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INTRODUCTION:

Thank you for selecting equipment engineered and manufactured by Flextech Industries, Ltd.

This technical manual is provided to help you receive the safest operation, longest life and the optimum performance available from your damper machinery.

Before you begin installation of your new unit, thoroughly review this manual and familiarize yourself with the equipment and components you have received. This will help you to better understand the unit and it's assembly procedures. This will also minimize any injuries that may occur during installation and may help alleviate any problems down the road.

WARNING: Never enter an isolation vessel or duct without taking adequate precautions to prevent injuries.

Never exceed stated operating pressure.
Damper configuration and actuator arrangement are detailed on the General Arrangement Drawings.

If you have any questions, require spare parts or need factory assistance, please call Flextech Industries.

RECEIVING:

Your shipment was carefully inspected and properly packaged at our company.
When delivered to carrier, it was in good condition. For your protection, follow these important receiving procedures:

1. Before signing delivery receipt, make sure you have correct number and type of pieces, crates, or cartons as the bill states from the same shipper. If shipment is short, specify shortage on delivery receipt and have driver sign the same specification on your copy of the bill.
2. If you discover an error after driver has left and you have signed the carrier's bill clear, immediately call carrier's ODS (over, damage, short) Department and report the error.
3. If shipment shows any indication of damage or pilferage, it should be noted on the delivery receipt in the same manner as the shortage notation. Seals, actuators, linkage, switches, piping and conduit are items most likely to receive damage during transportation and handling.
4. If shipment shows no damage upon receipt, but you discover concealed damage after the driver has left, immediately call carrier and request inspection. Note date of call and name of person, as well as department contacted. Keep all packing materials and contents in same condition as when damage was discovered. Request inspection in writing and allow five (5) working days for joint inspection with carrier's representative. On the sixth working day, you can make inspection yourself and determine cause of damage to the best of your ability. It is advisable to take pictures immediately after discovering damage in order to support your claim.
5. When requesting and inspection from carrier, state value of damaged goods. This applies to visible or concealed damage. When shipment value is small (i.e., $25 to $50), most carriers will waive inspection. In this event, get the name of the person waiving inspection and include it when filing a claim.

6. Inspection should be conducted jointly by you and carriers representative. Do not sign anything until you have read it carefully and are sure you are not inadvertently agreeing to some item that eliminates carriers liability (such as “damage was of a nature that could have been noted at time of delivery,” “inadequate” or “no interior packing,” etc.) unless this is actually the case. After completing inspection and receiving written acknowledgment of damage, notify our Customer Service Department to make any required repair arrangements.
7. Claim must be filed within nine (9) months of shipment date and must be supported by documents such as Original Invoice, Original Bill of Lading, Original Paid Freight Bill and Inspection Report (if any).
8. Damaged goods may be kept for an allowance. However, if damaged material is of no value and carrier liability is conclusively reflected, carrier should take possession of damaged goods within thirty days after claim is filed.
9. If carrier declines claim, immediately write and request claim be reconsidered, re-emphasizing pertinent conditions, and contact shipper for support of claim.
10. It is your responsibility to follow above instruction or carrier will not honor any claims for damage.
11. Check contents received against your packing list. Claims resulting from shortage or errors must be reported within two (2) weeks after receipt of materials to be honored.
12. We are not responsible for any service work or back charges without prior written authorization.
13. Immediately after shipment receipt, begin proper storage procedure. Refer to the “Storage Instruction” in this Manual for details.

STORAGE:

1. It is preferred, though not absolutely necessary, to store equipment inside.
2. If stored outside, dampers must be securely covered with a waterproof tarp. Equipment must be elevated off the ground to keep rain, mud, and snow from contacting equipment surfaces.
3. If the equipment is elevated on blocks, blocks must be positioned to keep the frame adequately supported and level. The frame should never be put in a “twist”. Check equipment periodically to ensure condensation is not forming and blocks are not settling and twisting the equipment frame.
4. These provisions apply only to the damper and not to the auxiliary components. Refer to storage requirements provided by the component manufacturers for appropriate procedure.
5. For long term storage, apply a coat of rust inhibitor (such as Cosmo-line) to machined surfaces (i.e. shafts, bearings, pivot pins, keyways, etc.). Replenish inhibitor as it degrades.
6. Dampers require a flat, level, and clean area for storage prior to installation.

HANDLING:

1. Lifting lugs are provided on all frame sections. Use these lifting lugs for all lifting. Never wrap a chain or rope around or through the frame.
2. Seals, actuators, and linkage can be damaged. Keep all lifting cables away from these components. Use only the lifting lugs provided.
3. When handling the damper sections in the horizontal (i.e. flat) position, use a for point pickup.
4. When raising the assembled damper from the horizontal position to the vertical position, use the following procedure:
    (a) Hook two chains to the lifting holes in the bottom section of the damper. Lift bottom at least four feet off the ground.
    (b) Hook two chains to the lifting holes in the top section of the damper. Slowly raise damper to the vertical position. This procedure prevents frame from digging into the ground.

CAUTION: Extreme care must be taken when handling equipment to avoid damaging piping, actuators, switches, and conduit. Damper frame may not be picked up in a vertical position unless so designed. Please check with the applicable damper drawings (see section #5). Erector must ensure that all components are securely attached and torque to specification before raising equipment. Review installing contractor Installation for details to prevent racking and square problems while lifting.

SAFETY FACTOR: Damper weights without shipping braces are listed on the drawings. Chains must be rated in excess of total equipment weight. Do not lift equipment if strong winds are present that might affect proper control of the equipment. Never permit personnel to stand or walk beneath equipment that is being handled, lifted, or not yet secured into position in the duct.

INSTALLATION & INSPECTION PROCEDURE:

The majority of operation and leakage problems are the direct result of damper installation out of square, out of flat or out of straight.

All dampers are squared during manufacturing and are double checked prior to leaving the factory. However, dampers can easily be distorted by bolting to ductwork that is not square and flat, improper handling or by seal welding to mating ductwork. Since damper frames are welded structures, it is impossible to hold frame members perfectly straight. Still the flange bolt patterns are always held straight and square. When possible, base all measurements on the flange bolt pattern.

Inspect for straightness, square and flatness prior to lifting damper onto the duct and after flange fasteners are installed but not yet tightened to torque. Inspection must also be made when installation is complete and prior to cycling.

When any measurements are taken, or any inspections made, the results should always be documented. Records must be made available to Flextech field service representatives.

If measurements show that the damper is not straight, square or flat, some damage may have already occurred to some of the components. Please call Flextech Industries, Ltd. Depending on the extent of the distortion and the application, a service call may be required to inspect for damage and to make recommendations on bringing the frame back into position without risking further damage.
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Straightness Test: Stretch a string along each line of flange holes. The flange bolt pattern should align within (1/8") one-eight inch of maximum allowable deviation. Check all four flanges on both faces of damper.

Acceptable: The damper frames are straight.
Not Acceptable: The frames are bowed. The damper is "Out of Square."

Flatness Test: Stretch a string across opposite corners of the inside duct opening. Stretch a second string diagonally between the other two opposite corners. Where the two strings intersect, they should not be more than 1/8" apart. If the strings touch each other, reverse them, putting top string on bottom and bottom string on top.

Acceptable: The frame is not twisted.
Not Acceptable: The frame is twisted. The flanges are not in the same plane.

Square Test: Before the damper is bolted in place, measure diagonally across the corner flange bolt pattern of the damper. The two measurements must be identical within ¼".

Acceptable: The damper is square. Corner to corner measurements are identical within ¼".

Not Acceptable: The damper is out of square. The duct opening forms a parallelogram.

Fasteners: All fasteners are tightened and checked at the factory. Some fasteners may have worked loose during shipment. Fasteners must be checked for proper torque prior to start-up of the damper.

All actuators and drive component fasteners must be tight prior to initial cycling. The actuator should no move as the damper cycles.

Many operational problems can be reduced or eliminated by checking tightness of frame fasteners prior to lifting.

If frame fasteners are loose, it is easier for the frame to twist. Components such as packing glands, conduit, piping, etc., must also be checked for tightness.

Torque Specifications are listed in the Torque Chart below:

TORQUE CHART

BOLT SIZE	FT/LBS	N/M
¼"	6	8
3/8"	29	39
½'	66	88
5/8"	125	167
¾"	235	314
7/8"	375	501
1"	545	728

Seals and cover plates are secured with ½" diameter weld studs with flat washers, lock washer and hex nut. Tighten nuts on weld studs to 36 ft. lbs. of torque.

AIRFLOW/ORIENTATION:

An air directional arrow is painted on the side of each damper.

The arrow points in the direction of normal system flow, as shown on the approved damper drawing.

In spite of precautions, it is possible that the approved drawing is incorrect or that the air directional arrow is not correctly positioned. Therefore, the damper drawings, system drawings, and air flow arrow must be reviewed and checked for accuracy prior to installation of the damper by a field engineer who is cognizant of the system function.

If any questions or inconsistencies arise, please call the Service Department prior to installation of the damper.

OPERATION & MAINTENANCE OF DAMPER:

Damper operation is to be in accordance with the "approved drawings, the engineer's plans and specifications, or special instructions" issued for the specific project by the engineer of owner.

Damper operation is to be in accordance with the approved drawings and the engineer's (owner's) plans and specifications by Flextech Industries prior to shipment of the damper units.

Damper unit operation should be checked at the time of installation prior to system on-line service.

Damper unit "accessory equipment", operators, solenoids, limit switches, etc., should function in accordance with the manufacturers specifications for the operation and in accordance with the "approved drawings, plans and specifications of the engineer (owner).

Maintenance should be performed on damper units in accordance with the preventative maintenance schedules as determined and prescribe by the engineer (owner).

Damper unit maintenance should be performed on, but not limited to the following items:

A. Bearings

Bearing maintenance should be performed in accordance with the following at minimum of a yearly interval. All bearings must be cleaned of accumulations.

B. Shaft Seals

Packing glands should be inspected for any evidence of undue wear. The packing should be inspected for deterioration.

C. Accessory Equipment

Accessory equipment such as operators are to be maintained in accordance with the individual manufacturers recommended maintenance schedules and/or in accordance with the engineer's (owner's) preventative maintenance schedules.

ACCESSIBILITY:

Locate catwalks to provide accessibility for damper maintenance. This is not intended to be a definitive requirement, but only a guideline from a serviceman's point of view.

CLEARANCE: Areas that may require maintenance should not be impeded with auxiliary steel such as columns, beams, girders, catwalks, duct stiffeners, conduit, insulation, etc. Slide gate dampers with cover plates should be allowed three feet clearance around each cover plate for access to, inspection of, and replacement of seals.

INSULATION: Flextech Industries dampers do not require insulation to provide reliable, long term operation. Insulation hinders inspection and maintenance. If specifications require insulation, apply insulation in a manner that can be easily and completely removed from all maintenance points. Never insulate over linkage bearings or packing glands.

TROUBLESHOOTING:

IF NO ACTUATOR RESPONSE:

1. Assure that actuator is properly wired and receiving proper voltage. Make sure phase rotation is correct.
2. Check to make sure that limit switches in actuator (See Actuator section) are properly set. Make sure torque switch is not tripped.
3. Check operation of hand wheel on actuator (See Actuator section). Assure that clutch is engaging properly.
4. Disconnect actuator from the damper. Check to verify that it is operating properly and that amp draw is normal.

IF ACTUATOR IS FUNCTIONING CORRECTLY BUT BLADE FAILS TO MOVE OR ONLY MOVES A LIMITED DISTANCE:

1. Check for obstruction prohibiting the complete cycle of the damper blade.
2. Check to see that the actuator is securely fastened to the blade through the coupling and the keys.
3. Check for obstructions prohibiting the blade from moving.
4. Check for free rotation of shaft bearings.
5. Verify that damper is installed properly. Any twisting or bending of the damper frame will impede or prohibit damper's operation. Use level and plumb-bob. (See "Installation Inspection Procedure in the Installation section.)
6. Check damper for distortion and for damage to any beams or components.
7. Check torque switches in actuator to see if they are operating properly. Assure that the open torque switch stops the damper in open operation, and that the closed switch stops in the closed position. (See Actuator Section)
8. Make sure all seals are intact.
9. If damper still fails to operate properly, call Flextech Industries, Ltd at (660) 885-8899. Be prepared to provide (a) system pressure, (b) system temperature and (c) results of inspection described above.

SAFETY PRECAUTIONS:

Flextech Industries dampers are designed to provide long-life and trouble free service. However, the damper must be inspected and maintained periodically as set forth in this manual.

Whenever maintenance is required, the following safety precautions should be adhered to:
1) Turn off electrical power to actuator and other components. Turn off air supply.
2) Lock out electrical disconnects and main air supply valves.
3) Block damper blades with heavy beams or attach block and tackle to prevent blade movement.
4) Use extreme care when removing heavy awkward components such as covers, bearings, actuator, etc.
5) Provide safe access to equipment to prevent personal injury.

Failure to follow the above precautions may result in equipment damage or personal injury.

BEARING LUBRICATION:

Most roller bearings are equipped with hydraulic grease fittings. Single-lip contact seals work well in the presence of moisture and dirty environments at moderate speed. Lubrication depends on the operating conditions. Standard and high temperature roller bearing units are pre-lubricated with a premium quality, lithium base grease conforming to NLGI #2 consistencies. If no unusual environmental conditions exist (extreme temperature, moisture, or contaminants), frequent lubrication is not required. Lubricate the bearings while they are rotating, pumping the grease in slowly until a small bead appears around the seals. This bead acts as an indicator of adequate lubrication and protects against the entry of foreign materials. If bearing is idle use only four or five shots of lubrications with a hand grease gun. Use grease and not oil. Any good quality lithium base grease conforming to NLGI #2 is sufficient. Listed below are some equivalents that may be used.

Shell Alvania #2 – Factory Supplied
Texaco Multifak #2
Mobil Mobilux #2
Texaco Premium RB
Exxon Unirex N2

LUBRICATION:

Bearings must be re-lubricated periodically to assure long life and trouble free operation. The recommended lubrication schedule is every six months or every twenty cycles, whichever occurs first. For normal operating conditions, a Lithium base grease conforming to NLGI Grade #2 consisting should be used. For best results, lubricate bearings while in operation. Pump grease in slowly until a slight bead forms around the seals. The bead acts as an indicator of adequate re-lubrication and provides additional protection against entry of foreign matter.

Grease in bearings prevents excessive wear of parts, protects components from corrosion and aids in dissipation of heat.

SLEEVE BEARINGS:

Graphite sleeve bearings such as the Dodge Model F2B-LT10-108, are solid lube bearings that do NOT require any lubrication.

REPLACEMENT: If bearings become frozen, rusted or worn, the part should be replaced.