

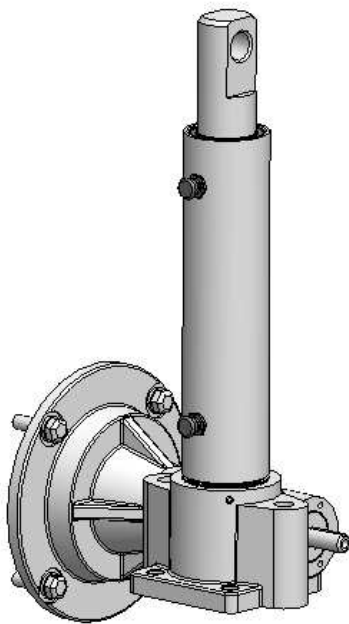


Joyce Dayton Corp.

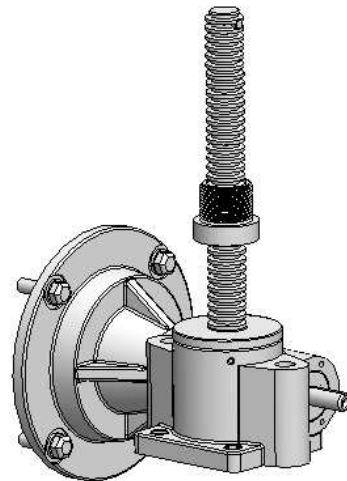
Operation and Maintenance Manual for Joyce Dayton

Integrated Actuator- Acme Screw

Maximum capacity: 2000-pounds



IATT/DIATT



IATN/DIATN

WARNING!

The recommendations in this manual for installation, operation and maintenance must be followed to ensure safe use. All persons responsible for the installation and use of Joyce Dayton Integrated actuators must be familiar with the contents of this manual.

Customer is responsible for guards and other protective devices and ensuring that integrated actuator usage conforms with local and national operating and safety codes appropriate to the class of equipment into which the integrated actuator is installed.

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Section I

General Information

1-1 Contact Joyce Dayton Corp.

Joyce Dayton Corp.
P.O. Box 1630
Dayton, OH 45401
(800) 523-5204 (US and Canada only)
(937) 294-6261 (937) 297-7173 Fax
Email: sales@joycedayton.com
Website: www.joycedayton.com

1-2 Purpose and Scope

This manual provides installation, operation and maintenance instruction for the standard Joyce Dayton integrated actuator with acme screw. Although this manual covers the standard integrated actuators, some may vary significantly from this manual. For special units, please contact Joyce Dayton Corp. for assistance.

1-3 Receipt of Product

All equipment should be immediately inspected upon receipt for any damage and to verify correct product and quantities. Any problems should be reported to Joyce Dayton Corp. and the freight carrier as soon as possible. Products returned without a *Return Goods Authorization (RGA)* form will not be accepted.

1-4 Warranty

Seller warrants its products to be free from defects in material and workmanship under normal and proper use in accordance with instruction of seller for a period of one year from the date of shipment to buyer. Seller's liability under such warranty or in connection with any other claim relating to the products shall be limited to the repair, or at seller's option, the replacement or refund of the purchase price, of any products or parts or components thereof which are returned to seller freight prepaid and which are defective in material or workmanship. Products or parts or components thereof, which are repaired or replaced by seller will be returned to buyer freight collect. This warranty is not intended to cover consumer products, as defined in the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, 15 U. S. C. Sections 2301-12, which are purchased by buyer for purposes other than resale. If buyer is not intending to resell the products, and if the products are consumer products as defined in the Magnuson-Moss Act, the foregoing warranty, but not the limitation of seller's liability, shall be null and void. EXCEPT AS EXPRESSLY STATED ABOVE, SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE OR OTHERWISE, ON THE PRODUCTS, OR ON ANY PARTS OR LABOR FURNISHED DURING THE SALE, DELIVERY OR SERVICING OF THE PRODUCTS.

1-5 Precautions of Use and Installation

1. Mechanical stops provided on the integrated actuators are not designed for use as end-of-travel stops. The customer is responsible for setting travel limits.
2. Travel can be limited using optional limit switches. These limit switches need to be set by the customer. In most applications, factory or manufacturer-assisted installation is not required. However, it is necessary that appropriate, qualified personnel perform the installation of Joyce Dayton products.
3. Joyce Dayton integrated actuators are not rated for shock-loading or extreme vibration. It is the responsibility of the user to ensure these conditions are not imposed on the actuator.
4. In the event that service or maintenance is required, the load must be secured or removed before any work can begin.

5. The integrated actuators can be mounted and operated in any orientation. Properly plug or vent the holes in the protection tube (4) to prevent dirt and moisture from contaminating the actuator (translating tube models only).
6. Never allow the integrated actuator to retract beyond the minimum closed position or extend beyond the maximum open position, as damage to the unit can occur. Refer to Section 3-5 for travel limit information.
7. External temperature may exceed 200 degrees F. near maximum duty cycle. Use caution to prevent personal injury.
8. Do not use in applications where integrated actuator can be pressed against an immovable object.
9. A brake motor is required on all integrated actuators that have a double lead. Only integrated actuators featuring single lead acme screws are self-locking. A brake motor is recommended on actuators with double-lead screws (DIA).

1-6 General Installation instructions

1. Ensure that all personnel who will service or operate equipment are familiar with its use and limitations.
2. Secure or remove the load before any installation procedures begin.
3. Be certain the rating of the actuator meets or exceeds the load.
4. Integrated actuators must be mounted on a rigid structure sufficient to support the maximum possible load. An under-designed structure could lead to premature wear or failure.
5. Drive shaft alignment is critical. Misalignment will cause reversing stresses in rotating members and will lead to fatigue failure. Correct coupling specification is critical for systems with more than one integrated actuator.
6. For systems with more than one integrated actuator, confirm that the integrated actuators and shafts operate without binding or excessive force before power is applied.
7. When fastening the load to an integrated actuator, make sure the actuator is in the retracted position. This positions the load accurately with respect to the lifting screw centerline. Never pull the translating tube to one side to make connection with your structure. Fully extend the integrated actuator to make sure the load is aligned with the translating tube.
8. All integrated actuators are to be mounted with S.A.E. Grade 8 bolts or equivalent.
9. Torque the mounting bolts in a systematic pattern to avoid damage to the actuator.
10. Optional limit switches, which may be furnished with the integrated actuator, are NOT pre-set. They require field adjustment before use.

Section II Maintenance

2-1 Lubrication

1. Integrated actuators are lubricated before leaving the factory.
2. Do not operate integrated actuators without lubrication.
3. For normal operation, traveling nut Integrated actuator screws should be greased at least once per month.
4. The lifting screw and translating tube are lubricated with Mobilgrease XHP 461 grease, or equivalent.
5. The products listed are recommended by the lubricant manufacturers to meet the requirements for normal operation. The listing of brand names is solely for the convenience of users of Joyce equipment and their lubricant suppliers; it does not constitute any endorsement. Joyce Dayton assumes no responsibilities for the quality, performance or availability of any listed products.

Company	Brand Name	Integrated Actuator Component
Exxon Mobil	Mobilgrease XHP 461	Housing, Lifting screw and tube
Exxon Mobil	Mobilith SHC PM	Housing, Lifting screw and tube
Exxon Mobil	Mobilith SHC 221	Housing, Lifting screw and tube
Exxon Mobil	Mobilith SHC 22	Housing, Lifting screw and tube

2-2 Repair Parts

Repair parts may be obtained by calling Joyce Dayton Customer Service at (800) 523-5204, (937) 294-6261, (937) 297-7173 (facsimile) or your local sales representative. When ordering repair parts, please supply the serial number (located on the nameplate). See Section 3-1 and Section 3-2 for exploded views, and Section 3-3 for the Parts List. Product description and an example serial tag can be found in section 3-4.

The following parts are recommended for rebuild or spares. See Exploded Views in Sections 3-1 and 3-2 and Parts List in Section 3-3.

- A. (2) Worm Shaft Bearing – (7)
- B. (2) Worm Shaft Seal – (9)
- C. (2) Retaining Ring – (8)
- D. (1) Seal – (15 or 20)
- E. (2) Thrust Bearing – (2)
- F. (1) Worm gear nut – (3)
- G. (1) Traveling nut – (12)
- H. (1) Jack Screw – (11)
- I. (1) Translating Tube Assembly: (13)
- J. (1) O-Ring (16 or 19)
- K. (1) Worm (6)

2-3 Disassembly of Translating Tube Actuator

1. Use the appropriate disassembly procedure. If the lifting nut is outside the actuator on the screw, it is a traveling nut integrated actuator; this is also called a “rotating screw” actuator. If the nut is not positioned outside the actuator sleeve, it is a translating tube integrated actuator.
2. Handle all machined parts with care and maintain an “order of disassembly” to aid in re-assembly.
3. The motor is optional. It is not user serviceable.
4. Disconnect power from the integrated actuator before proceeding.
5. To remove the motor, secure the integrated actuator in a work holding device such as a bench vise. Do not clamp onto the protection tube (4) or translating tube assembly (13).
6. Remove the four hex head screws and washers (26 & 27) that attach the motor to the flanged sleeve (1). Remove the motor.
7. Remove the coupling half (23) and key (24) from the worm shaft.
8. Remove the seal (9) and retaining ring (8).
9. Use a tool to tap on the flange end of the worm shaft (6). This will loosen and unseat the worm shaft bearing (7) and permit disassembly.
10. Loosen the two set screws (5) and unthread the protection tube (4). The upper thrust bearing (2) and the seal (20) may be exposed (or they may remain inside the protection tube when it is removed).
11. Disassemble the protection tube (4) from the translating tube assembly (11, 12, 13, 16, 25).
12. Disassemble the translating tube assembly from the sleeve (1) by firmly pulling upward, away from the sleeve (1).

13. The worm gear nut, key, and retaining ring (3, 14, and 10) will be attached to the end of the assembly.
14. Remove the retaining ring (10) from the end of the jackscrew (11).
15. Disassemble the nut and key (3, 14) from the jackscrew.
16. The jackscrew (11), translating tube (13), and dowel pin (25) are considered an assembly. If any of these parts are worn and/or damaged, you must replace them all. It is not possible to disassemble them without damaging them.
17. The lower thrust bearing (2) can now be pulled out of the sleeve.

2-4 Disassembly of Traveling Nut Actuator

1. Use the appropriate disassembly procedure. If the lifting nut is outside the actuator on the screw, it is a traveling nut integrated actuator; this is also called a “rotating screw” actuator. If the nut is not positioned outside the actuator sleeve, it is a translating tube integrated actuator.
2. Handle all machined parts with care and maintain an “order of disassembly” to aid in re-assembly.
3. The motor is optional. It is not user serviceable.
4. Disconnect power from the integrated actuator before proceeding.
5. To remove the motor, secure the integrated actuator in a work holding device such as a bench vise. Do not clamp onto the jackscrew (11).
6. Remove the four hex head screws and washers (20, 21) that attach the motor to the flanged sleeve (1). Remove the motor.
7. Remove the coupling half (17) and key (18) from the worm shaft.
8. Remove the seal (9) and retaining ring (8).
9. Use a tool to tap on the flange end of the worm shaft (6). This will loosen and unseat the worm shaft bearing (7) and permit disassembly.
10. Loosen the two set screws (5) and unthread the sleeve cap (4). The seal (15) and upper thrust bearing (2) may remain inside the sleeve cap when it is removed.
11. Disassemble the jackscrew (11) from the sleeve (1) by firmly pulling upward, away from the sleeve (1).
12. The worm gear nut (3), key (13), and retaining ring (10) will be attached to the end of the assembly.
13. Remove the retaining ring (10) from the end of the jackscrew (11).
14. Disassemble the worm gear nut and key (3, 13) from the jackscrew.
15. Unscrew the travelling nut (12) from the jackscrew (11) and remove.
16. The lower thrust bearing (2) can now be pulled out of the sleeve.

2-5 Inspection of Components

1. Before any inspection, it will be necessary to completely clean all parts of the integrated actuator. Use caution with any machined or fragile part.
2. Inspect the cleaned integrated actuator sleeve (1), jack screw (11), and translating tube assembly (11, 12, 13, 22, 25) or the rotating screw and traveling nut (11, 12). Check for any signs of stress or fracture, especially around mounting holes and clevis hole.
3. Inspect the condition of all the gears and components that have been disassembled.
4. Check the thrust bearings for any signs of brinelling, abrasive wear or spalling. Test for smooth, quiet operation of bearings.
5. Replace seals on translating tube model (9, 15, 20). Replace seals on the traveling nut model (9, 15).
6. Inspect O-Ring (19 or 16) and keys (14, 24 or 13, 18) for signs of damage or deformity.
7. Inspect lifting screw (11) for straightness and wear. This is part of an assembly on a translating tube actuator.
8. Inspect the clevis end of the translating tube for damage or deformity.
9. Inspect the traveling nut (12). Replace it if wear is evident.

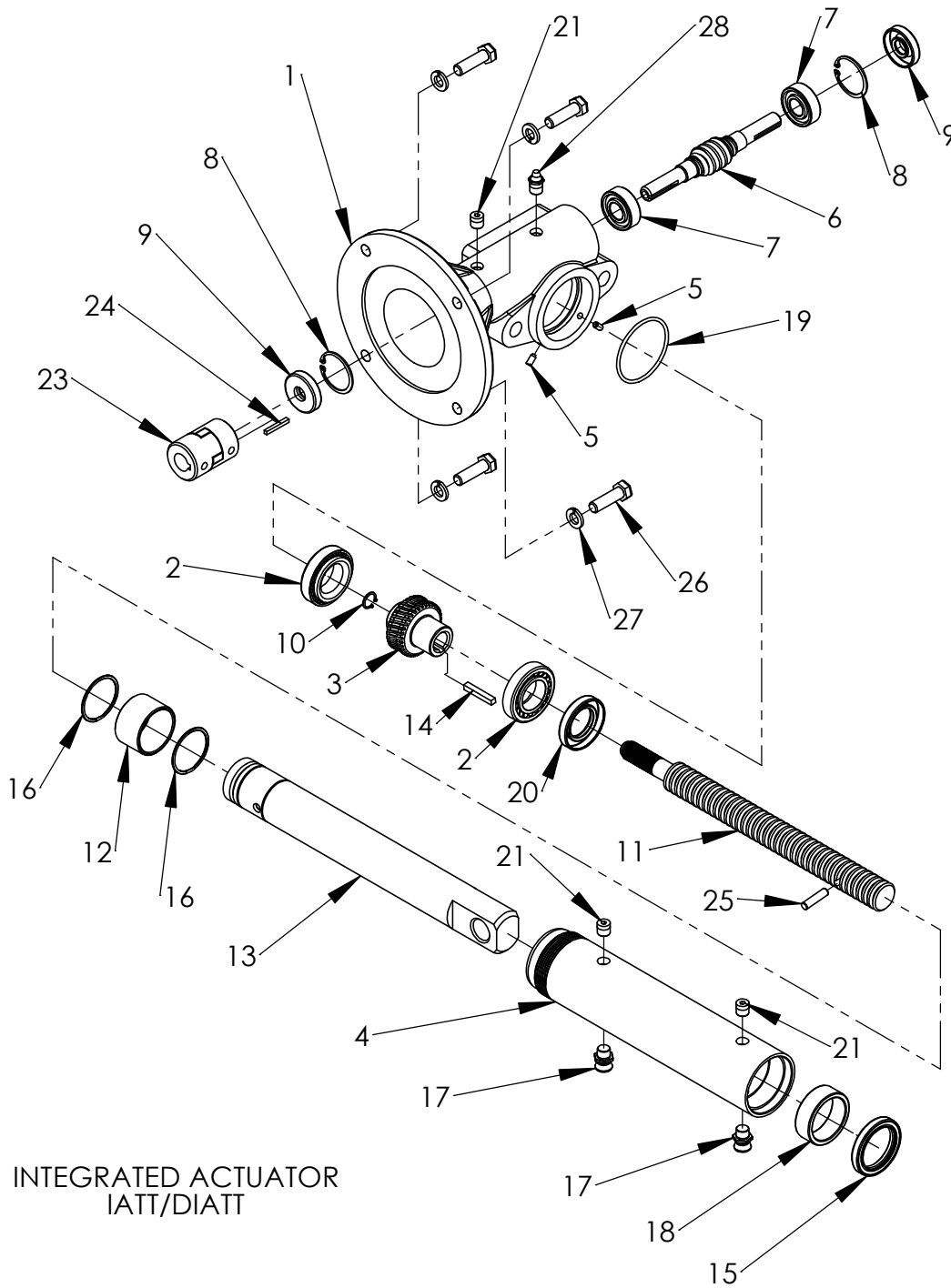
2-6 Assembly of Translating Tube Actuator

1. Rest the actuator sleeve (1) on a work surface with the flange downward.
2. Install the worm shaft bearing (7) into the sleeve (1). Do this by passing the worm through the wide opening at the side of the sleeve. Position it over the worm shaft opening. Seat the bearing with a tool.
3. Rotate the sleeve (1) so it rests on the base.
4. Assemble the O-ring lower thrust bearing (2) and O-ring (19)
5. Set the sleeve aside and continue.
6. Extend the threaded end of the translating tube assembly into the
7. Insert the worm shaft (6) through the sleeve (1) toward the flange. Inside the sleeve, this will pass in front of the already assembled worm gear nut (3) and through the previously installed worm shaft bearing (7).
8. Install the other worm shaft bearing (7) over the end of the worm (6). Seat this in place.
9. Install the retaining ring (8).
10. Check that the worm shaft (6) rotates when turned by hand. Loosening or tightening the threaded connection between the sleeve and the protection tube makes adjustments to the stiffness of rotation of the worm shaft.
11. Spot drill through the threaded holes in the sleeve (1) and insert the set screws (5).
12. Thread the air vent (17) and Pipe Plug (21) in to the protection tube.
13. Insert and seat the two worm shaft seals. Exercise care so the seals are not damaged on any sharp surfaces. Note: These seals are difficult to remove. Once they are removed, they must be replaced.
14. Use the key (24) to attach half the coupling (23) to the worm shaft.
15. Attach the other half coupling (23) to the motor shaft.
16. Join the motor to the integrated actuator via the coupling. Align the motor mount holes to the mounting holes on the flange. Use lock washers and screws (27, 28) to fasten the motor to the integrated actuator.
17. Insert grease fitting (28) into the sleeve and partially fill the cavity with Ronex Extra Duty 1 grease.
18. Insert the pipe plug (21) in the sleeve.

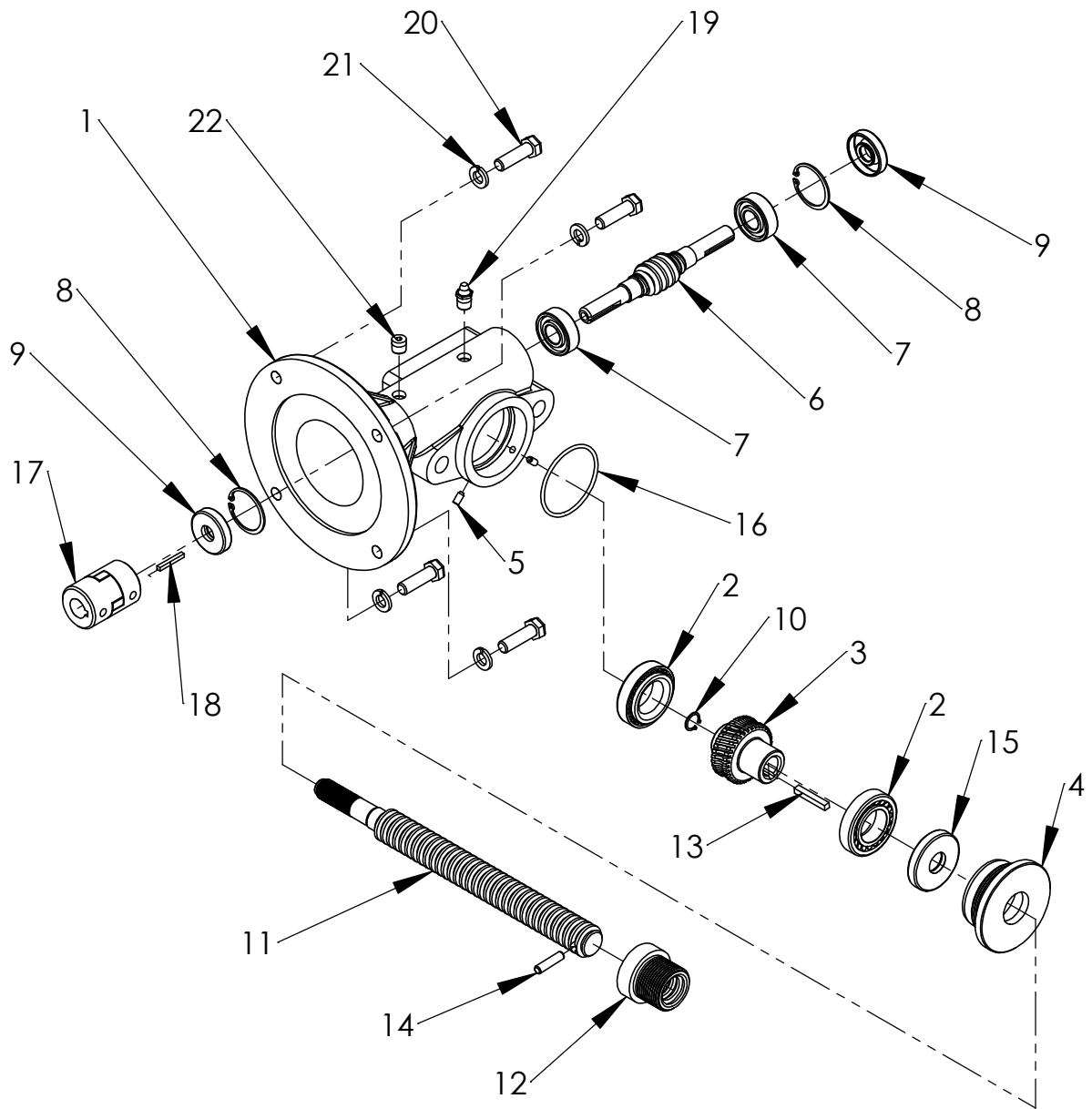
2-7 Assembly of Traveling Nut Actuator

1. Rest the actuator sleeve (1) on a work surface with the flange downward.
2. Install the worm shaft bearing (7) in the sleeve (1) by passing it through the wide opening at the side of the sleeve. Position it over the worm shaft opening. Seat the bearing with a tool.
3. Rotate the sleeve (1) so it rests on the base and install the lower thrust bearing (2) and O-ring (16).
4. Set the sleeve aside and continue.
5. Install the dowel pin (14) in the end of the screw (11).
6. Thread the traveling nut (12) on to the jackscrew (11). The flange of the traveling nut should be oriented toward the dowel pin (15).
7. First Insert the seal (16 TN), then the upper thrust bearing (2), into the sleeve cap (4).
8. Assemble the key (13), worm gear nut (3) and retaining ring (10) to the end of the jackscrew (11).
9. Insert the above assembly into the actuator sleeve (1).
10. Thread the sleeve cap (4) into the actuator sleeve (1) and tighten.
11. Insert the worm shaft (6) through the sleeve (1) toward the flange. Inside the sleeve, this will pass in front of the already assembled worm gear nut (3) and through the previously installed worm shaft bearing (7).
12. Install the other worm shaft bearing (7) over the end of the worm (6). Seat this in place.
13. Install the retaining ring (8).
14. Check that the worm shaft (6) rotates when turned by hand. Adjustments to change the stiffness of rotation of the worm shaft are made by loosening or tightening the threaded connection between the sleeve and the sleeve cap (4).
15. Spot drill through the threaded holes in the sleeve (1) and insert set screws (5).
16. Insert and seat the two worm shaft seals (9). Exercise care so the seals are not damaged on any sharp surfaces. Note: These seals are difficult to remove. Once they are removed, they must be replaced.
17. Use the key (19) to attach half the coupling (18) to the worm shaft.
18. Attach the other half of coupling (18) to the motor shaft.
19. Join the motor to the integrated actuator via the coupling. Align the motor mount holes to the mounting holes on the flange. Use lock washers and screws (20, 21) to fasten the motor to the integrated actuator
20. Insert the grease fitting (19) into the sleeve and partially fill the cavity with Ronex Extra Duty 1 grease.
21. Insert the pipe plug (22) in the sleeve.

Section III
Views & Parts List
3-1 Exploded View of Translating Tube Actuator



Section III
Views & Parts List
3-2 Exploded View of Traveling Nut Actuator



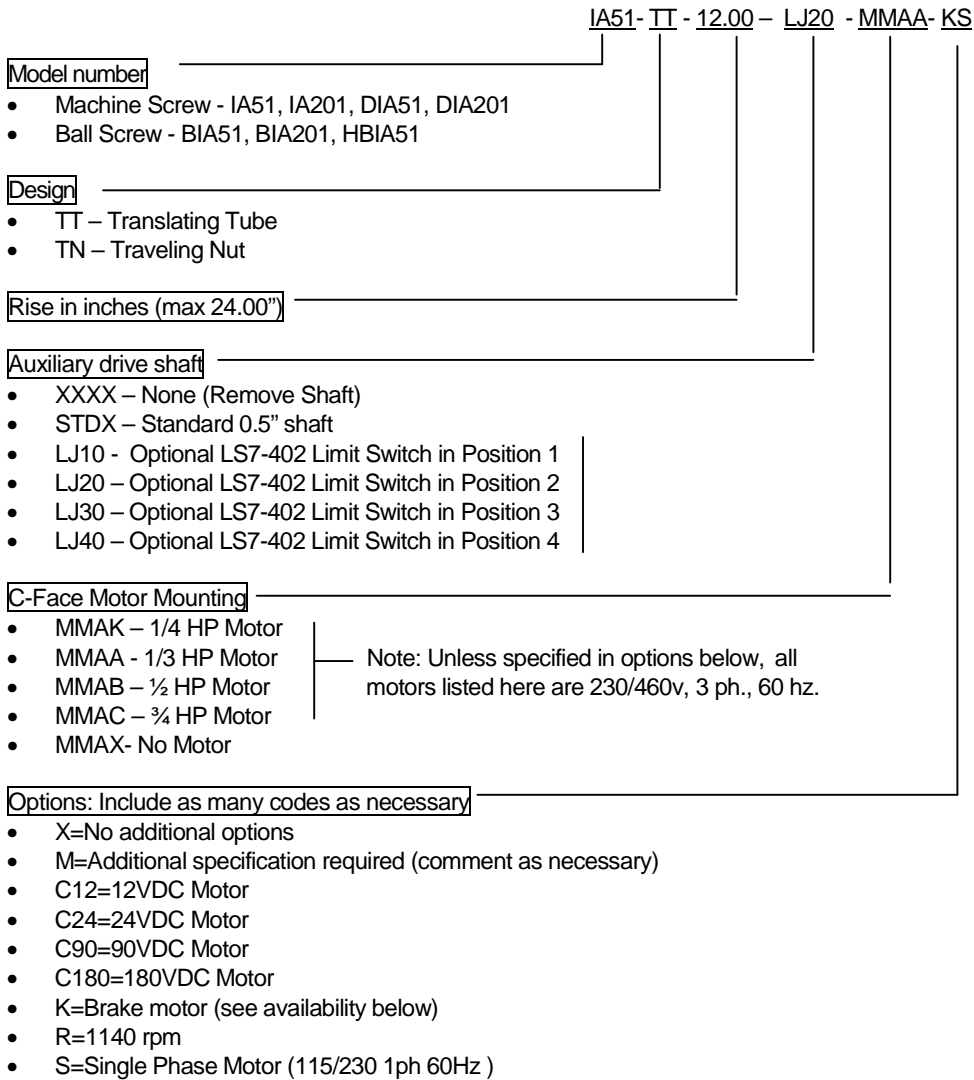
INTEGRATED ACTUATOR
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3-3 Parts List for Integrated actuator

Table 3-3 Parts list - Integrated Actuator (Acme)

Item	TRANSLATING TUBE MODEL Description (Qty.)	Item	TRAVELING NUT MODEL Description (Qty.)
1	Integrated actuator Sleeve (1)	1	Integrated actuator Sleeve(1)
2	Thrust Bearing (2)	2	Thrust Bearing (2)
3	Worm gear nut (1)	3	Worm gear nut (1)
4	Protection Tube (1)	4	Sleeve Cap (1)
5	Set Screw (2)	5	Set Screw (2)
6	Worm (1)	6	Worm (1)
7	Worm Shaft Bearing (2)	7	Worm Shaft Bearing (2)
8	Retaining Ring (2)	8	Retaining Ring (2)
9	Worm Shaft Seal (2)	9	Worm Shaft Seal (2)
10	Retaining Ring (1)	10	Retaining Ring (1)
11	Jack Screw (1)	11	Jack Screw (1)
12	Translating Tube Bushing (1)	12	Traveling Nut (1)
13	Translating Tube AY (1)	13	Key (1)
14	Key (1)	14	Dowel Pin (1)
15	Seal (1)	15	Seal (1)
16	Retaining Ring (2)	16	O Ring (1)
17	Air Vent 1/8 NPT (2)	17	Coupling (1)
18	Guide Bearing, LA15 (1)	18	Key (1)
19	O Ring (1)	19	Grease Fitting 1/8 NPT (1)
20	Seal (1)	20	Hex Head Screw (4)
21	Pipe Plug 1/8-27 NPT (3)	21	Lock Washer (4)
22	Large Decal (1)	22	Pipe Plug 1/8-27 NPT (1)
23	Coupling (1)	23	Name Plate (1)
24	Key (1)	24	Drive Screw (2)
25	Dowel Pin (1)		
26	Hex Head Screw (4)		
27	Lock Washer (4)		
28	Grease Fitting 1/8 NPT (1)		
29	Name Plate (1)		
30	Drive Screw (2)		

3-4 Integrated Actuator Part Number Structure & Serial Number Tag



Example: IA51TT-12.00-LI20-MMAA-KS is a 5:1 Ratio translating tube integrated actuator with 12" travel, a LS7-402 limit switch in position 2, and a 1/3 HP single phase brake motor.

Serial Number Tag



To obtain product information needed for maintenance, repair, and reorder, contact Joyce Dayton Corporation and provide the serial number.

