

# Installation, Operation and Maintenance Manual

## Series LFEMVII-6400SS

Sizes: ¼"-1½" Lead Free Electric Motor Valves

For 2" size, please contact Watts Technical Service.

### ⚠ WARNING



Read this Manual **BEFORE** using this equipment. Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment. Keep this Manual for future reference.



### ⚠ WARNING

You are required to consult the local building and plumbing codes prior to installation. If the information in this manual is not consistent with local building or plumbing codes, the local codes should be followed. Inquire with governing authorities for additional local requirements.

### ⚠ WARNING

**Need for Periodic Inspection/Maintenance:** This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. All products must be retested once maintenance has been performed. Corrosive water conditions, inlet temperatures over 200°F, and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal components helps assure maximum life and proper product function.

### ⚠ WARNING

The installation and maintenance of backflow assemblies should be performed by a qualified, licensed technician. Failure to do so may result in a malfunctioning assembly.

### Description:

The Watts LFEMVII-6400SS motor valve is an electrically actuated standard port bronze ball valve with 316 stainless steel ball and stem.

For ¼" - 1½" the actuator utilized is a unidirectional type with a NEMA 4 enclosure, featuring a shaded pole motor with a 25% duty cycle rating, hardened steel gear train and an extended male output shaft for manual override. The installation section of this manual is broken into two parts 1-valve and 2-electrical. Prior to installation it is important to familiarize yourself with both sections so that the unit is properly installed.

### Valve Guidelines

- A.** The stem seals on your EMVII-6400SS valve may require periodic adjustment during its normal service life, therefore installations that prevent access to the valve for maintenance must be avoided. Further, it is important to understand that valves' stem seals will not function indefinitely. Eventually stem seals will require adjustments. At this point the external leakage would start off as a slight seepage and if left unattended could become significant.
- B.** All Watts LFEMVII-6400SS's utilize bidirectional valves and as such, can be installed to shut off flow in either direction.
- C.** When piping up the valve, be sure that the threads on the mating pipe are free of excessive grit, dirt or burrs. Take care to assure that any pipe sealants used are not so excessively applied to the pipe threads that the valve cavity becomes fouled.
- D.** The unit can be installed with the actuator portion in either the vertical or horizontal plane, however for steam or high temperature applications see Section E.
- E.** For installations for steam or other high temperature services your Watts LFEMVII-6400SS features an electric actuator with a maximum ambient temperature rating of 150°F. (65.6°C) Higher temperatures will result in a significant reduction of the duty cycle rating and/or damage to electrical components.

Some steam or other high temperature applications may require that the actuator be installed horizontal to the pipe (on horizontal piping) to protect the unit from radiant heat. All piping in which units are installed and any adjacent piping must be insulated to further reduce the effects of piping radiant heat.

## Electrical Installation

### NOTICE

Prior to making wiring connections, be sure that all external wiring and electrical components have been properly selected to suit the power consumption levels of your particular unit.

**Table 1 - Power Consumption**

VALVE SIZE in.	VOLTAGE AND CYCLE TIME	MAX AMPERAGE DRAW
¼ - 1½	115 VAC-8 Second	1.6
¼ - 1½	115 VAC-35 Second	0.5
¼ - 1½	24 VAC-40 Second**	2.2

\*\* Requires min 40 VA Transformer.

### NOTICE

Not all voltage/cycle time combinations are available for every valve size. For specific model combinations consult your Watts distributor or representative.

### Sizes: ¼" - 1½"

- Your Watts LFEMVII-6400SS is provided with a total of six (6) functional terminal connections within the unit. Terminal numbers 1, 2, and 3 are connections for the internal SPDT auxiliary switch, while terminal numbers 4, 5, and 6 are provided for the operation of the valve.
- As shipped from the factory, the actuator has been mounted in a mode that makes circuit 4 and 5 the "open valve" circuit and circuit 5 and 6 the "closed valve" circuit. Note that terminal 4 feeds the open limit switch, terminal 5 is the motor common and terminal 6 feeds the close limit switch.

### ⚠ WARNING

Inadvertent application of power between terminals 4 and 6 will burn out the switches. Before application of power always recheck your terminal connections.

- To test the actuator:
  - Replace actuator cover before application of power.
  - Apply power to terminals 4 and 5 and observe for a "Fully Open" valve.
  - Apply power to terminals 5 and 6 and observe for a "Fully Closed" valve.
  - If valve operation is out of phase to your command signal; meaning if your external control wiring issues an "Open Valve" command and the unit closes, simply reverse your terminal 4 and 6 connection.
  - If your unit fails to fully open and/or fully close, check switch setting and, if required, reset switches per the instructions contained in subsequent sections of this manual.

## Maintenance

During its normal service life, the only maintenance that may be required by your LFEMVII-6400SS should be periodic stem seal adjustment. It is important that stem seal leaks not go unattended as failure to adjust stem packing could significantly reduce seal life.

### NOTICE

To adjust stem seals, simply tighten the stem gland nut. **Do Not Over Tighten**, as in doing so you may over-compress stem seals which could result in excessive stem seal loading and reduction of seal life.

## IV. Switch Setting (Travel Limits)

### A. ¼" - 1½"

- As stated earlier in this manual, your unit is supplied with 6 functional terminal connections. Terminals 4, 5, and 6 are provided for rotational travel limits of the actuator. Terminal 5 is common. Application of power between terminal 4 and 5 will open the valve, while powering between terminal 5 and 6 will close the valve.
- On all ¼"-1½" models the actuator utilizes a one piece camshaft, therefore, setting one switch will set all three.
- Viewing the actuator from the top, note that the **Top** switch (aux) ties into terminals 1, 2, and 3, the **Middle** switch ties into terminals 4 and 5 (open circuit) and the **Bottom** switch ties into terminals 5 and 6 (close circuit).
- To set all 3 circuits:
  - Disconnect power supply
  - Remove actuator cover
  - Place valve in its fully open position
  - Loosen camshaft retaining screw
  - Using the middle switch detent, rotate the camshaft until the middle switch arm drops into the middle cam detent
  - Retighten the camshaft retaining screw
  - Reinstall cover
  - Recheck all wiring connections prior to testing the unit.

## Operational Characteristics and Ratings

- Valve type:** Quarter turn ball valve, bronze body, 316SS ball and stem, reinforced Teflon® seats, standard port.
- Valve Ratings:** ¼"-1½" 600psi WOG (41.9 bar); 100psi (6.9 bar) WSP
- Valve end connections:** All sizes NPTF.
- Max. actuator ambient temperature rating:** 150°F (65.6°C).
- Max. amperage rating of aux. switch:** 10 AMPS @ 115 VAC.

**Table 2**

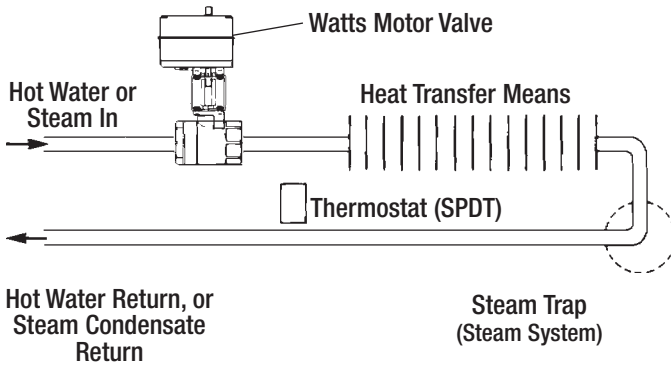
VALVE SIZE in.	Cv
¼ - ¾	6.3
½	9.0
¾	24.5
1	33.5
1¼	45.5
1½	73.0

**Table 3 - Steam Flow (#hr) - Full Open Valve**

VALVE SIZE in.	10 psi INITIAL		15 psi INITIAL		25 psi INITIAL	
	1psi ΔP	10psi ΔP	1psi ΔP	15psi ΔP	1psi ΔP	25psi ΔP
¼ - ¾	92	197	142	218	255	349
½	131	282	203	311	365	498
¾	358	767	551	848	992	1355
1	358	767	754	1159	1357	1853
1¼	358	767	1024	1574	1843	2516
1½	358	767	1643	2526	2957	4037

## Sample Installation #1

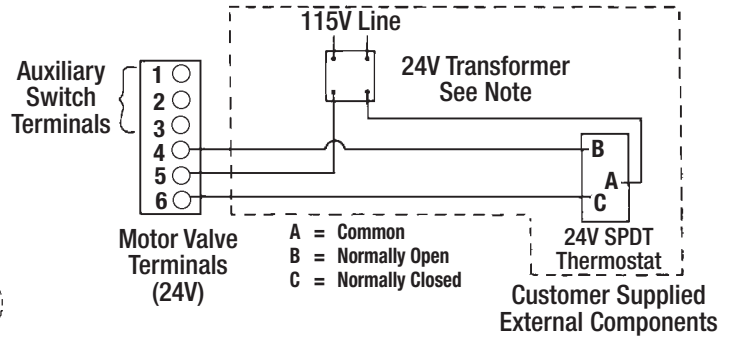
Use of Watts Electric Motor Valve as a zone control for hot water or steam space heating. Valve opens upon temperature drop. Closes when demand for heat is satisfied.



## Wiring Diagram #1

1/4" - 1 1/2"

Electrical diagram with 24V control circuit, 24V Motor Valve, SPDT thermostat.

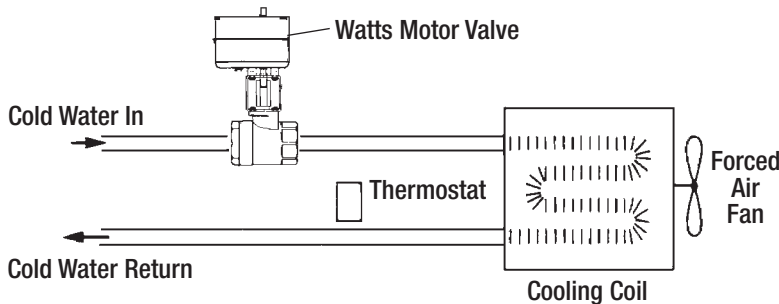


### NOTICE

1/4"-1 1/2" LFEMVII-6400SS-24-45 will operate with a 40 VAC transformer. Thermostat must be capable of handling amp rating at stall (see page 2- Operating Data) or relay must be added to circuit.

## Sample Installation #2

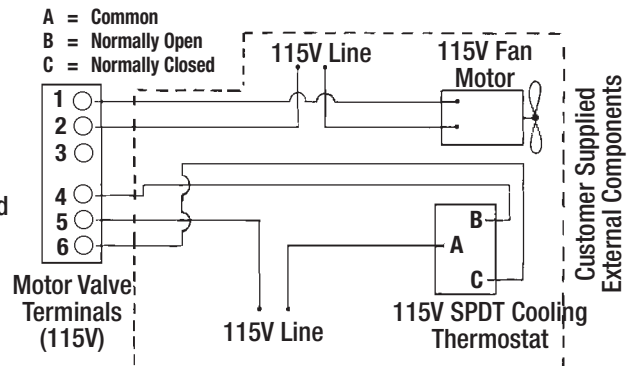
Cooling with refrigerated water and operating forced air fan with auxiliary switch. Motor Valve opens and starts blower upon temperature rise. Shuts off blower and closes when temperature drops to thermostat setting.



## Wiring Diagram #2

1/4" - 1 1/2"

Electrical diagram with 115V control circuit, 115V Motor Valve, line voltage SPDT cooling thermostat, 115V blower.



## Terminal Function 1/4" - 1 1/2"

1/4"-1 1/2" motor valves are supplied with wiring terminal strips having six terminals. Terminals 4, 5 and 6 operate the motor valve, while terminals 1, 2 and 3 are connected to an internal SPDT auxiliary switch.

For 24 VAC or 115 VAC models, the following terminal explanation will always apply.

Terminal No.	Function
Operating Terminal #4	When power is applied, valve will open
Operating Terminal #5	Common
Operating Terminal #6	When power is applied valve will Close
Auxiliary Switch Terminal #1	Makes when valve opens
Auxiliary Switch Terminal #2	Common
Auxiliary Switch Terminal #2	Makes when valve closes

**WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.  
**For more information:** [www.watts.com/prop65](http://www.watts.com/prop65)

**Limited Warranty:** Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

**THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**



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