tekmar® - Data Brochure

Actuating Motor 011

D 011

04/98

The tekmar Actuating Motor 011 is designed to operate any of the tekmar 4-way mixing valves from type 016 through to type 023. An isolated, auxiliary end switch is provided to turn on a boiler or other device. The cam for this end switch is adjustable. The tekmar Actuating Motor 011 can deliver 310 in•lbs (35 N•m) over a 90° stroke. Quality metal gears, bearings and shaft help ensure a long trouble-free operating life.

Sequence of Operation

Motor

The actuating motor rotates its output shaft whenever 24 V (ac) is applied between either the counter clockwise (↶) or clockwise (↷) terminals and the Com terminal. The motor is compatible with any control having a 24 V (ac) floating output.

Cam operated switches

There are three cams within the motor housing. The middle cam closes a contact between terminals (↶) and *4* when the output shaft is rotated fully counter clockwise. The bottom cam closes a contact between terminals (↷) and *5* when the output shaft is rotated fully clockwise. When these end switches are closed, the motor is stopped. The terminals can be connected to an external device to signal when the tekmar 4-way mixing valve is either fully open or fully closed.

Do not attempt to adjust the bottom two cams as damage to the motor can result. Rotating the cams voids the warranty.

The top cam is factory set to close the auxiliary end switch between terminals *6* and *7* when the output shaft is rotated approximately 10% counter clockwise. This allows the actuating motor to turn on a boiler or other device once the mixing valve is partially open. Systems with a large boiler output to load requirement may require the cam to be adjusted for greater flow before the boiler is fired. The top cam can be rotated 180° to allow the same switching action for clockwise opening valves.

Installation

STEP ONE — GETTING READY

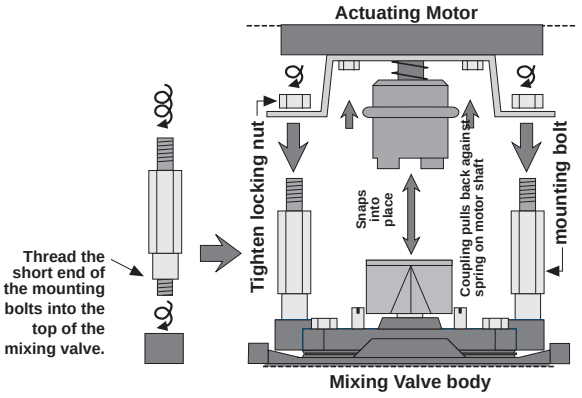
Check the contents of this package. If any of the items listed below are missing or damaged, please refer to the Limited Warranty and Product Return Procedure on the back of this brochure, and contact your wholesaler or local tekmar representative.

Type 011 includes:

- One Actuating Motor 011
- One Data Brochure D 011
- One mounting hardware set (including two mounting bolts and two locking nuts)
- One metal coupling

STEP TWO — MOUNTING

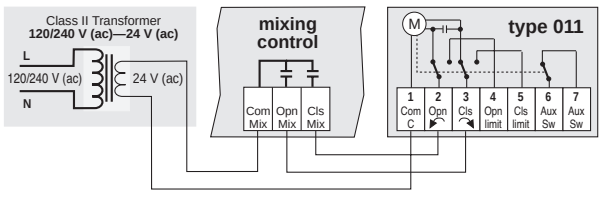
- Thread the short end of the mounting bolt directly into the valve. Using a 1/2" wrench, tighten securely.
- Remove the metal coupling from the motor shaft and check that the shear pin is installed such that an even length protrudes from each side of the shaft. Adjust by tapping the shear pin if necessary.
- With the metal coupling in place on the actuating motor shaft, lower the motor onto the valve and handle, aligning the holes on the motor mounting bracket with the mounting bolts.
- Manually rotate the valve handle until the coupling snaps securely into place.
- Install the two 1/2" nuts to the mounting bolts and tighten securely.
- Test that the coupling can be easily disengaged from the mixing valve handle by pulling the coupling towards the motor and turning the valve handle. To re-engage the motor, turn the handle until the coupling snaps into place.



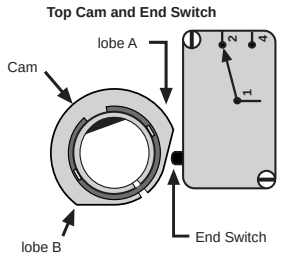
If the mixing valve becomes frozen or jammed, the shear pin is designed to break, preventing damage to the motor. If the shear pin has been broken, the valve handle can be rotated at any time. The actuating motor will still operate, but the valve handle will not be moving. If this occurs, the valve should be disassembled and the cause of the jamming corrected. Once corrected, replace the broken shear. Replacement shear pins are available through your local tekmar representative.

STEP THREE — WIRING

All electric wiring enters the motor through the standard 7/8" (22 mm) hole in the side of its case. This hole allows conduit to be run to the motor enclosure. Standard 18 AWG solid wire is recommended for all connections to the motor terminals. The specific wiring details for your application are provided in the brochures supplied with the control used in your system. Use watertight conduit fittings in order to maintain NEMA 4 enclosure rating.



STEP FOUR — SETTING THE AUXILIARY END SWITCH CAM

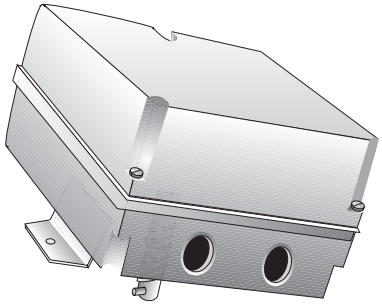


- The following assumes that the valve is plumbed with hot water from the boiler entering the right hand valve port.
- Remove the motor cover. While holding down the spring loaded manual release shaft, move the motor and handle to the desired valve position where the end switch needs to operate. The scale on the mixing valve can be used to estimate the percent mixing.
- Using your fingers, rotate the top cam. If you want the contacts between terminals *6* and *7 (Aux Sw)* to make when the valve opens to this point, rotate the cam until lobe A causes the end switch to click. If you want the contacts between terminals *6* and *7 (Aux Sw)* to break when the valve opens to this point, rotate the cam until lobe B causes the end switch to click.
- **If hot water from the boiler is piped into the left side of the valve, the functions of lobes A and B are reversed. This piping arrangement also reverses the function of the Opn (↷) and Cls (↶) terminals.**
- Test that the system operates correctly by powering the valve closed and then powering it open until the terminals *6* and *7 (Aux Sw)* make or break. If power to the boiler is supplied through this end switch, the boiler should turn on when the contacts are made.

Technical Data

Actuating Motor 011

Literature	—	D 011
Packaged weight	—	3.7 lb. (1700 g) Modified PPO (Noryl)
Dimensions	—	5-1/2" H x 6-1/4" W x 5" D (139 x 159 x 127 mm)
Approvals	—	CSA NRTL/C certified; NEMA 4 rated
Ambient conditions	—	Indoor use only, 32 to 140°F (0 to 60°C), < 90% RH non-condensing.
Power supply	—	Class 2, 24 V (ac) ±10% 50/60 Hz 5 VA
Auxiliary switch	—	240 V (ac), 10 A, 1/3 hp, pilot duty 240 VA 2A
Control signal	—	24 V (ac), floating action
Angle of rotation	—	90° shaft rotation
Running time	—	160 seconds (60 Hz), 190 seconds (50 Hz)
Maximum torque	—	310 in.• lb. (35 N•m)
Auxiliary Switch	—	0 to 90°; make or break
End Switch Transfer	—	3 A, 24 V (ac)
Shear Pin Breakage	—	310 in.• lb. (35 N•m), 10% tolerance



Caution The nonmetallic enclosure does not provide grounding between conduit connections. Use grounding type bushings and jumper wires.

Attention Un boîtier nonmétallique n'assure pas la continuité électrique des conduits. Utiliser des manchons ou des fils de accord spécialement conçus pour la mise á la terre.

Limited Warranty and Product Return Procedure

Limited Warranty ***The liability of tekmar Control Systems Ltd. and tekmar Control Systems, Inc. ("tekmar") under this warranty is limited. Please read and understand the conditions appearing herein.***

tekmar warrants each tekmar product against defects in workmanship and materials, when the product is installed and used in compliance with tekmar's instructions. The warranty period is for a period of twenty-four (24) months from the production date if the product is not installed during that period, or twelve (12) months from the documented date of installation if installed within twenty-four (24) months from the production date, but in any event the warranty period shall not extend beyond thirty-six (36) months from the production date. During the warranty period, tekmar will, at its discretion, either repair at no charge, exchange or give credit for the defective product, provided the product is returned to tekmar.

The liability of tekmar shall be limited to the cost of parts and labour provided by tekmar to correct defects in materials and / or workmanship or to the exchange of the defective product for a replacement product or to the granting of credit limited to the original cost of the product, at tekmar's discretion, and such repair, exchange or credit shall be deemed to be the sole remedy available from tekmar. This warranty does not cover the cost of the parts or labour to remove or to transport the defective product, or to reinstall the repaired or replacement product. Returned products that are not defective are not covered by this warranty.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, negligence, fire, Act of God, or has been damaged by modifications, alterations or attachments made subsequent to purchase which have not been authorized by tekmar, or if the product was not installed in compliance with the local codes and ordinances, or if due to defective installation of the product.

The warranty applicable to a product is as set out in the statement of warranty policy (the "Warranty") above, receipt of which is hereby acknowledged. The liability of tekmar is limited to those obligations identified in the warranty as obligations of tekmar. The warranty is understood to be in substitution for any loss, costs or damages for which tekmar might otherwise be liable at law or in equity and in particular, in lieu of any liability for fundamental breach of contract.

tekmar disclaims any responsibility for losses, expenses, inconveniences, or any special, indirect, secondary, incidental or consequential damages arising from ownership or use of any items subject to any claim hereunder, regardless of whether such claim is stated in contract, tort or strict product liability.

This warranty is in lieu of all other warranties, express or implied, including, without limitation, warranties of merchantability, fitness for a particular purpose, durability or description of the product, its non-infringement of any relevant patents or trademarks, and its compliance with or non-violation of any applicable environmental, health or safety legislation. No implied warranties shall extend beyond twenty-four (24) months from the production date.

Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

Product Return Procedures Products that are believed to have defects in workmanship or materials must be returned, together with a written description of the defect, to the tekmar representative for that territory. If the address of the representative is not known, please request it from tekmar at the telephone number listed below.

tekmar® Control Systems

tekmar Control Systems Ltd., Canada
tekmar Control Systems, Inc., U.S.A.
Head Office: 4611 - 23rd Street
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tekmar® - Data Brochure Addendum

Service Package **M3029** for Actuating Motor 011

D 010 A

06/00

The breakage of a shear pin is a symptom of a problem with the ease of movement of the mixing valve. The following trouble shooting guide is included to help identify what may be causing the problem and the corrective actions that can be taken to prevent further shear pin failures.

Symptoms, Possible cause:	*Possible result, Corrective action:*
• Foreign material in system causing jam in valve port.	• Once jammed, the glass fibre reinforced plastic flap assembly in the 1" to 2" mixing valves may break along with the shear pin. Ensure that all pieces of the flap are accounted for before restarting the system. If it is not possible to recover all of the pieces of the flap assembly, the system may experience pump failures. Install a strainer in the system to remove foreign material.
• Corrosion build up on valve bonnet or inside walls of valve. Water not treated or leak in heating system.	• Possible damage to flapper assembly (1" to 2" valves), broken shear pin, bent bottom plate on actuating motor. Do water treatment as described in D 016, Corrosion Control.
• Failure of end stop switches within the Actuating Motor. If the control operates the close and open output at the same time, damage to the actuating motor end switches may occur.	• Actuating motor drives back of handle into mounting bolts. Damage to the handle will be apparent. Return control and actuating motor for repair.
• Piping arrangements when using 2 1/2" to 4" valves.	• If you pipe pumps in series with the larger valves, the forces within the valve when the valve is trying to close from the 2 to 0 position may exceed the rating of the motor (310 in lbs) of force. Use primary - secondary piping arrangements.
• Valve "sits" for the summer months or long time intervals without any movement.	• Valve flapper may "freeze" to the valve body. During fall start up, coupler is broken. Manually exercise and check water quality on a regular basis. Most tekmar controls automatically exercise the mixing valve.
• Valve used on potable water (open) system.	• Incorrect application for this type of valve. Replace with a non-ferrous material.
• Leaking valve stem from top of bonnet. "O" ring seals damaged on valve stem. Leak in any part of the heating system.	• Leaking systems will introduce a continuous flow of new oxygen rich water. Net result will be deteriorated water quality. Fix leak(s). Recommend a low water cut off switch with water feed "turned off".

Installation

STEP ONE — GETTING READY

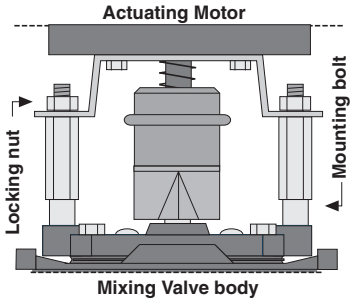
Check the contents of this package. If any of the items listed below are missing or damaged, please refer to the Limited Warranty and Product Return Procedure on the back of Data Brochure D 011 and contact your wholesaler or local tekmar representative.

***M3029** includes*

- Data Brochure D 011, Data Brochure D 010 A addendum, Data Brochure D 016
- Zinc die-cast coupler
- Shear pin
- Spring
- Screws, 2 pieces

STEP TWO — SERVICING

Loosen nuts from actuating motor mounting plate.
Remove mounting bolts and actuating motor from valve.

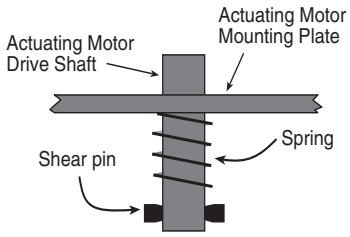


4-Way Mixing Valve Service, Data Brochure D 016

Note *Have valve seal kit on hand (**Part # M3022 or M3023 or M3024**).*

- If the mixing valve is equipped with stop pins, remove the two stop pins from the position indicator plate and discard.
- Replace stop pins with supplied screws.
- Isolate valve from system.
- Remove the four bolts that hold the flap assembly to valve.
- Carefully remove flap assembly from valve body.
- Clean inside valve body, check valve flap assembly for integrity.
- Reinstall flap assembly with new seal kit.

Replacing the Shear Pin

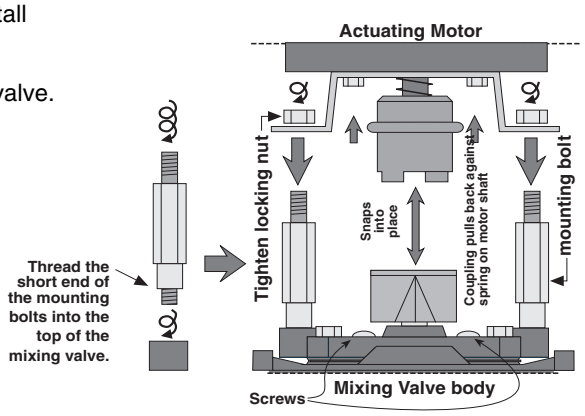


- While supporting shaft, drive shear pin out from shaft with punch and hammer.
- Remove old spring from shaft.
- Install new spring onto shaft.
- Install new shear pin centering it in the actuating motor shaft.
- Remove any burrs from shaft.
- Install new coupling and ensure smooth movement on drive shaft.
- Check back mounting plate of actuating motor. If bent, remove and straighten, or if badly bent, replace plate.

STEP THREE — ASSEMBLY

Follow the instructions in Data Brochure D 011, Step Two to reinstall actuating motor to valve.

Note It is important to have proper alignment of the motor to the valve.



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