

TAIYO

Proven reliability in fluid power controls

UTAM4 Series

AIR MOTOR • RADIAL PISTON TYPE

Torque Range: 0.5~40ft-lb

Horse Power: 0.1~0.31 HP

Reversible Type

No Sparks, Complete Burst-Proof • Direct & Geared Round Shaft Drive



UTAM4 Series

AIR MOTOR • RADIAL PISTON TYPE



- **TAIYO** air motors are designed for use in industrial applications such as powering air driven machinery, raising foundry cokes and drags, rotating a turnable, mixing paint, powering cranes, valve actuation and power source for mechanical hands.
- Speed could be easily controlled by flow adjustment from 100 r.p.m. up to Max. speed.
- Compact in size, light in weight and simple in structure are features of all models.
- **TAIYO** air motors can be mounted any way you like — Flange mounting and foot mounting are available.
- Air lines should be equipped with lubricators. Mount the lubricator as close to the motor as possible.

SPECIFICATIONS

Model No.	Item	Type	Gear Ratio	*Max. Power			Air Consumption scfm	Starting Torque ft-lb	Stall Torque ft-lb	Max. Allowable Shaft Load		Weight		
				Horse Power hp	Torque ft-lb	Speed rpm (Ref)				Radial Load lb	Thrust Load lb	Direct Drive lb	Flange Mount lb	Foot Mount lb
UTAM4-010	S	Direct Drive	—	0.10	0.47	1100	7	0.51	0.87	22	13	3.2	3.3	4.6
	G005	Geared Drive	1/5	0.09	2.09	220		2.16	3.61	55	33	—	6.6	6.4
	G010		1/10		4.19	110		4.33	7.22	121	55			
	G020		1/20		8.44	55		8.66	15.55	242	99			
UTAM4-015	S	Direct Drive	—	0.17	1.01	900	9.2	1.44	2.16	31	22	5.5	5.7	7.5
	G005	Geared Drive	1/5	0.15	4.33	180		6.49	9.38	88	55	—	11.2	11.0
	G010		1/10		8.66	90		12.99	19.48	176	77			
	G020		1/20		17.32	45		25.98	38.97	308	154			
UTAM4-030	S	Direct Drive	—	0.31	2.16	750	14.1	3.46	4.33	44	31	10.1	10.6	14.1
	G005	Geared Drive	1/5	0.27	9.38	150		15.15	19.48	110	66	—	19.6	19.4
	G010		1/10		19.48	75		30.31	38.97	220	99			
	G020		1/20		38.97	38		60.61	77.93	396	187			
Media		Filtered (Under 40 μ m) and lubricated air												
*Max. Operating Pressure		90 psig (7kgf/cm ²)												
Ambient and media temperature		32 – 158°F (0 – 70°C) at no freezing condition.												
** Lubrication for line lubricators		Should be necessary/Recommended oil; misting-type oils rated 150-200 SSU at 100°F (38°C)/ISO VG 32												
** Recommended gear oil		Same as Shell Oil Co. Alvania #EP RIO 71039 Grade "00" or Sun Petroleum Products Prestige 740 AEP Grade "00"												

* These Motors must be operated with sufficient load to prevent speed from exceeding maximum allowable speed shown on performance curve. Do not operate motors at more than 80% of or near Max. power speed.

** The oil used must be compatible with materials of construction. Contact your lubricant supplier and the builder of equipment to be lubricated to obtain lubricant recommendations.

The proper grades of grease and oil are essential to the economical operation of any air motor.

HOW TO ORDER/Order motors, mountings (except geared type) and accessories as separate line items.

Motor Model

Direct Drive

UTAM4-010 S

Series
(* including Muffler as standard)

Standard

①	Horse Power
010	0.10 hp
015	0.17 hp
030	0.31 hp

Mounting Kit For Direct Drive Motor

For	UTAM4-010	UTAM4-015	UTAM4-030
Kit No.	FM-010	FM-015	FM-030
Flange Mounting Kit	Including Flange Mtg. (1) Screw (3)	Including Flange Mtg. (1) Screw (3)	Including Flange Mtg. (1) Screw (5)
Kit No.	LM-010	LM-015	LM-030
Foot Mounting Kit	Including Foot Mtg. (1) Screw (3)	Including Foot Mtg. (1) Screw (3)	Including Foot Mtg. (1) Screw (5)

Geared Drive

UTAM4-015 F G 005

Series
(* including Muffler as standard)

Geared

①	Horse Power
010	0.09 hp
015	0.15 hp
030	0.27 hp

③	Gear Ratio
005	1/5
010	1/10
020	1/20

②	Mounting Style
F	Flange Mtg.
L	Foot Mtg.

Accessories

Modular F.R.L. Combination Set

Port Size (NPT)	TRIO	TWIN	Micro (Coalescing) Filter
1/4	UCFRL-08	UCKL-08	UCFF-08
3/8	UCFRL-10	UCKL-10	UCFF-10
1/2	UMFRL-15	UMKL-15	UMFF-15
3/4	UMFRL-20	UMKL-20	UMFF-20

Muffler

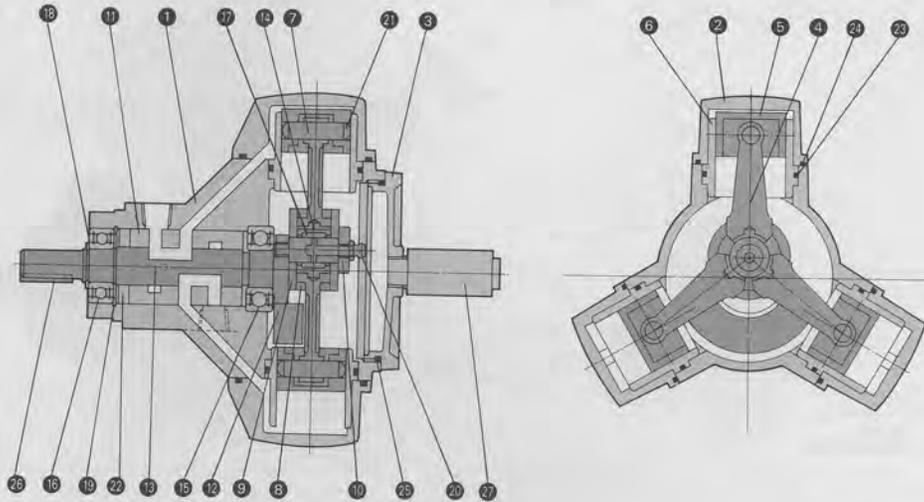
Port Size (PT)	Model No.
1/4	SA-8
3/8	SA-10

AIR MOTOR-RADIAL PISTON TYPE

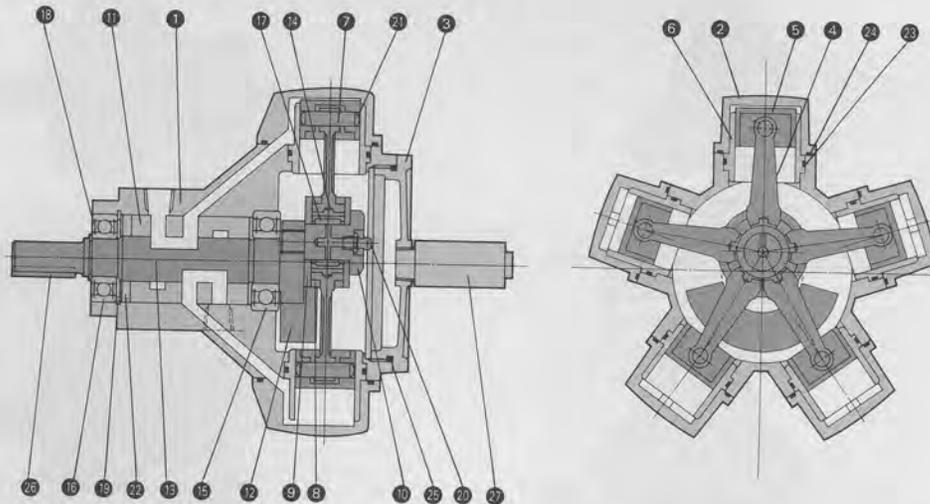
UTAM4 Series

INSIDE STRUCTURE/DIRECT DRIVE

UTAM4-010-015



UTAM4-030



PARTS LIST

No.	Name	Material	Q'ty
1	Casing	Aluminum alloy	1
2	Cylinder cover	Aluminum alloy	3 (5)
3	End cover	Synthetic resin	1
4	Connecting rod	Aluminum alloy	3 (5)
5	Piston	Brass casting	3 (5)
6	Sleeve	Cast iron	3 (5)
7	Piston pin	Carbon steel	3 (5)
8	Ring	Carbon steel	2
9	Thrust washer	Carbon steel	2
10	Crank pin	Carbon steel	1
11	Valve bushing	Cast iron	1
12	Balance weight	Carbon steel	1
13	Shaft	Chrome molybdenum steel	1
14	Liner	Synthetic resin	3 (5)

No.	Name	Material	Q'ty
15	Bearing	—	1
16	Bearing	—	1
17	Needle bearing	—	1
18	Snap ring	—	1
19	Snap ring	—	1
20	Grease nipple	—	1
21	Copper rivet	—	1
22	Oil seal	N.B.R.	1
23	Gasket	N.B.R.	3 (5)
24	Gasket	N.B.R.	3 (5)
25	Gasket	N.B.R.	1
26	Key	—	1
27	Muffler	—	1

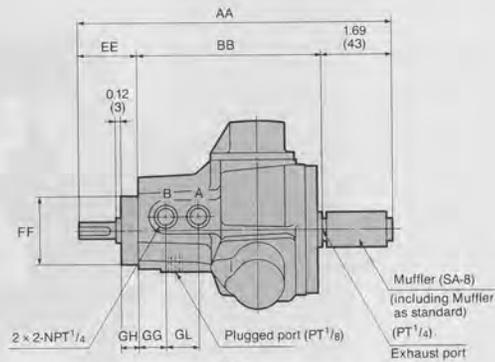
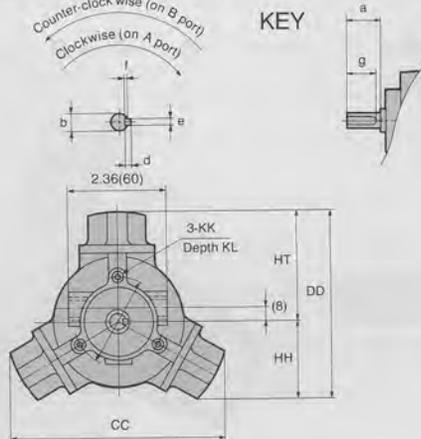
(*) Q'ty is for UTAM4-30.

UTAM4 Series AIR MOTOR • RADIAL PISTON TYPE

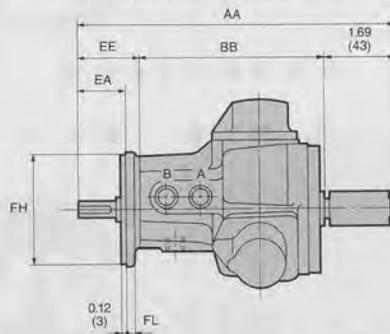
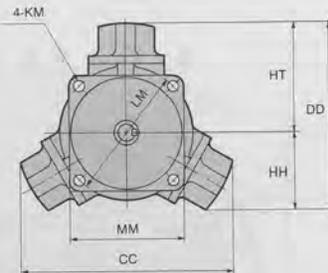
DIMENSIONS/DIRECT DRIVE/UTAM4-010•015

inch (mm)

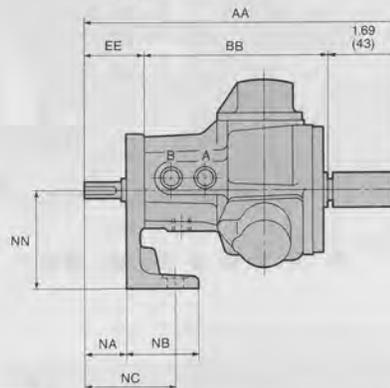
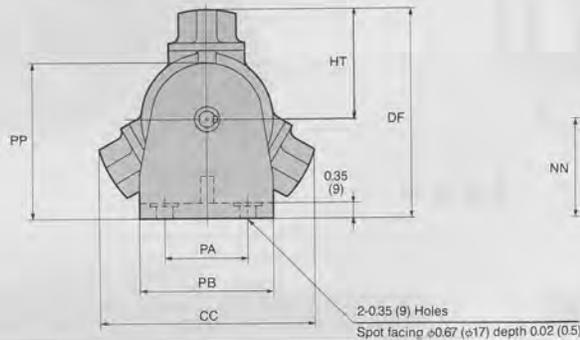
• Standard



• With Flange Mounting



• With Foot Mounting



DIMENSIONS

inch (mm)

Model No.	Symbol	AA	BB	CC	DD	DF	EA	EE	*FF	**FH	FL	GG	GH	GL	HH	HT	KK	KL	KM
UTAM4-010		7.56 (192)	4.45 (113)	5.12 (130)	4.53 (115)	5 (127)	1.14 (29)	1.42 (36)	$\phi 1.6535$ ($\phi 42$)	$\phi 2.6772$ ($\phi 68$)	0.20 (5)	0.67 (17)	0.39 (10)	0.79 (20)	1.89 (48)	2.64 (67)	(M5 x 0.8)	0.31 (8)	$\phi 0.24$ ($\phi 6$)
UTAM4-015		8.86 (225)	5.39 (137)	6.46 (164)	5.59 (142)	5.98 (152)	1.42 (36)	1.77 (45)	$\phi 1.8898$ ($\phi 48$)	$\phi 3.0709$ ($\phi 78$)	0.28 (7)	0.75 (19)	0.47 (12)	1.10 (28)	2.36 (60)	3.23 (82)	(M6 x 1)	0.47 (12)	$\phi 0.28$ ($\phi 7$)

*Tolerance-00098" (0.025) **Tolerance-001" (0.03)

Model No.	Symbol	LL	LM	MM	NA	NB	NC	NN	PA	PB	PP	KEY					
												a	***b	d	e	f	g
UTAM4-010		$\phi 2.17$ ($\phi 55$)	$\phi 3.15$ ($\phi 80$)	$\square 2.83$ ($\square 72$)	1.02 (26)	1.77 (45)	2.20 (56)	$2.36 \pm .004$ (60 ± 0.1)	1.97 (50)	3.15 (80)	3.70 (94)	0.91 (23)	$\phi 0.3937$ ($\phi 10$)	0.118 (3)	0.118 (3)	0.071 (1.8)	0.787 (20)
UTAM4-015		$\phi 2.44$ ($\phi 62$)	$\phi 3.62$ ($\phi 92$)	$\square 3.39$ ($\square 86$)	1.30 (33)	1.97 (50)	2.48 (63)	$2.76 \pm .004$ (70 ± 0.1)	2.76 (70)	3.94 (100)	4.33 (110)	1.18 (30)	$\phi 0.4724$ ($\phi 12$)	0.157 (4)	0.157 (4)	0.098 (2.5)	1.063 (27)

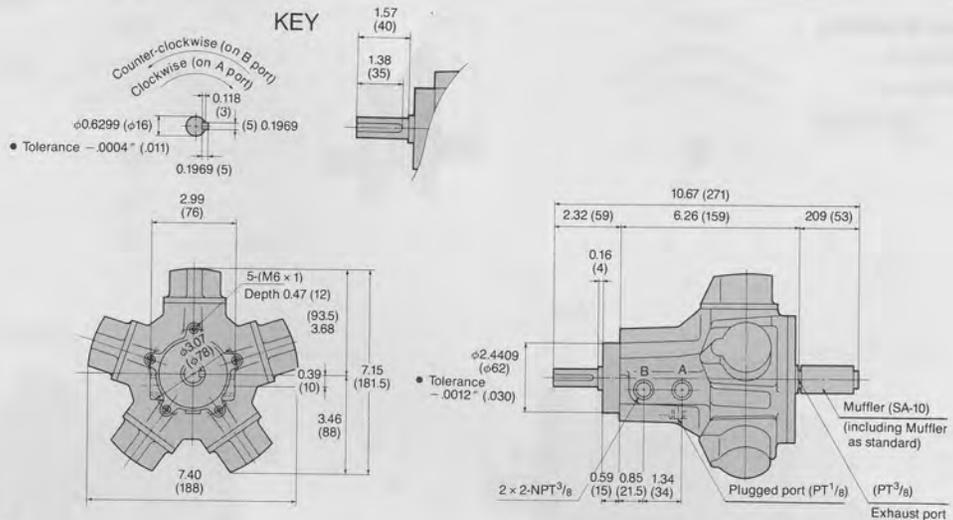
***Tolerance-0004" (0.11)

AIR MOTOR • RADIAL PISTON TYPE **UTAM4 Series**

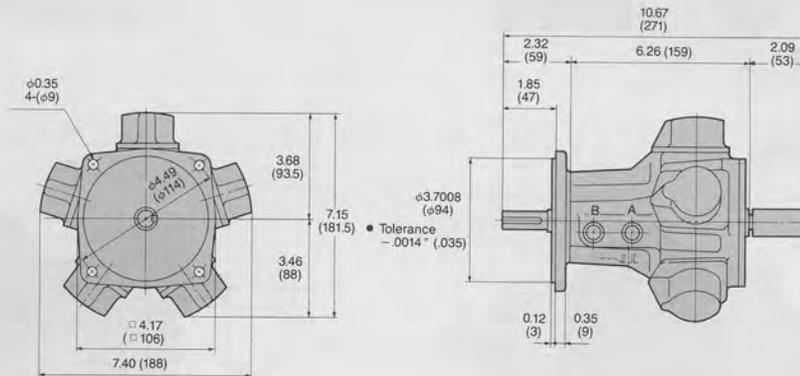
DIMENSIONS/DIRECT DRIVE/UTAM4-030

inch (mm)

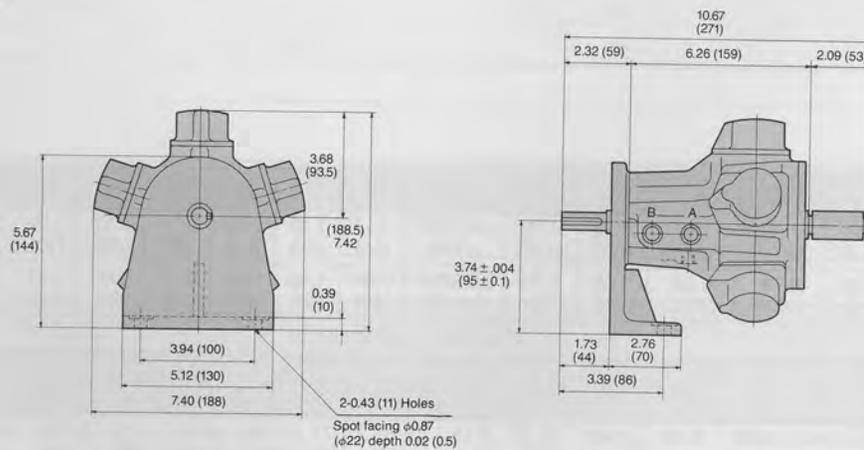
• Standard



• With Flange Mounting



• With Foot Mounting



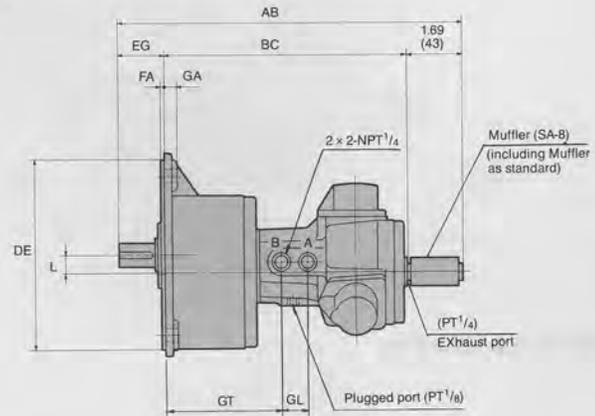
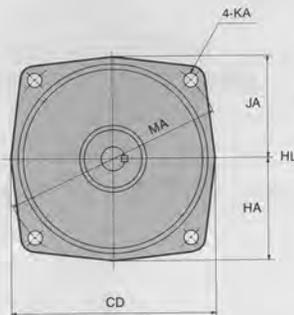
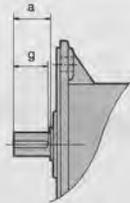
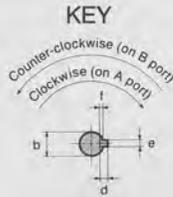
UTAM4 Series AIR MOTOR • RADIAL PISTON TYPE

DIMENSION/GEARED DRIVE/UTAM4-010-015 **F_G** ※※※

inch (mm)

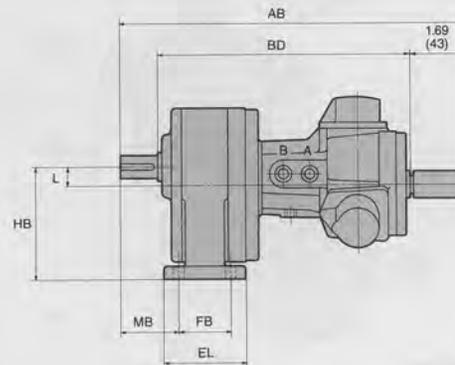
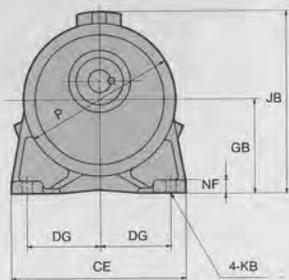
- With Flange Mounting
TAM4-010FG ※※※
TAM4-015FG ※※※

Gear ratio



- With Foot Mounting
TAM4-010LG ※※※
TAM4-015LG ※※※

Gear ratio



DIMENSIONS

inch (mm)

Model No.	Symbol	AB	BC	BD	CD	CE	*DE	DG	EG	EL	FA	FB	GA	GB	GL	GT	HA
UTAM4-010	※G ※※※	10.45 (265.5)	7.38 (187.5)	7.57 (192.5)	6.10 (155)	5.28 (134)	φ5.7087 (φ145)	2.17 (55)	1.38 (35)	2.52 (64)	0.12 (3)	1.57 (40)	0.39 (10)	2.80 (71)	0.79 (20)	3.60 (91.5)	3.05 (77.5)
UTAM4-015	※G ※※※	12.32 (313)	8.78 (223)	9.06 (230)	6.50 (165)	6.06 (154)	φ5.8268 (φ148)	2.56 (65)	1.85 (47)	3.54 (90)	0.16 (4)	2.56 (65)	0.47 (12)	2.83 (72)	1.10 (28)	4.13 (105)	3.25 (82.5)

*Tolerance - .0016 (.04)

Model No.	Symbol	HB	HL	JA	JB	KA	KB	L	MA	MB	NF	P	KEY					
													a	**b	d	e	f	g
UTAM4-010	※G ※※※	3.35 (85)	6.10 (155)	3.05 (77.5)	5.43 (138)	φ0.43 (φ11)	φ0.35 (φ9)	0.55 (14)	φ6.69 (φ170)	1.77 (45)	0.39 (10)	φ4.41 (φ112)	1.18 (30)	0.7087 (φ18)	0.2362 (6)	0.2362 (6)	0.14 (3.5)	1.06 (27)
UTAM-015	※G ※※※	3.54 (90)	6.50 (165)	3.25 (82.5)	6.06 (154)	φ0.43 (φ11)	φ0.43 (φ11)	0.71 (18)	φ7.28 (φ185)	2.17 (55)	0.47 (12)	φ4.92 (φ125)	1.57 (40)	0.8661 (φ22)	0.2362 (6)	0.2362 (6)	0.14 (3.5)	1.38 (35)

**Tolerance - .0005 (.013)

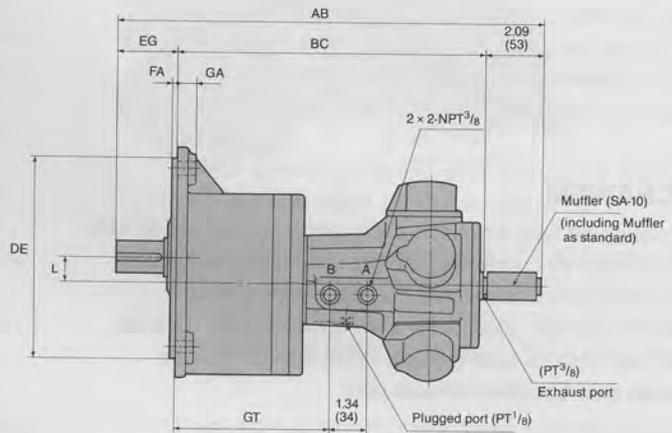
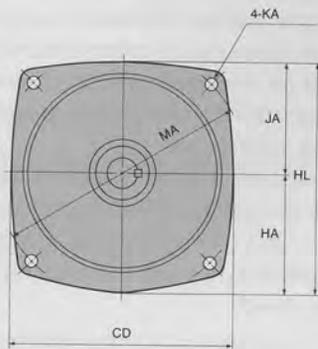
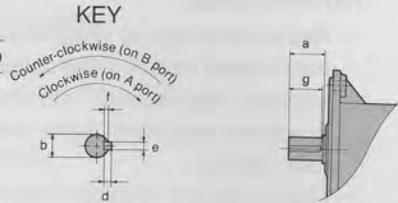
AIR MOTOR • RADIAL PISTON TYPE **UTAM4 Series**

DIMENSIONS/GEARED DRIVE/UTAM4-030 **FG*****

inch (mm)

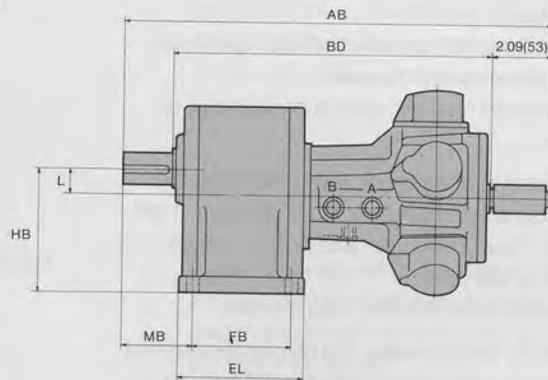
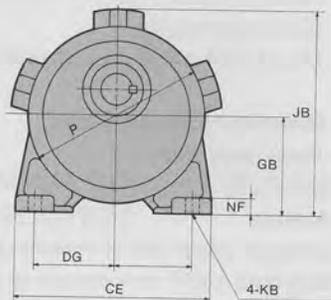
- With Flange Mounting
TAM4-030FG***

Gear ratio



- With Foot Mounting
TAM4-030LG***

Gear ratio



DIMENSIONS

inch (mm)

Model No.	Symbol	AB	BC	BD	CD	CE	*DE	DG	EG	EL	FA	FB	GA	GB	GT
UTAM4-030**G***		14.33 (364)	10.28 (261)	10.47 (266)	7.36 (187)	6.69 (170)	φ6.6929 (φ170)	2.76 (70)	1.97 (50)	4.72 (120)	0.16 (4)	3.54 (90)	0.59 (15)	3.46 (88)	4.86 (123.5)

*Tolerance - .0016 (.04)

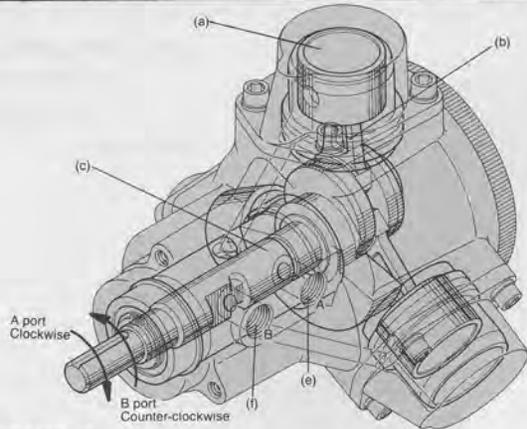
Model No.	Symbol	HA	HB	HL	JA	JB	KA	KB	L	MA	MB	NF	P	KEY					
														a	**b	d	e	f	g
UTAM4-030**G***		3.94 (100)	4.33 (110)	7.64 (194)	3.70 (94)	7.15 (181.5)	φ0.43 (φ11)	φ0.43 (φ11)	0.87 (22)	φ8.46 (φ215)	2.56 (65)	0.59 (15)	φ5.98 (φ152)	1.77 (45)	1.1024 (φ28)	0.2756 (7)	0.3150 (8)	0.16 (4)	1.57 (40)

**Tolerance - .0005 (.013)

UTAM4 Series

AIR MOTOR • RADIAL PISTON TYPE

OPERATIONAL PRINCIPLE OF RADIAL PISTON TYPE AIR MOTOR



MECHANISM

In radial piston type air motor, each piston (a), connected with crankshaft (c) by connecting rod (b), interlocking with rotary valve which provides compressed air to each cylinder through A port (e), accordingly corresponding piston thrusts crank then obtains turning force. While B port (f) on the opposite side functions exhaust port.

ADVANTAGES

- Radial piston type air motors have more positive starting, better speed control at low speeds, and slightly better stopping characteristics than vane motors.
- In addition, they have slightly lower air consumption at the lower speeds.
- Output torque is developed by pressure acting on pistons; there are 3 or 5 pistons per motor.
- Most motors have 3 or 5 pistons, but there is some disagreement as to which number is preferable since both designs give excellent performance.
- Power developed by piston motors increases with inlet pressure, number of pistons, piston area, stroke and speed.
- Primary factor limiting speed in a piston motor is the inertia of the moving parts.
- Radial piston type air motors are basically low-speed devices capable of reaching free speeds up to 1500 rpm.
- They can lug heavy loads at all speeds and are particularly adaptable to applications requiring high starting torque and slow speed.

HANDLING INSTRUCTIONS & CAUTIONS

• Mounting

- When installing motors, be sure all couplings, sprockets, attachments, etc. are properly guarded.
Failure to comply could result in serious bodily harm or property damage.
- When air is admitted to one port on reversible tools, the other port becomes an exhaust port; if it is plugged, it will produce a severe "back pressure" and greatly reduce speed and power of the motor.
Do not plug exhaust ports of motor. Use mufflers.
- In corrosive or dusty atmospheres, it is recommended that air lines be equipped with micro (coalescing) filters, air filters and exhaust mufflers.

• Piping

- Mount the lubricator, regulator, filter and directional control valve as close to the motor as possible.
It is possible to save air consumption.
- Before mounting, flush pipe with compressed air and remove cutting powder, cutting oil and dust.
- When steel tubes are used for piping, be sure they are zincplated pipes.
- Do not plug exhaust ports of directional control valve to keep away from "back pressure".

• Lubrication

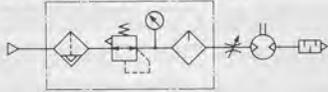
- Air lines should be equipped with lubricators.
Recommended supply of lubricant is 5 drop/min. at 70 psig (Setting pressure).
Mount the lubricator as close to the motor as possible.

• Environmental conditions

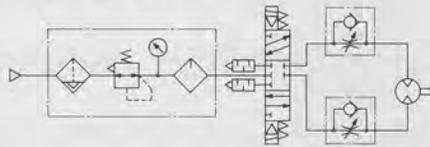
- **Keep away from —**
 - * Dust
 - * Moisture
 - * Corrosive gases and chemicals or their solutions
 - * More than 158°F temperature and direct sunlight

BASIC CIRCUIT / For all reversible air motors, 4 way directional control valve (*TAIYO* USR Series 550•551) is recommended. In uncertain applications, consult to *TAIYO*.

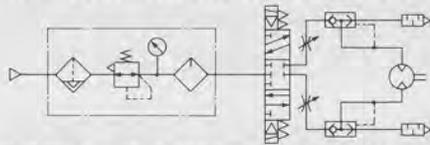
1. ONE DIRECTION ROTATION



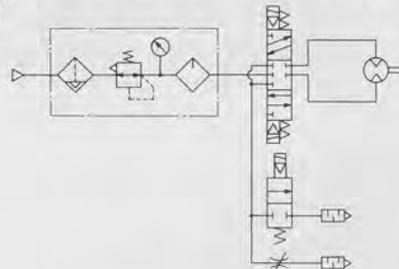
2. REVERSIBLE ROTATION



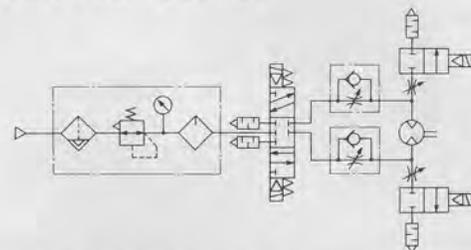
3. REVERSIBLE ROTATION WITH HIGH OUTPUT



4. REVERSIBLE ROTATION WITH REDUCING SPEED CIRCUIT



5. REVERSIBLE ROTATION WITH REDUCING SPEED CIRCUIT AND HIGH OUTPUT



For continuous run either clockwise or counter-clockwise.

Performance curve shown on the diagram is based on this circuit because of no back pressure.

Turns motor clockwise or counter-clockwise via solenoid valve.

In this case speed is controlled by throttle but exhaust is also throttled. Air throttling consumes less air. In this circuit, however, when back pressure comes big owing to valve capacity and piping, there causes output drops.

Upon selecting solenoid valve and piping, it is advisable to afford much possible room.

Attaching quick throttle valve to the foregoing No. 2 circuit, specially designed so as not to cause back pressure, you can expect both output and rotational frequency as close as shown on the performance curve.

Attaching reducing speed circuit to the said No. 2 circuit, two directional solenoid valves open on high speed operations and also they close on slow speed operation, thus two different speeds are obtainable. Back pressure raises as same as No. 2 circuit and output drops than performance curve.

Specially designed to the foregoing No. 4 circuit so as not to raise back pressure. You can expect to obtain output and rotational frequency almost same as performance curve.

● **RECOMMENDED AIR LINE EQUIPMENT**

Port Size (NPT)	Air Motor	Modular F.R.L. Combination Set		4 Way Directional Air Valve • Solenoid/Pilot Operated
		TRIO	TWIN	
1/4	UTAM4-010	UCFRL- ⁰⁶ / ₁₀ (Port Size: 1/4•3/8)	UCKL- ⁰⁶ / ₁₀ (Port Size: 1/4•3/8)	USR550 Series (Cv factor .8)
	UTAM4-015			
3/8	UTAM4-030	UMFRL- ¹⁵ / ₂₀ (Port Size: 1/2•3/4)	UMKL- ¹⁵ / ₂₀ (Port Size: 1/2•3/4)	USR551 Series (Cv factor 1.1)