

# 转角精密低噪音系列

Corner precision low noise series

## HAFRseries



### 性能特點

- 回程間隙低
- 齒輪齒隙低於8arcmin，定位精確
- 輸出效率高
- 全負載時效率達到97%
- 低噪音
- 油脂潤滑免維護
- 使用高粘度、不易分離的潤滑脂，有效防止潤滑脂滲漏。在產品壽命期內無需更換潤滑脂。

### Performance characteristics

- Low return clearance
- Gear backlash is less than 8arcmin, accurate positioning improves rigidity and torque
- High output efficiency
- 97% efficiency at full load
- Low noise
- Grease lubrication free of maintenance
- Use high-viscosity, hard-to-separate grease to effectively prevent grease leakage. In No need to change the grease during the life of the product.

## 技術規格表/Specifications Table

規格 Model No	單位 Unit	段數 Stage	比數 Ratio	HAFR 060	HAFR 090	HAFR 120	HAFR 160
額定輸出扭矩PN Normal Output Torque	Nm	1	3	18	60	115	210
			4	33	105	240	630
			5	30	100	230	540
			7	23	90	180	360
			8	25	85	160	300
			10	18	70	140	280
			12	18	65	140	220
			15	18	70	140	230
			16	38	115	280	700
			20	38	115	260	700
		2	25	33	110	270	580
			20	38	110	260	700
			32	40	110	280	700
			35	35	110	270	580
			40	40	110	280	700
			50	35	110	270	580
			64	40	100	240	550
			70	30	90	220	550
100	15	70	140	520			
急停扭矩 Emergency Stop Torque	Nm	1.2	3-200	3倍額定輸出力矩/3Times of Nominal Output Torque			
額定輸入轉速IN Normal Input Speed	rpm	1.2	3-200	4000	3500	3000	
最大輸出轉速n1B Max Output Speed	rpm	1.2	3-200	8000	6000	6000	5000
精密背隙P1 Precision Backlash P1	arcmin	1	3-10	≤ 8	≤ 8	≤ 8	≤ 8
精密背隙P2 Precision Backlash P2	arcmin	1	3-10	≤ 11	≤ 11	≤ 11	≤ 11
扭轉剛性/Torsional Rigidity	Nm/arcmin	1.2	3-200	3	9.2	15	50
容許徑向力 Max Radial Force	N	1.2	3-200	360	700	2100	4800
容許軸向力 Max Axial Force	N	1.2	3-200	310	605	1750	4150
使用壽命/Service Life	hr	1.2	3-200	20000h			
效率η/Efficiency	%	1	3-10	≥ 94%			
重量/Weight	kg	1	3-10	1.6	4.1	10.2	23.9
		2	15-200	2.0	5.2	11.3	27.1
使用溫度 Operating Temperature	°C	1.2	3-200	[-15°C~+90°C]			
潤滑/Lubrication		1.2	3-200	全合成潤滑脂 (Synthetic Grease)			
防護等級/Protection Class		1.2	3-200	IP65			
安裝方位/Mounting position		1.2	3-200	任意方位 (Any Direction)			
噪音值 L (n1=3000rpm, 白色聲) Noise Level	dB(A)	1.2	3-200	≤ 60	≤ 68	≤ 70	≤ 75

1. 比數(n1/n2) (Note 1: Ratio (n1/n2))  
2. 輸出轉速100rpm時，作用於輸出軸中心位置。  
3. 最大加速力矩Tmax=60% of Tnom，連續運轉，使用壽命為10000hrs。

Note: When the output rotation number is 100 rpm, it acts on the center position of the output shaft.  
Note 2: The maximum acceleration force is T2B=60% of T2N0T, continuous continuous rotation, and the service life is 10000hrs.

## 機型代碼

## HAFR SERIS ORDERING CODE

HAFR - 060 - 10 - S1 - P1 - 馬達 - (Φ14x30/Φ50x3/4-Φ70-Φ5.5)

电机输出安装尺寸 Motor Type	马达型号 Motor manufacturer and model
背隙等级 Backlash Class	P1: 精密背隙 Precision Backlash P1 P2: 标准背隙 Standard Backlash P2
出力轴键槽 Output Shaft Keyway	S1-实心轴, 无键槽 Solid Output Shaft (No Keyway) S2-标准品, 有键槽 Standard (Keyway) S3-输出为孔 Output for holes
比数Ratio 单节: 3,4,5,7,8,10 双节: 12,15,16,20,25,28,35,40,50,64,100	
减速机系列 Type	HAFR060, HAFR090, HAFR120, HAFR160
产品名称(The product name)	

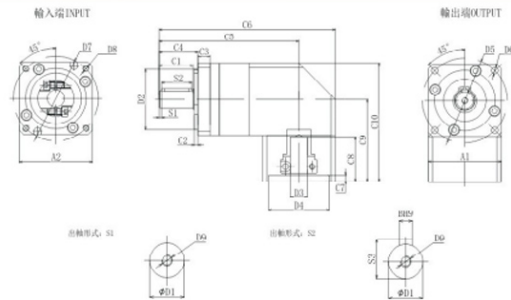
## 減速機轉動慣量表

## Reducer moment of inertia

規格	單位	段數	比數	HAFR060	HAFR090	HAFR120	HAFR160	
轉動慣量表	kg/cm2	1	3	0.004	0.77	2.03	12.14	
			4	0.004	0.77	2.03	12.14	
			5	0.064	0.77	2.63	12.14	
			7	0.064	0.77	2.63	12.14	
			8	0.064	0.77	2.63	12.14	
			10	0.064	0.77	2.03	12.14	
			2	12-40	0.064	0.50	2.03	12.14
				50-100	0.064	0.50	2.63	12.14

## MODEL:HAFR

### 單段1-Stage 比數: 3,4,5,7,8,10



### 規格表 Specifications (Unit:mm)

尺寸/Size	HAFR 060-L1	HAFR 090-L1	HAFR 120-L1	HAFR 160-L1
D1	Φ14(16)	Φ20(22)	Φ25(32)	Φ40
D2	Φ50	Φ80	Φ110	Φ130
D3	Φ14(≤14)	Φ19(≤24)	Φ25(≤32)	Φ35(≤42)
D4	Φ50(30-50)	Φ70(30-70)	Φ110(50-140)	Φ114.3(70-180)
D5	Φ70	Φ100	Φ130	Φ185
D6	4-Φ5.5	4-Φ6.5	4-Φ9	4-Φ11
D7	Φ70(45-90)	Φ90(70-145)	Φ145(70-165)	Φ200(90-235)
D8	(4-M5X10)	(4-M6X12)	(4-M8X16)	(4-M12X20)
D9	M5X10	M6X12	M10X15	M16X20
C1	28	36	50	80
C2	3	3	4	5
C3	10	10	15	18
C4	32	40	55	86
C5	(109.5)	(157.0)	(207.0)	(287.0)
C6	(145.0)	(194.0)	(273.0)	(367.0)
C7	(5.0)	(7.0)	(10.0)	(8.0)
C8	(36.5)	(45.5)	(73.0)	(94.0)
C9	(67.6)	(88.3)	(134.5)	(170.5)
C10	(97.0)	(140)	(194.5)	(252.5)
A1	60	90	120	165
A2	( 60 )	( 90 )	( 120 )	( 178 )
S1	2	3	5	7
S2	25	30	40	65
R1	16(18)	22.5(24.5)	28(35)	43
B	5	6	8	12

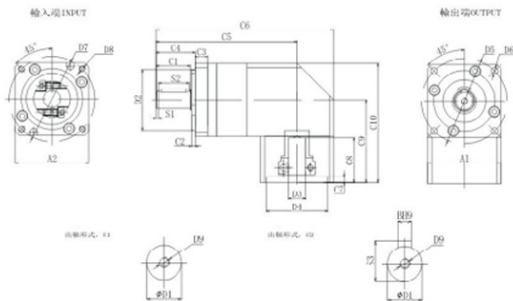
注1: ( ) 括号内为可选范围尺寸, ( ) 括号外为标准尺寸。  
注2: 減速機出力軸可以为客户定制大小和长度。  
注3: 輸入尺寸可根據客戶電機尺寸自制定制。

Note 1: Inside of ( ) is the optional range of sizes outside of ( ) is the standard size.  
Note 2: The reducer output shaft size and length can be customized for customers.  
Note 3: The input size can be customized according to the customer's motor size

## MODEL:HAFR

### 雙段2-Stage

比數: 12,15,16,20,25,28,35,40,50,64,100



### 規格表 Specifications (Unit:mm)

尺寸/Size	HAFR 060-L2	HAFR 090-L2	HAFR 120-L2	HAFR 160-L2
D1	Φ14(16)	Φ20(22)	Φ25(32)	Φ40
D2	Φ50	Φ80	Φ110	Φ130
D3	Φ14(≤14)	Φ19(≤24)	Φ25(≤32)	Φ35(≤42)
D4	Φ50(30-50)	Φ70(30-70)	Φ110(50-140)	Φ114.3(70-180)
D5	Φ70	Φ100	Φ130	Φ185
D6	4-Φ5.5	4-Φ6.5	4-Φ9	4-Φ11
D7	Φ70(45-90)	Φ90(70-145)	Φ145(70-165)	Φ200(90-235)
D8	(4-M5X10)	(4-M6X12)	(4-M8X16)	(4-M12X20)
D9	M5X10	M6X12	M10X15	M16X20
C1	28	36	50	80
C2	3	3	4	5
C3	10	10	15	18
C4	32	40	55	86
C5	(126.0)	(181.0)	(239.0)	(324.0)
C6	(162.0)	(219.0)	(305.0)	(414.0)
C7	(5.0)	(7.0)	(10.0)	(8.0)
C8	(36.5)	(45.5)	(73.0)	(94.0)
C9	(67.6)	(88.3)	(134.5)	(170.5)
C10	(97.0)	(140)	(194.5)	(252.5)
A1	60	90	120	165
A2	( 60 )	( 90 )	( 120 )	( 178 )
S1	2	3	5	7
S2	25	30	40	65
R1	16(18)	22.5(24.5)	28(35)	43
B	5	6	8	12

注1: ( ) 括号内为可选范围尺寸, ( ) 括号外为标准尺寸。  
注2: 減速機出力軸可以为客户定制大小和长度。  
注3: 輸入尺寸可根據客戶電機尺寸自制定制。

Note 1: Inside of ( ) is the optional range of sizes outside of ( ) is the standard size.  
Note 2: The reducer output shaft size and length can be customized for customers.  
Note 3: The input size can be customized according to the customer's motor size