

**TOMY MAGNETIC DRIVEN PUMP**  
**TEN SERIES**  
**INSTRUCTION MANUAL**



- Be sure to read the following instructions carefully before use.

**Important Notes**

- Make sure that this manual will be put in good hands of the operator.
- Carefully read the instructions in this manual to handle your equipment correctly and keep it at full capacity.
- Keep this manual in a safe, accessible place for future reference.

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### Revision History

20 JUN. 2011	SF-QMS701-01E	New Edition
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## 1. SAFETY PRECAUTIONS

In this instruction manual, the safety precautions in handling the pump are classified into the following. Be sure to pay attention to and observe these instructions.

 **WARNING** Serious injuries or death may result in case the precautions are not observed.

 **CAUTION** Damages of machinery and devices or serious performance failure may result in case the precautions are not observed.

**ATTENTION** Instructions to follow in order to keep the performance of machinery and service life.

**REFERENCE** Additional information.

### **HANDLING PRECAUTIONS**

#### **WARNING**

- **Set up the pump without reach of children and other non-personnel.**
- **Do not get onto a pump or do not use it as a stool, otherwise, the pump could fall and cause injury.**
- **Do not handle the pump with wet hands. An electric shock may result.**
- **If any anomaly has occurred, turn off the power immediately.**

If any liquid leak, abnormal noise, or abnormal vibration has occurred, disconnect the power source immediately and check for the cause.

- **Use caution for liquid which may be frozen.**

If any liquid that may be frozen (including liquid with crystal deposition) is handled, the pump may be damaged with frozen liquid immediately after the pump is started. Take appropriate actions against the potential risk of frozen liquid. Before a long-term shut-down, be sure to drain the pump and piping (hoses) completely.

- **Use caution for installation, operation and repairs.**

Installation, operation and any repair for the magnetic driven pump as well as its peripheral and electrical units must be carried out by a qualified person who completed the appropriate by administrator.

Before disassembling the pump for repair, be sure to disconnect the power source and make certain that no voltage is applied to the pump. Ensure that the pump never be turned on during the repair. For this purpose, provide an intermediate switch separately. Post a sign “MEN AT WORK” in a conspicuous place.



If any dangerous chemical solution is used, fully understand its characteristics before starting to disassemble the pump. Wear protective clothing against chemical solutions as well as protective goggles, gloves and mask, if necessary. Reduce the residual pressure in the pump, discharge the liquid and then use water to purge the inside the pump.



- **Dangerous substances**

For whatever purpose including a repair, never return to us any unit or part that was used with a radioactive solution.

- **Disposal of unnecessary units and parts**

Dispose of magnetic driven pumps and the accessories according to the laws and regulations in relation to Industrial Wasters.

 **CAUTION**

- If any accessory or optional part other than our genuine or authorized one is used, we take no guarantee for any performance of the pump and/or any accident that may result from such use.
- Our pump use the transfer fluid as its internal cooling system, therefore, dry-running the pump can cause the temperature to rise to a dangerous level that may seriously damage the pump. If dry-running occurs, switch off the pump immediately; let it cool for at least an hour before priming the pump to prepare it for normal operation.

 Do not subject the pump to rapid cooling, which may damage the internal parts.

- If anything unusual (smoke, burning smell, etc.) happens, stop the operation and contact your local dealer or us. A fire or electric shock may result.

**ATTENTION**

- Check that the conditions of the liquid being actually used are the same as those specified in your order, including its name, concentration, temperature, specific gravity, and viscosity.
- In order to prevent cavitations, the loss on the suction-side of the pump must be minimized. For this purpose, install the pump near the liquid being sucked and shorten the suction pipe (hose). Minimize bends in the pipes, the number of joints, etc. which may restrict the liquid flow. If a long pipe is unavoidably necessary, use a thicker suction pipe in order to reduce the piping loss.

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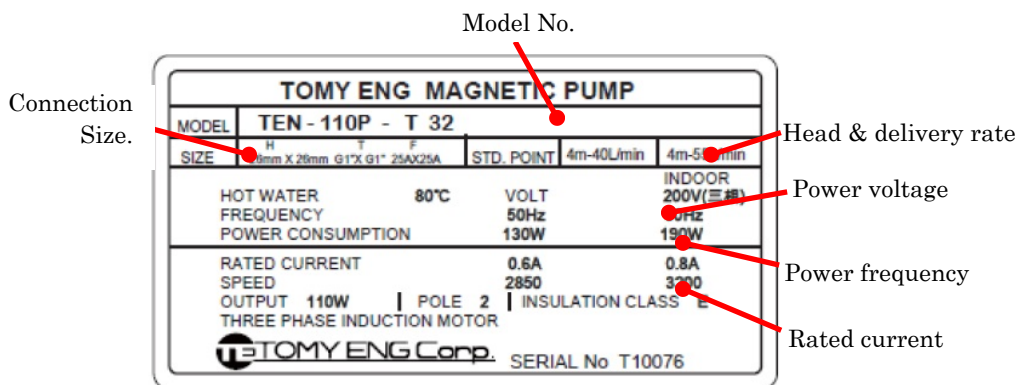
## 2. OPEN BOX AND CHECK

After unpacking the carton, check that the contents meet your order including the machine plate and accessories which you specified. Also check for any damaged part, loosen screw, or any other anomaly which might have occurred during the transportation. If any defective is found, contact your dealer immediately.

This pump is only indoor use. Can not use at outdoor.

### **⚠ CAUTION**

- When performing the trial operation of the magnetic driven pump, be sure to use clear water to check that no leak occurs from the pipe (hose) joints, the pump, and then use the actual liquid.



## 3. MODEL CODE

TEN-150 P □ - H-1 1 5  
 ① ② ③ ④ ⑤ ⑥ ⑦

① : Series No. 5~250

② : Materials mark

P ; GFR-P.P.

V ; CFR-PVDF

③ : Specification mark

Non mark ; Standard spec.

H ; High head & small flow rate

L ; Low head & big flow rate

④ : Connection method

H ; Hose

T ; Thread

F ; Flange(for model 150 & 250)

⑤ : Phase No.

1 ; Single phase

3 ; Triple phase

⑥ : Power voltag

1 ; AC100V

2 ; AC200V

3 ; Other voltage

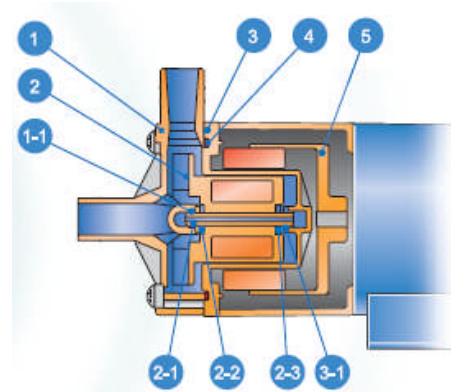
⑦ : Frequency

0 ; Both 50Hz & 60Hz

5 ; Only 50Hz

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4. NAME AND MATERIAL OF SECTION



No.	Parts name	TEN-P type material	TEN-V type material
1	Front casing	GFR-PP	GFR-PVDF
1-1	Front bearing	PTFE	PTFE
2	Impeller(Magnet-can)	GFR-PP	GFR-PVDF
2-1	Spindle	Alumina ceramic	Alumina ceramic
2-2	Front thrust	Alumina ceramic	Alumina ceramic
2-3	Rear thrust	Alumina ceramic	Alumina ceramic
3	Rear casing	GFR-PP	GFR-PVDF
3-1	Rear bearing	PTFE	PTFE
4	O-ring	FKM or EPDM	FKM or EPDM
5	Drive magnet	—	—
6	Motor	—	—

## **BEFORE USE**

### **[No Dry - Running]**

Our pump use the transfer fluid as its internal cooling system, therefore, dry-running the pump can cause the temperature to rise to a dangerous level that may seriously damage the pump. If dry-running occurs, switch off the pump immediately; let it cool for at least an hour before priming the pump to prepare it for normal operation.

Do not subject the pump to rapid cooling, which may damage the internal parts.

At the rotation check, put the water (about 200mL) into the pump casing.

### **[Operating Temperature]**

The optimal temperature range for pumping pure water is 0-80°C (But not Freeze) . Please consult the distributor for the temperature range suitable for your chemicals. Operating temperature may change the fluid's viscosity, vapor pressure, and corrosiveness. Please ensure that your pump is operating within the proper temperature range.

We recommend the operating environmental temperature to be between 0-40°C and humidity to be below 90%RH.

### **[Concentrations, Viscosity and Specific Gravity]**

A change in a fluid's concentration will usually affect its viscosity and specific gravity. Other physical properties like corrosiveness, may also change with the fluid's concentration, therefore, the selected pump material should be able to withstand the corrosive properties of the fluid.

When the fluid's viscosity and/or Specific Gravity differ from that of water, the shaft power, flow rate and pump head may change also.

### **[Sludge]**

These pumps can not pumping fluids that carry small particles or sludge.

## 5. INSTALLATION, PIPING & WIRING

### [Installation Location]

- (1) The pump should be close to the ground and located near the inlet tank.
- (2) There should be sufficient space reserved around the pump to facilitate future maintenance and repairs.
- (3) The pump and its wiring should be placed in a relatively dry environment, protected from possible flooding.

### [Installation]

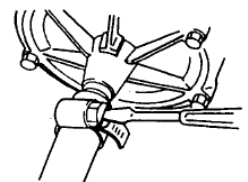
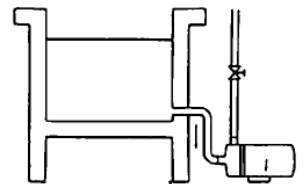
- (1) Please almost level the basic surface to install a pump.
- (2) Please fix a pump surely so that a pump does not vibrate while driving.

### [The Piping (Hose) System]

- (1) The pipes should have adequate structural support and shouldn't use the pump as its primary support.
- (2) Please attach an expansion joint between a pump and the plumbing beforehand.
- (3) Use short and straight piping as possible.

### [Inlet Piping]

- (1) This pump should be in the place which is lower than the surface level of suction, because can not be self-suction.
- (2) Inlet piping and connectors should be installed properly to prevent sucking in air.
- (3) Tighten the connection end with tight ring in case of leaking liquid, if the suction nozzle side is connected, especially do not suck air in, otherwise, it will be caused reducing performance of magnetic pump-up water and appearing racing.
- (4) Make the suction pipe as short as possible. Minimize bends in the pipes, the number of joints, etc. which may restrict the liquid flow. If a long pipe is unavoidably necessary, use a thicker suction pipe, in order to reduce the piping loss.



### [Outlet Piping]

- (1) The weight of the outlet piping should be properly supported to prevent putting excessive stress on the pump.
- (2) A control valve can be used for the flow control and keep off the overload. Do not run the pump with the control valve closed for an extended period of time.
- (3) When starting the pump, always start with a closed valve, and then slowly open the valve to obtain the desired operating pressure and flow. Always open or close the valve gradually.
- (4) Check valve is necessary to prevent back flow (water hammer) from damaging the pump during unexpected power outages at long distance outlet piping.
- (5) Pressure gauge used should be able to read beyond the operating pressure.
- (6) The exhaust valve should be installed if the horizontal section of the outlet piping is very long and for preventing frozen.



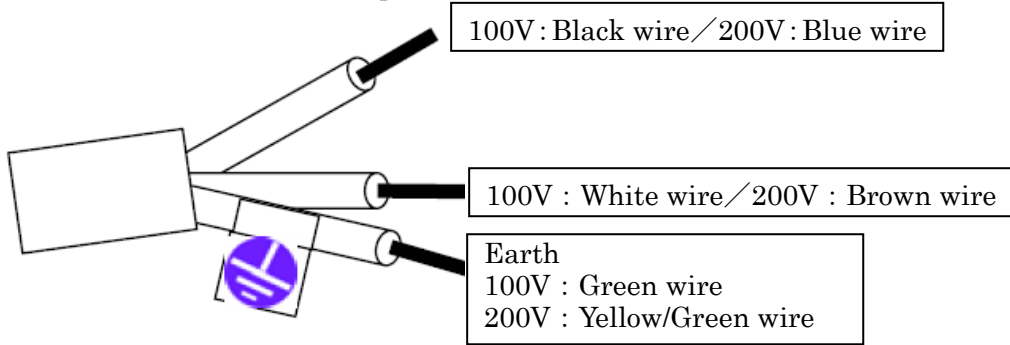
**[Wiring]**

The wiring system should be done properly, using premium equipment and complying with rules and standards set by the electrical company. The following recommendations should also be implemented:

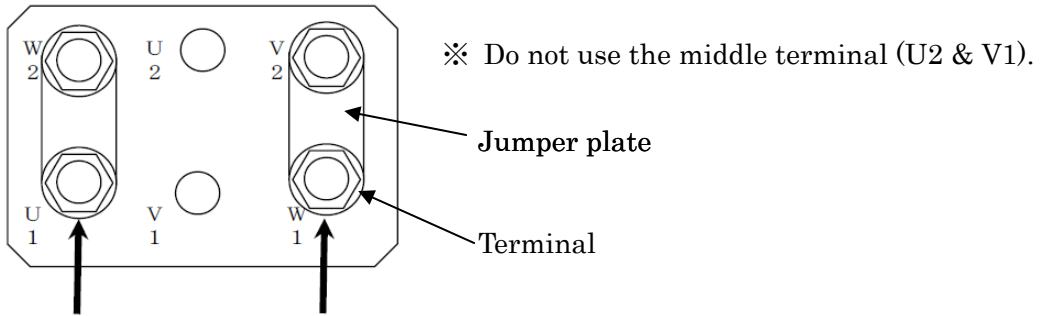
- (1) Please use magnetic relays that have the same power ratings as the pump's motor.
- (2) Magnetic relays and on-off switches should be installed properly and away from the pump.

[Wiring method for the single phase 100V or 200V]

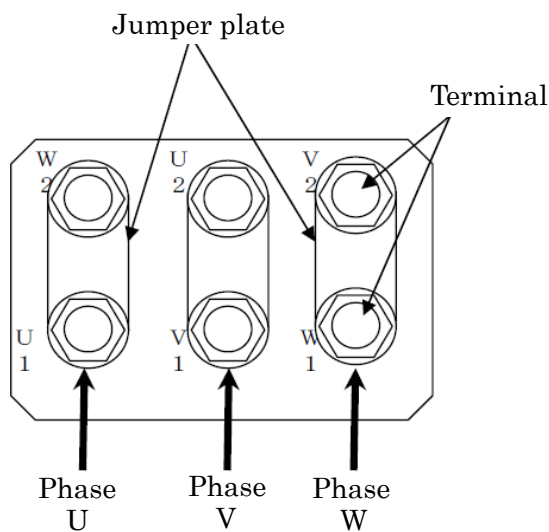
- (1) Model TEN-5P - 70P/70V with power code



- (2) Model TEN-110P/110V up with the terminal box



[Wiring method for the triple phase 200V]



## 6. OPERATING PROCEDURE AND TERMS

### [Notes Prior to Starting the Pump]

- (1) Check the motor's power rating, including frequency, voltage and wiring.
- (2) Recheck to make sure all the parts (hose, piping, flange, pump casing, base plate, etc.) are securely fastened.
- (3) Fill the pump with liquid (priming) to remove any air within the pump and suction piping.
- (4) Check to ensure the inlet valve is open.
- (5) Using a screwdriver, rotate the motor's cooling fan to ensure it is not too tight or stuck.  
(With cooling fan model only)

### [Starting Up the Pump]

- (1) Check the direction of rotation of the motor by rapidly switching on and off the power.
- (2) Close the outlet valve and start up the pump.
- (3) Slowly open the outlet valve when the motor has reached a stable speed. Adjust the outlet valve to obtain the desired operating pressure or flow rate.

### [Operating the Pump]

- (1) Shut down the pump immediately in the case of cavitations or dry-running.
- (2) If decoupling should happen, shut down the pump to prevent reducing the magnet's strength.
- (3) During power outages, shut off the pump's power supply and close the outlet valve.
- (4) When switching on the pump with the outlet valve closed, the outlet pressure should increase. If the pressure fails to rise, or if the pressure is too low, shut down the pump and check the piping and wiring.

### [Shutting Down the Pump]

- (1) Close the outlet valve slowly to prevent damage to the pump due to reverse fluid flow (water hammer).
- (2) Shut off the pump. It should stop gradually. If not, check the interior of the pump for problems.
- (3) The pump should be checked periodically. If the pump is used in a cold operating environment (relative to the fluid's freezing point), the fluid may crystallize even if the pump is shut down for a very short amount of time. To prevent crystallization, a drain plug should be included in the piping system or a heating system could be used to maintain the temperature during shutdown.

## 7. TROUBLESHOOTING

Problem	Possible cause	Correction
Pump does not operate	Supply power in-compatible.	Set the right voltage.
	Circuit breaker off or protective device activated.	Check and readjust the load, reset.
	Excessive viscosity or density.	Change pump to the proper type.
	The impellor injured.	Change the impellor.
	Motor damaged.	Contact to the distributor.
Pump is operating but fluid is not fed.	Air and gas pockets in pipe and pump casing.	Let out all air and gas.
	Air sucked at the suction-side piping.	Inspect and retighten up the leaking parts.
	Fluid amount too short.	Add the liquid and out all air from pipe and pump casing.
	Impellor and other parts of liquid-contact wrongly set up.	Disassemble and reassemble according to the exploded view.
	Excessive viscosity or density.	Change pump to the proper type.
	The impellor injured.	Change the impellor.
	The foreign objects stuck to the impellor.	Take clear or change the impellor.
	Looseness of the pump casing bolts.	Fastened the casing bolts.
Current value over.	Bad wiring.	Re-wiring.
	Dry-running.	Off the power rapidly, wait min. one hour and check the contact liquid parts.
	Excessive viscosity or density.	Change pump to the proper type.
	The impellor injured.	Change the impellor.
	The foreign objects stuck to the impellor.	Take clear or change the impellor.
Vibration or noise too high.	Air and gas pockets in pipe and pump casing.	Let out all air and gas.
	Dry-running.	Off the power rapidly, wait min. one hour and check the contact liquid parts..
	The impellor injured.	Change the impellor.
	The foreign objects stuck to the impellor.	Take clear or change the impellor.
Liquid leaks of pump.	Excessive pressure at discharge side.	Stop the pump. Check the discharge line to pinpoint the cause (foreign matters, open valve, etc.). Contact as required.
	Hose joint, connector or flange joint over-tightened to deform and damage O-ring, etc.	Stop the pump, remove the leaking parts, and check the deformation or damage. Replace O-ring, etc. if required, with one.
	Looseness of the pump casing bolts.	Fastened the casing bolts.

## MAINTENANCE

### [Daily Inspection]

<b>Appearance</b>	<ol style="list-style-type: none"> <li>1. Check for oxidation or corrosion of the front casing, bracket, and base plate.</li> <li>2. Check for leakage of the pump and the piping system.</li> </ol>
<b>Operation</b>	<ol style="list-style-type: none"> <li>1. Check for irregular sounds and vibrations.</li> <li>2. Check the in-tank fluid levels and inlet/outlet pressures.</li> <li>3. Check the power supply and motor loading.</li> <li>4. Check and test-run backup pumps regularly to ensure they can function properly when needed.</li> </ol>

### [Periodic Maintenance]

<b>Part Name</b>	<b>Inspection Item</b>	<b>Solution</b>
<b>Front And Rear Casing</b>	<ol style="list-style-type: none"> <li>1. Cracks</li> <li>2. Scratch marks (except when pumping particle laden fluids)</li> <li>3. Crystallization or sludge</li> <li>4. Shaft support loose or deformed</li> <li>5. Looseness of the pump casing bolts.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Contact the distributor</li> <li>3. Clean</li> <li>4. Contact distributor</li> <li>5. Fastened the casing bolts.</li> </ol>
<b>Front Casing O-ring</b>	<ol style="list-style-type: none"> <li>1. Deformed, corroded or swollen</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> </ol>
<b>Impeller and Magnet Assembly</b>	<ol style="list-style-type: none"> <li>1. Scratch marks or cracks</li> <li>2. Cracked bearing or crystallization</li> <li>3. Bearing displays signs of some wear and tear</li> <li>4. Crystallization and other sludge</li> <li>5. Foreign objects stuck in impeller</li> <li>6. Impeller deformed</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact distributor</li> <li>2. Contact distributor</li> <li>3. Replace if worn excessively</li> <li>4. Clean</li> <li>5. Remove the objects</li> <li>6. Contact distributor</li> </ol>
<b>Spindle and Rear Thrust</b>	<ol style="list-style-type: none"> <li>1. Scratch marks</li> <li>2. Cracks</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact distributor</li> <li>2. Replace</li> </ol>

## 8. WARRANTY & REPAIR

When a problem arises, please read this instruction manual and try to troubleshoot the problem. If the problem cannot be found, or if replacement parts are needed, please call the distributor, and give them the following information:

- (1) The pump model and manufacturing serial number indicated on the nameplate.
- (2) The operating condition.
- (3) The situation under which the pump fails.

Please refer to the warranty card for details of the warranty terms and conditions.

Instruction manual No.	SF-QMS701-01E
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