

Servo Actuators FLA





Content	
Our inspiration	04
Far beyond the horizon	
Product description	
Ordering code	
Combinations	11
Technical data	12



Robotics and Automation | Machine tools | Semiconductor technology | Medical | Packaging machines | Special environments



Our inspiration

Your business drives us. For every individual set of requirements, we have an equally diverse range of solutions: four out of every five products that leave our company are special versions, developed, designed, and produced to customer specifications - from space saving component sets to customised special drives. Harmonic Drive® Precision Drive Technology based on the strain wave gear principle can be found in machine tools, and of course also in robotics, the aerospace industry, and numerous other key industries.

Our headquarters are in Limburg an der Lahn, Germany, but our marketplace is the entire world. Since the company was founded in 1970, Harmonic Drive AG has grown from a small distribution company to a leading international solution provider with production capability for drive technology - with a parent company in Japan and a sister company in the USA, employees in more than 20 locations worldwide, and a product range of over 23,000 items.

Each product reflects our extensive expertise – and also the conviction that successful innovations are not made for the market, but are created by the market. We are your reliable partner when it comes to developing solutions together that ideally meet your needs - as a result Harmonic Drive AG has been creating pioneering products for nearly half a century.

Find out for yourself: share your next challenge with us and find out how your business can become a driving force for innovation.



Far beyond the horizon

Our highly developed drive solutions can be found all over the world – and even above it: gears from Harmonic Drive AG ensure that the "Opportunity" space probe is still operating reliably more than 13 years after its precise landing on the surface of Mars.

Whether it's a red or blue planet: gears, actuators and systems from Harmonic Drive AG are used wherever the highest demands are placed on quality and reliability. It is no wonder that our pioneering mechatronic products are used today in a wide range of key industries.

Thanks to local sites worldwide and close cooperation with our parent company in Japan and our sister company in the USA, we ensure that you can benefit from customised Harmonic Drive[®] Solutions around the globe – we are there where you need us, crossing national borders and time zones with ease, and facing tricky challenges with enthusiasm.





We successfully meet the requirements of our customers from a wide range of industries. The driving force behind our success is creativity and customer focus: more than 80% of our solutions are developments that we have designed and produced ourselves for specific purposes – from applications in optical machines in India to communications engineering in South Africa.

Let us know what you need: we are sure to have the ideal solution for your requirements.

Maybe you will think of us the next time you travel the globe in a plane from the Airbus range, where high precision Harmonic Drive[®] Gears for aviation help ensure that you have a safe flight and put the world at your feet.

armonic rive AG



Ultra flat and ultra light

The servo actuator of the FLA Series consists of a brushless DC motor and a precision gear with output bearing. The series offers maximum torque between 1.8 Nm and 34 Nm and is available in four sizes.

Flexibility in gear selection

The new ultra flat and ultra light FLA Series combines a high precision and high performance gear with a compact and highly efficient brushless DC motor. The FLA Series is equipped with either our highly dynamic and efficient Harmonic Planetary Gear or with our high precision and high torque Harmonic Drive® Strain Wave Gear.

The FLA Series is ideal for a variety of applications such as wheel drives for automated guided vehicle or articulated drives in exoskeletons. The highly efficient brushless DC motor is available in two voltage levels 24VDC or 48VDC and therefore ideally suited for battery powered applications.



Harmonic Drive® Servo Actuators are the perfect combination of highly dynamic compact servo motors, precision Harmonic Drive® Component Sets and integral high load capacity, tilt resistant output bearings.

Optimised for your applications:

- Lightweight and weight optimised construction
- Easy and direct connection of the load
- Flat design
- Shortest axial length
- Lowest noise pollution
- Low heat generation and long service life in battery powered applications

Customer Benefits

FLA

Ordering code

Table 10.1

Series	Size Version	Ratio Gear type		Ratio Gear type		Ratio Gear type		Motor winding	Special design	
	11A 08HP 50FB 100FB									
FLA 14A 17A 20A	14A	08HP	50FB	100FB		24 V 48 V	According to customer requirements			
	17A	09HP	50FB	100FB						
	20A	09HP	50FB	-						
Ordering code										
FLA	- 11A	-	50FB		н -	- 24 ·	SP SP			

Table 10.2

Ratio Gear type								
Ordering code	Ratio	Gear type						
08HP	8	HP = HarmonicPlanetary®						
09HP	9	HP = HarmonicPlanetary®						
50FB	50	FB = HarmonicDrive® Strain Wave Gear						
100FB	100	FB = HarmonicDrive® Strain Wave Gear						

Table 10.3

Motor feedback			Motor winding					
Ordering code	Туре	Size Version	Ordering code	Maximum DC bus voltage				
н		11A 24 14A	24 VDC					
		17A 20A	48	48 VDC				

Combinations

Table 11.1

Size Version		FLA							
		11	A	14A		17A		20A	
	8	•	-	•	-	-	-	-	-
Detie	9	-	-	-	-	•	-	•	-
Ratio	50	-	•	-	•	-	•	-	•
	100	-	•	-	•	-	•	-	-
Costium	HP	•	-	•	-	•	-	•	-
Gear type	FB	-	•	-	•	-	•	-	•
Motor feedback	н	•	•	•	•	•	•	•	•
Motor winding	24	•	•	•	•	•	•	•	•
	48	•	•	•	•	•	•	•	•

available
O on request
- not available

Technical data

Table 12.1

	Symbol [Unit]	FLA-11A-08HP FLA-14A-08HP		FLA-17A-09HP	FLA-20A-09HP			
Motor winding		24						
Gear type			н	Р				
Ratio	i[]	8	8	9	9			
Maximum output torque ¹⁾	T _{max} [Nm]	1.8	3.7	7.3	12.1			
Maximum output speed ¹⁾	n _{max} [rpm]	500	500	500	400			
Rated torque ^{1) 2)}	T _N [Nm]	0.6	1.2	3.0	4.1			
Rated speed ^{1) 2)}	n _n [rpm]	100	100	100	100			
Continuous stall torque ^{1) 2)}	T _o [Nm]	0.6	0.6 1.2		4.1			
Maximum current ¹⁾	I _{max} [A _{rms}]	8.7 18.0		26.2	31.4			
Rated current ^{1) 2)}	I _N [A _{rms}]	3.0 6.0		10.4	10.7			
Moment of inertia	J _{out} [kgm²]	0.00013	0.00039	0.001	0.0026			
Weight	m [kg]	0.39	0.62	0.87	1.06			
Motor feedback			Hall Sensor (O	pen Collector)				
Signal form			Recta	angle				
Number of pulses (motor side)	n ₂ [U / V / W]	30	30	30	48			
Number of pulses (output side)	n ₂ [U / V / W]	240	240	270	432			
Protection class		IP40						
Ambient operating temperature	[°C]	0 40						
Output bearing								
Tilting moment stiffness	K _B [Nm/arcmin]	0.58	0.96	1.28	1.48			
Dynamic tilting moment	M _{dyn,max} [Nm]	1.2	1.6	2.0	2.4			

Table 12.2

	Symbol [Unit]	FLA-11A-08HP FLA-14A-08HP		FLA-17A-09HP	FLA-20A-09HP				
Motor winding		48							
Gear type			Н	Р					
Ratio	i[]	8	8	9	9				
Maximum output torque ¹⁾	T _{max} [Nm]	1.8	3.7	7.3	12.1				
Maximum output speed ¹⁾	n _{max} [rpm]	500	500	500	400				
Rated torque ^{1) 2)}	T _N [Nm]	0.6	1.2	3.0	4.1				
Rated speed ^{1) 2)}	n _n [rpm]	100	100	100	100				
Continuous stall torque ^{1) 2)}	T _o [Nm]	0.6 1.2		3.0	4.1				
Maximum current ¹⁾	I _{max} [A _{rms}]	4.5 9.6		13.6	17.8				
Rated current ^{1) 2)}	I _N [A _{rms}]	1.6 3.0		5.3	6.0				
Moment of inertia	J _{out} [kgm²]	0.00013 0.00039		0.001	0.0026				
Weight	m [kg]	0.39	0.62	0.87	1.06				
Motor feedback			Hall Sensor (O	pen Collector)					
Signal form			Recta	angle					
Number of pulses (motor side)	n ₂ [U / V / W]	30	30	30	48				
Number of pulses (output side)	n ₂ [U / V / W]	240 240		270	432				
Protection class		IP40							
Ambient operating temperature	[°C]	0 40							
Output bearing									
Tilting moment stiffness	K _B [Nm/arcmin]	0.58	0.96	1.28	1.48				
Dynamic tilting moment	M _{dyn,max} [Nm]	1.2	1.6	2.0	2.4				

 $^{1)}$ Depending on the selected controller type $^{2)}$ Valid at an ambient temperature of \leq 40 °C and a mounted aluminum cooling surface with the following dimensions: FLA-11A: 220 x 220 x 8 mm / FLA-14A: 250 x 250 x 10 mm / FLA-17A: 280 x 280 x 12 mm / FLA-20A: 300 x 300 x 15 mm







Technical data

Table 14.1

	Symbol [Unit]	FLA-11A-xxFB		FLA-14A-xxFB		FLA-17A-xxFB		FLA-20A-xxFB
Motor winding					2	4		
Gear type					F	В		
Ratio	i[]	50	100	50	100	50	100	50
Maximum output torque ¹⁾	T _{max} [Nm]	6.7	11.0	11.2	18.2	23	34	33
Maximum output speed ¹⁾	n _{max} [rpm]	100	50	100	50	100	50	80
Rated torque ^{1) 2)}	T _N [Nm]	1.7	2.4	2.6	3.8	7.9	11.4	13.0
Rated speed ^{1) 2)}	n _n [rpm]	60 30		60	30	60	30	50
Continuous stall torque ^{1) 2)}	T _o [Nm]	1.7 2.4		2.6	3.8	7.9	11.4	13.0
Maximum current ¹⁾	I _{max} [A _{rms}]	6.0	5.0	9.7	8.7	18.4	14.3	19.2
Rated current ^{1) 2)}	I _N [A _{rms}]	1.9	1.7	3.0	2.5	6.8	5.3	8.7
Moment of inertia	J _{out} [kgm²]	0.0073	0.029	0.019	0.077	0.048	0.19	0.12
Weight	m [kg]	0.4	42	0.72 0.94			1.17	
Motor feedback				Ha	ll Sensor (O	pen Collect	or)	
Signal form					Recta	angle		
Number of pulses (motor side)	n ₂ [U / V / W]	3	0	3	0	3	0	48
Number of pulses (output side)	n ₂ [U / V / W]	1500	3000	1500	3000	1500	3000	2400
Protection class					IP	40		
Ambient operating temperature	[°C]	0 40						
Output bearing								
Tilting moment stiffness	K _B [Nm/arcmin]	0.!	58	0.9	96	1.28		1.48
Dynamic tilting moment	M _{dyn,max} [Nm]	1.	2	1.	6	2.0		2.4

Table 14.2

	Symbol [Unit]	FLA-11A-xxFB		FLA-14A-xxFB		FLA-17A-xxFB		FLA-20A-xxFB
Motor winding				48				
Gear type					F	В		
Ratio	i[]	50	100	50	100	50	100	50
Maximum output torque ¹⁾	T _{max} [Nm]	6.7	11.0	11.2	18.2	23	34	33
Maximum output speed ¹⁾	n _{max} [rpm]	100	50	100	50	100	50	80
Rated torque ^{1) 2)}	T _N [Nm]	1.7	2.4	2.6	3.8	7.9	11.4	13.0
Rated speed ^{1) 2)}	n _n [rpm]	60 30		60	30	60	30	50
Continuous stall torque ^{1) 2)}	T _o [Nm]	1.7 2.4		2.6	3.8	7.9	11.4	13.0
Maximum current ¹⁾	I _{max} [A _{rms}]	3.1	2.6	4.8	4.2	9.4	7.2	10.7
Rated current ^{1) 2)}	I _N [A _{rms}]	1.0	0.8	1.5	1.2	3.4	2.9	5.1
Moment of inertia	J _{out} [kgm²]	0.0073	0.029	0.019	0.077	0.048	0.19	0.12
Weight	m [kg]	0.4	42	0.72 0.94			1.17	
Motor feedback				Ha	ll Sensor (O	pen Collect	or)	
Signal form					Recta	angle		
Number of pulses (motor side)	n ₂ [U / V / W]	3	0	3	0	3	0	48
Number of pulses (output side)	n ₂ [U / V / W]	1500	3000	1500	3000	1500	3000	2400
Protection class					IP	40		
Ambient operating temperature	[°C]	0 40						
Output bearing								
Tilting moment stiffness	K _B [Nm/arcmin]	0.!	58	0.9	96	1.28		1.48
Dynamic tilting moment	M _{dyn.max} [Nm]	1.	2	1.	6 2.		.0	2.4

 $^{1)}$ Depending on the selected controller type $^{2)}$ Valid at an ambient temperature of \leq 40 °C and a mounted aluminum cooling surface with the following dimensions: FLA-11A: 220 x 220 x 8 mm / FLA-14A: 250 x 250 x 10 mm / FLA-17A: 280 x 280 x 12 mm / FLA-20A: 300 x 300 x 15 mm



Illustration 15.3 FLA-17A-FB [mm]





info@harmonicdrive.co.uk