Data Sheet D-A-UP_G

Actuators & Positioners
Models UP1/2/3/4/5/6/7

Universal Pneumatic Rotary Actuators

Wide Range of Torque Ratings
Six actuator sizes available in ratings from 122 to 7320 Newton meter (90 to 5400 foot-pounds). 12745 Newton meter (9400 foot-pounds) with Master-slave solution.

Easy and Flexible Installation
Place in convenient locations and connect to driven device by standard linkage components.

Control modes for safe operation
Options available for Fail-Safe or Fail-in-Place on loss of control input and air supply.

Suitable for High Temperature Environments
Use in ambient temperatures up to 82ºC (180ºF), depending on control input.
(Refer to Specifications for temperature limitations.)

Adjustable Relationship Between Control Signal and Output Shaft Position
Adjusts easily with use of standard positioner characteristics: linear, square, and square root relationship or custom-shaped.

Conventional or Digital Positioner Options
Complete range of control signal options including the TZIDC with HART digital communications and explosion proof versions.

Manual Operation
Quick and smooth transfer shifts easily from automatic to manual control.

Wide Range of Options Available
Factory installed NEMA 4X enclosure, pneumatic or electric shaft position transmitter, alarm/travel switches, air failure lock, and heated enclosures available.

Actuators & Positioners
Models UP1/2/3/4/5/6/7

Universal Rotary Actuators
Type UP Pneumatic

The Type UP Pneumatic Universal Rotary Actuators regulate dampers, fan inlet vanes, lever-operated valves, turbine governors, fluid drives and other final control elements (See Figure 1).

These actuators accept electric or pneumatic control signals. This provides modulating or on/off control power to position devices through mechanical linkage or by direct coupling.

Types UP1 and UP2 actuators include a double-acting rotary vane power unit. Types UP3, UP4, UP5 and UP6 actuators include a double-acting piston with a motion conversion mechanism to convert linear to rotary motion.

Order the actuator with a positioner, or a single or double acting on/off solenoid valve. Refer to ordering information.

Actuators with a positioner include a TZIDC or Type AV Characterizable Positioners. The AV positioner is a push-pull action, force balance type control instrument. It offers a variety of input ranges including 21 to 103 kilopascals (3 to 15 psig), 21 to 186 kilopascals (3 to 27 psig) or 4 to 20 milliamps.

With the AV positioner, there are standard cams for linear, square, or square root relationships between the control input and output position. Custom shaping the cam provides for specific positioning control characterization of the relationsip between the input signal and the output shaft position.

With the TZIDC positioner, characterization is done electronically. The positioner acts as a pneumatic relay, through a separate air supply it produces the differential pressure that moves the actuator into position.

The TZIDC "Smart" positioner is available on all sizes of UP drives. The TZIDC offers the advantages of:

1. Configurable Smart Digital Positioner with diagnostics and digital communication capability via HART protocol
2. AUTOSTROKE function provides for self-calibration and self-tuning
3. Modular: Options or replacement parts can be added easily in the field.
4. As a Field IT device, it can be integrated as part of the ABB Asset Management solutions.
5. Integral Analog or Digital Position Feedback
6. Fail Open/Close or Fail-in-Place on loss of input signal.
7. High immunity to shock and vibration.
8. Low flow cut-off for valve or damper applications.
9. Configurable custom characterization to correct for non-linear flow characteristics of the damper or butterfly valve.
10. * FM/CSA Approved for use in intrinsically safe applications. The TZIDC can be used in Div. 2, Non-Incendive applications without barriers.
11. * The TZIDC-200 can be used in Class I, Div. 1, Gr C-G, Explosion Proof Environments.

* *Refer to the ordering information for option combinations. Also call factory for hazardous application solutions.*

Actuators with a solenoid valve provide on/off control. In this case, positioning of the actuator is at either of the extreme ends of travel (0 percent or 100 percent). The solenoid valve is suitable for 120 VAC, 115/125 VDC or 220 VAC service, single coil for fail-safe or dual coil for Fail-in-Place on loss of coil voltage. Refer to ordering information.

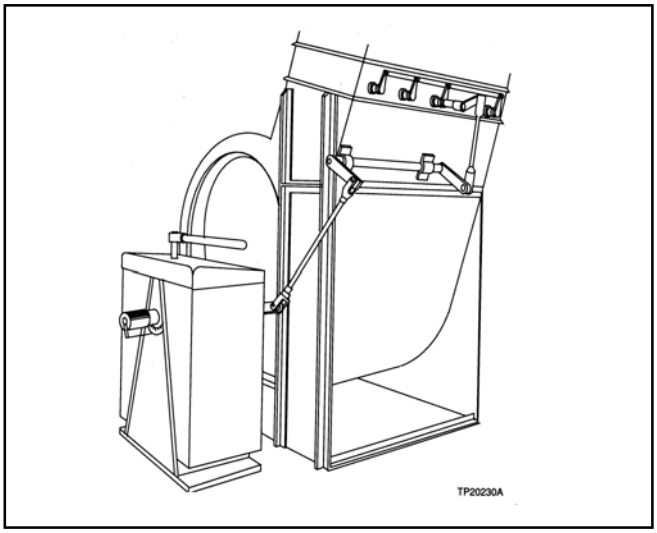


Figure 1. Typical Fan Damper Control Application

Engineering Specifications

Operating Torque
See Table 1 and Figures 2 & 3 for operating torque versus air supply pressure.

Supply Pressure
40 to 100 psig with AV Positioners
40 to 90 psig with TZIDC Positioners

Stroke Times
See Figures 4 through 14

TABLE 1. - Suggested Maximum Operating Torques at Minimum and Maximum Supply Pressures [1]

UP1			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	40	276	54
45	44.2	310	59.7
50	48.3	345	65.3
55	52.5	379	71
60	56.7	414	76.7
65	60.8	448	82.3
70	65.0	483	88
75	69.2	517	93.7
80	73.3	552	99.3
85	77.5	586	105
90	81.7	621	110.7
95	85.8	655	116.3
100	90	690	122

UP2			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	165	276	224
45	188.8	310	256.2
50	212.5	345	288.3
55	236.3	379	320.5
60	260.0	414	352.7
65	283.8	448	384.8
70	307.5	483	417
75	331.3	517	449.2
80	355.0	552	481.3
85	378.8	586	513.5
90	402.5	621	545.7
95	426.3	655	577.8
100	450	690	610

UP3			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	325	276	441
45	364.6	310	494.7
50	404.2	345	548.3
55	443.8	379	602
60	483.3	414	655.7
65	522.9	448	709.3
70	562.5	483	763
75	602.1	517	816.7
80	641.7	552	870.3
85	681.3	586	924
90	720.8	621	977.7
95	760.4	655	1031.3
100	800	690	1085

UP4			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	550	276	746
45	625.0	310	847.7
50	700.0	345	949.3
55	775.0	379	1051
60	850.0	414	1152.7
65	925.0	448	1254.3
70	1000.0	483	1356
75	1075.0	517	1457.7
80	1150.0	552	1559.3
85	1225.0	586	1661
90	1300.0	621	1762.7
95	1375.0	655	1864.3
100	1450	690	1966

UP5			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	1060	276	1437
45	1205.0	310	1633.6
50	1350.0	345	1830.2
55	1495.0	379	2026.75
60	1640.0	414	2223.3
65	1785.0	448	2419.9
70	1930.0	483	2616.5
75	2075.0	517	2813.1
80	2220.0	552	3009.7
85	2365.0	586	3206.25
90	2510.0	621	3402.8
95	2655.0	655	3599.4
100	2800	690	3796

UP6			
supply, psig	torque, ft-lbs	supply, kPa	torque, Nm
40	1900	276	2576
45	2133.3	310	2892.3
50	2366.7	345	3208.7
55	2600.0	379	3525
60	2833.3	414	3841.3
65	3066.7	448	4157.7
70	3300.0	483	4474
75	3533.3	517	4790.3
80	3766.7	552	5106.7
85	4000.0	586	5423
90	4233.3	621	5739.3
95	4466.7	655	6055.7
100	4700	690	6372

Note 1: Maximum supply pressure for UP with TZIDC positioner option is 90 psi

Actuators & Positioners
Models UP1/2/3/4/5/6/7

Volume Displacement for 90°
Mechanical Output Rotation
- UP1: 655 cm^3 (40 $in.^3$) Rotary Vane
- UP2: 1965 cm^3 (120 $in.^3$) Rotary Vane
- UP3: 3685 cm^3 (225 $in.^3$) Cylinder [15 x 20 cm (6 x 8 in.)]
- UP4: 6550 cm^3 (400 $in.^3$) Cylinder [20 x 20 cm (8 x 8 in.)]
- UP5: 13,110 cm^3 (800 $in.^3$) Cylinder [20 x 41 cm (8 x 16 in.)]
- UP6: 20,565 cm^3 (1255 $in.^3$) Cylinder [25 x 41 cm (10 x 16 in.)].

Engineering Specifications

Temperature Limits:

-40 to 82ºC (-40 to 180ºF)[1] for UP with AV positioners

-40 to 85ºC (-40 to 185ºF) for UP with TZIDC positioners

The low temperature operative limit can be extended below 0ºC (32ºF) without heaters if the dew point of the air supply is maintained at least 10ºC (18ºF) below the minimum expected ambient temperature.

Note 1: Some actuator/positioner combinations may have slightly higher minimum, and slightly lower maximum operating temperatures. Refer to the appropriate positioner specification for temperature limitations.

Mechanical Rotation

UP1 & UP2: Rotary vane stroke is nominally set for 90° rotation, but can be adjusted over a range from 80° to 92° via adjustable mechanical stop.

UP3, UP4, UP5 & UP6: Stroke of the cylinder provides a 90° rotation of the output lever.

Positioner: Refer to Spec/Data Sheet for details on Type AV or TZIDC positioners.

Positioner Input Signal:

- AV1: 21 to 103 kPa (3 to 15 psig); 21 to 186 kPa (3 to 27 psig); 50% range suppression and/or zero elevation capability.
- AV2: 4 to 20mA goes to 0% (direct acting) or 100% (reverse acting) on loss of input signal.
- AV3: 4 to 20 mA (holds position on loss of input signal).
- TZIDC: 4 to 20 mA (fail-safe) goes to 0% or 100%, or (fail-freeze) remains in position upon loss of input signal. Refer to nomenclature.

Air Consumption (nominal) at Balance with Positioner:

AV: Typical 188.8 cm^3/s (0.4 scfm) @ 517.1 kPa (75.0 psig) supply at null

TZIDC: < 0.03 kg/h (0.015scfm) at null independent of supply pressure

Air Supply:

For UP with TZIDC Positioner the maximum air supply is 90 psi.

For UP with AV the maximum air supply is 100 psi.

Positioner Action: Direct action is standard. With increasing signal, actuator lever rotates as follows:

- UP1: Counterclockwise when facing lever
- UP2: Clockwise when facing lever
- UP3/4*: Clockwise when facing lever
- UP5/6*: Counterclockwise when facing lever

*Note *: UP3 thru UP6 can have lever mounted on either side of actuator. Factory delivery provides lever on left-side for UP3 & 4 and on right-side for UP5 & 6 when facing positioner.*

Performance Specifications:

Refer to the appropriate positioner specification for hysteresis, resolution, deadband, repeatability, etc.

Solenoid Type & Coil Specifications

4-way, 2-position, 2-wire type (UP_ _5 and UP_ _6).
4-way, 2-position, 4-wire type (UP_ _8 and UP_ _9).
UP1 and UP2: NEMA 4X enclosure rating.
CSA certified 120 VAC or 240 VAC, 50/60 Hz, 10.1 W ; or 125 VDC, 11.6 W
UP3, UP4, UP5 & UP6: NEMA[2] enclosure rating.
CSA certified 120 VAC or 240 VAC, 50/60 Hz, 10.1 W; or 125 VDC, 11.6 W

Note 2: The solenoid valve is mounted inside the actuator enclosure on these models, so the environmental rating of the entire unit is a function of the environmental rating of the actuator enclosure. See nomenclature.

External Connections

Air Supply:
- UP1 and UP2: 1/4 - 18 NPT female
- UP3 and UP4: 1/4 - 18 NPT female
- UP5 and UP6: 1/2 - 14 NPT female

Pneumatic Signal:
1/4-18 NPT female when using Type AV11 or AV12 positioners as the control input.

Air Failure Reset: 1/4-18 NPT female

Electrical Conduit:
Cutouts for 1/2 in. and 3/4 in. NPT female when using Type AV2, AV3 and TZIDC positioners, or a solenoid valve for the control input.

Manual Operator

- UP1 & UP2: Lever type with manual locking bolt.
- UP3 & UP4: Split nut with locking ratchet.
- UP5 & UP6: Gear type with self-locking ratchet.

Materials of Construction

Frame: Carbon Steel
Output Shaft: Carbon Steel
Top Covers: Sheet metal
End Covers: Sheet metal
Actuators UP1 & UP2:
Die Cast aluminum rotary vane housing.
Actuators UP3, UP4, UP5 & UP6:
High tensile aluminum allow hard coated to 60Rc cylinder housing and high strength 6061-T6 aluminum alloy and flanges.
Seals on vane, vane shaft, piston & piston rod:
Nitrile rubber.
Coating on metal parts:
Corrosion-resistant polyurethane

Engineering Specifications

Storage:

Store in a dry, indoor location not subject to rapid temperature changes that would cause condensation to form inside the unit.

Storage Temperature Limits:

-40 to 82ºC (-40 to 180ºF) with AV positioners
-40 to 85ºC (-40 to 185ºF) with TZIDC positioners

Enclosure Certification:

NEMA 3R Standard
NEMA 4X - Must be ordered by nomenclature. Refer to order code breakdown.

Agency Approvals:

cFMus certified for use in general purpose (non-hazardous) locations.

Weight: Refer to Tables 3 and 4.

Options and Accessories

Shaft Position Transmitter:

Electric (external to positioner):
4 to 20mA linear output relative to the actuator shaft position. Use AVPT position transmitter as a non-standard option. Only possible on UP2 - 6 if code, UP_ _ _ C _ _ _ is not selected.
Consult factory for details.

Electric (internal to positioner):
Two-wire unit requiring a 12 to 34 VDC supply and producing a 4 to 20 mA linear output relative to the actuator shaft position.

Pneumatic:
Produces a 21 to 103 kPa (3 to 15 psig) or 21 to 186 kPa (3 to 27 psig) linear output relative to the actuator shaft position. Minimum required air supply is 138 kPa (20 psig). The output may be characterized by the user (not available for Type UP1 actuators).

Potentiometric Resistive:

A potentiometer internal to the Types AV1, AV2 and AV3 positioners. Gears connect the potentiometer to the positioner output shaft.The position of the potentiometer shaft indicates the actuator shaft position. The relationship between the potentiometer and the output shaft results in one degree of rotation of the output shaft corresponding to approximately 9.9 ohms of resistive change at the potentiometer. Refer to the appropriate Type AV positioner instruction for more information.

Adjustable Alarm/Travel Switches:

Consists of four or two (see options) linkage-driven, cam-operated SPDT microswitches, adjustable over the full stroke of the actuator. Used as alarm contacts or for external position indications.

Contact Ratings:

15A @ 125 VAC @ 60ºC (140ºF).
0.5A @ 125 VAC or 250 VDC @ 60ºC (140ºF).
Switch contacts must be derated 1.5 A for every 10°C (18ºF) rise above 60ºC (140ºF)

Air Failure Lock:

Locks actuator in its last position when the air supply falls below a preset value. Each actuator includes a pneumatic pushbutton and contains hardware for local or remote reset connection.

UP1 & UP2:

Mechanical latch device with a three-way pneumatic trip valve as the air supply sensor. Trip valve factory preset at 35 psig. Trip valve can also be readjusted at site.

UP3, UP4, UP5 & UP6:

Uses a three-way pneumatic trip valve as the air supply sensor, that trips one four-way (UP3 and UP4) or two three-way (UP5 and UP6) lock-up valves to lock the actuator in the last position. Includes a pressure switch used to signal an air failure alarm or for a status light. Trip valve and pressure switch factory preset at 55 psig; both can also be readjusted at site.

Reserve Air Tank:

Available for all but UP1. Drives actuator into the full open or full closed position when the air supply falls below a preset value. Factory preset values are 35 psig for UP2 & 55 psig for UP3/4/5/6. Value can also be readjusted at site. Tank sizes are 20.8 L (5.5 gal) for UP2, 30.3 L (8.0 gal) for UP3/4/5, and 64.4 L (17.0 gal) for UP6.

Alarm Pressure Switch Contact Ratings: [1]

13A @ 115/230 VAC @ 60ºC (140ºF)
0.5A @ 110/125VDC @ 60ºC (140ºF)
Switch contacts must be derated 1.5 A for every 10ºC (18ºF) rise above 60ºC (140ºF)

Note 1: Not available in combination with TZIDC-200 Explosion-Proof Positioner. Consult factory for details.
Note 2: Special solutions available on request. Consult factory.

Strip Heaters (Thermostatically Controlled)

Available for all except Type UP1 actuators and UP's with Explosion Proof TZIDC-200 Positioner. The low temperature operative limit can be extended below 0ºC (32ºF) without heaters if the dew point of the air supply is maintained at least 10ºC (18ºF) below the minimum expected ambient temperature.

UP2: 1 heater element,
120 VAC,
500 W.

UP3, UP4, UP5 & UP6:
2 heater elements,
120 VAC,
500 W (1000 W total).

Volume Boosters & Quick Exhaust Valves:

To decrease stroke time.
Option available on UP6
Refer to Figure 13 for stroke time

Accessories

Coalescing Filter/Regulator for UP3-6:
Parker No. 12E37E18AA & PS807P
Auto float drain
1/2" NPT connections
40 SCFM capacity
250 psi maximum inlet
125 psi maximum outlet
with mounting bracket

Coalescing Filter for UP1-2:
Parker No. 11F18EC
Auto float drain
1/4" NPT connections
45 scfm capacity
250 psi maximum inlet

Regulator with gage for UP1-2:
Parker No. 06R118AC
1/4" NPT connection
53 scfm capacity
250 psi maximum inlet
125 psi maximum outlet

Pressure Switch:
Part No. 1941099_2 (UP1 and UP2)

Pressure Gages:
Instrument signal (3-15psi) for AV1 positioner
Output pressure for AV & TZIDC
Part No. 5326605_4 (Instrument one required)
Part No. 5326605_6 (Output, two required).

Speed Control:
Regulates time constant of positioner and final control element. Orifices installed directly into the positioner output ports (only for AV positioners).
Part No. 5327327_1: 1 mm (0.04 in.).
Part No. 5327327_2: Blank - Drill to suit.
For TZIDC positioners the speed control is electronically adjustable.
(Refer to TZIDC configuration)

TABLE 3. Type UP Actuator Shipping Weights

Actuator Type	Shipping Weight kg (lb)
UP10A/10B/10C/104/107	25 (55)
UP105/106/108/109	23 (50)
UP20A/20B/20C/204/207	45 (100)
UP205/206/208/209	43 (95)
UP3 A/3 B/3 C/3 4/3 7	145 (320)
UP3 5/3 6/3 8/3 9	143 (315)
UP4 A/4 B/4 C/4 4/4 7	163 (360)
UP4 5/4 6/4 8/4 9	162 (355)
UP5 A/5 B/5 C/5 4/5 7	336 (741)
UP5 5/5 6/5 8/5 9	334 (736)
UP6 A/6 B/6 C/6 4/6 7	369 (814)
UP6 5/6 6/6 8/6 9	367 (809)

TABLE 4. Option Shipping Weights [1]

Option	Shipping Weight - kg (lb)
Electric Shaft Position Transmitter	1.8 (4.0)
Pneumatic Shaft Position Transmitter	5.0 (11.0)
Alarm/Travel Switches	1.1 (2.5)
Strip Heaters	1.1 (2.5) for UP2 Actuator 2.0 (4.5) for all others
Air Failure Lock	3.6 (8.0) for UP1 Actuator 5.0 (11.0) for UP2 Actuator 5.9 (13.0) for UP3 and UP4 Actuator 6.8 (15.0) for UP5 and UP6 Actuator

Note 1: Add these values to those listed in Table 3 where applicable.

Operating Torque/ Stroke Time

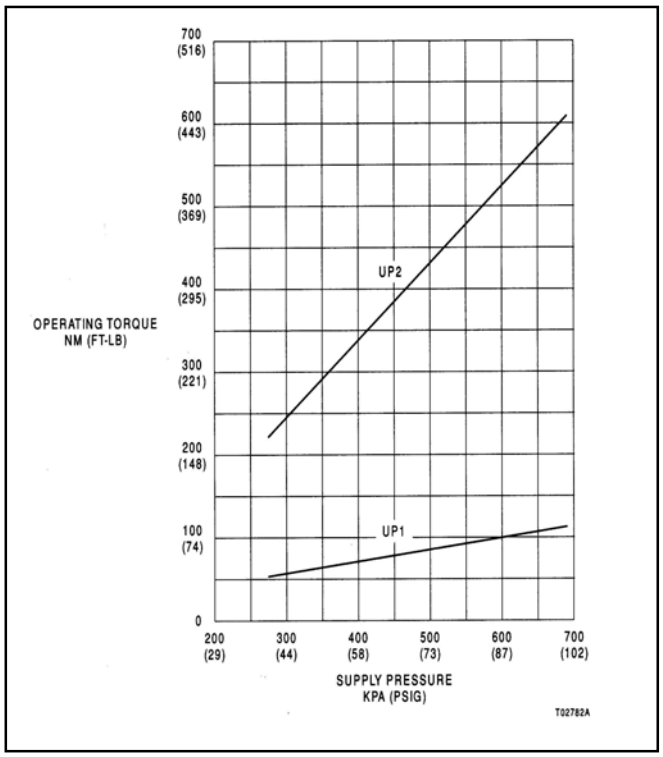


Figure 2. Operating Torque Versus Supply Pressure for Type UP1 and UP2 Actuators

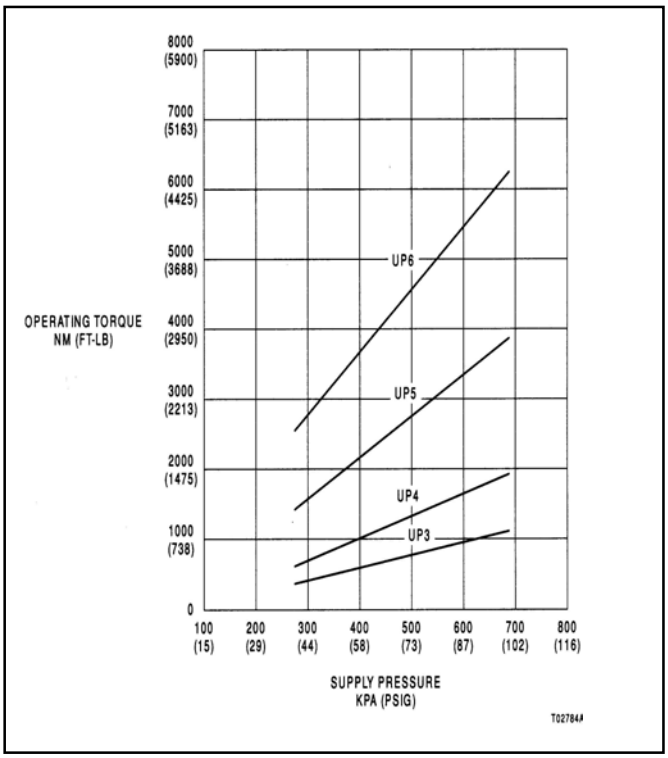


Figure 3. Operating Torque Versus Supply Pressure for Types UP3 through UP6 Actuators

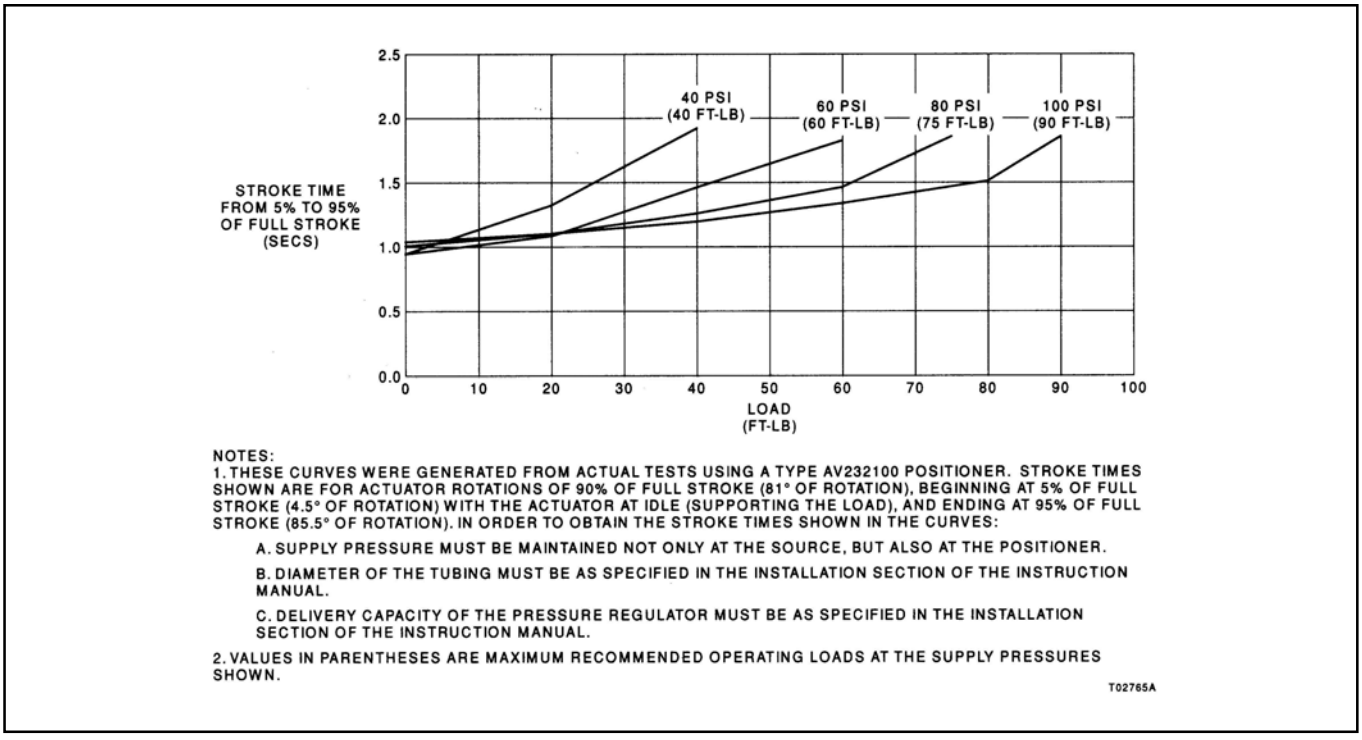


Figure 4. Stroke Times for Type UP1 Actuator with Type AV2 Positioner - 5 to 95% of Stroke

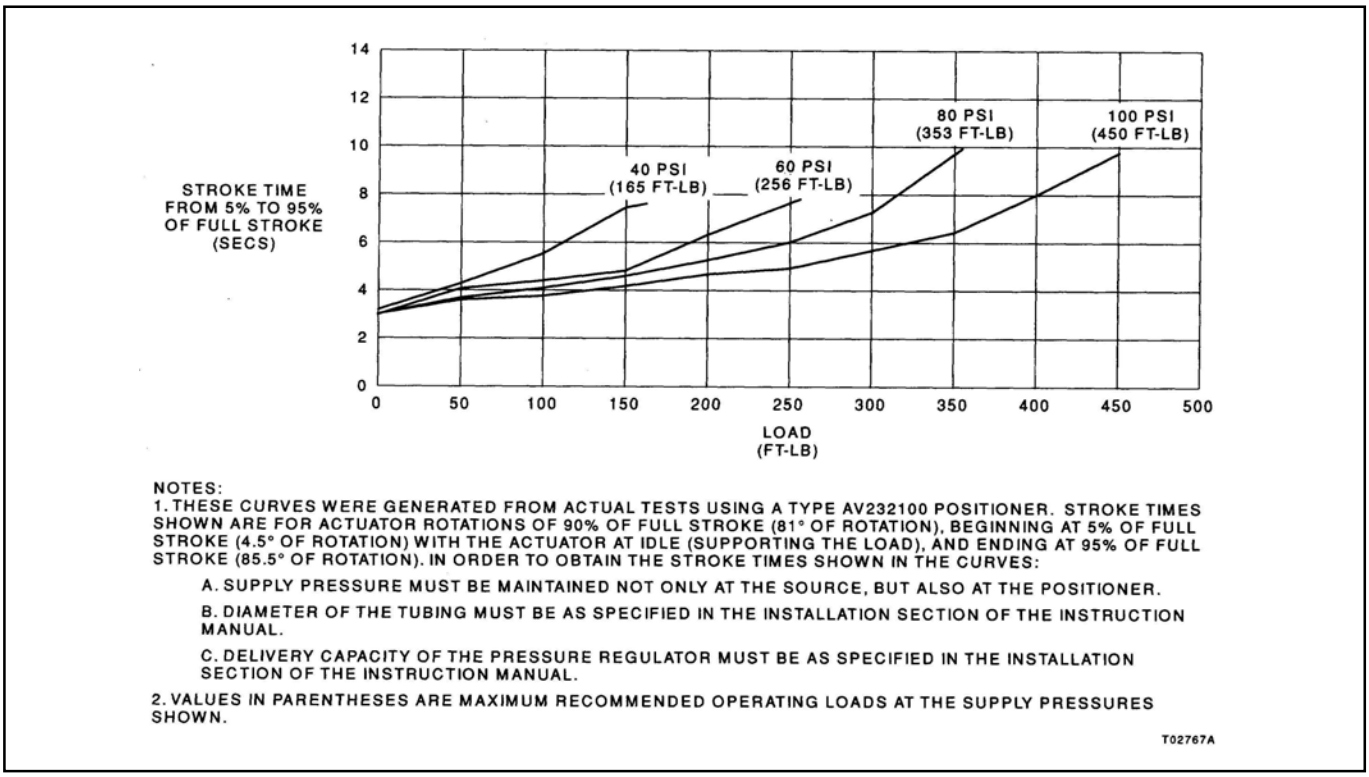


Figure 5. Stroke Times for Type UP2 Actuator with Type AV2 Positioner - 5 to 95% of Stroke

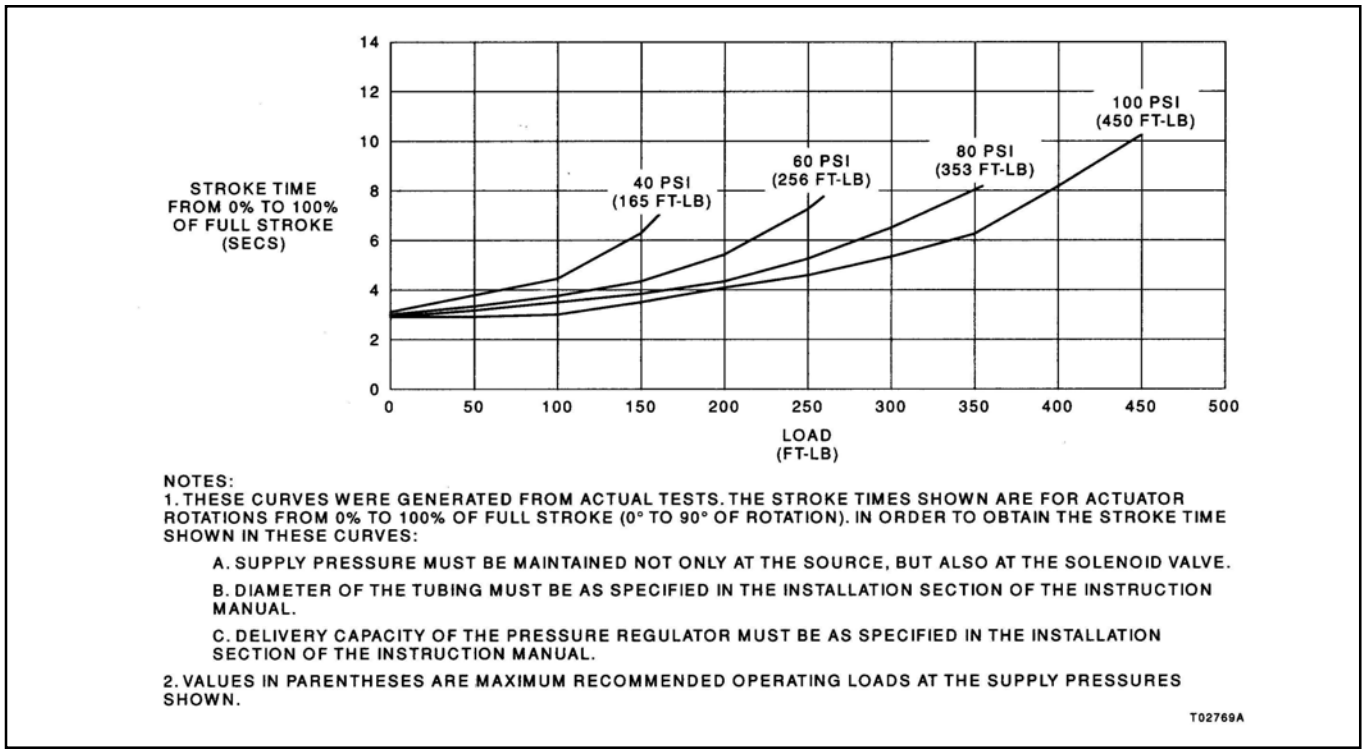
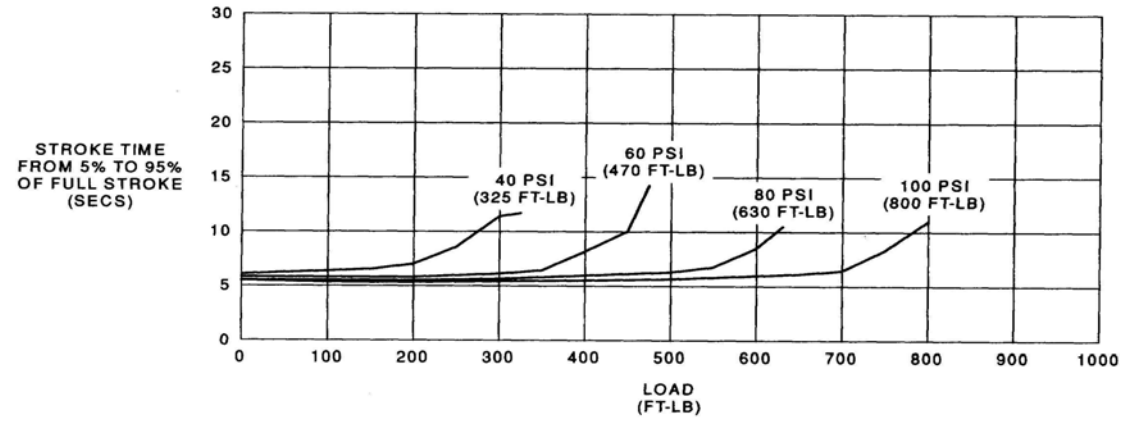


Figure 6. Stroke Times for Type UP2 Actuator with Solenoid Valve



NOTES:
1. THESE CURVES WERE GENERATED FROM ACTUAL TESTS USING A TYPE AV232100 POSITIONER. STROKE TIMES SHOWN ARE FOR ACTUATOR ROTATIONS OF 90% OF FULL STROKE (81° OF ROTATION), BEGINNING AT 5% OF FULL STROKE (4.5° OF ROTATION) WITH THE ACTUATOR AT IDLE (SUPPORTING THE LOAD), AND ENDING AT 95% OF FULL STROKE (85.5° OF ROTATION). IN ORDER TO OBTAIN THE STROKE TIMES SHOWN IN THE CURVES:

A. SUPPLY PRESSURE MUST BE MAINTAINED NOT ONLY AT THE SOURCE, BUT ALSO AT THE POSITIONER.

B. DIAMETER OF THE TUBING MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

C. DELIVERY CAPACITY OF THE PRESSURE REGULATOR MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

2. VALUES IN PARENTHESES ARE MAXIMUM RECOMMENDED OPERATING LOADS AT THE SUPPLY PRESSURES SHOWN.

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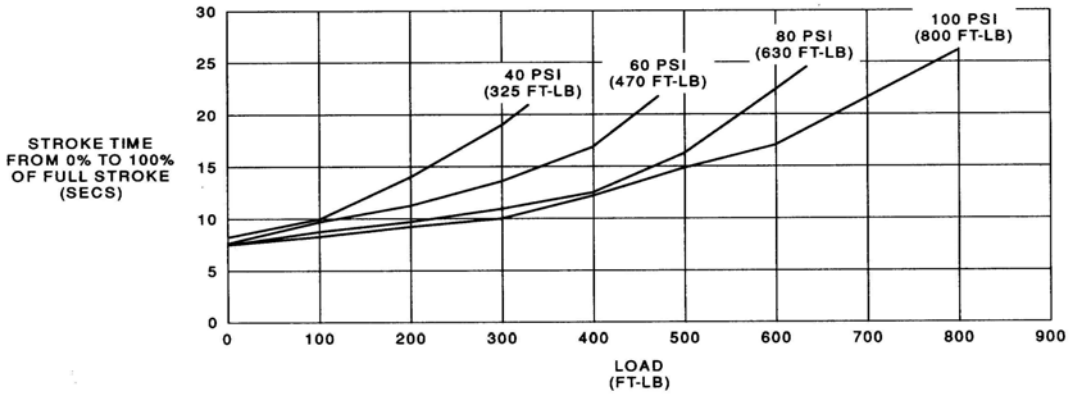
Figure 7. Stroke Times for Type UP3 Actuator with
Type AV2 Positioner - 5 to 95% of Stroke



NOTES:
1. THESE CURVES WERE GENERATED FROM ACTUAL TESTS. THE STROKE TIMES SHOWN ARE FOR ACTUATOR ROTATIONS FROM 0% TO 100% OF FULL STROKE (0° TO 90° OF ROTATION). IN ORDER TO OBTAIN THE STROKE TIME SHOWN IN THESE CURVES:

A. SUPPLY PRESSURE MUST BE MAINTAINED NOT ONLY AT THE SOURCE, BUT ALSO AT THE SOLENOID VALVE.

B. DIAMETER OF THE TUBING MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

C. DELIVERY CAPACITY OF THE PRESSURE REGULATOR MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

2. VALUES IN PARENTHESES ARE MAXIMUM RECOMMENDED OPERATING LOADS AT THE SUPPLY PRESSURES SHOWN.

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Figure 8. Stroke Times for Type UP3 Actuator with Solenoid Valve

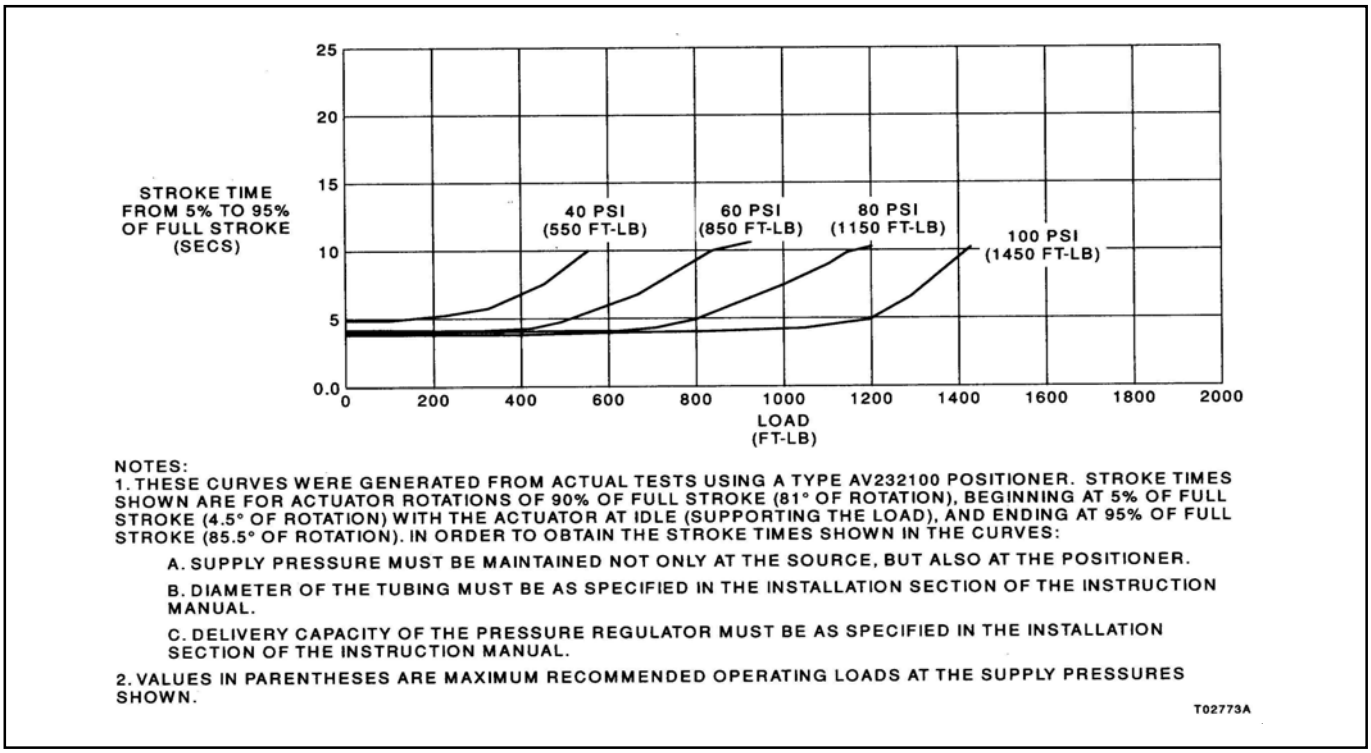


Figure 9. Stroke Times for Type UP4 Actuator with
Type AV2 Positioner - 5 to 95% of Stroke

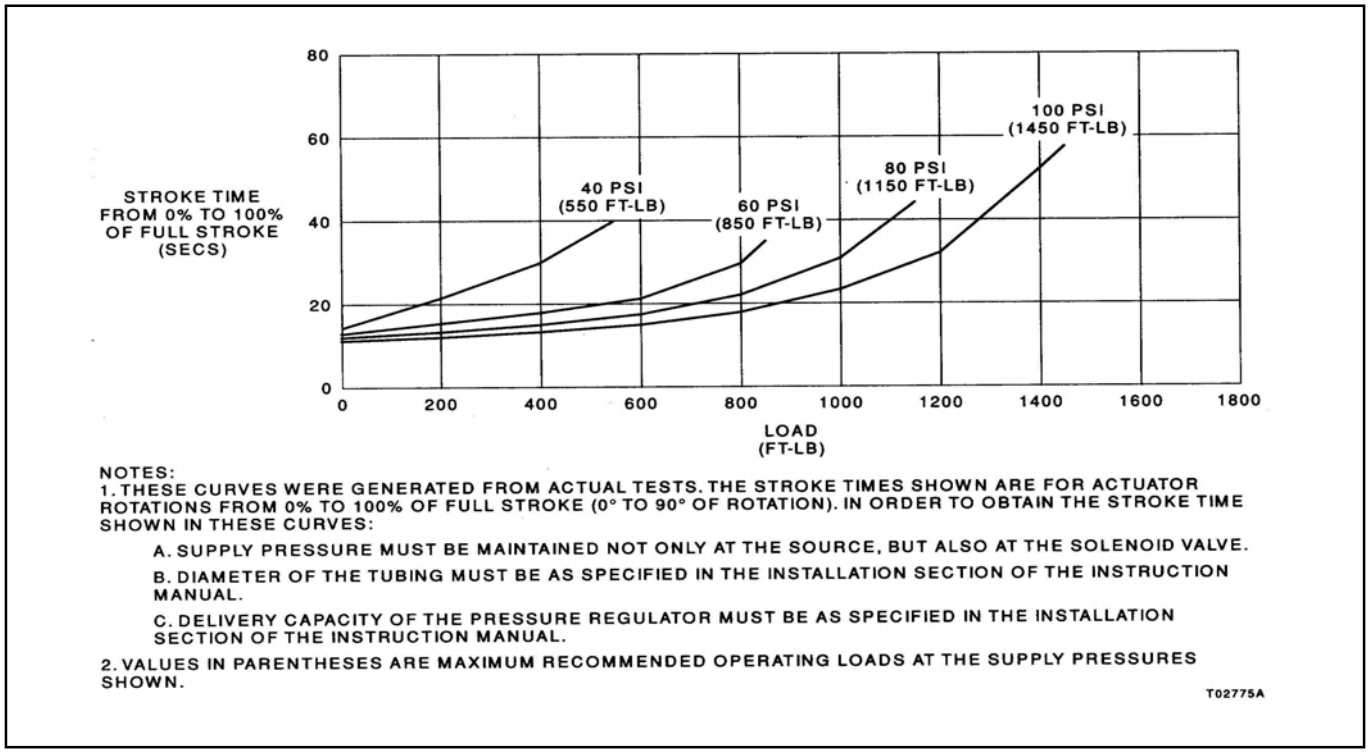


Figure 10. Stroke Times for Type UP4 Actuator with Solenoid Valve

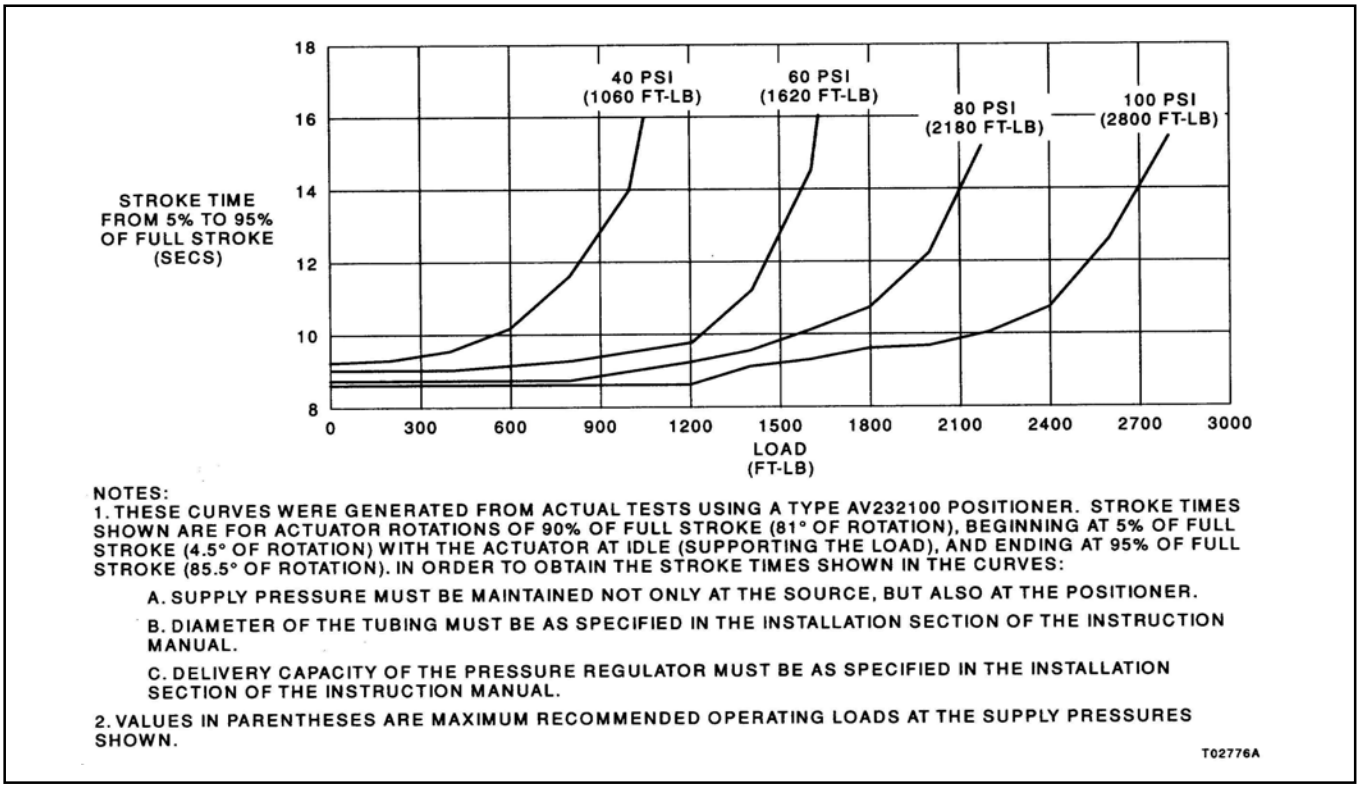


Figure 11. Stroke Times for Type UP5 Actuator with
Type AV2 Positioner - 5 to 95% of Stroke

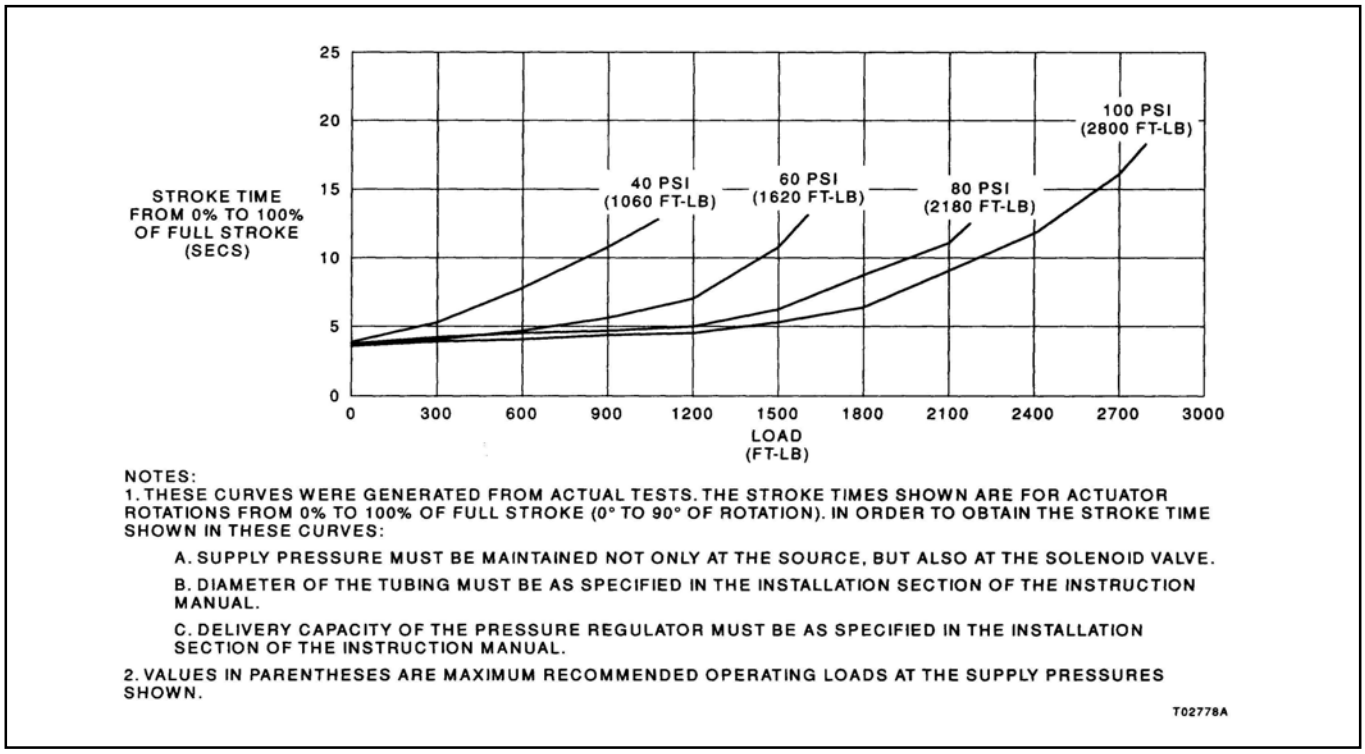
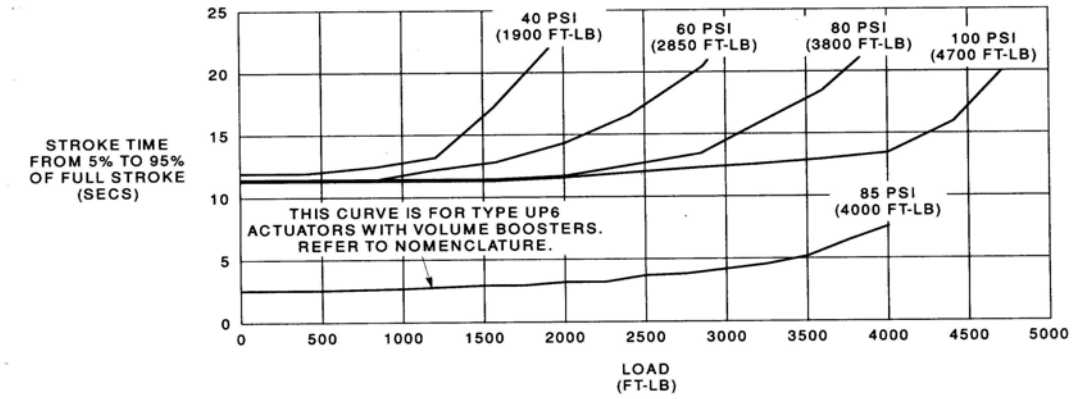


Figure 12. Stroke Times for Type UP5 Actuator with Solenoid Valve



NOTES:
1. THESE CURVES WERE GENERATED FROM ACTUAL TESTS USING A TYPE AV232100 POSITIONER. STROKE TIMES SHOWN ARE FOR ACTUATOR ROTATIONS OF 90% OF FULL STROKE (81° OF ROTATION), BEGINNING AT 5% OF FULL STROKE (4.5° OF ROTATION) WITH THE ACTUATOR AT IDLE (SUPPORTING THE LOAD), AND ENDING AT 95% OF FULL STROKE (85.5° OF ROTATION). IN ORDER TO OBTAIN THE STROKE TIMES SHOWN IN THE CURVES:

A. SUPPLY PRESSURE MUST BE MAINTAINED NOT ONLY AT THE SOURCE, BUT ALSO AT THE POSITIONER.

B. DIAMETER OF THE TUBING MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

C. DELIVERY CAPACITY OF THE PRESSURE REGULATOR MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

2. VALUES IN PARENTHESES ARE MAXIMUM RECOMMENDED OPERATING LOADS AT THE SUPPLY PRESSURES SHOWN.

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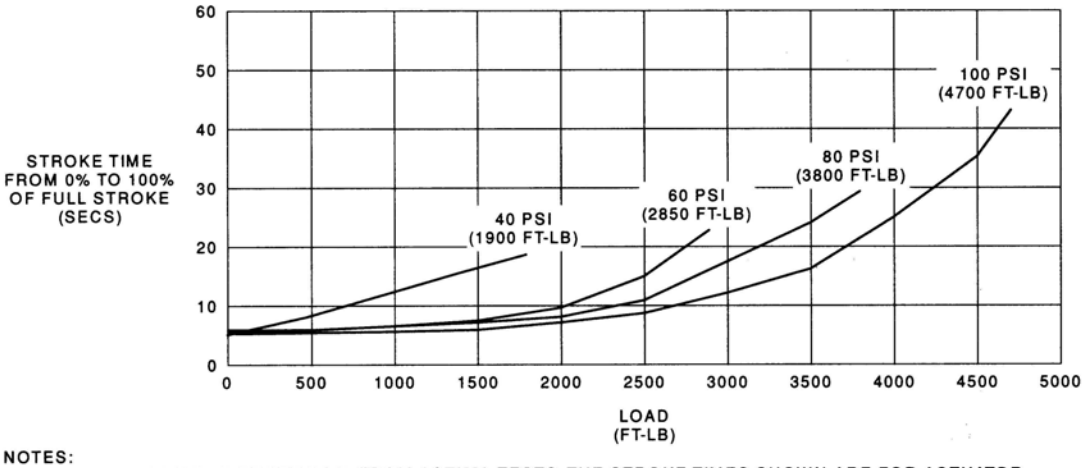
Figure 13. Stroke Times for Type UP6 Actuator with Type AV2 Positioner - 5 to 95% of Stroke



NOTES:
1. THESE CURVES WERE GENERATED FROM ACTUAL TESTS. THE STROKE TIMES SHOWN ARE FOR ACTUATOR ROTATIONS FROM 0% TO 100% OF FULL STROKE (0° TO 90° OF ROTATION). IN ORDER TO OBTAIN THE STROKE TIME SHOWN IN THESE CURVES:

A. SUPPLY PRESSURE MUST BE MAINTAINED NOT ONLY AT THE SOURCE, BUT ALSO AT THE SOLENOID VALVE.

B. DIAMETER OF THE TUBING MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

C. DELIVERY CAPACITY OF THE PRESSURE REGULATOR MUST BE AS SPECIFIED IN THE INSTALLATION SECTION OF THE INSTRUCTION MANUAL.

2. VALUES IN PARENTHESES ARE MAXIMUM RECOMMENDED OPERATING LOADS AT THE SUPPLY PRESSURES SHOWN.

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Figure 14. Stroke Times for Type UP6 Actuator with Solenoid Valve

Dimensional Detail

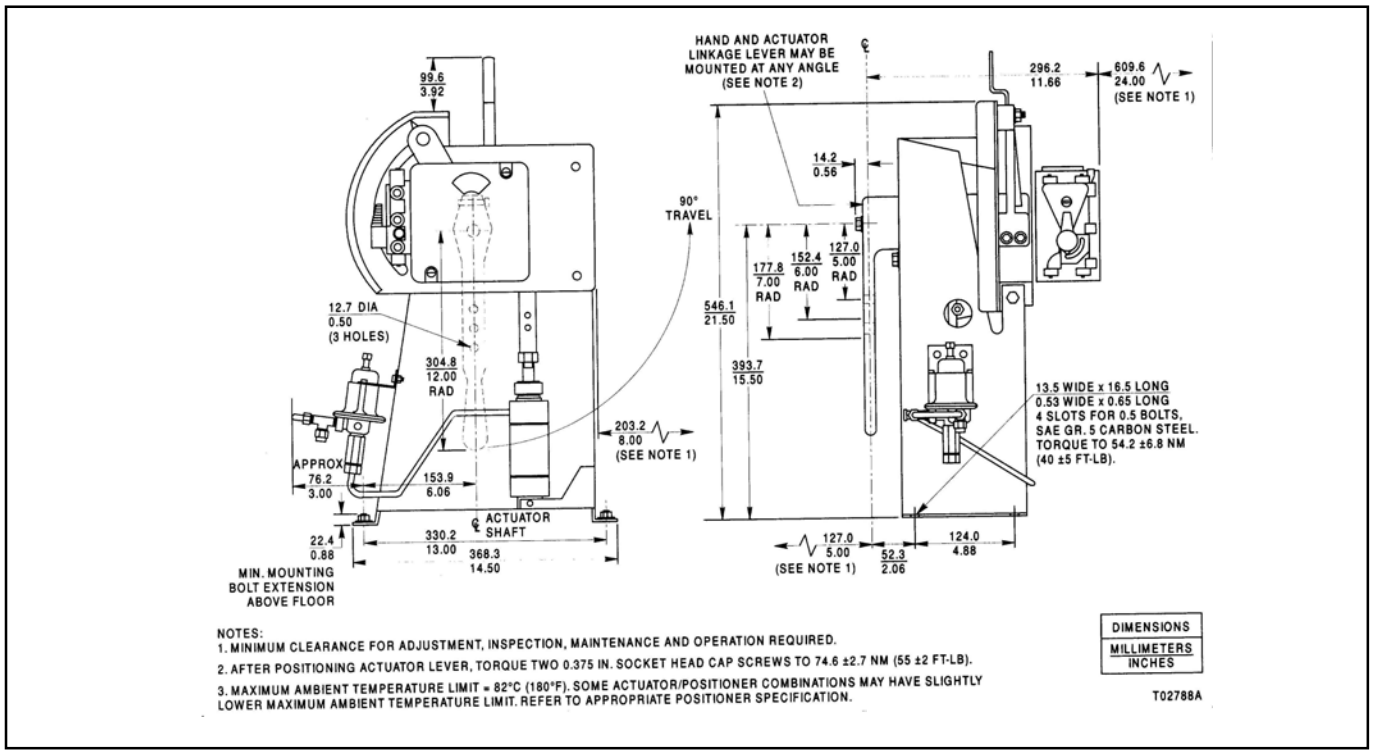

Figure 15. Type UP1 Actuator with Positioner and Air Failure Lock

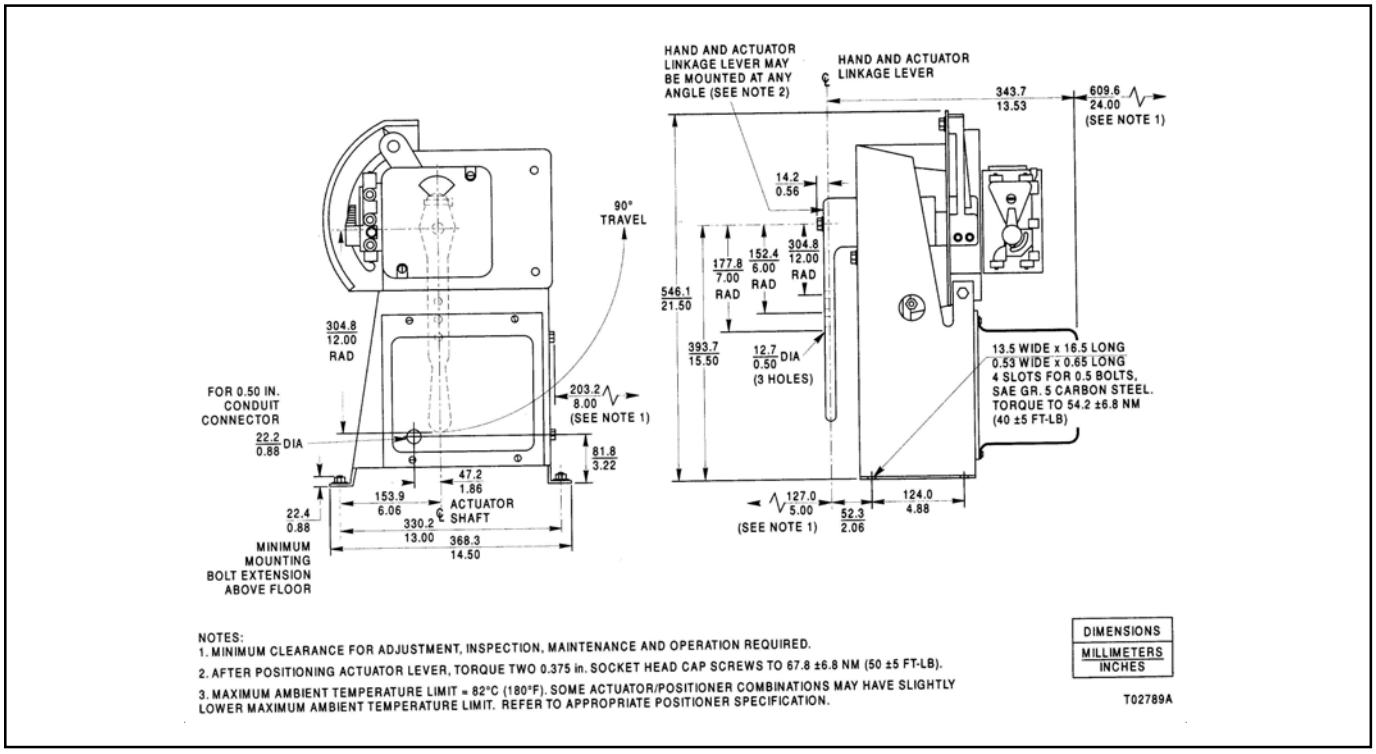

Figure 16. Type UP1 Actuator with Electric Shaft Position Transmitter and Travel Switches

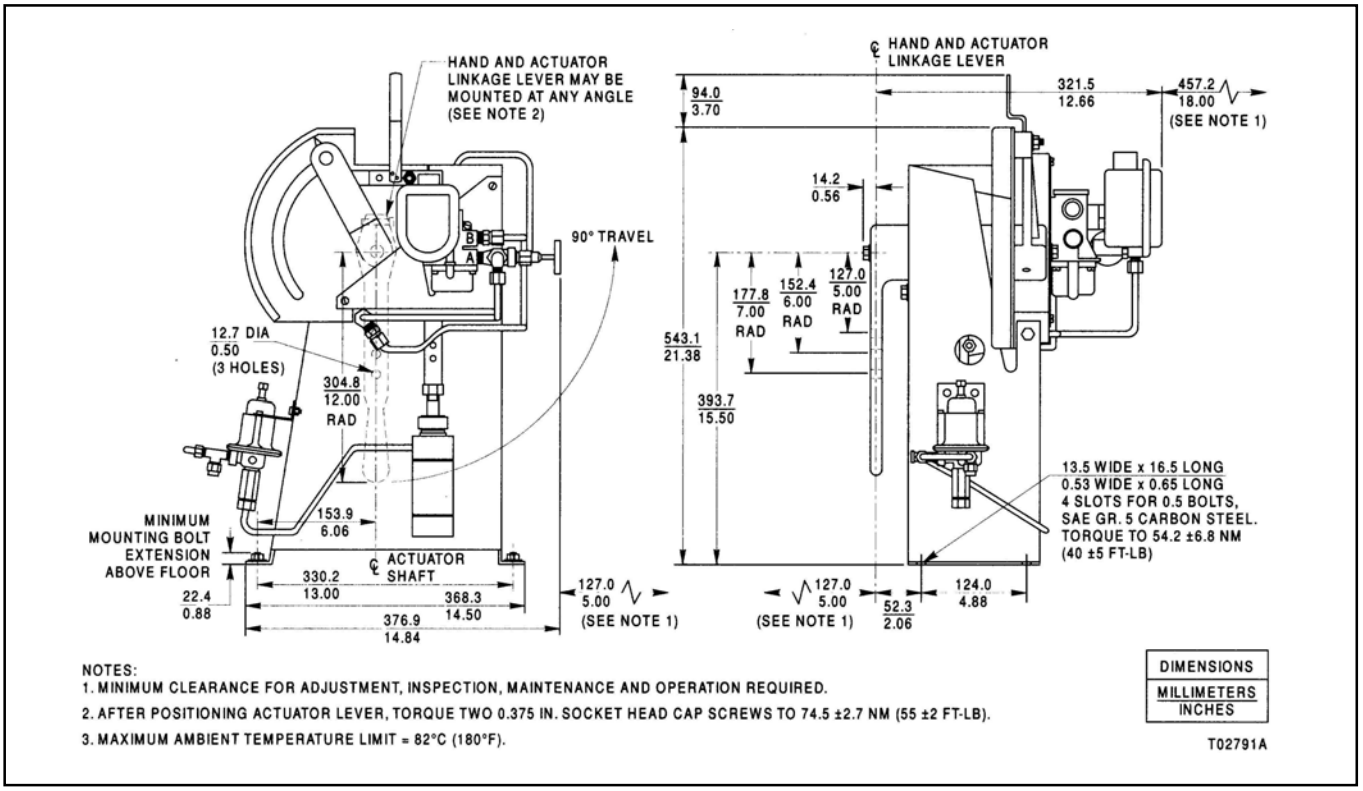

Figure 17. Type UP1 Actuator with Solenoid Valve and Air Failure Lock

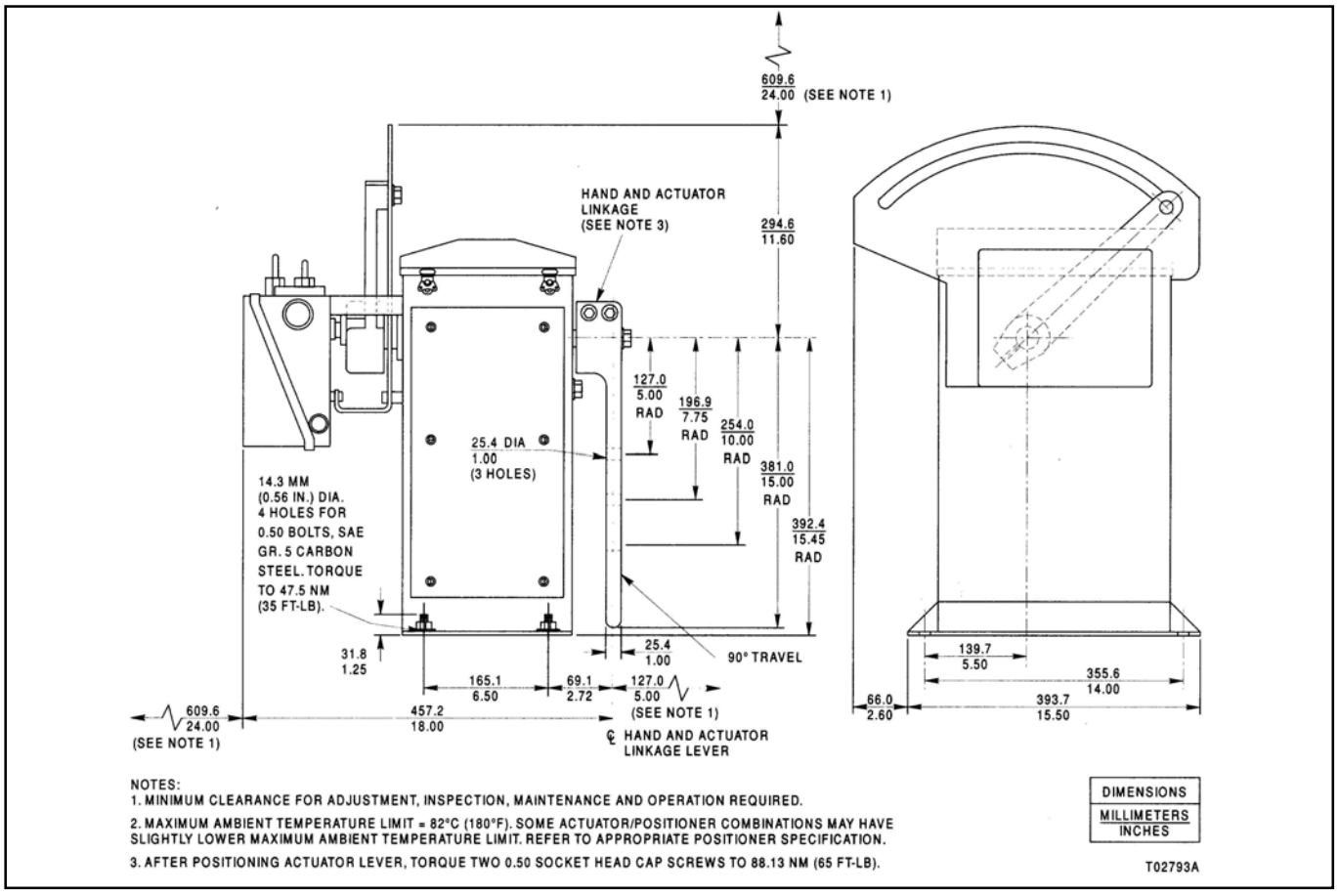

Figure 18. Type UP2 Actuator with Positioner

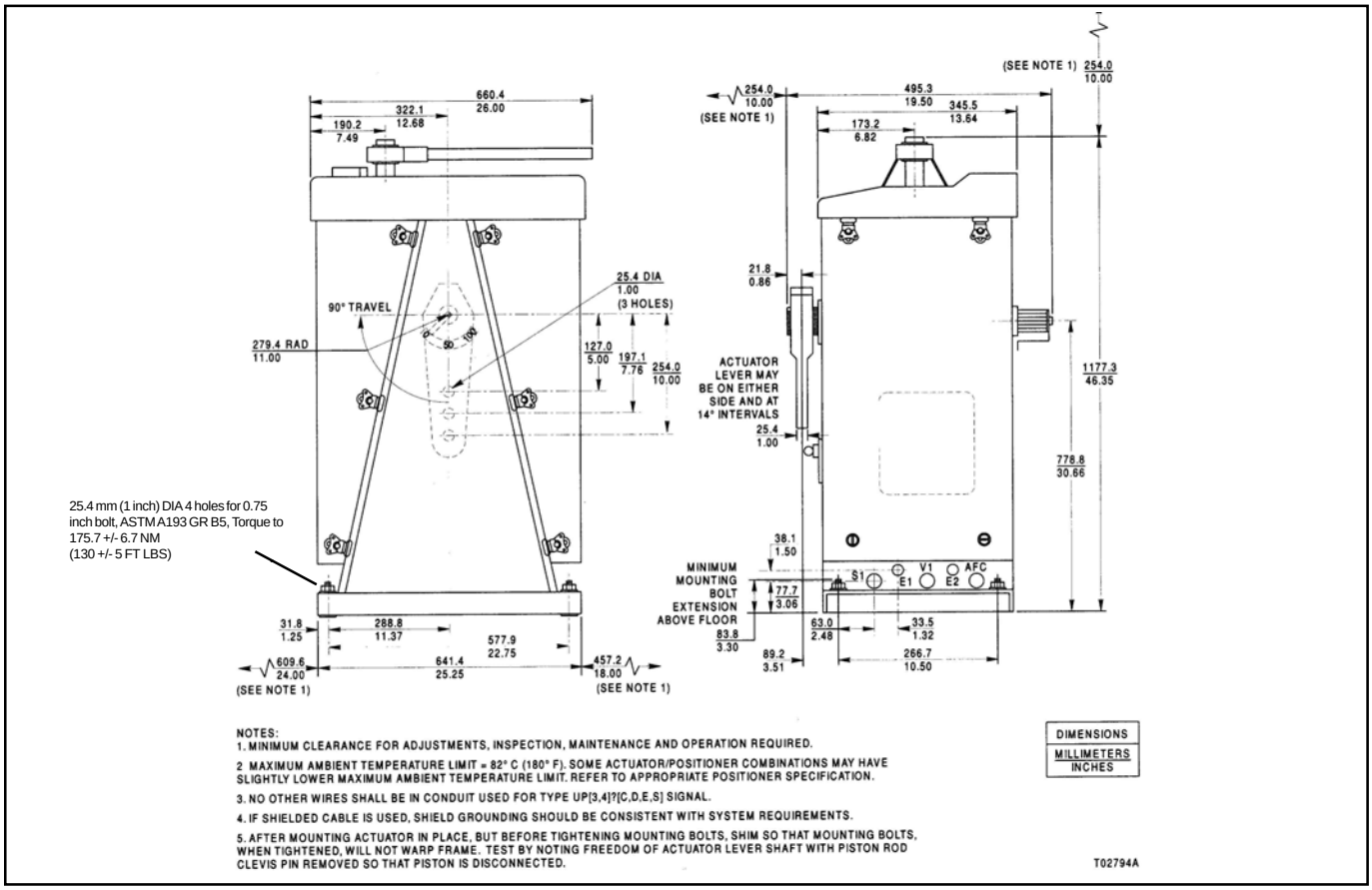

Figure 19. Type UP3 and UP4 Actuators

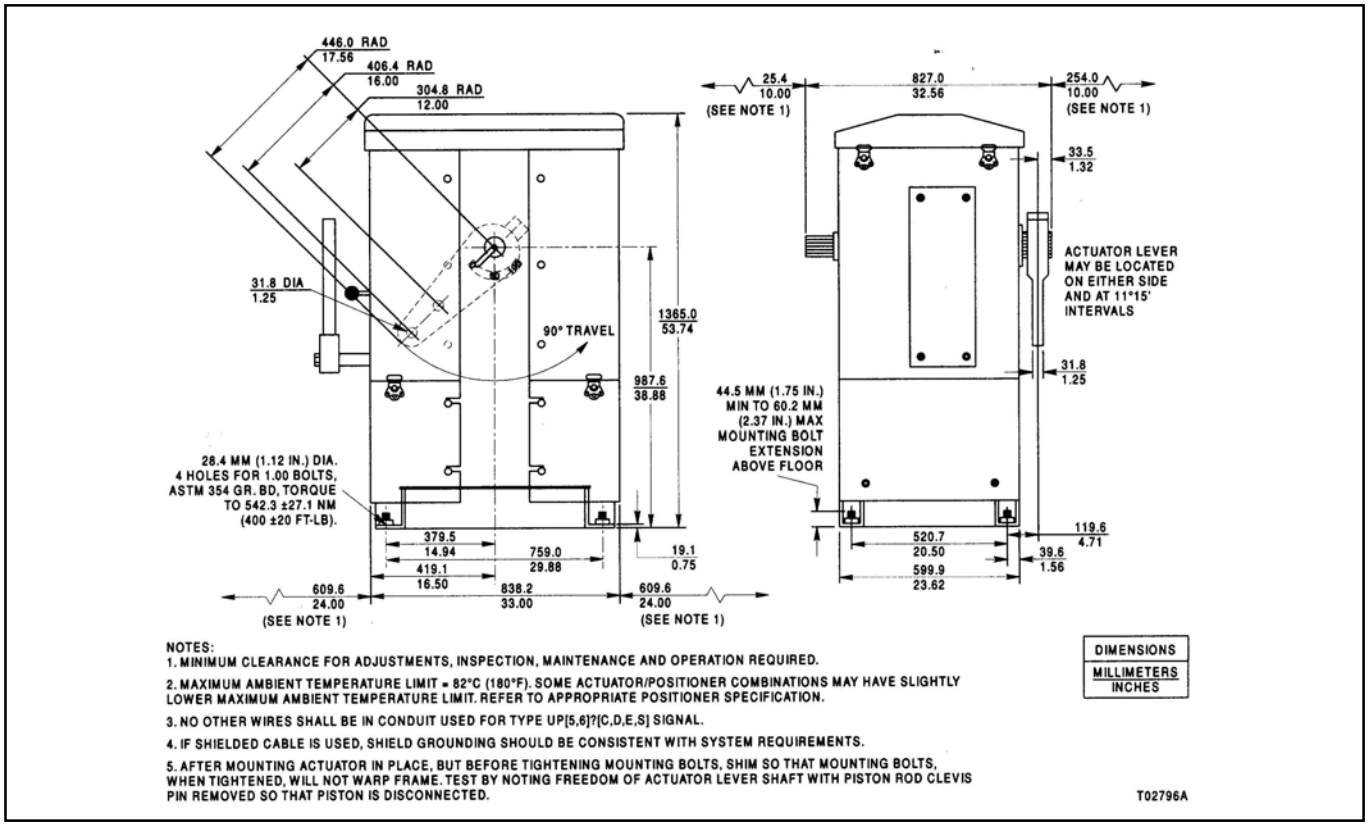

Figure 20. Type UP5 and UP6 Actuators

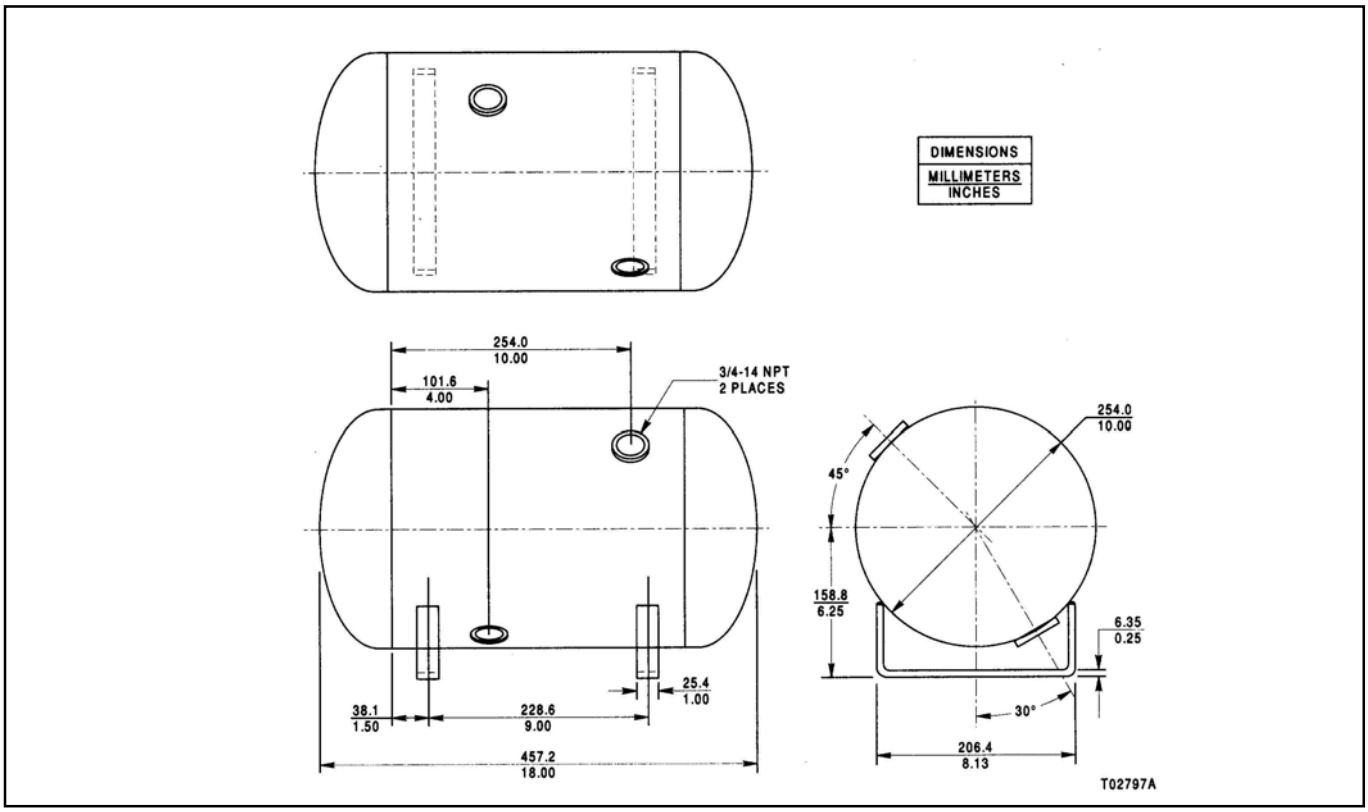

Figure 21. 20.8-Liter (5.5-Gallon) Air Tank for
Type UP2 Actuators

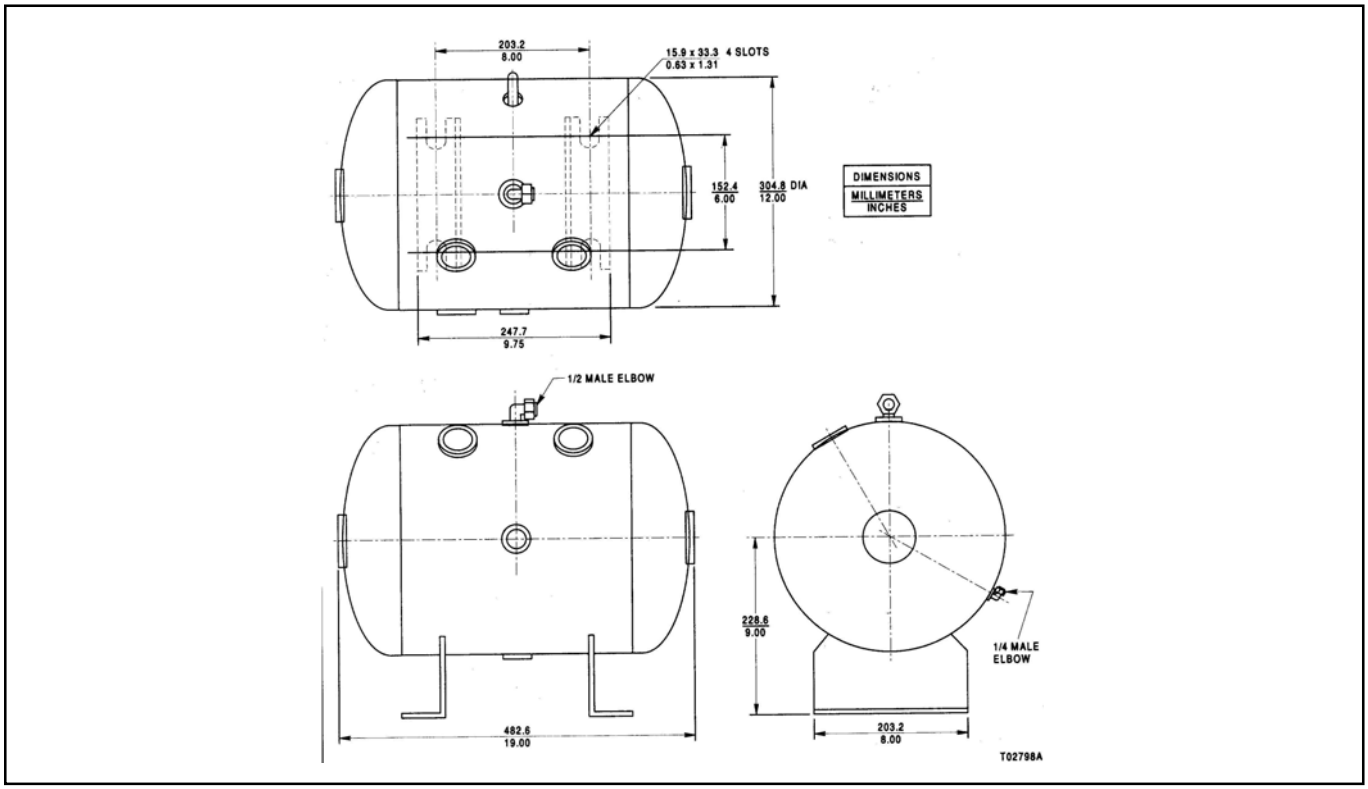

Figure 22. 30.3-Liter (8.0 Gallon) Air Tank for
Type UP3, UP4 and UP5 Actuators

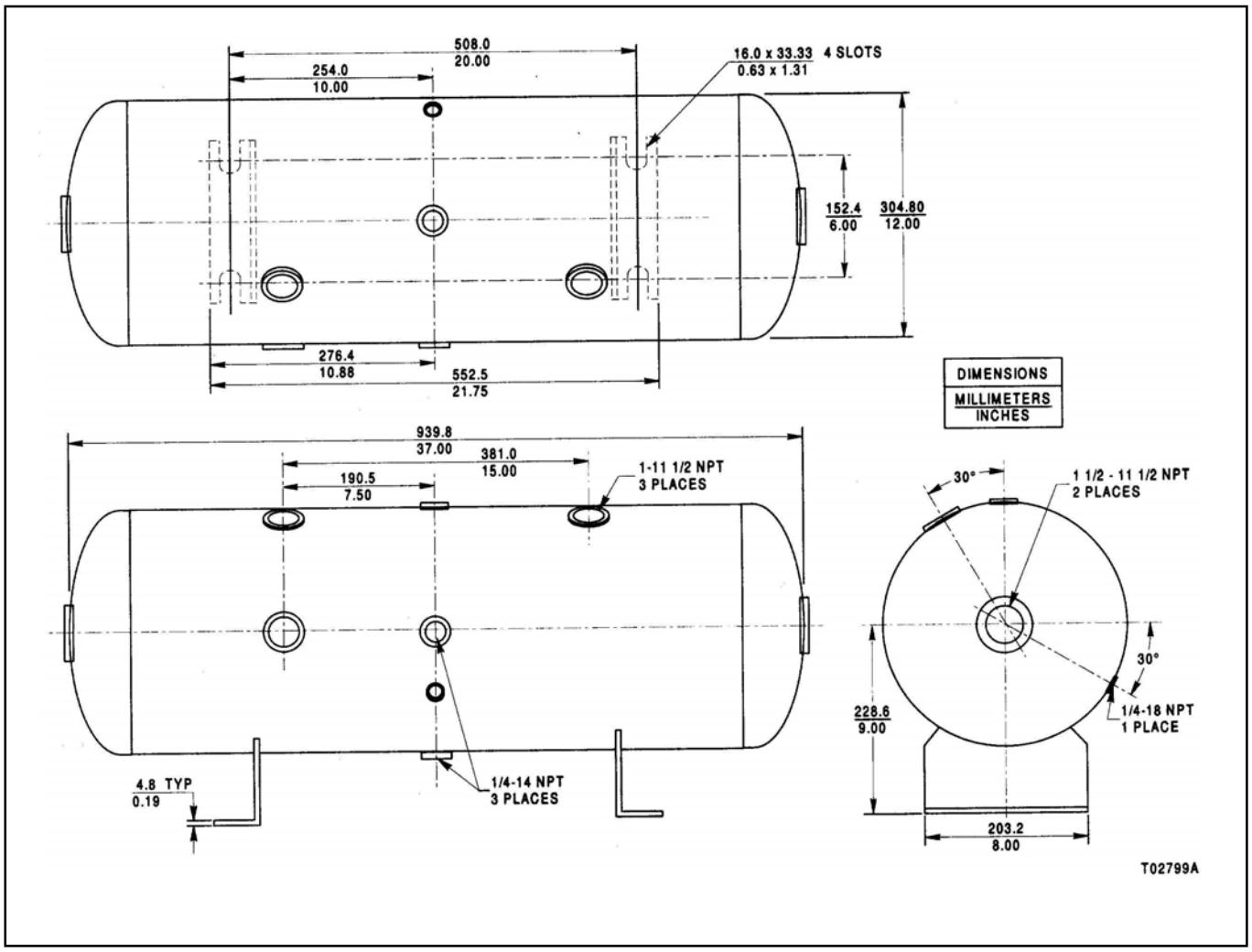

Figure 23. 64.4-Liter (17.0 Gallon) Air Tank for
Type UP6 Actuators

UP1 Pneumatic Rotary Actuator, 90 ft/lb Rated Torque at 100 psig Supply (See Note A)		UP1

1 : Enclosure Rating

Standard, NEMA 3R		**0**
NEMA-4X, Positioner Enclosure only		**1**
Non Standard Option		**X**

2 : Control Input

3 … 15 psig (0.2 … 1.03bar) with AV1121_ _ 0 Pneumatic Positioner	(Note: 4)	**A**
3 ... 27 psig (0.2 ... 1.86 bar) with AV1221_ _ 0 Pneumatic Positioner	(Note: 4)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 5)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 5)	**Z**
On-Off Solenoid, 120 V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125 V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**

3 : Shaft Position Transmitter

None		**0**
Potentiometric Resistive Output, built into Positioner (for UP1 A / B / C / D only)	(Note: 1)	**A**
4 ... 20 mA Output, built Into AV / TZIDC Positioners (for UP1 , A/B/C/D/U/W/Y&Z only)	(Notes: 2, 6)	**B**
Non Standard Option		**X**

4 : Adjustable Travel Switches

None		**0**
Include, 4-SPDT	(Note: 3)	**1**
Include, 2-SPDT	(Note: 3)	**2**
Non Standard Option		**X**

5 : Air Failure Control

None		**0**
Air Failure Lock-up	(Note: 3)	**1**
Non Standard Option		**X**

6 : Actuator Heaters

None		**0**
Non Standard Option		**X**

7 : Tubing Material

Standard Tubing		**0**
Stainless Steel Tubing	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Option

Mylar, adhesive backed aluminum finish		**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)		**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)		**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Control Input code Y, Z
Note 4: kPa = psi x 6.895
Note 5: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 6: 24 V Supply required (not included)

Note A: The Maximum Supply Pressure for UP with TZIDC is 90 psi (g)

UP1 ACCESSORIES

	Code
Instruction Manual (One copy is supplied, at no cost, with order)	PN25059A
Linkage Accessories:	
Light Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 0.500" to 0.875" (12.7 - 22.2 mm), 0.188" (4.77 mm) Groov pin diameter	5328690A1
For shaft diameter 0.938" to 1.062" (23.8 - 26.9 mm), 0.312" (7.97 mm) Groov pin diameter	5328690A2
For shaft diameter 1.125" to 1.500" (28.6 - 38.1 mm), 0.312" (7.92 mm) Groov pin diameter	5328690A3
Light Duty Linkage Components	
Clevis	5313902A1
Clevis Pin Assembly	5313974A1
Ball and Socket	5323123A1
Pipe Connector, 7" (2.13 m) long	5313940A1
Pipe Connector, 10' 6" (2.3 m) long	5313940A2
Adapter Assembly	5314282A1
Reinforcing Sleeve	5328639A1
Rod Connector, 3' 7" (1.09 m) long	5313932A16
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Filter - (coalescing) with Bracket (Maximum inlet pressure 250 psi, 1/4-18 NPT)	5328563D2
Supply Air Regulator with Bracket and gage (Maximum inlet pressure 250 psi, 1/4-18 NPT) Secondary pressure 2-125 psi	1951029D5
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV Only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners. Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts: (Part of nomenclature configuration)	
Rotary Vane Rebuild Kit	258244A1
Vane Actuator	5328575F1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

UP2 Pneumatic Rotary Actuator, 450 ft/lb Rated Torque at 100 psig Supply (See Note A)		UP2
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA-4X		**1**
Non Standard Option		**X**
2 : Control Input		
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 6)	**A**
3 ... 27 psig (0.2 ... 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 6)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 7)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 7)	**Z**
On-Off Solenoid, 120 V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125 V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP2_ A / B / C / D only)	(Note: 1)	**A**
4 ... 20 mA Output, built Into AV / TZIDC Positioners (for UP2_A/B/C/D/U/W/Y&Z only)	(Notes: 2, 8)	**B**
3 ... 15 psig (0.2…1 bar) Pneumatic Position Transmitter Out (AV112000 Positioner) (For UP20A_ _ _ _ only)	(Notes: 3, 4)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include, 4-SPDT	(Note: 5)	**1**
Include, 2-SPDT	(Note: 5)	**2**
Non Standard Option		**X**
5 : Air Failure Control		
None		**0**
Air Failure Lock-up (Hold last position)	(Note: 5)	**1**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Note: 5)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 5)	**1**
240 V AC	(Note: 5)	**2**
Non Standard Option		**X**
7 : Tubing Material		
Standard Tubing		**0**
Stainless Steel Tubing	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Option	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Enclosure Rating code 1
Note 4: Not available with Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G
Note 5: Not available with Control Input code Y, Z
Note 6: kPa = psi x 6.895
Note 7: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 8: 24 V Supply required (not included)

Note A: The Maximum Supply Pressure for UP with TZIDC is 90 psi (g)
Note E: Not suitable for hazardous process applications that require FM/CSA

UP2 ACCESSORIES

Linkage Accessories:	**Code**
Medium Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 0.875" to 1.062" (22.2 - 26.9 mm), 0.312" (7.92 mm) Groov pin diameter	5328976A1
For shaft diameter 1.125" to 1.375" (28.6 - 34.9 mm), 0.376" (9.52 mm) Groov pin diameter	5328976A2
For shaft diameter 1.438 (36.5 mm), 0.375" (9.52 mm) Groov pin diameter	5328976A3
Medium Duty Linkage Components	
Clevis	197758A1
Clevis Pin Assembly	197757A1
Ball and Socket, Self Lubricating	5328986A1
1-1/4 In. Pipe Connector, 10'6" (3.08 m) long	5313945A1
1-1/4 In. Pipe Connector, 21' (6.4 m) long	
Adapter	53683A1
Reinforcing Sleeve 12'(3.66 m) long	5314038A2
Rod Connector, 4' (1.22 m) long	5313835A2
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Filter - (coalescing) with Bracket (Maximum inlet pressure 250 psi, 1/4-18 NPT)	5328563D2
Supply Air Regulator with Bracket and gage (Maximum inlet pressure 250 psi, 1/4-18 NPT) Secondary pressure 2-125 psi	1951029D5
Pressure Gages - for Actuators with Positioners	
Instrument - 0-30 psig range (AV only)	5326605A4
Supply - 0-160 psig range	5326605A5
Output - 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners. Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Rotary Vane Rebuild Kit	258244A2
Vane Actuator	5328838A1
Spare Parts for UP20 with Acutuator Heaters (UP20_ _ _ _1)	
Thermoswitch	662460A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

UP3 Pneumatic Rotary Actuator, 800 ft/lb Rated Torque at 100 psig Supply (See Note A)

		UP3
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA-4X		**1**
Non Standard Option		**X**
2 : Control Input		
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 5)	**A**
3 ... 27 psig (0.2 ... 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 5)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 6)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 6)	**Z**
On-Off Solenoid, 120 V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC1, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125 V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP3_ A / B / C / D only)	(Note: 1)	**A**
4 ... 20 mA Output, built into AV / TZIDC Positioners (for UP3_A/B/C/D/U/W/Y&Z only)	(Notes: 2, 7)	**B**
3 ... 15 psig (0.2…1 bar) Pneumatic Position Transmitter (AV112000) (for UP30A_ _ _ _only)	(Note: 3)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include, 4-SPDT	(Note: 4)	**1**
Include, 2-SPDT	(Note: 4)	**2**
Non Standard Option		**X**
5 : Air Failure Control		
None		**0**
Air Failure Lock-up (Hold last position)	(Note: 4)	**1**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Note: 4)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 4)	**1**
240 V AC	(Note: 4)	**2**
Non Standard Option		**X**
7 : Tubing Material		
Standard Tubing		**0**
Stainless Steel Tubing	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Option	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Enclosure Rating code 1 and Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G
Note 4: Not available with Control Input code Y, Z
Note 5: kPa = psi x 6.895
Note 6: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 7: 24 V Supply required (not included)

Note A: The Maximum Supply Pressure for UP with TZIDC is 90 psi (g)
Note E: Not suitable for hazardous process applications that require FM/CSA

UP3

UP3 ACCESSORIES:

Linkage Accessories:	**Code**
Medium Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 1.438" to 1.875" (36.5 - 47.6 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A1
For shaft diameter 1.938" to 2.375" (49.2 - 60.3 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A2
For shaft diameter 2.439" to 2.875" (61.9 - 73.0 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A3
For shaft daimeter 2.938" (74.6 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A4
Medium Duty Linkage Components	
Clevis	197758A1
Clevis Pin Assembly	197757A1
Ball and Socket, Self Lubricating	5328986A1
1-1/4 In. Pipe Connector, 10'6" (3.08 m) long	5313945A1
1-1/4 In. Pipe Connector, 21' (6.4 m) long	
Adapter	53683A1
Reinforcing Sleeve 12' (3.66 m) long	5314038A2
Rod Connector, 4' (1.22 m) long	5313835A2
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Regulator Filter - (Coalescing) with gage (maximum inlet pressure 250 psi)	
Maximum outlet pressure 125 psi, 1/2 NPT (high capacity), 40 SCFM	1951439D1
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners.	
Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Cylinder Rebuild Kit (For ABB/Bailey Cylinder Part #5328775A1) Note 1	258240A1
Replacement Cylinder	614B069U33
Spare Parts for UP30 with Acutuator Heaters (UP30_ _ _ _ 1)	
Thermoswitch	662460A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

Note 1: Suitable for UP3's with ABB/Bailey cylinders prior to serial #08W006221 (April 2008)
Not suitable for UP3 cylinders previously upgraded to new design identified by silver color of cylinder tube

UP4 Pneumatic Rotary Actuator, 1450 ft/lb Rated Torque at 100 psig Supply (See Note A)

		UP4
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA 4X		**1**
Non Standard Option		**X**
2 : Control Input		
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 5)	**A**
3 ... 27 psig (0.2 ... 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 5)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 6)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 6)	**Z**
On-Off Solenoid, 120V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125 V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Coil, Fail Safe upon loss of coil voltage	Single	**F**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Coil, Fail-in-Place upon loss of coil voltage	Dual	**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP4 _A, B, C, D only)	(Note: 1)	**A**
4 ... 20 mA Output, built Into AV / TZIDC Positioners (for UP4_A/B/C/D/U/W/Y&Z only) (Note: A)	(Notes: 2, 7)	**B**
3 ... 15 psig (0.2 ... 1 bar) Pneumatic Position Transmitter, (AV112000) (for UP4_A_ _ _ _only)	(Note: 3)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include 4-SPDT	(Note: 4)	**1**
Include 2-SPDT	(Note: 4)	**2**
Non Standard Option		**X**
5 : Air Failure Control		
None		**0**
Air Failure Lock-up (Hold last position)	(Note: 4)	**1**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Note: 4)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 4)	**1**
240 V AC	(Note: 4)	**2**
Non Standard Option		**X**
7 : Special Options		
Standard Tubing		**0**
Stainless Steel Tubing Fittings	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Option	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G
Note 4: Not available with Control Input code Y, Z
Note 5: kPa = psi x 6.895
Note 6: Explosion Proof Application Cl 1 Div 1 Gr C-G
Note 7: 24 V Supply required (not included)

Note A: The Maximum Supply Pressure for UP with TZIDC (is 90 psig)
Note E: Not suitable for use in hazardous process applications require FM/CSA approved

UP4

UP4 ACCESSORIES

Linkage Accessories:	**Code**
Medium Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 1.438" to 1.875" (36.5 - 47.6 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A1
For shaft diameter 1.938" to 2.375" (49.2 - 60.3 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A2
For shaft diameter 2.439" to 2.875" (61.9 - 73.0 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A3
For shaft daimeter 2.938" (74.6 mm), 0.500" (12.7 mm) Groov pin diameter	5328977A4
Medium Duty Linkage Components	
Clevis	197758A1
Clevis Pin Assembly	197757A1
Ball and Socket, Self Lubricating	5328986A1
1-1/4 In. Pipe Connector, 10'6" (3.08 m) long	5313945A1
1-1/4 In. Pipe Connector, 21' (6.4 m) long	
Adapter	53683A1
Reinforcing Sleeve 12'(3.66 m) long	5314038A2
Rod Connector, 4' (1.22 m) long	5313835A2
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Regulator Filter - (Coalescing) with gage (maximum inlet pressure 250 psi)	
Maximum outlet pressure 125 psi, 1/2 NPT (high capacity), 40 SCFM	1951439D1
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners. Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Cylinder Rebuild Kit (For ABB/Bailey Cylinder Part #5328769A1) Note 1	258241A1
Replacement Cylinder	614B069U34
Spare Parts for UP40 with Acutuator Heaters (UP4 1)	
Thermoswitch	662460A1
Heater	1943002A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

Note 1: Suitable for UP4's with ABB/Bailey cylinders prior to serial #08W000704 (February 2008)
Not suitable for UP4 cylinders previously upgraded to new design identified by silver color of cylinder tube

UP5 Pneumatic Rotary Actuator, 2800 ft/lb Rated Torque at 100 psig Supply (See Note A)		UP5
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA 4X		**1**
Non Standard Option		**X**
2 : Control Input		
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 5)	**A**
3 ... 27 psig (0.2 .... 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 5)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 6)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 6)	**Z**
On-Off Solenoid, 120V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220V AC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220V AC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP5_A/B/C/D only)	(Note: 1)	**A**
4 ... 20 mA Output, built into AV / TZIDC Positioners (for UP5_A/B/C/D/U/W/Y&Z only)	(Notes: 2, 7)	**B**
3 ... 15 psig (0.2 .... 1 bar), Pneumatic Position Transmitter (AV112000) (for UP5_A_ _ _ _only)	(Note: 3)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include 4-SPDT	(Note: 4)	**1**
Include 2-SPDT	(Note: 4)	**2**
Non Standard Option		**X**
5 : Air Failure Control		
None		**0**
Air Failure Lock-up (Hold last position)	(Note: 4)	**1**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Note: 4)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 4)	**1**
240 V AC	(Note: 4)	**2**
Non Standard Option		**X**
7 : Tubing Material		
Standard Tubing		**0**
Stainless Steel Tubing	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Option	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G
Note 4: Not available with Control Input code Y, Z
Note 5: kPa = psi x 6.895
Note 6: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 7: 24 V Supply required (not included)

Note A: The Maximum Supply Pressure for UP with TZID is 90 psi (g)
Note E: Not suitable for use in Hazardous process application that require FM/CSA approved

UP5

UP5 ACCESSORIES

Linkage Accessories:	**Code**
Heavy Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 1.938" to 4.000" (49.2 - 101.6 mm)	6628241A1
Heavy Duty Linkage Components	
Clevis	6614440A1
Clevis Pin Assembly	6634507A1
Ball and Socket, Self Lubricating	5328987A1
2-1/2" - 8 NPT Pipe Connector, 13' 4" (4.06 m) long	6615890A4
2-1/2" - 8 NPT Adapter	6614437A1
Reinforcing Sleeve 12' (3.66 m) long	5314038A2
2-1/2" - 8 NPT Pipe Connector, 20" (6.10 m)	5313835A2
Retaining Ring	197164A125
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Regulator Filter - (Coalescing) with gage (maximum inlet pressure 250 psi)	
Maximum outlet pressure 125 psi, 1/2 NPT (high capacity), 40 SCFM	1951439D1
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners. Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Cylinder Rebuild Kit (For ABB/Bailey Cylinder Part #5328952A1) Note 1	258241A1
Replacement Cylinder	614B069U35
Spare Parts for UP50 with Acutuator Heaters (UP50 _ _ _ _ 1)	
Thermoswitch	662460A1
Heater	1943002A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

Note 1: Suitable for UP5's with ABB/Bailey cylinders prior to serial #08W006423 (June 2008)
Not suitable for UP5 cylinders previously upgraded to new design identified by silver color of cylinder tube

UP6 Pneumatic Rotary Actuator, 4600 ft/lb Rated Torque at 100 psig Supply (See Note A)		UP6
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA-4X		**1**
Non Standard Option		**X**
2 : Control Input		
None (For Slave Drive Only)	(Note: 8)	**0**
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 9)	**A**
3 ... 27 psig (0.2 ... 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 9)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal (Note: A)		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal (Note: A)		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input (Note: A)	(Note: 10)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input (Note: A)	(Note: 10)	**Z**
On-Off Solenoid, 120V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125 V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220V AC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220V AC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP6_A/B/C/D only)	(Note: 1)	**A**
4 ... 20 mA Output, built into AV / TZIDC Positioners (for UP6_A/B/C/D/U/W/Y&Z only)	(Notes: 2, 11)	**B**
3-15 psig (0.2…1 bar) Pneumatic Position Transmitter (AV112000) (for UP6_A_ _ _ _only)	(Note: 3)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include 4-SPDT	(Note: 4)	**1**
Include 2-SPDT	(Note: 4)	**2**
Non Standard Option		**X**
5 : Air Failure Control / Volume Boosters		
None		**0**
Air Failure Lock-up (Hold last position)	(Notes: 5, 12)	**1**
Volume Boosters	(Notes: 6, 13)	**2**
Air Failure Lock-up (Hold last position) + Volume Boosters	(Notes: 6, 13)	**3**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Notes: 5, 12)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 4)	**1**
240 V AC	(Note: 4)	**2**
Non Standard Option		**X**
7 : Tubing Material		
Standard Tubing		**0**
Stainless Steel Tubing	(Note: 7)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Options (Each tag may have 4 lines each consisting of 25 characters)	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G, 0
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G, 0
Note 3: Not available with Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G, 0
Note 4: Not available with Control Input code Y, Z
Note 5: Not available with Control Input code 0, Y, Z
Note 6: Not available with Control Input code 5, 6, 8, 9, F, G, 0, Y, Z
Note 7: Not available with Control Input code 5, 6, 8, 9, F, G
Note 8: Includes Master / Slave Installation Kit, P/N 258458 1
Note 9: kPa = psi x 6.895
Note 10: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 11: 24 V Supply required (not included)
Note 12: Not available on UP6 0
Note 13: Not available on UP6 0 , Volume Boosters available on UP6 A, B, C, D, U, W, Y, & Z only

Note A: The Maximum Supply Pressure for UP with TZIDC is 90 psi (g)
Note E: Not suitable for use in Hazardous process application that require FM/CSA approval

UP6

UP6 ACCESSORIES:

Linkage Accessories:	**Code**
Heavy Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 1.938" to 4.000" (49.2 - 101.6 mm)	6628241A1
Heavy Duty Linkage Components	
Clevis	6614440A1
Clevis Pin Assembly	6634507A1
Ball and Socket, Self Lubricating	5328987A1
2-1/2" - 8 NPT Pipe Connector, 13' 4" (4.06 m) long	6615890A4
2-1/2" - 8 NPT Adapter	6614437A1
Reinforcing Sleeve 12' (3.66 m) long	6615891A6
2-1/2" - 8 NPT Pipe Connector, 20" (6.10 m)	6615890A8
Retaining Ring	197164A125
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Regulator Filter - (Coalescing) with gage (maximum inlet pressure 250 psi)	
Maximum outlet pressure 125 psi, 1/2 NPT (high capacity), 40 SCFM	1951439D1
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners.	
Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Cylinder Rebuild Kit (For ABB/Bailey Cylinder Part #5328945A1) Note 1	258241A1
Replacement Cylinder	614B069U36
Spare Parts for UP60 with Acutuator Heaters (UP60_ _ _ _ 1)	
Thermoswitch	662460A1
Heater	1943002A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

Note 1: Suitable for UP6; with ABB/Bailey cylinder prior to serial #08W000564 (March 2008)
Not suitable for UP6 cylinder previously upgraded to new design identified by silver color of cylinder tube

UP7 Pneumatic Rotary Actuator, 5400 ft/lb Rated Torque at 80 psig Supply (See Note A)		UP7
1 : Enclosure Rating		
Standard, NEMA 3R		**0**
NEMA-4X		**1**
Non Standard Option		**X**
2 : Control Input		
3 … 15 psig (0.2 … 1.03bar) with AV1121_ _0 Pneumatic Positioner	(Note: 6)	**A**
3 ... 27 psig (0.2 .. 1.86 bar) with AV1221_ _0 Pneumatic Positioner	(Note: 6)	**B**
4 ... 20 mA with AV2321_ _0 Positioner, Fail Safe Open/Closed upon loss of mA signal		**C**
4 ... 20 mA with AV3321_ _0 Positioner, Fail-in-Place upon loss of mA signal		**D**
4 ... 20 mA with TZIDC Positioner, Fail Safe Open/Close upon loss of mA signal		**U**
4 ... 20 mA with TZIDC Positioner, Fail-in-Place upon loss of mA signal		**W**
4 ... 20 mA with TZIDC-200 (EXP), Fail Safe Open/Close, upon loss of mA input	(Note: 7)	**Y**
4 ... 20 mA with TZIDC-200 (EXP), Fail-in-Place upon loss of mA input	(Note: 7)	**Z**
On-Off Solenoid, 120V AC, Single Coil, Fail Safe upon loss of coil voltage		**5**
On-Off Solenoid, 115 / 125V DC, Single Coil, Fail Safe upon loss of coil voltage		**6**
On-Off Solenoid, 120 V AC, Dual Coil, Fail-in-Place upon loss of coil voltage		**8**
On-Off Solenoid, 115 / 125 V DC, Dual Coil, Fail-in-Place upon loss of coil voltage		**9**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Single Coil, Fail Safe upon loss of coil voltage		**F**
On-Off Solenoid, 220 VAC 50 Hz / 240 VAC 60 Hz Dual Coil, Fail-in-Place upon loss of coil voltage		**G**
Non Standard Option		**X**
3 : Shaft Position Transmitter		
None		**0**
Potentiometric Resistive Output, built into Positioner (for UP7_A/B/C/D only)	(Note: 1)	**A**
4 ... 20 mA Output, built into AV / TZIDC Positioners (for UP7_A/B/C/D/U/W/Y&Z only)	(Notes: 2, 8)	**B**
3-15 psig (0.2…1 bar) Pneumatic Position Transmitter (AV112000) (for UP7_A_ _ _ _only)	(Note: 3)	**C**
Non Standard Option		**X**
4 : Adjustable Travel Switches		
None		**0**
Include 4-SPDT	(Note: 4)	**1**
Include 2-SPDT	(Note: 4)	**2**
Non Standard Option		**X**
5 : Air Failure Control / Volume Boosters		
None		**0**
Air Failure Lock-up (Hold last position)	(Note: 5)	**1**
Volume Boosters	(Notes: 5, 9)	**2**
Air Failure Lock-up (Hold last position) + Volume Boosters	(Notes: 5, 9)	**3**
Reserve Air Tank, Actuator goes to 0 or 100 % Upon Loss of Air Supply	(Note: 4)	**4**
Non Standard Option		**X**
6 : Actuator Heaters (Note E)		
None		**0**
120 V AC	(Note: 4)	**1**
240 V AC	(Note: 4)	**2**
Non Standard Option		**X**
7 : Tubing Material		
Standard Tubing		**0**
Stainless Steel Tubing	(Note: 2)	**S**
Non Standard Option		**X**

Additional ordering information

8 : Tagging Options (Each tag may have 4 lines each consisting of 25 characters)	
Mylar, adhesive backed aluminum finish	**1**
Stainless Steel, Wire Attached - (Must specify tag text in parameter data)	**2**
Stainless Steel, Permanently Attached - (Must specify tag text in parameter data)	**3**

Note 1: Not available with Control Input code U, W, Y, Z, 5, 6, 8, 9, F, G
Note 2: Not available with Control Input code 5, 6, 8, 9, F, G
Note 3: Not available with Control Input code B, C, D, U, W, Y, Z, 5, 6, 8, 9, F, G
Note 4: Not available with Control Input code Y, Z
Note 5: Not available with Control Input code 5, 6, 8, 9, F, G, Y, Z
Note 6: kPa = psi x 6.895
Note 7: Explosion Proof Application Cl 1 Div 1 Gr C-G, refer to TZIDC-200 data sheet
Note 8: 24 V Supply required (not included)
Note 9: Volume Boosters available on UP7_A, B, C, D, U, W, Y & Z only

UP7

UP7 ACCESSORIES:

Linkage Accessories:	**Code**
Heavy Duty Driven Lever, for interconnecting between linkage and the final control element	
For shaft diameter 1.938" to 4.000" (49.2 - 101.6 mm)	6628241A1
Heavy Duty Linkage Components	
Clevis	6614440A1
Clevis Pin Assembly	6634507A1
Ball and Socket, Self Lubricating	5328987A1
Retaining Ring	197164A125
*NOTE: For complete connecting linkage dimensions, specifications and application examples, see Reference information below**	
Accessories:	
Supply Air Regulator Filter - (Coalescing) with gage (maximum inlet pressure 250 psi)	
Maximum outlet pressure 125 psi, 1/2 NPT (high capacity), 40 SCFM	1951439D1
Pressure Gages - for Actuators with Positioners	
Instrument 0-30 psig range (AV only)	5326605A4
Supply 0-160 psig range	5326605A5
Output 0-160 psig range (2x required)	5326605A6
Speed Control Orifices - Regulates time constant of final control element with AV Positioners.	
Installs directly into Positioner Port.	
0.040 in hole	5327327A1
No hole (drill to suit)	5327327A2
Spare Parts:	
Cylinder Rebuild Kit	Consult Factory
Replacement Cylinder	Consult Factory
Spare Parts for UP70 with Acutuator Heaters (UP70 1)	
Thermoswitch	662460A1
Heater	1943002A1
Solderless Terminal	1941401A1

References

Customer Information:

Production Specification	D-APE-AV1234
Product Instruction	PN25059A
*Connecting Linkage Technical Information	TI-A-UP-Rotary Actuator Connecting Linkage (G81-5-1)

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3KXE171201R1001

DS-DA-UP-EN Rev. G 010.21.2012

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