TSE-C242-5E
BULLETIN

YASKAWA ELECTRIC

HIGH PERFORMANCE DC SERVOMOTORS
Print Motors™
STANDARD SERIES/WITH REDUCTION GEAR

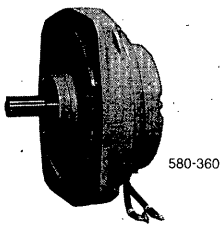
UGPMEN-08DA2 50W
(UG)PMES-□A2 100–1000W
UGPMEN-08DAOF 10.4–51.9kg·cm
(UG)PMES-□AF 20.5–276kg·cm

Print Motors Standard Series are small and lightweight pancake shaped DC motors employing coreless and low-inertia disk-type armatures.

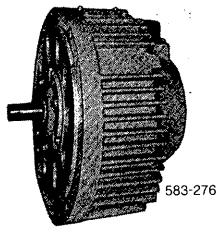
Due to the coreless armature, cogging torque is not generated. Many commutator segments make smooth contact with brushes so that stable speed with long-life is possible. Since frequent reverse operation is accepted, Print Motors Standard Series are optimum as servomotors or precision speed control motors.

The Print Motor with Reduction Gear consists of Print Motor Standard Series and reduction gear combined with a spur gear and features compact arrangement.

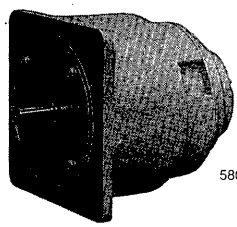
Since this Print Motor with Reduction Gear is aligned with the reduction gear output shaft and the print motor shaft, installation to a driven machine is easy to accomplish.


580-360

Print Motor Standard Series
Type (UG)PMES-12A2


583-276

Print Motor Standard Series
Type (UG)PMES-20A2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Print Motor with Reduction Gear
(UG)PMES-09AF

PRINT MOTOR STANDARD SERIES

RATINGS AND SPECIFICATIONS (Table 1)

- Time rating: Continuous rating
- Insulation: Class B
- Ambient temp.: − 10 to + 40℃
- Machine accuracy: Class B
- Vibration class: V15
- Paint color: Munsell 7.5 BG 6/1.5
- Connecting method: Direct connection
- Construction: Totally-Enclosed, Permanent Magnet Type (Reduction gear is of flanged type)
- Reduction gear: Within 1-degree backlash angle at output shaft

Item \ Type		UGPMEN-08DA2	(UG)PMES-09A2	(UG)PMES-12A2	(UG)PMES-16A2	(UG)PMES-20A2
Rated Output *	W	50	100	200	500	1000
Rated Torque *	kg•cm	1.22	2.43	6.5	19.5	32.5
Rated Speed *	rpm	4000	4000	3000	2500	3000
Rated Voltage *	V	17	26	42	83	142
Rated Current *	A	4.9	5.5	6.4	7.3	8.3
Power Rate *	kW/s	0.72	1.3	2.5	5.8	5.0
Angular Acceleration *	rad/s²	6000	5200	4300	3000	1570
Instantaneous Max Torque *	kg•cm	7.3	14.4	36.4	103	168
Instantaneous Max Current *	A	24.5	29	33	37	40
Max Speed	rpm	6600	6600	4950	4130	4000
Rotor Inertia ($GD^2/4$)	kg•cm²	0.2	0.46	1.5	6.2	20.3
Armature Resistance	Ω	0.42	0.54	0.68	0.92	0.75
Armature Inductance	mH	0.016	0.02	0.06	0.15	0.13
Induced Voltage Constant	mV/rpm	3.15	5.2	11.5	29	44
Torque Constant	kg•cm/A	0.306	0.506	1.12	2.82	4.29
Friction Torque	kg•cm	0.104	0.11	0.23	0.44	0.8
Viscosity Control Coefficient	g•cm/rpm	0.03	0.075	0.18	0.48	1.0
Mechanical Time Constant	ms	9.2	10	8.5	7.5	8.6
Electrical Time Constant	ms	0.03	0.04	0.09	0.16	0.17

*Values when armature winding temperature is 100℃ other values are given when the temperature is 20℃.

Note:
1. Rated torque and rated current show values given by power supply with smooth voltage waveform such as battery power and in locations having ambient temperature of 40℃ or less.
2. Instantaneous max torque and instantaneous max current are rated for one second.
3. Power rate is computed as follows:

$$\text{Power rate (kW/s)} = 0.096 \times \frac{[\text{Rated torque (kg·cm)}]^2}{GD^2/4(\text{kg·cm}^2)}$$

Type Designation

• (UG) PMES-□□A□□□

Print Motor

Armature diameter 09: 9cm 12: 12cm 16: 16cm 20: 20cm

Design revision order

Construction 2: Double bearing, flanged, straight shaft F: With reduction gear *2

Drive-end modified specifications *1 S: With oil seal

Opposite-drive-end modified specifications

M: With detector mounting stand only
4: With TG(11TG-D027)
F: With feedback unit
E: With optical encoder
B: With brake
W: With brake and TG
Z: With brake and feedback unit
D: With brake and optical encoder

*1. When there are no drive-end modified specifications, put a symbol for opposite-drive-end modified specification here.
*2. There is no PMES-20 type with reduction gear.
[Example] PMES-12A2SZ ····· With oil seal, with brake, with feedback

• UGPMEN-□□DA□□□

Print Motor

Armature diameter 0.8: 8cm

Design revision order

Construction 2: Double bearing, flanged, straight shaft (B): (Single bearing, flanged, straight shaft)
O: Shaft, built-in type without bearing (to be used for types with reduction gear.)

Drive-end modified Specifications S: With oil seal F: With reduction gear
O: Drive-end standard, opposite-drive-end modification exit.

Opposite-drive-end modified specifications 4 to D: Same as PMES type (there is no M.)

[Example] UGPMEN-08DA2O4 ····· No drive-end modification, with 11TG-D027

CHARACTERISTICS

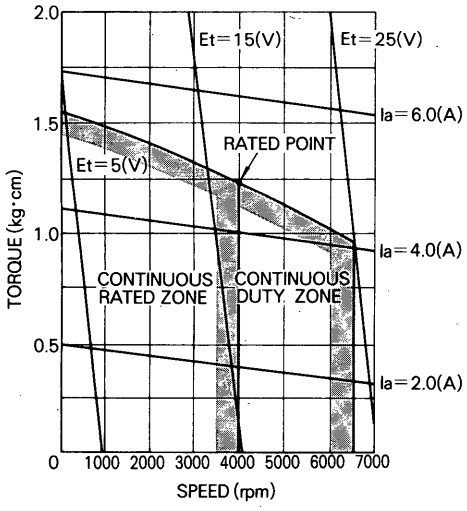
Fig. 1 shows the torque-speed curve and continuous duty zone; Fig. 2 shows the torque-speed curve and instantaneous rated zone.

These figures are given when smooth DC power is used and armature temperature is 100℃.

Et: Terminal voltage
Ia: Armature current

(1) Torque-Speed Curve and Continuous Duty Zone

• UGPMEN-08DA2



• (UG)PMES-09A2

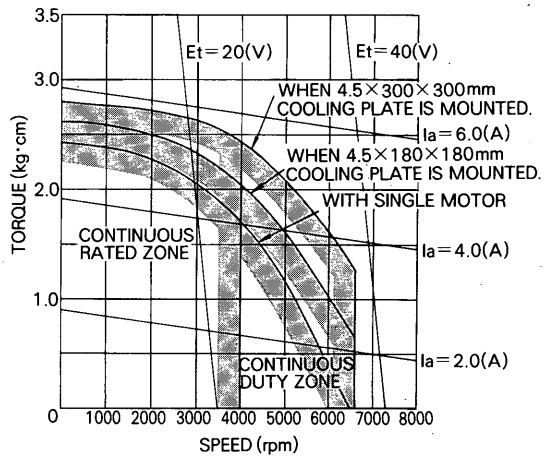
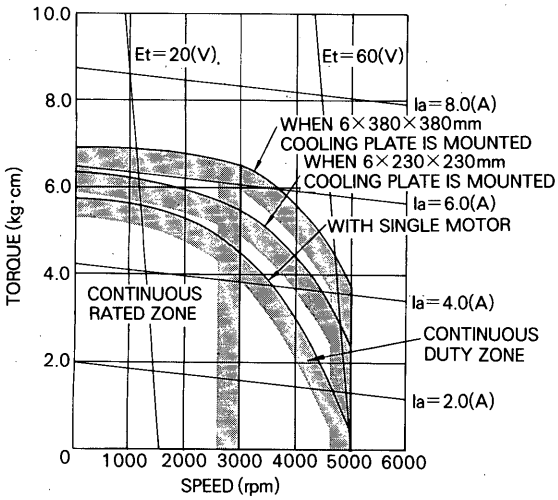
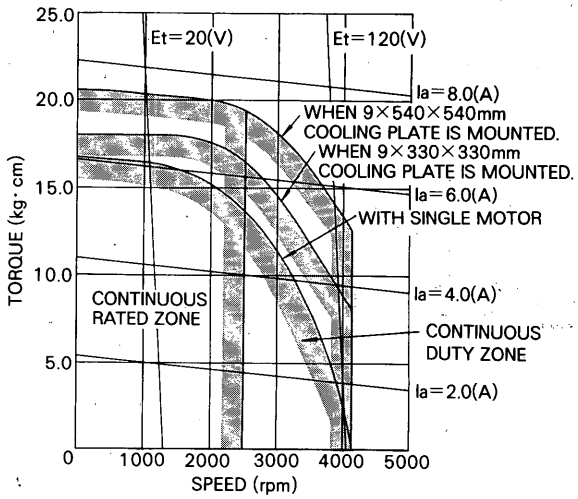


Fig. 1 Torque-Speed Curve and Continuous Duty Zone

• (UG) PMES-12A2



• (UG) PMES-16A2



• PMES-20A2

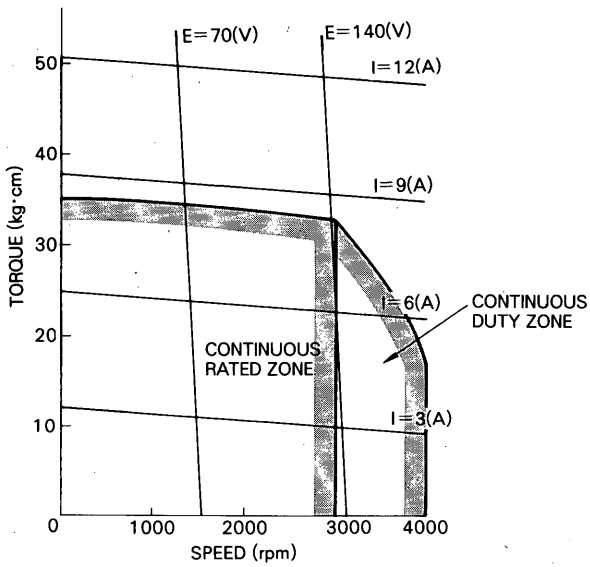


Fig. 1.2 Torque-Speed Curve and Continuous Duty Zone

Torque and speed of print motor standard type can be computed as follows depending on voltage and current to be applied:

$$T = K_T \times (Ia - Iot)$$

$$n = \frac{Et - (Rat \cdot Ia + V_{BR})}{K_E} \times 10^3$$

However,

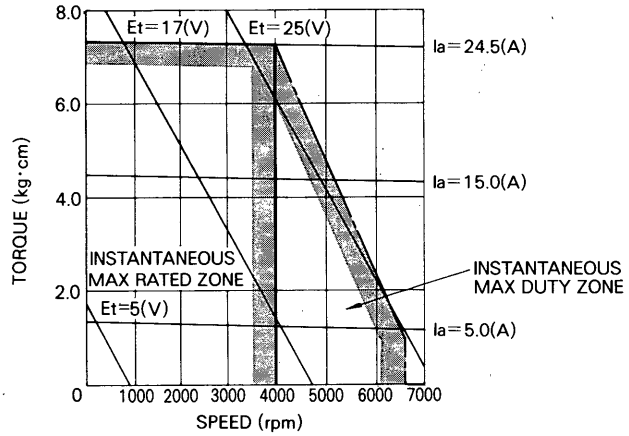
$$Iot = \frac{Tf + Fd\,(20°) \times 10^{-3} \times \frac{255}{(235 + t)} \times n}{K_T}$$

$$Rat = \frac{(235 + t)}{255} \times Ra\ (20°)$$

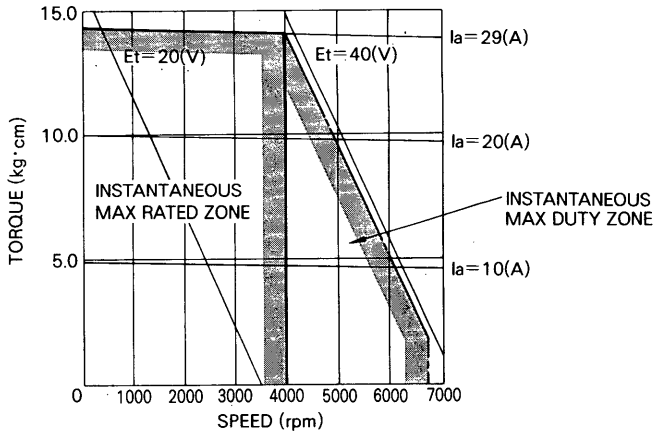
T: Torque (kg•cm)
K_T: Torque constant (kg•cm/A)
Ia: Current (A)
Iot: No-load current at armature temp. t℃ (A)
n: Speed
Et: Voltage (V)
Rat: Armature resistance at armature temp. t℃ (Ω)
Ra: Armature resistance at armature temp. 20℃ (Ω)
V_{BR}: Brush drop voltage (V) (Approx. 1 to 2 V)
K_E: Induced voltage constant (mV/rpm)
Tf: Friction torque (kg•cm)
Fd: Viscosity control coefficient at 20℃ (g•cm/rpm)
t: Armature temp. (℃)

(2) Torque-Speed Curve and Instantaneous Rated Zone

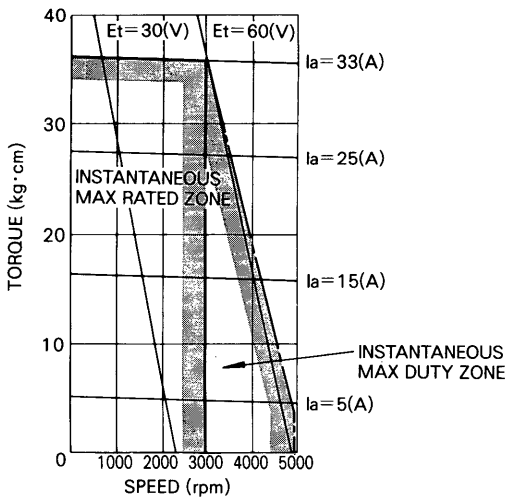
• UGPMEN-08DA2



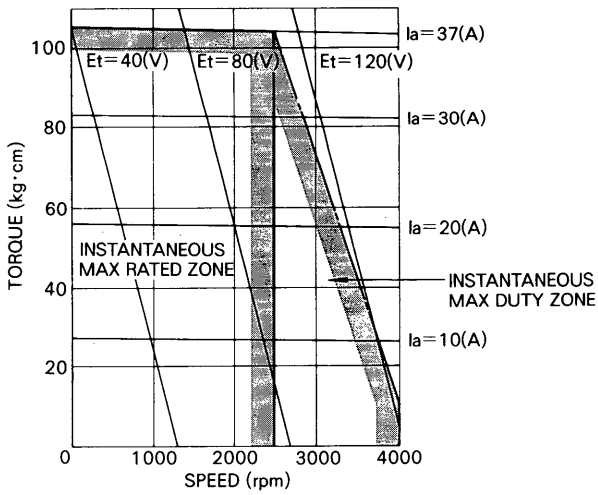
• (UG) PMES-09A2



• (UG)PMES-12A2



• (UG) PMES-16A2



• PMES-20A2

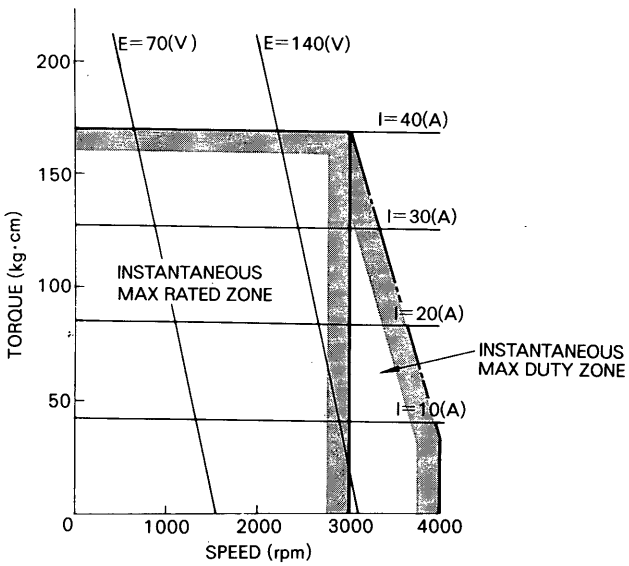


Fig. 2 Torque-Speed Curve and Instantaneous Rated Zone

MOTOR OPERATION AND PROTECTION

(1) Grounding method of print motor power supply

When operating print motor with single-phase rectified AC, provide insulation transformer to use insulation circuit against the ground as shown in Fig. 3.

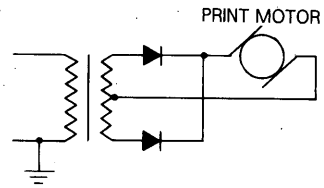


Fig. 3 Grounding Method of Power Supply

(2) Current waveform

- When power supply waveform contains pulsating component, print motor current pulsates; it is necessary to multiply rated torque value by proper derating factor.

  For example, when using DC power supply of which single-phase AC is full-wave rectified by diode, rated torque becomes approx. 70 % of rated value. When using power supply of which single-phase AC is full-wave rectified by thyristor, rated torque becomes approx. 50 %.

  However, when smoothing DC reactor is used, this does not apply.

- When impulse load is repeatedly charged, be careful not to let effective value exceed rated current value.

(3) Intermittent duty characteristics

When operating print motor repeatedly as shown in Fig. 4, current conduction time (to) is limited by intermittent duty characteristics shown in Fig. 5.

Therefore, when two elements out of Ia, (to), α are given, other one element is limited by intermittent duty characteristics shown in Fig. 5. Current value Ia in current conduction time (to) must always be considered with waveform rate.

[Example] In Figs. 4 and 5, when Ia is 200 % and α is 20 % in UGPMEN-08DA2, on time (to) becomes 13 seconds maximum.

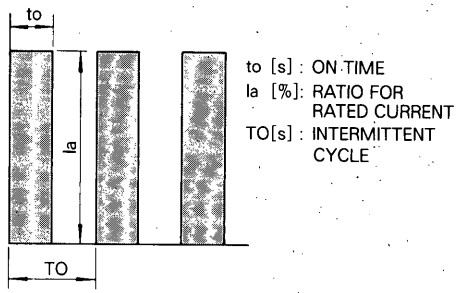


Fig. 4 Intermittent Operation

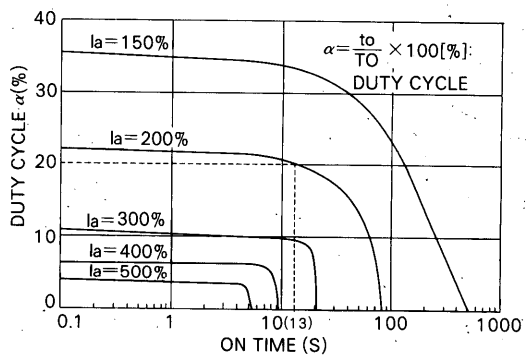


Fig. 5 Intermittent Duty Characteristics

(4) Derating factor against ambient temperature

Current conducted to print motor varies depending on ambient temperature and cooling conditions. When used at ambient temperature 40℃ or more, continuous allowable zone becomes smaller since the allowable temperature of print motor standard series is fixed.

Due to ambient temperature and speed lower the current less than derating factor shown in Fig.6.

[Example]

When using UGPMEN-08DA2 at ambient temperature 70 ℃ and 2250 rpm;

From rating of UGPMEN-08DA2 in Table 1,

Continuous rated current Ia = 4.9 (A)

$$\text{Speed ratio} = \frac{\text{Applicable speed}}{\text{Rated speed}} = \frac{2250\ \text{rpm}}{4000\ \text{rpm}} = 0.56$$

Derating factor is 0.69 from Fig. 6.

Therefore, 4.9 × 0.69 = 3.38 (A).

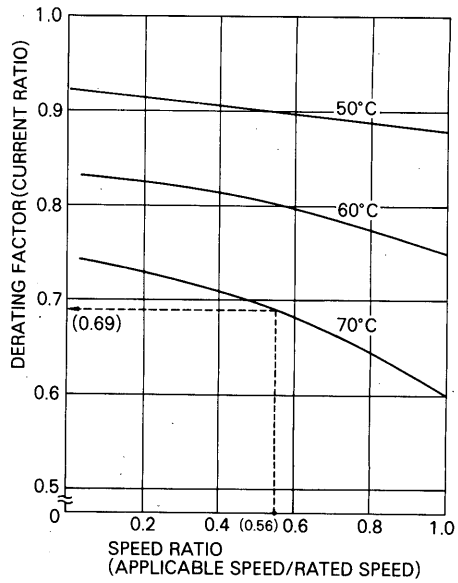


Fig. 6 Derating Factor against Ambient Temperature

(5) Overload characteristics and overload protection

Since the print motor has small armature heat capacity and effective cooling function, armature heat time constant is small. Therefore, when the motor is overloaded and overloaded current is conducted to armature, armature winding temperature rapidly rises.

On the other hand, cooling can be performed very quickly; it returns to the normal temperature as soon as power is turned off.

Fig .7 shows the relation between the overload rate and time to reach the allowable temperature.

Starting characteristics show overload allowable time when motor temperature is the same as ambient temperature.

As overload protection relay to be adjusted to such temperature characteristics, RHP thermal overload relay (quick-action type) is available by YASKAWA as an optional. For detais, see page 14.

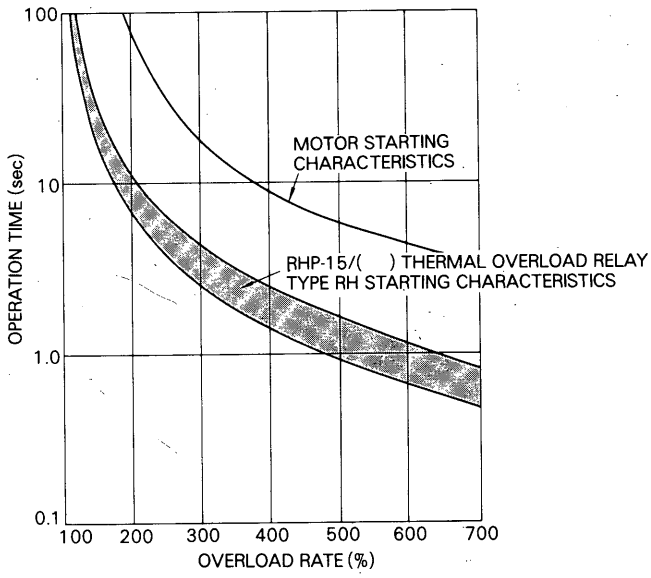


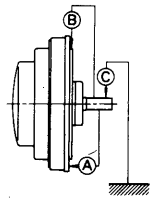
Fig. 7 Thermal Overload Relay Type RH Operation Characterisitcs and Print Motor Overcurrent Short-Time Rating Characteristics

MECHANICAL SPECIFICATIONS

(1) Accuracy

See Table 2.

Table 2 Accuracy of Shaft and Mounting Periphery

Accuracy	Reference Diagram
Flange surface perpendicular to shaft Ⓐ 0.06 mm (TIR)	
Flange diameter concentric to shaft Ⓑ 0.06 mm (TIR)	
Shaft run out Ⓒ 0.04 mm (TIR)	

Note: TIR Means difference between max. and min. values of dial gauge reading.

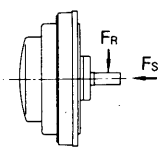
(2) Strength

Print Motor Standard Series can bear instantaneous maximum torque up to 500 % of motor rating at output shaft.

(3) Allowable Radial Load, Allowable Thrust Load

Follow Table 3 for reference of values to use radial load and thrust load.

Table 3 Allowable Radial Load, Allowable Thrust Load

Type	Allowable Radial Load F_R kg	Allowable Thrust Load Fs kg	Reference Diagram
UGPMEN-08DA2	6	2.5	
(UG) PMES-09A2	9	3.5	
(UG) PMES-12A2	16	6.5	
(UG) PMES-16A2	30	13.5	
(UG) PMES-20A2	40	20	

Note: Radial load and thrust load are maximum values of the sum of load occurring from motor torque and load applied to shaft by external forces.

(4) Vibration Resistance

When Print Motor Standard Series shaft is installed horizontally as shown in Fig. 8, it can bear vibration acceleration 2.5 Gs in 3 directions: UP-down, right-left, and forward-backward.

(5) Impact Resistance

When Print Motor Standard Series Shaft is installed horizontally as shown in Fig. 9 and given an up and down inpact, it can bear impact acceleration of 7.5 Gs and 5 times of impact force.

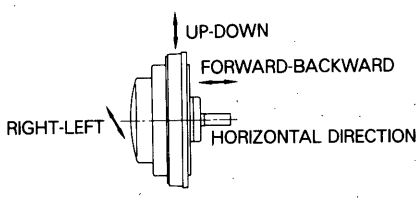


Fig. 8 Vibration Resistance

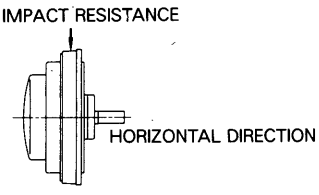


Fig. 9 Impact Resistance

(6) Brush Life (Table 4)

Brush life is approx. 4000 hours when motor is provided with inertia load: Peak current at reverse operation is kept at instantaneous maximum current value; and plugging operations (forward/reverse) up to rated rpm are performed.

Table 4 Blush Life

Print Motor Standard Series Type	Brush Dimensions mm			Max Applicable Length of Brush mm	Qty of Brushes
	H	W	L		
UGPMEN-08DA2	3	7	18	7.5	4
(UG) PMES-09A2	4	7	16	7	2
(UG) PMES-12A2	4	10	18	7	2
(UG) PMES-16A2	4	10	18	7	4 (2 sets)*
(UG) PMES-20A2	4	10	2.5	7	4 (2 sets)*

*Brush set consists of two brushes.

(7) Applications for Locations Subjected to Water- or Oil- Drops

When Print Motor Standard Series is used in locations subjected to water- or oil-drops, extreme wear on brush sliding face and bearing grease leakage may occur.

Therefore, it is recommended to provide protective covers as countermeasures. For preventing splash, apply liquid gasket on mating surfaces or screw heads.

Do not use the print motor in following cases:

- Where corrosive liquids, such as chemicals or saline solutions may be splashed.
- When using in the presence of corrosive or explosive gases such as, chlorine gas; hydrogen gas and oxygen gas.
- When using in inert gas or vacuum.

PRINT MOTOR WITH REDUCTION GEAR

RATINGS AND SPECIFICATIONS

Table 5 Ratings and Specifications

Item \ Type			UGPMEN-08DAOF			(UG) PMES-09AF			(UG) PMES-12AF			(UG) PMES-16AF
Nominal Reduction Ratio			1/10	1/25	1/50	1/10	1/25	1/50	1/10	1/25	1/50	1/10
Reduction Ratio			1/10.00268	1/24.94854	1/50.87557	1/10.09615	1/24.71595	1/49.84722	1/10.09185	1/25.29021	1/50.03177	1/10.07740
Output Shaft Rated Torque			10.4	25.9	51.9	20.5	51.5	103	55	138	276	165
Output Shaft Speed			400	160	80	400	160	80	300	120	60	250
Print Motor Standard Series	Type		UGPMEN-08DA2			(UG) PMES-09A2			(UG) PMES-12A2			(UG) PMES-16A2
	Rated Output*	V	50			100			200			500
	Rated Torque*	kg•cm	1.22			2.43			6.5			19.5
	Rated Speed*	rpm	4000			4000			3000			2500
	Rated Voltage*	V	17			26			42			83
	Rated Current*	A	4.9			5.5			6.4			7.3
	Power Rate*	kW/s	0.72			1.3			2.5			5.8
	Angular Acceleration*	rad/s^2	6000			5200			4300			3000
	Instantaneous max torque*	kg•cm	7.3			14.4			36.4			103
	Instantaneous max current	A	24.5			29			33			37
	Max Speed	rpm	6600			6600			4950			4130
	Rotor Inertia ($GD^2/4$)	kg•cm^2	0.2			0.46			1.5			6.2
	Armature Resistance	Ω	0.42			0.54			0.68			0.92
	Armature Inductance	mH	0.016			0.02			0.06			0.15
	Induced Voltage Constant	mV/rpm	3.15			5.2			11.5			29
	Torque Constant	kg•cm/A	0.306			0.506			1.12			2.82
	Wear Torque	kg•cm	0.104			0.11			0.23			0.44
	Viscosity Control Coefficient	g•cm/rpm	0.03			0.075			0.18			0.48
	Mechanical Time Constant	ms	9.2			10			8.5			7.5
	Electrical Time Constant	ms	0.03			0.04			0.09			0.16
	Inertla($GD^2/4$) (Printmotor shaft conversion)	kg•cm^2	Approx. 0.02			Approx. 0.043			Approx. 0.16			Apprpx. 0.63
Redution Gear	Backlash		Within 1-degree angle at output shaft, within 25-degree angle at print motor shaft									
	Efficiency	%	More than 85 %									
	Applicable Grease		Sunlight EM3 [Made by Showa Shell Oil Company]									

*Values when armature winding temperature is 100 ℃. Other Values are given when the temperature is 20 ℃.

Note: 1. Rated torque and rated current show values given by power supply with smooth voltage waveform such as battery power and in locations having ambient temperature of 40 ℃ or less.
2. Instantaneous max torque and instantaneous max current are rated for one second.
3. Power rate is computed as follows:

$$\text{Power rate (kW/s)} = 0.096 \times \frac{[\text{Rated torque (kg•cm)}]^2}{GD^2/4(\text{kg•cm}^2)}$$

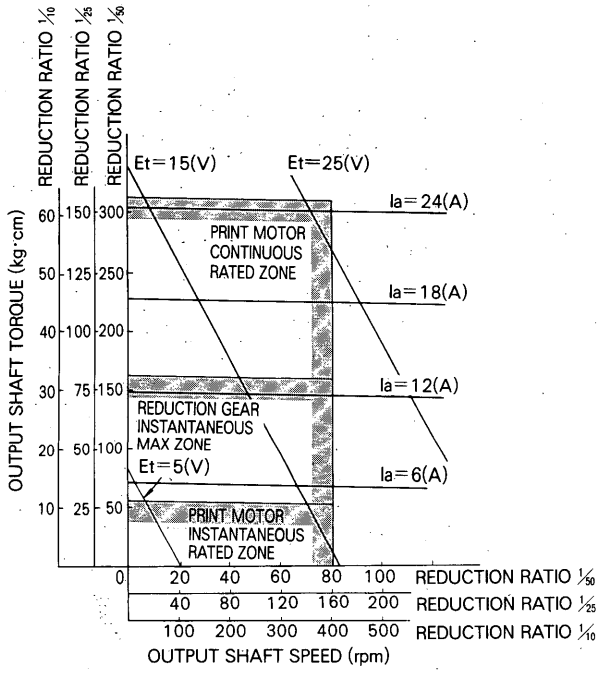
4. (UG) PMES-20AF is not currently produced.

CHARACTERISTICS

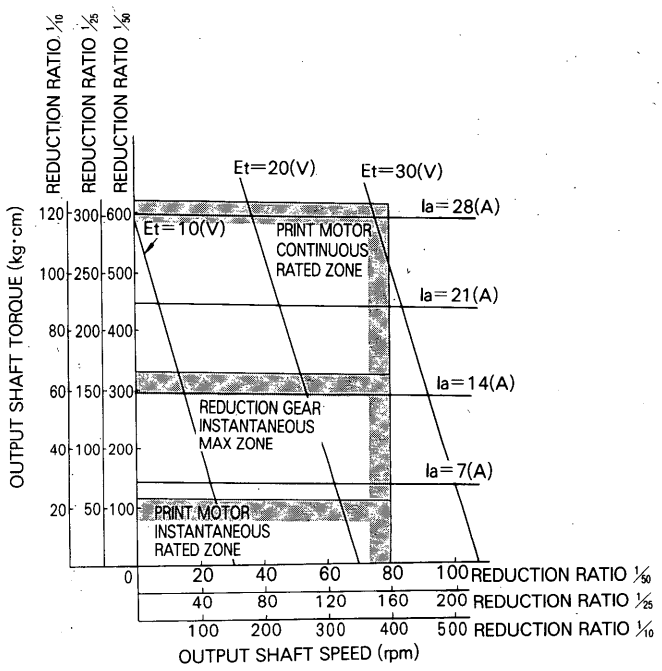
Fig. 10 shows rated zone of print motor with reduction gear. These figures show characteristics when using smooth DC power supply, armature temperature of Print Motor Standard Series is 100 ℃, and reduction gear efficiency is 85 %.

Et ... Terminal voltage
Ia ... Armature current

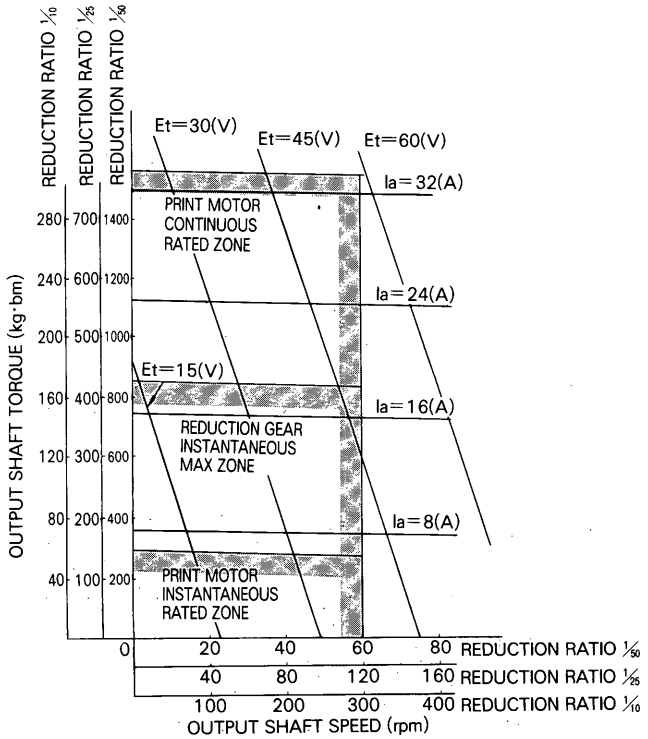
• UGPEMEN-08DAOF



• (UG) PMES-09AF



• (UG) PMES-12AF



• (UG) PMES-16AF

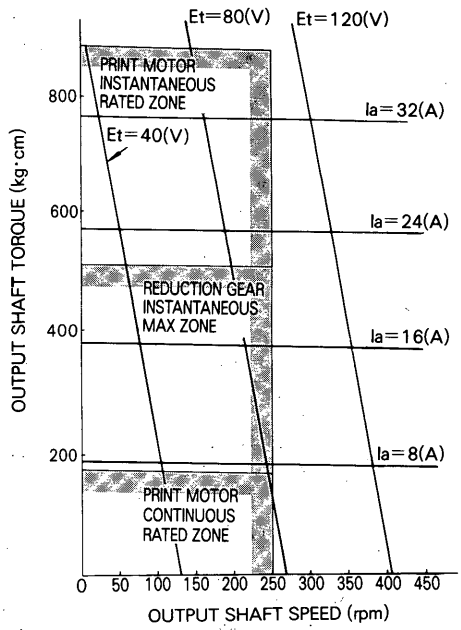


Fig. 10 Rated Zone of Print Motor with Reduction Gear

MECHANICAL SPECIFICATIONS

(1) Strength

Print motor reduction gear section can bear instantaneous maximum torque up to 300 % of motor rating and continuous rated torque up to 150 of motor rating at output shaft.

Generally, for instantaneous torque at acceleration or deceleration, torque transmitted to reduction gear is reduced to half because print motor rotor acceleration consumes half of the instantaneous torque occurring in the print motor when load inertia is the same as print motor rotor inertia in motor shaft conversion.

In such a case, print motor can be used within this range.

(2) Allowable Radial Load, Allowable Thrust Load

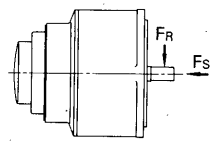
Use radial load and thrust load within the value shown in Table. 6.

(3) Mounting Angle Zone

Do not mount print mtor with reduction gear when its output shaft faces upward within vertical direction of 45° (Fig. 11).

When output shaft should be mounted in ▨ portion as shown in Fig. 11, consult Yaskawa representative.

Table 6 Allowable Rodial Load, Allowable Thrust Load

Type	Reduction Ratio	Allowable Radial Load	Allowable Thrust Load	Reference Diagram
GPMEN-08DAOF	1/10	18	10	
	1/25,1/50	20	15	
(UG) PMES-09AF	1/10	32	18	
	1/25,1/50	36	26	
(UG) PMES-12AF	1/10	24	20	
	1/25,1/50	58	43	
(UG) PMES-16AF	1/10	22	31	

Note: Radial load and thrust load are maximum value of the sum of load occurring from motor torque and load given to shaft by external forces.

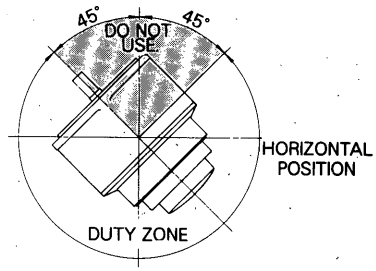


Fig. 11 Mounting Angle Zone

MODULAR PRINT MOTOR

Modular print motor is also available: print motor provided with oil seal, speed detecting DC tachometer generator, position detecting optical encoder, position holding brake, etc.

Fig. 7 shows applications of print motor and each detector.

Table 7 Applications of Print Motor and Each Detector

Print Motor Type	Detector				
	DC Tachometer Generator Type	Feedback Unit Type *		Optical Encoder Type *	
UGPMEN-08DA2†	11TG-D027	TFUE-03□C7 TFUE-05□C7 TFUE-08□C7	TFUE-02□C7 TFUE-15□C7 TFUE-20□C7 TFUE-25□C7 TFUE-30□C7	UTOPE-03□CL UTOPE-05□CL UTOPE-08□CL	UTOPE-02□CL UTOPE-15□CL UTOPE-20□CL UTOPE-25□CL UTOPE-30□CL
(UG) PMES-09A2					
(UG) PMES-12A2					
(UG) PMES-16A2					
(UG) PMES-20A2					

* □ in feedback unit and optical encoder types must be filled out with either of D (without reference signal) or Z (with reference signal).

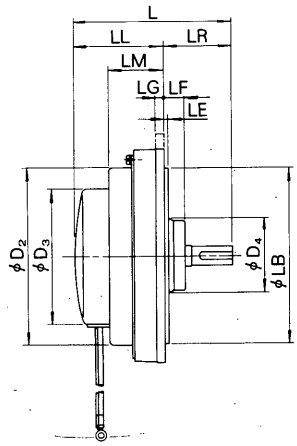
† Print motor UGPMEN-08DA2 can not be provided with feedback unit.

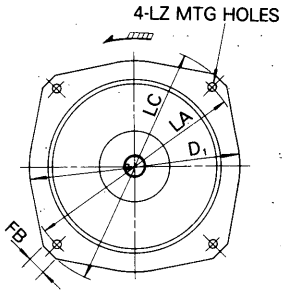
Note:

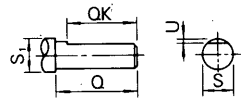
1. ▭ shows standard products and ▨ shows optional products.
2. Combination of DC tachometer generator and magnetic brake is also available.

DIMENSIONS in mm

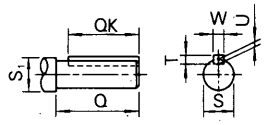
PRINT MOTOR STANDARD SERIES







UGPMEN-08DA2
(UG) PMES-09A2

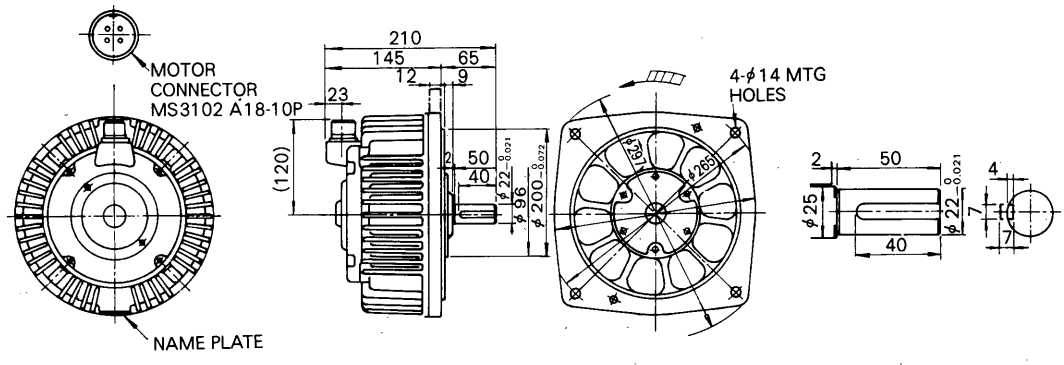


(UG) PMES-12A2
(UG) PMES-16A2

Type	D_1	D_2	D_3	D_4	L	LA	LB^{h8}	LC	LE	LF	LG	LL	LM	LR	LZ	FB	Shaft Extension							Bearing No.		Approx. Weight kg
																	Q	Qk	S^{h7}	S_1	T	U	W	Opposite Drive End	Drive End	
UGPMEN-08DA	107	105	70	48	108.5	115	$95_{-0.054}^{0}$	131	3	10.5	7	77.5	64.5	31	5.8	R8	18	16	$7_{-0.015}^{0}$	10.5	–	0.5	–	607ZZ	627ZZ	1.8
(UG) PMES-09A2	122	100	75	43	92	130	$110_{-0.054}^{0}$	148	3	10	5	59	39	33	5.8	14	20	18	$9_{-0.015}^{0}$	10	–	1	–	6000ZZ	6000ZZ	2.2
(UG) PMES-12A2	157	131	100	54	116	165	$130_{-0.063}^{0}$	180	3	15	6	66	41	50	7	16	30	25	$14_{-0.018}^{0}$	15	5	3	5	6202ZZ	6202ZZ	3.6
(UG) PMES-16A2	208	181	138	65	156	215	$180_{-0.063}^{0}$	240	4	20	7	92	58	64	9	30	40	35	$16_{-0.018}^{0}$	17	5	3	5	6303ZZ	6303ZZ	8.5

Note:
1. Output shaft employs class 2 of parallel keys in compliance with JIS* B1301 (1959).
2. Output shaft rotates in the direction of the arrow when connecting motor lead terminals Ⓐ with ⊕, Ⓑ with ⊖.

• (UG) PMES-20A2



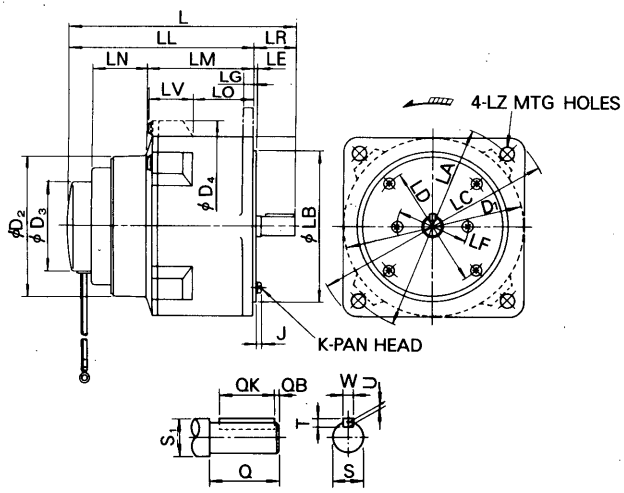
Approx. weight: 13.2 kg

Note:
1. Output shaft employs class 2 of parallel keys in compliance with to JIS* B1301 (1959).
2. Output shaft rotates in the direction of the arrow when connecting motor lead terminals Ⓐ with ⊕, Ⓑ with ⊖.
   Termianl Ⓒ is connected to ground terminal.

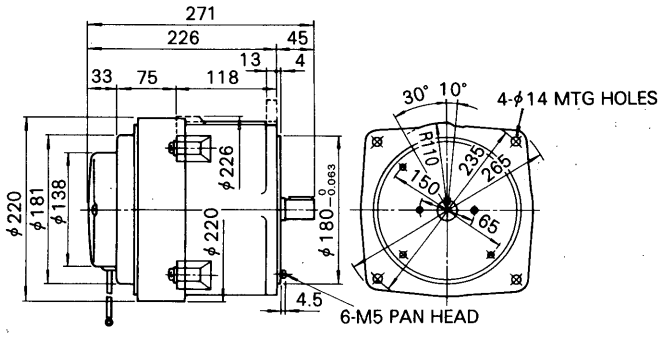
*Japanese Industrial Standard.

PRINT MOTOR WITH REDUCTION GEAR

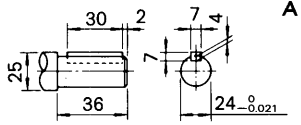
• UGPMEN-08DAOF to (UG) PMES-12AF • (UG) PMES-16AF (Reduction ratio 1/10)



Detail of Shaft Extension



Approx. weight: 21.5 kg



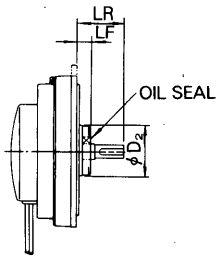
Detail of Shaft Extension

Type	Reduction Ratio	D_1	D_2	D_3	D_4	J	K	L	LA	LB h8	LC	LD	LE	LF	LG	LL	LM	LN	LO	LR	LV	LZ	Shaft Extension Q	QB	QK	S h7	S_1	T	U	W	Approx. Weight kg
UGPMEN-08DAOF	1/10, 1/25, 1/50	136	107	70	–	4.5	4-M5	184	160	120 0 -0.054	180	95	3	–	8	152	82.5	56.5	–	32	–	9	26	1	22	14 0 -0.018	15	5	3	5	8.0
(UG) PMES-09AF	1/10, 1/25, 1/50	154	122	75	–	4.5	4-M5	192	180	130 0 -0.063	202	110	3	–	9	156	90	46	–	36	–	12	28	1	24	16 0 -0.018	17	5	3	5	8.5
(UG) PMES-12AF	1/10	154	156	100	175	4.5	4-M5	209	180	130 0 -0.063	202	110	3	–	9	173	91	57	45	36	51	12	28	1	24	16 0 -0.018	17	5	3	5	12
	1/25, 1/50	205	156	100	–	4.5	6-M5	238	235	180 0 -0.063	265	150	4	65	13	193	112	56	–	45	–	14	36	2	30	24 0 -0.021	25	7	4	7	16.5

Note:
1. Output shaft employs class 2 of parallel keys in compliance with JIS* B1301 (1959).
2. Output shaft rotates in the direction of the arrow when connecting motor lead terminals Ⓐ with ⊕, 86 with ⊖.

MODULAR PRINT MOTOR STANDARD SERIES

• With Oil Seal

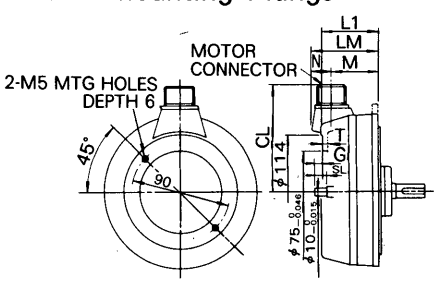


Type	Dimensions LR	LF	D_2	Applicable Oil Seal Type
(UG) PMES-19A2S	33	11.5	43	SB10207
(UG) PMES-12A2S	50	17.5	54	SB15287
(UG) PMES-16A2S	64	21	65	SB17287
(UG) PMES-20A2S	65	13	96	SB25387

Note:
• Locate oil level below oil seal lip level.
• Oil seal should not be immersed in the oil.

Note: Oil seal to be used is made by Nippon Oil Seal Industry Co., Ltd.

• With Mounting Flange



*Japanese Industrial Standard

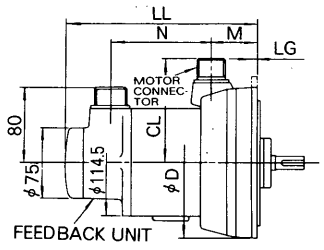
Type	Dimensions LM	M	N	CL	T	SL	G	L1	Motor Connector Type
(UG) PMES-09A2M	60	41	19	102	3	10	7	49	MS3102A 14S-2P
(UG) PMES-12A2M	68	46.5	21.5	109	3	10	7	56	MS3102A 18-10P
(UG) PMES-16A2M	113	91.5	21.5	124	4	10	7	82	MS3102A 18-10P
(UG) PMES-20A2M	145	122	23	120	5	10	10	118	MS3102A 18-10P

Connector Terminals

A: Motor terminal ⊕
B: Motor terminal ⊖
C: Ground terminal
D: Not used.

MODULAR PRINT MOTOR STANDARD SERIES (Cont'd)

• With Feedback Unit

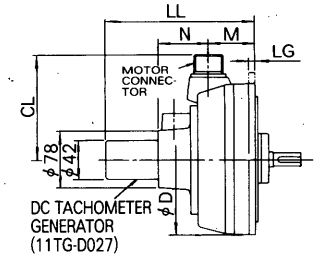


Type	Dimensions						Motor Connector Type
	LL	M	N	LG	D	CL	
(UG) PMES-09A2F	185	41	101	5	122	102	MS3102A 14S-2P
(UG) PMES-12A2F	192	46.5	102	6	157	109	MS3102A 18-10P
(UG) PMES-16A2F	218	91.5	83	7	208	124	MS3102A 18-10P
(UG) PMES-20A2F	235	122	88	12	240	120	MS3102A 18-10P

Connector Terminal

A: Motor terminal ⊕
B: Motor terminal ⊖
C: Ground terminal
D: Not used

• With DC Tachometer Generator

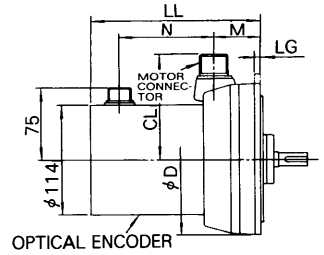


Type	Dimensions						Motor Connector Type
	LL	M	N	LG	D	CL	
(UG) PMES-09A24	142	41	46	5	122	102	MS3102A 14S-2P
(UG) PMES-12A24	149	46.5	47.5	6	157	109	MS3102A 18-10P
(UG) PMES-16A24	175	91.5	28.5	7	208	124	MS3102A 18-10P
(UG) PMES-20A24	211	122	34	12	240	120	MS3102A 18-10P

Connector Terminal

A: Motor terminal ⊕
B: Motor terminal ⊖
C: TG Output terminal ⊕
D: TG Output terminal ⊖

• With Optical Encoder

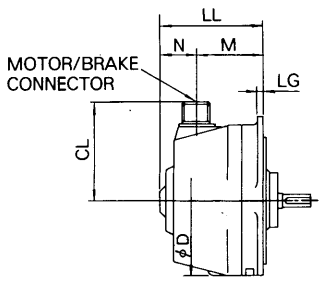


Type	Dimensions						Motor Connector Type
	LL	M	N	LG	D	CL	
(UG) PMES-09A2E	167	41	96	5	122	102	MS3102A 14S-2P
(UG) PMES-12A2E	174	46.5	97.5	6	157	109	MS3102A 18-10P
(UG) PMES-16A2E	200	91.5	78.5	7	208	124	MS3102A 18-10P
(UG) PMES-20A2E	236	122	84	12	240	120	MS3102A 18-10P

Connector Terminal

A: Motor terminal ⊕
B: Motor terminal ⊖
C: Ground terminal
D: Not used

• With Holding Brake



Type	Dimensions						Motor Connector Type
	LL	M	N	LG	D	CL	
(UG) PMES-09A2B	111	60	51	5	125	92	MS3102A 14S-2P
(UG) PMES-12A2B	115	64	51	6	157	99	MS3102A 18-10P
(UG) PMES-16A2B	137	94	43	7	208	124	

Connector Terminal

A: Motor terminal ⊕
B: Motor terminal ⊖
C: Brake terminal ⊕
D: Brake terminal ⊖

Note: 80VDC input to C and D.

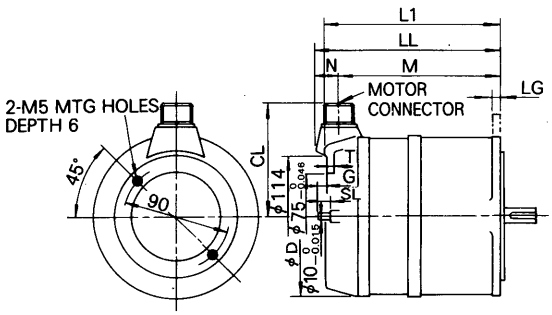
• Applicable Plug and Cable Clamp

Connector	Plug	Cable Clamp
MS3102A 14S-2P	MS3106B 14S-2S	MS3057-6A
MS3102A 18-10P	MS3106B 18-10S	MS3057-10A

Note: Use plug and cable clamp made DAIICHI DENSHI KOGYO, KK.

MODULAR PRINT MOTOR WITH REDUCTION GEAR

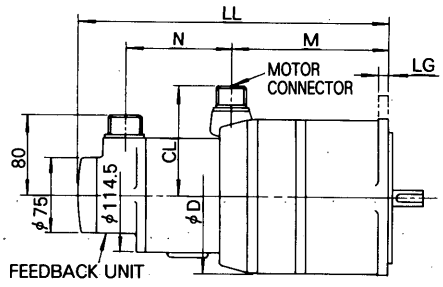
• With Mounting Flange



Type	Reduction Ratio	Dimensions									
		LL	M	N	LG	D	CL	T	SL	G	L1
(UG) PMES-09AFM	1/10*, 1/25, 1/50	158	139	19	9	122	102	3	10	7	146.5
(UG) PMES-12AFM	1/10*	175	153.5	21.5	9	157	109	3	10	7	163
	1/25, 1/50	195.5	174	21.5	13	157	109	3	10	7	183.5
(UG) PMES-16AFM	1/10	247.5	226	21.5	13	208	124	4	10	7	216.5

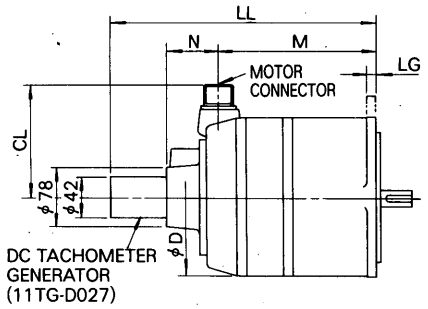
*Rotated CCW.

• With Feedback Unit



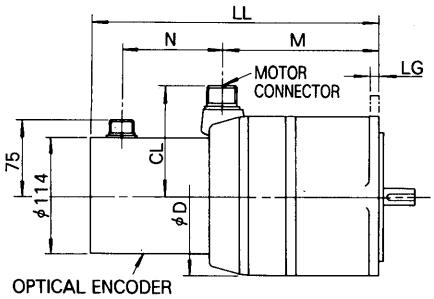
Type	Reduction Ratio	Dimensions					
		LL	M	N	LG	D	CL
(UG) PMES-09AFF	1/10*, 1/25, 1/50	283	139	101	9	122	102
(UG) PMES-12AFF	1/10*	299	153.5	102	9	157	109
	1/25, 1/50	319	174	102	13	157	109
(UG) PMES-16AFF	1/10	352	226	83	13	208	124

• With DC Tachometer Generator



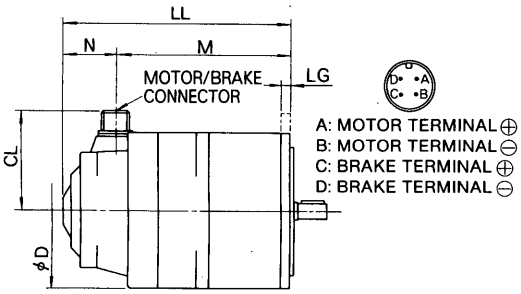
Type	Reduction Ratio	Dimensions					
		LL	M	N	LG	D	CL
(UG) PMES-09AF4	1/10*, 1/25, 1/50	240	139	46	9	122	102
(UG) PMES-12AF4	1/10*	256	153.5	47.5	9	157	109
	1/25, 1/50	277	174	47.5	13	157	109
(UG) PMES-16AF4	1/10	310	226	28.5	13	208	124

• With Optical Encoder



Type	Reduction Ratio	Dimensions					
		LL	M	N	LG	D	CL
(UG) PMES-09AFE	1/10*, 1/25, 1/50	265	139	96	9	122	102
(UG) PMES-12AFE	1/10*	281	153.5	97.5	9	157	109
	1/25, 1/50	302	174	97.5	13	157	109
(UG) PMES-16AFE	1/10	335	226	78.5	13	208	124

• With Holding Brake



Type	Reduction Ratio	Dimensions						Motor/Brake Connector Type
		LL	M	N	LG	D	CL	
(UG) PMES-09AFB	1/10*, 1/25, 1/50	209	158	51	9	125	92	MS3102A 14S-2P
(UG) PMES-12AFB	1/10*	222	171	51	13	157	99	MS3102A 18-10P
	1/25, 1/50	242	171	51	13	157	99	
(UG) PMES-16AFB	1/10	272	229	43	13	208	124	

*Rotated CCW.

Note:

1. Installation periphery dimensions and rotation direction of modular print motor are the same as those of Print Motor Standard Series. Rotation direction of modular print motor with reduction gear differs depending on reduction ratio.
2. Motor connector and connector terminals of modular print motor with reduction gear are the same as those of Modular Print Motor Standard Series. Straight plug is provided as standard.

ASSOCIATED DEVICES

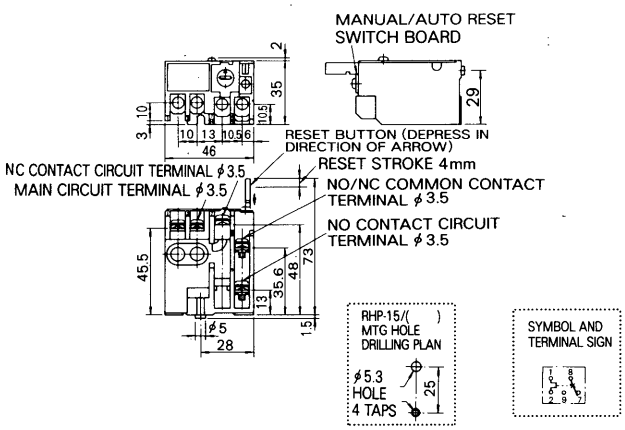
■ RHP THERMAL OVERLOAD RELAY (Quick Action Type)

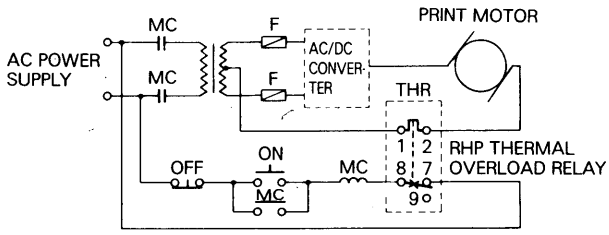
RHP Thermal Overload Relay Application Table

Applicable Motor Type	Rated Current	Applicable RHP Thermal Overload Relay
UGPMEN-08DA2	4.9A	RHP-15/4.9
(UG) PMES-09A2	5.7A	RHP-15/5.7
(UG) PMES-12A2	6.6A	RHP-15/6.6
(UG) PMES-16A2	7.5A	RHP-15/7.5
(UG) PMES-20A2	8.3A	RHP-15/8.3F

RHP Thermal Overload Relay Characteristics Table

Type	Contact Rated Current A				Thermal Element	Contact Construction	Approx. Weight g
	110V	220V	440V	550V			
RHP-15/( )	6	3	1.5	1.2	1	1NONC	70





RHP Thermal Overload Relay Connection Diagram

■ CONTROLLER

Controller *Servopack* for print motor is available in system or standard type to meet various applications.

For details, refer to the following bulletins:

- TSE-C717-11
  Servopack
  TRANSISTOR PWM, REVERSIBLE
  TYPE CPCR-FR01B TO FR05C
- TSE-C717-12
  Servopack
  FOR SPEED CONTROL
  (TRANSISTOR PWM, REVERSIBLE)
  TYPE CPCR-MR01C TO-MR99C

A Better Tomorrow for Industry through Automation
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