

TORQUE MOTOR

轉矩馬達

轉矩馬達的特性

CHARACTERISTICS OF THE TORQUE MOTOR

- 轉矩馬達具有強大的啟動迴轉扭力與垂下特性，在迴轉數—轉矩特性之全區域內，特別是在低速及拘束時，皆能安定運轉。
- 馬達的迴轉扭力與電壓成平方比，變更供給電壓即可改變迴轉速度。適用於低電壓時，使低速運轉中的物件逆迴轉，而電壓提升時提供高速運轉之用途。
- 轉矩馬達的設計不同於一般馬達，其拘束狀態為在低速運轉時，能得到穩定轉矩。適合在需要強制性靜止轉矩之場合或用於平常作高速運轉工程結束時，具保持拘束狀態用。電壓60V時可作連續運轉，在60V以上即需作短時間額定，110V時為5分鐘額定。※使用於拘束運轉時，其出力扭力會增大，請勿超越齒輪所容許之迴轉扭力，也務必不要碰撞停止，以免其衝擊力會造成減速機齒輪的毀損。
- 適用於捲取作業。持續性且一定速度的物品，以一定張力捲取。當捲取輪軸外徑變大時，迴轉扭力需增大，而速度則減慢。
- 在迴轉速—轉矩之特性的範圍內，與馬達運轉方向相反旋轉時，亦可當作剎車使用。
- A torque motor possesses strong starting torque and sloping characteristics. Within the full range of revolution-torque curve, especially under low speed and constraint, it can rotate steadily.
- The motor torque changes approximately proportion to the square of the voltage. The speed can be changed easily by varying the voltage supplied to the motor.
- The torque motor is designed differently than other motors. It can obtain stable torque in low speed under a restrained condition. Suitable in force static-torque situation, or restraints mode is required when the high-speed operation is finished. Continuously operation is available at 60V, rated for short interval operation is required above 60V, and 5 minutes rated at 110V. ※When operated under the restraint mode with speed reducer, the motor output torque would increase greatly. Please do not exceed the allowable torque of the speed reducer, and NEVER strike with force to stop the motor to prevent impact damage to the speed reducer.
- In an application where an object is released continuously at a constant speed and wound up with constant tension, the torque must be doubled and the speed must be halved if the diameter of the winding spool is doubled.
- Within the range of the revolution-torque characteristic curve, the motor can be used as a brake when the rotating motion is in the opposite direction.

轉矩馬達的種類

TYPES OF THE TORQUE MOTOR

■ 內藏轉矩馬達 REGULATOR BUILT-IN TYPE

接線箱內藏電壓調節器，可依附屬的速度設定器簡單地控制馬達速度，無須將電壓調節器架設於外部，安裝更簡便。
The voltage regulator is stored inside the terminal box, where it can control the motor speed easily with the speed controller it is attached to. No need to attach the regulator on the exterior of the motor, making the installation more convenient.

■ 標準型轉矩馬達 STANDARD TYPE

必須於外部架設電壓調節器，以調整速度與扭力。
External voltage regulator is required to adjust speed and torque.

機型MODEL	額定時間 RATED TIME	最大出力(W) MAX. OUTPUT	電壓(V) VOLTAGE	頻率(HZ) FREQ.	額定轉速(rpm) RATED SPEED	起動轉矩(Kg.cm) STARTING TORQUE	額定轉矩(Kg.cm) RATED TORQUE	額定電流(A) RATED CURRENT	電容量(μF) CAPACITY
2TK3(C)A(GN)-AP	5分min.連續Continuous	3/1	110/60	60	990/570	0.59/0.33	0.19/0.14	0.44/0.37	6 μ f/300V
	5分min.連續Continuous	3/1	110/60	50	1150/880	1.02/0.39	0.26/0.11	0.47/0.33	6 μ f/300V
3TK6(C)A(GN)-AP	5分min.連續Continuous	6/2	110/60	60	1550/1070	2.23/0.57	0.38/0.18	0.76/0.44	10 μ f/300V
	5分min.連續Continuous	6/2	110/60	50	1250/840	2.20/0.58	0.47/0.23	0.59/0.36	10 μ f/300V
4TK10(C)A(GN)-AP	5分min.連續Continuous	10/3	110/60	60	1500/700	2.87/0.99	0.65/0.41	0.91/0.61	12 μ f/300V
	5分min.連續Continuous	10/3	110/60	50	1140/1050	2.94/1.15	0.86/0.28	0.67/0.49	12 μ f/300V
5TK20(C)A(GN)-AP	5分min.連續Continuous	20/5	110/60	60	1340/1170	4.61/2.37	1.45/0.42	1.87/1.25	20 μ f/300V
	5分min.連續Continuous	20/5	110/60	50	1100/1010	4.57/1.95	1.76/0.48	1.36/0.92	20 μ f/300V
5TK40(C)A(GX)-AFP	5分min.連續Continuous	40/10	110/60	60	1510/1280	7.89/2.09	2.58/0.76	1.55/0.97	24 μ f/300V
	5分min.連續Continuous	40/10	110/60	50	1360/680	6.9/2.37	0.72/1.44	1.10/0.92	24 μ f/300V

機型MODEL	額定時間 RATED TIME	最大出力(W) MAX. OUTPUT	電壓(V) VOLTAGE	頻率(HZ) FREQ.	額定轉速(rpm) RATED SPEED	起動轉矩(Kg.cm) STARTING TORQUE	額定轉矩(Kg.cm) RATED TORQUE	額定電流(A) RATED CURRENT	電容量(μF) CAPACITY
2TK3(C)A(GN)-CP	5分min.連續Continuous	3/1	220/120	60	1170/1180	0.63/0.36	0.23/0.08	0.18/0.14	1 μ f/450V
	5分min.連續Continuous	3/1	220/120	50	1070/650	0.76/0.32	0.27/0.15	0.15/0.10	1 μ f/450V
3TK6(C)A(GN)-CP	5分min.連續Continuous	6/2	220/120	60	1240/1050	1.38/0.62	0.47/0.18	0.33/0.22	2 μ f/450V
	5分min.連續Continuous	6/2	220/120	50	1100/1180	1.63/0.7	0.54/0.17	0.27/0.20	2 μ f/450V
4TK10(C)A(GN)-CP	5分min.連續Continuous	10/3	220/120	60	1200/1300	2.76/1.23	0.80/0.22	0.37/0.28	2.5 μ f/450V
	5分min.連續Continuous	10/3	220/120	50	1050/1020	2.84/1.19	0.91/0.28	0.29/0.21	2.5 μ f/450V
5TK20(C)A(GN)-CP	5分min.連續Continuous	20/5	220/120	60	1350/1240	3.97/1.24	1.44/0.39	0.5/0.32	3 μ f/450V
	5分min.連續Continuous	20/5	220/120	50	1070/760	4.26/1.35	1.83/0.65	0.37/0.24	3 μ f/450V
5TK40(C)A(GX)-CFP	5分min.連續Continuous	40/10	220/120	60	1480/1360	7.9/2.4	2.63/0.72	0.45/0.5	6 μ f/450V
	5分min.連續Continuous	40/10	220/120	50	1100/900	7.1/3.2	3.53/1.1	0.71/0.54	6 μ f/450V

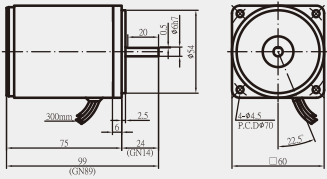
備註：電壓如超過額定電壓，須另行訂購。 NOTES：Custom order is required when applied voltage exceeding the rated voltage.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty. 產品因人為原因或天災等因素導致不良或損壞，不在保固範圍內。

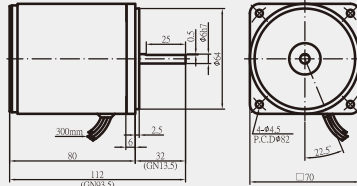


TORQUE MOTOR 轉矩馬達

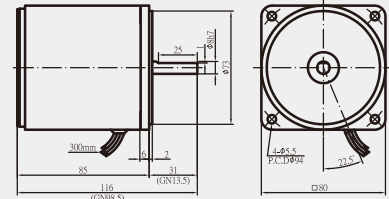
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- OUTLINE & SPECIFICATION
- 單位/UNIT : mm



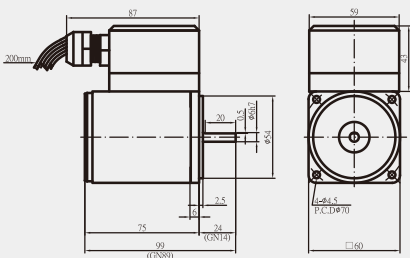
3W 2TK3A(GN)-AP(CP)



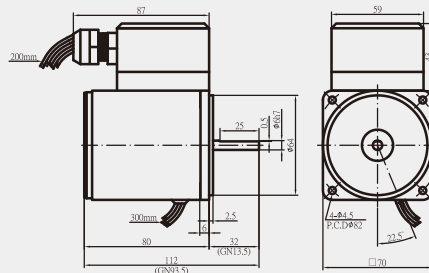
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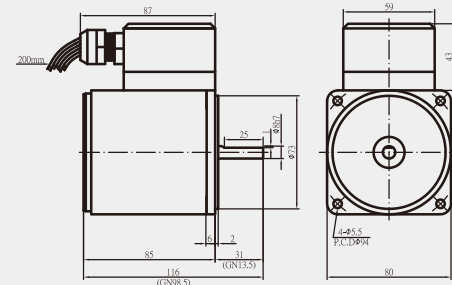
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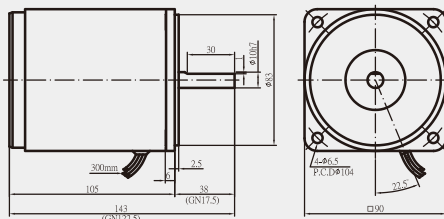
3W 2TK3CA(GN)-AP(CP)



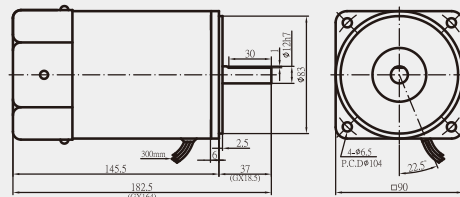
6W 3TK6CA(GN)-AP(CP)



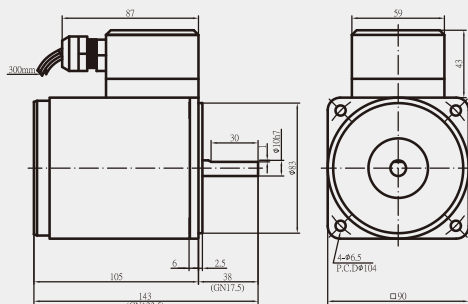
10W 4TK10CA(GN)-AP(CP)



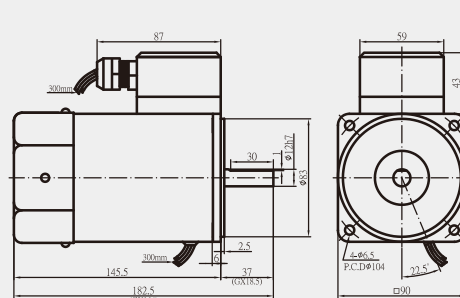
20W 5TK20A(GN)-AP(CP)



40W 5TK40A(GN/GX)-AP(CP)



20W 5TK20CA(GN)-AP(CP)



40W 5TK40CA(GN/GX)-AP(CP)

SPEED REDUCER

減速機

- 外形圖與規格表
- OUTLINE & SPECIFICATION
- 單位/UNIT : mm

減速機之選定 HOW TO SELECT A SPEED REDUCER

■ 與減速機直結後的回轉數及轉矩 ROTATION AND TORQUE GIVEN FROM CONJUNCTION WITH SPEED REDUCER

與減速機直結後的回轉數及轉矩可由以下公式算出
Following is the calculation formula:

$$\text{回轉速 Rotations: } N_G = \frac{N_M}{i}$$

$$\text{轉矩 Torque: } T_G = T_M \cdot i \cdot \eta$$

N_G : 加減速機後之回轉數 Rotations after conjunction with speed reducer (rpm)

N_M : 馬達本體之回轉數 Rotations of Motor (rpm)

i : 減速機減速比 Speed Reducer's reduce ratio

T_G : 加減速機後之轉矩 Torque after conjunction with speed reducer (kg·m)

T_M : 馬達本體之轉矩 Torque of Motor (kg·m)

η : 減速機之傳動效率 The transmission efficiency of the Speed Reducer

■ 最大容許轉矩 MAXIMUM TORQUE ALLOWED

限於材料或其他條件的限制，減速機能承受的轉矩是有極限的，當減速比變大時，請參考後面各章節。

The maximum torque a speed reducer can tolerate is limited due to materials or other specs. Please see the specification of speed reducer for maximum torque allowed at different ratio.

■ 容許側向負載及容許軸向負載

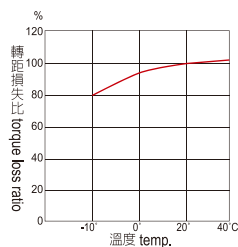
ALLOWABLE RADIAL LOAD AND AXIAL LOAD

所謂側向負載，就是出力軸在1/2處可以承受的彎曲負載，一般使用於以鏈條連結的機構。若是使用的連結器傳動的方式，可以不考慮。因為側向負載與軸向負載會影響減速機的壽命及強度，請勿超負載使用。

Radial load refers to the bending load of output shaft at the 1/2 point, commonly used in units linked by chains. Radial load can be disregarded if a coupling is used. Do not over-load since radial load and axial load may affect service life and strength.

■ 依溫度調整減速比 ADJUSTED THE SPEED REDUCER RATIO VIA ENVIRONMENT TEMPERATURE

環境溫度對於減速機的傳動效率有明顯的影響。上表的傳動效率是在室溫20°C時的量測值。當機台使用在寒帶地區時，請用右表的轉矩損失比來乘標示的轉矩。例如：若機台使用在-10°C的環境，其轉矩將減少20%。(僅供參考用)



Transmission efficiency of a speed reducer apparently does affected by the environment temperature. The graphic display the torque loss percentage at different ambient temperature (for reference only).

■ 負載形態與減速機壽命 LOAD PATTERNS VS. LIFESPAN OF SPEED REDUCER

減速機的壽命會因負載方式，每日運轉時間及軸承種類的不同而改變。下表是假設減速機的負載低於最大容許轉矩。(僅供設計人員參考用)

Speed Reducer lifespan will be vary by ways of loading including but not limit to operation time frame, different type of bearing. The following table assumes that the load gear is under the maximum permissible torque. (Reference for engineers)

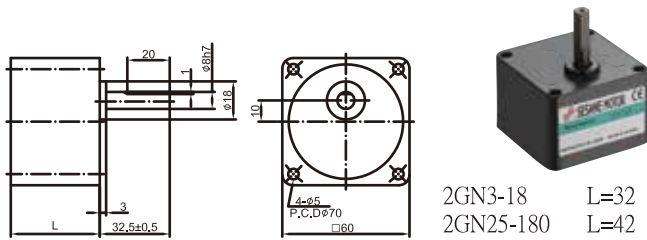
單位：小時 hrs

負載形態 LOAD PATTERN	含油軸承 BEARING			滾珠軸承 BALL BEARING			應用說明 Application instructions.
	5 hrs/day	8 hrs/day	24 hrs/day	5 hrs/day	8 hrs/day	24 hrs/day	
固定負載 FIXED LOAD	2000	1500	1000	6250	5000	3400	單方向運轉，如，輸送機。 Operated in one direction, such as conveyors.
輕微衝擊 SLIGHT IMPACT	1500	1250	800	4200	3400	2500	經常起動/停止的機構，凸輪運轉。 Frequent start/stop, ex. cam operator.
強烈衝擊 STRONG IMPACT	800~1000	700~1000	600~700	2000~2500	1700~2500	1400~1700	可逆馬達的瞬間正逆轉，用 車器瞬間剎車。 Reversible motors, instant moment reversed, with brake system in an instant brake.

■ 馬達有圓軸及齒輪軸兩種，只有齒輪軸才能夠與減速機直結。 MOTOR EQUIP WITH ROUND SHAFT AND GEAR SHAFT, ONLY GEAR SHAFT CAN CONJUNCT WITH SPEED REDUCER.



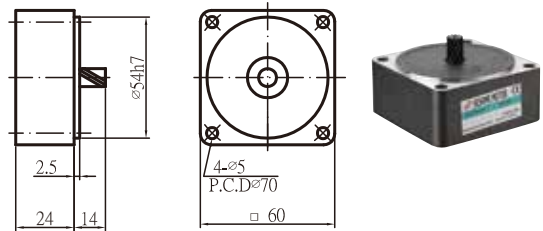
2 GN KE . 2 GN 減速機 / SPEED REDUCER



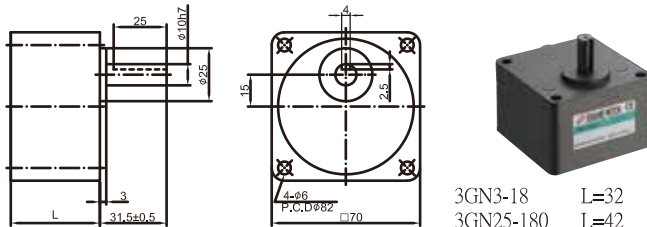
2GN3-18 L=32
2GN25-180 L=42

迴轉速 / SPEED(rpm)	500	300	200	180	150	120	100	60	50	30	20	15	10
減速比 / SPEED REDUCTION RATIO 50HZ	3	5	7.5	-	10	12.5	15	25	30	50	75	100	150
減速比 / SPEED REDUCTION RATIO 60HZ	3.6	6	9	10	-	15	18	30	36	60	90	120	180
最大容許轉矩 / (kgf.cm) MAX. TORQUE	1.1	1.8	2.7	3.0	3.9	4.5	5.4	8.1	9.7	15	23	25	25

2GN10X . 2GN10XK 中間減速機 / INTERMEDIATE SPEED REDUCER

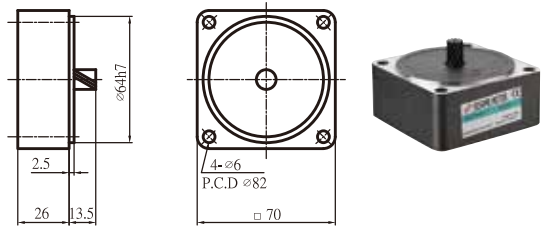


3 GN KE . 3 GN 減速機 / SPEED REDUCER



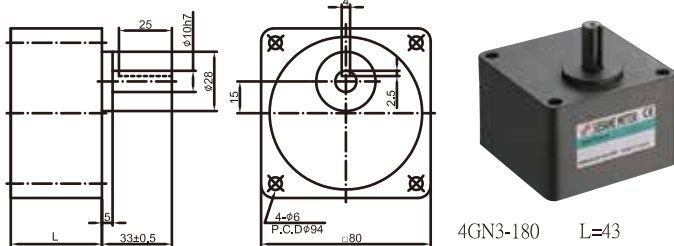
3GN3-18 L=32
3GN25-180 L=42

3GN10X . 3GN10XK 中間減速機 / INTERMEDIATE SPEED REDUCER



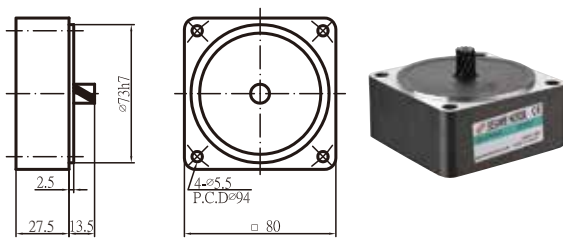
迴轉速 / SPEED(rpm)	500	300	200	180	150	120	100	60	50	45	37.5	30	20	15	10
減速比 / SPEED REDUCTION RATIO 50HZ	3	5	7.5	-	10	12.5	15	25	30	-	40	50	75	100	150
減速比 / SPEED REDUCTION RATIO 60HZ	3.6	6	9	10	-	15	18	30	36	40	-	60	90	120	180
最大容許轉矩 / (kgf.cm) MAX. TORQUE	2.6	4.4	6.6	7.4	9.8	11	13	20	24	24	32	36	50	50	50

4 GN KE . 4 GN 減速機 / SPEED REDUCER



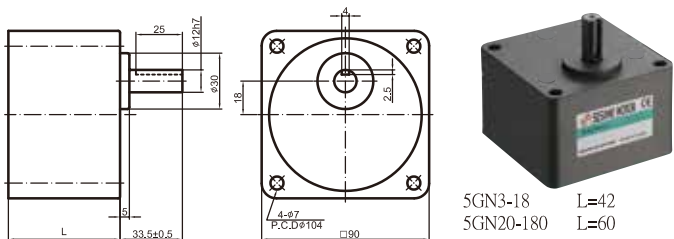
4GN3-180 L=43

4GN10X . 4GN10XK 中間減速機 / INTERMEDIATE SPEED REDUCER



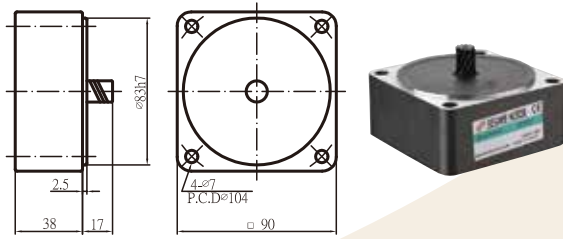
迴轉速 / SPEED(rpm)	500	300	200	180	150	120	100	60	50	45	37.5	30	20	15	10
減速比 / SPEED REDUCTION RATIO 50HZ	3	5	7.5	-	10	12.5	15	25	30	-	40	50	75	100	150
減速比 / SPEED REDUCTION RATIO 60HZ	3.6	6	9	10	-	15	18	30	36	40	-	60	90	120	180
最大容許轉矩 / (kgf.cm) MAX. TORQUE	4.4	7.4	11	12	15	11	22	33	40	40	50	60	80	80	80

5 GN KE . 5 GN 減速機 / SPEED REDUCER



5GN3-18 L=42
5GN20-180 L=60

5GN10X . 5GN10XK 中間減速機 / INTERMEDIATE SPEED REDUCER



迴轉速 / SPEED(rpm)	500	300	200	180	150	120	100	90	75	60	50	45	37.5	30	20	15	10
減速比 / SPEED REDUCTION RATIO 50HZ	3	5	7.5	-	10	12.5	15	-	20	25	30	-	40	50	75	100	150
減速比 / SPEED REDUCTION RATIO 60HZ	3.6	6	9	10	-	15	18	20	-	30	36	40	-	60	90	120	180
最大容許轉矩 / (kgf.cm) MAX. TORQUE	10	17	26	29	36	43	52	52	65	78	93	93	100	100	100	100	100

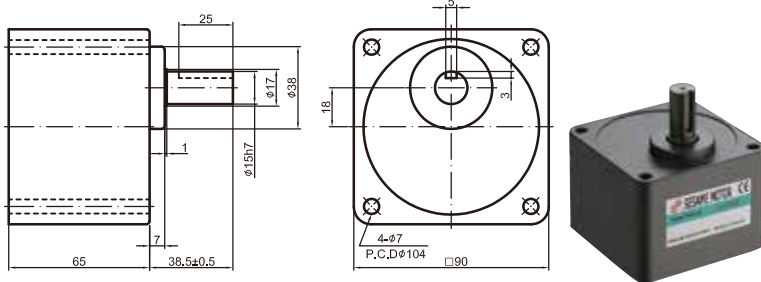
SPEED REDUCER

減速機

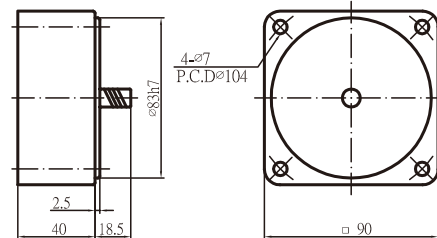
- 外形圖與規格表
- OUTLINE & SPECIFICATION
- 單位/UNIT : mm



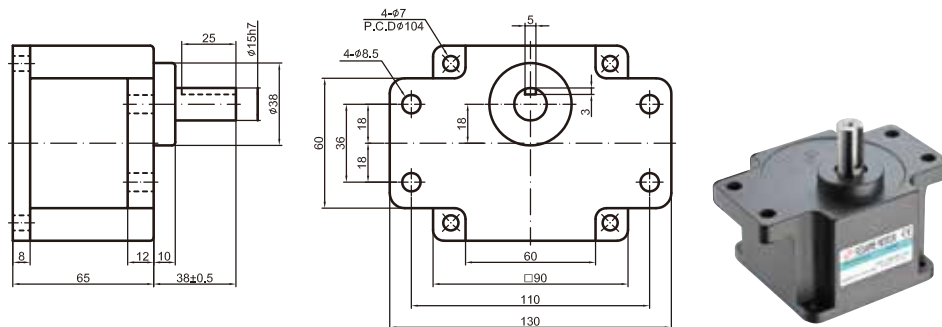
■ 5 GX□KB 減速機/ SPEED REDUCER



■ 5GX10XK 中間減速機/ INTERMEDIATE SPEED REDUCER

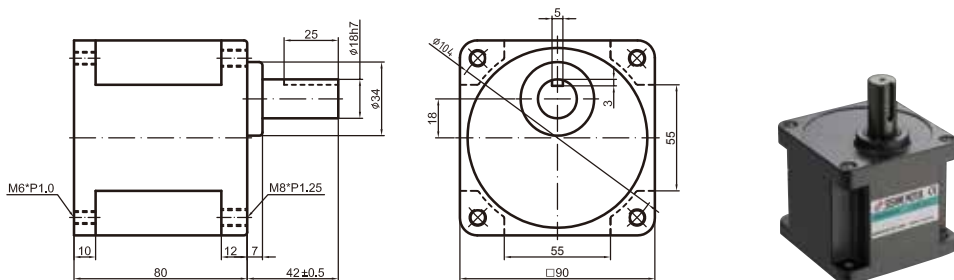


■ 5 GX□K 減速機/ SPEED REDUCER



迴轉速/ SPEED(rpm)	500	300	200	120	100	90	75	60	50	30	20	15	10	9	7.5
減速比/ SPEED REDUCTION RATIO 50HZ	3	5	7.5	12.5	15	-	20	25	30	50	75	100	150	-	200
減速比/ SPEED REDUCTION RATIO 60HZ	3.6	6	9	15	18	20	-	30	36	60	90	120	180	200	-
最大容許轉矩/ (kgf.cm) MAX. TORQUE	15	26	38	57	69	69	86	103	124	200	200	200	200	200	200

■ 5 GX□KBH 重力減速機/ GRAVITY FORCE TYPE REDUCER



迴轉速/ SPEED(rpm)	30	20	15	10	9	7.5
減速比/ SPEED REDUCTION RATIO 50HZ	50	75	150	150	-	200
減速比/ SPEED REDUCTION RATIO 60HZ	60	90	180	120	200	-
最大容許轉矩/ (kgf.cm) MAX. TORQUE	350	350	350	350	350	350

說明 :

1. 減速機品名中□放入減速比。
2. 迴轉速是以馬達的同步轉速為基準(50 HZ : 1500rpm , 60HZ : 1800rpm)除以減速比 ; 實際迴轉速應依負載之大小減少2%~ 20% 。
3. 標示 ■ 的減速機旋轉方向與馬達方向相反 , 其他則與馬達同方向。
4. 齒箱使用注意事項及說明 : 減速機中若有金屬或異物仍勉強與馬達組合 , 將會使齒輪受傷而產生異常音 , 及減少減速機使用壽命 , 也可能發生意外 , 請特別注意。
5. 齒箱與馬達結合一定要核對編碼是否正確 , 否則無法組裝。

NOTES :

1. Please fill in the required speed reduction ratio in the □ (square) after the speed reducer model no.
2. Rotational speed is calculated by dividing the synchronous speed of the motor (50Hz: 1500rpm; 60Hz: 1800rpm) with the reduction ratio. Depending on total load, actual rotational speed is 2%~20% less.
3. Speed reducers marked in the highlighted areas have opposite rotational direction to the motor. Others unmarked have the same rotational direction as the motor.
4. Attention: metal chips or objects in speed reducer will result in gear damage, noise and shorten service-life when assembling with motor.
5. Please make sure that the shaft size of the motor matches to that of the accompanying reducer model before assembly, otherwise inconformity will occur.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty. 產品因人為原因或天災等因素導致不良或損壞, 不在保固範圍內。

COMPONENTS

零組件類

泛用型馬達
GENERAL PURPOSE MOTOR

速度控制型馬達
SPEED CONTROLLED MOTOR

控制器
CONTROLLER

煞車馬達
BRAKE MOTOR

離合煞車馬達
CLUTCH BRAKE MOTOR

轉矩馬達
TORQUE MOTOR

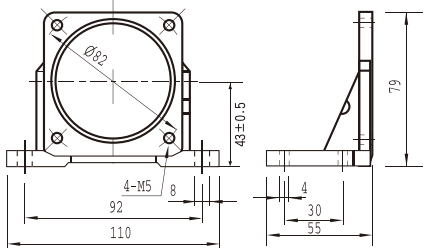
減速機
SPEED REDUCER

零組件類
COMPONENTS

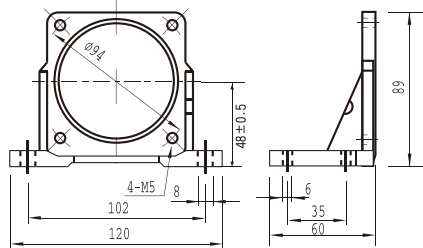


馬達安裝用L型腳座 / L TYPE BASE BRACKET FOR MOTOR INSTALLATION

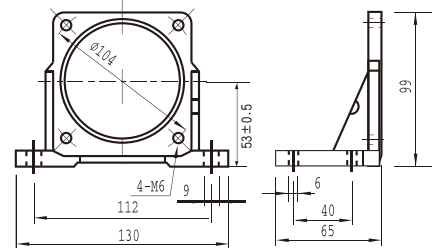
PAL-3N (□70mm用)



PAL-4N (□80mm用)

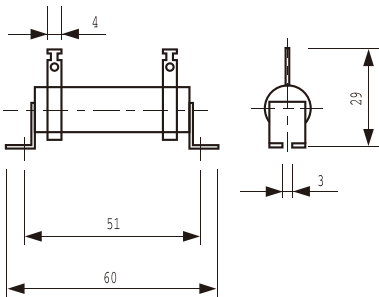


PAL-5N (□90mm用)

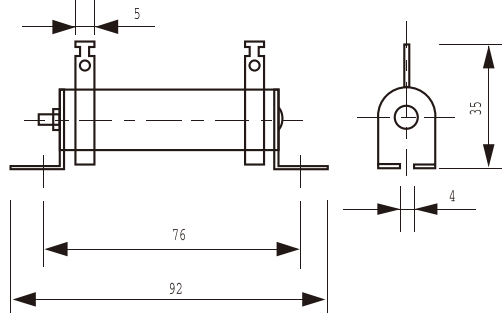


電子式煞車回路用外部電阻器 / EXTERNAL RESISTOR FOR ELECTRONIC BRAKE CIRCUITS

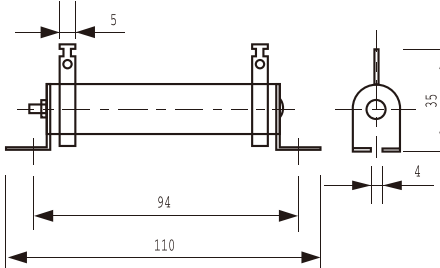
DDR10W10Ω J (10瓦/10歐姆)



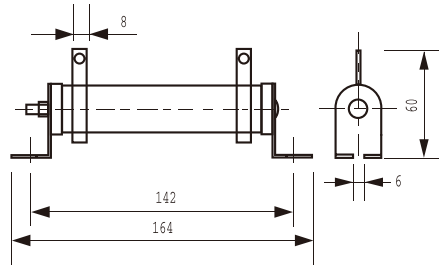
DDR20W20Ω J (20瓦/20歐姆)



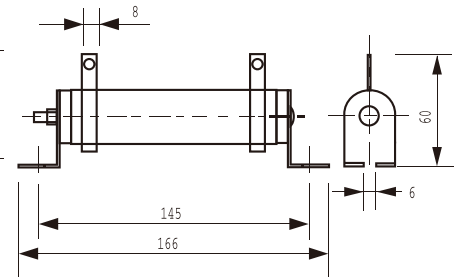
DDR30W20Ω J (30瓦/20歐姆)



DDR50W50Ω J (50瓦/50歐姆)

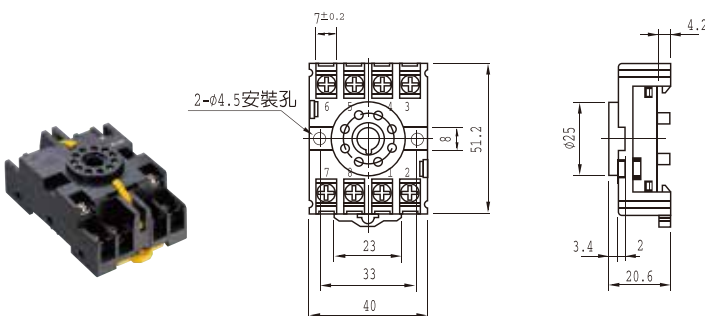


DDR80W50Ω J (80瓦/50歐姆)



露出型腳座 / EXTENDED BASE BRACKET

PF-083A腳座 (8腳用)



11-PFA腳座 (11腳用)

