

tekmar[®] - Data Brochure

D 100

4 - way Mixing Valves 116 - 123, Actuating Motor 216

2/92

tekmar 4-way mixing valves

These precision mixing valves are designed to be operated by a tekmar Actuating Motor 216, are of highest quality and are built for long trouble free service. Since they have cast iron bodies, they should only be used in 'closed' heating systems.

To reduce the risk of localized corrosion in the mixing valve we strongly recommend that iron pipes be installed between the boiler and the mixing valve and that an effective anti-corrosion agent be added to the heating system water.

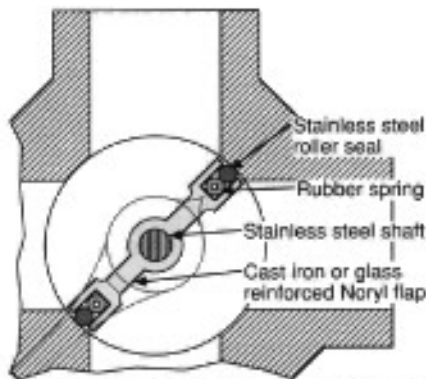
The valve shaft has double O-ring seals which enable it to withstand up to 90 psi (600 kPa) operating pressure. The operating temperature range for pure water is 32°F (0°C) to 230°F (110°C). Acceptable media are chilled water, hot water with antifreeze and anticorrosive compounds (max. 30%), glycol, ethyl alcohol glycol, propylene dichloride alcohol, mono ethyl alcohol, ethyl methyl alcohol, glycerine, antifrogen N + I. *Not for media based on mineral oil components.* **Damage to the O-ring seals may result over time if more than 30% of these compounds are added. Contact tekmar if O-rings and replacement instructions are required.** For types 121-123 the valve mechanism must be removed from the valve body when welding the flanges because excessive heat will damage the internal rubber seals.

type 116 — 1" female NPT
type 117 — 1-1/4" female NPT
type 118 — 1-1/2" female NPT
type 119 — 2" female NPT

Includes mixing valve and handle

type 121 — 2-1/2" flanged
type 122 — 3" flanged
type 123 — 4" flanged

Includes mixing valve and handle, Butt-welded flanges, Gaskets, nuts and bolts



Section showing the advanced stainless steel roller seal for low leakage and easy rotation.



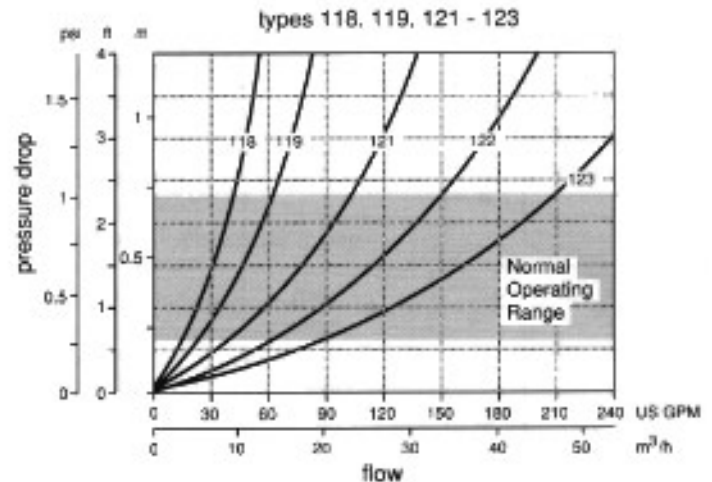
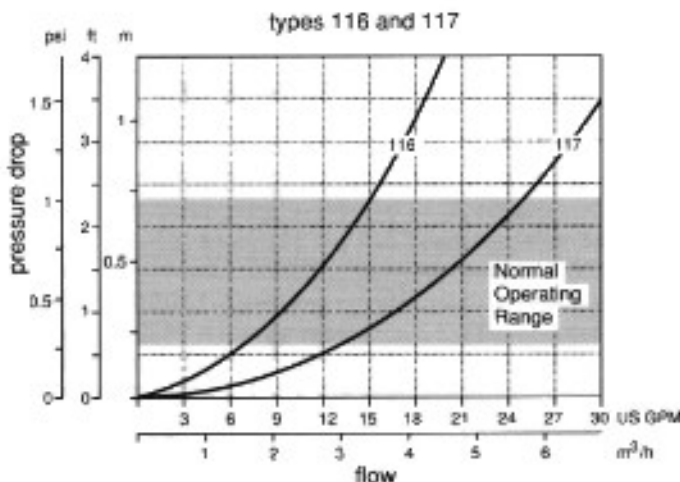
tekmar Actuating Motor 216

These high quality motors are designed to operate any of tekmar's 4-way mixing valves from type 116 through to type 123.

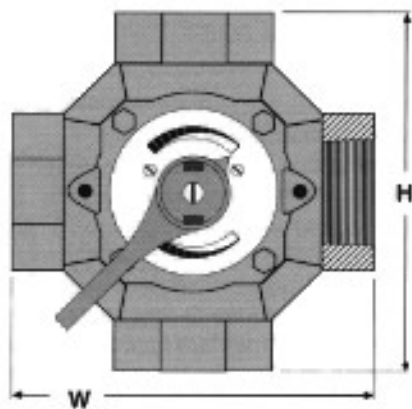
The output shaft of the Actuating Motor rotates smoothly through its 90° range of travel in 3-1/2 minutes and can provide a full 310 in-lb (35 N-m) torque while only using 3VA of current. A 24Vac ±10%, 60Hz floating control signal can run the motor to open the valve at a fixed speed, close it at the same speed, or leave the output shaft in its present position.

The Actuating Motor has three 1 Amp end switches. The bottom two stop the motor at its fully closed and fully open positions. The third end switch is adjustable and is available for auxiliary functions such as turning off a boiler when the mixing valve is almost closed.

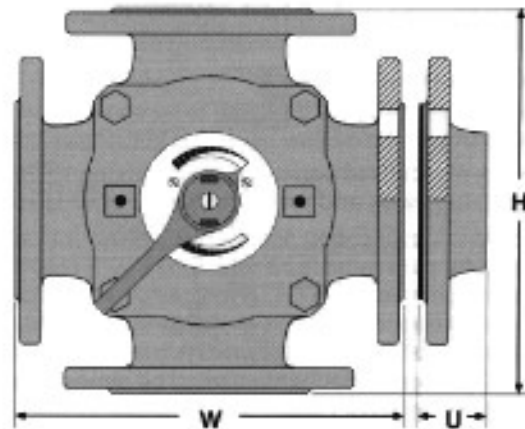
Performance Curves



Dimensional Drawings and CV Values



type 116-119



type 121-123

type number	Pipe size	CV Value *	Dimension H	Dimension W	Dimension U	Net Weight
116	1"	15	5-7/8" (148 mm)	5-7/8" (148 mm)	-	7.5 lbs (3.4 kg)
117	1-1/4"	25	6-1/4" (158 mm)	6-1/4" (158 mm)	-	10 lbs (4.5 kg)
118	1-1/2"	40	7-1/4" (182 mm)	7-1/4" (182 mm)	-	12.7 lbs (5.8 kg)
119	2"	60	7-7/8" (198 mm)	7-7/8" (198 mm)	-	16 lbs (7.3 kg)
121	2-1/2"	100	9-1/2" (234 mm)	9-1/2" (234 mm)	1-5/8" (41 mm)	54 lbs (24.5 kg)
122	3"	150	10" (254 mm)	10" (254 mm)	1-3/4" (45 mm)	85 lbs (38.5 kg)
123	4"	210	11-1/2" (295 mm)	11-1/2" (295 mm)	1-7/8" (48 mm)	112 lbs (51 kg)

* CV = the flow of water in US GPM at 60°F (16°C) through a valve in the full open position with 1 psi (2.307 feet) pressure differential across the valve.

Installation Configuration of 4-way Mixing Valves 116 - 123

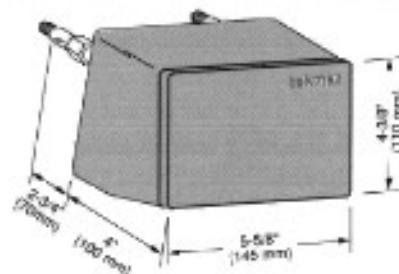
Configuration	Changes required from delivered configuration	Wiring diagram
<p>#1</p>	<p>No changes required</p> <p>Note: The 4-way mixing valve can be converted to a 3-way mixing valve by capping the "to boiler" port.</p>	<p>Mixing valve control</p> <p>Actuating motor</p>
<p>#2</p>	<p>Turn the valve over until the handle's pointer is pointing down. Move stops to the upper two holes. Remove the handle, rotate it 180°, re-install it.</p> <p>Note: The 4-way mixing valve can be converted to a 3-way mixing valve by capping the "to boiler" port.</p>	<p>Mixing valve control</p> <p>Actuating motor</p>

Installation of Actuating Motor 216

Actuating Motor 216 includes

- Actuating Motor
- Hardware and coupling for mounting to tekmar rotary mixing valves. (see illustration below)

The tekmar Actuating Motor 216 is CSA approved.
CSA #LR 58223

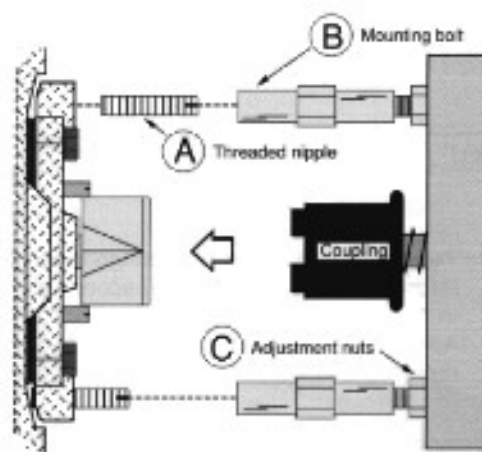


Mechanical Installation

The Actuating Motor is easily attached to any of the tekmar mixing valves.

- Install the threaded nipples into the mixing valve. **(A)**
- Position the Actuating Motor on the mixing valve. Thread the mounting bolts onto the nipples and tighten. **(B)**
- Align the center of the Actuating Motor with the center of the mixing valve and fit the coupling into the mixing valve's handle.
- Tighten the adjustment nuts and test that the coupling can be easily disengaged from the mixing valve handle. **(C)**
- To disengage the Actuating Motor coupling from the mixing valve handle, pull the coupling towards the motor and turn the mixing valve handle. To engage the motor, turn the handle until the coupling snaps into its two slots.
- For manual operation of the mixing valve; measure the supply temperature while rotating the valve handle until it reaches a position where the correct temperature is being delivered.

The markings on the faceplate indicate: **1 = Cold** **9 = Hot.**



Note:

If the mixing valve becomes frozen or jammed, the black plastic coupling between the motor and valve is designed to break and prevent damage to the motor. If this occurs; the valve should be disassembled, the cause of the jamming corrected, and a new coupling installed. Couplings and gaskets are available from your wholesaler or tekmar agent.

Electrical Installation

The Actuating Motor rotates its output shaft whenever 24 Vac, 60 Hz is applied between either the clockwise or counter-clockwise terminal and the neutral terminal.

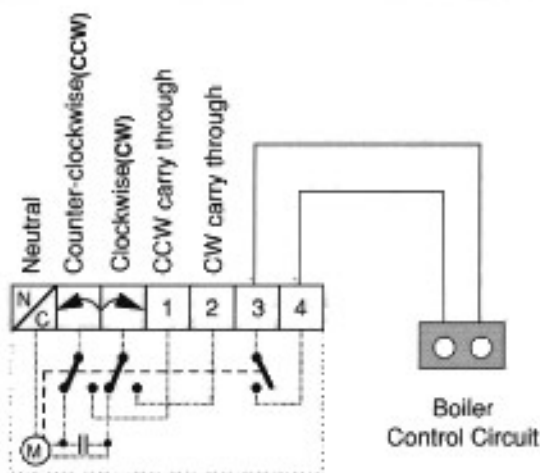
All electric wiring enters the motor through the standard 7/8" (22mm) knock-out in the bottom of the case, allowing conduit to be connected to the motor if required.

Note connection to auxiliary end switch. The most common application uses the switch, as illustrated, to energize a boiler circuit. The switch is factory pre-set to **close** when the valve is driven more than 5 to 10% counter-clockwise (open in valve configuration #1, page 2).

The switch is rated for a 1 Amp load at 24Vac.

Caution

Maximum 24 volts only to be supplied to this motor.

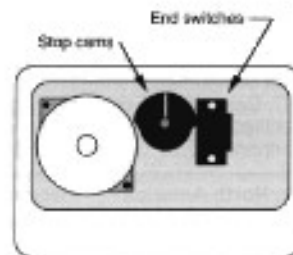


End switches

There are 3 end switches and 3 stop cams in the 216 motor. The bottom switch stops the motor rotation in the fully counter-clockwise position and the second switch stops the motor in the fully clockwise position. The bottom two cams are pre-set in the factory and sealed.

Do not attempt to loosen the hex head screw or adjust the bottom cams, or damage to the motor may result. Breaking the paint seal will void the warranty.

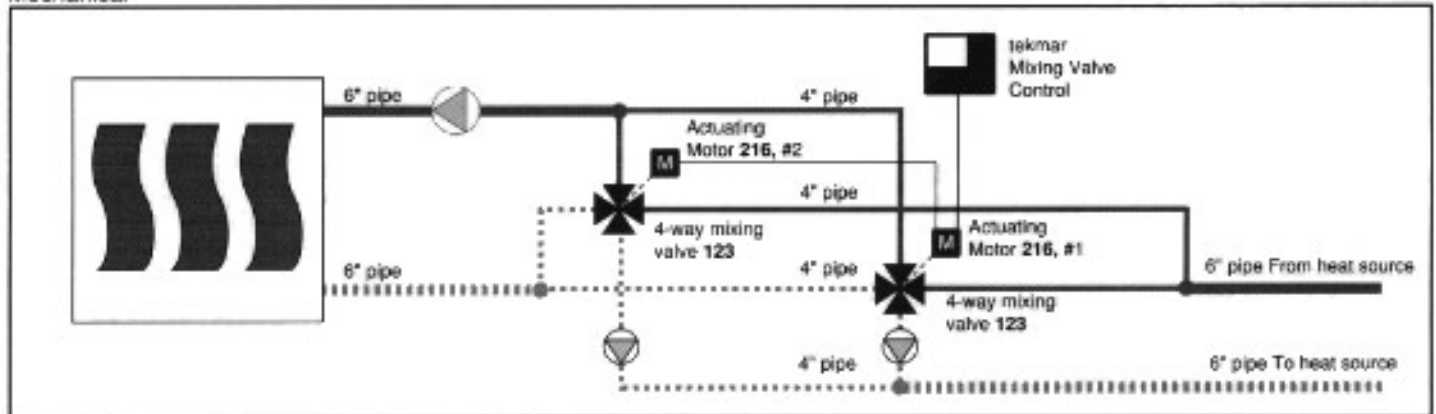
The auxiliary end switch stop cam (top cam) is factory set to **close** its end switch (make) whenever the output shaft is rotated more than 5 to 10% counter-clockwise. This option is normally used in valve configuration #1 shown on page 2 to energize a boiler circuit as the mixing valve starts to open. This cam is friction fit to the hex head screw, and can be rotated clockwise for special applications to delay the switching of the end switch until the shaft rotates further counter-clockwise. The auxiliary stop cam can be rotated 180°, to allow the same switching action for clockwise rotation on valves that have been installed as in configuration #2 on page 2.



Staging of 4-way mixing valves with Actuating Motors 216

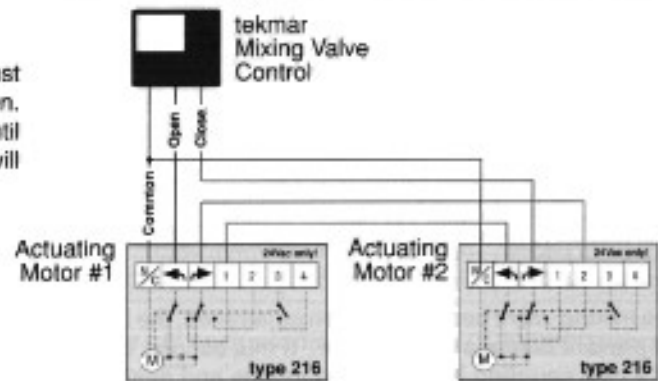
The highest capacity tekmar 4-way mixing valve is the 4" (100mm) type 123 with a maximum recommended flow rate of 210 US GPM. For systems with flow rate requirements that exceed 210 US GPM, tekmar 4-way mixing valves and Actuating Motors can be operated in sequence by using an Actuating Motor 216 for each valve as illustrated below.

Mechanical



Electrical

Two Actuating Motors can be staged so that one motor must be driven fully open before the second motor begins to open. In this example, Actuating Motor #2 will not open until Actuating Motor #1 is fully open, and Actuating Motor #1 will not close until Actuating Motor #2 is fully closed.



Limited Warranty and Product Return Procedure

Limited Warranty: tekmar warrants to the original purchaser each tekmar product against defects in workmanship and materials when the product is installed and used in compliance with tekmar's instructions. This limited warranty covers the cost of parts and labour provided by tekmar to correct defects in materials and/or workmanship. Returned products that are fully operational are not considered a warranty case. tekmar also does not cover parts or labour to remove, transport or reinstall a defective product. tekmar will not be liable for any damage other than repair or replacement of the defective part or parts and such repair or replacement shall be deemed to be the sole remedy from tekmar. This warranty shall not apply to any defects caused or repairs required as a result of unreasonable or negligent use, neglect, accident, improper installation, or unauthorized repair or alterations. In case of defect, malfunction or failure to conform to warranty, tekmar will, for a warranty period of 24 months from the date of invoice to the original purchaser or 12 months from the date of installation of the product, whichever occurs first, repair, exchange or give credit for the defective product. Any express or implied warranty which the purchaser may have, including merchantability and fitness for a particular purpose, shall not extend beyond 24 months from the date of invoice or 12 months from the date of installation of the product, whichever occurs first.

Replacements: tekmar can send replacement products if requested. All replacements are invoiced. Any possible credit for the replacement will only be issued once the replaced product has been returned to tekmar.

Product Return Procedure: Products that are believed to have failed must be returned to tekmar Control Systems Ltd. 4611-23rd Street, Vernon B.C. Canada V1T 4K7 when agreed to by tekmar. The installer or other qualified service person must, at the owner's expense, determine which component has failed. The product must be returned complete with

all of its components (sensors, base, etc.). Products must be returned together with the proof of purchase to the original purchaser who then returns the product to tekmar after receiving a Return Goods Authorization (RGA) number from tekmar.

Please include the following information with the product. The full address of the original purchaser, the RGA number and a description of the problem.

From the U.S.A., in order to avoid customs charges, products must be returned via US Post with the package clearly marked with the RGA number, product type and the statement "Canadian Product returned for repair". For shipping purposes the product can be valued at one half list price.

- 1) If returned during the warranty period and the product is defective, tekmar will issue full credit for the returned product less cost of missing parts.
- 2) If returned during the warranty period and the product is fully operational, tekmar will return the product to the original purchaser for a testing cost of \$30.00 plus postage.
- 3) If returned during the warranty period and the product is not damaged and is fully operational, tekmar can take back the product for a return charge of 40% of the product's net value. This request has to be specified otherwise the product will be returned with a testing cost of \$30.00 plus postage.
- 4) If returned after the warranty period and the product needs repair, tekmar will repair and return the product. Repair and postage costs will be invoiced. tekmar's repair costs are calculated at \$30.00 / hour plus the cost of parts. If the repair costs will be more than \$60.00 a repair estimate will be sent to the original purchaser.

In North America: tekmar Control Systems Ltd., Canada
tekmar Control Systems, Inc., USA
Head Office: 4611 - 23rd Street
Vernon, B.C. Canada V1T 4K7
Tel. (604) 545-7749 Fax. (604) 545-0650

