磁粉離合器/制動器簡介　Powder clutch/Brake introduction

■ 結構及工作原理
Structure and working principle

磁粉離合器是由主動轉子(輸入軸)、從動轉子(輸出軸)、含激磁綫圈的磁軛組成，三部分相對同心装配，形成了一個可以相對轉動的整體，在主動轉子和從動轉子之間的環形空隙(工作腔)内填有高導磁性的合金磁粉。

激磁綫圈無電流通過時，工作腔中的磁粉呈鬆散狀態。在主動轉子所産生的離心力的作用下，磁粉被均匀的甩在主動轉子的内壁上，主、從動轉子之間無力的相互作用，磁粉離合器處于分離狀態，没有轉矩的傳遞。

激磁綫圈有電流通過時，磁軛中産生工作磁通，工作腔中的磁粉沿磁通方向呈鏈狀連接起來(形成磁粉鏈)，磁粉離合器就是靠此時磁粉與磁粉、磁粉與工作面之間的摩擦力和磁粉鏈之間的抗剪力來傳遞轉矩，磁粉離合器處于結合狀態。(見圖1)

切斷電流時，磁通隨激磁電流的消失而消失，磁粉在重力的作用下又重新處于鬆散狀態，并在離心力的作用下，被甩在主動轉子的内壁上，磁粉離合器又處于分離的狀態。

磁粉制動器與磁粉離合器的原理相同，祇要磁粉離合器的從動轉子加以固定，就形成了磁粉制動器。(見圖2)

The magnetic powder clutch is composed of active rotor(input shaft),driven rotor (output shaft)and Yoke with excitation coil.The three parts are resembled against the concentric part and form a system which can rotate relatively.The annular gap between active rotor and driven rotor is full of alloy powder which has high permeability.

The magnetic powder will be in the state of loose when the current do not pass the excitation coil.The magnetic powder will be thrown on the inner wall of active rotor.In this case,there will not exist the interaction force between the active and driven rotor.Because the magnetic powder clutch is in the state of separation,no torque transmission exits.

The magnetic powder in the working chamber will link in a link state under the action of the magnetic flux generated from the Yoke when the current pass the excitation coil .The magnetic powder clutch can transfer torque relying on the shear force generated from magnetic chain and the friction generated from the magnetic powder and working face.In this case ,the magnetic powder clutch is in the state of combination.

When the current is cut off,the magnetic flux will disappear with the disappearance of the magnetizing current,the magnetic powder will be in the state of loose under the action of gravity again,and will be thrown on the inner wall of active rotor under the action of the centrifugal force.In this case,the magnetic powder clutch will be in the state of separation again.

The magnetic powder clutch and brake have the same principle,the magnetic powder brake will form as long as the driven rotor of the magnetic powder clutch is fixed.

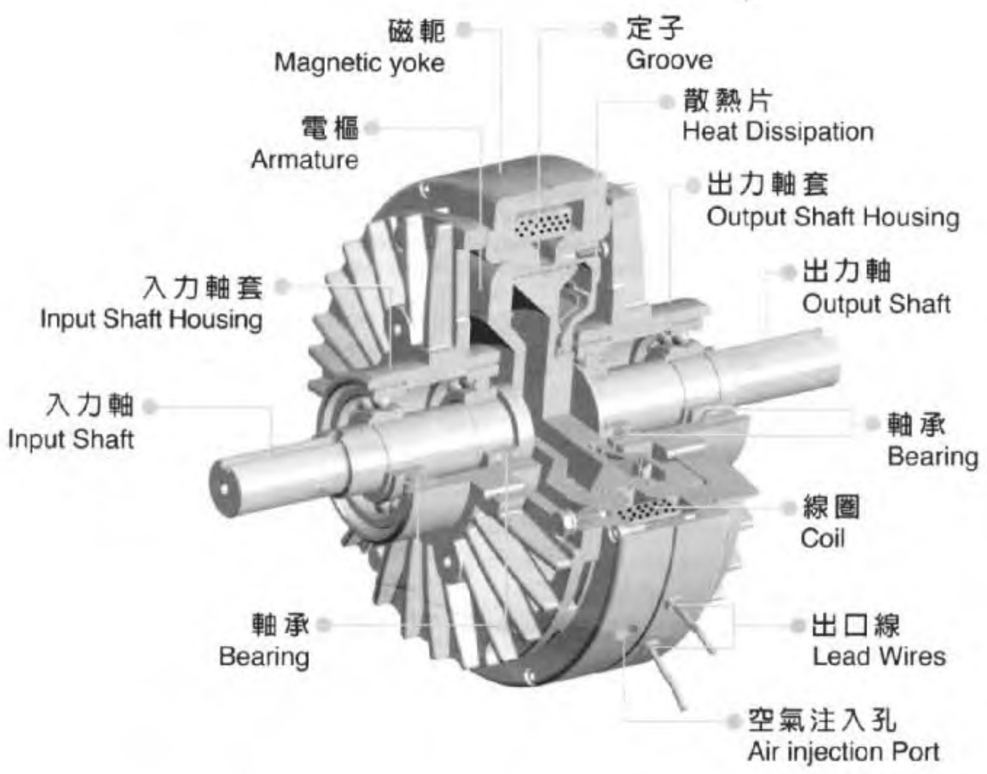


圖1 磁粉離合器工作原理
chart 1 working principle of the magnetic particle clutch

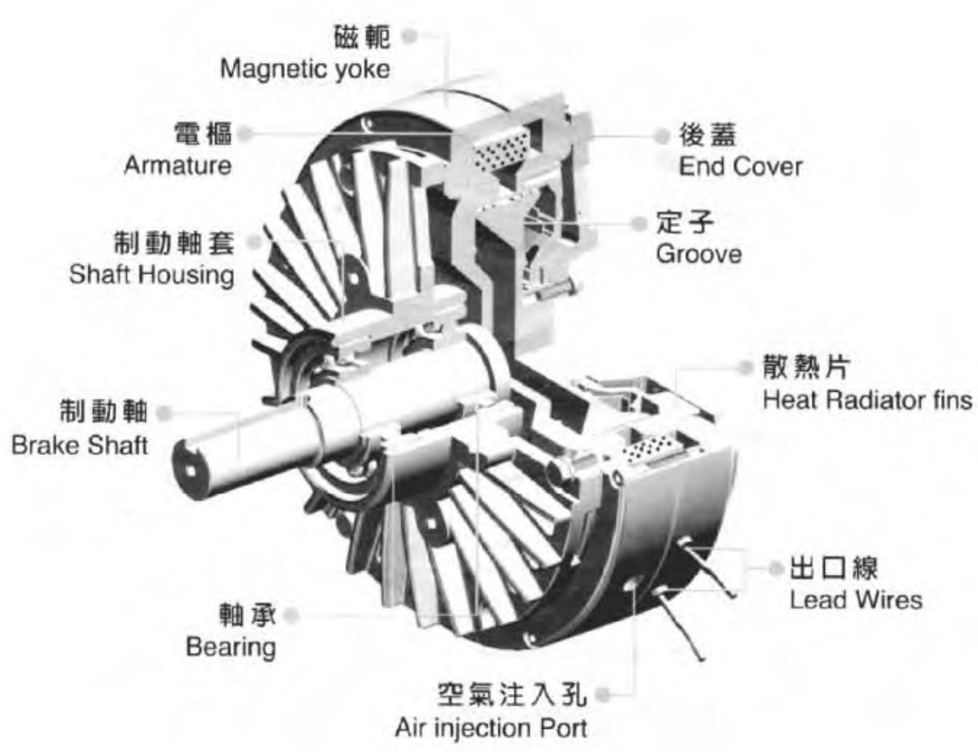


圖2 磁粉制動器工作原理
chart 2 working principle of the magnetic particle brake

■ 特性
Features

● 激磁電流與轉矩成綫性關系
The magnetizing current has a linear relationship with torque

如圖3所示，傳遞的轉矩與激磁電流基本成綫性關系。衹要改變激磁電流的大小，便可在較大範圍内控制轉矩的大小。一般情况下，在5%–100%的額定轉矩範圍内，激磁電流與傳遞轉矩基本成正比例綫性關系。

As is shown in chart 3,the transmission torque has a linear relationship with the magnetizing current .The size of the torque can get controlled within larger range.Under normal circumstance,the magnetizing current has a linear relationship with transitive torque within range of 5%–100% rated torque.

● 穩定的滑差轉矩
Stable slip torque

當激磁電流保持不變時，其傳遞的轉矩不受主動件與從動件之間的轉速差(滑差轉速)影響，如圖4所示。也就是説，静摩擦轉矩與動摩擦轉矩無差别，因此可以穩定地實現轉矩恒定。此特性應用于張力控制，用户衹要調整激磁電流便能準確地控制轉矩，從而有效地控制卷料的張力。

The slip rotational speed between driven rotor and active rotor do not affect the transitive torque when the magnetizing current retain constant,as shown in chart 4.That is to say,the static friction torque and the dynamic friction torque have no difference.Therefore,the torque can retain constant stably.The features are applied to tension control ,users can control the tension of the roll material effectively as long as regulating the magnetizing current accurately.

● 防止由于滑差所致的發熱現象
Prevention of the phenomenon of heat since slip

通常連續滑動時摩擦部分免不了會發熱，甚至燒毁。但是本設備具備完備的散熱裝置，長時間運轉也不會過于發熱，而且使用壽命長。

The friction part will generate heat inevitably or even destroyed when it keep continuous sliding.But this device has a complete cooling set,it will not generate a lot of heat after long time running and it has a long service life.

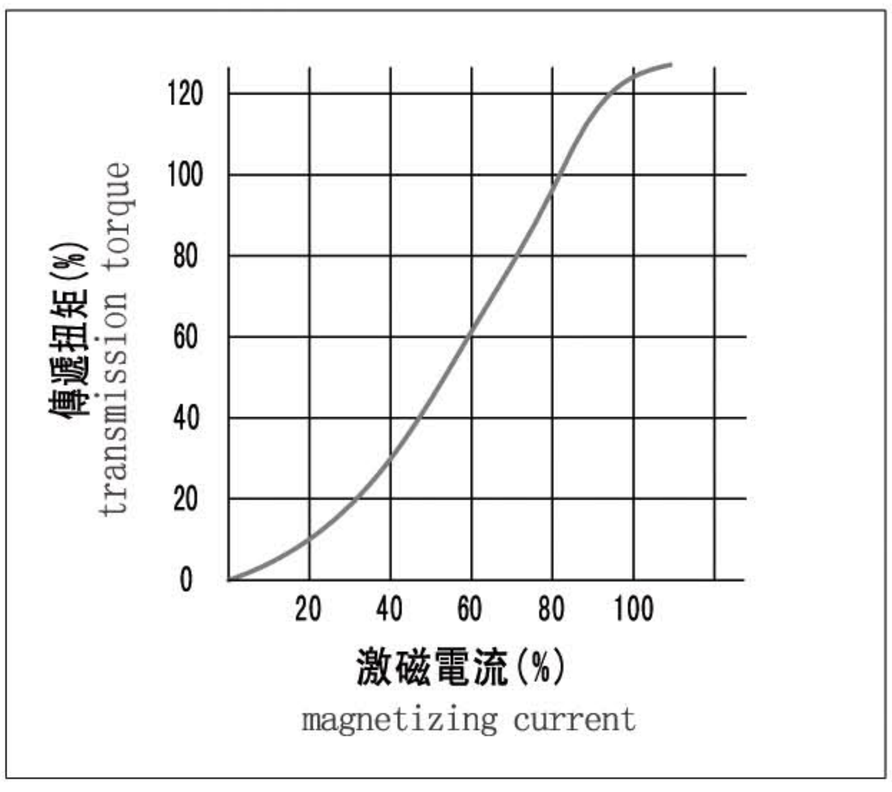


圖3 激磁電流與傳遞扭矩之關系
chart 3 The relationship of the magnetizing current and the transmission torque

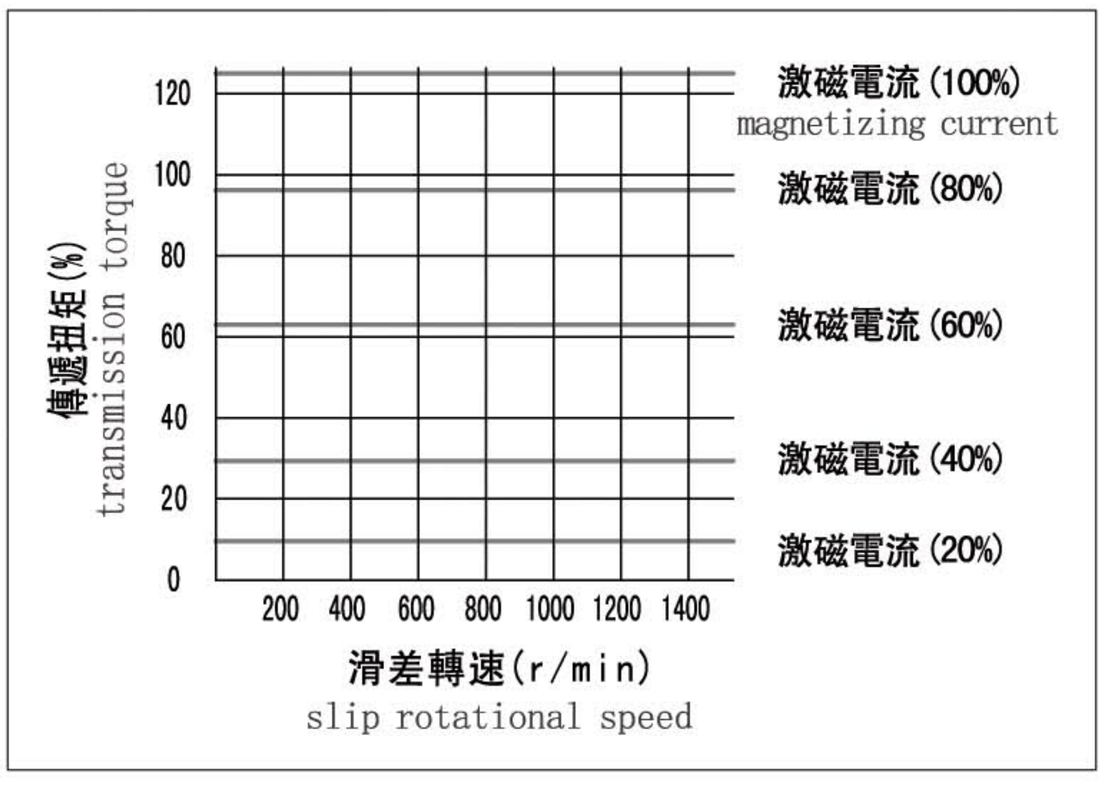
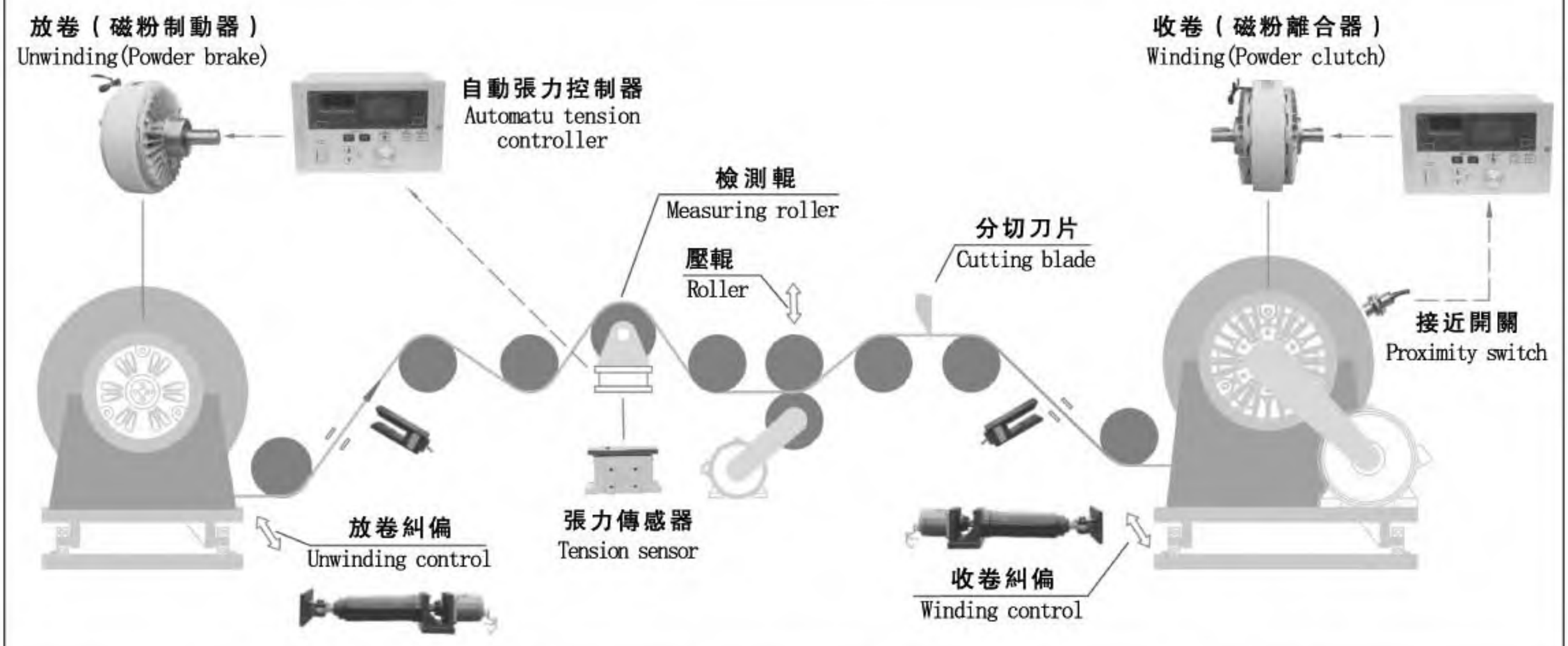


圖4 滑差轉速與傳遞扭矩之關系
chart 4 The relationship of the slip rotational speed and the transmission torque

■ 應用範圍
Application

由于磁粉離合器/制動器具有以上特性，現已廣泛應用于造紙、印刷、塑料、橡膠、紡織、印染、電綫電纜、冶金以及其他相關卷取加工行業中收卷和放卷張力的控制。下面是一套較爲完整的張力控制系統示意圖。

Due to the features of the magnetic powder clutch and brake,they have been widely used in paper making, printing,plastic items,rubber industry,textile industry, printing and dyeing ,wire and cable, metallurgy industry and tension control of winding and unwinding in roll material processing industry.A complete set of schematic of tension control system is as follows:



另外：磁粉離合器還可以用于緩衝啓動、過載保護、調速等；磁粉制動器還可以用于傳動機械的測試加載、制動等。

Moreover ,the magnetic powderclutch can be also used in soft starting,overload protection ,speed regulation;the magnetic powder brake can be also used in test loading and braking of the transmission machinery.

■ 設計參考
Design reference

首先，我們解釋一下兩個名詞：
First ,let us learn the meaning of the following words:

1、滑差轉速: 磁粉離合器爲輸入軸與輸出軸之間的轉速差，磁粉制動器爲輸入軸的轉速；

2、滑差功率: 磁粉離合器/制動器在傳遞轉矩時，因爲有滑差轉速而産生的功率。

1.slip rotational speed:the speed difference between input shaft and output shaft of magnetic powder clutch,the rotational speed of output shaft for magnetic powder brake.

2.slip power:the power generated from the slip rotational speed when the magnetic powder clutch or brake transfer torque.

磁粉離合器/制動器的選型一般以其所需的最大轉矩、轉速爲依據來選定。但同時也要保證其實際工作的滑差功率小于額定值，因爲滑差功率會轉化成熱量造成各部位零件的温度上升。具體計算公式如下：

The selection of the magnetic powderclutch or brake rely on the maximum required torque and rotational speed.Because the temperature of all parts will rise when the slip power is converted into heat , it is guaranteed that the actual slip power is less than the rated value.

$$P = \frac{2\pi}{60} \times M \times n = F \times V \quad \text{(unit:w)}$$

式中 in this formula :

P–滑差功率 slip power (unit:w)

M–工作轉矩 working torque (units:N.m)

n–滑差轉速 slip rotational speed (units:r/min)

F–工作張力 working tension （unit:N）

V–綫速度 line speed (unit:m/s)

舉例：POD–B–10KG 磁粉制動器，滑差功率爲 7000W，額定轉矩爲100 N.m，許用轉速爲 1500 r/min。

Example: POD–B–10KG magnetic powder brake ,the slip power is 7000w, the rated torque is 100 N.m, the allowed rotational speed is 1500 r/min.

當其在額定轉矩工作時，允許的最高轉速爲：

When it works at the rated torque,the highest allowed rotational speed is :

$$n = \frac{60\times P}{2\pi\times M} = \frac{9.55\times P}{M} = \frac{9.55\times 7000}{100} = 668.8\ (\text{r/min})$$

當其在最高滑差轉速工作時，允許的最大轉矩爲：

When it works at the highest slip rotational speed ,the highest allowed torque is:

$$M = \frac{60\times P}{2\pi\times n} = \frac{9.55\times P}{n} = \frac{9.55\times 7000}{1500} = 44.6\ (\text{N.m})$$

■ 注意事項 Notes

● 不得超載、冷却到位 Don't overload, meanwhile cool to appropriate temperature

磁粉離合器/制動器在工作時，其轉矩、轉速、滑差功率均不得超過額定值。冷却方式(自然冷却、强制氣冷却、水冷却)需根據實際工作時産生的最大滑差功率而定。冷却空氣需過濾油和水。有條件，可加裝温度檢測、報警裝置，防止温度過高，影響磁粉的使用壽命。(最高温度80℃)

The value of the torque /rotational speed /slip power should be less than the rated value. The cooling mode (natural cooling /forced air cooling/water cooling)should depend on the maximum slip power when it works and the cooling air should pass the water and oil filter.The temperature detector and the alarm should be installed to prevent high temperature which can affect the service life of the magnetic powder.(the highest temperature is 80°C)

● 關于壽命 Concerning the service life

磁粉離合器/制動器的使用壽命在于磁粉的使用壽命。一般而言，磁粉在不超載的狀態下，其使用壽命爲4500–7500小時；但在有些狀態下其使用壽命可延長數倍，如：降低磁粉離合器/制動器的工作轉矩、相對滑差轉速和滑差功率到額定值的50%–70%。也就是説，在設計時，餘量盡可能放大一些。

The life of the magnetic powder clutch and brake rely on the life of the magnetic powder.Generally speaking ,its service life is 4500–7500 hours in the state of non overloaded;But its service life can extend several times in some cases,such as:the working torque of the magnetic powder clutch/brake、relative slip rotational speed and slip power can be reduced to 50%–70% of the rated value.This is to say ,the margin can be enlarged as soon as possible when designing.

磁粉離合器/制動器簡介　Powder clutch/Brake introduction

● **關于轉矩 Concerning the torque**

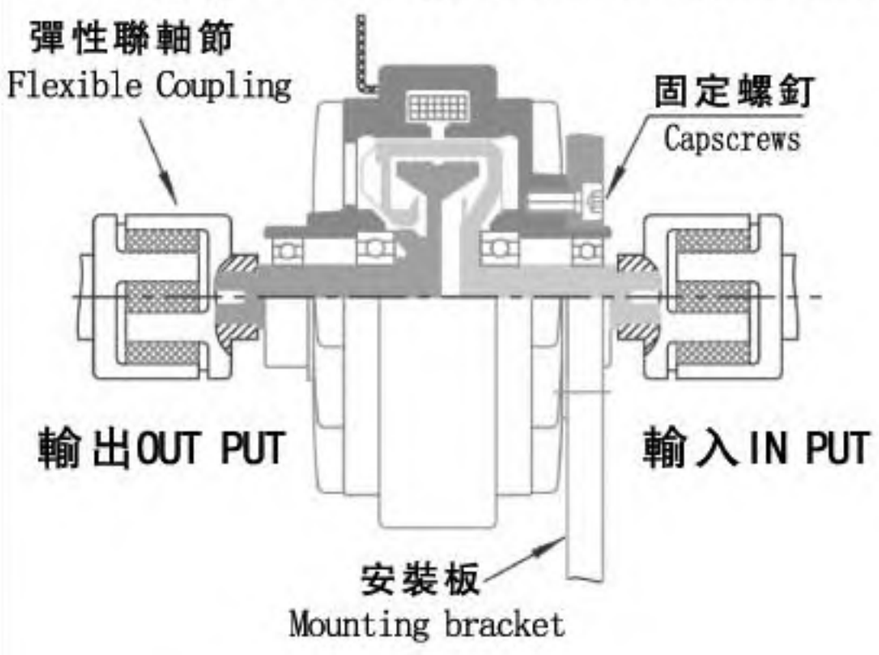
磁粉離合器/制動器出廠使用後，其磁粉在早期使用過程中會發生磨合，轉矩會略爲有所下降，可通過調整電流來加以補償。

After the magnetic powder clutch and brake wroking,the magnetic powder will be in grinding at the beginning which lead to the torque decreasing slightly,but the gap can be compensated through adjustment the current.

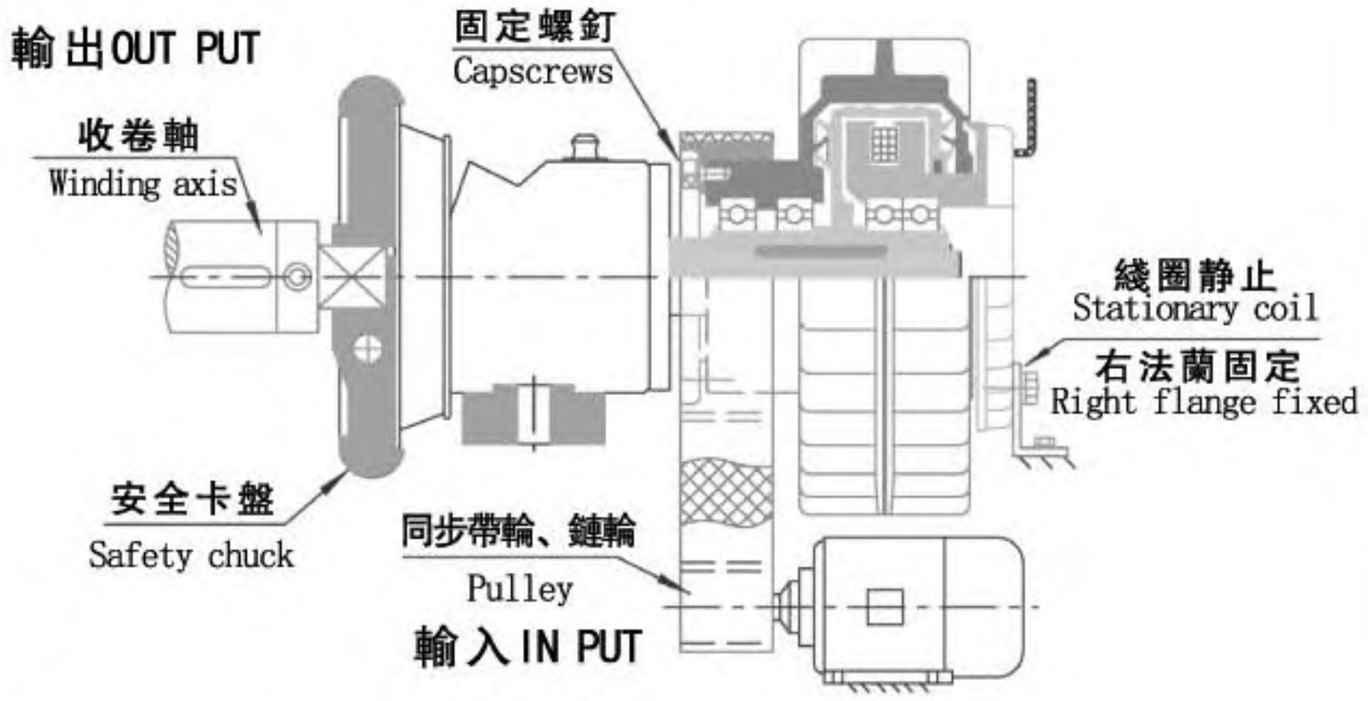
■ 安裝示例 Installation example

● **磁粉離合器Powder clutch**

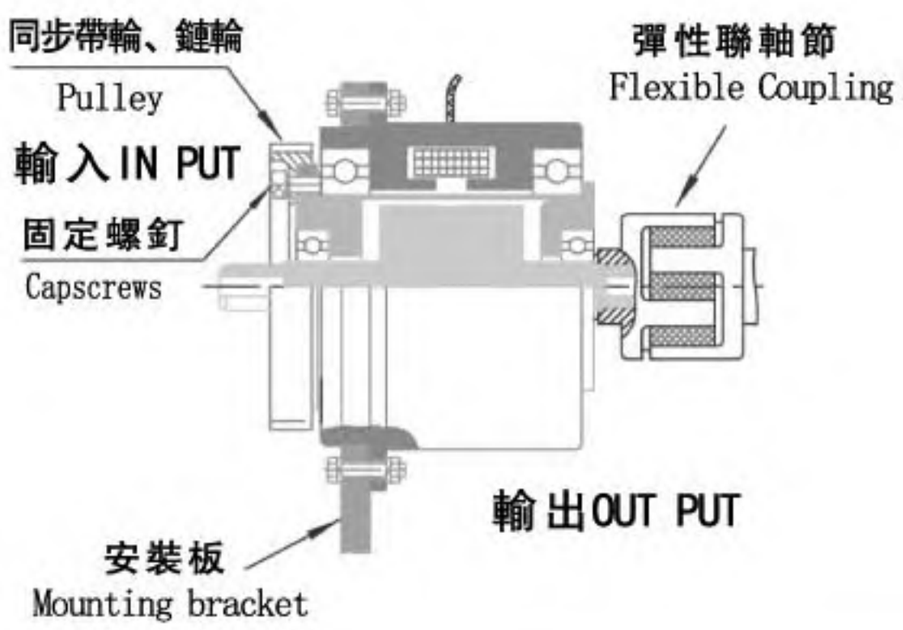
●出軸式(對軸安裝)
Output shaft type(installation against the shaft)



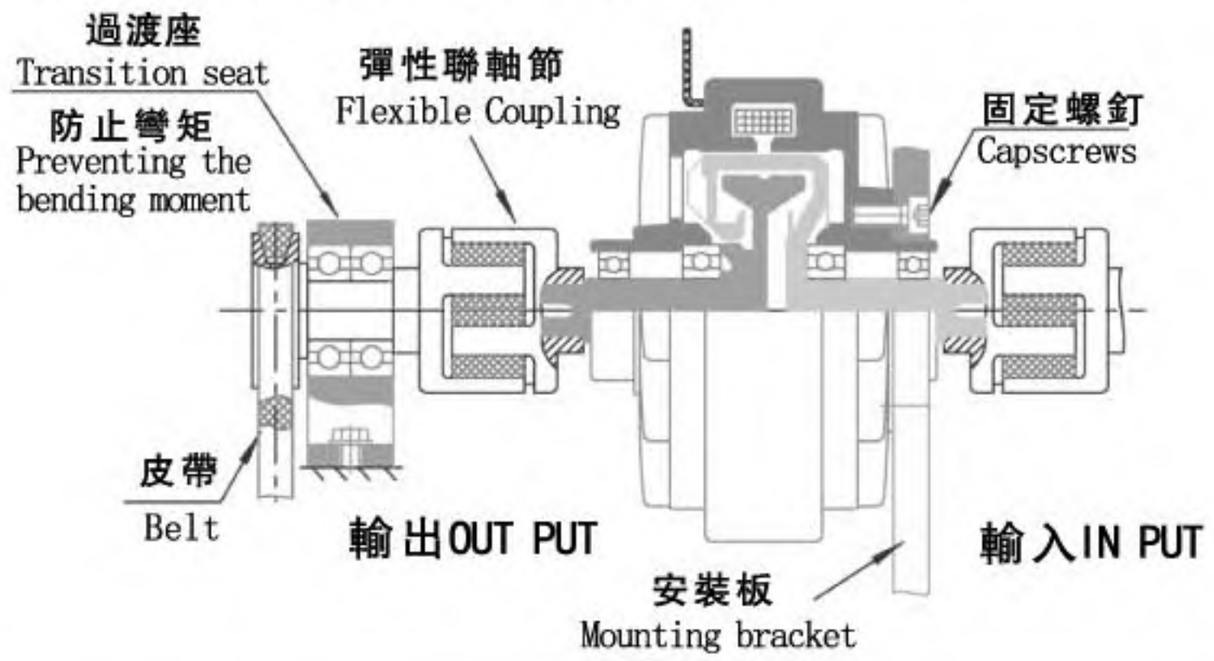
●外殼旋轉式Rotating shell type



●法蘭盤式Flange plate type

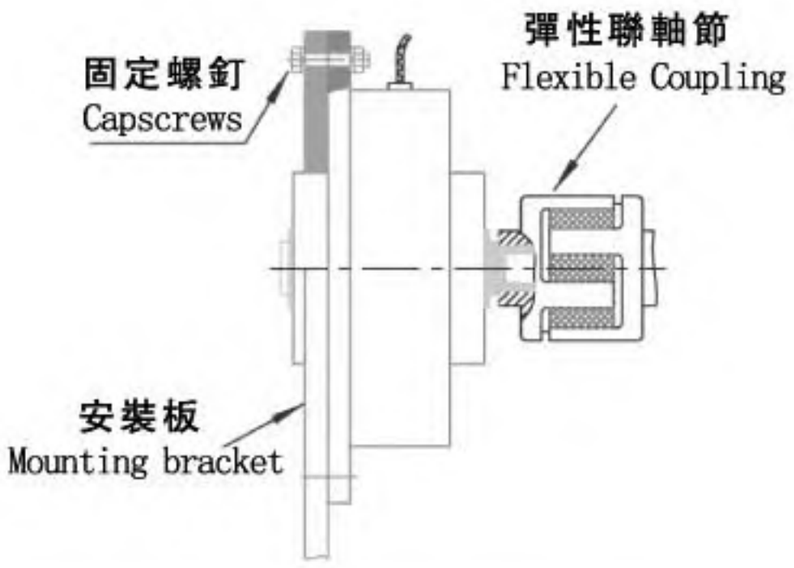


●出軸式(齒輪、皮帶輪、同步帶輪安裝)
Output shaft type(gear/ pulley/pulley-synchronous installation)

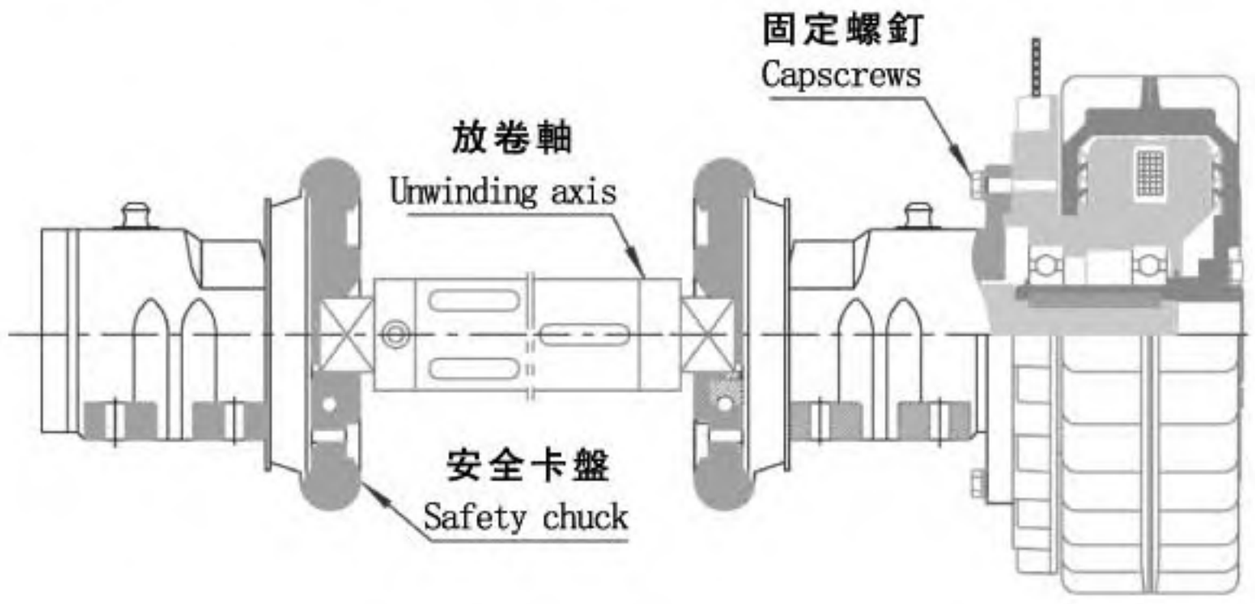


● **磁粉制動器Powder brake**

●出軸式(對軸安裝)
Output shaft type(installation against the shaft)



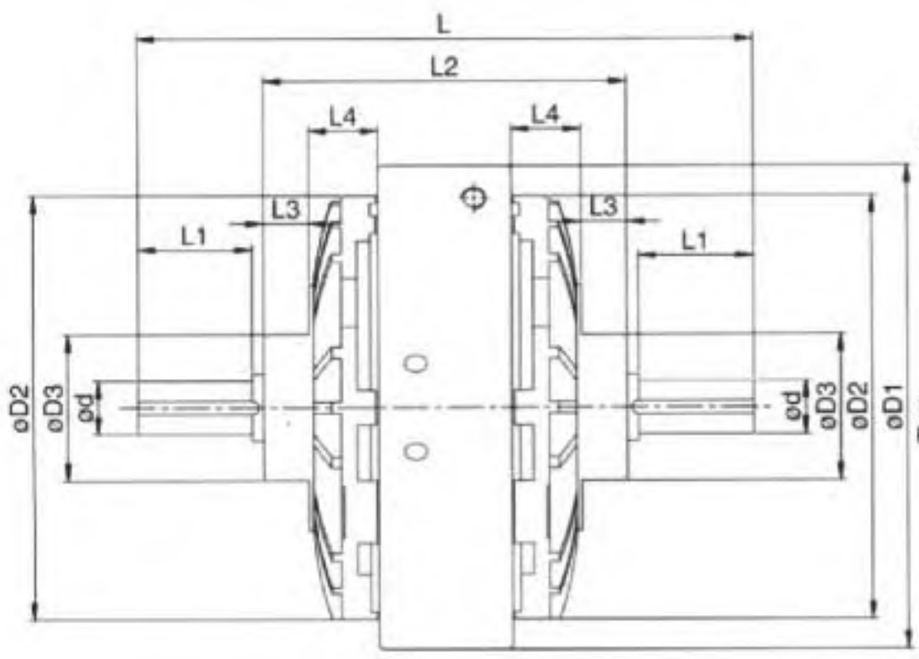
●外殼旋轉式Rotating shell type

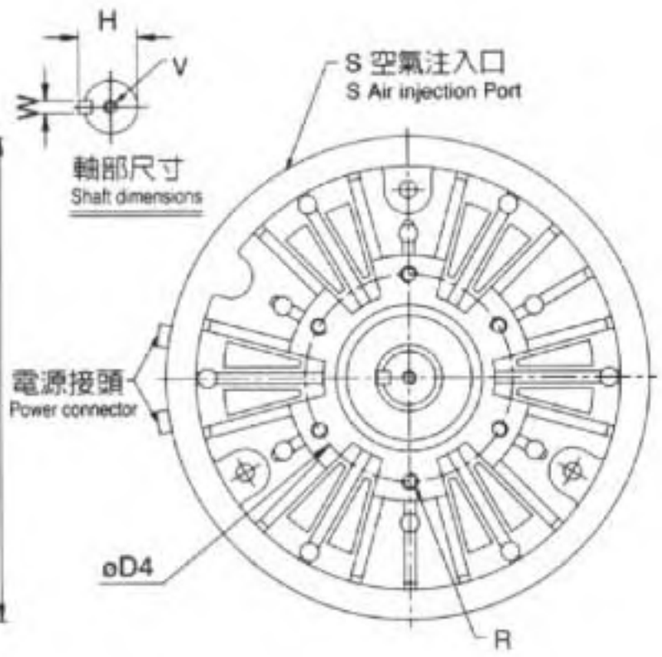


TJ-POC

磁粉式離合器 Magnetic Particle Clutch

天 機
Tian Ji

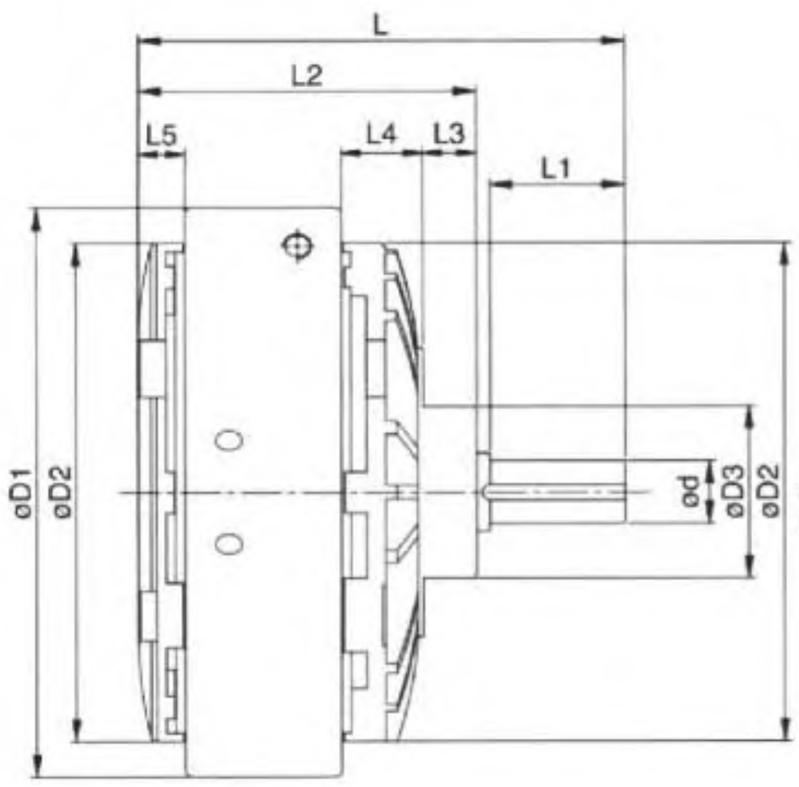


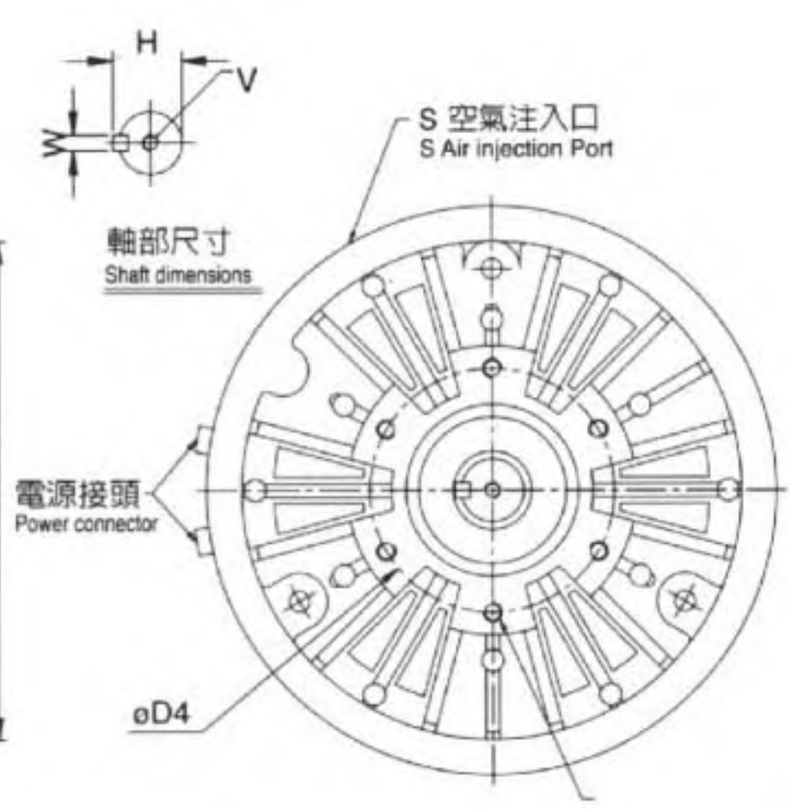


型號 MODEL		TJ-POC-0.6	TJ-POC-1.5	TJ-POC-2.5	TJ-POC-5	TJ-POC-10	TJ-POC-20	TJ-POC-40
定格轉距 [kgf–m](N–m) Rated torque		0.6(6)	1.2(12)	2.5(25)	5(50)	10(100)	20(200)	40(400)
容量 Capacity DC24V (75℃)	電流(A) Current	0.81	0.94	1.24	2.15	2.4	2.7	3.5
	電力(W) Power	19.4	22.5	30	51.5	57.6	64.8	84
	時定數(S) Number of hours set	0.08	0.1	0.12	0.13	0.25	0.37	0.4
慣性矩 Moment of inertia (kgm2)	入力側 intput side	$6*10^{-4}$	$1.34*10^{-3}$	$3.8*10^{-3}$	$9.5*10^{-3}$	$3.5*10^{-2}$	$9.15*10^{-2}$	$2.4*10^{-1}$
	出力側 output side	$2.40*10^{-4}$	$4.90*10^{-4}$	$1.49*10^{-3}$	$4.8*10^{-3}$	$2.5*10^{-2}$	$6.89*10^{-2}$	$2.2*10^{-1}$
强制空冷 容許滑動 功率 Allowable slippagerate with forced–air cooling	風壓(Pa) Air pressure	-	$3*10^{4}$	$5*10^{4}$	$1*10^{5}$	$6*10^{4}$	$5*10^{4}$	$2*10^{5}$
	風量(M^3/min) Air volume	-	0.2	0.4	0.6	1.1	1.6	2.0
	功率(W) Power	-	250	380	700	1100	1900	2800
重量 Weight (kg)		4	5.2	9	14.5	37	53	100
最高轉速 Maximum Speed (r/min)		1800						
磁粉重量Weight of powder(g)		10	20	33	60	140	225	370
外型尺寸 Exterior domensions	D1	134	152	182	219	276	325	395
	D2	116	126	159.5	196	260.5	301	360
	D3(g7)	42	42	55	74	100	110	130
	D4	64	64	78	100	140	150	200
	L	164	191.7	230	293.9	359	407.2	500.4
	L1	26	29.5	43	55	65	69	92
	L2	100	124	136	172	198	230	291
	L3	14	15	17	30	28	30	35
	L4	18	25.5	26	28	46	56	66.5
	d(h7)	12	15	20	25	30	35	45
	H($^{-0}_{-0.2}$)	13.5	17	22	28	33	38.5	48.5
	W(p7)	4	5		7		10	12
	V	M4*0.7P*8L	M4*0.7P*8L	M5*0.8P*10L	M6*1P*12L	M10*1.5P*20L		
	R	6-M5*0.7P*10L	6-M6*1P*10L			6-M10*1.5P*15L		8-M10*1.5P*15L
	S	1/8	1/8		1/4	3/8		

TJ-POD

磁粉式煞車器 Powder-type Solendoid Brake





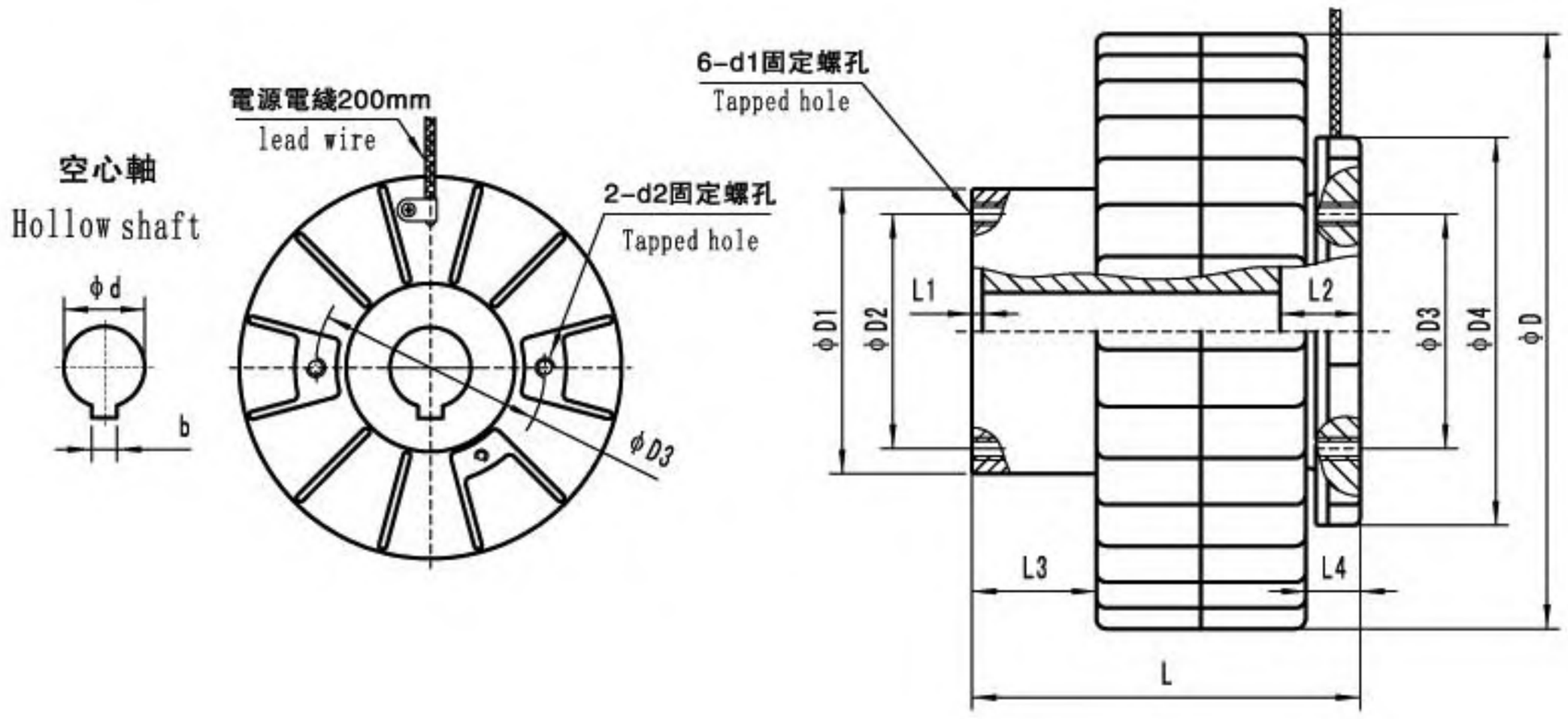
型號 MODEL		TJ-POD-0.6	TJ-POD-1.5	TJ-POD-2.5	TJ-POD-5	TJ-POD-10	TJ-POD-20	TJ-POD-40
定格轉距 [kgf-m](N-m) Rated turning distance		0.6(6)	1.2(12)	2.5(25)	5(50)	10(100)	20(200)	40(400)
容量 Capacity DC24v (75℃)	電流(A) Current	0.81	0.94	1.24	2.15	2.4	2.7	3.5
	電力(W) Power	19.4	22.5	30	51.5	57.6	64.8	84
	時定數(S) Number of hours set	0.08	0.1	0.12	0.13	0.25	0.37	0.4
慣性矩 Moment of inertia (kgm^2)		$6.00*10^{-4}$	$1.34*10^{-3}$	$3.8*10^{-3}$	$9.5*10^{-3}$	$3.5*10^{-2}$	$9.15*10^{-2}$	$2.4*10^{-1}$
强制空冷容許滑動功率 Allowable slippage rate with forced-air cooling	風壓(Pa) Air pressure	-	$3*10^4$	$5*10^4$	$1*10^5$	$6*10^4$	$5*10^4$	$2*10^5$
	風量(M^3/min) Air volume	-	0.2	0.4	0.6	1.1	1.6	2.0
	功率(W) Power	-	250	380	700	1100	1900	2800
重量 Weight (kg)		4	5.2	9	14.5	34	53	100
最高轉速 Maximum number of turns (r/min)		1800						
磁粉重量Weight of powder(g)		10	20	33	60	140	225	370
外型尺寸 Exterior domensions	D1	134	152	182	219	278	327	395
	D2	116	126	160	196	260	301	365
	D3(g7)	42	42	55	74	100	110	130
	D4	64	64	78	100	140	150	200
	L	112.5	132	155	193	239	278	338
	L1	114	29	43	55	65	69	92
	L2	26	98	108	132	167	199	234
	L3	14	15	17	30	28	30	35
	L4	18	25.5	26	28	46	56	70
	L5	12.5	14.5	15	18	21.5	32	40
	d(h7)	12	15	20	25	30	35	45
	H($^{-0}_{-0.2}$)	13.5	17	22	28	33	38.5	48.5
	W(p7)	4	5		7		10	12
	V	M4*0.7P*8L	M4*0.7P*8L	M5*0.8P*10L	M6*1P*12L	M10*1.5P*20L		
	R	6-M5*0.7P*10L	6-M6*1P*10L			6-M10*1.5P*15L		8-M10*1.5P*15L
	S	1/8	1/8		1/4	3/8		

● 本公司保留產品規格尺寸設計變更或停用之權利。
We reserve the right to the design, change and terminating of the product speicification and size.

TJ-POC-A

(法蘭盤輸入、空心軸輸出、空心軸支撐、外殼旋轉）磁粉離合器

Mangnetic powder clutch（flange input / hollow shaft output / hollow shall intall / rotational shell)

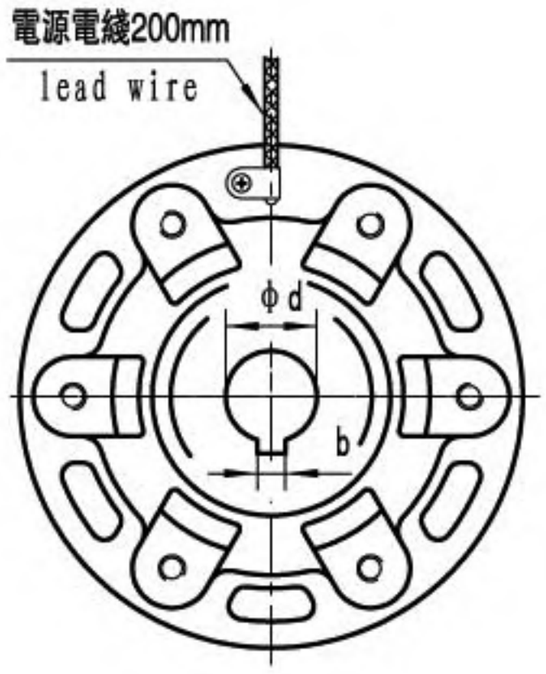


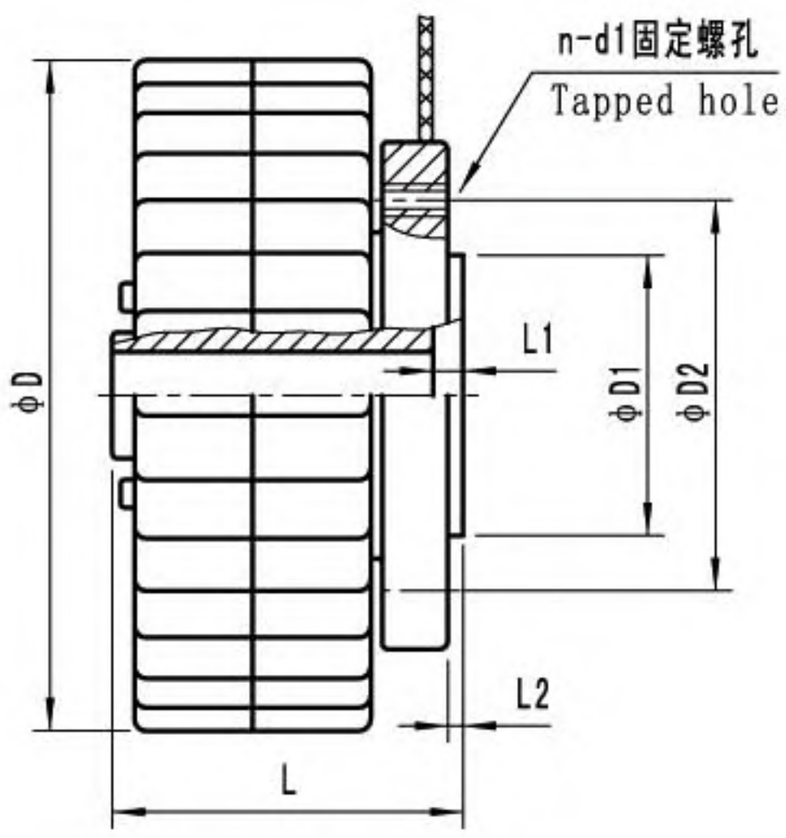
型號 MODEL		TJ-POC-A-0.6	TJ-POC-A-1.5	TJ-POC-A-2.5	TJ-POC-A-5	TJ-POC-A-10	TJ-POC-A-20	TJ-POC-A-40
定格轉距（NM)Rated torque		6	12	25	50	100	200	400
容量 Capacity DC24V (75℃)	電流(A) Current	0.74	0.9	1.1	1.4	2.0	2.5	3.0
	許用轉速(r/min) Allowable rotational speed	1800	1800	1800	1800	1800	1000	1000
	滑差功率(W) Slip power	130	320	450	700	900	1900	2600
外形尺寸 Outline dimension	D	128	160	180	220	275	335	360
	L	86	103	119	150	166	198	258
空心軸 聯結尺寸 Hollow shaft size	d(H7)	15	18	20	30	35	45	50
	b(F8)	4	5	6	8	10	14	14
	L1	1	2	2	3	4	1	1
	L2	21	25	26	31	32	45	50
	L3	21	32	36	48	48	59	68
法蘭盤聯結尺寸 Flange size	d1*深度Depth	M6*10	M6*10	M6*10	M8*12	M10*18	M10*18	M10*18
	D1(g7)	70	80	90	110	125	160	160
	D2	60	68	80	95	110	140	140
定子固定尺寸 Fixed stator size	D3	60	68	80	95	110	140	140
	D4	82	96	114	150	176	200	200
	L4	7	13	17	20	18	21	21
	d2*深度Depth	M4*8	M6*8	M6*8	M8*12	M10*18	M10*18	M10*18

TJ-POD-A

（空心軸聯結、止口支撐、外殼旋轉）磁粉制動器

Magnetic powder brake(hollow shaft coupling/center ring install/rotatinal shell





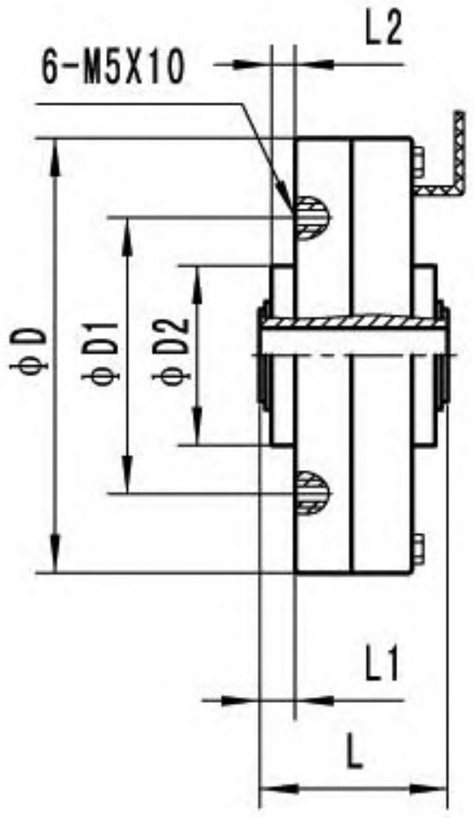
型號 MODEL		TJ-POD-A-0.6	TJ-POD-A-1.5	TJ-POD-A-2.5	TJ-POD-A-5	TJ-POD-A-10	TJ-POD-A-20	TJ-POD-A-40
定格轉距（NM)Rated torque		6	12	25	50	100	200	400
容量 Capacity DC24V (75℃)	電流(A) Current	0.3	0.39	0.73	0.94	1.21	1.9	2.2
	許用轉速(r/min) Allowable rotational speed	1800	1800	1800	1800	1800	1000	1000
	滑差功率(W) Slip power	130	320	450	700	900	1900	2600
外形尺寸 Outline dimension	D	128	160	180	220	275	335	360
	L	68	88	98	115	136	160	210
空心軸聯結尺寸 Hollow shaft size	d(H7)	12	18	20	30	35	45	50
	b(F8)	4	5	6	8	10	14	12
	L1	4	2	5	5	6	8	8
止口支撐尺寸 Center ring installation size	L2	2	5	5	5	5	6	6
	D1(g7)	70	74	100	110	120	160	160
	D2	80	100	140	150	150	240	240
	n-d1*深度 Depth	3-M5*10	3-M6*10	3-M10*19	3-M10*19	6-M10*22	6-M10*30	6-M10*30

● 本公司保留產品規格尺寸設計變更或停用之權利。
We reserve the right to the design, change and terminating of the product speicification and size.

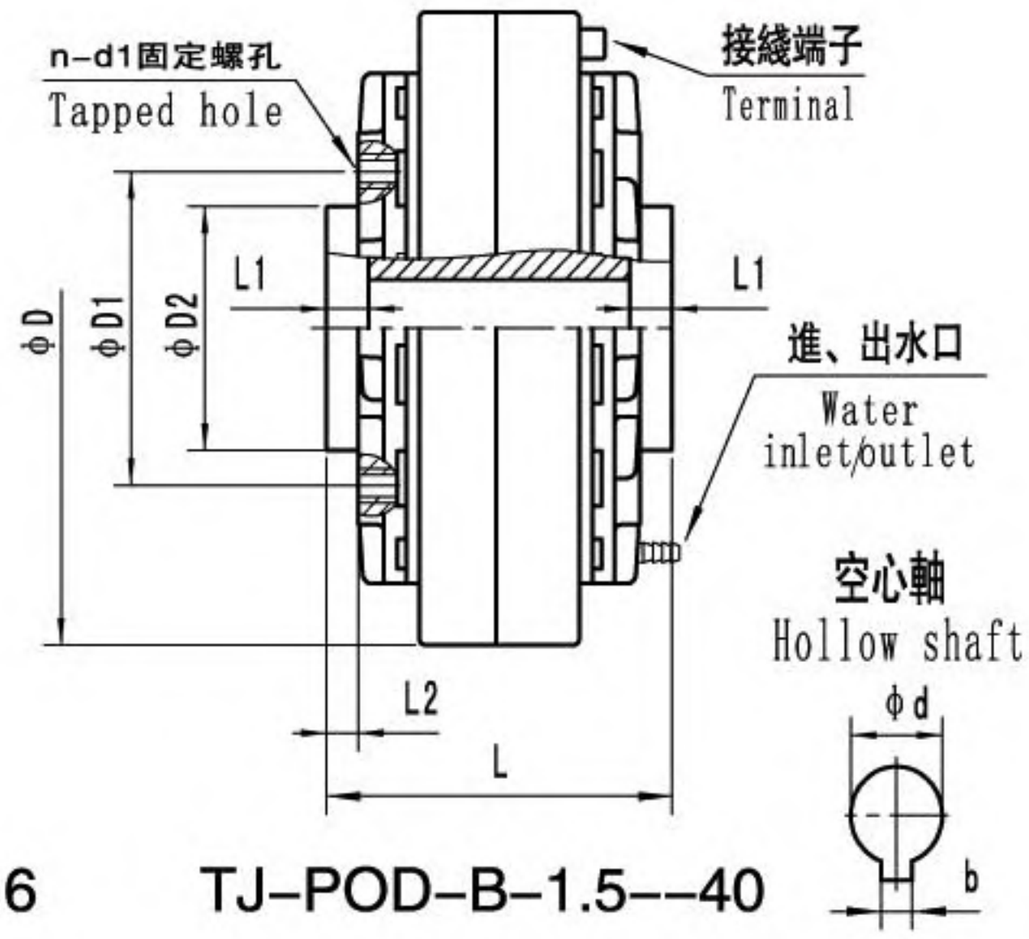
TJ-POD-B

（空心軸聯結、止口支撑、内殼旋轉）磁粉制動器

Magnetic powder brake(hollow shaft coupling/center ring install/inner shell rotates)



TJ–POD–B–0.6



TJ–POD–B–1.5––40

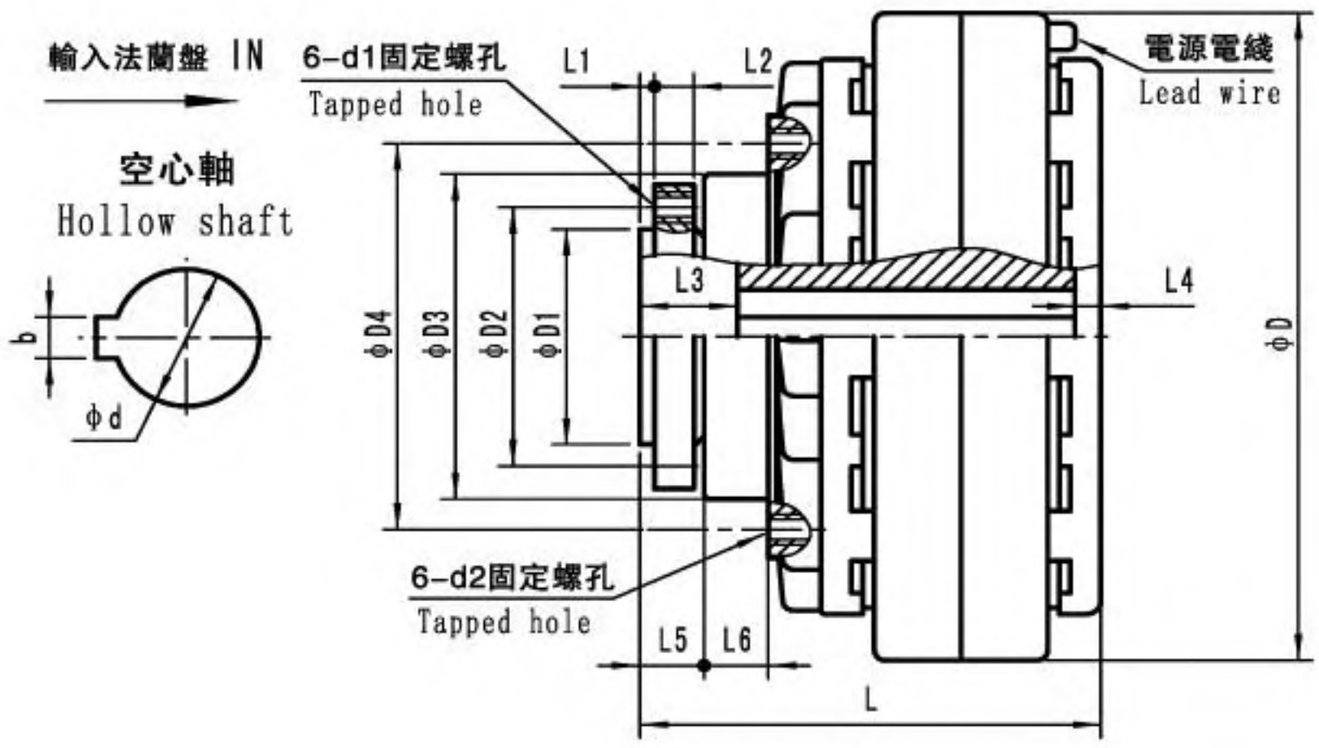
型號 MODEL		TJ-POD-B-0.6	TJ-POD-B-1.5	TJ-POD-B-2.5	TJ-POD-B-5	TJ-POD-B-10	TJ-POD-B-20	TJ-POD-B-40
定格轉距（NM)Rated torque		6	12	25	50	100	200	400
容量 Capacity DC24V (75℃)	電流(A) Current	0.5	0.6	0.8	1.0	1.2	1.8	2.5
	許用轉速(r/min) Allowable rotational speed	1500	1500	1500	1500	1500	1000	1000
	滑差功率(W) Slip power	60	120	200	300/320	4000	5000	6000
外形尺寸 Outline dimension	D	126	152	172	220	258	298	370
	L	68	70	79	96	118	132	156
空心軸聯結尺寸 Hollow shaft size	d(H7)	12	16	25	30	35	45	50
	b(F8)	4	5	8	8	10	14	14
	L1	5.5	6	7.5	8	9	11	13
止口支撑尺寸 Center ring installation size	L2	3	3	3	3	3	3	5
	D1	75	82	105	130	150	180	200
	D2(g7)	42	65	90	110	120	150	160
	d1*深度Depth	6-M5*8	6-M6*9	6-M6*9	6-M8*10	6-M10*12	6-M10*16	6-M12*19
冷却方式Cooling mode		自冷 Self cooling			自冷/單水冷 Self cooling/Single water cooling	單水冷Single water cooling		

TJ-POC-B

（法蘭盤輸入、空心軸輸出、止口支撐、內殼旋轉）磁粉離合器

Magnetic powder clutch(flange input/hollow shaft output/center ring install/inner shell rotates)

天 機
Tian Ji

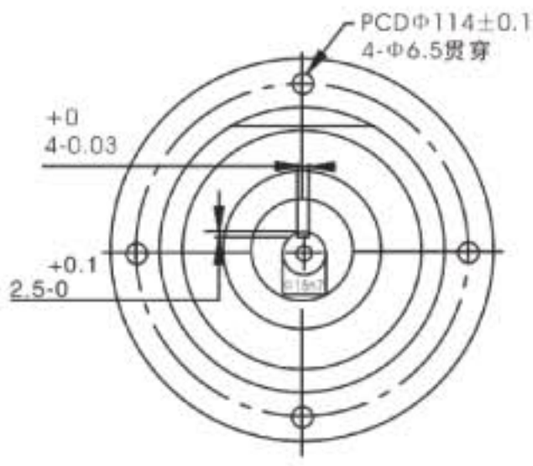


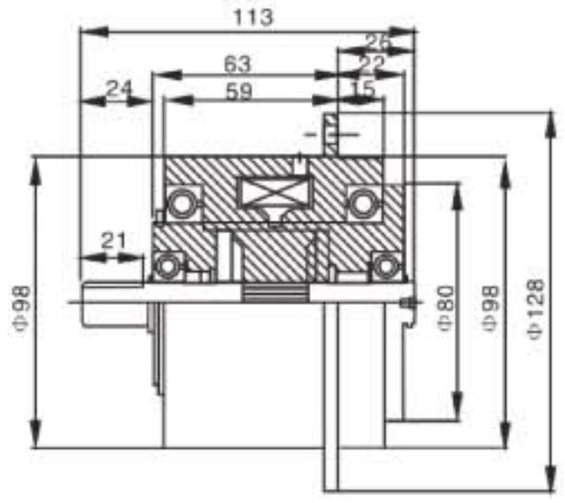
型號 MODEL		TJ-POC-B-0.6	TJ-POC-B-1.5	TJ-POC-B-2.5	TJ-POC-B-5	TJ-POC-B-10	TJ-POC-B-20	TJ-POC-B-40
定格轉距（NM)Rated torque		6	12	25	50	100	200	400
容量 Capacity DC24V (75℃)	電流(A) Current	0.9	1.0	2.0	2.3	2.5	2.5	3.0
	許用轉速(r/min) Allowable rotational speed	1500	1500	1500	1500	1500	1000	1000
	滑差功率(W) Slip power	70	150	230	360	600	860	1300
外形尺寸 Outline dimension	D	140	152	186	220	290	336	398
	L	110	126	122	155	177	197	239
法蘭盤聯結尺寸 Flange size	D1(g7)	60	65	70	90	110	130	135
	D2	75	80	85	105	130	150	160
	L1	3	3	3	3	4	4	5
	L2	8	9	10	12	14	15	15
	d1*深度Depth	M5*8	M6*9	M6*10	M6*12	M10*14	M10*15	M12*15
空心軸 聯結尺寸 Hollow shaft size	d(H7)	16	20	25	30	35	45	50
	b(F8)	5	6	8	8	10	14	14
	L3	44	49	51	64	77	83	91
	L4	3	3	4	4	8	9	7
止口支撐尺寸 Center ring installation size	D3(g7)	85	90	100	120	150	170	180
	D4	100	105	115	140	180	190	210
	L5	13	14	15	17	20	21	23
	L6	24	29	26	36	41	42	43
	d2*深度Depth	M5*10	M6*12	M6*12	M6*14	M10*15	M10*16	M12*19

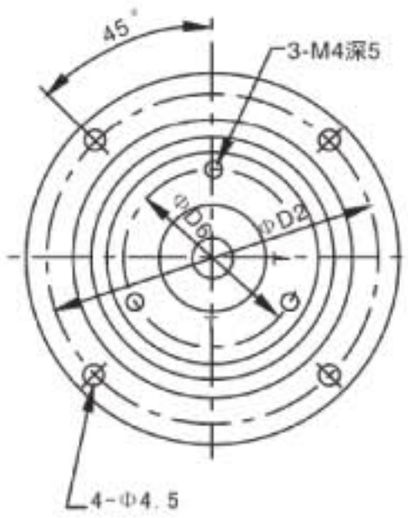
TJ-POC-C

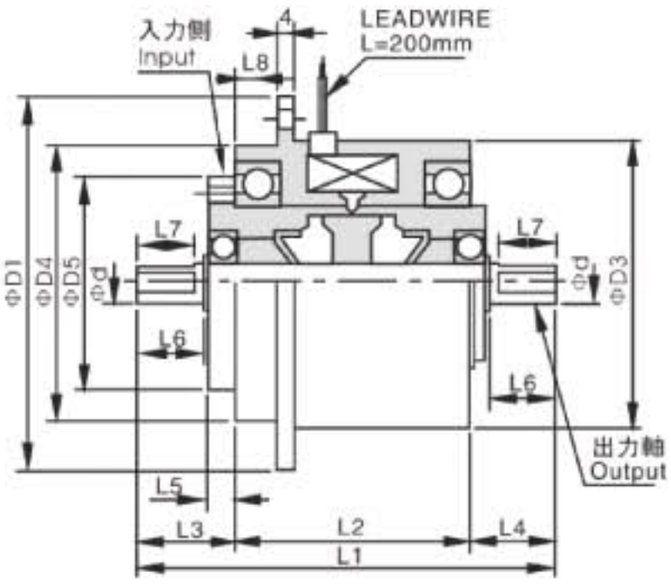
磁粉式微型離合器 Micro Magnatic Particle Clutch

天機 Tian Ji





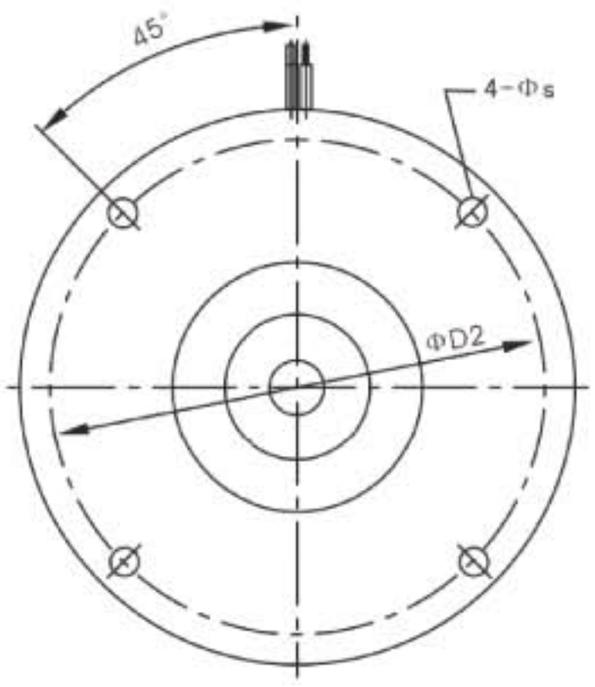


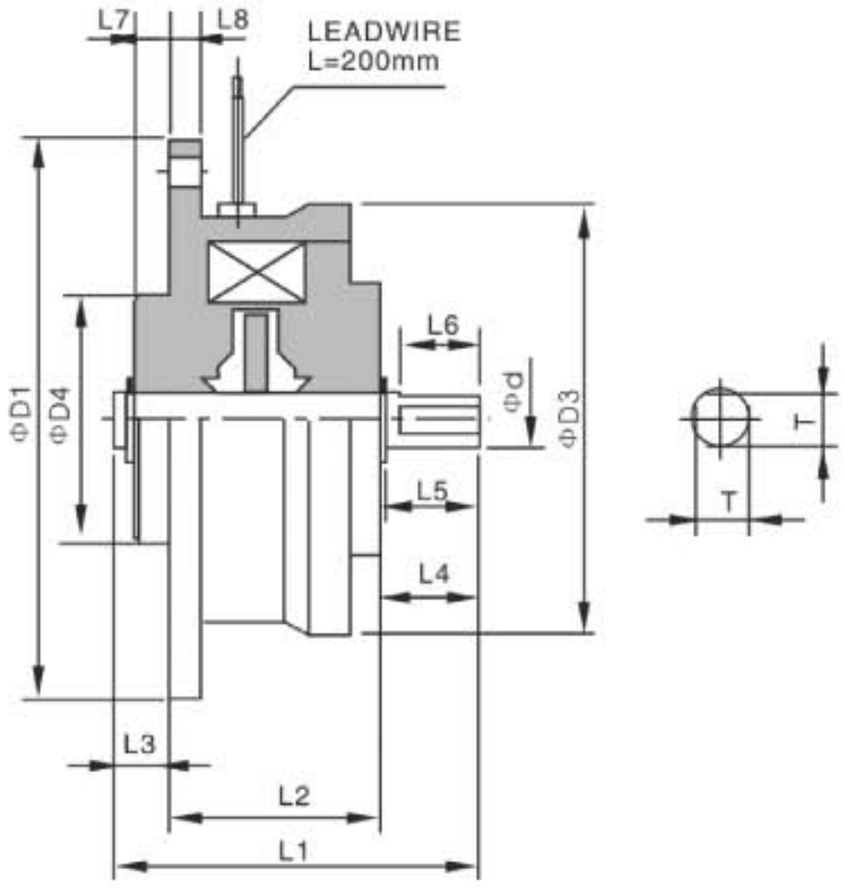


型號 MODEL		TJ-POC-C-0.05	TJ-POC-C-0.1	TJ-POC-C-0.2	TJ-POC-C-0.5
定格轉距 (Nm) Rated torque		0.05 (0.5)	0.1 (1.0)	0.2 (2.0)	0.5 (5.0)
容量 Capacity DC24V (75℃)	電流(A)Current	0.35	0.47	0.55	0.8
	電力(W)Power	8.4	11.3	13	19
	時定數(S) Number of hours set	0.02	0.03	0.055	0.055
慣性矩 Moment of metia(kgm^2)	入力側Input side	$2.1*10^{-1}$	$3.46*10^{-1}$	$6.8*10^{-1}$	1.85
	出力側Output side	$1.7*10^{-2}$	$4.6*10^{-2}$	$1.03*10^{-1}$	$4.0*10^{-1}$
重量 Weight (kg)		0.67	0.88	1.27	2.3
最高轉速(r/min)Maximum speed		1800			
外型尺寸 Exterior domensions	D1	70	76	85	100
	D2	60	66	75	90
	D3	50	56	65	80
	D4(g7)	48	54	63	78
	D5(g7)	40	42	48	60
	D6	30	34	40	50
	D6(g6)	5	7	9	12
	L1	77.2	83	95	111
	L2	47	48.5	53	64
	L3	16.6	18.5	22.5	25
	L4	13.6	16	19.5	22
	L5	5.5	5.5	6.5	6
	L6	10.5	12	15	18
	L7	9	10	13	16
	L8	8.5	8.5	9.5	12
	T	4.5	6.5	8.5	11.5

TJ-POD-C

磁粉式微型煞車器 Micro Magnatic Particle Brake

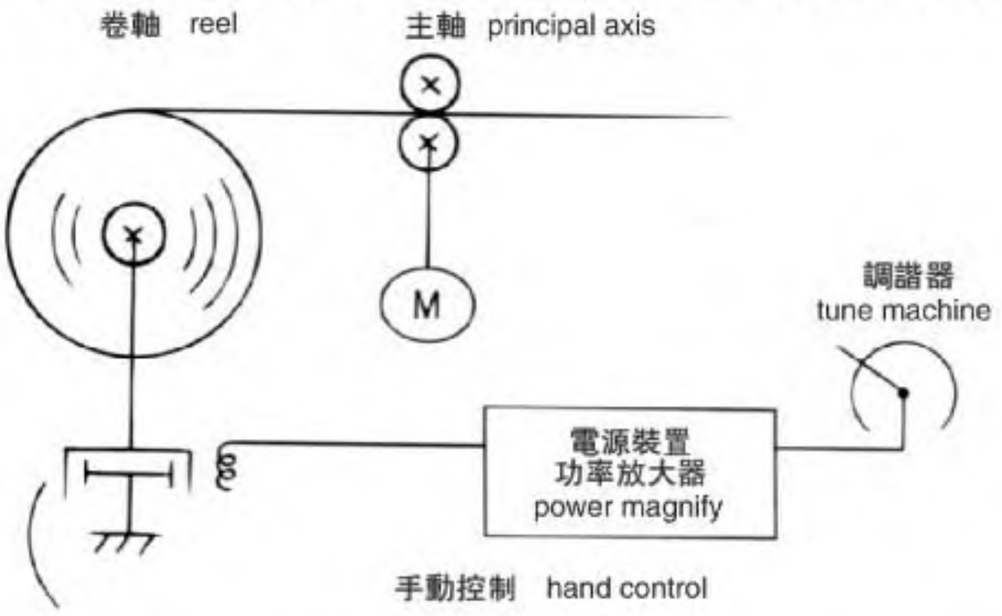




型號 MODEL		TJ-POD-C-0.05	TJ-POD-C-0.1	TJ-POD-C-0.2	TJ-POD-C-0.5
定格轉距(kgm)(Nm) Rated torque		0.05(0.5)	0.1(1.0)	0.2(2.0)	0.5(5.0)
容量 Capacity DC24V (75℃)	電流(A)Current	0.35	0.42	0.5	0.6
	電力(W)Power	8.4	10	12	14.4
	時定數(S) Number of hours set	0.02	0.02	0.034	0.045
慣性矩 J Moment of inertia (kgm^2)		$9.4*10^{-3}$	$2.75*10^{-2}$	$5.25*10^{-2}$	$1.25*10^{-1}$
重量 Weight (kg)		0.4	0.54	0.96	1.3
最高回轉速Max speed(r/min)		1800			
外型尺寸 Exterior domensions	D1	70	76	90	108
	D2	60	66	80	95
	D3	50	56	70	82
	D4(g7)	24	30	40	44
	d(g7)	5	7	9	15
	L1	45	50	59	66
	L2	29	30	34	36
	L3	5	7	9	11
	L4	11	13	16	19
	L5	10	12.2	15	18
	L6	9	10	13	16
	L7	3	4	6	8
	L8	4	4	5	5
	S	4.5	4.5	4.5	6
	T	4.5	6.5	8.5	14

手動控制器及安裝範例 Manual controller and installation example

手動控制機構範例 Hand Controller Machine Example



特性 Character

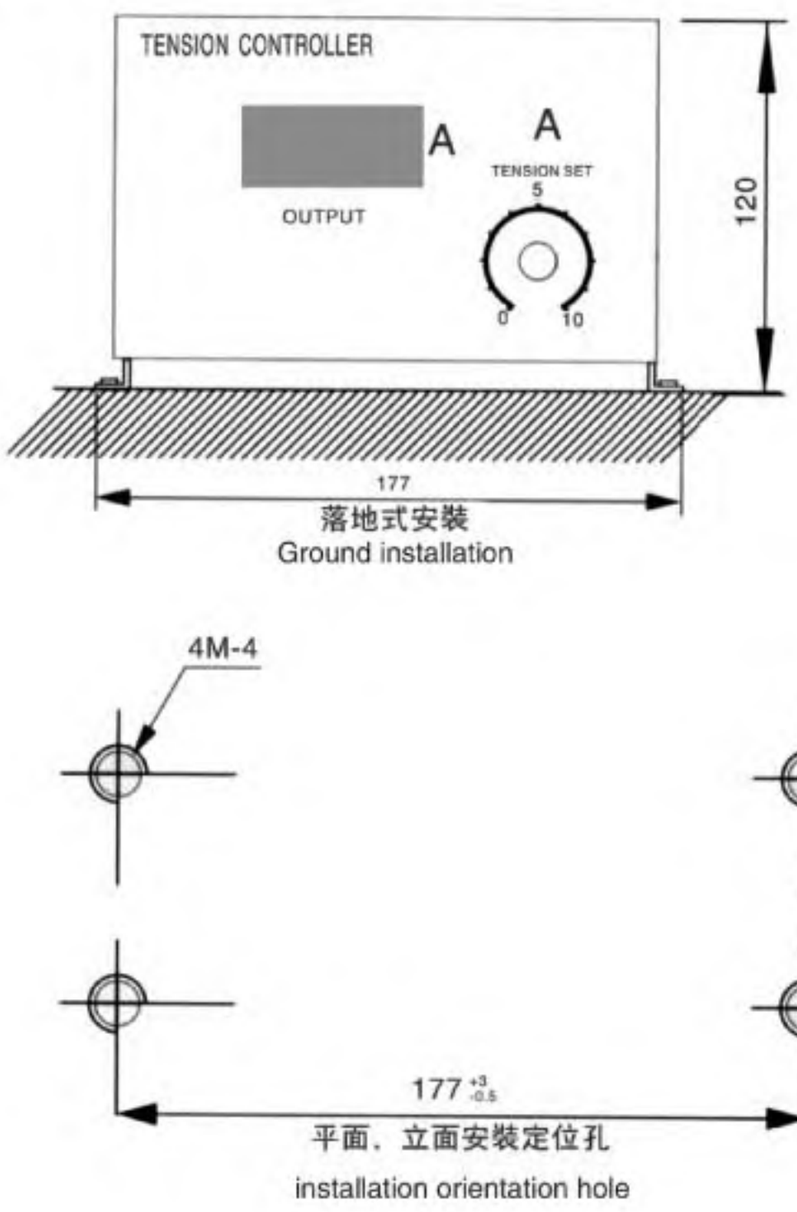
手動張力控制就是在收卷和放卷時伴隨卷徑的變化，分階段地對離合器和制動器的勵磁電流進行手動調整以得到張力的控制方式。此外,希望利用可編程控制器D/A變換器等裝置控制離合器/制動器的勵磁電流時，可以直接把外控電壓(0-10V)接入手動控制器，進行自動控制。範例如右上圖示。

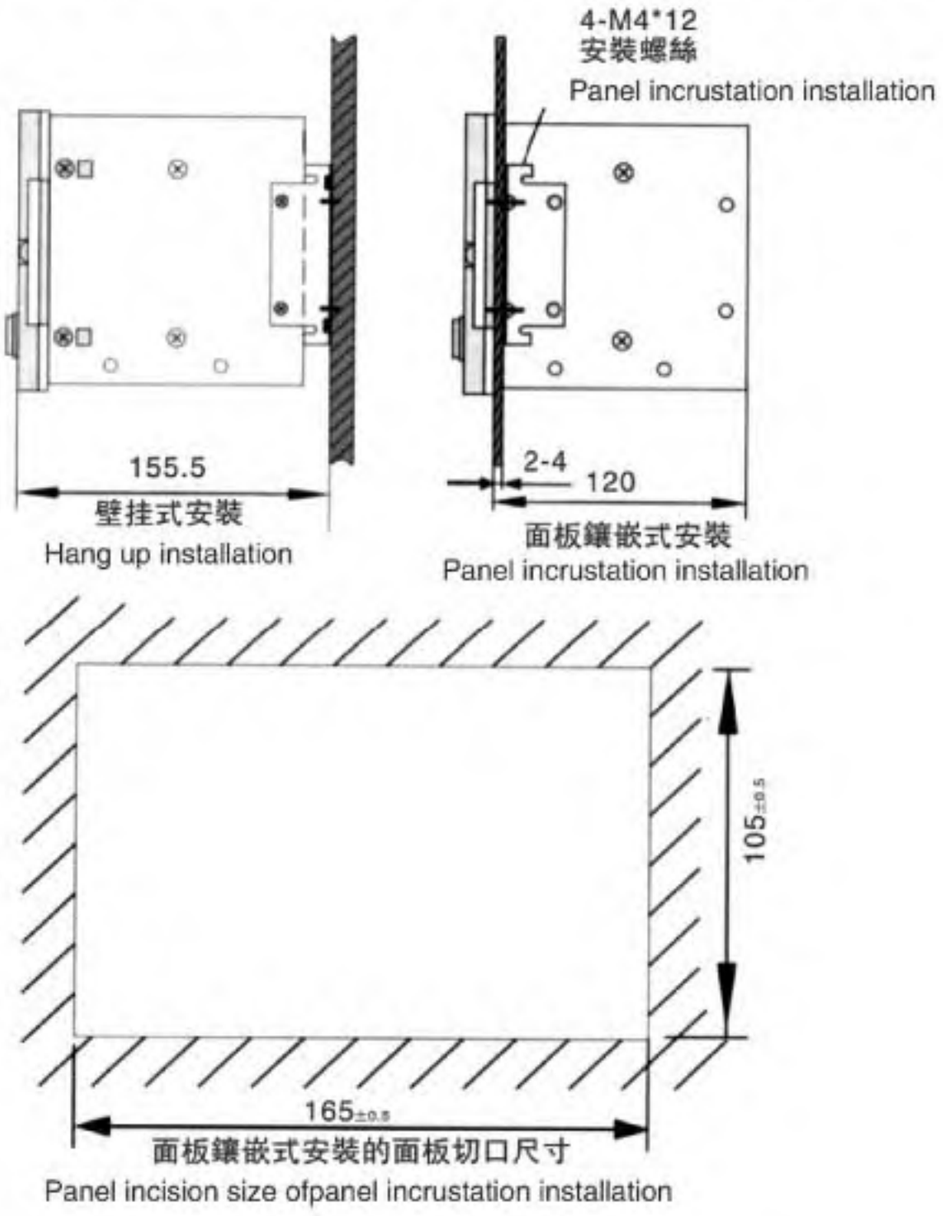
Hand Tension Control is a way to get tension control by manually adjust the excitation current of clutch and arrester periodically while the diameter of reel change during Receives and Puts the volume。 In addition, we hope that we can utilize when programmable control D/A and other change machine control excitation current of clutch/arrester to input 0–10v voltage to hand controller, in order to control automatically. See Figure in the upper–right comer.

規格 Specification

控制方式 Control Manner	脉宽調制切換式調節系統 Pulse width concoct switch adjust system
輸入電壓 Input Voltage	AC85-264V 50/60HZ
輸出 Output	DC24V 0~4A
適用機種 Suitable for Machine	磁粉離合器、制動器 magnetism powder clutch, brake
輔助功能 Assistant Function	短路保護輸入信號并可外部信號控制 （面板信號或0~10v) Short Circuit to protect input signal and can be controlled by outside signal. (panel signal or 0–10v)
工作環境 Working Environment	使用周圍温度: -5℃+40℃使用周圍温度3.8%以下，使用環境: 不容許腐蝕性氣體、塵埃及雨水 Use temperature around:–5 40,use temperature around below 3.8%,use environment: not allow causticity gas,dust and rain
安装方法 Installation	落地式安装、壁挂式安装、鑲嵌式安装 Ground installation,Hang up installation, incrustation installation
重量 Quantity	1kg

安裝範例及尺寸 Installation range and size





● 本公司保留產品規格尺寸設計變更或停用之權利。
We reserve the right to the design, change and terminating of the product specification and size.

自動張力控制器及安装範例 Automtic regulator and installation example

天 機
Tian Ji

特性 Specialty

自動張力控制器采用目前國際上多項先進技術；專用微處理器，高速18位A/D轉換器，抗干擾自動恢復技術，及PID無超調算法,從而實現恒張力控制。廣泛應用于印刷、包裝、造紙、紡織、綫纜等各種需對張力進行精密測控的行業。根據輸入信號的不同，分為全自動型張力控制器和半自動張力控制器。

張力控制系統的信號輸入可以選擇是來自:
1.張力檢測器的電流或電壓輸出(mA或mV)--全自動型
2.編碼器或接近開關的輸出信號 (0~9V)--半自動型

Our automatic tension control technology uses intemational many vanguard technologies, adopts the microprocessor, high speed 18 A/D switch, antijamming self-recovery tech-nology, and PID non-over modulation algorithm, thus achieve the permanent tension control. Widely applies in printing, the packing, the papermaking, the spinning and also the weaving, the line cable and so on. According to the difference of signal,it divides into completely automatic and Semiau-tomatic.

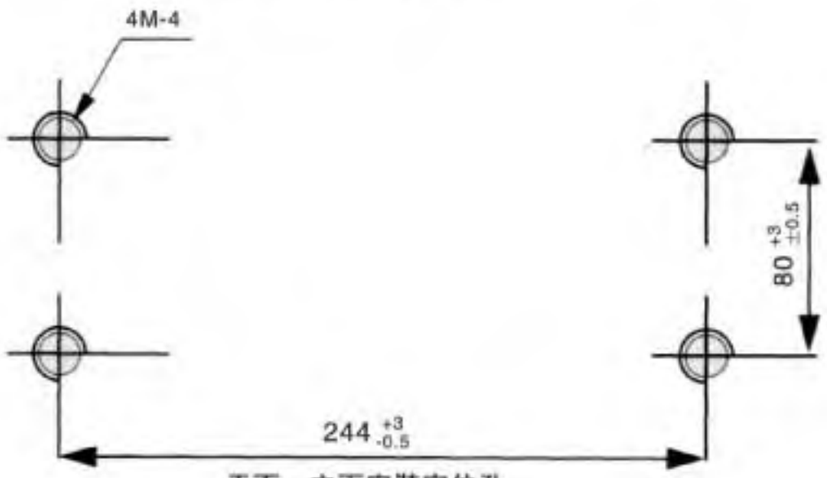
The tension controller signal input may choose is comes from:
1. Tension detector electric current either voltage output (mA or mV) completely automatic.
2. Encoder or close switch output signal (0-9V)--Semiau-tomatic.

規格 Specification

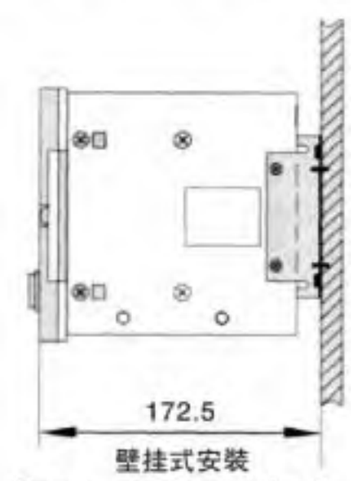
工作電源輸入 **Work mains input**	AC220V 100W
工作電源輸出 **Work power source outputs**	DC10V,張力檢測器電源 **DC10V, the tension examination power source**
模擬量輸入信號 **Simulation input signal**	兩路張力檢測器的信號輸入 **two group tension detector signal input**
模擬量出信號 **Simulation output signal**	控制輸出DC0 - 10V用于控制變頻器伺服放大器等 控制輸出DC0-24V用于控制DC24V, 電流在4A以下的磁粉(電磁)離合器l制動器等 **Control outputs DC0-10V to use in serving controls and so on amplifier.** **Control output DC0-24V to use in controlling the DC24V electric current less than 4A, following magnetic powder (electromagnetism) digital quantity**
數字量輸入信號 **Input signal**	每個數字量都是采用光電隔離電路輸入的，所有數字量輸入只有DIO DIA DIB **each numeral quantities and so on coupling brake all to use the Photoelectricity isolation electric circuit to input, all digital quantity input only DIO DIA DIB**
使用環境溫度 **Use ambient temperature**	-10~40℃
使用環境濕度 **Use environment humidity**	35~85%RH (不得結露） **35~85%RH (No condensation)**
使用環境 **Use environment**	無腐蝕性，無可燃氣體，無導電性塵埃，灰塵少 **Non-corrosiveness,not flammable gas, non-conductive dust, dust few**
接地 **Earths**	D類接地（禁止與強電電綫共同接地） **D kind of earth (It is prohibition of the strong electricity electric wire earths together)**

安裝範例及尺寸 Installment model and size

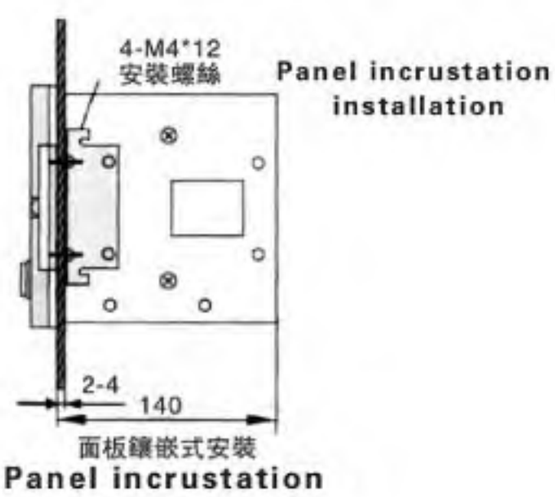
落地式安裝
Ground installation



平面、立面安裝定位孔
installation onentation hole

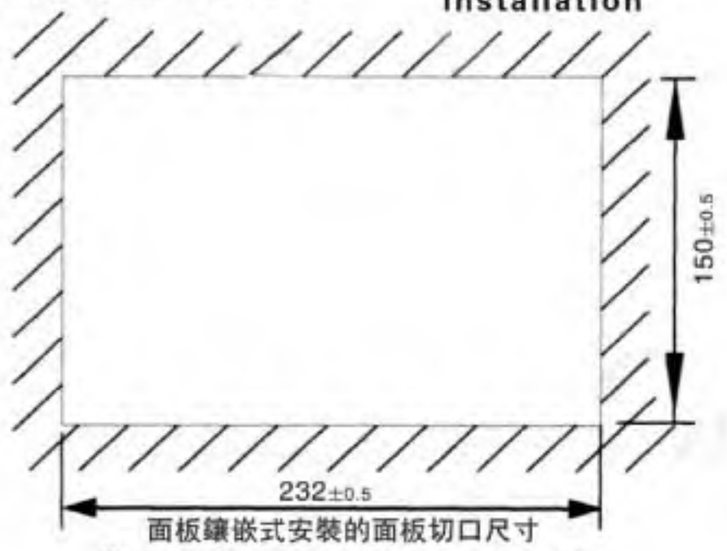


壁挂式安裝
Hang up installation



Panel incrustation installation

面板鑲嵌式安裝
Panel incrustation installation



面板鑲嵌式安裝的面板切口尺寸
Panel incision size of panel incrustation installation

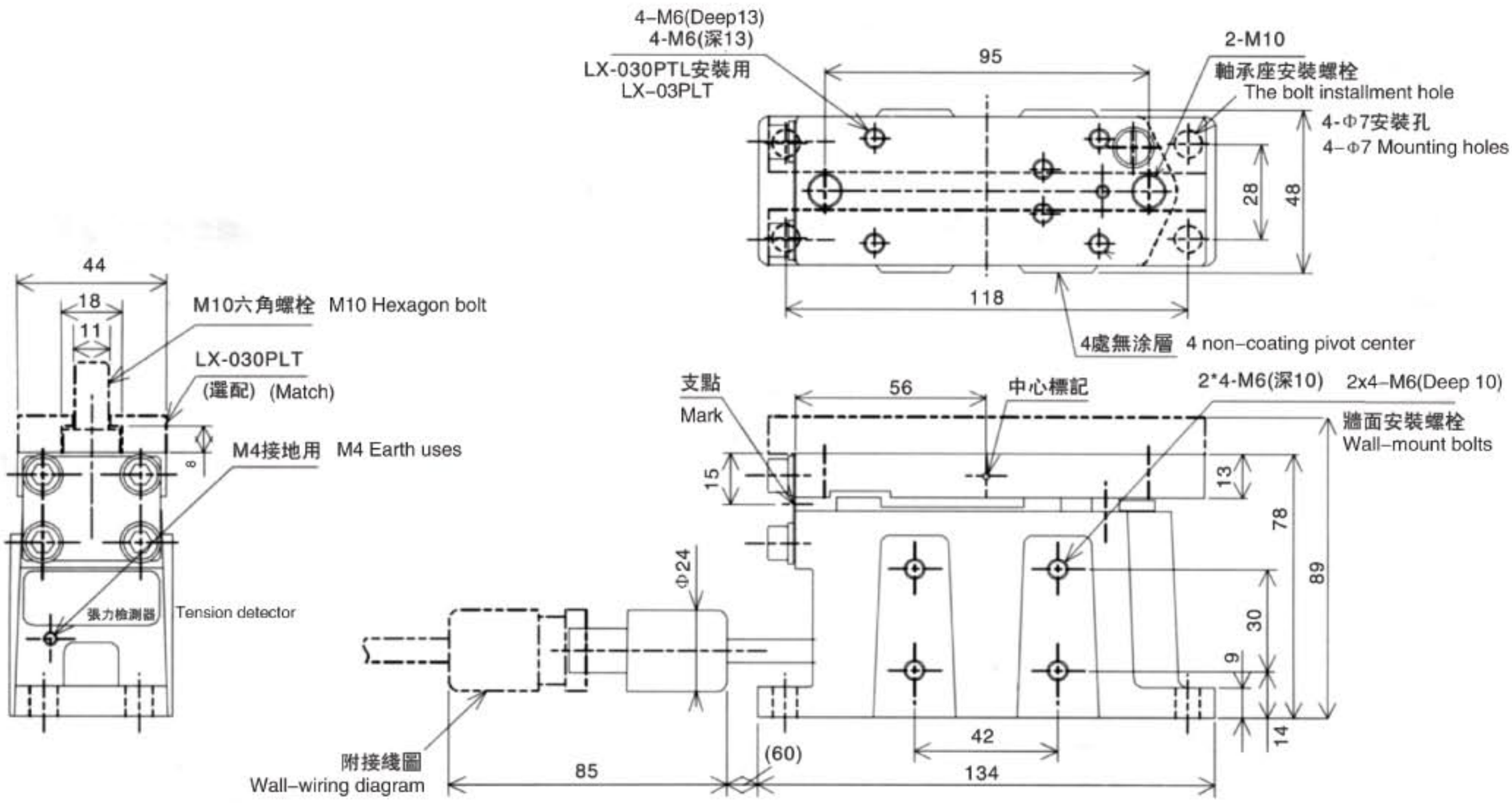
● **本公司保留產品規格尺寸設計變更或停用之權利。**
We reserve the right to the design, change and terminating of the product speicification and size.

張力檢測器及安裝範例　Tension detector and installation example

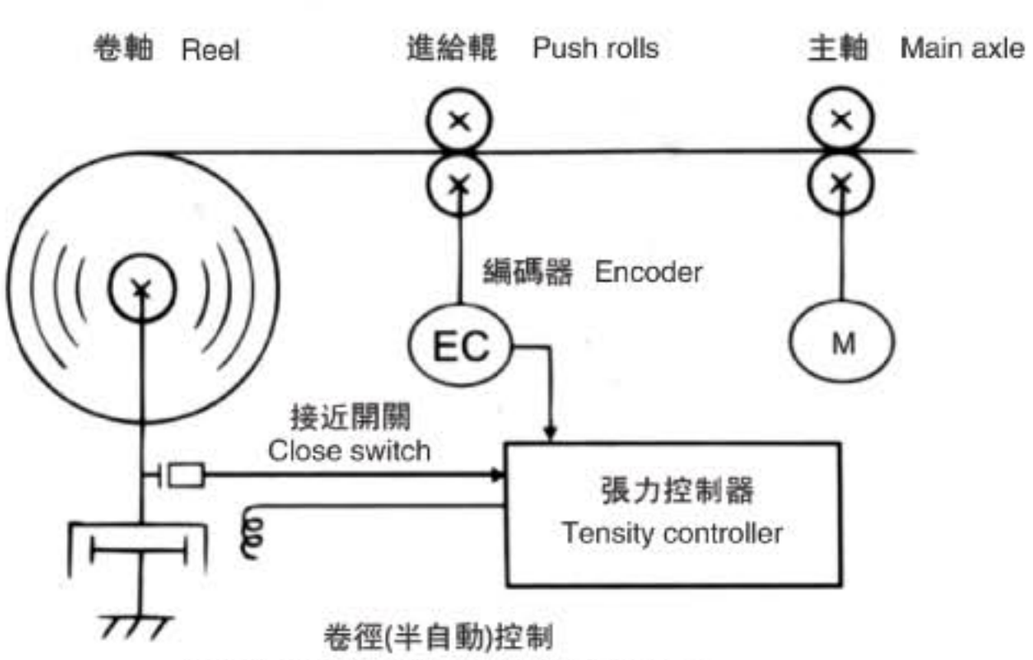
規格 Specification

型號 Model	50N	150N	300N	500N
額定負載 Rated load	50N	150N	300N	500N
適用負載方向 Working load direction	壓縮和拉伸兩個方向 Compression and tension in both directions			
安裝 Installs	地面安裝、牆壁安裝、天花板安裝 Ground installation、Hang up installation、Suspended installation			
接綫尺寸 The wiring size	7m*Φ7 (附件) 7m*Φ7 (Annex)			
使用條件 Exploitation conditions	-5～+40℃振動2m/s² 以下 -5~+40°C Vibration of the follwing2m/s2			
重量(約) Weight	1.8kg			

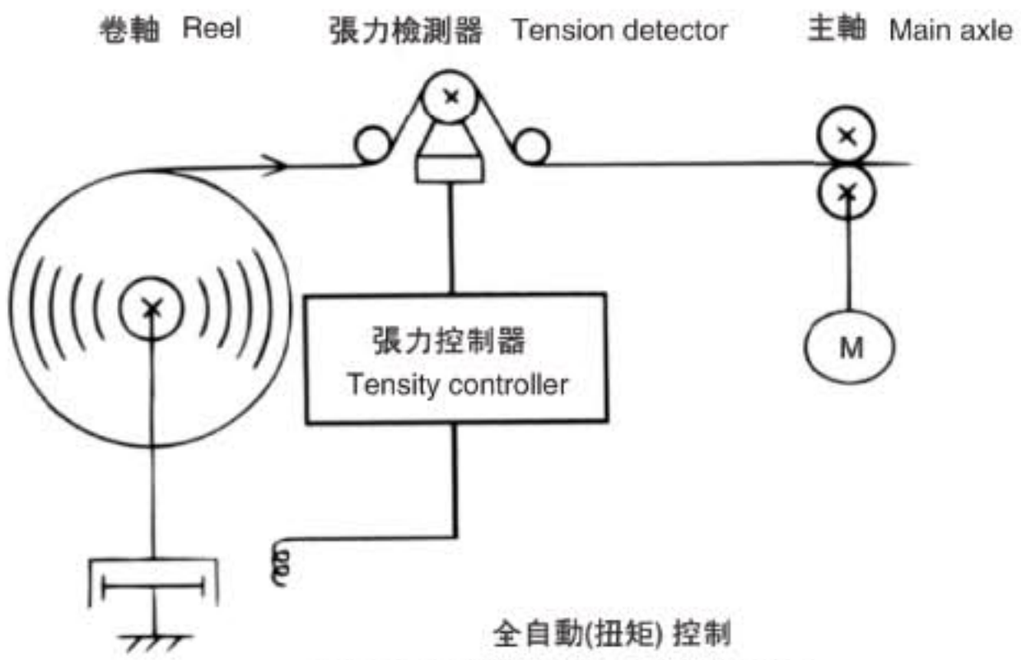
外型尺寸 Size



張力控制機構範例 The tension model of tension control



卷徑(半自動)控制
Volume dameter (semiautomatic) controls



全自動(扭矩) 控制
Completetyautomatic (torque) controls

●本公司保留產品規格尺寸設計變更或停用之權利。