YASKAWA
ELECTRIC

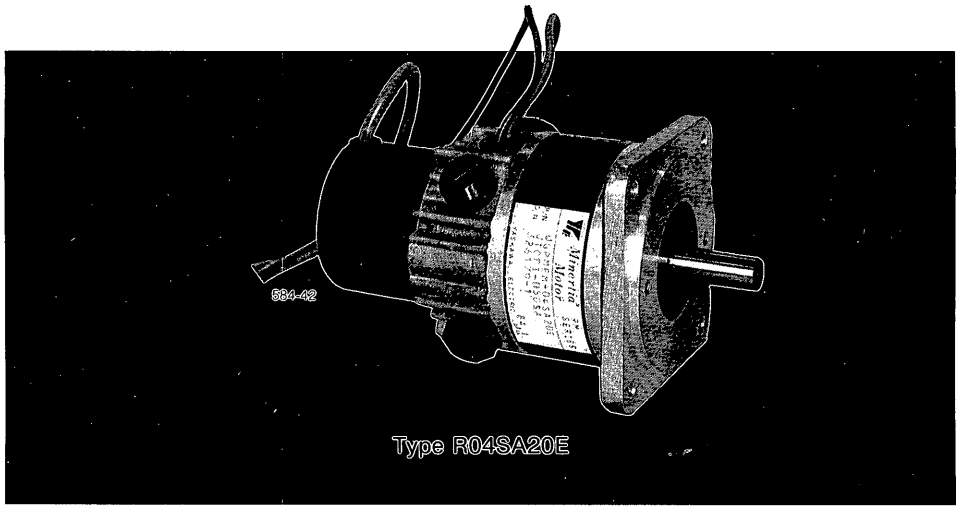
TSE-C253-20G

EXCELLENT PERFORMANCE/SIZE RATIO IN A SMALL PACKAGE

Minertia® Motor R Series

For Industrial Robot Drives

Type R01□□ to R40□□



Type R04SA20E

Designed to meet the Demands of Robot Applications

R series is a new line introduced for integration into robots as an articulate power drive, or as a drive for insertion machines, IC bonders, or high precision X-Y tables.

R series features compact size, light weight, yet possesses excellent torque/weight and torque/volume ratios in servodrive applications.

FEATURES

- High performance DC servomotor
- Magnetic field formation using rare earth magnet
- Rated speed as high as 3000 rpm
- Compact and light weight
  - Small diameter
  - Short length
- Excellent torque/weight and torque/volume ratios
- Totally-enclosed construction having slot core armature
- Available with optical encoders, feedback units, DC tachometers
- Suitable motor controllers available for special applications
- Unique bearing configuration—no thrust movement of motor shaft

RATINGS AND SPECIFICATIONS

Time rating: Continuous

Insulation: Class B for Type R01SA to R08MB
Class F for Type R40SA and R40MA

Dielectric Strength:
500 VAC for a minute for Type R01SA to R08SA
1000 VAC for a minute for Type R08MB and 40SA
1500 VAC for a minute for Type R40MA

Enclosure: Totally-enclosed self-cooled type

Ambient Temperature: −10°C to +40°C in operation
−20°C to +60°C in storage (no condensation)

Humidity: 35% to 80% RH in operation
10% to 80% RH in storage (no condensation)

Vibration: V-15

Finish in Munsell Notation: N1. 5 (Black)

Excitation: Permanent magnet

Mounting: Flange-mounted type

Table 1 Ratings and Specifications

Motor Type	R01SA	R02SA	R02MA	R04SA	R04MA	R08SA	R08MB	R40SA	R40MA
Peak rated torque oz·in	75	150	250	300	500	750	1250	1190	2140
Rated torque oz·in	15	30	50	60	100	150	250	450	850
Torque constant oz·in/A	7.58	8.12	11.5	11.9	16.8	20.2	32.7	51.6	69.0
Armature winding resistance Ohms (at 25°C)	2.75	1.12	0.94	0.59	0.41	0.41	0.49	0.57	0.34
Armature inductance mH	1.2	0.9	0.9	0.7	0.6	1.2	2.0	4.0	3.1
Peak current amps	10	18.8	22.1	25.5	30.1	37.5	38.5	27.6	36.3
Voltage constant volts/1000 rpm	5.6	6.0	8.5	8.8	12.4	14.9	24.2	38.2	38.2
Viscous damping coefficient oz·in/1000 rpm	0.42	0.82	1.5	2.2	3.7	3.5	2.5	4.03	7.23
Friction torque oz·in	0.9	2.4	3.5	3.6	5.1	6.4	8.3	15.5	19.4
Inertia oz·in·sec^2 × 10^{-3}	0.652	2.22	3.96	13.6	23.7	72.2	118	366	625
Mechanical time constant millisec	4.4	5.4	4	8	4.9	10	7.7	11	6.1
Electrical time constant millisec	0.44	0.8	0.96	1.2	1.5	2.9	4.1	7.1	9.4
Power rate kW/sec	2.43	2.86	4.45	1.87	2.97	2.2	3.73	3.94	8.16
Torque inertia ratio rad/sec^2	23000	13500	12600	4410	4210	2080	2120	1230	1360
Thermal resistance deg C/watt	3.5	2.33	1.86	1.86	1.55	1.25	1.0	0.8	0.6
Max temperature rise deg	100	100	100	100	100	100	100	155	155
Rated speed rpm	3000	3000	3000	3000	3000	3000	3000	2500	2200
Max safe operating speed rpm	4500	4000	4000	4000	4000	4000	4000	4000	3500
Max no load speed rpm	5000	5000	5000	5000	5000	5000	5000	4000	3500
Cooling required cfm, in H_2O	Totally-enclosed self-cooled								
Weight lb	0.89	1.77	2.43	3.09	4.86	8.36	11.5	18.1	24.3

Note: Rated torque is indicated by allowable continuous torque value at ambient temperature 25°C, when the following heat dissipating aluminum plate is mounted on the motor: 6″ × 6″ × 1/8″ for Type R01, 10″ × 10″ × 1/4″ for Type R02, R04; 12″ × 12″ × 1/2″ for Type R08, R40.

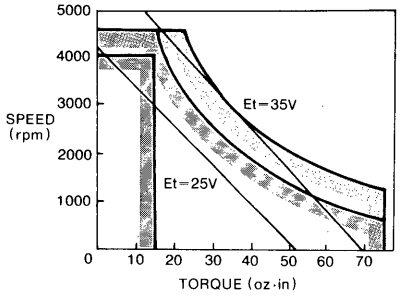
ELECTRIC CHARACTERISTICS

SPEED-TORQUE CHARACTERISTICS

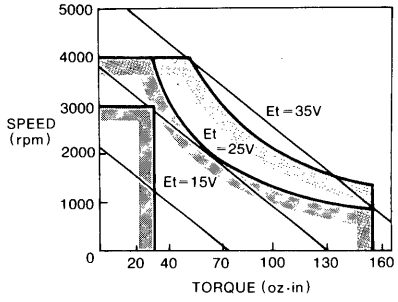
Fig. 1 shows speed-torque characteristics when armature voltage (Et) and armature current (Ia) are maintained constant.

= CONTINUOUS DUTY ZONE
= INTERMITTENT DUTY ZONE
= RECOMMENDED COMMUTATION LIMIT

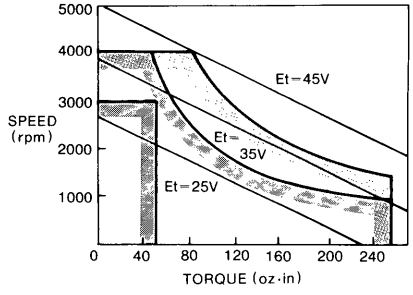
(a) Type R01SA



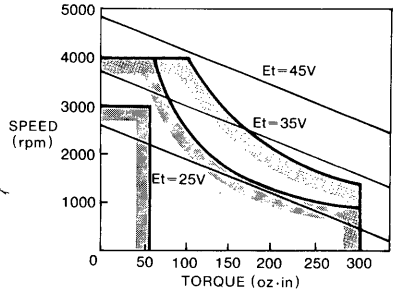
(b) Type R02SA



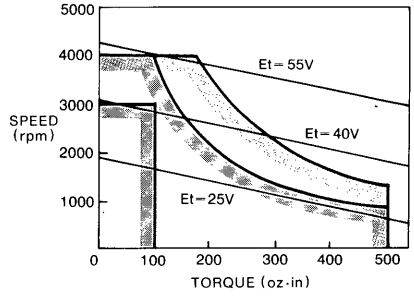
(c) Type R02MA



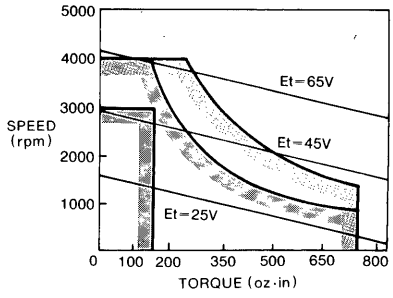
(d) Type R04SA



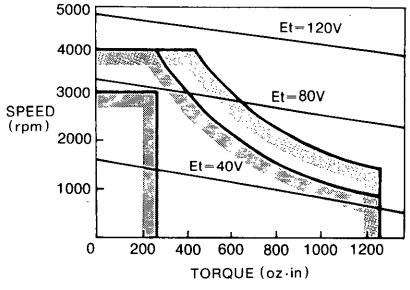
(e) Type R04MA



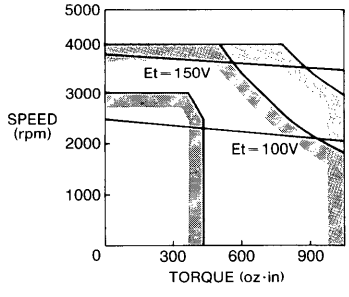
(f) Type R08SA



(g) Type R08MB



(h) Type R40SA



(i) Type R40MA

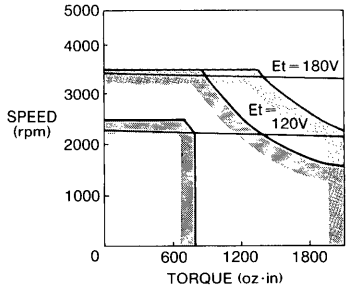


Fig. 1 Speed-Torque Characteristics

TYPE DESIGNATION

R 02S A 2 O E

Minertia Motor R Series

FRAME SIZE

01S	33W
02S	70W
02M	110W
04S	130W
04M	220W
08S	330W
08M	550W
40S	830W
40M	1380W

DESIGN ORDER

CONFIGURATION OF FLANGE SHAFT

2	D face (Square flange) Straight shaft
K	C face (Round flange) Straight shaft

O	Without Oil Seal
S	With Oil Seal
X	Special

OPTIONAL DETECTORS (MODULAR SERIES)

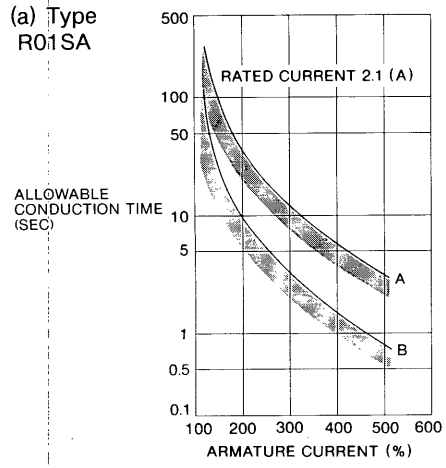
-	Motor alone
E	Optical encoder
7	DC tachometer generator Type G7SV
F	Feedback unit (Encoder & TG)
B	Brake
W	Brake, DC tachometer generator
D	Brake, Optical encoder
Z	Brake, Feedback unit

STARTING AND OVERLOAD CHARACTERISTICS

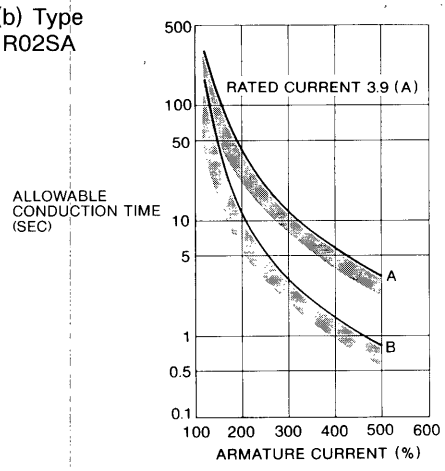
At cold condition (A) — Curves are obtained at starting operation when armature temperature is equal to ambient temperature.

At hot condition (B) — Curves obtained when armature temperature is at optimum at the rated operation.

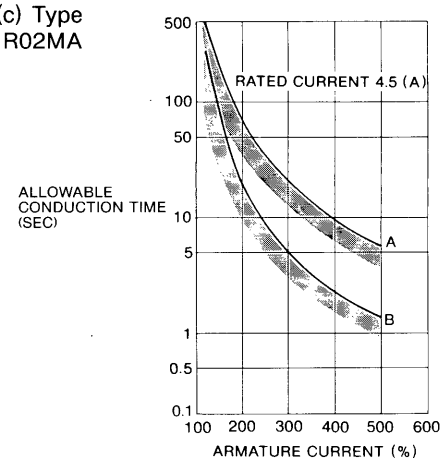
(a) Type R01SA



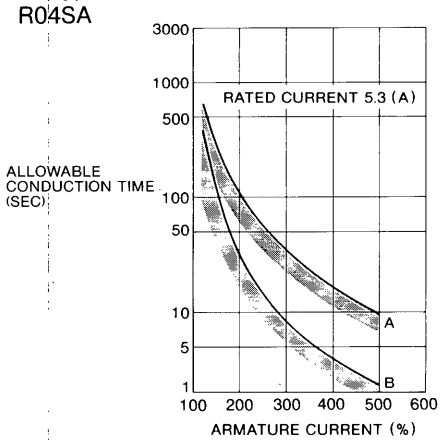
(b) Type R02SA



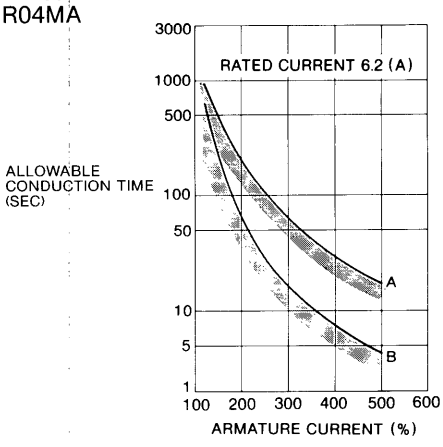
(c) Type R02MA



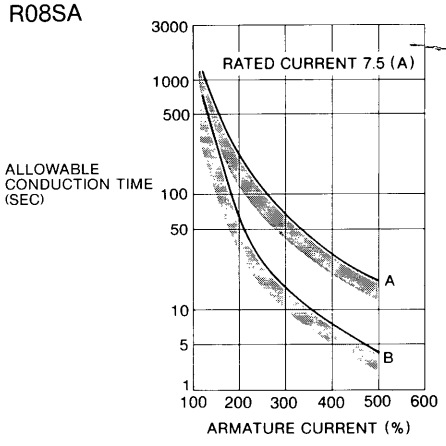
(d) Type R04SA



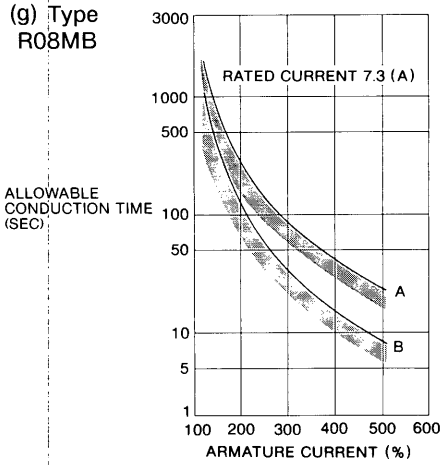
(e) Type R04MA



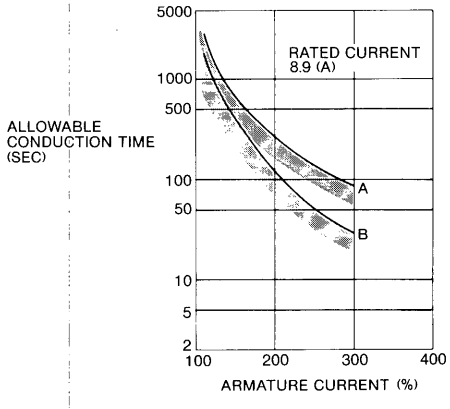
(f) Type R08SA



(g) Type R08MB



(h) Type R40SA



(i) Type R40MA

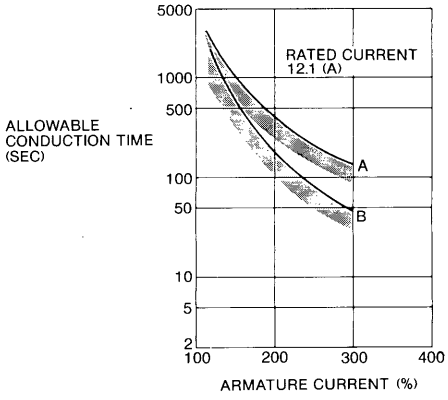


Fig. 2 Starting and Overload Characteristics

GROUNDING MOTOR POWER SUPPLY

When the Minertia Motor R series is operated on DC power obtained by rectifying a single-phase AC current, the circuit should be grounded by the transformer as shown in Fig. 3.

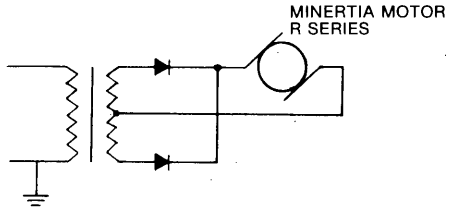


Fig. 3 Grounding of Motor Power Supply

OVERLOAD PROTECTION

It is recommended that the motor be provided with Yaskawa thermal overload relay type RHP-15/F for overload protection.

Table 2 Selection of Thermal Overload Relay

Minertia Motor Type	Rated Current A	Thermal Overload Relay Type RHP-
R01SA	2.1	15/2.1F
R02SA	3.9	15/3.9F
R02MA	4.5	15/4.5F
R04SA	5.3	15/5.3F
R04MA	6.2	15/6.2F
R08SA	7.5	15/7.5F
R08MB	7.3	15/7.5F
R40SA	8.9	15/8.3F
R40MA	12.1	15/11.5F

Type	Rated Contact Current A				No. of Thermal Elements	Contact Arrangement	Approx Weight
	110V	220V	440V	550V			oz
RHP-15/( )	6	3	1.5	1.2	1	1NONC	2.5

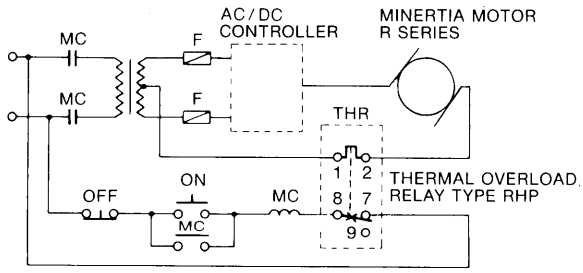


Fig. 4 Connection Diagram of Thermal Overload Relay Type RHP

MECHANICAL CHARACTERISTICS

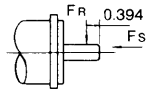
MECHANICAL STRENGTH

Minertia Motors R series can carry up to 500% of the rated momentary maximum torque at output shaft.

ALLOWABLE THRUST LOAD AND ALLOWABLE EQUIVALENT RADIAL LOAD

Table 3 shows allowable loads according to motor types.

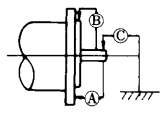
Table 3 Allowable Radial Load and Thrust Load

Minertia Motor Type	Allowable Radial Load (Fr) lb	Allowable Thrust Load (Fs) lb	Reference Diagram in inches
R01SA	8.8	4.4	
R02SA	17.6	8.8	
R02MA	17.6	8.8	
R04SA	33	8.8	
R04MA	33	8.8	
R08SA	55	22	
R08MB	55	22	
R40SA	55	22	
R40MA	55	22	

Note: Radial load and thrust load are the maximum value of total of the load causing from motor torque and the load applying to the shaft externally.

MECHANICAL SPECIFICATIONS

Table 4 Mechanical Specifications in inches

Accuracy (T.I.R.)*		Reference Diagram
Flange surface perpendicular to shaft Ⓐ	0.0016	
Flange diameter concentric to shaft Ⓑ	0.0016	
Shaft run out Ⓒ	0.0008	

**T.I.R. (Total Indicator Reading)*

DIRECTION OF ROTATION

Minertia Motor R series rotates counterclockwise viewed from drive end when lead connections are: red lead (+: plus); black lead (−: minus).

IMPACT RESISTANCE

Motor Only

When mounted horizontally and exposed to vertical shock impulses, the motor can withstand up to three impacts with impact acceleration of 50 G.

With Optical Encoder

With motor mounted horizontally and exposed to vertical shock impulses, the motor can withstand up to two impacts with impact acceleration of 10 G.

VIBRATION RESISTANCE

With motor mounted horizontally, the motor can withstand the vibration (vertical, lateral, axial) with vibration acceleration of 2.5 G.

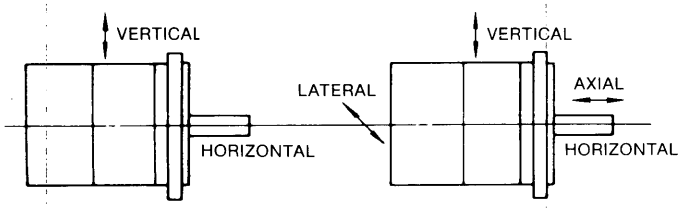


Fig. 5 Impact Resistance

Fig. 6 Vibration Resistance

VIBRATION CLASS

Vibration of the motor running at no load is V-15 or below. (amplitude 1.5 micron meter maximum p-p)

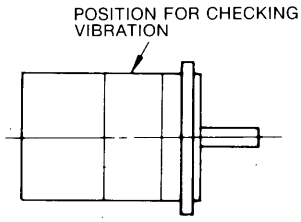


Fig. 7

MODIFICATIONS

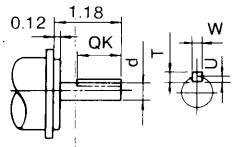
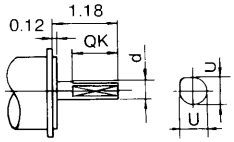
OPTIONS

Type of Shaft Extension

Recommended modification of motor shaft extension is shown in Table 5.

Table 5 Type of Shaft Extension

Dimensions in inches

	With Key					With Flat Key Seat		
Reference Diagram								
Motor Type	QK	d	T	W	U	QK	d	U
R01SA[ ]	—	—	—	—	—	0.591	$0.0236^{+0}_{-0.0005}$	0.2165
R02SA[ ]	0.787	$0.315^{0}_{-0.0006}$	0.120	0.120	0.0709	0.787	$0.315^{+0}_{-0.0006}$	0.2953
R02MA[ ]	0.787	$0.315^{0}_{-0.0006}$	0.120	0.120	0.0709	0.787	$0.315^{+0}_{-0.0006}$	0.2953
R04SA[ ]	0.787	$0.433^{0}_{-0.0006}$	0.1575	0.1575	0.0984	0.787	$0.315^{+0}_{-0.0006}$	0.3937
R04MA[ ]	0.787	$0.433^{0}_{-0.0006}$	0.1575	0.1575	0.0984	0.787	$0.433^{+0}_{-0.0006}$	0.3937
R08SA[ ]	0.787	$0.551^{0}_{-0.0007}$	0.1968	0.1968	0.1181	0.787	$0.551^{+0}_{-0.0007}$	0.5118
R08MB[ ]	0.787	$0.630^{0}_{-0.0007}$	0.1968	0.1968	0.1181	0.787	$0.630^{+0}_{-0.0007}$	0.5118
R40SA[ ]	1.260	$0.748^{0}_{-0.0008}$	0.2362	0.2362	0.138	—	—	—
R40MA[ ]	1.260	$0.748^{0}_{-0.0008}$	0.2362	0.2362	0.138	—	—	—

Dripproof Type

Motor structure of Minertia Motor R series of dripproof type is as shown below.

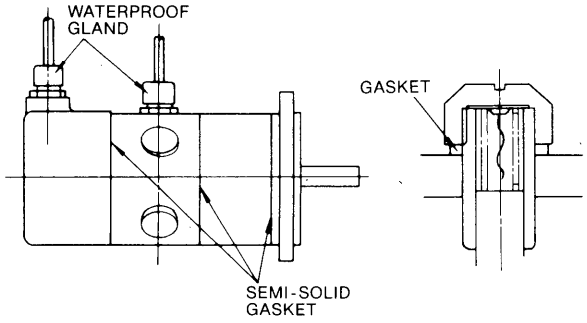


Fig. 8 Dripproof Enclosure

Caution when operation

- Never expose the motor to water (e.g. heavy rain, flooding, spraying). Protect the motor from corrosive liquids.
- Oil seal will not be provided with the dripproof type motor. If oil seal is required, it should be ordered in addition to designating dripproof type.

Connectors and Cables

Connectors and cables can be also specified by the customer. Contact the company representative for the special requirement.

Oil Seals

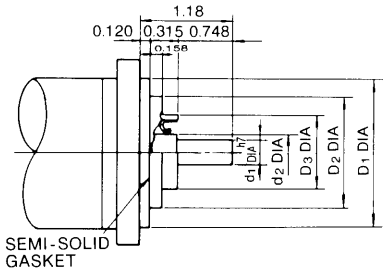
Life expectancy of oil seal is approximately 5000 hours at rated load and rated speed.

Oil sealed motors should be operated under the following conditions:

- Optimum oil level should be below oil seal lip.
- Oil seal should not be immerged in oil.

Avoid the locations listed below:

- Where corrosive liquids like chemicals and salt water prevail.
- Where explosive gases or corrosive gases like chlorine gas, hydrogen gas, and oxygen gas persist.
- In vacuum or where inert gas exists.



Dimensions in inches

Motor Type	Oil Seal Type	D_1	D_2	D_3	d_1	d_2
R01SA□S□	—	—	—	—	—	—
R02SA□S□	SB08227 (NOK)*	1.97	1.77	1.10	$0.315^{+0}_{-0.0006}$	0.394
R02MA□S□	SB08227 (NOK)	1.97	1.77	1.10	$0.315^{+0}_{-0.0006}$	0.394
R04SA□S□	SB12257 (NOK)	2.76	2.52	1.57	$0.433^{+0}_{-0.0006}$	0.472
R04MA□S□	SB12257 (NOK)	2.76	2.52	1.57	$0.433^{+0}_{-0.0006}$	0.472
R08SA□S□	SB17287 (NOK)	4.33	3.54	2.56	$0.551^{+0}_{-0.0007}$	0.669
R08MB□S□	SB17287 (NOK)	4.33	3.54	2.56	$0.630^{+0}_{-0.0007}$	0.669
R40SA□S□	SB20307 (NOK)	4.33	3.54	2.56	$0.748^{+0}_{-0.0008}$	0.787
R40MA□S□	SB20307 (NOK)	4.33	3.54	2.56	$0.748^{+0}_{-0.0008}$	0.787

*NOK: Nippon Oil Seal Industry Co., Ltd.

MODULAR MINERTIA MOTORS R SERIES

Modular Minertia Motors consist of any combination of Minertia Motor R series with DC tachometer generator, optical encoder, or magnetic brake.

Table 6 List of Options Combined with Minertia Motors R Series

◎: Standard ○, △: Available on order ×: Not manufactured

Motor Type \ Options	— Motor alone	7 TG	E OP	B BR	F FBU	W BR& TG	D BR& OP	Z BR& FBU
R01SAKO	◎	○	○	×	×	×	×	×
R02SA2O	◎	○	○	○	○	△	△	△
R02MA2O	◎	○	○	○	○	△	△	△
R04SA2O	◎	○	○	○	○	△	△	△
R04MA2O	◎	○	○	○	○	△	△	△
R08SA2O	◎	○	○	○	○	△	△	△
R08MB2O	◎	○	○	○	○	△	△	△
R40SA2O	◎	○	○	○	○	△	△	△
R40MA2O	◎	○	○	○	○	△	△	△

Note: For options indicated by △, contact the company representative.
TG: DC tachometer generator OP: Optical encoder
BR: Magnetic brake FBU: Feedback unit

Table 7 Applicable Magnetic Brakes and Detectors for Minertia Motors R Series

Motor Type UGRMEM-	Magnetic Brake Type	Detector: DC Tach-gen	Detector: Optical Encoder	Detector: Feedback Unit
R02SA2O	MSB/ 90-3YM	TG-7SVC	UTOPI-□□□ SE, UTOPI-□□□ SC	TFUE-□□□ SE, TFUE-□□□ SC
R02MA2O				
R04SA2O	MSB/ 90-6.5YM			
R04MA2O				
R08SA2O	SCFB/ 90-20YM			
R08MB2O				
R40SA2O	FSB/ 90-40			
R40MA2O				

Note: Motor type UGRMEM-R0ISA cannot be attached magnetic brake.

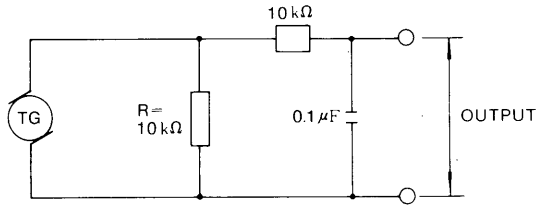
With DC Tachometer Generator

DC tachometer generators are available as speed feedback units. Specifications of DC tachometer generators are shown in table below.

Table 8 Specifications of DC Tachometer Generator

Type		G7SVC
Output Voltage	(V/1000 rpm) ±10 %	7
Ripple Amplitude	% p-p (at 1000 rpm)	1.5
Ripple Frequency	Cycles/rev.	13
Linearity	% (at 200–4000 rpm)	1
Direction Deviation	% (at 200–4000 rpm)	1
Armature Inertia	$oz \cdot in \cdot s^2 \times 10^{-3}$	0.208
Armature Resistance	Ω (20°C) ± 10 %	150
Temperature Coefficient	%/°C	< 0.05
Speed Range	rpm	200–4000
Max Speed	rpm	5000
Min Load Resistance	kΩ	5.1
Insulation Resistance	MΩ	10
Dielectric Strength	VAC	500
Ripple Expectancy	H	5000

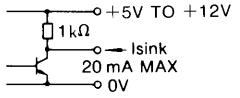
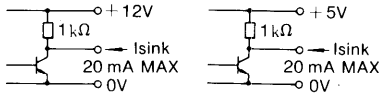
Note:
1. Output voltage is measured across the output terminals.
2. Ripple amplitude and linearity are obtained through filter circuit as shown below.



With Optical Encoder

Optical encoders are available as position and speed feedback signals.
(For speed feedback signals, F/V converter should be used.) Specifications are listed in Table 9.

Table 9 Specifications of Optical Encoders

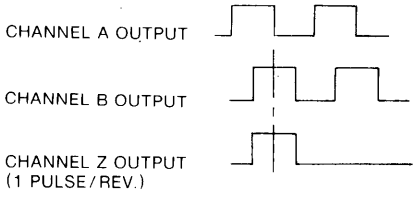
Optical Encoder Type	UTOPI-□□□SE	UTOPI-□□□MAB	UTOPI-□□□MUB
Input Supply Voltage	+5 TO +12VDC ±5%	+ 12 VDC ± 5%	+ 5VDC ± 5%
Current Consumption	150 mA max	150 mA max	
No. of Output Pulses	Type UTOPI-020 ····· 200 pulses/rev Type UTOPI-030 ····· 300 pulses/rev Type UTOPI-040 ····· 400 pulses/rev Type UTOPI-050 ····· 500 pulses/rev Type UTOPI-060 ····· 600 pulses/rev Type UTOPI-080 ····· 800 pulses/rev Type UTOPI-100 ····· 1000 pulses/rev Type UTOPI-150 ····· 1500 pulses/rev Type UTOPI-200 ····· 2000 pulses/rev Type UTOPI-250 ····· 2500 pulses/rev	Type UTOPI-040 ····· 400 pulses/rev Type UTOPI-050 ····· 500 pulses/rev Type UTOPI-060 ····· 600 pulses/rev Type UTOPI-080 ····· 800 pulses/rev Type UTOPI-100 ····· 1000 pulses/rev	
Output Wave Form	Square Wave	Square Wave	
Output Signal Level	VOH: 10V Min at 12V VOH: 4V Min at 5V VOL: 1.5V Max at 12V VOL: 0.4V Max at 5V	VOH: 10V Min VOH: 4V Min VOL: 1.5V Max VOL: 0.4V Max	
Rise Time	1 μs Max.	1 μs Max.	
Fall Time	0.5 μs Max.	0.5 μs Max.	
Output Circuit			
Phase Offset	ϕ: 25 ± 10 %	ϕ25 ± 10 %	
Flutter	2% p-p Max	2% p-p Max	
Pulse Duty Cycle	50 ± 10%	50 ± 10%	
Channel Z Pulse Width	50 ± 10%	50 ± 10%	
Response Frequency	75 kHz	75 kHz	
Illumination Source	LED	LED	
Sensor	Photo diode	Photo diode	
Max Allowable Speed	12,000 rpm	12,000 rpm	
Moment of Inertia	9.9 oz·in·s²×10⁻⁵	5 oz·in·s²×10⁻⁵	
Ambient Temperature	0 to + 60°C (in operation), − 20 to + 80°C (at standby)	0 to + 60°C (in operation), − 20 to + 80°C (at standby)	
Humidity	+20 to +80% RH	+20 to +80% RH	
Vibration (in operation)	2.5 G Max	2.5 G Max	

★Lead Identification of Encoders and DC Tachometer Generators

• Type SE, MAB, MUB

	Input/Output	Color	Lead Function
Encoder	Input	Red	+5 VDC or +12 VDC
		Black	0 V
	Output	Blue	Channel A output
		Black	Channel A common
		Yellow	Channel B output
		Black	Channel B common
		Green	Channel Z output
		Black	Channel Z common
DC Tachometer Generator	Output	White	Plus
		Black	Minus

〈Signal Wave〉

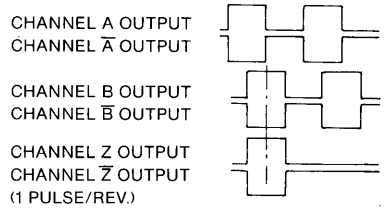


Origin pulse, 1 pulse/rev synchronizes with channel B pulse.

• Type SC (Balanced type line driver)

	Input/Output	Color	Lead Function
Encoder	Input	Red	+5 VDC
		Black	0 V
	Output	Blue	Channel A output
		Black	Channel $\overline{A}$ output
		Yellow	Channel B output
		Black	Channel $\overline{B}$ output
		Green	Channel Z output
		Black	Channel $\overline{Z}$ output
DC Tachometer Generator	Output	White	Plus
		Black	Minus

〈Signal Wave〉



Origin pulse, 1 pulse/rev synchronizes with channel B pulse.

With Feedback Units

Feedback units are available as position and speed detection units. Feedback units for Minertia Motor R series unitized DC tachometer generator and optical encoder. Specifications are listed in Table 10.

Table 10 Specifications of Feedback Unit

	TFUE-□□□SE	
	G7SVC (DC tachometer generator)	UTOPI-□□□SE (Optical encoder)
Characteristics	See Table 8.	See Table 9.
Rotor Inertia J ($GD^2/4$)	0.354 oz·in·s^{2}10^{-3} Max	
Friction Torque	2.09 oz·in·Max	
Filter Circuit	See Table 8.	—

With Magnetic Brakes

Magnetic brakes listed below are not used for stopping, but for holding after coming to a full stop.

Table 11 Specifications of Magnetic Brakes

	Magnetic Brake Type			
	MSB/ 90-3YM	MSB/ 90-6.5YM	SCFB/ 90-20YM	FSB/ 90-40
Input Supply Voltage	90 VDC ±10 %			
Power Consumption HP	7.4	7.1	14.5	16.8
Braking Torque oz·in	42	90	278	555
Applicable Motor	R02SA	R04SA	R08SA	R40SA
	R02MA	R04MA	R08MB	R40MA
Type	Spring loaded fail-safe type			

MEMO

MOTOR CONTROLLER

For detailed data on Servopack, refer to bulletin, Servopack Type CPCR-FR.

Listed below are Minertia Motors R Series and Servopack and f/V Converters. f/V converters are to be used only when speed feedback signal must be obtained from optical encoder.

Table 12 Minertia Motors and Applicable Controller Servopack

Minertia Motor Type	Servopack Type CPCR-1	DC Reactor Type	Power Transformer Type CPT-	f/V Converter2 Type JASP-
R01SAKOE	FR01B97-R1S	X-5019(3mH2A)	10042(150 VA)	FV00□□-□□
R02SA2OE	FR01B97-R2S	X-3064 (1mH8A)	8570(200 VA)	FV00□□-□□
R02SA2OF	FR01B-R2S			—
R02MA2OE	FR01B97-R2M		8588(300 VA)	FV00□□-□□
R02MA2OF	FR01B-R2M			—
R04MA2OE	FR01B97-R4S		8629(500 VA)	FV00□□-□□
R04MA2OF	FR02B-R4S			—
R04MA2OE	FR02B97-R4M			FV00□□-□□
R04MA2OF	FR02B-R4M			—
R08SA2OE	FR05C97-R8S	X-5006 (2mH8A)	10017(1 kVA)	FV00□□-□□
R08SA2OF	FR05C-R8S			—
R08MB20E	FR05C97-R8M			FV00□□-□□
R08MB20F	FR05C-R8M			—
R40SA2OE	MR15CY92, 94	X-3056	—	FV00□□-□□
R40SA2OF				—
R40MA2OE	MR22CY93, 95	X-3057	—	FV00□□-□□
R40MA2OF				—

1 Type Designation of Servopack

CPCR-□□□□□

Servopack

FR: Field-effect transistor PWM Reversible Type

MR: Transistor PWM Reversible Type

Capacity
01: 110 W
02: 220 W
05: 500 W
15: 1.5 kW
22: 2.2 kW

Special Specifications
Blank: Standard
9: External base OFF function
3: 3 V/1000 rpm TG
7: 6 V/Rating rpm f/V
Y92, 94: For motor type R40S
Y93, 95: For motor type R40M

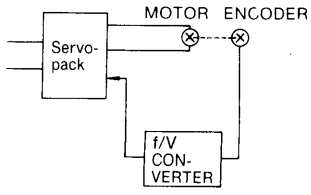
Design Revision (A, B, C···)

Motor Type
R1S : Type R01S
R2S : Type R02S
R2M: Type R02M
R4S : Type R04S
R4M: Type R04M
R8S : Type R08S
R8M: Type R08M

2 Specifications of f/V Converter

JASP-FV00□□-□□		
Power Supply	+12 V ±1% 110 mA, +12 V ±1% 50 mA, +5V ±5% 200 mA	
Environmental Condition	Operating Temperature	0 to +60°C
	Storing Temperature	−20 to +70°C
Input	Humidity	85 % Max (No condensation)
	Frequency	90°C Phase difference 2-Phase pulse 50 kHz Max
	Pulse Voltage	12 V (JASP-FV00 1□-□□)
		5 V (JASP-FV00 2□-□□)

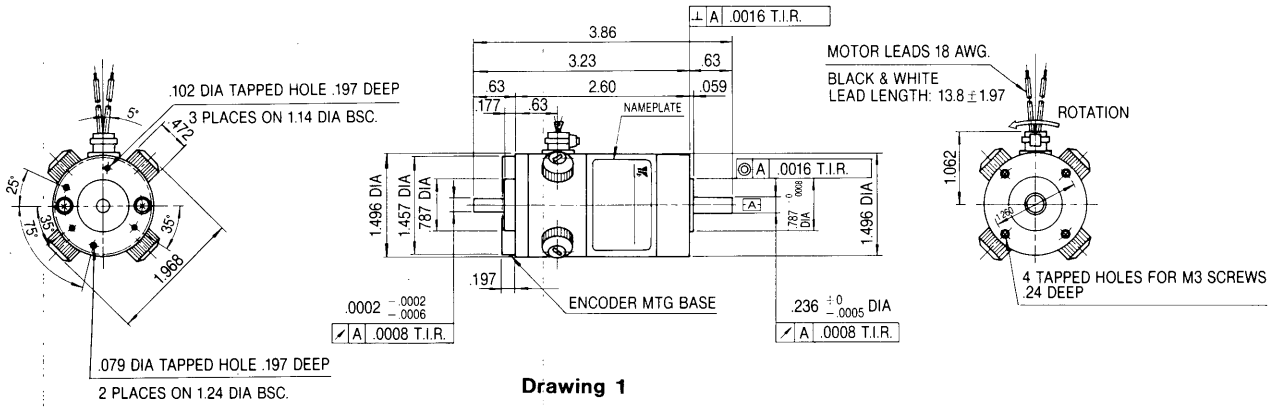
Contact the company representative.



DIMENSIONS in inches

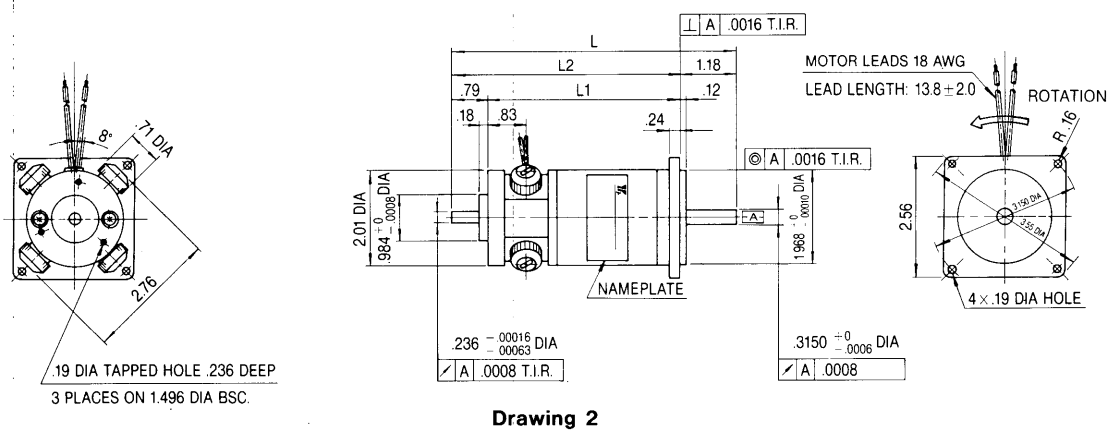
MOTORS ONLY

Type RO1



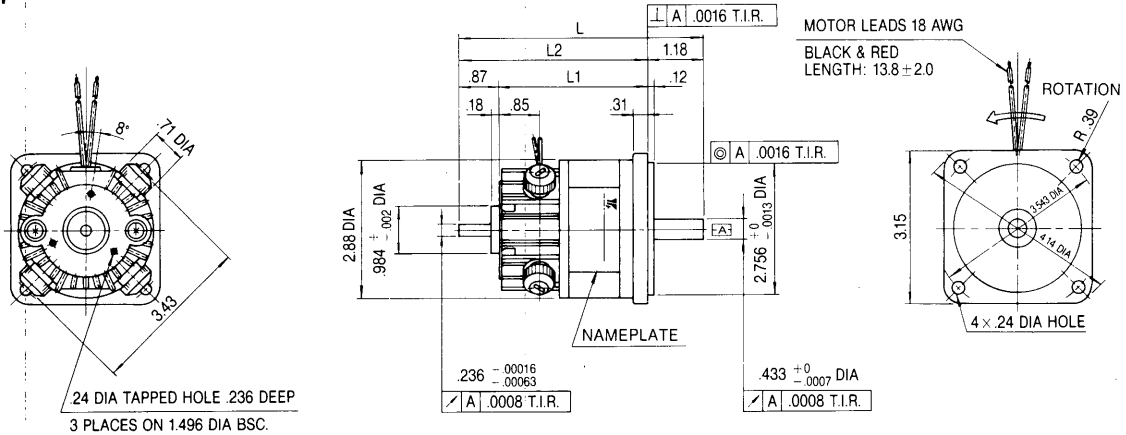
Drawing 1

Type RO2



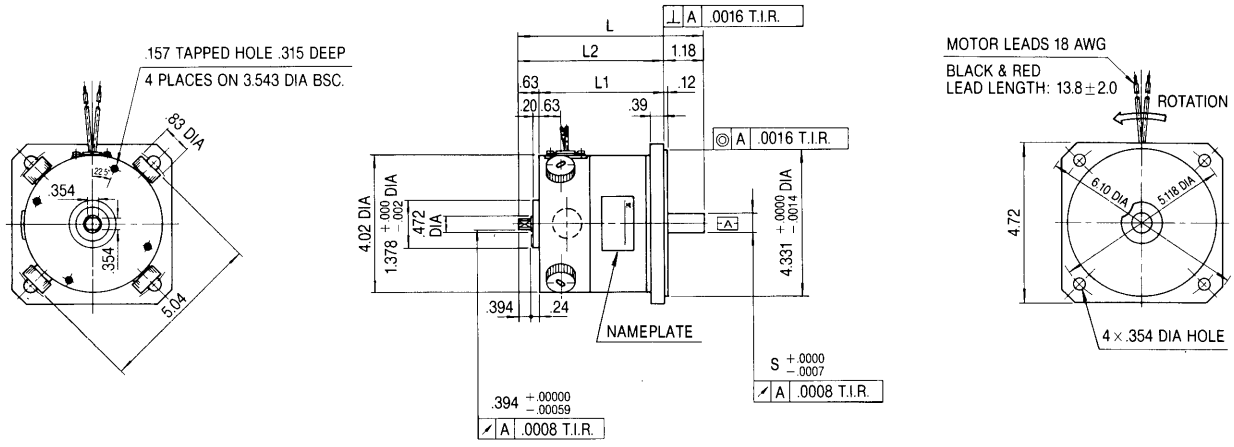
Drawing 2

Type RO4



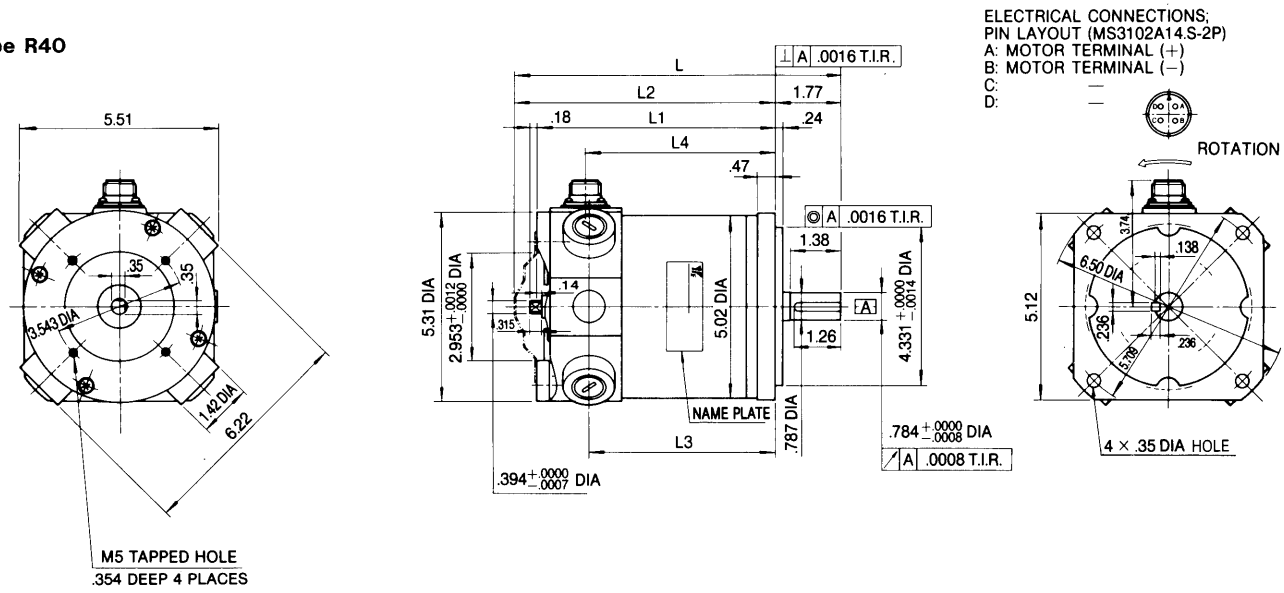
Drawing 3

Type R08



Drawing 4

Type R40



Drawing 5

Motor Type	Dwg	L_1	L_2	L_3	L_4	L	S	Allowable Load (lb) Thrust	Radial
RO1SAK	1	—	—	—	—	—	—	4.4	8.8
RO2SA2	2	2.99	3.78	—	—	4.96	—	8.8	17.6
RO2MA2		4.09	4.88	—	—	6.06	—		
RO4SA2	3	3.19	6.06	—	—	5.24	—	8.8	33
RO4MA2		4.21	5.08	—	—	6.26	—		
RO8SA2	4	3.70	4.33	—	—	5.51	.551	22	55
RO8MA2		4.65	5.28	—	—	6.46	.629		
R40SA2	5	6.26	6.89	4.80	4.92	8.66	—	22	55
R40MA2		7.64	8.27	6.18	6.30	10.04	—		

Note: CCW rotation with positive voltage applied to red lead and minus voltage, to black lead when viewed from shaft "A" end.

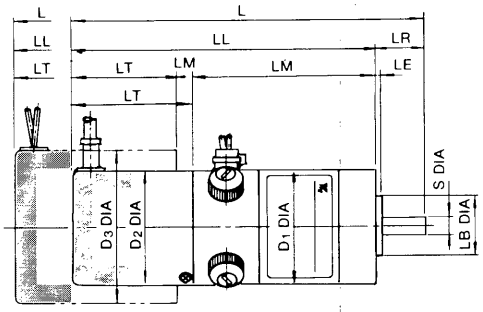
MOTORS WITH DETECTORS

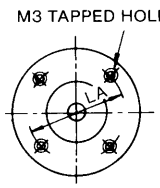
OP: Optical encoder

TG: DC tachometer generator

FBU: Feedback unit (OP + TG)

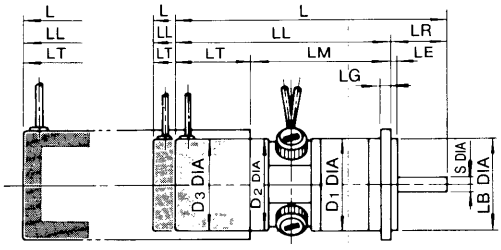
Type R01

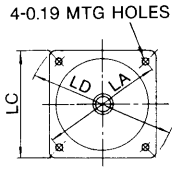




Motor Type	Detector	D_1	D_2	D_3	LA	LB	LC	LD	LE	LG	LM	LR	L	LL	LT	S	Weight lb
R01SAKOE	OP	1.5	1.5	—	1.260	0.787 $^{+0}_{-0.0008}$	—	—	0.06	—	2.56	0.63	4.53	3.90	1.30	0.236 $^{+0}_{-0.0005}$	0.89
R01SAKO7	TG		—	2.01							2.60		5.31	4.69	2.09		1.11

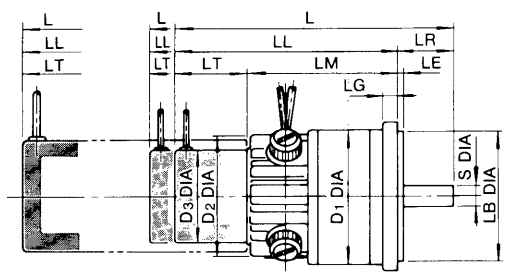
Type R02

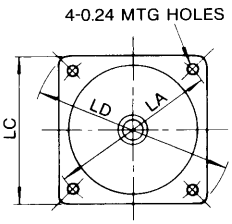




Motor Type	Detector	D_1	D_2	D_3	LA	LB	LC	LD	LE	LG	LM	LR	L	LL	LT	S	Weight lb
R02SA2OE	OP	2.01	2.01	2.01	3.150	1.968 $^{+0}_{-0.0010}$	2.56	3.55	0.12	0.24	2.99	1.18	5.43	4.25	1.26	0.315 $^{+0}_{-0.0006}$	1.77
R02SA2O7	TG			2.01									6.22	5.04	2.05		2.00
R02SA2OF	FBU			2.36									9.14	7.96	4.96		2.64
R02MA2OE	OP	2.01	2.01	2.01	3.150	1.968 $^{+0}_{-0.0010}$	2.56	3.55	0.12	0.24	4.09	1.18	6.53	5.35	1.26	0.315 $^{+0}_{-0.0006}$	2.43
R02MA2O7	TG			2.01									7.33	6.14	2.05		2.65
R02MA2OF	FBU			2.36									10.24	9.06	4.96		3.52

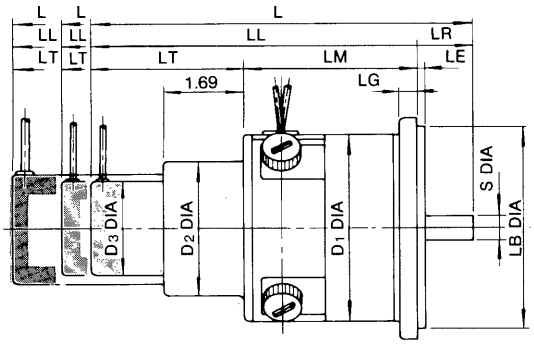
Type R04

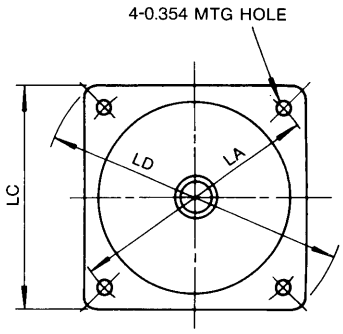




Motor Type	Detector	D_1	D_2	D_3	LA	LB	LC	LD	LE	LG	LM	LR	L	LL	LT	S	Weight lb
R04SA2OE	OP	2.88	2.84	2.01	3.543	2.756 $^{+0}_{-0.0013}$	3.15	4.14	0.12	0.31	3.19	1.18	5.63	4.45	1.26	0.433 $^{+0}_{-0.0007}$	3.09
R04SA2O7	TG			2.01									6.42	5.24	2.05		3.53
R04SA2OF	FBU			2.36									9.33	8.15	4.96		4.18
R04MA2OE	OP	2.88	2.84	2.01	3.543	2.756 $^{+0}_{-0.0013}$	3.15	4.14	0.12	0.31	4.21	1.18	6.65	5.47	1.26	0.433 $^{+0}_{-0.0007}$	4.85
R04MA2O7	TG			2.01									7.44	6.26	2.05		5.06
R04MA2OF	FBU			2.36									10.36	9.18	4.96		5.72

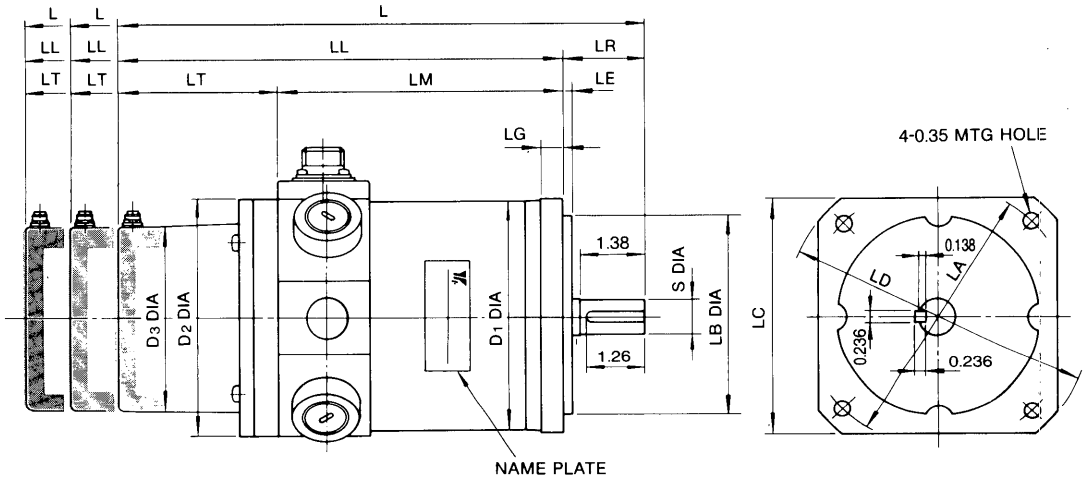
Type R08





Motor Type	Detector	D_1	D_2	D_3	LA	LB	LC	LD	LE	LG	LM	LR	L	LL	LT	S	Weight lb
R08SA2OE	OP	4.02	2.88	2.01	5.118	4.331 $^{+0}_{-0.0014}$	4.72	6.10	0.12	0.39	3.90	1.18	8.04	6.85	2.96	0.551 $^{+0}_{-0.0006}$	8.36
R08SA2O7	TG			2.01									8.76	7.58	3.92		8.80
R08SA2OF	FBU			2.36									9.79	8.61	4.77		9.24
R08MB2OE	OP	4.92	2.88	2.01	5.118	4.331 $^{+0}_{-0.0014}$	4.72	6.10	0.12	0.39	4.84	1.18	8.78	7.80	2.96	0.630 $^{+0}_{-0.0007}$	11.56
R08MB2O7	TG			2.01									9.84	8.66	3.82		12.0
R08MB2OF	FBU			2.36									10.79	9.61	4.77		12.4

Type R40



Motor Type	Detector	D_1	D_2	D_3	LA	LB	LC	LD	LE	LG	LM	LR	L	LL	LT	S	Weight lb
R40SA2OE	OP	5.02	5.31	3.94	5.709	4.331 $^{+.0000}_{-.0014}$	5.12	6.50	0.24	0.47	5.91	1.77	11.14	9.37	3.46	0.748 $^{+.0000}_{-.0008}$	20.28
R40SA2O7	TG												11.93	10.16	4.25		20.94
R40SA2OF	FBU												13.11	11.34	5.43		22.05
R40MA2OE	OP	5.02	5.31	3.94	5.709	4.331 $^{+.0000}_{-.0014}$	5.12	6.50	0.24	0.47	7.29	1.77	12.52	10.75	3.46	0.748 $^{+.0000}_{-.0008}$	26.46
R40MA2O7	TG												13.31	11.54	4.25		27.17
R40MA2OF	FBU												14.49	12.92	5.43		28.22

A Better Tomorrow for Industry through Automation

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