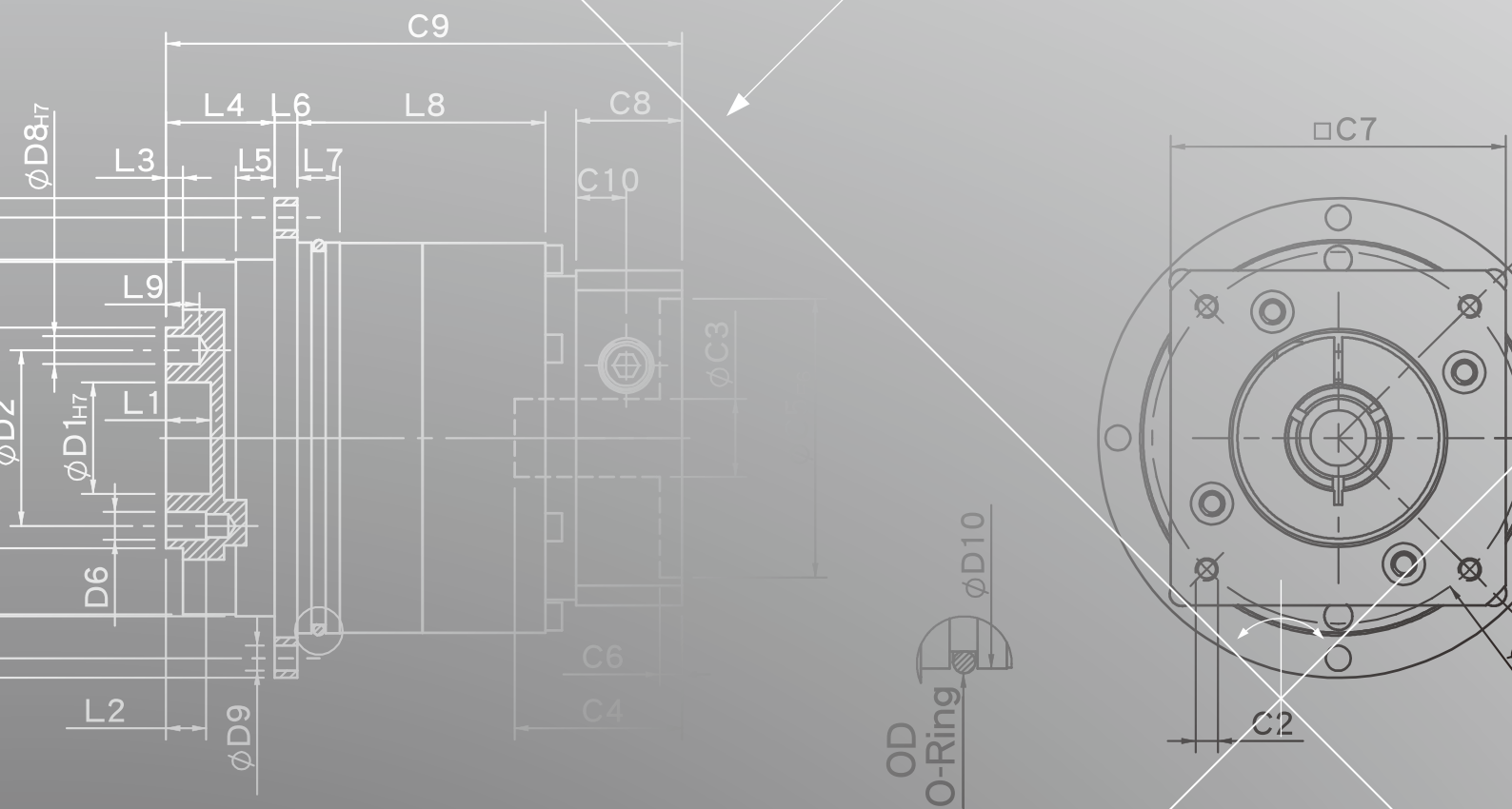
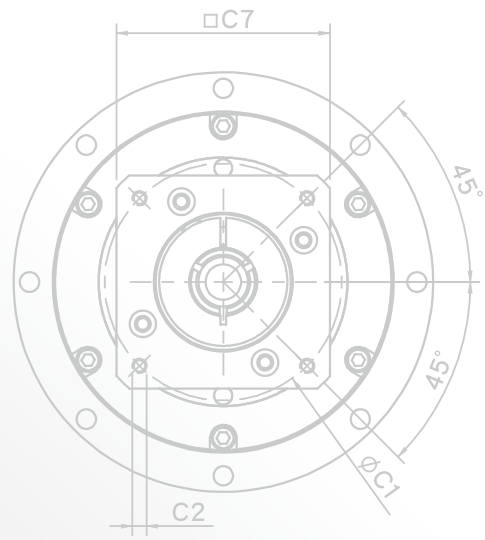
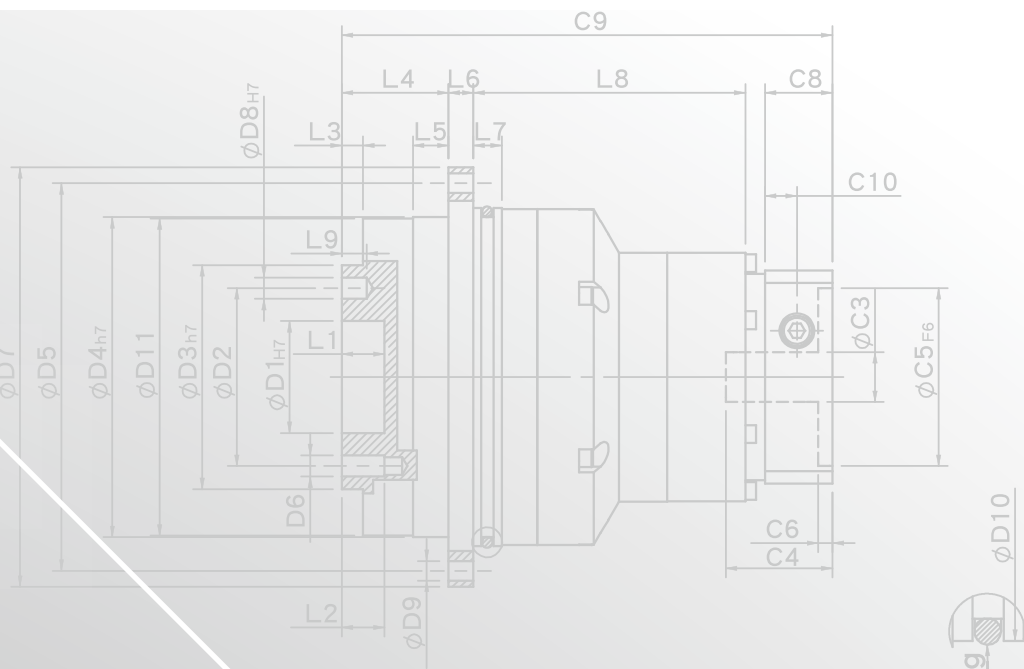
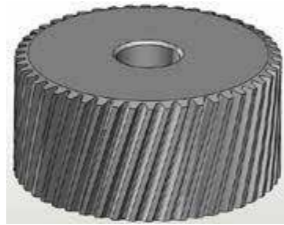


# PHF SERIES

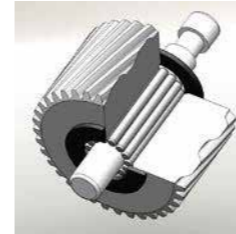




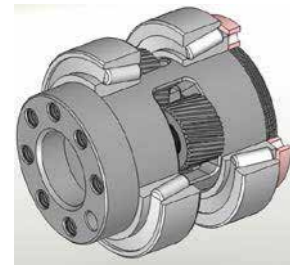
PHF SERIES FEATURES PHF系列 產品特點



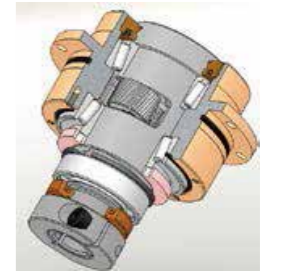
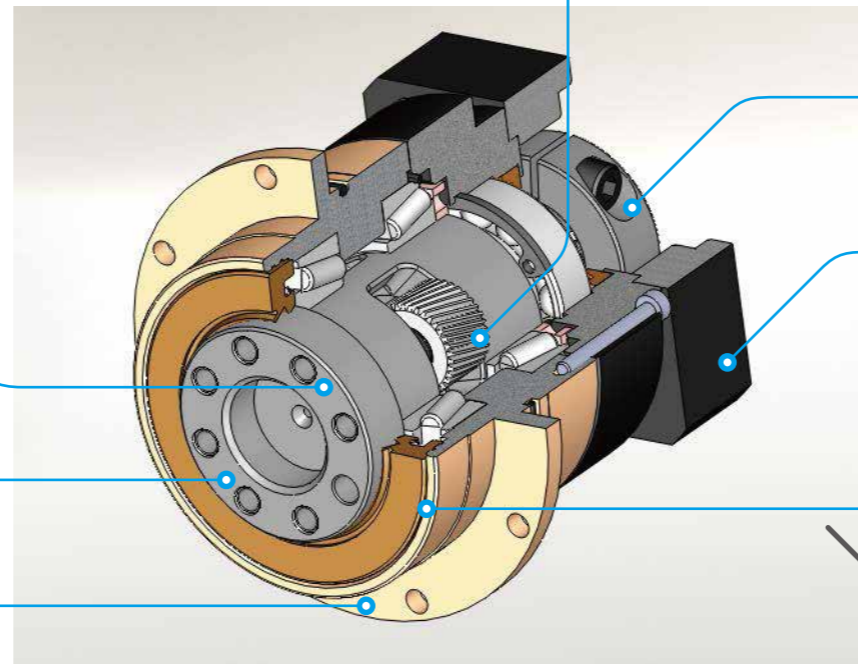
齒輪材質選用高級合金鋼，獨特熱處理至最佳硬度，並經過研磨加工，以獲得最佳的精度、高耐磨耗及高耐衝擊韌性。  
Alloy steel gear with unique heat treatment. Additionally, with gear grinding process-ing to get the best accuracy, high wear resistance and high impact toughness.



行星齒輪傳動介面採用針狀軸承，滿針排列不含保持器，以達到最大接觸面積最小間隙公差，提高結構剛性及輸出扭力。  
Planet gear transmission interface equipped with needle bearings, full needle roller bearings aligned without retainer achieve maximum exposure but smallest gap tolerances. Enhance over-all gear structure rigid and output torque.

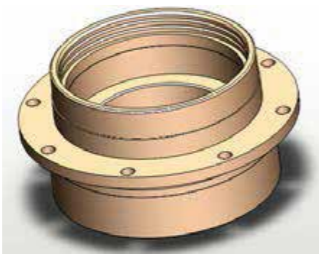
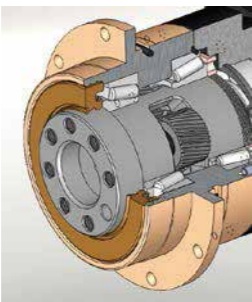


行星固定架及出力軸設計一體成型，且前後使用滾錐軸承，可承受軸向負載及徑向負載大於滾珠軸承，培林設定位置為大跨距，可達到最大扭轉剛性及出力軸高軸向負載及徑向負載能力。  
Planetary arm bracket and output shaft are one-piece constructed, using tapered roller bearings can bear the axial load and radial load that are more than deep groove ball bearings. Setting the bearing apart for larger span to reach the largest torsional rigidity and contribute high axial load and radial load capacity.



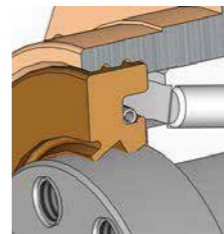
輸入端與馬達入力軸連結方法採用控緊式機構，鎖緊環經過動平衡分析，確保高轉速下，結合介面的同心度及零滑差動力傳遞。  
Input-end and motor shaft are coupled through a dynamic balanced collar clamping mechanism to ensure connection interface concentricity and zero slip power transmission at high speed.

出力軸表面與油封搭配確保最低磨擦係數和減少啟動負載，保持最佳密封性，延長使用壽命且出力軸為中空穴設計，可搭配圓形法蘭面連結，大幅縮小安裝的空間。  
Grinding process to smooth surface of output shaft, and with oil seal to minimum friction coefficient and reducing start up load; result in the best seal-ability and extended lifespan. Hollow out-put shaft connect perfectly with circular flange drastically reducing the installation space.



先進無電鍍表面處理，耐刮，耐腐蝕，最適合高科技設備嚴苛要求。本體齒箱與內環齒一體加工成形，再經德國頂級插齒機加工。具有高精度，高扭力，耐磨耗等特點。  
Advanced electroless nickel plating surface treatment resists scratch and corrosion. Suitable for stringent require of high-tech equipment. The gear box and internal gear ring are one-piece constructed, and then processed with advanced Germany gear shaper machinery for high-precision, high torque and abrade consumption.

PHF系列整體設計上可容許伺服馬達高轉速的輸入，達到最大扭力輸出。出力軸為中空穴設計，可搭配圓形法蘭面連結，大幅縮小安裝的空間。精密斜齒輪設計及專業齒輪加工，製造出低運轉背隙、高效率、低噪音及長壽命的行星減速機。  
PHF series overall design suitable for combination operation with servo motor high-speed input and achieves maximum torque output. Hollow out-put shaft connects perfectly with circular flange drastically reducing the installation space. Precision helical gear design and gear processing create a planetary gearhead with low backlash operation, high efficiency, low noise and long lifespan.



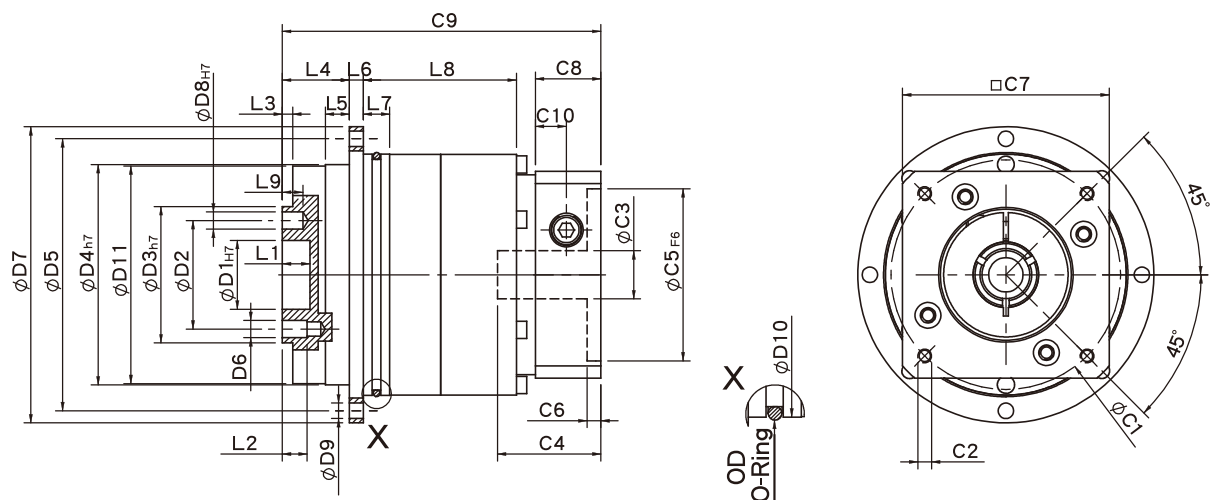
高科技油封設計上唇為防塵唇，下唇為防油唇。採IP65防護等級的密封設計，並採用高級潤滑油脂，不洩漏、免保養。  
High-tech oil seal design on the upper lip guard against dust intruder, lower lip to guard against oil leak. Protection grade IP65 safeguards fully avoid leaking problem, and given it maintenance-free.



先進馬達連接板設計，配合入力軸襯套，安裝容易，可與各種廠牌之伺服、步進馬達完美搭配組合。  
Advanced motor bracket design coupled with the input shaft bushing is easy to mount to any servo or stepper motor.

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。

## PHF Single Stage Dimensions PHF單段外型尺寸圖



## Specifications 規格

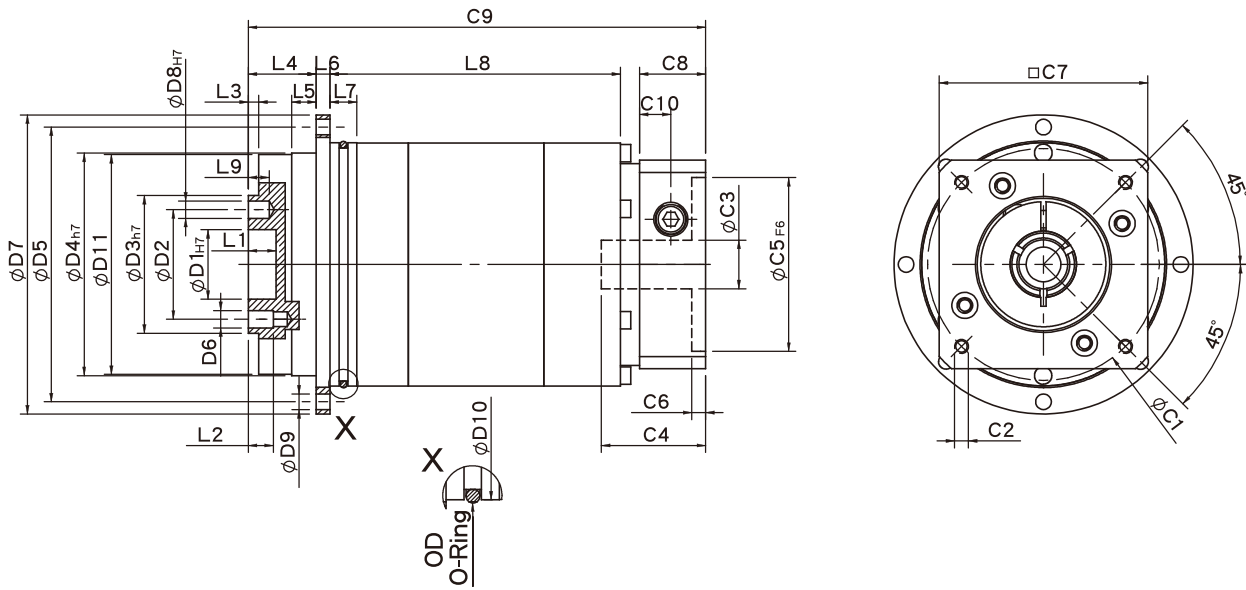
Unit:mm

尺寸 Dimensions	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
D1 <sub>H7</sub>	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3 <sub>H7</sub>	28	40	63	80	100	160	180
D4 <sub>H7</sub>	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	72	86	118	145	179	247	300
D8 <sub>H7</sub>	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5
D10	60	70	95	120	152	212	255
D11	46.2	63.2	89.2	109.2	139.2	199.2	254.2
L1	4	8	12	12	12	12	20
L2	6	7.2	12	13.5	16	22.5	30.5
L3	3	3	6	6	6	8	12
L4	19.5	19.5	30	29	38	50	66
L5	7	7	10	10	14.6	15	20
L6	4	4	7	8	10	12	18
L7	5	7.7	8	10	12	17	39.5
L8	25	37.5	36.5	54.5	65	92	118
L9	4	6	7	7	7	10	10
C1 <sup>2</sup>	46	70	90	115	145	200	235
C2 <sup>2</sup>	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3 <sup>2</sup>	≤8/≤11	≤14/≤19	≤19/≤24	≤24/≤32/≤38	≤35/≤38	≤50	≤55
C4 <sup>2</sup>	28.1	36.5	41.2	51.1	69.7	81	112
C5 <sup>2</sup> <sub>F6</sub>	30	50	70	95	110	114.3	200
C6 <sup>2</sup>	4	4	6.7	6	8.5	6	6
C7 <sup>2</sup>	42	60	90	115	140	182	220
C8 <sup>2</sup>	16.5	19	25.5	30	38	40	50
C9 <sup>2</sup>	74.8	92.5	107	131.5	171.5	215	271
C10 <sup>2</sup>	7.4	9	11.3	13.9	17.8	21	21
OD	56x2	66x2	90x3	110x3	145x3	200x5	238x5

★ C1~C10 是公製標準馬達連接板尺寸,請依所選用的馬達決定。 ★ C1~C10 are motor specific dimensions(metric std shown), Size may vary according to motor flange.

★ 本公司有權針對以上數據規格進行設計變更不先行告知。 ★ Specification subject to change without notice.

## PHF Double Stage Dimensions-1 PHF雙段外型尺寸圖-1



## Specifications 規格

Unit:mm

尺寸 Dimensions	PHF42	PHF60	PHF90
D1 <sub>H7</sub>	12	20	31.5
D2	20	31.5	50
D3 <sub>h7</sub>	28	40	63
D4 <sub>h7</sub>	47	64	90
D5	67	79	109
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	72	86	118
D8 <sub>H7</sub>	3	5	6
D9	3.4	4.5	5.5
D10	60	70	95
D11	46.2	63.2	89.2
L1	4	8	12
L2	6	7.2	12
L3	3	3	6
L4	19.5	19.5	30
L5	7	7	10
L6	4	4	7
L7	5	7.7	8
L8	54.5	72.5	81.5
L9	4	6	7
C1 <sup>2</sup>	46	70	90
C2 <sup>2</sup>	M4x0.7P	M5x0.8P	M6x1.0P
C3 <sup>2</sup>	≤8/≤11	≤14/≤19	≤19/≤24
C4 <sup>2</sup>	28.1	36.4	41.2
C5 <sup>2</sup> <sub>F6</sub>	30	50	70
C6 <sup>2</sup>	4	4	6.7
C7 <sup>2</sup>	42	60	90
C8 <sup>2</sup>	16.5	19	25.5
C9 <sup>2</sup>	102.5	127.5	151.1
C10 <sup>2</sup>	7.4	9	11.3
OD	56x2	66x2	90x3

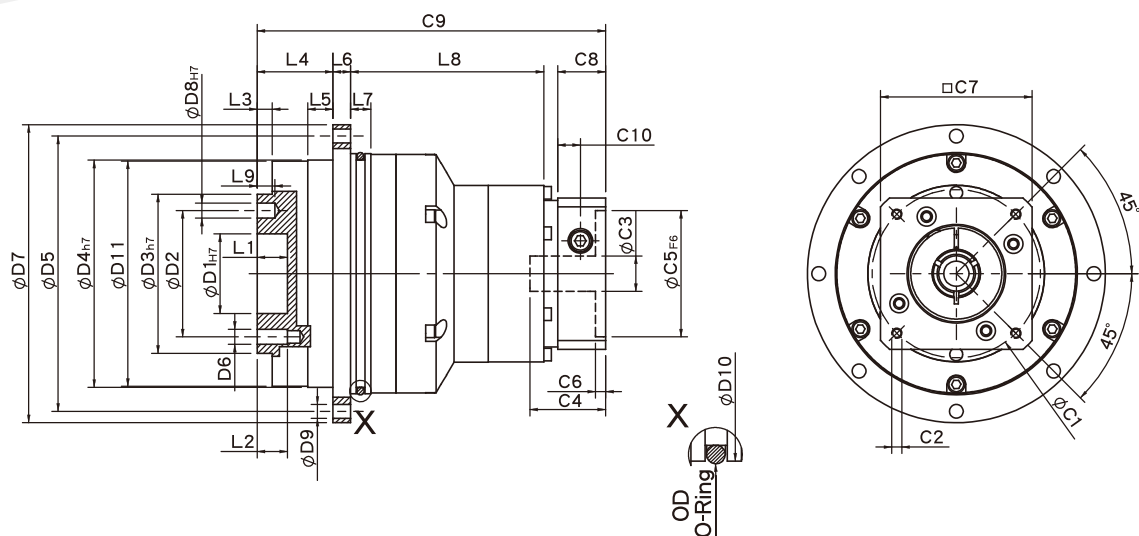
★ C1~C10是公製標準馬達連接板尺寸,請依所選用的馬達決定。

★ 本公司有權針對以上數據規格進行設計變更不先行告知。

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★ Specification subject to change without notice.

## PHF Double Stage Dimensions-2 PHF雙段外型尺寸圖-2



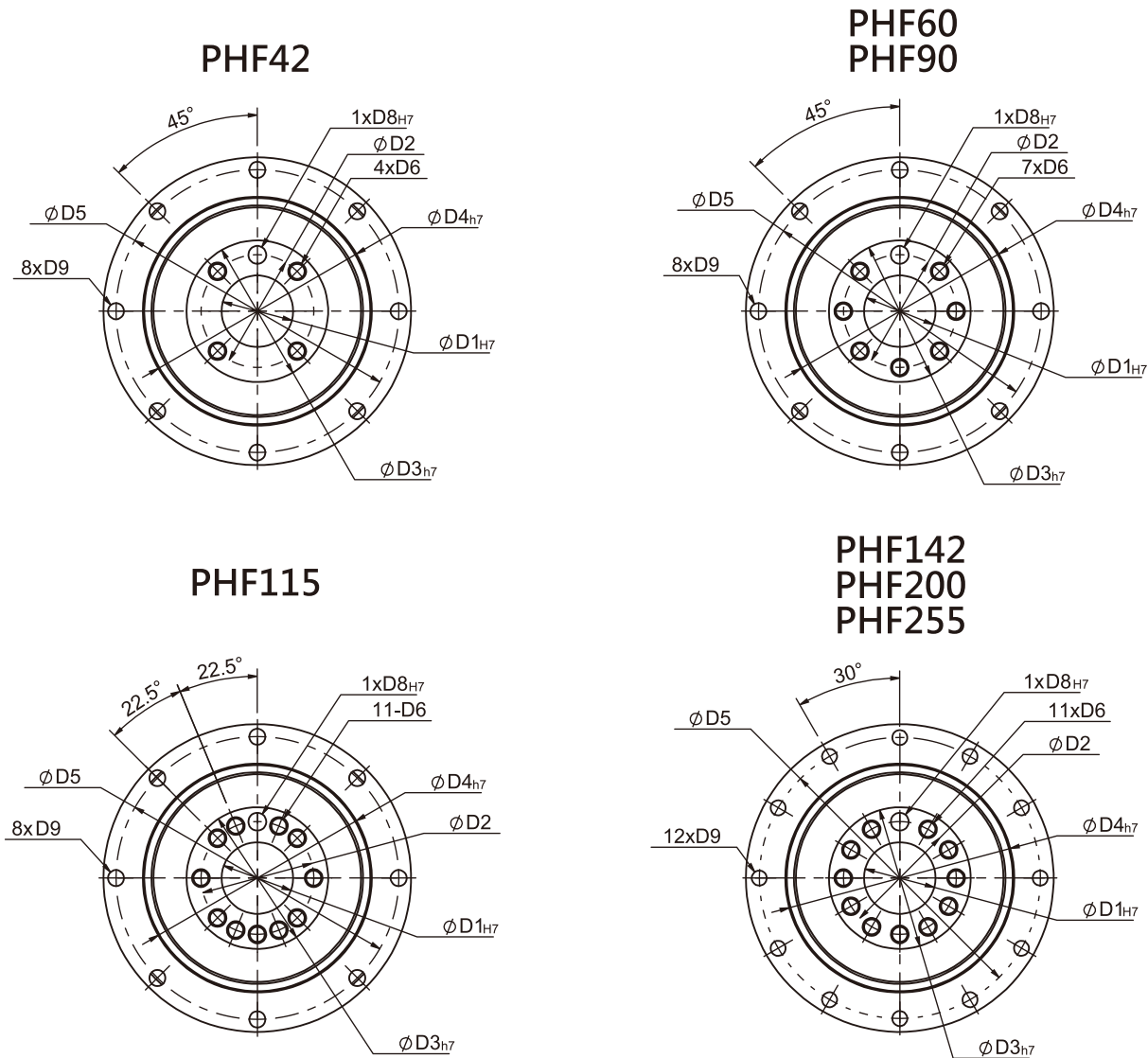
## Specifications 規格

Unit:mm

尺寸 Dimensions	PHF60T	PHF90T	PHF115T	PHF142T	PHF200T	PHF255T
D1 <sub>H7</sub>	20	31.5	40	50	80	100
D2	31.5	50	63	80	125	140
D3 <sub>h7</sub>	40	63	80	100	160	180
D4 <sub>h7</sub>	64	90	110	140	200	255
D5	79	109	135	168	233	280
D6	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	86	118	145	179	247	300
D8 <sub>H7</sub>	5	6	6	8	10	12
D9	4.5	5.5	5.5	6.6	9	13.5
D10	70	95	120	152	212	255
D11	63.2	89.2	109.2	139.2	199.2	254.2
L1	8	12	12	12	12	20
L2	7.2	12	13.5	16	22.5	30.5
L3	3	6	6	6	8	12
L4	19.5	30	29	38	50	66
L5	7	10	10	14.6	15	20
L6	4	7	8	10	12	18
L7	7.7	8	10	12	17	39.5
L8	65.2	69.5	93.5	110	161.7	192
L9	6	7	7	7	10	10
C1 <sup>2</sup>	46	70	90	115	145	200
C2 <sup>2</sup>	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3 <sup>2</sup>	≤8/≤11	≤14/≤19	≤19/≤24	≤24/≤32/≤38	≤35/≤38	≤50
C4 <sup>2</sup>	28.1	36.5	41.2	51.1	69.7	81
C5 <sup>2</sup> <sub>F6</sub>	30	50	70	95	110	114.3
C6 <sup>2</sup>	4	4	6.7	6	8.5	6
C7 <sup>2</sup>	42	60	90	115	140	180
C8 <sup>2</sup>	16.5	19	25.5	30	38	40
C9 <sup>2</sup>	113.2	138	163.1	198	281	335
C10 <sup>2</sup>	7.4	9	11.3	13.9	17.8	21
OD	66x2	90x3	110x3	145x3	200x5	238x5

★ C1~C10是公製標準馬達連接板尺寸,請依所選用的馬達決定。 ★ C1~C10 are motor specific dimensions(metric std shown), Size may vary according to motor flange.  
 ★ 本公司有權針對以上數據規格進行設計變更不先行告知。 ★ Specification subject to change without notice.

## PHF Flange Dimensions PHF法蘭面尺寸圖



## Specifications 規格

Unit:mm

尺寸 Dimensions	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
D1 <sub>H7</sub>	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3 <sub>h7</sub>	28	40	63	80	100	160	180
D4 <sub>h7</sub>	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D8 <sub>H7</sub>	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5

★ 本公司有權針對以上數據規格進行設計變更不先行告知。

★ Specification subject to change without notice.

## PHF Specifications Table PHF性能規格共表

規格 Specifications		節數 Stage	減速比 Ratio	PHF-42	PHF-60	PHF-90	PHF-115	PHF-142	PHF-200	PHF-255
額定輸出力矩 $T_{2N}$ Nominal Output Torque	N • m	1	3	-	40	105	180	340	580	1100
			4	16	43	110	240	500	1100	1700
			5	17	50	130	290	600	1200	2000
			7	14	44	125	270	530	1100	1750
			10	11	37	95	220	430	900	1450
		2	減速比 Ratio	PHF-42	PHF-60 (T)	PHF-90(T)	PHF-115T	PHF-142T	PHF-200T	PHF-255T
			15	-	40	105	180	600	1200	2000
			20	16	43	110	240	600	1200	2000
			25	17	50	130	290	600	1200	2000
			30	17	50	130	290	600	1200	2000
			35	17	50	130	290	600	1200	2000
			40	17	50	130	290	600	1200	2000
			50	17	50	130	290	600	1200	2000
			70	14	44	125	270	530	1100	1750
100	11	37	95	220	430	900	1450			
急停力矩 $T_{2NOT}$ Emergency Stop Torque	N • m	3.0 倍額定輸出力矩 ( 3.0 times of Nominal Output Torque) (* 最大輸出力矩 Max. Output Torque $T_{2B}$ = 60% of Emergency Stop Torque)								
額定輸入轉速 $n_{1N}$ Nominal Input Speed	rpm	1,2	3-100	5000	5000	4000	4000	3000	3000	2000
最大輸入轉速 $n_{1max}$ Max. Input Speed	rpm	1,2	3-100	10000	10000	8000	8000	6000	5000	4000
超精密背隙 Micro Backlash P0	arcmin	1	3-10	≤ 2	≤ 2	≤ 2	≤ 1	≤ 1	≤ 1	≤ 1
		2	12-100	≤ 4	≤ 4	≤ 4	≤ 3	≤ 3	≤ 3	≤ 3
精密背隙 Precision Backlash P1	arcmin	1	3-10	≤ 4	≤ 4	≤ 4	≤ 3	≤ 3	≤ 3	≤ 3
		2	12-100	≤ 6	≤ 6	≤ 6	≤ 5	≤ 5	≤ 5	≤ 5
標準背隙 Standard Backlash P2	arcmin	1	3-10	≤ 6	≤ 6	≤ 6	≤ 5	≤ 5	≤ 5	≤ 5
		2	12-100	≤ 8	≤ 8	≤ 8	≤ 7	≤ 7	≤ 7	≤ 7
扭轉剛性 Torsional Rigidity	N • m / arcmin	1,2	3-100	6	12	30	80	150	450	1000
容許彎曲力矩 $M_{2KB}^{-1}$ Max. Bending Moment	N • m	1,2	3-100	43	125	288	503	1470	2950	6080
容許軸向力 $F_{2aB}^{-1}$ Max. Axial Load	N	1,2	3-100	1015	1340	2868	3890	9850	12560	21850
使用溫度 Operating Temp.	°C		3-100	-10 °C ~ +90 °C						
使用壽命 Service Life	hr		3-100	30,000 (15,000/ 連續運轉 Continuous operation)						
效率 Efficiency	%	1	3-10	≥ 97%						
		2	12-100	≥ 94%						
重量 Weight	kg	1	3-10	0.7	1.5	3.3	6.2	13.6	32.1	63.3
		2	12-100	1.1	2.3(1.8)	6.0(4.1)	8.1	17.9	38.6	79.5
安裝方向 Mounting Position	-	1,2	3-100	任意方向 Any direction						
噪音值 Noise Level <sup>2</sup>	dB(A)/1m	1,2	3-100	56	58	60	63	65	67	70
防護等級 Protection Class	-	1,2	3-100	IP65						
潤滑 Lubrication	-	1,2	3-100	全合成潤滑油脂 Synthetic Lubricant						
減速機轉動慣量 Inertia(J1)										
節數 Stage	減速比 Ratio	單位 unit		PHF-42	PHF-60	PHF-90	PHF-115	PHF-142	PHF-200	PHF-255
1	3	Kg • cm <sup>2</sup>		-	0.19	0.72	2.35	9.05	29.80	72.50
	4		0.02	0.18	0.67	1.66	7.17	25.86	58.21	
	5		0.02	0.17	0.65	1.50	6.52	23.63	54.36	
	7		0.02	0.14	0.60	1.45	6.17	22.92	54.12	
	10		0.02	0.14	0.58	1.41	6.10	22.73	53.98	
2	減速比 Ratio			PHF-42	PHF-60(T)	PHF-90(T)	PHF-115T	PHF-142T	PHF-200T	PHF-255T
	15/20			0.02	0.17(0.02)	0.65(0.17)	0.65	2.35	9.05	29.8
	25/30/35/40			0.02	0.14(0.02)	0.60(0.14)	0.60	1.45	6.17	22.92
	50/70/100			0.02	0.14(0.02)	0.58(0.14)	0.58	1.41	6.10	22.73

\* 1. 輸出轉速 100rpm 時，作用於輸出軸中心位置。Applied to the output shaft center @100rpm.  
\* 2. 3000rpm 空載量測。Measured at 3000 rpm with no load. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at nominal input speed or 3000 rpm (if nominal input speed is higher than 3000 rpm) with no load.  
※本公司有權對以上數據規格逕行設計變更不先行告知。The above figures/specifications are subject to change without prior notice.

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。