1 BE SURE TO READ FOR YOUR SAFETY

Be sure to thoroughly read and understand the SAFETY PRECAUTIONS given in this section before using the equipment in order to operate the equipment correctly.
The precautionary measures described in this section are intended to prevent danger or damage to you or to others. The contents of this manual that could possibly be performed improperly are classified into two categories: ⚠**WARNING**, and ⚠**CAUTION**. The categories indicate the extent of possible damage or the urgency of the precaution. Note however, that what is included under ⚠**CAUTION** may at times lead to a more serious problem. In either case, the categories pertain to safety-related items, and as such, must be observed carefully.

- ⚠**WARNING** : Operating the equipment improperly by failing to observe this precaution may possibly lead to death or injury to humans.
- ⚠**CAUTION** : Operating the equipment improperly by failing to observe this precaution may possibly cause injury to humans and other physical damage.
- **NOTE** : Gives information that does not fall in the WARNING or CAUTION categories.
- Explanation of Symbols:

⚠ : The △ mark indicates a WARNING or CAUTION item. The symbol inside the mark describes the precaution in more detail ("electrical shock", in the case of the example on the left).
⃠ : The ⃠ mark indicates a prohibited action. The symbol inside the mark, or a notation in the vicinity of the mark describes the precaution in more detail ("disassembly prohibited", in the case of the example on the left).
: The ● mark indicates an action that must be taken, or instructs how to perform a task. The symbol inside the mark describes the precaution in more detail ("provide ground work", in the case of the example on the left).

PRECAUTIONS TO THE PRODUCT SPECIFICATIONS

⚠ CAUTION

- ●Do not operate the product under any conditions other than those for which it is specified. **Failure to observe the precaution can lead to electrical leakage, electrical shock, fire, water overflow or other problems.** (Frequency / Voltage)

PRECAUTIONS DURING TRANSPORT AND INSTALLATION

⚠ WARNING

- ●Use an appropriate lifting equipment to lift the unit. **Improper lifting may result in the fall of the product which could cause damage of the product or human injury.**
- ●Install the product properly in accordance with this instruction manual. **Improper installation may result in electrical leakage, electrical shock, fire, water leakage, or injury.**
- ●Electrical wiring should be performed in accordance with all applicable regulations in your country. **Imperfect wiring or neglecting the installation of proper equipment will cause electrical leakage or fire.**
- ●Provide a secure grounding dedicated for the product. Never fail to provide an earth leakage circuit breaker and a thermal overload relay in your starter or control panel (Both available on the market). **If an electrical leakage occurs by due to a product failure, it may cause electrical shock.**
- ●Use a power outlet that has a sufficient rating and has been exclusively provided for the pump. **If the power outlet is shared with other equipment, it can lead to an abnormal heat of the outlet and can cause fire as a result.** (Power Supply Capacity)

⚠ CAUTION

- ●Be sure to provide a ground wire securely. Do not connect the ground wire to a gas pipe, water pipe, lightening rod, or telephone ground wire. **Improper grounding could cause electrical shock.**
- ●Prevent a metallic object or dust from sticking to the power plug. **Adhesion of foreign object to the plug could cause electrical shock, short-circuit, or fire.**
- ●Do not scratch, fold, twist, make alterations, or bundle the cable, or use it as a lifting device. **The cable may be damaged, which may cause electrical leakage, short-circuit, electrical shock, or fire.**
- ●Do not use the cabtyre cable, power plug, or power outlet if it is damaged or if it is not closely fitted. Connect every conductor of the cabtyre cable securely to the terminals. **Failure to observe this can lead to electrical shock, short-circuit, or fire.**
- ●Install the discharge pipe securely so that no water leakage may occur. In addition, it is suggested to provide a stand-by pump in case of flooding. **Failure to do so may result in damage to nearby walls, floors, and other equipment.**
- ●When the product will be carried by hand, decide the number of persons considering the mass of the product. **When lifting up the product, do not attempt to do it by simply bowing from the waist. Use the knees, too, to protect your back.**
- ●This pump is neither dust-proof nor explosion-proof. Do not use it at a dusty place or at a place where toxic, corrosive or explosive gas is present. **Use in such places could cause fire or explosion.**
- ●Allow the pump to suck as few foreign object as possible. If there is a risk that the pump could be buried under the sediment, place it on a solid base like concrete block. **Failure to do so may result in breakdown of the pump and could cause electrical leakage or short circuit.**
- ●If a hose is used for the discharge line, take a measure to prevent the hose from shaking. **If the hose shakes, you may be wet or injured.**

PRECAUTIONS DURING TEST OPERATION AND OPERATION

⚠ WARNING

- ●Never try to operate the pump if somebody is present in the pump sump. **If an electrical leakage occurs, it can cause electrical shock.**
- ●Never start the pump while it is suspended, as **the unit may jerk and could lead to injury.**
- ●When changing power connection is needed to correct the direction of rotation, be sure to turn off the power supply (earth leakage circuit breaker, etc.), and perform the work after making sure that the impeller has stopped completely. **Failure to do so may lead to electrical shock, short-circuit, or injury.** (OFF / STOP)

⚠ CAUTION

- ●Do not operate the product under any voltage other than described on the nameplate with the voltage variation limit within ±10%. If it is operated with a generator, it is strongly suggested not to operate other equipment with the same generator. **Failure to observe this caution may cause malfunction and breakdown of the product, which may lead to electrical leakage or electrical shock.** (Rated Voltage)
- ●Do not touch the product with bare hands during or immediate after the operation, as the product may become very hot during operation. **Failure to observe this caution may lead to be burned.**
- ●Do not use the pump for oil, sea water, or strong acid. **Use for these liquid may result in the damage of the pump.** (For oil, sea water, or strong acid)
- ●Do not run the product dry or operate it with its gate valve closed, as **doing so will damage the product, which may lead to electrical leakage or electrical shock.**

⚠ CAUTION

- ●Do not use the product for hot or warm liquid over 40°C, as **doing so will damage the product, which may lead to electrical leakage or electrical shock.**
- ●When the product will not be used for an extended period, be sure to turn off the power supply (earth leakage circuit breaker, etc.). **Deterioration of the insulation may lead to electrical leakage, electrical shock, or fire.** (OFF)
- ●Do not allow foreign object (pin, wire, etc.) to enter the suction inlet of the pump. **Failure to observe this caution could cause it to malfunction or to operate abnormally, which may lead to electrical leakage or electrical shock.**

PRECAUTIONS DURING MAINTENANCE AND INSPECTION

⚠ WARNING

- ●Absolutely turn off the power supply or disconnect the plug before starting maintenance or inspection. Do not work with wet hands. **Failure to observe these cautions may lead to electrical shock or injury.** (OFF / STOP)
- ●Do not disassemble or repair any parts other than those designated in the operation manual. If repairs are necessary in any other than the designated parts, consult with the dealer where it was purchased or Tsurumi representative. **Improper repairs can result in electrical leakage, electrical shock, fire, or water leakage.**
- ●In case any abnormality (excessive vibration, unusual noise or odor) is found in the operation, turn the power off immediately and consult with the dealer where it was purchased or Tsurumi representative. **Continuing to operate the product under abnormal conditions may result in electrical shock, fire, or water leakage.** (OFF)

⚠ CAUTION

- ●After reassembly, always perform a test operation before resuming use of the product. **Improper assembly can result in electrical leakage, electrical shock, fire, or water leakage.** (Test operation)

PRECAUTION TO POWER OUTAGE

⚠ WARNING

- ●In case of power outage, turn off the power supply. **The product will resume operation when the power is restored, which presents serious danger to people in the vicinity.** (power outage / OFF)

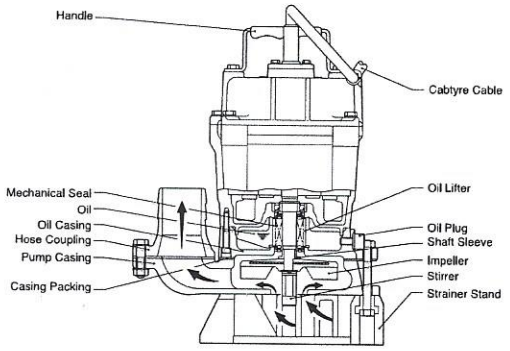
OTHER PRECAUTION

⚠ CAUTION

- ●Never use the product for potable water. **It may present a danger to human health.** (Potable Water)

2 PART NAMES

■ **Example**



3 PRIOR TO OPERATION

After unpacking, verify the contents.

Product Inspection

Inspect the product for damage during shipment, and make sure all bolts and nuts are tightened properly.

Specification Check

Check the nameplate of the unit to verify that it is the product that you have ordered. Pay particular attention to its voltage and frequency specifications.

Note: *If you discover any damage or discrepancy in the product, please contact the dealer where this equipment was purchased or the Tsurumi sales office in your area.*

Accessory Check

Verify that all accessory items are included in the package.

- Hose Band ..... 1 pc
- Operation Manual 1

Note: *If you discover any damage or discrepancy in the product, please contact the dealer where this equipment was purchased or the Tsurumi sales office in your area.*

Product Specifications

⚠CAUTION **Do not operate this product under any conditions other than those that have been specified.**

■Major Standard Specifications

Applicable Liquids	Consistency and Temperature	Water, Rain Water, Ground Water, Sand carring Water, Mud carrying Water ; 0 ~ 40°C
Pump	Impeller	Vortex-Type
	Shaft Seal	Double Mechanical Seal
	Bearing	Shielded Ball Bearing
Motor	Specifications	Dry Submersible Induction Motor, 2-Pole
	Insulation	Class E
	Protection System (built-in)	Miniature protector (0.4kW) Circle thermal protector (0.75kW)
	Lubricant	Turbine oil VG32 (non-additive)
Connection		Hose Coupling

■Standard specifications (50/60Hz)

Model	Bore (mm)	Phase	Starting Method	Output (kW)	Max.Head (m) (ft.)	Max.capacity (m³/min) (GPM)	WHT (kg)
HS2.4S	50	1	Capacitor-Run	0.4	12 39	0.200 53	11.3
HSE2.4S	50	1	Capacitor-Run	0.4	12 39	0.200 53	11.9
HSZ2.4S	50	1	Capacitor-Run	0.4	12 39	0.200 53	11.3
HS2.75S	50	1	Capacitor-Run	0.75	18/19 59/62	0.23/0.21 61/55	19.0
HS3.75S	80	1	Capacitor-Run	0.75	18/19 59/62	0.30/0.23 79/61	19.6
HSZ2.75S	50	1	Capacitor-Run	0.75	18/19 59/62	0.23/0.21 61/55	19.0
HSZ3.75S	80	1	Capacitor-Run	0.75	18/19 59/62	0.30/0.23 79/61	19.6

Note: *The weight (mass) given above is the operating weight of the pump itself, not including the cabtyre cable.*

4 INSTALLATION

⚠CAUTION
- **The supply voltage should be within ± 10% of the rated voltage.**
- **The water temperature for operating the pump should be between 0 ~ 40°C. Failure to observe the precautions given above could cause the pump to malfunction, which may lead to current leakage or electrical shock.**

Note: *To use the pump for a special solution, contact the dealer where it was purchased, or the Tsurumi sales office in your area.*

■Critical Use Pressure

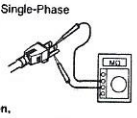
⚠CAUTION **Do not operate the pump in an area that is exposed to a water pressure that exceeds the values given below.**

Critical Use Pressure	0.2MPa (2kgf/cm²) – discharge pressure during use

Preparation for Installation

■Single-phase power supply:

Use a megger to measure the resistance between the tip of the cabtyre cable plug and the ground terminal to verify the insulation resistance of the motor. Measure twice the resistance between each of the two tips of the plug and ground. (This diagram shows a 3-pin plug type.)



⚠CAUTION **Beware that the power plug varies by country or region.**

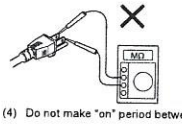
Insulation resistance reference value = 20MΩ minimum

Note: *The insulation resistance reference value of 20MΩ minimum is based on a new or repaired pump. For reference values of a pump that has already been put into operation, refer to "7. Maintenance and Inspection" of this manual.*

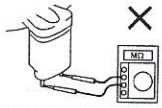
■How to use level relay unit (HSE2.4S,HSZ2.4S)

⚠CAUTION
- **Do not measure the insulation resistance with insulation resistance tester for following parts. It causes a trouble.**
- **Do not lift or hang the level relay unit.It will damage and cause a leakage, an electric shock, and a fire.**
- **In the case of the float type, do not lift it by the float cable, as it will damage the cable, and lead to a leakage, electrical shock, and fire.**

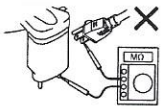
(1) between the plug



(2) between the electrode of a level relay unit



(3) between the electrode of a level relay unit and a plug

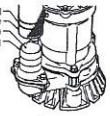


(4) Do not make "on" period between the other level relay unit.

Precautions During Installation

⚠WARNING **When installing the pump, be mindful of the pump's center of gravity and weight. If the pump is not suspended properly, the pump may fall and break, which may lead to injury.**

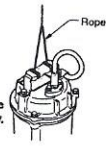
⚠CAUTION **When installing or moving the pump, never suspend the pump by the cabtyre cable. Doing so will damage the cable, which may cause a current leakage, electrical shock, or fire.**



(1) When a hose is used, attach the hose to the hose coupling as far as it will go, then fasten it securely with a hose band.

(2) Handle the pump carefully without applying shock to it, such as by dropping it. To suspend the pump, do so manually or by attaching a rope or chain to its handles.

⚠CAUTION **The rope for suspending the pump during its installation must be of a thickness that accommodates the weight of the pump. When using a chain, make sure that the chain does not become twisted. Failure to observe these precautions could cause the rope or chain to break and the pump to fall and break, which could lead to personal injury.**



6 OPERATION

Prior to Operation

(1) Once again, check the nameplate of the pump to verify that its voltage and frequency are correct.

⚠CAUTION **Improper voltage and frequency of the power supply will prevent the pump from attaining its full potential, and may also damage the pump.**

Note: *Verify the specs on the pump's nameplate.*

(2) Check the wiring, power supply voltage, the capacity of the ground leakage circuit breaker, and the insulation resistance of the motor.

■Insulation resistance reference value = 20MΩ minimum

Note: *The insulation resistance reference value of 20MΩ minimum is based on a new or repaired pump. For reference values of a pump that has already been put into operation, refer to "Maintenance and Inspection".*

(3) Adjust the setting of the thermal relay (i.e. 3E relay) to the pump's rated current.

Note: *Verify the rated current on the pump's nameplate.*

(4) When using a generator, as much as possible avoid operating the pump in conjunction with other types of equipment.

6-1 NON-AUTOMATIC OPERATION

Trial Operation

⚠WARNING **Never start the pump while it is suspended, as the pump may jerk and cause a serious accident involving injury.**

(1) Operate the pump for a short time (3-10 minutes) and verify its operating conditions.

⚠CAUTION **If the pump generates a considerable amount of vibration, noise, or smell, disconnect the power supply immediately and contact the dealer where the pump purchased, or the Tsurumi sales office in your area. If the pump is continued to be used in the abnormal state, it may cause current leakage, electrical shock, or fire.**

(2) Continue operation if no abnormal conditions are found during the trial operation.

Operation

⚠WARNING **The pump unit may be extremely hot during operation. To prevent burns, do not touch the pump unit with bare hands during or after the operation.**

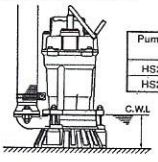
Pay attention to the water level during the pump operation. The pump may become damaged if it is allowed to operate dry.

Due to an overload operation or a pump malfunction, if the motor protector trips to stop the pump, make sure to eliminate the cause of the problem before restarting.

Note: *A large amount of amperage flows when a submergible pump is started, causing the temperature of its windings to rise rapidly. Beware that a frequent stop-and-go operation of the pump will accelerate the deterioration of the insulation of the motor windings and thus affect the use life of the motor.*

Operating Water Level

⚠CAUTION **Do not operate the pump below the C.W.L. (Continuous Running Water Level) indicated below. Failure to observe this condition may result in damage to the pump, electrical leakage or electrical shock.**



Pump Model	C.W.L. (mm)
HS2.4S	90
HS2/3.75S	90

9 TROUBLESHOOTING

⚠WARNING **To prevent serious accidents, disconnect the power supply before inspecting the pump.**

Read this Operation Manual carefully before requesting repair. After re-inspecting the pump, if it does not operate normally, contact the dealer where this equipment was purchased, or the Tsurumi sales office in your area.

Problem	Possible cause	Countermeasure
Pump fails to start; or, starts but stops immediately.	①No proper power is supplied (i.e. power outage). ②Plug is not inserted. ③Open circuit in cabtyre cable or poor connection. ④Malfunction in float. ⑤Electrode is insulated by debris. ⑥Malfunction in level relay unit.	① Contact the electric power company or an electrical repair shop. ② Connect the plug. ③ Check whether there is an open circuit in the cabtyre cable or wiring. ④ Remove obstacles and check the operation of the float. ⑤ Use sandpapar to remove the debris. ⑥ Repair or replace the level relay unit.
Pump starts but stops immediately, causing the motor protector to trip.	①Foreign matter is wedged in the impeller, causing the motor protector to trip. ②The movement of the stop float is obstructed, causing the start float alone to perform the start and stop operations. ③The voltage is too low. ④A 50Hz unit is used at 60Hz. ⑤The pump has been operated for a long time with its strainer stand clogged. ⑥Malfunction of motor (seizure or water leakage). ⑦The pump is drawing in too much mud.	① Inspect the pump and remove the debris. ② Remove obstacles and check the operation of the stop float. ③ Provide the rated voltage or use an extension cable that meets the specifications. ④ Check the nameplate and replace the pump or the impeller. ⑤ Remove the debris from the strainer stand. ⑥ Repair or replace. ⑦ Place a concrete block under the pump to prevent the pump from drawing in excess mud.
The pumping volume is low.	①The impeller is worn. ②The hose is clogged or kinked at its midspan. ③The strainer stand is clogged or is buried. ④The motor rotates in reverse. ⑤A 60Hz pump is used at 50Hz.	① Replace the impeller. ② Minimize the bends of the hose, and if the pump is used in a dusty area, place it inside a mesh basket during operation. ③ Remove the debris from the strainer stand.Place a concrete block under the pump to prevent the pump from drawing in excess mud. ④ Change the power connection. ⑤ Check the nameplate and replace the pump or the impeller.
Pump generates vibration or noise.	①Motor bearings are damaged.	① Replace the bearings.
The pump does not stop automatically.	①The movement of the floats is obstructed. The switch in a float is faulty. ②The water level of the (stop) float is set lower than the pump's minimum possible operating water level. ③Malfunction in level relay unit ④Electrode is shorted by debris. ⑤Influence by electrical device in the vicinity of the pump.	① Remove the blockage. Or, replace the part. ② Set the water level of the (stop) float higher than the pump's minimum possible operating water level. ③ Repair or replace the level relay unit. ④ Use sandpaper to remove the debris. ⑤ Check whether there are any wires that are tangled around the electrode. Check whether there are any electrical devices that could generate electro-magnetic interference, and relocate the unit as necessary.

The following information is required when ordering repairs or making other inquiries.

Product model	
Manufacturing number	
Purchase date	
Remarks	

Disposal of Product

Properly dispose of the product by disassembling it, presorting the contents, and sending them to the waste material treatment site.