

FOR A MORE STABLE ROTATING JOINT MODULE,
CHOOSE HOBBER

HAG

SERIES

Hollow internal drive rotary actuator

Application Area

The 48V version of this product is widely used in collaborative robots, medical robots, humanoid robots, specialized robots, the 3C industry, the semiconductor industry, AGVs, and mobile camera gimbals.

Product characteristics

- Integrated** Integrates a high-torque precision harmonic reducer, frameless torque motor, torque sensor (optional), absolute encoder, electromagnetic brake (optional), and driver into a single unit; a single module enables closed-loop torque control;
- Long service life** Stable performance with a precision retention lifespan of over 1.0 million hours.
- High precision** Maximum positioning accuracy ≤ 15 arcsec, maximum repeatability ≤ 2 arcsec.
- Maintenance-free** Maintenance-free throughout the reducer's lifecycle, and based on a modular design.
- Easy to use** Integrated direct drive for easy installation and plug-and-play operation.
- Hollow bore** Hollow bore facilitates the passage of cables, air tubes, laser beams, and more.
- High compatibility** Dimensions are essentially the same for models with or without brakes, and with or without torque sensors.



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Product Mix

Harmonic Reducer

Standard Comes standard with the leader harmonics

Torque Sensor

Standard High-precision torque sensor (optional)

Frameless Torque Motor

Standard 48V

High-Performance Drivers

Standard Terminal wiring, EtherCAT/CANopen

Absolute Encoder

Standard	BISS-C Protocol
High-speed end	19-bit/20-bit single-turn
low-speed end	20-bit single-turn , 14-bit multi-turn

Brake

Standard Permanent magnet brake (optional)

Built-in Driver I/O Interfaces: Two 24 V I/O inputs, two 24 V I/O outputs; Analog Interfaces: ± 10 V analog inputs; Communication Protocols: EtherCAT (CIA402), CANopen (CIA402), CAN-FD, Modbus RS-485

Model definition

HAG - 14 - T - XXX - DC 1 - 02 - A - C - K001

Series

HAG: Series of Modules with Built-in Actuators

Base Number

11、14、17、20、25、32、40

Torque Sensor

T: With torque sensor
N: Without torque sensor

Reduction ratio

51: Gear ratio 51
81: Gear ratio 81 (not available for 32)
101: Gear ratio 101
121: Gear ratio 121 (not available for 11, 14, or 17)
161: Gear ratio 161 (not available for 11, 14, 17, 20, or 25)

Voltage Class

DC: 48V

Custom Customer Number

No label by default

Contact Information

C: CANopen
E: Ethercat

Electromagnetic brake

A: Without electromagnetic brake
B: With electromagnetic brake

Encoder Type: 02

High-speed end: Bits 11-25 are 19-bit, Bits 32-40 are 20-bit
low-speed end: 20-bit multi-turn 12-bit
Encoder Protocol: BISS-C

Internal version number

Internal Configuration

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HAG-11

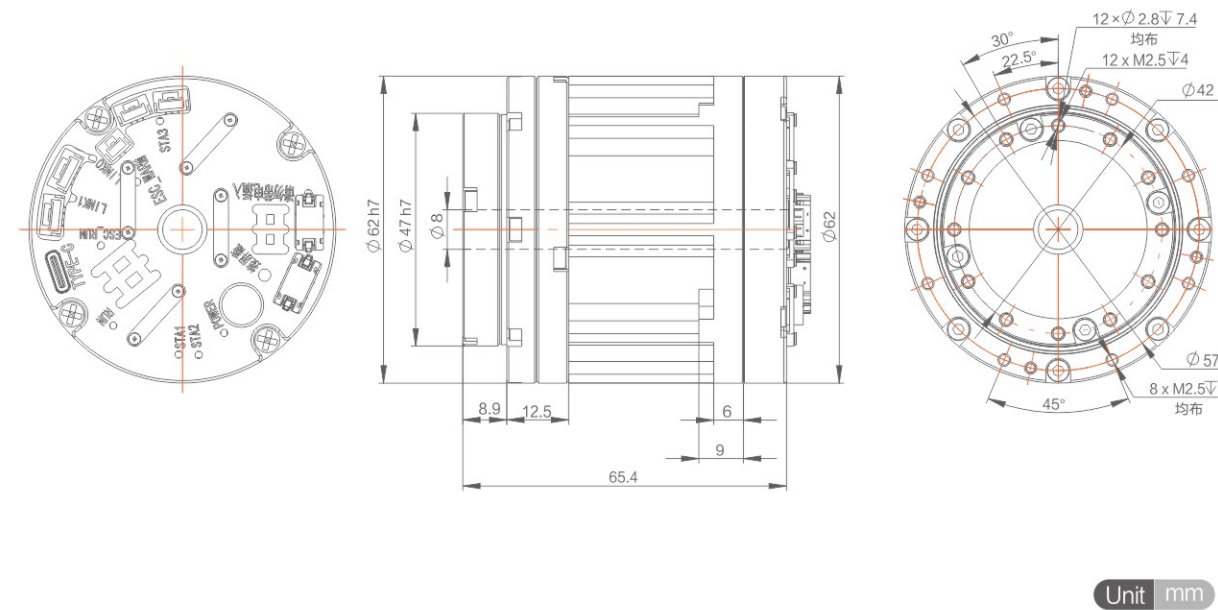
SERIES

Rotary Actuator Performance Specifications				
Model Selection HAG-		11		
DC Bus Voltage 48 VDC	Gear ratio		51	81
	Peak torque	N.m	11.4	15
	Rated torque	N.m	4.6	6.2
	Maximum speed	rpm	88	56
	Rated speed	rpm	59	37
	Maximum current	Arms	3.35	2.78
	Rated current	Arms	1.50	1.28
	Torque constant	N.m/Arms	3.06	4.86
	Motor phase-to-phase resistance	Ohms (20℃)		2.56
	Motor phase-to-phase inductance	mH		1.8
Absolute Encoder	Encoder Type		Absolute BISS-C Protocol	
	Encoder resolution (output)	bit	Single-turn 2 ³⁰ (1048576), Multi-turn 2 ³² (4096)	
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤75	
			The above are default values; can be customized for unidirectional positioning accuracy ≤20	
Repeatability		Arcsec	≤10	
Overturning stiffness		x10 ⁴ N.m/rad	8	
Torsional stiffness		x10 ⁴ N.m/rad	0.46	0.6
Power-off holding brake (motor side)		N.m	≥0.2	
Rotor moment of inertia	Without brakes	kg*m ²	1.86×10 ⁻⁵	
	With brakes	kg*m ²	1.94×10 ⁻⁵	
Quality	Without brakes	Kg	0.51	
	With brakes	Kg	0.55	
Number of motor poles		Pole	10	
Torque sensor	Rated Range	Nm	-25 0 25 Nm	
	Maximum Overload	%F.S.	200%	
	Safe Overload	%F.S.	150%	
	Zero-Point Temperature Drift	%F.S.	±0.2% F.S./10℃	
	Sensitivity Temperature Drift	%F.S.	±0.1% F.S./10℃	
	Force Resolution	%F.S.	<0.2%	
	Torque Fluctuation	Nm	<0.2	
	Nonlinearity Error	%F.S.	±0.2% F.S.	
Torque Control	Sampling Frequency	kHz	8K	
	Input/Output Instructions		Torque/Speed Command	
	Control Methods		PID and Feedforward	
	Reference Instructions		CANopen, EtherCAT	
Communication Protocol			EtherCAT_cia402、CANopen_cia402、CAN-FD	
Debugging Interface			USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification	
Motion Mode			1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode	
Protection Mode			1. Undervoltage, overvoltage, or overcurrent 2. Driver overheating 3. Speed tracking error exceeded limit 4. Current tracking error exceeded limit 5. Position tracking error exceeded limit 6. Synchronization error exceeded limit 7. Communication error 8. Home position return failure	
Ambient Conditions			Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m	
Motor Insulation			Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F	
Protection Rating			IP40	

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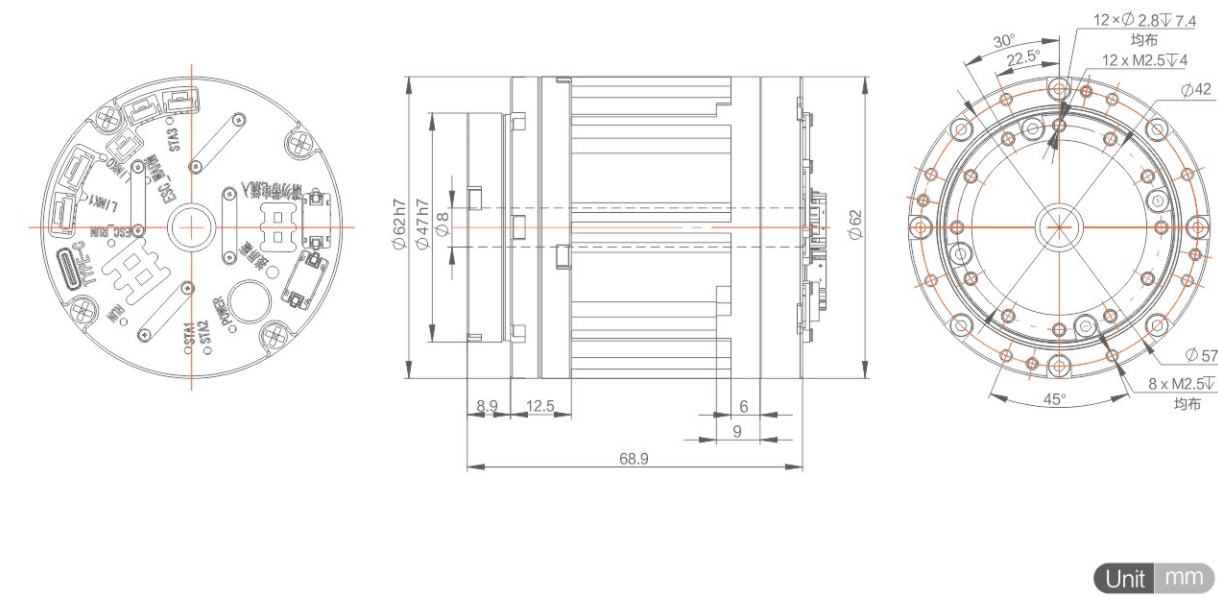
HAG-11N

Without A Torque Sensor



HAG-11T

With Torque Sensor



FOR A MORE STABLE ROTATING JOINT MODULE,
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HAG-14

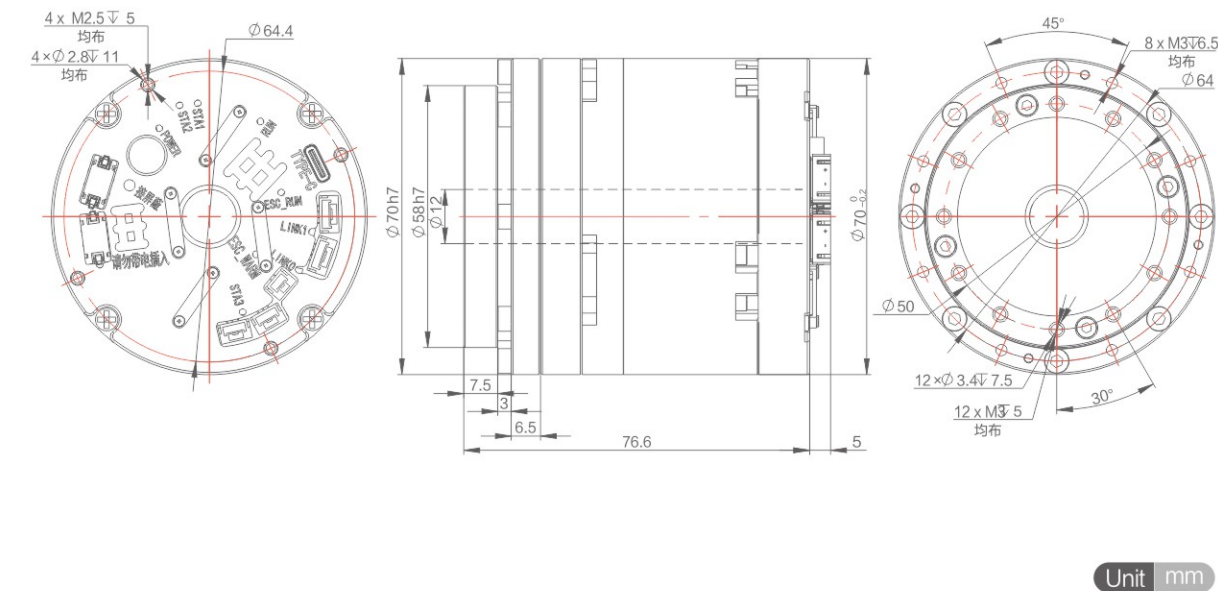
SERIES

Rotary Actuator Performance Specifications					
Model Selection HAG-			14		
Gear ratio			51	81	101
DC Bus Voltage 48 VDC	Peak torque	N.m	23	29	35
	Rated torque	N.m	10.5	16.5	21
	Maximum speed	rpm	98	62	50
	Rated speed	rpm	59	37	30
	Maximum current	Arms	6.39	5.07	4.91
	Rated current	Arms	2.92	2.89	2.95
	Torque constant	N.m/Arms	3.60	5.71	7.13
	Motor phase-to-phase resistance	Ohms (20℃)	0.89		
	Motor phase-to-phase inductance	mH	1.67		
Motor back-EMF constant	Vrms/krpm	7			
Absolute Encoder	Encoder Type		Absolute BISS-C Protocol		
	Encoder resolution (output)	bit	Single-turn 2 ³⁰ (1048576), Multi-turn 2 ¹² (4096)		
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤ 75		
Repeatability		Arcsec	The above are default values; can be customized for unidirectional positioning accuracy ≤20		
Overturning stiffness		x10 ⁴ N.m/rad	≤ 10		
Torsional stiffness		x10 ⁴ N.m/rad	0.46	8	
Power-off holding brake (motor side)		N.m	0.6		
Rotor moment of inertia	Without brakes	kg*m ²	≥0.65		
	With brakes	kg*m ²	3.52 × 10 ⁻⁵		
Quality	Without brakes	Kg	3.76 × 10 ⁻⁵		
	With brakes	Kg	0.875		
Number of motor poles		Pole	0.92		
Torque sensor	Rated Range	Nm	16		
	Maximum Overload	%F.S.	-35-0-35 Nm		
	Safe Overload	%F.S.	200%		
	Zero-Point Temperature Drift	%F.S.	150%		
	Sensitivity Temperature Drift	%F.S.	± 0.2% F.S./10℃		
	Force Resolution	%F.S.	± 0.1% F.S./10℃		
	Torque Fluctuation	Nm	<0.2%		
	Nonlinearity Error	%F.S.	<0.2%		
Sampling Frequency		kHz	± 0.2% F.S.		
Torque Control	Input/Output Instructions	8K			
	Control Methods	Torque/Speed Command			
	Reference Instructions	PID and Feedforward			
	Performance	CANopen, EtherCAT			
Communication Protocol		Refresh rate: 62.5 μs (16 kHz); force control bandwidth: 20 Hz or higher; supports 360° force control; infinite rotation at the end; force control accuracy: <±1% F.S.			
Debugging Interface		EtherCAT_cia402、CANopen_cia402、CAN-FD			
Motion Mode		USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification			
Protection Mode		1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode			
Ambient Conditions		1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure			
Motor Insulation		Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m			
Protection Rating		Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F IP40			

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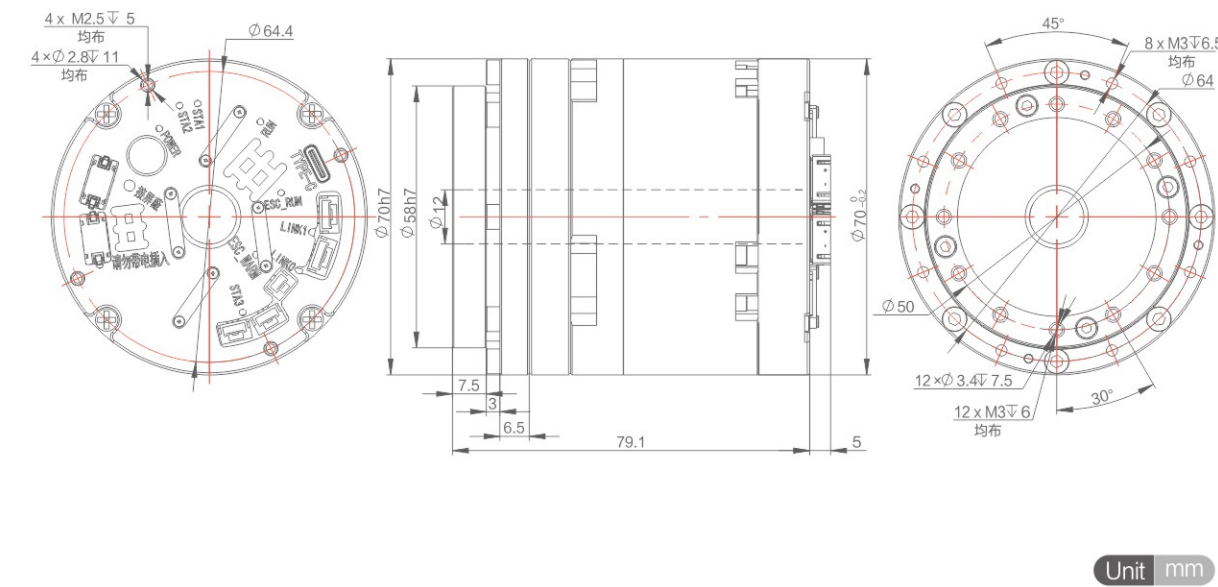
HAG-14N

Without A Torque Sensor



HAG-14T

With Torque Sensor



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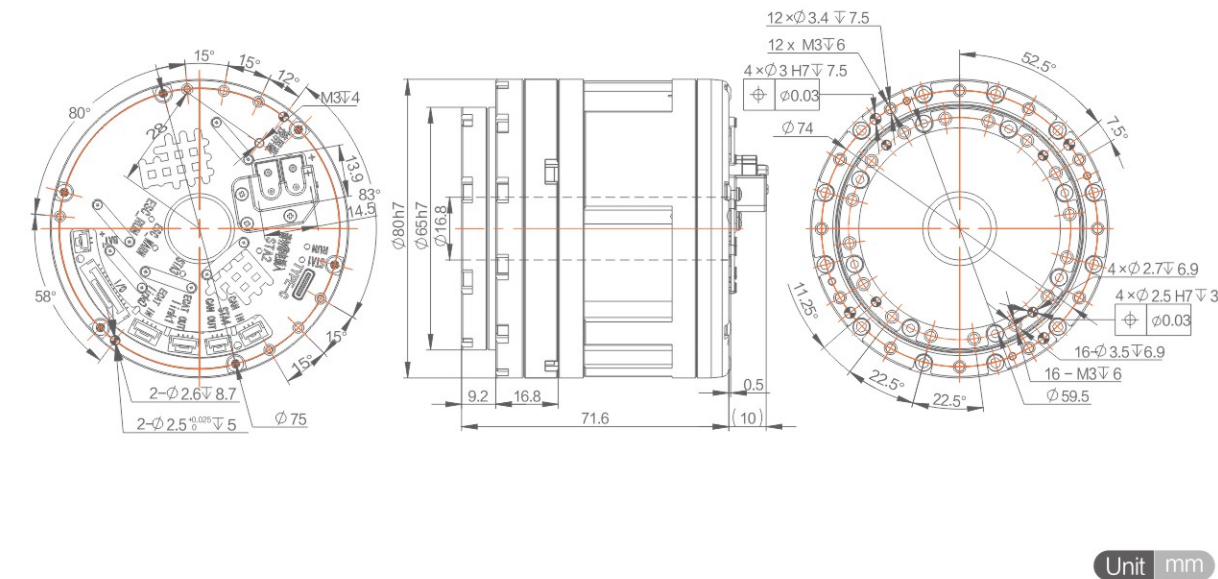
HAG-17 SERIES

Rotary Actuator Performance Specifications				
Model Selection HAG-		17		
DC Bus Voltage 48 VDC	Gear ratio		51	81
	Peak torque	N.m	38	49
	Rated torque	N.m	21	28
	Maximum speed	rpm	78	49
	Rated speed	rpm	59	37
	Maximum current	Arms	8.91	7.24
	Rated current	Arms	4.93	4.13
	Torque constant	N.m/Arms	4.26	6.77
	Motor phase-to-phase resistance	Ohms (20℃)	0.6	
	Motor phase-to-phase inductance	mH	1.54	
Absolute Encoder	Encoder Type		Absolute BISS-C Protocol	
	Encoder resolution (output)	bit	Single-turn 2 ³⁰ (1048576), Multi-turn 2 ³² (4096)	
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤ 75	
Repeatability		Arcsec	≤ 10	
Overturning stiffness		x10 ⁴ N.m/rad	15	
Torsional stiffness		x10 ⁴ N.m/rad	1.07	1.3
Power-off holding brake (motor side)		N.m	≥ 0.65	
Rotor moment of inertia	Without brakes	kg*m ²	6.61 × 10 ⁻⁵	
	With brakes	kg*m ²	6.8 × 10 ⁻⁵	
Quality	Without brakes	Kg	1.1	
	With brakes	Kg	1.15	
Number of motor poles		Pole	16	
Torque sensor	Rated Range	Nm	-65-0-65 Nm	
	Maximum Overload	%F.S.	200%	
	Safe Overload	%F.S.	150%	
	Zero-Point Temperature Drift	%F.S.	± 0.2% F.S./10℃	
	Sensitivity Temperature Drift	%F.S.	± 0.1% F.S./10℃	
	Force Resolution	%F.S.	<0.2%	
	Torque Fluctuation	Nm	<0.2%	
	Nonlinearity Error	%F.S.	± 0.2% F.S.	
Torque Control	Sampling Frequency	kHz	8K	
	Input/Output Instructions		Torque/Speed Command	
	Control Methods		PID and Feedforward	
	Reference Instructions		CANopen, EtherCAT	
I/O Interfaces			Two 24V I/O inputs; two 24V I/O outputs	
Analog Interfaces			± 10V analog interface	
Communication Protocols			EtherCAT_cia402、CANopen_cia402、CAN-FD、485_Modbus	
Debugging Interfaces			USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification	
Motion Modes			1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode	
Protection Modes			1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure	
Ambient Conditions			Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m	
Motor Insulation			Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F	
Protection Rating			IP40	

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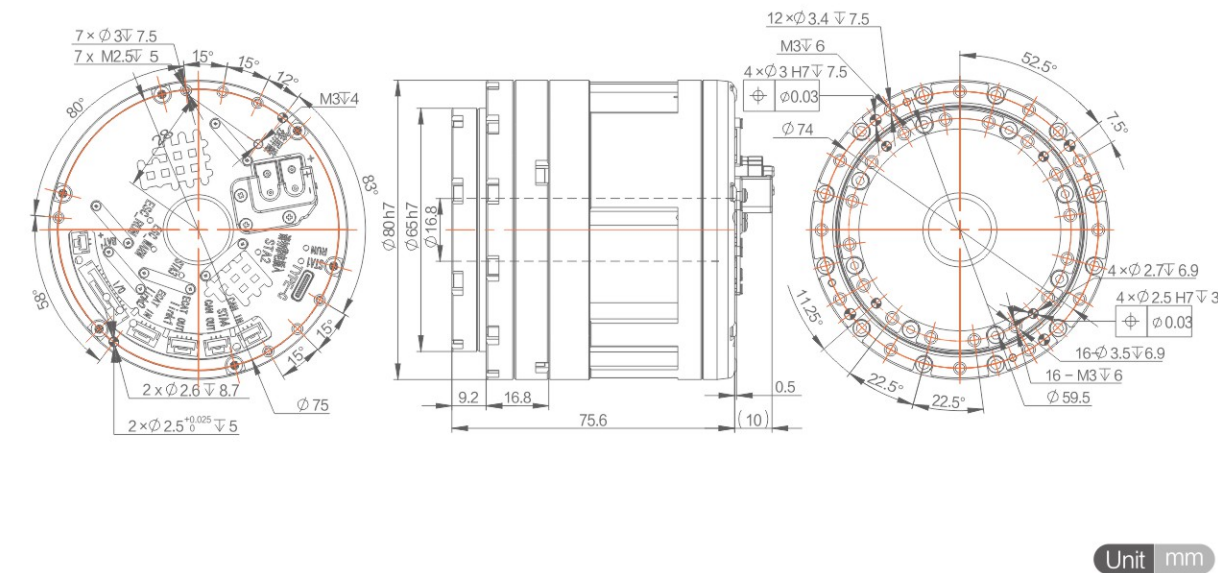
HAG-17N

Without A Torque Sensor



HAG-17T

With Torque Sensor



FOR A MORE STABLE ROTATING JOINT MODULE,
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HAG-20

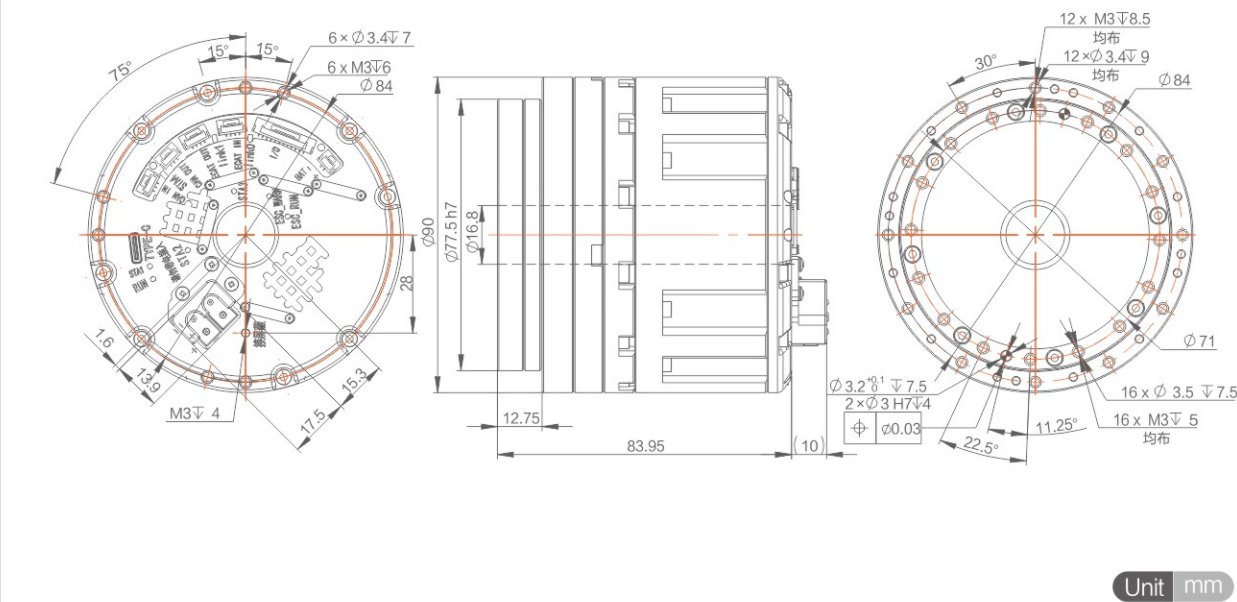
SERIES

Rotary Actuator Performance Specifications						
Model Selection HAG-			20			
DC Bus Voltage 48 VDC	Gear ratio		51	81	101	121
	Peak torque	N.m	52	83	104	111
	Rated torque	N.m	26	42	53	63
	Maximum speed	rpm	98	62	50	41
	Rated speed	rpm	59	37	30	25
	Maximum current	Arms	17.01	17.09	17.18	15.30
	Rated current	Arms	8.50	8.65	8.75	8.68
	Torque constant	N.m/Arms	3.06	4.86	6.05	7.25
	Motor phase-to-phase resistance	Ohms (20℃)	0.18			
Motor phase-to-phase inductance	mH	0.45				
Motor back-EMF constant	Vrms/krpm	7.7				
Absolute Encoder	Encoder Type		Absolute BISS-C Protocol			
	Encoder resolution (output)	bit	Single-turn 2 ²⁰ (1048576), Multi-turn 2 ¹² (4096)			
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤75			
Repeatability		Arcsec	The above are default values; one-way positioning accuracy can be customized to ≤20			
Overturning stiffness		x10 ⁴ N.m/rad	≤10			
Torsional stiffness		x10 ⁴ N.m/rad	24			
Power-off holding brake (motor side)		N.m	1.8	2.3		
Rotor moment of inertia	Without brakes	kg*m ²	≥1			
	With brakes	kg*m ²	8.81 × 10 ⁻⁵			
Quality	Without brakes	Kg	9.47 × 10 ⁻⁵			
	With brakes	Kg	1.43			
Number of motor poles		Pole	1.51			
Torque sensor	Rated Range	Nm	16			
	Maximum Overload	%F.S.	-140-0-140 Nm			
	Safe Overload	%F.S.	200%			
	Zero-Point Temperature Drift	%F.S.	150%			
	Sensitivity Temperature Drift	%F.S.	± 0.2% F.S./10℃			
	Force Resolution	%F.S.	± 0.1% F.S./10℃			
	Torque Fluctuation	Nm	<0.2%			
	Nonlinearity Error	%F.S.	<0.2			
Sampling Frequency		kHz	± 0.2% F.S.			
Torque Control	Input/Output Instructions	8K				
	Control Methods	Torque/Speed Command				
	Reference Instructions	PID and Feedforward				
	Performance	CANopen, EtherCAT				
Analog Interfaces		Refresh rate: 62.5 μs (16 kHz); force control bandwidth: 20 Hz or higher; supports 360° force control; infinite rotation at the end; force control accuracy: <± 1% F.S.				
Communication Protocols		± 10V analog interface				
Debugging Interfaces		EtherCAT_cia402、CANopen_cia402、CAN-FD、485_Modbus				
Motion Modes		USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification				
Protection Modes		1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode				
Ambient Conditions		1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure				
Motor Insulation		Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m				
Protection Rating		Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F IP40				

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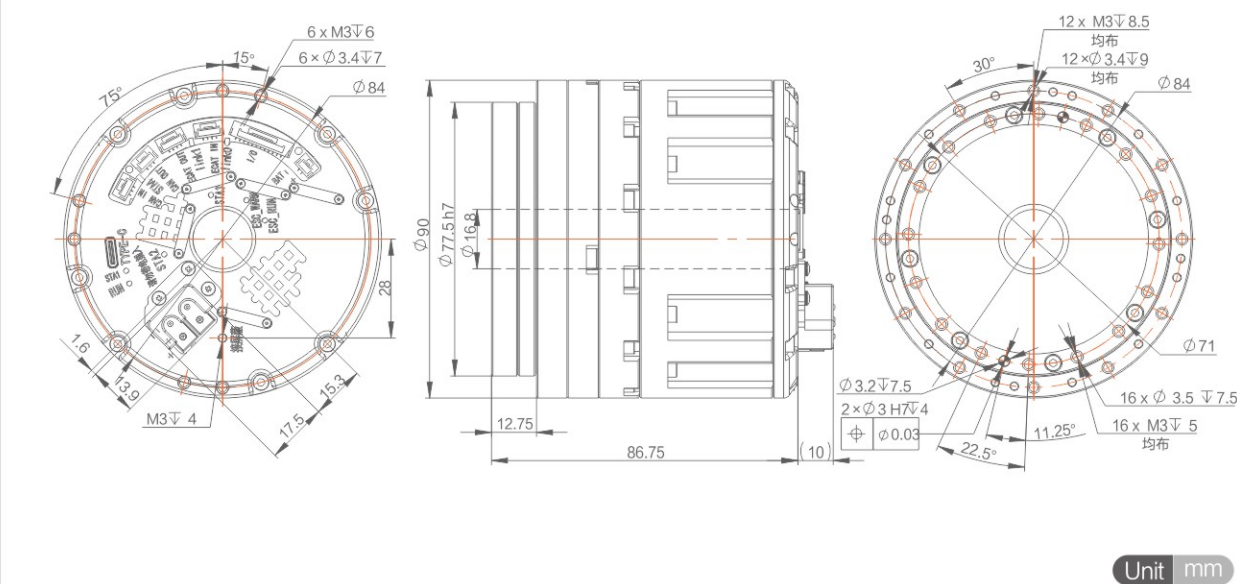
HAG-20N

Without A Torque Sensor



HAG-20T

With Torque Sensor



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HAG-25

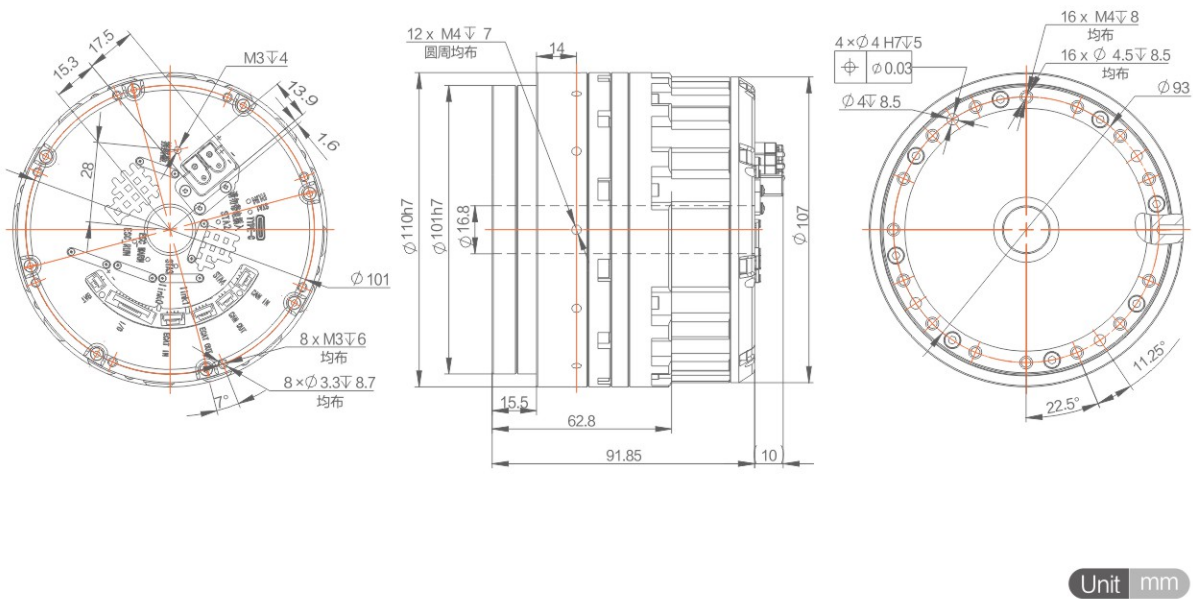
Rotary Actuator Performance Specifications

Model Selection HAG-		25			
DC Bus Voltage 48 VDC	Gear ratio		51	81	101
	Peak torque	N.m	100	158	195
	Rated torque	N.m	54	85	106
	Maximum speed	rpm	78	49	40
	Rated speed	rpm	59	37	30
	Maximum current	Arms	27.98	27.84	27.55
	Rated current	Arms	14.05	13.93	13.93
	Torque constant	N.m/Arms	3.84	6.10	7.61
	Motor phase-to-phase resistance	Ohms (20℃)	0.1		
	Motor phase-to-phase inductance	mH	0.56		
Absolute Encoder	Encoder Type		Absolute Value BISS-C Protocol		
	Encoder resolution (output)	bit	Single-turn: 2 ²⁰ (1048576), Multi-turn: 2 ³² (4096)		
	Positioning Accuracy _ Fully Closed-Loop Control	Arcsec	≤75		
			The above are the default values; the one-way positioning accuracy can be customized to ≤20.		
Repeatability		Arcsec	≤10		
Overturning stiffness		x10 ⁴ N.m/rad	38		
Torsional stiffness		x10 ⁴ N.m/rad	3.4		4.6
Power-off holding brake (motor side)		N.m	≥2		
Rotor moment of inertia	Without brakes	kg*m ²	1.33*10 ⁻⁴		
	With brakes	kg*m ²	1.45*10 ⁻⁴		
Quality	Without brakes	Kg	2.43		
	With brakes	Kg	2.54		
Number of motor poles		Pole	16		
Torque sensor	Rated Range	Nm	-250-0-250Nm		
	Maximum Overload	%F.S.	200%		
	Safe Overload	%F.S.	150%		
	Zero-Point Temperature Drift	%F.S.	±0.2%F.S./10℃		
	Sensitivity Temperature Drift	%F.S.	±0.1%F.S./10℃		
	Force Resolution	%F.S.	<0.2%		
	Torque Fluctuation	Nm	<0.2		
	Nonlinearity Error	%F.S.	±0.2%F.S.		
Torque Control	Sampling Frequency	kHz	8K		
	Input/Output Instructions		Torque/Speed Command		
	Control Methods		PID and Feedforward		
	Reference Instructions		Canopen, EtherCAT		
		Performance	Refresh rate: 62.5 μs (16 kHz); force control bandwidth: 20 Hz or higher; supports 360° force control; infinite rotation at the end; force control accuracy: ±0.5% F.S.		
I/O Interfaces			Two 24V I/O inputs; two 24V I/O outputs		
Analog Interfaces			±10V analog interface		
Communication Protocols			EtherCAT_cia402、CANopen_cia402、CAN-FD、485_Modbus		
Debugging Interfaces			USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification		
Motion Modes			1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode		
Filter			1. First-order low-pass filter 2. Second-order low-pass filter 3. Notch filter 4. High-pass filter 5. Bandpass filter 6. Cascading of various filters		
Protection Modes			1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure		
Ambient Conditions			Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m		
Motor Insulation			Insulation resistance: 100 MΩ or higher (500 V DC)		
			Dielectric strength: 1500 V AC for 1 minute		
Protection Rating			Insulation class: Class F		
			IP40		

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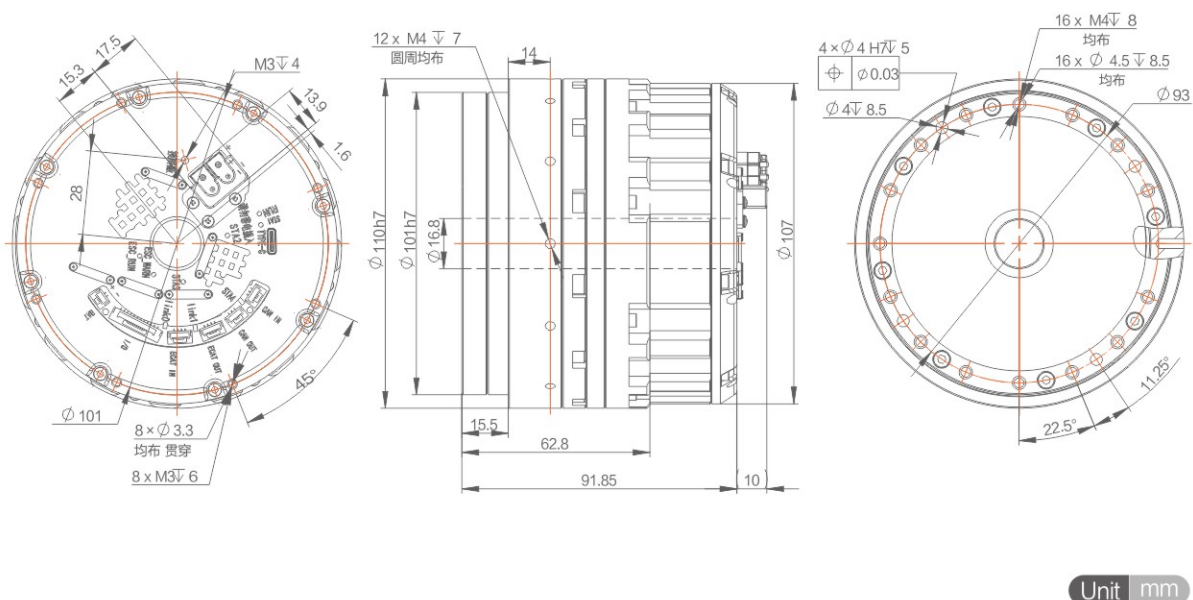
HAG-25N

Without A Torque Sensor



HAG-25T

With Torque Sensor



FOR A MORE STABLE ROTATING JOINT MODULE,
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HAG-32

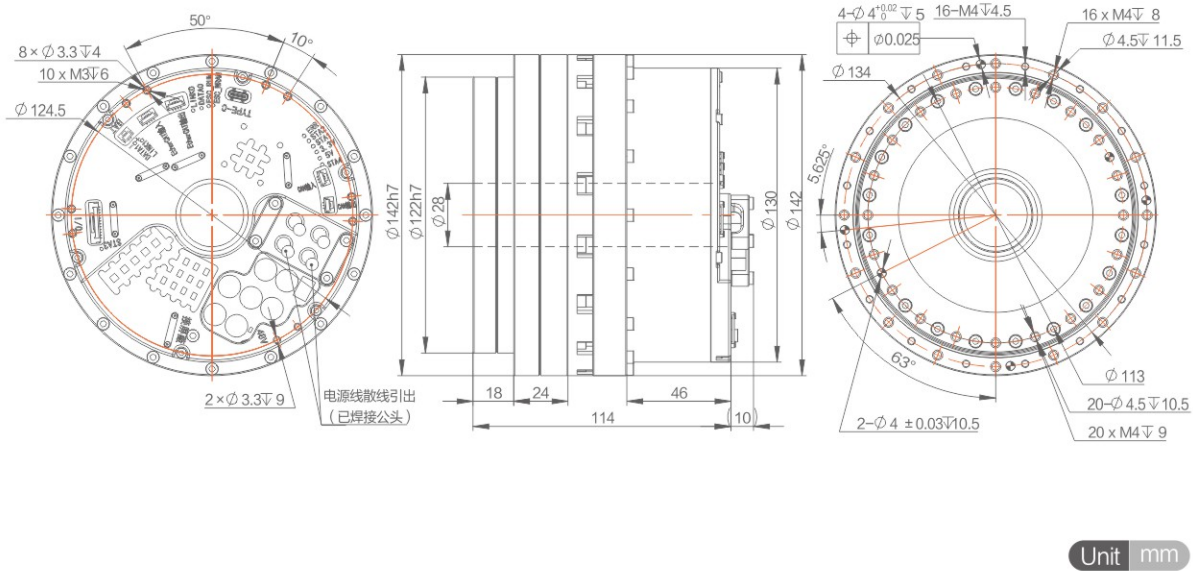
SERIES

Rotary Actuator Performance Specifications					
Model Selection HAG-			32		
Gear ratio			51	101	161
DC Bus Voltage 48 VDC	Peak torque	N.m	218	380	430
	Rated torque	N.m	124	247	300
	Maximum speed	rpm	55	28	17
	Rated speed	rpm	43	22	14
	Maximum current	Arms	45.82	40.33	28.63
	Rated current	Arms	23.98	24.12	18.38
	Torque constant	N.m/Arms	5.17	10.24	16.33
	Motor phase-to-phase resistance	Ohms (20℃)	0.067		
	Motor phase-to-phase inductance	mH	0.46		
Motor back-EMF constant	Vrms/krpm	10			
Absolute Encoder	Encoder Type		Absolute Value BISS-C Protocol		
	Encoder resolution (output)	bit	Single-turn: 2 ²⁰ (1048576), Multi-turn: 2 ³² (4096)		
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤75		
Repeatability		Arcsec	The above are the default values; the one-way positioning accuracy can be customized to ≤20.		
Overturning stiffness		x10 ⁴ N.m/rad	≤10		
Torsional stiffness		x10 ⁴ N.m/rad	7.6	9.9	
Power-off holding brake (motor side)		N.m	≥4.2		
Rotor moment of inertia	Without brakes	kg*m ²	8.84*10 ⁻⁴		
	With brakes	kg*m ²	9.24*10 ⁻⁴		
Quality	Without brakes	Kg	4.57		
	With brakes	Kg	4.8		
Number of motor poles		Pole	16		
Torque sensor	Rated Range	Nm	-500-0-500Nm		
	Maximum Overload	%F.S.	200%		
	Safe Overload	%F.S.	150%		
	Zero-Point Temperature Drift	%F.S.	± 0.2%F.S./10℃		
	Sensitivity Temperature Drift	%F.S.	± 0.1%F.S./10℃		
	Force Resolution	%F.S.	<0.2%		
	Torque Fluctuation	Nm	<0.2		
	Nonlinearity Error	%F.S.	± 0.2%F.S.		
Sampling Frequency		kHz	8K		
Torque Control		Input/Output Instructions	Torque/Speed Command		
		Control Methods	PID and Feedforward		
		Reference Instructions	Canopen、EtherCAT		
		Performance	Refresh rate: 62.5 μs (16 kHz); force control bandwidth: 20 Hz or higher; supports 360° force control; infinite rotation at the end, force control accuracy: <± 1% F.S.		
I/O Interfaces		Two 24V I/O inputs; two 24V I/O outputs			
Analog Interfaces		± 10V analog interface			
Communication Protocols		EtherCAT_cia402、CANopen_cia402、CAN-FD、485_Modbus			
Debugging Interfaces		USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification			
Motion Modes		1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode			
Protection Modes		1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure			
Ambient Conditions		Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m			
Motor Insulation		Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F			
Protection Rating		IP40			

FOR A MORE STABLE ROTATING JOINT MODULE,
CHOOSE HOBBER

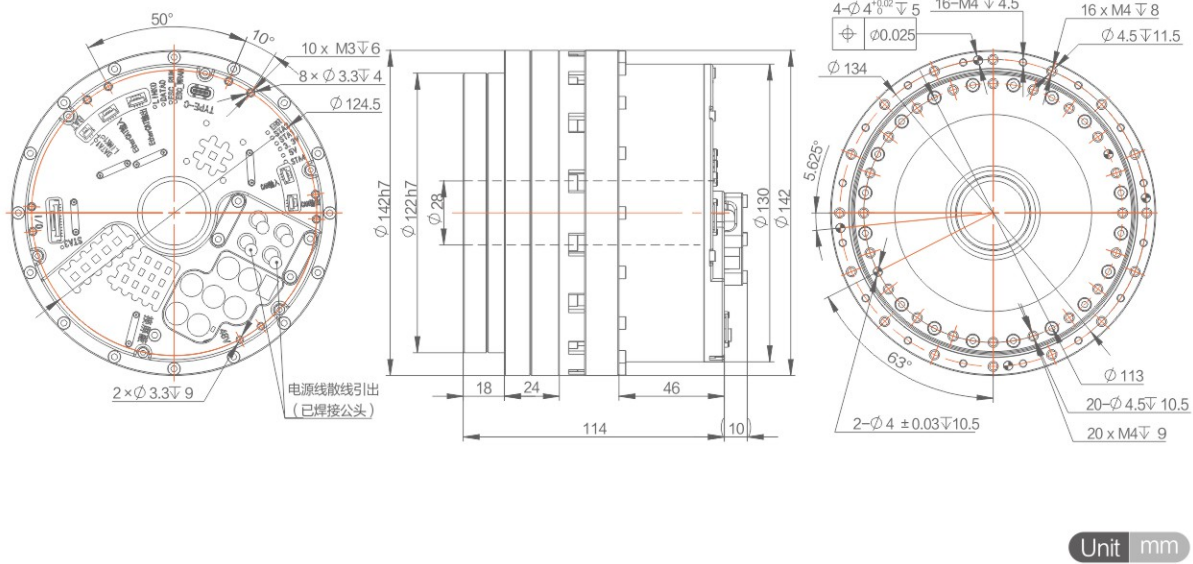
HAG-32N

Without A Torque Sensor



HAG-32T

With Torque Sensor



FOR A MORE STABLE ROTATING JOINT MODULE,
CHOOSE HOBBER

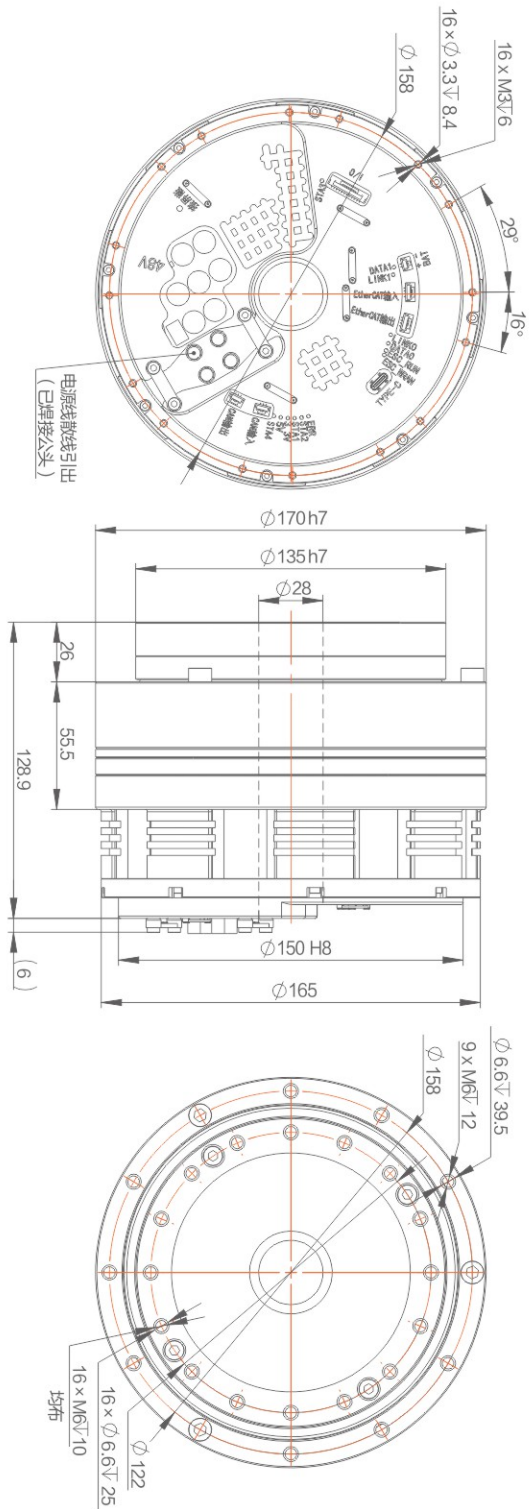
HAG-40SERIES

Rotary Actuator Performance Specifications							
Model Selection HAG-			40				
Gear ratio			51	81	101	121	161
DC Bus Voltage 48 VDC	Peak torque	N.m	405	641	702	762	800
	Rated torque	N.m	216	345	430	515	557
	Maximum speed	rpm	49	31	25	21	16
	Rated speed	rpm	35	22	18	15	11
	Maximum current	Arms	59.62	59.41	52.18	47.28	37.30
	Rated current	Arms	31.80	31.98	31.96	31.95	25.97
	Torque constant	N.m/Arms	6.79	10.79	13.45	16.12	21.45
	Motor phase-to-phase resistance	Ohms (20℃)	0.05				
	Motor phase-to-phase inductance	mH	0.35				
	Motor back-EMF constant	Vrms/krpm	13.5				
Absolute Encoder	Encoder Type		Absolute Value BISS-C Protocol				
	Encoder resolution (output)	bit	Single-turn: 2 ²⁰ (1048576), Multi-turn: 2 ¹² (4096)				
Positioning Accuracy _ Fully Closed-Loop Control		Arcsec	≤75				
			The above are the default values; the one-way positioning accuracy can be customized to ≤20.				
Repeatability		Arcsec	≤10				
Overturning stiffness		x10 ⁴ N.m/rad	175				
Torsional stiffness		x10 ⁴ N.m/rad	14	18.6			
Power-off brake (motor side)		N.m	≥6				
Rotor moment of inertia	Without brakes	kg*m ²	1.6*10 ⁻³				
	With brakes	kg*m ²	1.67*10 ⁻³				
Quality	Without brakes	Kg	7.49				
	With brakes	Kg	7.8				
Number of motor poles		Pole	16				
I/O Interfaces			Two 24V I/O inputs; two 24V I/O outputs				
Analog Interfaces			± 10V analog interface				
Communication Protocols			EtherCAT_cia402、CANopen_cia402、CAN-FD、485_Modbus				
Debugging Interfaces			USB Debugging 1. Access to position loop, speed loop, and current loop data, as well as real-time PID adjustment 2. Reading driver status. 3. Variable load inertia identification				
Motion Modes			1. Contour Torque Mode 2. Contour Speed Mode 3. Contour Position Mode 4. Cycle-Synchronous Position 5. Cycle-Synchronous Speed 6. Cycle-Synchronous Current 7. Analog Current 8. Analog Speed 9. Home Position Mode				
Protection Modes			1. STO Safe Torque Off 2. Undervoltage, overvoltage, and overcurrent 3. Driver overheating 4. Speed tracking error exceeded limit 5. Current tracking error exceeded limit 6. Position tracking error exceeded limit 7. Synchronization error exceeded limit 8. Communication error 9. Home position return failure				
Ambient Conditions			Operating temperature: 0-40° C / Storage temperature: -20-60° C Operating humidity / Storage humidity: 20-80% RH (non-condensing) Vibration resistance: 24.5 m/s ² (frequency: 10-400 Hz) Free from dust, metal particles, corrosive gases, flammable gases, oil mist, etc. For indoor use only; avoid direct sunlight Altitude below 1,000 m				
Motor Insulation			Insulation resistance: 100 MΩ or higher (500 V DC) Dielectric strength: 1500 V AC for 1 minute Insulation class: Class F				
Protection Rating			IP40				

FOR A MORE STABLE ROTATING JOINT MODULE,
CHOOSE HOBBER

HAG-40N

Without A Torque Sensor



Unit mm