

## ACR SERIES

- ▶ Small thickness and light weight
- ▶ Large center hole
- ▶ Integrated Hall sensor and temperature sensor
- ▶ Direct drive with high torque without cogging effect
- ▶ Limit-angle or 360-degree operation
- ▶ Multi-coil and multi-track configurations

### Introduction

Ironless ACR series arc motors are specifically designed for angular motion with constrained rotation angles less than 360 degrees. Compared with DDR motors, Akribis's ACR series arc motors feature larger center holes, lower profile form factors, and higher stiffness. When coupled with larger radius circular encoder scales and arc bearings, ACR motors can achieve better positioning, repeatability, and accuracy.

$T_{cn}$  (Continuous Torque) = 24.3Nm ~ 460.7Nm  
 $T_{pk}$  (Peak Torque) = 72.8Nm ~ 1382.2Nm

### Features

- ▶ Ironless technology and no cogging force
- ▶ Thin coil design with low mass
- ▶ High motor constant
- ▶ Big center hole
- ▶ Integrated hall sensors
- ▶ Flexible configuration with multiple coils or tracks
- ▶ Multiple coils connected in series or parallel to increase torque output
- ▶ Multiple tracks attaching together to extend angle of rotation

### Applications

In applications with limited angle of rotation where direct drive rotary motors are not necessary, ACR series arc motors can effectively lower cost and save space, particularly in systems with large radius of motion. Compared with conventional direct drive rotary motors, ACR arc motors can provide larger center hole, lower profile, and great torque output with optimized electromagnetic and mechanical design. ACR arc motors enable customers to develop more compact systems and to increase competitiveness in the market.

Akribis ACR series arc motors are applicable to G2.5, G4.5, G6, G8.5, G10.5 and G11 LCD, 8-inch or 12-inch wafer processing and inspection equipment, as well as biomedical devices, precision assembly and industrial printing machines.

#### Limit-angle type

Model	Power Radius (mm)
ACR240	240
ACR335	335
ACR820	820
ACR1525	1525

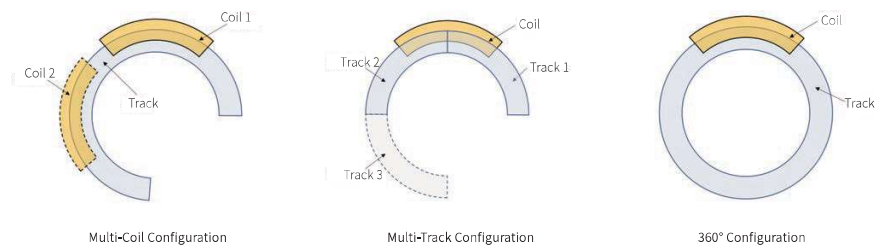
#### 360° type

Model	Power Radius (mm)
ACR240	240
ACR335	335
ACR820	820
ACR1525	1525

### Configurations

Akribis ACR series arc motors allow customers to flexibly configure systems based on their needs: multiple coils to increase torque output, or multiple tracks to increase range of motion. By attaching multiple tracks together, ACR motors can accomplish full 360° degrees of rotation.

(E.g. ACR240, ACR 335 and ACR820)

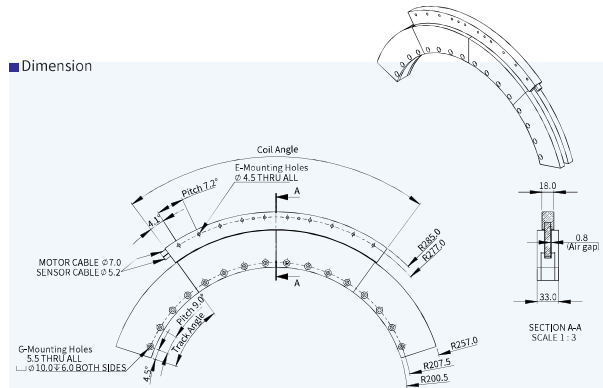


ACR240-S5

Specifications

Specification	Unit	ACR240-S5
Winding Type	-	Series
Continuous Torque @100°C	Nm	24.3
Peak Torque	Nm	72.8
Torque Constant	Nm/Arms	20.2
Back EMF Constant	Vpeak/rpm	1.7
Motor Constant	Nm/Sqrt(W)	2.8
Continuous Current @100°C	Arms	1.2
Peak Current	Arms	3.6
Resistance (Terminal to Terminal)	Ω	35.2
Inductance (Terminal to Terminal)	mH	21.3
Electrical Time Constant	ms	0.6
Air Gap	mm	0.8
Magnetic Period	degree	7.2
Coil Weight	kg	1.2

Dimension

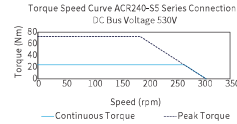


Magnet Track

Specification	Unit	ACR240-TR36
Arc Angle	degree	36°
Weight	kg	1.4
Moment of Inertia	kg·m <sup>2</sup>	0.07
G	-	4

- In the measurement of continuous current, the coil is mounted on the testing fixture and the ambient temperature is 25°C.
- In the measurement of line resistance, the ambient temperature is 25°C.

Torque-Speed Curve



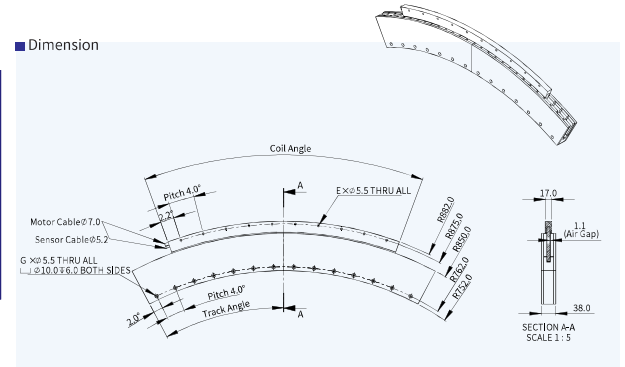
ACR240 Coil		
Coil Angle	E	
ACR240-S5	73.0°	10

ACR820-S5

Specifications

Specification	Unit	ACR820-S5
Winding Type	-	Series
Continuous Torque @100°C	Nm	331.5
Peak Torque	Nm	994.5
Torque Constant	Nm/Arms	195.0
Back EMF Constant	Vpeak/rpm	16.7
Motor Constant	Nm/Sqrt(W)	26.2
Continuous Current @100°C	Arms	1.7
Peak Current	Arms	5.1
Resistance (Terminal to Terminal)	Ω	37.0
Inductance (Terminal to Terminal)	mH	47.0
Electrical Time Constant	ms	1.3
Air Gap	mm	1.1
Magnetic Period	degree	4.0
Coil Weight	kg	2.5

Dimension

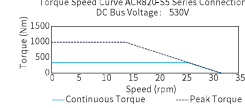


Magnet Track

Specification	Unit	ACR820-TR24	ACR820-TR28
Arc Angle	degree	24°	28°
Weight	kg	5.8	6.8
Moment of Inertia	kg·m <sup>2</sup>	3.8	4.4
G	-	6	7

- In the measurement of continuous current, the coil is mounted on the testing fixture and the ambient temperature is 25°C.
- In the measurement of line resistance, the ambient temperature is 25°C.

Torque-Speed Curve



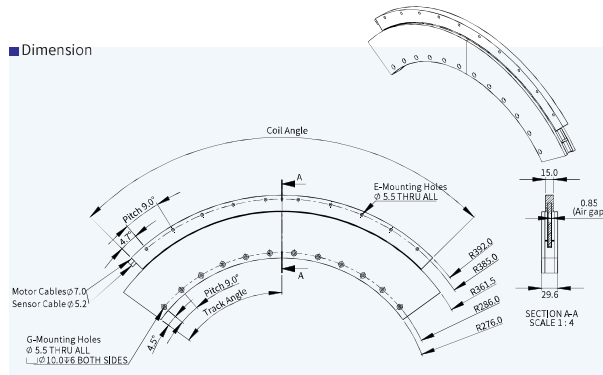
ACR820 Coil		
Coil Angle	E	
ACR820-S5	40.4°	10

ACR335-S5

Specifications

Specification	Unit	ACR335-S5
Winding Type	-	Series
Continuous Torque @100°C	Nm	92.3
Peak Torque	Nm	276.9
Torque Constant	Nm/Arms	77.2
Back EMF Constant	Vpeak/rpm	6.6
Motor Constant	Nm/Sqrt(W)	7.7
Continuous Current @100°C	Arms	1.2
Peak Current	Arms	3.6
Resistance (Terminal to Terminal)	Ω	67.1
Inductance (Terminal to Terminal)	mH	69.8
Electrical Time Constant	ms	1.0
Air Gap	mm	0.85
Magnetic Period	degree	9.0
Coil Weight	kg	1.8

Dimension

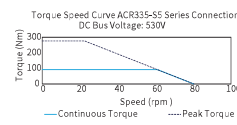


Magnet Track

Specification	Unit	ACR335-TR36	ACR335-TR54
Arc Angle	degree	36°	54°
Weight	kg	2.5	3.7
Moment of Inertia	kg·m <sup>2</sup>	0.26	0.39
G	-	4	6

- In the measurement of continuous current, the coil is mounted on the testing fixture and the ambient temperature is 25°C.
- In the measurement of line resistance, the ambient temperature is 25°C.

Torque-Speed Curve



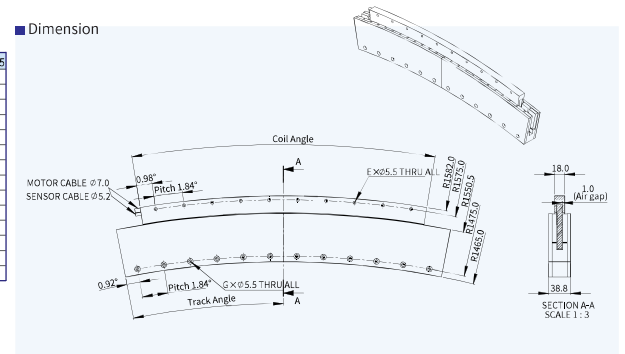
ACR335 Coil		
Coil Angle	E	
ACR335-S5	90.4°	10

ACR1525-S5

Specifications

Specification	Unit	ACR1525-S5
Winding Type	-	Series
Continuous Torque @100°C	Nm	460.7
Peak Torque	Nm	1382.2
Torque Constant	Nm/Arms	257.3
Back EMF Constant	Vpeak/rpm	22.0
Motor Constant	Nm/Sqrt(W)	31.6
Continuous Current @100°C	Arms	1.8
Peak Current	Arms	5.4
Resistance (Terminal to Terminal)	Ω	31.2
Inductance (Terminal to Terminal)	mH	37.5
Electrical Time Constant	ms	1.2
Air Gap	mm	1.0
Magnetic Period	degree	1.84
Coil Weight	kg	2.2

Dimension

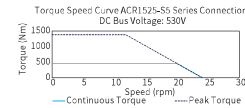


Magnet Track

Specification	Unit	ACR1525-TR11.04
Arc Angle	degree	11.04°
Weight	kg	4.4
Moment of Inertia	kg·m <sup>2</sup>	10.0
G	-	6

- In the measurement of continuous current, the coil is mounted on the testing fixture and the ambient temperature is 25°C.
- In the measurement of line resistance, the ambient temperature is 25°C.

Torque-Speed Curve



ACR1525 Coil		
Coil Angle	E	
ACR1525-S5	18.52°	10

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Motor Cable Connection

**MOTOR CABLE**

PIN	DESCRIPTION	COLOR
-	M1	BLACK1
-	M2	BLACK2
-	M3	BLACK3
-	PE	YELLOW/GREEN

DETAIL A SCALE 1:1

**HALL CABLE**

PIN	DESCRIPTION	COLOR
1	HA	GREEN
2	HB	YELLOW
3	HC	GREY
4	SWDC	BROWN
5	QWDC	WHITE
8	T1	PINK
9	T2	BLUE

DEFAULT - FLYING LEADS  
OPTION - D-SUB 9 PINS (MALE)

THERMAL SENSOR WIRE  
(K TYPE - PT100)

Part Numbering

Motor Coil

**ACR820-S-S5-K-H9D-1.0-FB**

Model: ACR240 / ACR335 / ACR820 / ACR1525

Connection: S = Series

Size: S9

Ferrite Bead Options: NFB7, FB

Cable length (m): 1.0

Hall options: HT7, HT9

Thermal sensor: KPT100 (RTD)

- Please refer to the **Specifications** for the available connection types.
- HF = comes with built-in hall sensor & hall cable terminated in flying leads (standard).
- H9D = comes with built-in hall sensor & hall cable terminated with 9-Pins D-Sub connector.
- NFB = motor cable terminated in flying leads without ferrite bead (standard).
- FB = motor cable terminated with ferrite bead.

Motor Track

**ACR820-TR28**

Model: Example: ACR820

Track angle: Example: TR28 = 28 degrees

- Please refer to **Dimensions** for available tracks.

Motor Cable Specifications

Motor Type	Outer Diameter (mm)	Min. Bending Radius (Flexible Use)	Min. Bending Radius (Fixed Laying)
AUM1	4.1	12×outer diameter	5×outer diameter
AUM2 / 3 / 4 / 5	6.0	10×outer diameter	5×outer diameter
AUM6	9.5	12×outer diameter	6×outer diameter
AJM , AQM	7.4	10×outer diameter	5×outer diameter
AKM30-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM50-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM100-B1 / B2 / B4	8.0	10×outer diameter	5×outer diameter
AKM150-B4 / B8	9.5	10×outer diameter	5×outer diameter
AKM200-B4 / B8	9.5	10×outer diameter	5×outer diameter
ACR335	6.8	10×outer diameter	4×outer diameter
ACR820	6.8	10×outer diameter	4×outer diameter
ACR1525	6.8	10×outer diameter	4×outer diameter

Hall Cable Specifications

Motor Type	Outer Diameter (mm)	Min. Bending Radius (Flexible Use)	Min. Bending Radius (Fixed Laying)
AUM	3.8	10×outer diameter	5×outer diameter
AUM6	5.2	12×outer diameter	6×outer diameter
AJM , AQM	3.8	10×outer diameter	5×outer diameter
AKM	5.2	10×outer diameter	5×outer diameter
ACR335	5	12×outer diameter	6×outer diameter
ACR820	5	12×outer diameter	6×outer diameter
ACR1525	5	12×outer diameter	6×outer diameter

Motor Wire Specifications

Motor Type	Outer Diameter (mm)	Min. Bending Radius (Flexible Use)	Min. Bending Radius (Fixed Laying)
AWM1	1.5	10×outer diameter	5×outer diameter
AWM2	1.5	10×outer diameter	5×outer diameter
AWM3	1.5	10×outer diameter	5×outer diameter
AWM4	2.2	10×outer diameter	5×outer diameter
AWM5	2.6	10×outer diameter	5×outer diameter