



# WALRUS

## *TQ Series*

### ***Electronic Control Pump Instruction Manual***



ISO 9001 Certified

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**Walrus America Inc**

# EC Declaration of Conformity

Manufacturer:

Walrus Pump Co., Ltd.

Address:

No. 83 -14, Dapiantou, Sanjhih Township, Taipei County 252, Taiwan

Declare that the machinery described:

Name : Water Pump

Model : TQ Series

Conform to the following directive:

2006/42/EC—Machinery directive

2006/95/EC—Low voltage directive

2004/108/EC—EMC (Electromagnetic compatibility) directive

Refer to the following standards:

EN ISO 12100:2010

EN ISO 13857:2008

EN 809:1998+A1:2009

EN 60335-1:2002

EN 60335-2-41:2003

EN 61000-6-2:2005

EN 61000-6-3:2007

R&D department manager: Kao Tien-chuan

Manager:

*Kao Tien chuan*

# TQ Series Instruction Manual

Please read all instructions carefully before installing your new systems, as failures caused by incorrect installation or operation are not covered by the warranty.

## I. Product

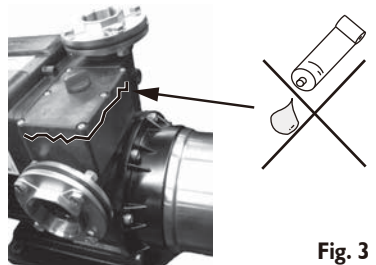
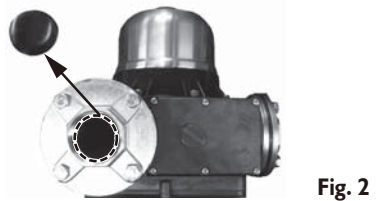
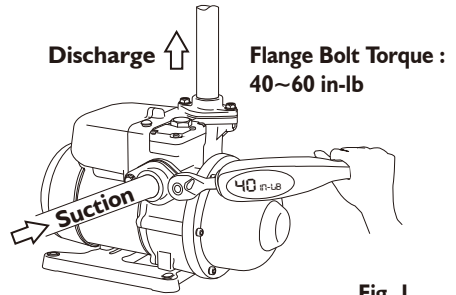
The TQ series are designed for the pumping of non-aggressive water, or water not containing solid particles.

## II. Operating conditions:

1. Ambient temp. : Max. +104°F (40°C)
2. Liquid temp. : +39°F(4°C) ~ +104°F(40°C)Max.
3. System pressure: Max. 120 PSI
4. Relative humidity: Max. 85%(RH)

## III. Installation

1. The pump foundation should be rigid enough to absorb any vibration from the motor, and the pump should be securely bolted to the foundation.
2. It is recommended that the plumber/installer provides an adequate draining system to avoid damage in case of leakage, particularly when installed indoors. When it is installed outside, it should be covered by a weather-proof housing, well ventilated to allow motor heat to escape.
3. Connect the suction pipe to the side and discharge pipe on the top.( See Fig 1 )
4. When it is installed with water heater, a check valve should be installed between pump (discharge) pipeline and water heater (suction) to avoid high-pressure steam backflow.
5. It is required to shut off the pump when the liquid source is unavailable; although it has the dry run cut off function.
6. For TQ1500/2200/3700, please cut out the center of the rubber gasket inside the inlet and outlet flanges as it will block the water flow.( See Fig 2 )
7. Regular maintenance requires to open the prime cover in order to access the check valve. DO NOT apply any bonded material (such as silicon, glue etc) to seal the chamber cover ( See Fig 3).



## IV. Piping

1. The suction line should be installed as short and straight as possible, with a minimum of bends. The internal diameter of the suction pipe must be equal to, or greater than the ports of the pump.
2. The connection between the suction line and pump must be airtight, and the suction pipe must be positioned so it has an upward slope to the pump (thus avoiding the formation of air pockets).
3. If it is likely the water supply may contain solid particles, such as leaves and sand, a filter should be installed on the suction line.
4. If hose is used as the suction pipe, it must be non-collapsible.
5. To minimize pressure drop, the discharge pipe should be at least the same size as the discharge port of the pump.
6. For long suction pipes or high suction lifts over 13 ft, the suction pipe should be of greater diameter than the suction port.
7. Ensure all connections are completely sealed using thread tape only.

## V. Connections to Water Source

### I. Flooded Suction- from Well System

With gravity feed to the pump, there are no special adjustments to be made. See Fig. 4 below for recommended layout. Simply make necessary plumbing connections and apply power. The pump is ready to use.

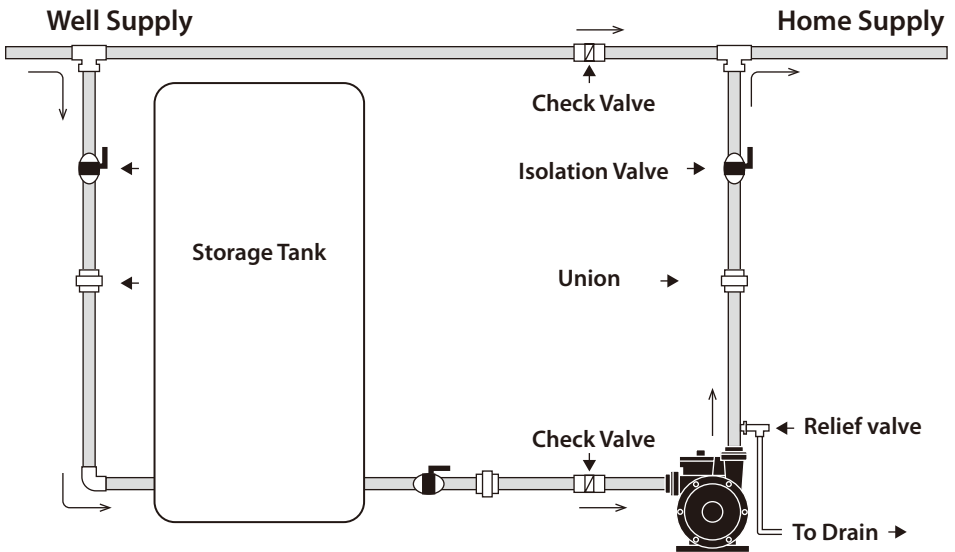


Fig. 4

## 2. Flooded Suction -from city water supply

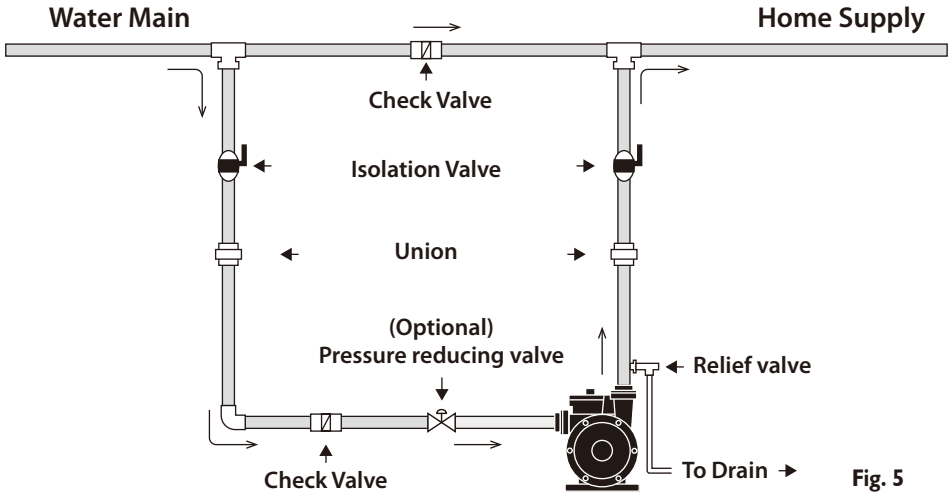


Fig. 5

Directly applied city pressure can exceed pump operating pressure and damage the pump. The max inlet pressure should not exceed 50 psi, except TQ3700 which is limited to 45 PSI. Any greater incoming pressure is required to install a pressure reducing valve on the suction side of the pump. In some areas where local codes restrict maximum home pressure, a pressure reducing valve is also required on suction to lower the inlet pressure. The chart below shows the applicable settings for the pressure reducing valve :

Local code limits for home pressure	Pressure reducing valve setting (psi)					
	TQ200	TQ400	TQ800	TQ1500	TQ2200	TQ3700
No limit	50	50	50	50	50	45
90 psi	50	50	25	30	30	20
80 psi	45	40	15	20	20	10

## 3. Suction Lift- below ground water sources

This connection does not require any adjustment. Whenever the installation position of the pump is higher than 3ft above the lowest water level, a foot valve must be installed on the end of suction pipe.

### Warning

The pump is not designed for continuous operation under low discharge flows such as slow closing float valves, slow running taps. Under this application, please install an extra tank ( typically 2-3 gallon ) to avoid “cycling”. (Fig 6) Please set the extra pressure tank prussure the same as activation pressure. Leaking discharge line and leaking taps will damage the unit through causing the pump to repeatedly start and stop.

**Note:** Optional external water pressure tank can be used to decrease the on/off cycle rate of the pump system, which can extend the life of the pump.

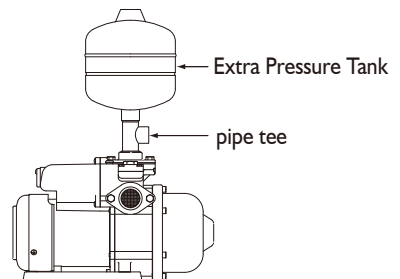


Fig. 6

## VI. Electrical connection



This mark located outside the connection box is a warning for an electrical hazard.

1. Ensure the mains voltage is the same as the value shown on the motor plate and that the pump is safely connected to ground/earth.
2. The single phase models are supplied with plug and lead and can be connected directly to the mains supply. The 3 phase models should hook up with a circuit breaker.

## VII. Wiring diagram

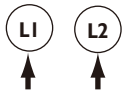
### WARNING:

**Risk of electric shock - This pump has not been investigated for use in swimming pool or marine areas.**

**To reduce the risk of electric shock, connect only to a properly grounded, grounding-type receptacle.**

Before operation, please ensure the voltage is correct and the circuit breaker and grounding connectors are all connected in accordance with local regulations.

#### Single-phase power supply

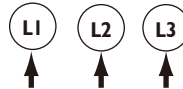


Input power



Grounding

#### 3-phase power supply (check if rotation is correct)



Input power



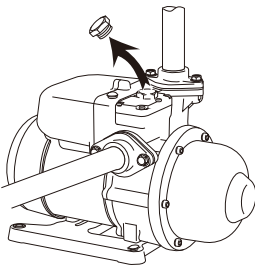
Grounding

Fig. 7

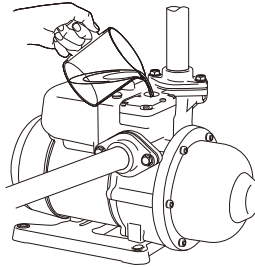
## VIII. Starting

1. Before starting, the pump must be primed. For installation with no inlet pressure, please follow the procedure as shown in Fig 8.

#### a. Remove the filling plug



#### b. Fill water in chamber



#### c. Replace the filling plug

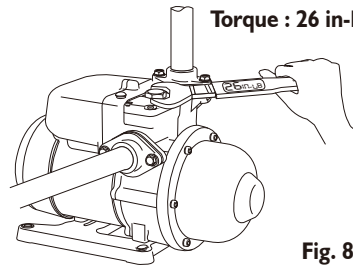


Fig. 8

2. For installation with inlet pressure, remove the priming plug and allow the water to flow into the priming chamber until all air is expelled.
3. The priming procedure should be repeated until all air is expelled and the pump delivers a full stream of water without air bubbles.
4. The pump must always be checked for prime if not used for a prolonged period. It is imperative to fill the pump with liquid before operation as dry running causes irreparable damage to the mechanical seal.
5. When 3-phase motor is supplied, please ensure if the rotation is correct. You can switch any of the 2 wires to change the rotation.

## IX. Precautions

1. The pump should be shut down and the trouble corrected if the pump is running at speed and found to have any of the following problems:
  - No liquid discharged - Not enough liquid discharged
  - Excessive vibration - Motor runs hot
2. Do not allow the pump to continually start and stop (cycling) as this will reduce the motor life.
3. Cycling can occur on pressure units when the pressure tank pre-charge drops, or where there is a leak in the discharge plumbing.

## X. Operation and maintenance

Under normal operating conditions, the pump does not require any maintenance as long as the following points are observed:

1. Periodically check the condition of the check valve and strainer (if used).
2. If the pump is to be inactive for long periods, it should be rinsed thoroughly with clean water, then, drained and stored in a dry place.  
It has to be re-primed before start-up.
3. If the pump shaft is seized up after periods of inactivity, please place a screw driver from the motor end to rotate the shaft. It should free the pump shaft. ( See Fig 9 ) If this does not remedy the problem, the unit will need dismantling.

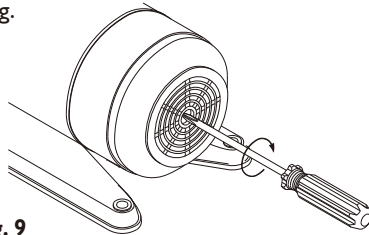


Fig. 9

4. Pressure tank air charge should be checked at regular intervals of every 6 months and after the pump has not been used for a prolonged period. To check the Pressure Tank air pressure, turn off power, open a tap on the discharge line to release pressure from the pump, unscrew the black plastic cover and apply an accurate pressure gauge to the valve as shown in Fig 10.

Pressure should be adjusted to the original pre-charge as follows:

TQ200: 20 psi (1.4 Kg/cm<sup>2</sup>)

TQ400: 28 psi (2.0 Kg/cm<sup>2</sup>)

TQ800: 36 psi (2.5 Kg/cm<sup>2</sup>)

TQ1500 up to TQ3700: 43 psi (3.0 Kg/cm<sup>2</sup>)

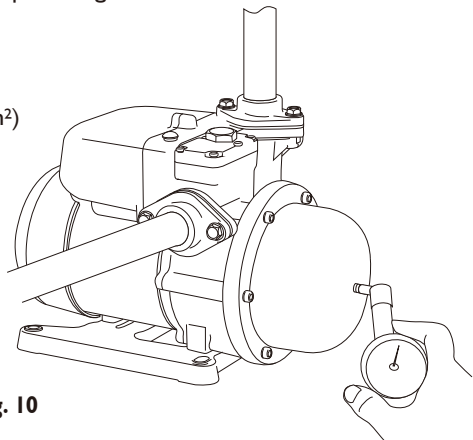


Fig. 10

## XI. Flooded Suction Performance Table

### TQ200

Inlet pressure (psi)	Flow rate				
	3 gpm	6 gpm	9 gpm	12 gpm	15 gpm
10	37	32	27	22	15
20	47	42	37	32	25
30	57	52	47	42	35

### TQ400

Inlet pressure (psi)	Flow rate					
	3 gpm	6 gpm	9 gpm	12 gpm	15 gpm	18 gpm
10	48	42	37	30	23	15
20	58	52	47	40	33	25
30	68	62	57	50	43	35

### TQ800

Inlet pressure (psi)	Flow rate						
	3 gpm	6 gpm	9 gpm	12 gpm	15 gpm	18 gpm	21 gpm
10	71	65	60	50	43	35	23
20	81	75	70	60	53	45	35
30	91	85	80	70	63	55	45
40	101	95	90	80	73	65	55

### TQ1500

Inlet pressure (psi)	Flow rate					
	10 gpm	20 gpm	30 gpm	40 gpm	50 gpm	60 gpm
10	63	59	55	48	39	27
20	73	69	65	58	49	37
30	83	79	75	68	59	47
40	93	89	85	78	69	57

### TQ2200

Inlet pressure (psi)	Flow rate					
	10 gpm	20 gpm	30 gpm	40 gpm	50 gpm	60 gpm
10	66	62	58	53	46	36
20	76	72	68	63	56	46
30	86	82	78	73	66	56
40	96	92	88	83	76	66

### TQ3700

Inlet pressure (psi)	Flow rate					
	10 gpm	20 gpm	30 gpm	40 gpm	50 gpm	60 gpm
10	80	75	70	65	59	49
20	90	85	80	75	69	59
30	100	95	90	85	79	69
40	110	105	100	95	89	79



## **XII. Frequently asked questions:**

### **1. What causes the TQ to start?**

The TQ has the built-in pressure switch and internal flow switch. Each of these can turn the pump on depending on water consumption. The pump will start when:

- The pressure is BELOW the pressure switch activation point. OR
- The flow rate is greater than 0.7 GPM.

The preset activation point for each model is provided in the pump specifications.

### **2. What causes the TQ to stop?**

The flow switch is designed to automatically stop the TQ pump when flow drops to below 0.7 GPM. The pump will shut off in a few seconds after flow stops (TQ200-800 is programmed to stop after 8 seconds and TQ1500-3700 is programmed to stop after 15 seconds). In addition, the TQ will be turned off in the event of dry-run or over temperature alarm.

### **3. What is the purpose of the built-in pressure tank?**

The pressure tank comes from the factory pressurized at approximately 20-43 psi (with the pump pressure at zero). It is designed to minimize motor startup due to small flow demand or minor leak of the pipeline.

TQ200 - 20 psi (1.4 Kg/cm<sup>2</sup>)

TQ400 - 28 psi (2.0 Kg/cm<sup>2</sup>)

TQ800 - 36 psi (2.5 Kg/cm<sup>2</sup>)

TQ1500 up to 3700 - 43 psi (3.0 Kg/cm<sup>2</sup>)

### **4. How is the dry-run condition determined and the protection provided?**

The dry-run is defined when the motor is running AND the flow rate is less than 0.3 GPM AND when pressure is less than the pressure switch setting. The protection is provided:

When the pump is run dry 2 minutes, it will automatically shut off for 10 minutes and then attempts to restart. When all 3 attempts are failed, the pump will rest for 1 hour and then attempts to restart. This protection mode will be repeated until the water supply is back to normal.

In case the pump is cycling (on-and-off repeatedly) due to small flow (less than 0.3GPM), air pocket in the system, air loss in the pressure tank or leak in the pipeline, the protection is provided:

The pump will run for 8 seconds and stop for about 3 seconds. When the cycling mode repeat for 15 times consecutively, the pump will be rest for 1 hour. Then it will start over the protection mode until the problem is corrected.

**Note:** The pump can be reset anytime by removing the power plug.

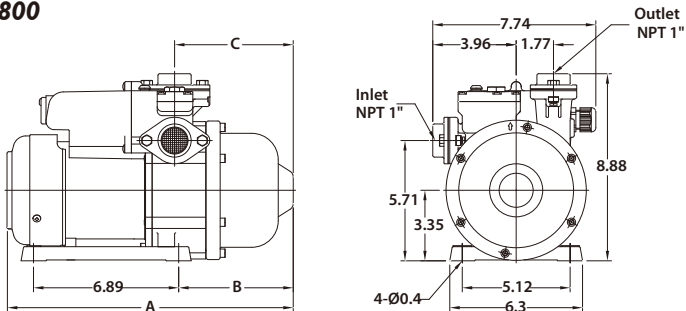
### **5. What is the maximum inlet pressure allowed in the TQ?**

The maximum internal system pressure allowed for TQ is 120 psi. The maximum inlet pressure when added to the TQ pressure must not exceed 120 psi. For example with a 40 psi inlet pressure supplied to the TQ800, internal system pressures can reach approximately 107 psi (67 + 40 psi).

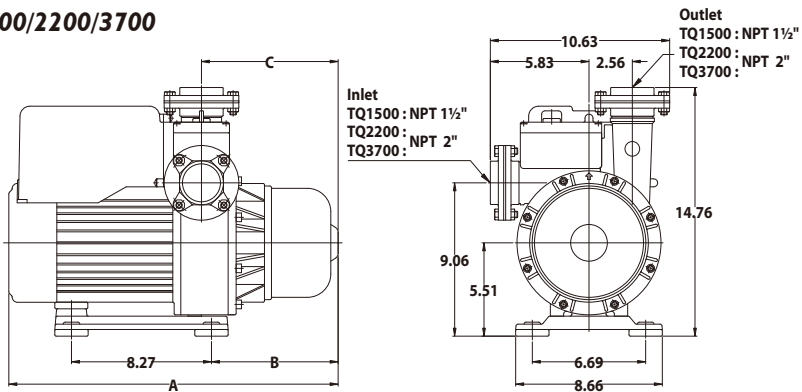
Additionally, if inlet pressures exceed the built-in pressure switch activation point (20-43 psi factory default), the pressure switch will be unable to function, and the ability to turn the TQ on at low flow rates will be lost. In this situation, only the flow switch will be able to turn the TQ on at flow rates above 0.7 gpm.

### XIII. Dimensions: (in.)

#### TQ200/400/800



#### TQ1500/2200/3700



Model	A (in.)	B (in.)	C (in.)
TQ 200	13.23	5.08	5.28
TQ 400	13.56	5.43	5.63
TQ 800	16.42	6.46	6.65
TQ1500~3700	19.72	7.76	8.35

### XIV. Specification: 60Hz

Model	Power (HP)	Phase (Ø)	Voltage (V)	Amp's (A)	Preset activation pressure (psi)	Max discharge pressure (psi)	Q max. (GPM)	N.W. (lbs)
TQ200	¼	I	115 or 230	4.0 or 2.0	20	31	16.9	16.3
TQ400	½	I	115 or 230	6.0 or 3.0	28	40	18.5	19.6
TQ800	I	I	115 or 230	11.0 or 5.5	36	67	23.8	25.6
TQ1500	2	I or 3	230	9.5 or 6.5	43	58	66.0	62.8
TQ2200	3	3	230	9.5	43	60	71.3	68.3
TQ3700	5	3	230	12	43	72	71.3	74.4

## XV. Troubleshooting



**Before starting work on the pump, make sure that the electricity supply has been switched off and that it cannot be accidentally switched on.**

Problem	Cause	Remedy
1. pump does not start	a. No power supply	Connect the electricity supply
	b. Too low/high voltage	Check if supply voltage is within $\pm 10\%$
	c. No water consumption	Open a tap
	d. Seized-up pump	Place a screwdriver against the shaft end of the motor to check if the rotor will spin freely, and contact your pump supplier.
2. Pump cuts out during operation	a. Seized-up pump	Same as above
	b. Overloaded motor	Turn off the power supply and restart or contact your pump supplier.
	c. Poor water supply	Check if pump suction inlet is blocked.
	d. The protection for pump dry run or cycling is activated.	Check the detailed information per XII (Frequently asked questions).
3. Pump starts when no water is consumed	a. Existing pipe is leaking	Fix the leakage.
	b. Defective check valve	Clean or replace a new one.
	c. Pipe suck in air.	Check the suction pipe and water supply.
4. Pump starts and stops too frequently	a. Leakage in suction pipe or air in the water.	Check the suction pipe and water supply.
	b. Discharge flow is too low.	Set your tap on a higher water flow.
5. Electric shock	a. Defective ground connection	Correct the ground connection.
6. Pump does not stop when water is not consumed	a. Poor water supply or air suck in.	1. Turn off the power supply and open the refilling plug to release the air. Then restart. 2. In case of long suction pipes, turn off the power and make sure if water supply is adequate.
	b. Defective check valve.	Clean or replace with a new valve.
7. Pump runs normal but with very low discharge flow	a. 3-phase motor runs in wrong rotating direction	Switch any of the 2 wires from motor terminal to correct rotation.
	b. Poor water supply	check if water supply is adequate and if the suction pipe is blocked.

## Limited Warranty

Products manufactured by Walrus Pumps Co (Walrus) are warranted to the first user only to be free of defects in material and workmanship for a period of 12 months from date of installation, but no more than 24 months from date of shipment. Walrus' liability under this warranty shall be limited to repairing or replacing at our election, without charge, FOB Walrus' distribution center or authorized service agent. Walrus will not be liable for any cost of removal, installation, transportation or any other charges that may arise in connection with warranty claim.

The warranty period commences on the date of original purchase of the equipment. Proof of purchase and installation date, failure date, and supporting installation data must be provided when claiming repairs under warranty.

This warranty is subject to due compliance by the original purchaser with all directions and conditions set out in the installation and operating instructions. Failure to comply with these instructions, damage or breakdown caused by fair wear and tear, negligence, misuse, incorrect installation, inappropriate chemicals or additives in the water, inadequate protection against freezing, rain or other adverse weather conditions, corrosive or abrasive water, lightning or high voltage spikes or through unauthorized persons attempting repairs are not covered under warranty.

Walrus will not be liable for any incidental or consequential damages, losses, or expenses, arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Certain states do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from state to state.

Supersedes all previous publications



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