

# ROTATION STAGES

## 5.152 Ultra Precision Rotation Stage UPR-270 AIR



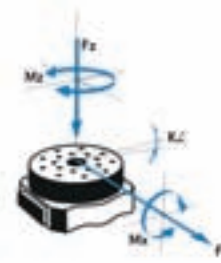
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z Peak(Nm)$	$k^*x(\mu rad/Nm)$
TM-050	100	400	4.8	10	30



### KEY FEATURES

- High-precision air bearings
- Torque motor
- Uni-directional repeatability down to  $0.00003^\circ$
- Flatness and eccentricity  $\pm 0.07 \mu m$
- Wobble  $\pm 1.25 \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 40 kg (center mounted on top of the platform)
- Integrated inductive reference switch
- Integrated angular scale
- Free center hole 35 mm diameter
- Optionally double head system for higher accuracy



The UPR-270 AIR ultra-precision rotation stage was developed for dynamic positioning with a maximum of precision. The high precision air-bearing insure excellent flatness, wobble and accuracy values. All UPR-270 AIR rotation stages are directly driven by a torque motor. The UPR-270 AIR is equipped with an angular scale system and a reference switch. Standard resolutions of up to  $0.00002^\circ$  can be achieved.

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 0.05$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 0.07$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 1.25$	
Weight (kg)	33	
Motor	TM-050	
Linear scale		AE-015
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00001
Resolution typical ( $^\circ$ )		0.00002
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.00005$
Uni-directional Repeatability ( $^\circ$ )		0.00003
Nominal Current (A)	2	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.0005 ... 360	
Material	Aluminum, black anodized / stainless steel (rotary platform)	

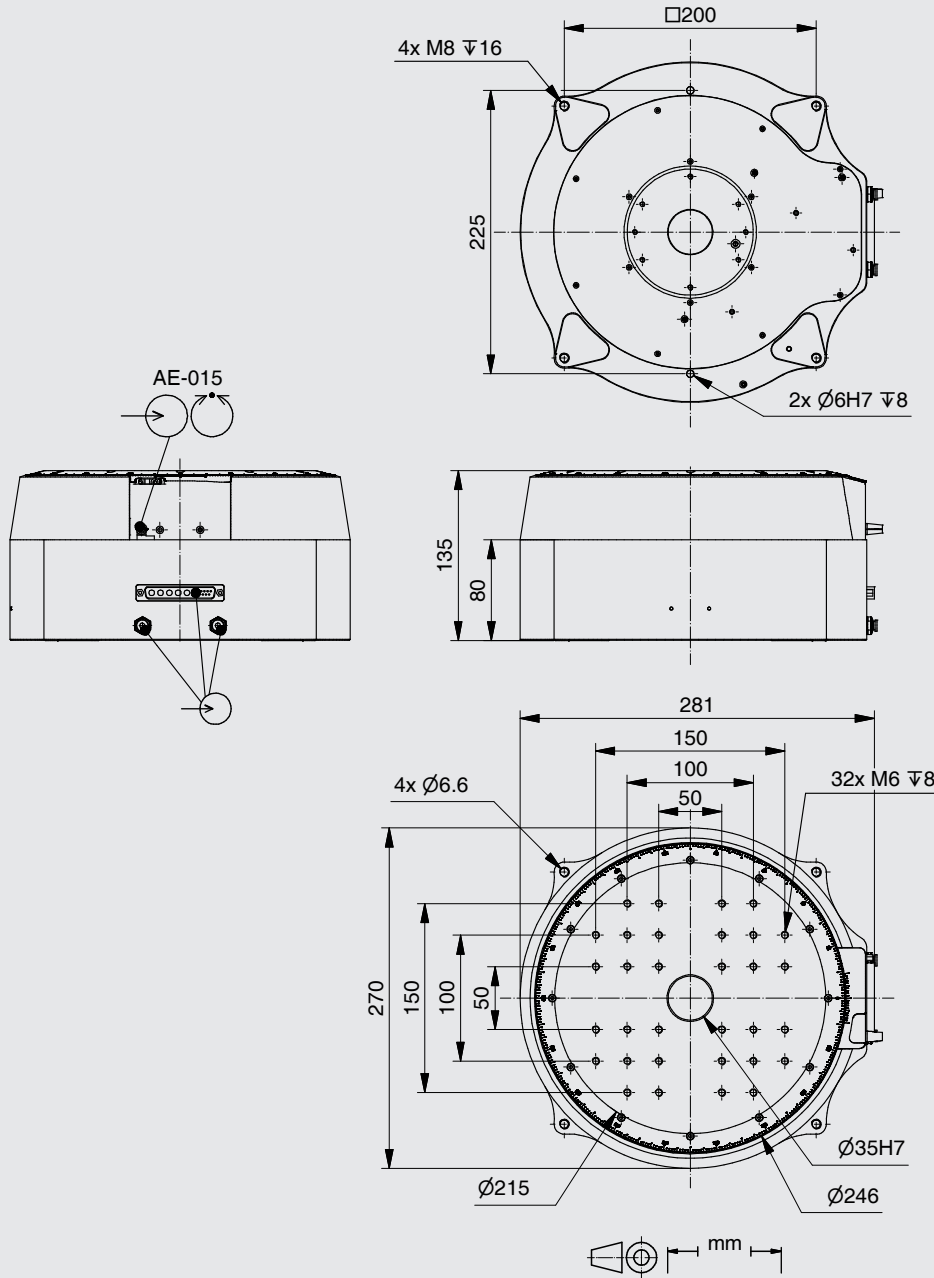
Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- AFW-65



Order No.	6829-9-	0
TM-050	1	
AE-015, Angular scale	0	

## 5.154 Ultra Precision Rotation Stage UPR-270



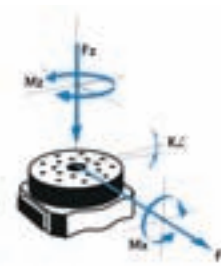
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z \text{ Peak}(Nm)$	$k \times X(\mu rad/Nm)$
TM-050	200	400	4.5	10	8



### KEY FEATURES

- High-precision bearings
- Torque motor
- Uni-directional repeatability down to  $0.00007^\circ$
- Flatness and eccentricity  $\pm 1 \mu m$
- Wobble  $\pm 15 \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 40 kg (center mounted on top of the platform)
- Integrated inductive reference switch
- Free center hole 60 mm diameter
- Integrated angular scale
- Optionally double head system for higher accuracy



The UPR-270 ultra-precision rotation stages are mainly utilized in the field of semiconductor technology, for positioning systems of laser treatment, robotics and synchrotron applications and high load applications. All UPR rotation stages are directly driven by a torque motor, eliminating the need for mechanical transmissions. This results in better positioning accuracies, higher acceleration and speed. Calibrated paired angular ball bearings guarantee a high central load capacity without breakdown torque. The UPR rotation stages are equipped with a high resolution angular scale and with an inductive reference switch.

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 1$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 2.5$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 15$	
Weight (kg)	29	
Motor	TM-050	
Linear scale		AE-015
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00001
Resolution typical ( $^\circ$ )		0.00005
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.0001$
Uni-directional Repeatability ( $^\circ$ )		0.00007
Nominal Current (A)	2	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.001 ... 360	
Material	Aluminum, black anodized / stainless steel (rotary platform)	

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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UPR-160 AIR

UPR-160

UPR-120 AIR

UPR-120

UPR-100 AIR

UPR-100

TRS-65

PRS-200

PRS-110

DT-65 N

RS-40

DT-80

DT-80 R

DT-50

DT-34

WT-120

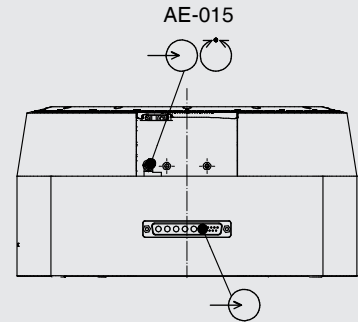
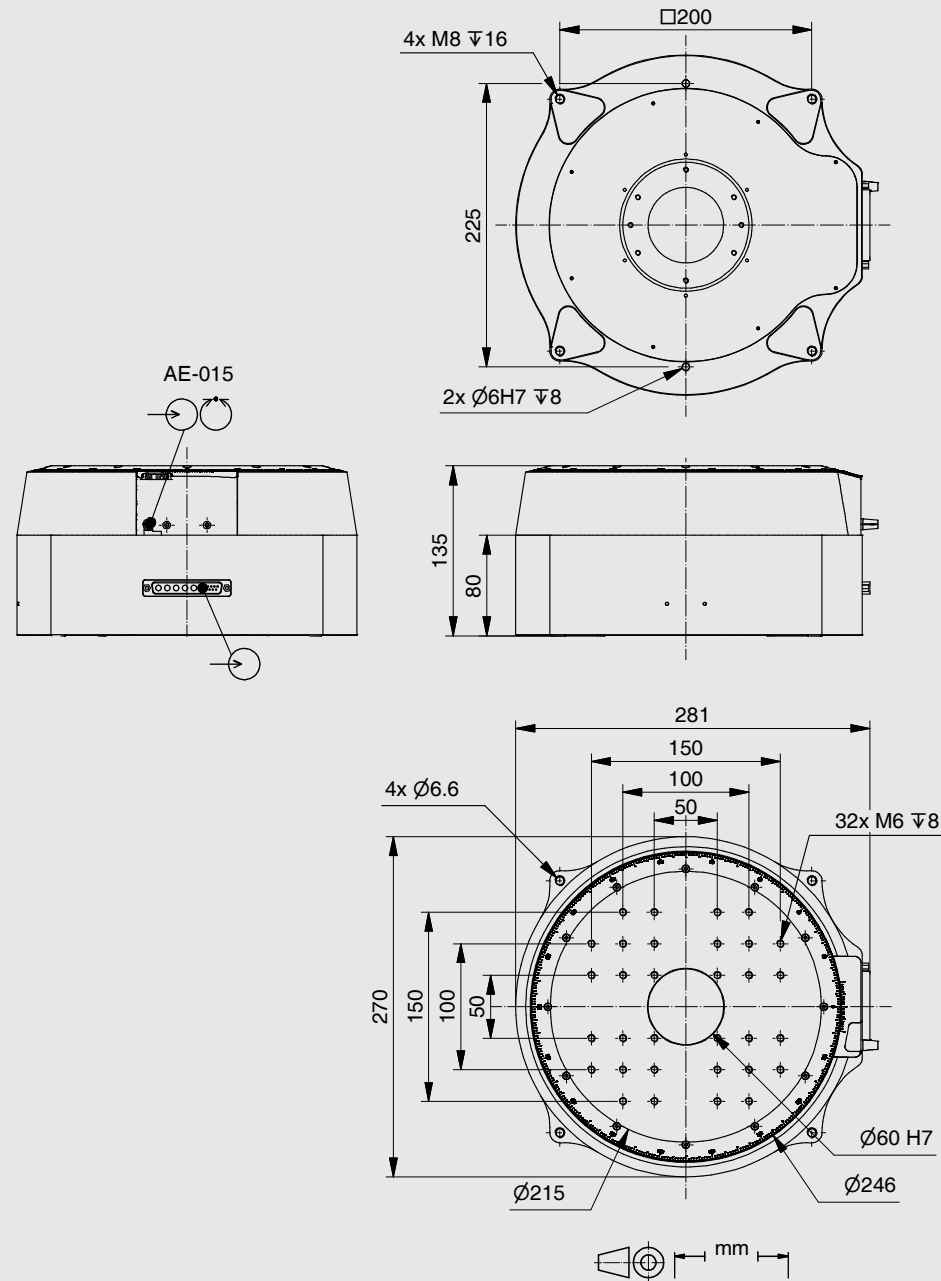
WT-90

WT-100

WT-85

TT-65

AFW-65



Order No.	6814-9-	0
TM-050	1	
AE-015, Angular Scale	0	

## 5.156 Ultra Precision Rotation Stage UPR-160 AIR



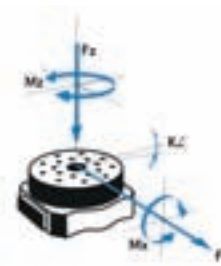
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z \text{ Peak}(Nm)$	$k+x(\mu rad/Nm)$
TM-010	40	200	0.7	2	40



### KEY FEATURES

- High precision air bearings
- Torque motor
- Uni-directional repeatability down to  $0.00005^\circ$
- Flatness and eccentricity  $\pm 0.1 \mu m$
- Wobble  $\pm 1.25 \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 20 kg (center mounted, on top of the platform)
- Integrated inductive reference switch
- Free center hole 35 mm diameter
- Integrated angular scale



The UPR-160 AIR ultra-precision rotation stage was developed for maximum precision dynamic positioning applications. The high precision air-bearing insure excellent flatness, wobble and accuracy values. All UPR-160 AIR rotation stages are directly driven by a torque motor. The UPR-160 AIR is equipped with an angular scale system and reference switches. Standard resolutions of up to  $0.00004^\circ$  can be achieved.

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 0.05$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 0.1$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 1.25$	
Weight (kg)	7.5	
Motor	TM-010	
Linear scale		AE-051
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00002
Resolution typical ( $^\circ$ )		0.00004
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.00008$
Uni-directional Repeatability ( $^\circ$ )		0.00005
Nominal Current (A)	2.4	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.0005 ... 360	
Material	Aluminum, black anodized / stainless steel (rotary platform)	

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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**UPR-160 AIR**

UPR-160

UPR-120 AIR

UPR-120

UPR-100 AIR

UPR-100

TRS-65

PRS-200

PRS-110

DT-65 N

RS-40

DT-80

DT-80 R

DT-50

DT-34

WT-120

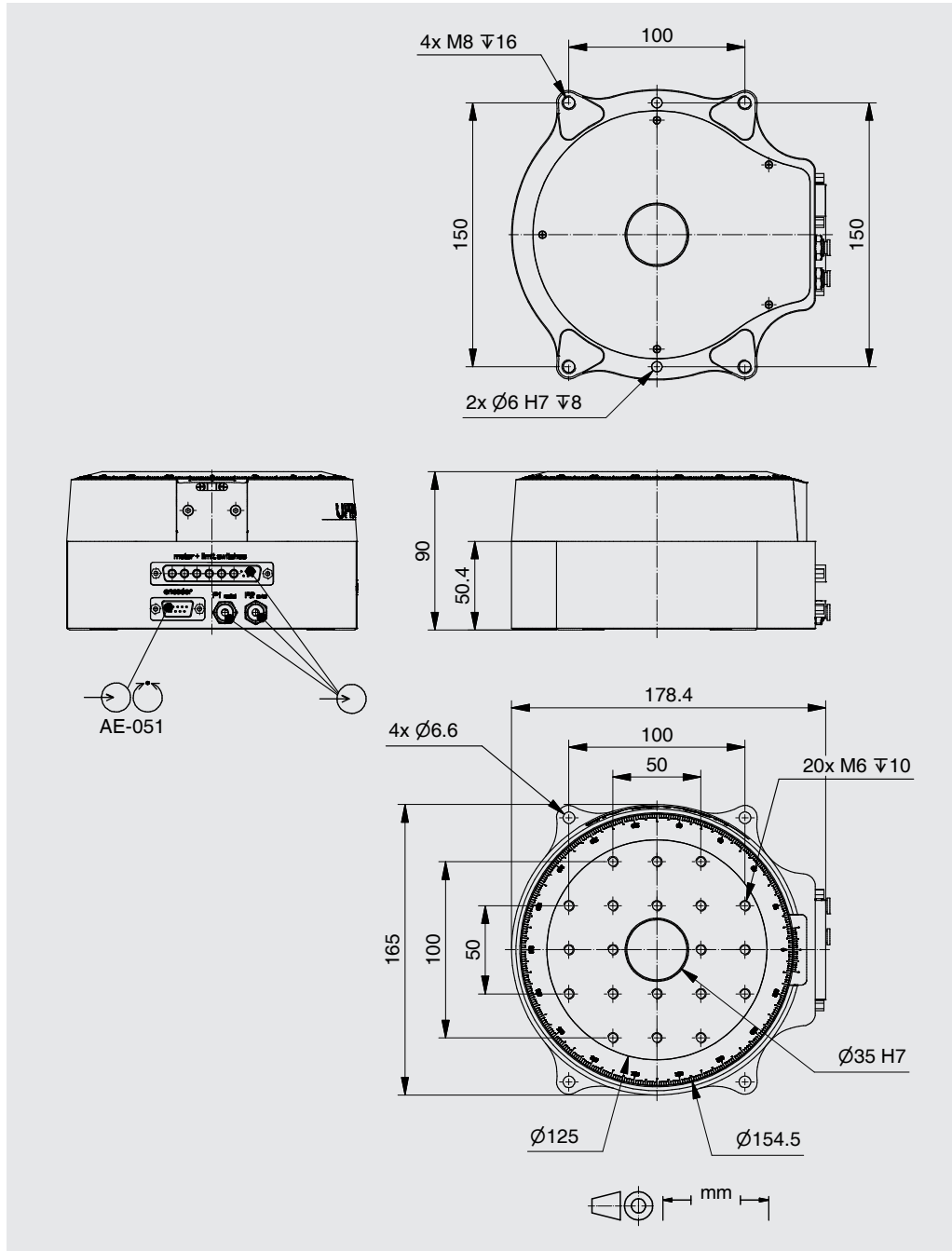
WT-90

WT-100

WT-85

TT-65

AFW-65



Order No.	6826-9-	0
TM-010		1
AE-051, Angular Scale		0

## 5.158 Ultra Precision Rotation Stage UPR-160



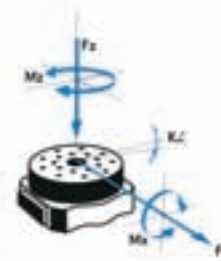
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z \text{ Peak}(Nm)$	$k^+x(\mu rad/Nm)$
TM-010	100	200	0.5	2	16



### KEY FEATURES

- High-precision bearings
- Torque motor
- Uni-directional repeatability down to  $0.00008^\circ$
- Flatness and eccentricity  $\pm 3 \mu m$
- Wobble  $\pm 25 \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 20 kg (center mounted, on top of the platform)
- Integrated inductive reference switch
- Free center hole 35 mm diameter
- Integrated angular scale



The UPR-160 ultra-precision rotation stages are mainly utilized in the field of semiconductor technology, for positioning of laser treatment systems, robotics and synchrotron applications for rather fast applications. All UPR rotation stages are directly driven by a torque motor, eliminating the need for mechanical transmissions. This results in better positioning accuracies, higher acceleration and speed. Calibrated, paired angular ball bearings guarantee a high central load capacity without breakdown torque. The UPR-160 rotation stages are equipped with a high resolution angular scale and with inductive limit switches.

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 1$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 3$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 25$	
Weight (kg)	6	
Motor	TM-010	
Linear scale		AE-051
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00002
Resolution typical ( $^\circ$ )		0.00008
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.0001$
Uni-directional Repeatability ( $^\circ$ )		0.00008
Nominal Current (A)	2.4	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.001 ... 360	
Material	Aluminum, black anodized / stainless steel (rotary platform)	

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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UPR-270

UPR-160 AIR

**UPR-160**

UPR-120 AIR

UPR-120

UPR-100 AIR

UPR-100

TRS-65

PRS-200

PRS-110

DT-65 N

RS-40

DT-80

DT-80 R

DT-50

DT-34

WT-120

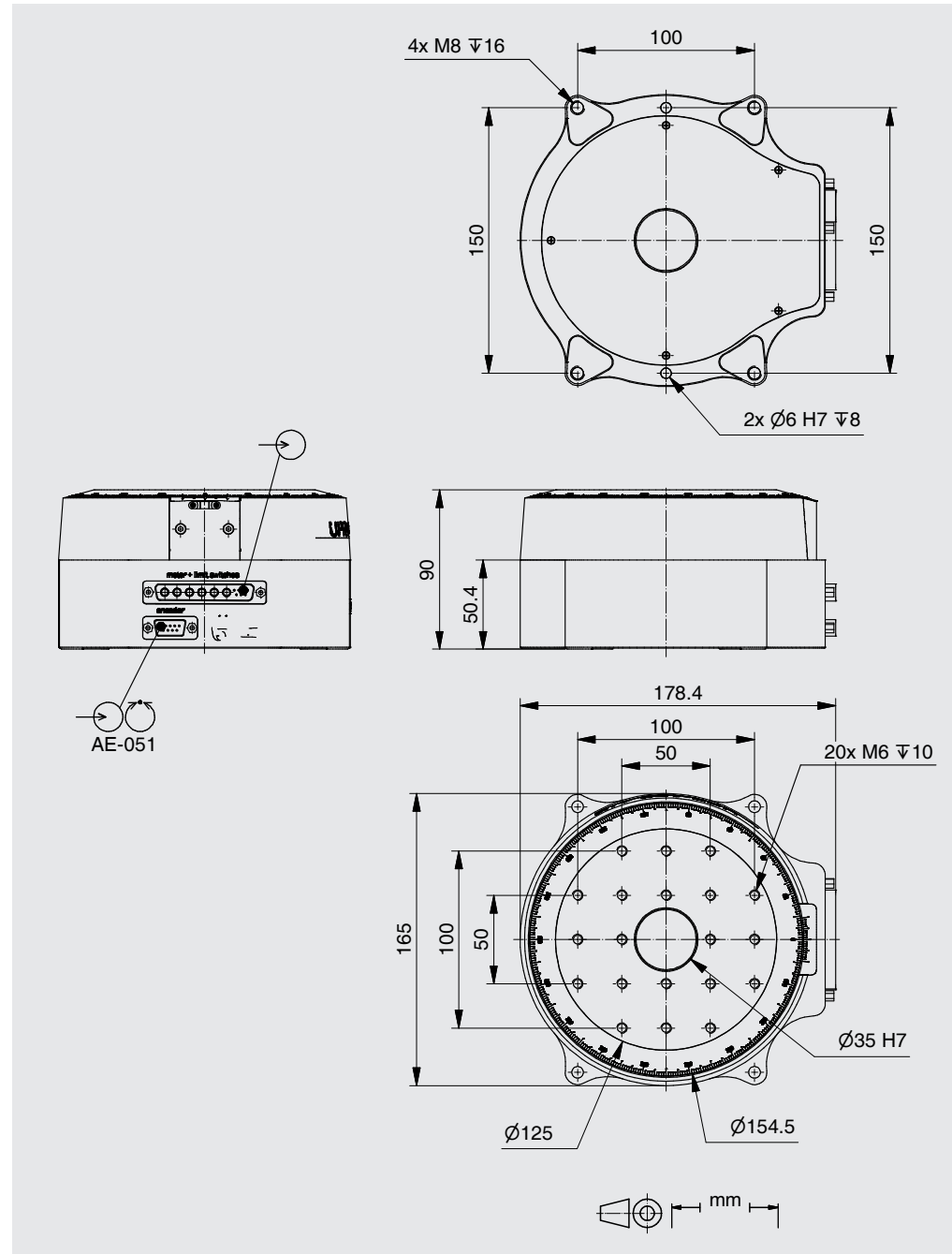
WT-90

WT-100

WT-85

TT-65

AFW-65



Order No.	6811-9-	0
TM-010		1
AE-051, Angular Scale		0

## 5.160 Ultra Precision Rotation Stage UPR-120 AIR



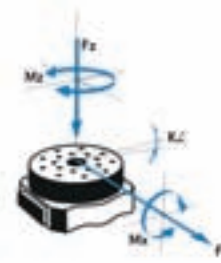
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z Peak(Nm)$	$k^+x(\mu rad/Nm)$
TM-012	40	200	0.7	2	40



### KEY FEATURES

- High-precision air bearings
- Torque motor
- Uni-directional repeatability down to  $0.00005^\circ$
- Flatness and eccentricity  $\pm 0.1\mu m$
- Wobble  $\pm 1.25\mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 20 kg (center mounted, on top of the platform)
- Integrated optical reference switch
- Free center hole 35 mm diameter
- Integrated angular scale
- Optionally double head system for higher accuracy



The UPR-120 AIR ultra-precision rotation stage was developed for dynamic positioning with a maximum precision. Due to the use of a high precision air-bearing, the stage achieves excellent values for flatness, wobble and accuracy. All UPR-120 AIR rotation stages are directly driven by a torque motor. The UPR-120 AIR is equipped with an angular scale system and an optical reference switch. For higher positioning accuracies or resolutions, the UPR-120 AIR can be offered with different angular scales or even a double head scale system.

### TECHNICAL DATA

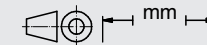
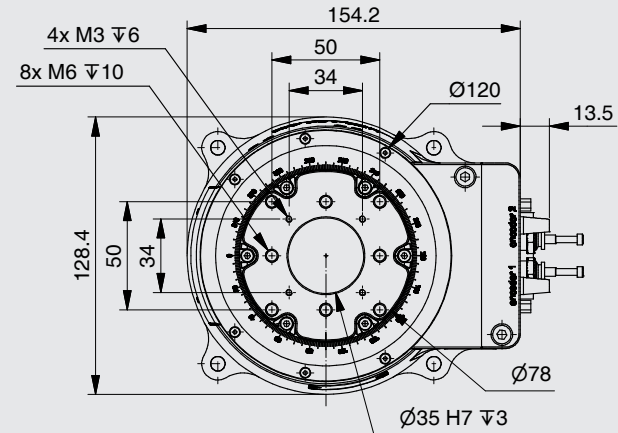
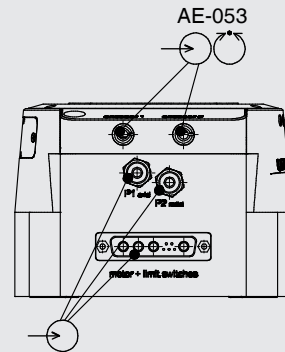
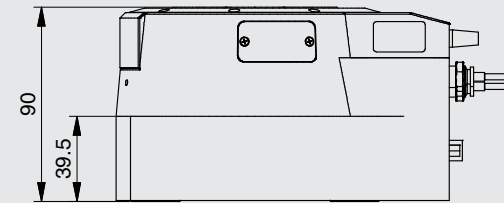
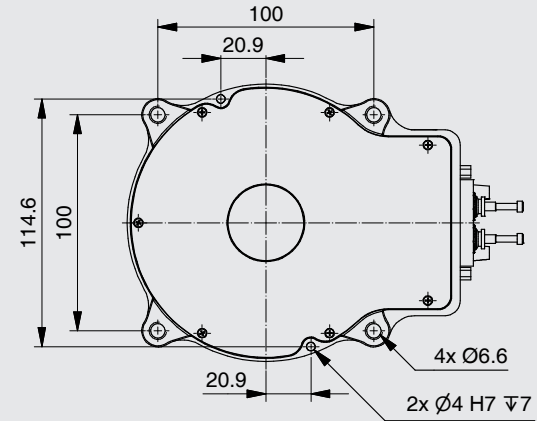
Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 0.05$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 0.1$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 1.25$	
Motor	TM-012	
Linear scale		AE-053
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00002
Resolution typical ( $^\circ$ )		0.00004
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.00008$
Uni-directional Repeatability ( $^\circ$ )		0.00005
Nominal Current (A)	2.4	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.0005 ... 360	
Material	Aluminum, black anodized / stainless steel (rotary platform)	

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- PRS-110
- DT-65 N
- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6824-9-	1	0
TM-012		1	
AE-053, Angular scale		1	
OLS-012, Optical switches		3	

## 5.162 Ultra Precision Rotation Stage UPR-120



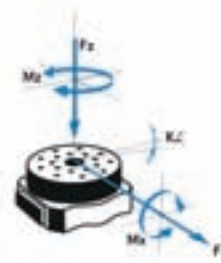
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_z(Nm)$	$M_z Peak(Nm)$	$k \times X(\mu rad/Nm)$
TM-012	100	200	0.5	2	16



### KEY FEATURES

- High-precision bearings
- Torque motor
- Uni-directional repeatability down to  $0.00008^\circ$
- Flatness and eccentricity  $\pm 3 \mu m$
- Wobble  $\pm 25 \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 20 kg (center mounted, on top of the platform)
- Integrated optical reference switch
- Free center hole 35 mm diameter
- Integrated angular scale
- Optionally double head system for higher accuracy



positioning applications. This stage is mainly used in the field of semiconductor technology, for positioning of laser treatment systems, robotics and synchrotron applications. All rotation stages from the UPR series are directly driven by a torque motor, eliminating the need for mechanical transmissions. This results in better positioning accuracy, higher acceleration and speed. Calibrated cross roller bearings guarantee a high central load capacity without breakdown torque. The UPR-120 rotation stages are equipped with a high resolution angular scale and with a contactless limit switch.

The UPR-120 ultra-precision rotation stage was developed for fast and accurate

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 1$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 3$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 25$	
Weight (kg)	6	

Motor	TM-012	AE-053
Linear scale		AE-053
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )	0.00002	0.00002
Resolution typical ( $^\circ$ )	0.00008	0.00008
Bi-directional Repeatability ( $^\circ$ )	$\pm 0.0001$	$\pm 0.0001$
Uni-directional Repeatability ( $^\circ$ )	0.00008	0.00008
Nominal Current (A)	2.4	

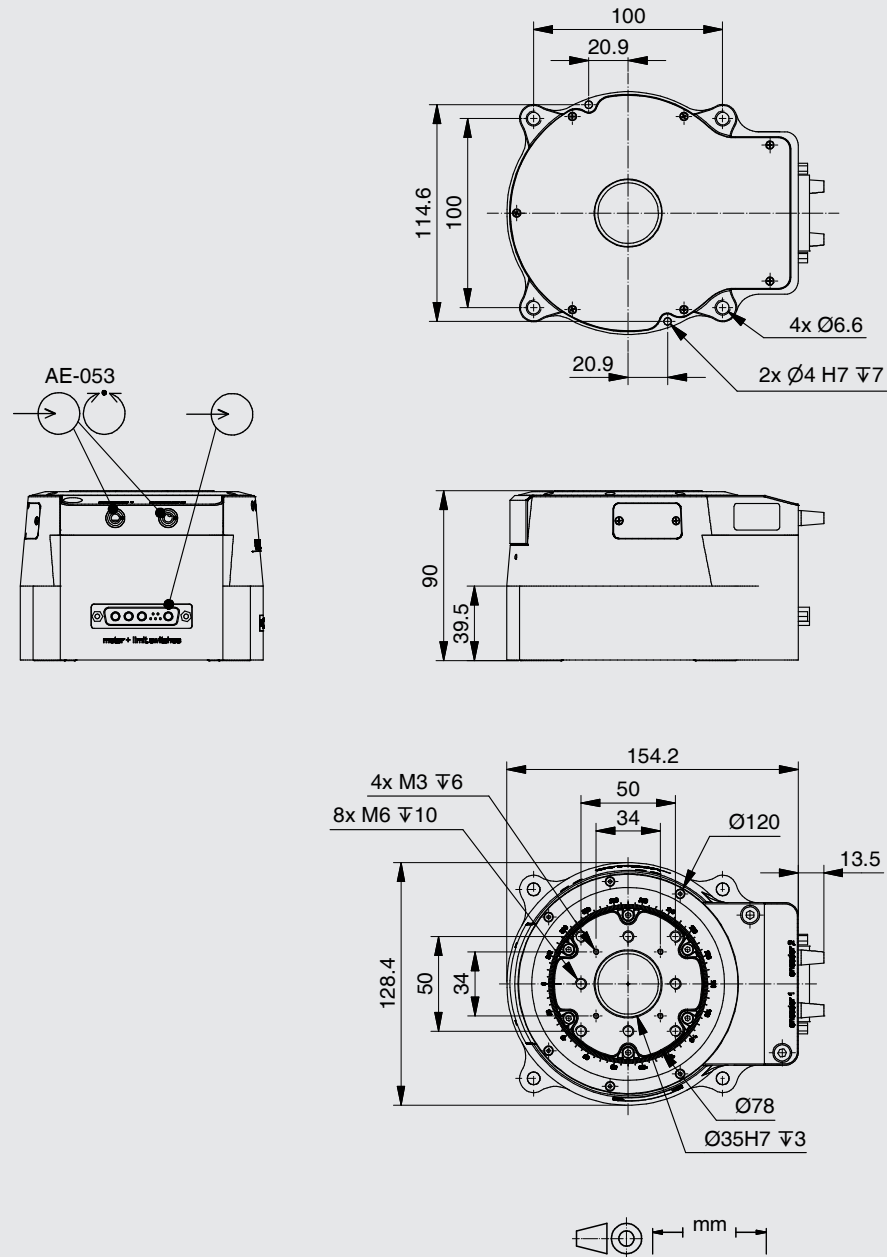
Accuracy	on request
Velocity range ( $^\circ/sec$ )	0.001 ... 360
Material	Aluminum, black anodized / stainless steel (rotary platform)

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6808-9-	1	0
TM-012		1	
AE-053, Angular scale		1	
OLS-012, Optical switches		3	

## 5.164 Ultra Precision Rotation Stage UPR-100 AIR



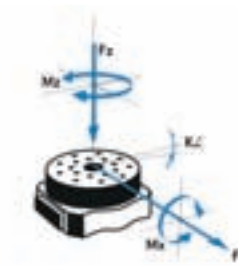
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$M_z Peak(Nm)$
TM-030	7.5	15	0.05	0.25	0.5



### KEY FEATURES

- High-precision air bearings
- Torque motor
- Uni-directional repeatability down to 0.00005°
- Flatness and eccentricity  $\pm 0.2 \mu m$
- Wobble  $\pm 5 \mu rad$
- Maximum speed 360°/sec
- Load capacity up to 1.5 kg (center mounted, on top of the platform)
- Integrated reference mark (encoder index)
- Free center hole 8 mm diameter
- Integrated angular scale



The UPR-100 AIR ultra-precision rotation stages are developed for maximum precision dynamic positioning applications. Due to the high precision air-bearing the stage can achieve excellent values for flatness, wobble and accuracy. All UPR-100 AIR rotation stages are directly driven by a torque motor. The UPR-100 AIR is equipped with an angular scale system and reference switches. The standard resolution is 0.00004°.

### TECHNICAL DATA

Travel range (°)	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 0.1$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 0.2$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 5$	
Weight (kg)	1.2	
Motor	TM-030	
Linear scale		AE-080
Speed max. (°/sec)	360	
Resolution calculated (°)		0.00002
Resolution typical (°)		0.00004
Bi-directional Repeatability (°)		$\pm 0.00008$
Uni-directional Repeatability (°)		0.00005
Nominal Current (A)	1.2	
Accuracy	on request	
Velocity range (°/sec)	0.0005 ... 360	
Material	Aluminum, black anodized	

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

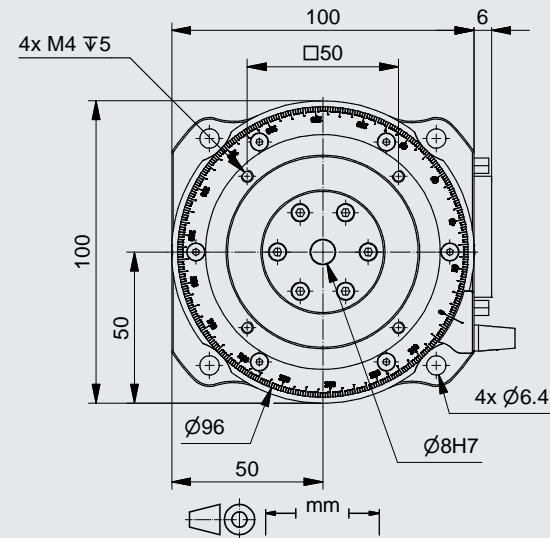
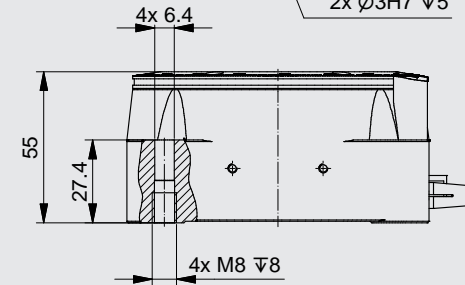
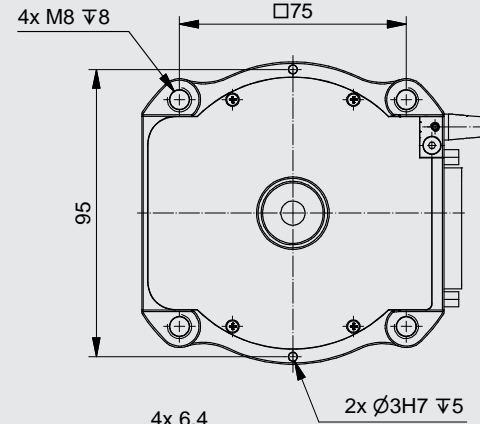
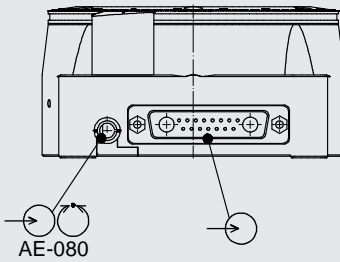
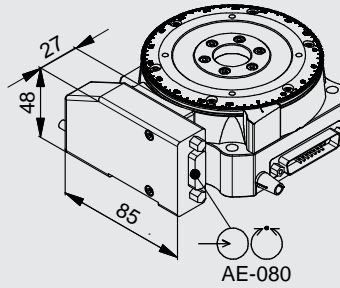
Error and technical modifications are subject to change

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- PRS-110
- DT-65 N
- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6823-9-	1	
TM-030		1	
AE-080, Angular scale		1	
HLS-010, Hall switches		1	

## 5.166 Ultra Precision Rotation Stage UPR-100



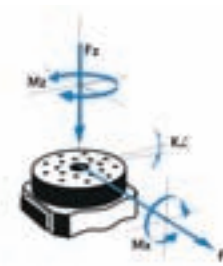
### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$M_z\text{ Peak}(Nm)$	$k^{+x}(\mu rad/Nm)$
TM-030	15	20	5	0.25	0.5	80



### KEY FEATURES

- High-precision bearings
- Torque motor
- Uni-directional repeatability down to  $0.00008^\circ$
- Flatness and eccentricity  $\pm 2.5\ \mu m$
- Wobble  $\pm 25\ \mu rad$
- Maximum speed  $360^\circ/sec$
- Load capacity up to 2 kg (center mounted, on top of the platform)
- Integrated reference mark (encoder index)
- Free center hole 20 mm diameter
- Integrated angular scale



The UPR-100 ultra-precision rotation stages are mainly utilized in the field of semiconductor technology, for positioning of laser treatment systems, robotics and synchrotron applications. All rotation stages from the UPR series are directly driven by a torque motor, eliminating the need for mechanical transmissions. This results in better positioning accuracies, higher acceleration and speed. Calibrated paired angular ball bearings guarantee a high central load capacity. The UPR-100 rotation stages are equipped with a high resolution angular scale and with hall limit switches.

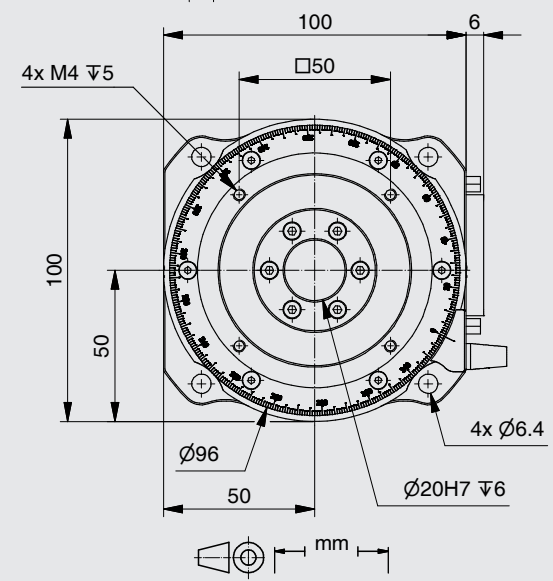
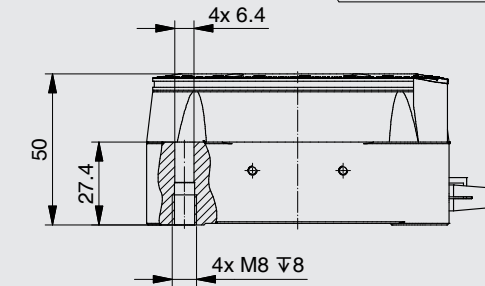
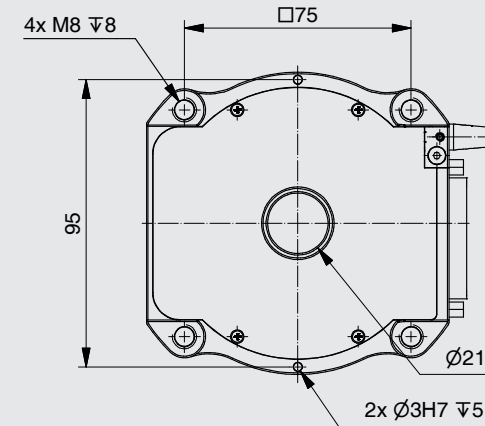
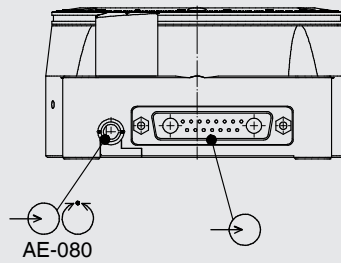
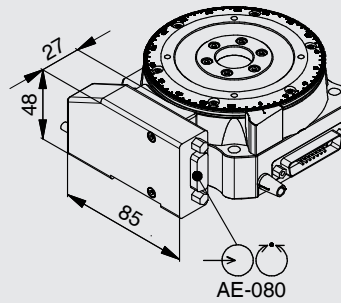
### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless	
Flatness (Bearings) ( $\mu m$ )	$\pm 1$	
Eccentricity (Bearings) ( $\mu m$ )	$\pm 3.5$	
Wobble (Bearings) ( $\mu rad$ )	$\pm 25$	
Weight (kg)	1.2	
Motor	TM-030	
Linear scale		AE-080
Speed max. ( $^\circ/sec$ )	360	
Resolution calculated ( $^\circ$ )		0.00002
Resolution typical ( $^\circ$ )		0.00008
Bi-directional Repeatability ( $^\circ$ )		$\pm 0.0001$
Uni-directional Repeatability ( $^\circ$ )		0.00008
Nominal Current (A)	1.2	
Accuracy	on request	
Velocity range ( $^\circ/sec$ )	0.002 ... 360	
Material	Aluminum, black anodized	

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change





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- PRS-200
- PRS-110
- DT-65 N
- R5-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65

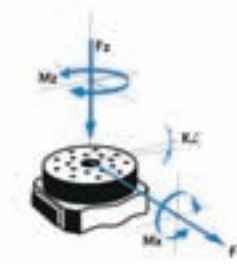
Order No.	6805-9-	1	
TM-030		1	
AE-080, Angular scale		1	
HLS-010, Hall switches		1	

## 5.168 Torque Rotation Stage TRS-65



### FACTS

Load characteristics	$F_{x(N)}$	$F_{z(N)}$	$M_{x(Nm)}$	$M_{z(Nm)}$
TM-040	3	5	5	0.05



The TRS-65 precision rotation stage was developed for fast and accurate positioning applications in a smaller 45° travel range, typically on top of an XY stage stack. It is a perfect fit for the LMS-60 and LMS-80 linear motor driven stages. It is mainly utilized in the field of semiconductor technology, for positioning of laser treatment systems and robotics. The TRS-65 is directly driven by a torque motor eliminating the need for mechanical transmissions. This results in better positioning accuracies, higher acceleration and speed and a longer operating life.

### KEY FEATURES

- Torque motor
- Travel range 45°
- Maximum speed 360 °/sec
- Load capacity up to 0.5 kg
- Integrated hall limit switches
- Integrated angular scale

### TECHNICAL DATA

Travel range (°)	45	
Flatness (Bearings) (µm)	± 2	
Eccentricity (Bearings) (µm)	± 3	
Wobble (Bearings) (µrad)	± 30	
Weight (kg)	0.75	
Motor	TM-040	
Linear scale		AE-055
Speed max. (°/sec)	360	
Resolution calculated (°)		
Resolution typical (°)	0.0005	
Bi-directional Repeatability (°)	± 0.0005	
Uni-directional Repeatability (°)	0.00025	
Nominal Current (A)		
Accuracy	on request	
Velocity range (°/sec)	0.001 ... 360	
Material	Stainless steel	

Note: FS = full step, RE = rotary encoder

More info: Detailed information concerning motors and encoders, see appendix.

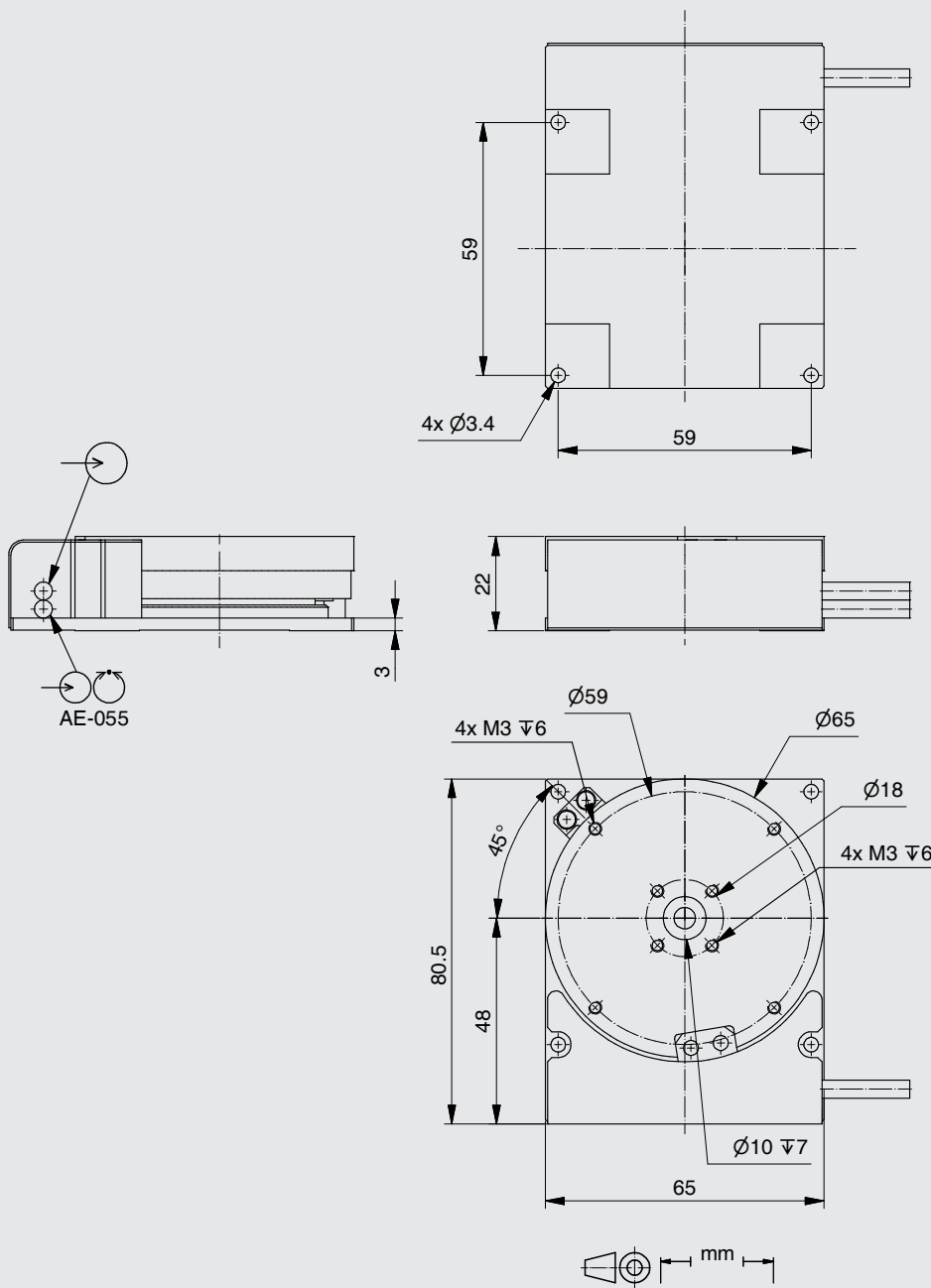
Error and technical modifications are subject to change

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- UPR-100

**TRS-65**

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- PRS-110
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- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



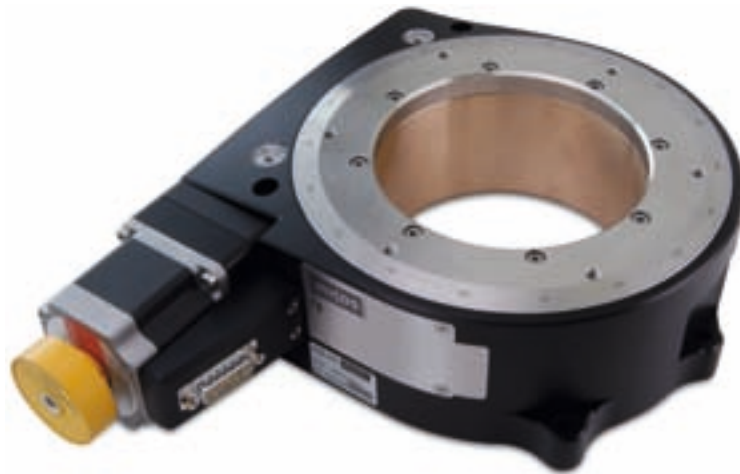
Order No.	6803-9-				
TM-040		1			
45°		1			
AE-055		1			
HLS-020, Hall switches		1			

## 5.170 Precision Rotation Stage PRS-200



### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-088	200	500	60	4	10
2Phase-070	200	500	60	4	10



### KEY FEATURES

- Uni-directional repeatability down to 0.0003°
- Maximum speed 150°/sec
- Load capacity up to 50 kg
- Integrated reference hall limit switches
- Limit switch adjustable
- Option: angular scale
- Clear aperture 120 mm



from a special, high-rigidity, tempered aluminum alloy. Two calibrated preloaded zero backlash precision roller bearings guarantee an excellent flatness and smooth motion. A hardened and ground screw worm combined with a calibrated worm gear guarantee a quiet and smooth motion. As an option, the PRS-200 stages can be delivered with an integrated optical angular scale. The PRS-200 rotation stages are equipped with two reference switches which can be easily adjusted by the user. Drive variations including a DC or 2-phase stepper motor are available.

The large 120 mm diameter clear aperture is particularly significant for the PRS-200 rotation stages. The body is fabricated

### TECHNICAL DATA

Travel range (°)	360, endless				
Flatness (Bearings) (μm)	± 1				
Eccentricity (Bearings) (μm)	± 2.5				
Wobble (Bearings) (μrad)	± 17.5				
Weight (kg)	8				
<b>Motor</b>	<b>DC-B-088</b>		<b>2Phase-070</b>		
Linear scale					<b>AE-068</b>
Speed max. (°/sec)	75	150	35	60	
Resolution calculated (°)	0.0001	0.0002 (RE)	0.01	0.02 (FS)	0.00008
Resolution typical (°)	0.001		0.001	0.002	0.0003
Bi-directional Repeatability (°)	± 0.01		± 0.01		± 0.0005
Uni-directional Repeatability (°)	0.002		0.002		0.0003
Nominal Current (A)	4.35		2		
Voltage Range (V)	48				
Worm gear reduction	180:1   90:1				
Accuracy	on request				
Velocity range (°/sec)	0.001 ... 150				
Material	Aluminum, black anodized, stainless steel, red brass				

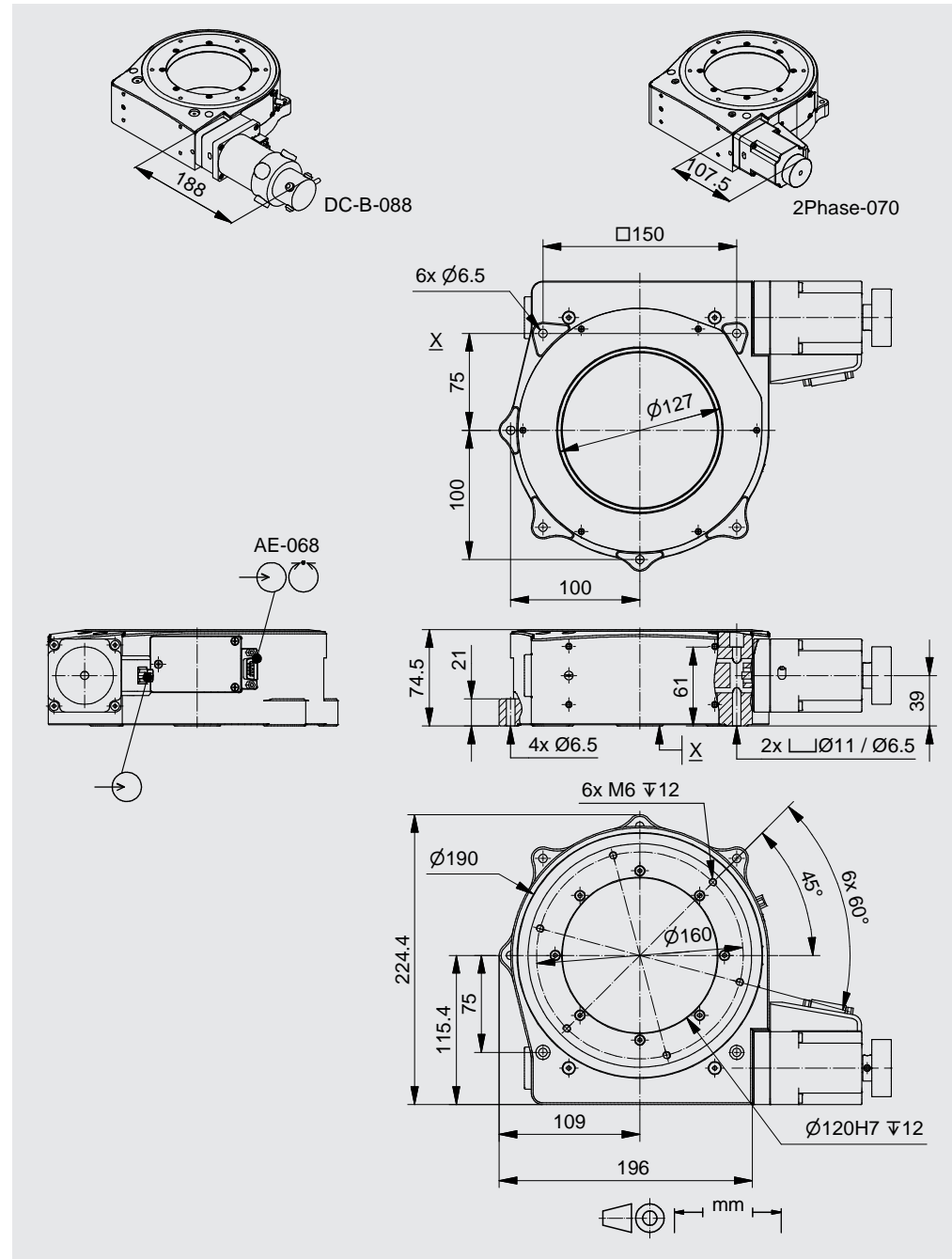
Note: FS = full step, RE = rotary encoder

More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- WT-100
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- TT-65
- AFW-65



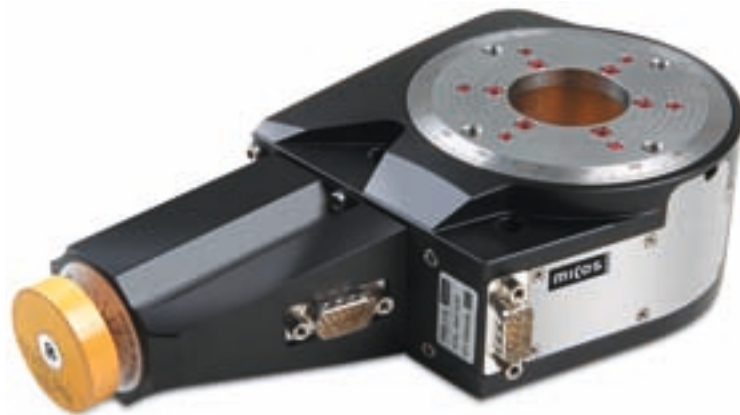
Order No.	6449-9-	1		
DC-B-088		1		
2Phase-070		2		
without AE-068		0		
AE-068, Angular scale		1		
HLS-010, Hall switches		1		
Worm gear reduction 180:1		1		
Worm gear reduction 90:1		2		

## 5.172 Precision Rotation Stage PRS-110



### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-040	50	100	40	3	30
2Phase-033	50	100	40	3	30



### KEY FEATURES

- Uni-directional repeatability down to  $0.0002^\circ$
- Maximum speed  $200^\circ/\text{sec}$
- Load capacity up to 10 kg
- Integrated mechanical limit switches
- Limit switch adjustable
- Option: angular scale
- Clear aperture 35 mm



The PRS-110 precision rotation stages can be used in a wide range of industrial and scientific applications. They are a good fit with the LS-110 linear stages and ES-100 elevation stages. The body is fabricated from a special, high-rigidity

tempered aluminum alloy. Two calibrated and preloaded four-point contact bearings guarantee excellent wobble, flatness and eccentricity specifications. A hardened and ground worm screw combined with a calibrated worm gear insure a smooth and accurate motion. The PRS-110 precision rotation stages can be equipped with optical angular scales. Resolutions up to  $0.0002^\circ$  are standard. The PRS-110 precision rotation stages are equipped with reference switches and are motorized with DC or 2-phase stepper motors.

### TECHNICAL DATA

Travel range ( $^\circ$ )	360, endless
Flatness (Bearings) ( $\mu\text{m}$ )	$\pm 1$
Eccentricity (Bearings) ( $\mu\text{m}$ )	$\pm 2.5$
Wobble (Bearings) ( $\mu\text{rad}$ )	$\pm 15$
Weight (kg)	2.6

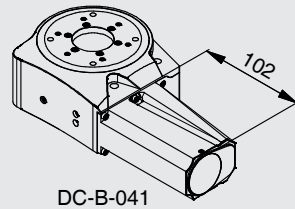
Motor	DC-B-040	2Phase-033	AE-050
Linear scale			AE-050
Speed max. ( $^\circ/\text{sec}$ )	200	50	
Resolution calculated ( $^\circ$ )	0.0002 (RE)	0.02 (FS)	0.0001
Resolution typical ( $^\circ$ )	0.002	0.002	0.0002
Bi-directional Repeatability ( $^\circ$ )	$\pm 0.01$	$\pm 0.01$	$\pm 0.0002$
Uni-directional Repeatability ( $^\circ$ )	0.002	0.002	0.0002
Nominal Current (A)	3.8	1.2	
Voltage Range (V)	24		

Worm gear reduction	90:1
Accuracy	on request
Velocity range ( $^\circ/\text{sec}$ )	0.002 ... 200
Material	Aluminum, black anodized, stainless steel, red brass

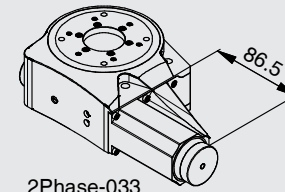
Note: FS = full step, RE = rotary encoder

More info: Detailed information concerning motors and encoders, see appendix.

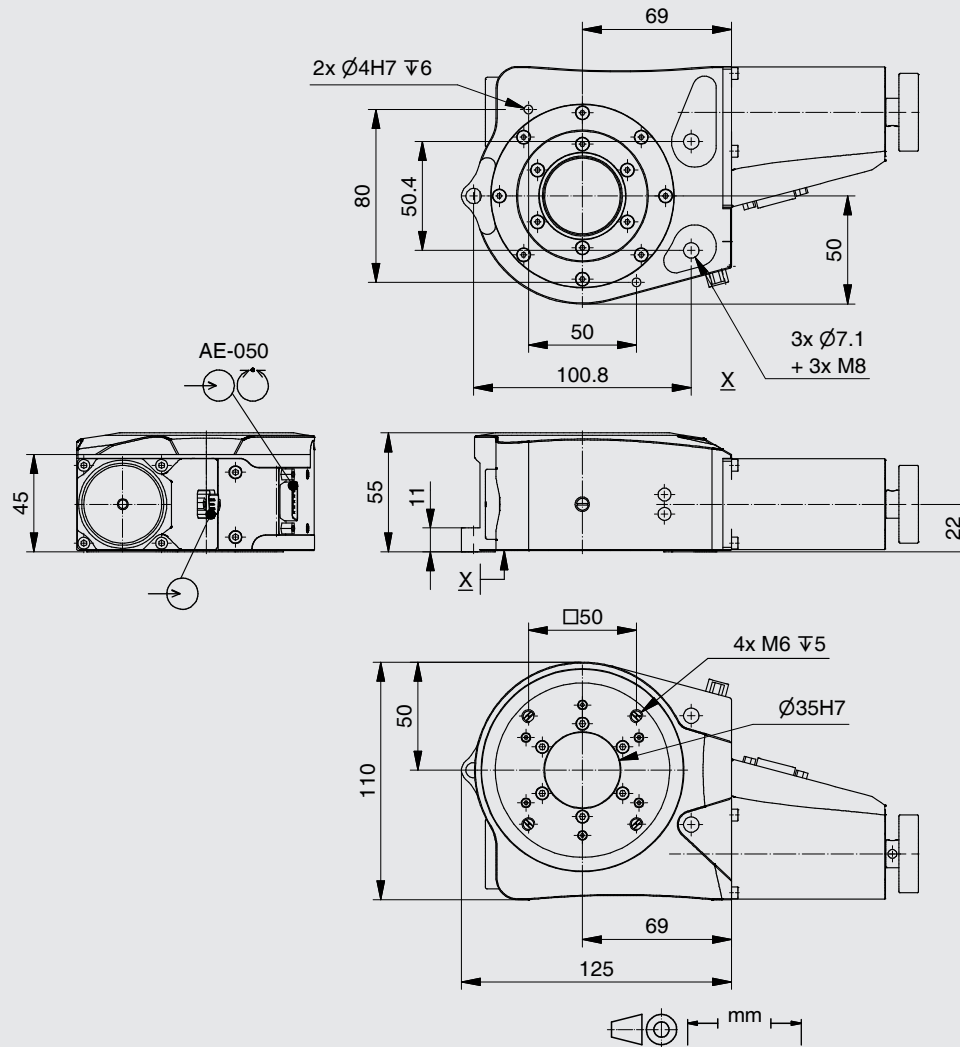
Error and technical modifications are subject to change



DC-B-041



2Phase-033



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- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65

Order No.	6447-9-	0
DC-B-040		1
2Phase-033		2
without AE-050		0
AE-050, Angular scale		1

## FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-031	15	30	10	0.8	180
2Phase-045	15	30	10	0.8	180



The rotation stages DT-65 N are fabricated from a special high-rigidity tempered aluminum alloy. A pre-loaded four-point double row ball bearing guarantees good wobble and flatness specifications. A hardened and ground worm screw combined with a calibrated worm gear guarantees minimum backlash. All motorized rotation DT-65 N stages are equipped with a reference switch. Drive variations such as DC or 2-phase stepper motors are available.



## KEY FEATURES

- Uni-directional repeatability down to 0.002 °
- Maximum speed 60 °/sec
- Load capacity up to 3 kg
- Integrated mechanical reference switch
- Clear aperture 25 mm
- Optionally rotary encoder on the rotation axis

## TECHNICAL DATA

Travel range (°)	360, endless	
Flatness (Bearings) (µm)	± 6	
Eccentricity (Bearings) (µm)	± 6	
Wobble (Bearings) (µrad)	± 30	
Weight (kg)	1.3	
<b>Motor</b>	<b>DC-B-031</b>	<b>2Phase-045</b>
Speed max. (°/sec)	60	45
Resolution calculated (°)	0.001 (RE)	0.01 (FS)
Resolution typical (°)	0.002	0.002
Bi-directional Repeatability (°)	± 0.01	± 0.01
Uni-directional Repeatability (°)	0.002	0.002
Nominal Current (A)	1.96	1.2
Voltage Range (V)	24	
Worm gear reduction	180:1	
Accuracy	on request	
Velocity range (°/sec)	0.001 ... 60	
Material	Aluminum, black anodized, red brass	

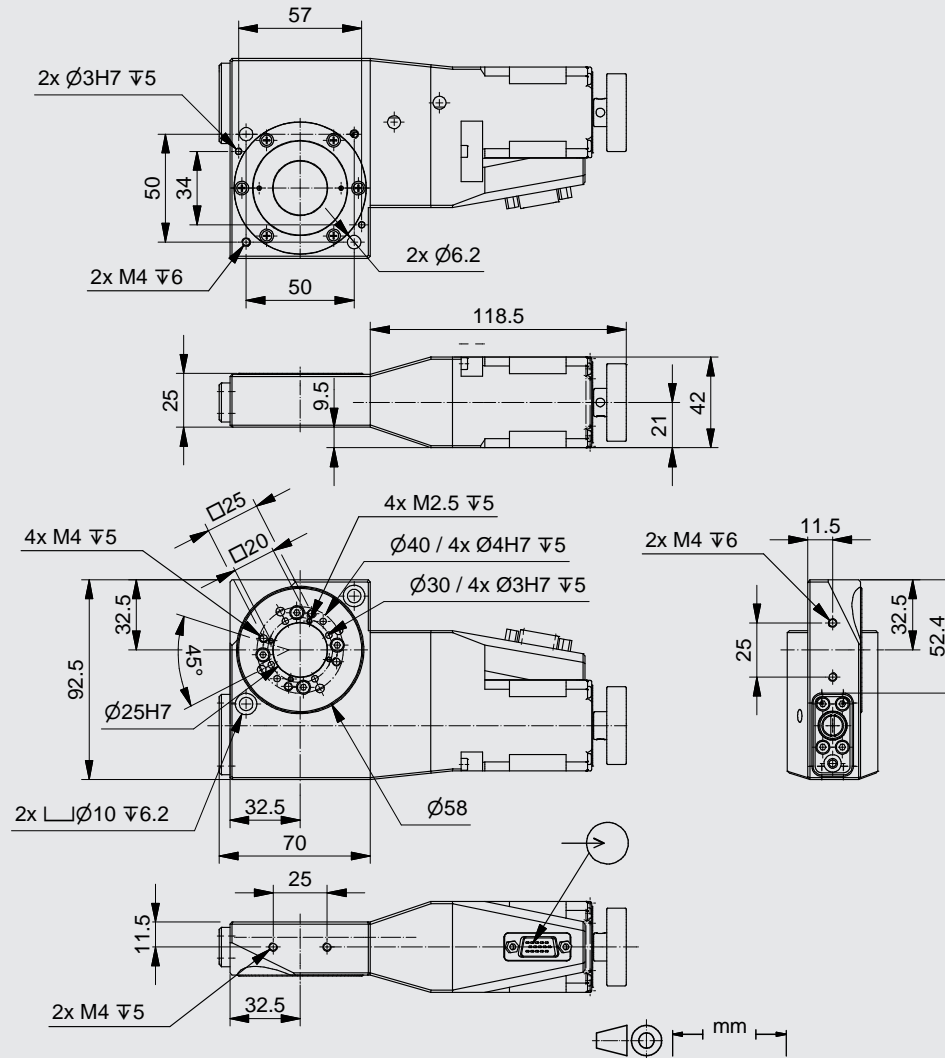
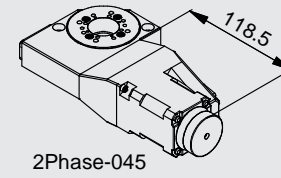
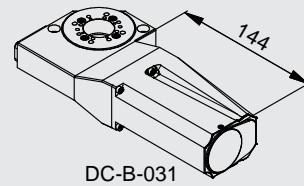
Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6440-9-	0	0
DC-B-031		1	
2Phase-045		3	

## 5.176 Rotation Stage RS-40

NEW

V

### FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-009	10	20	2	0.2	270
2Phase-010	5	10	1	0.2	270



The RS-40 rotation stage is very compact but offers a big 20 mm (25 mm holding diameter) aperture. A precision bearing guarantees a perfectly smooth move. The RS-40 rotation stages have nearly zero backlash worm gear reduction. All RS-40 motorized rotation stages are equipped with a hall reference switch and are offered with a DC or geared stepper motor.



### KEY FEATURES

- Clear aperture 20 mm
- Uni-directional repeatability down to 0.005 °
- Maximum speed 7 °/sec
- Load capacity up to 1 kg
- Integrated hall reference switch
- Optionally rotary encoder on the rotation axis

### TECHNICAL DATA

Travel range (°)	360, endless	
Flatness (Bearings) (µm)	± 5	
Eccentricity (Bearings) (µm)	± 5	
Wobble (Bearings) (µrad)	± 35	
Weight (kg)	0.4	
Motor	DC-B-009	2Phase-010
Speed max. (°/sec)	7	5
Resolution calculated (°)	0.00003 (RE)	0.0021961 (FS)
Resolution typical (°)	0.005	0.005
Bi-directional Repeatability (°)	± 0.04	± 0.04
Uni-directional Repeatability (°)	0.005	0.005
Nominal Current (A)	0.16	0.25
Voltage Range (V)	12	
Worm gear reduction	90:1	
Accuracy	on request	
Velocity range (°/sec)	0.002 ... 7	
Material	Aluminum, black anodized, stainless steel, red brass	

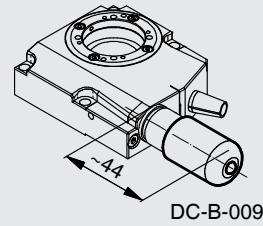
Note: FS = full step, RE = rotary encoder

More info: Detailed information concerning motors and encoders, see appendix.

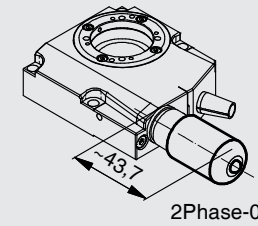
Error and technical modifications are subject to change

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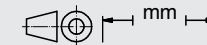
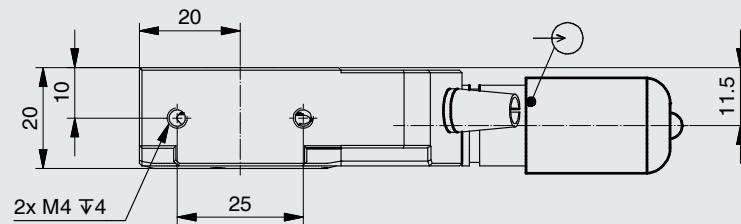
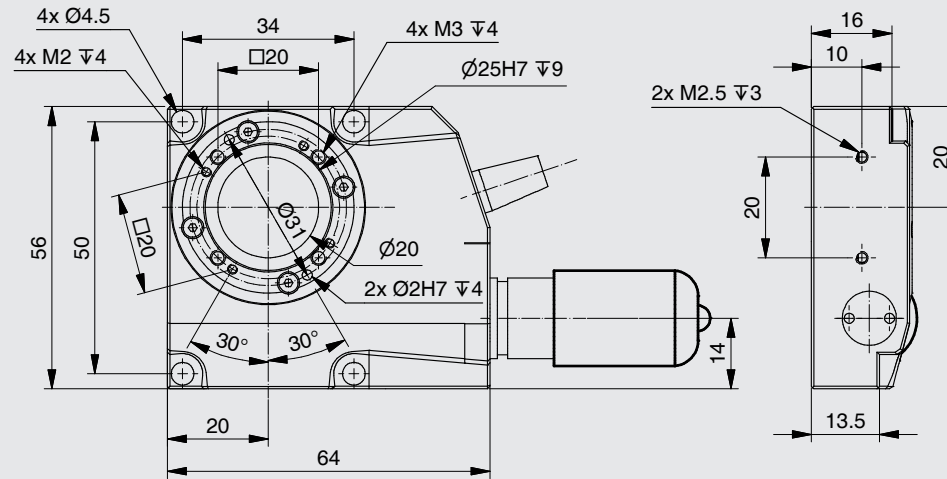
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- UPR-160
- UPR-120 AIR
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- DT-65N
- RS-40**
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



DC-B-009



2Phase-010



Order No.	3216-9-	0	0
DC-B-009		1	
2Phase-010		2	
HLS-010, Hall switch		1	

FACTS

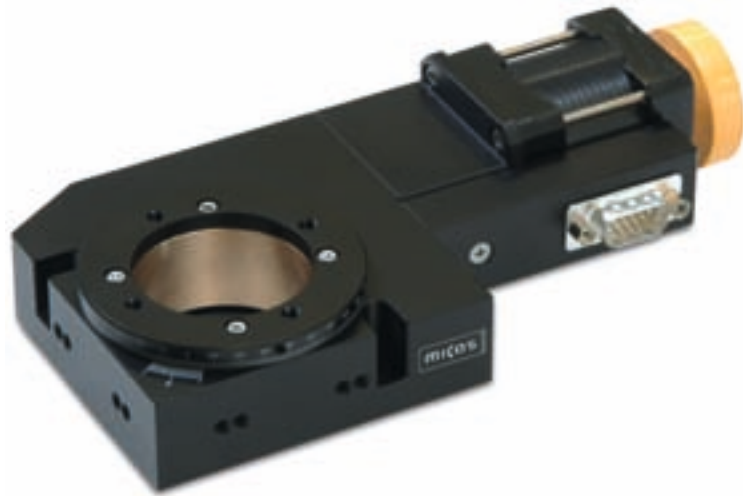
Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-029	10	20	5	0.1	150
2Phase-041	10	20	5	0.1	150
2Phase-042	10	20	5	0.1	150



PRS-110 high precision rotation stages. They are mainly developed for simple positioning in the laboratory. The large aperture of 40 mm diameter is suitable for many applications in the microscopy area. The worm screw and worm gear combination is preloaded to produce a near "zero-backlash" and smooth motion. Rotation stages of the DT-80 series can be driven by a DC or 2-phase stepper motor and are equipped with a mechanical reference switch.

Additionally the DT-80 can be ordered with our SMC pollux motor-controller module (2Phase-042).

The DT-80 rotation stages are a low cost alternative to the PI miCos DT-65 N and



KEY FEATURES

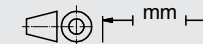
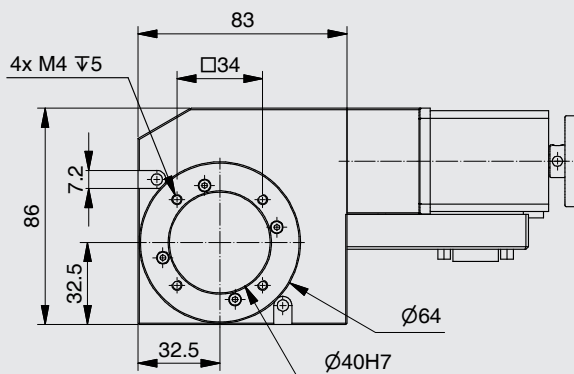
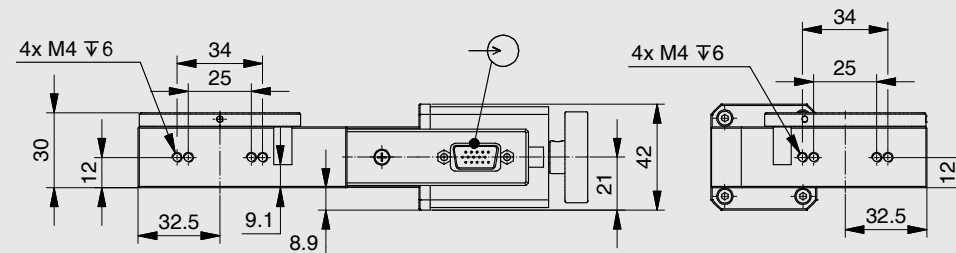
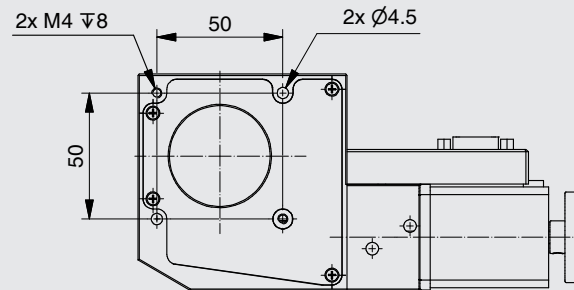
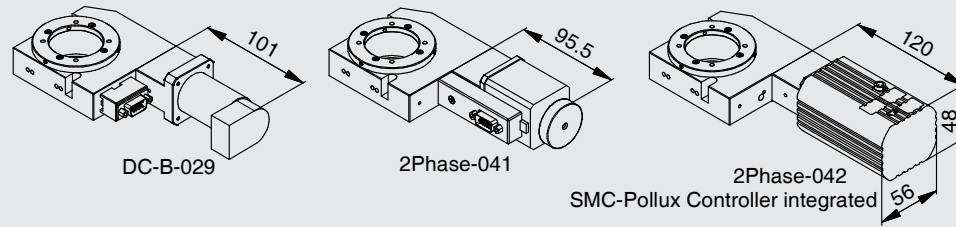
- Uni-directional repeatability down to 0.01 °
- Maximum speed 40 °/sec
- Load capacity up to 2 kg
- Integrated mechanical reference switch
- Clear aperture 40 mm

TECHNICAL DATA

Travel range (°)	360, endless		
Flatness (Bearings) (µm)	± 30		
Eccentricity (Bearings) (µm)	± 30		
Wobble (Bearings) (µrad)	± 100		
Weight (kg)	0.8		
<b>Motor</b>	<b>DC-B-029</b>	<b>2Phase-041</b>	<b>2Phase-042</b>
Speed max. (°/sec)	40	30	30
Resolution calculated (°)	0.001 (RE)	0.01 (FS)	0.01 (FS)
Resolution typical (°)	0.004	0.004	0.004
Bi-directional Repeatability (°)	± 0.5	± 0.5	± 0.5
Uni-directional Repeatability (°)	0.01	0.01	0.01
Nominal Current (A)	1.17	1.7	0.5
Voltage Range (V)	24		
Worm gear reduction	180:1		
Accuracy	on request		
Velocity range (°/sec)	0.001 ... 40		
Material	Aluminum, black anodized, red brass		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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Order No.	6443-9-	0	0
DC-B-029		1	
2Phase-041		2	
2Phase-042		4	

FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-013	10	20	5	0.1	150
2Phase-047	10	20	5	0.1	150
2Phase-042	10	20	5	0.1	150



The DT-80 R rotation stage is a low cost alternative to the PI miCos DT-65 N and PRS-110 high precision rotation stages. The preloaded belt driven DT-80 R produces a nearly zero backlash and smooth motion and allows a much higher speed of rotation in comparison to other stages. The large aperture of 40 mm diameter is suitable for many applications in the microscopy area. The DT-80 R is equipped with hall reference switches and is driven by a DC or 2-phase stepper motor. Additionally the DT-80 R can be ordered with our SMC pollux motor-controller module.



KEY FEATURES

- Uni-directional repeatability down to 0.01 °
- Maximum speed 1170 °/sec
- Load capacity up to 2 kg
- Integrated hall reference switches
- Limit switches adjustable
- Clear aperture 40 mm
- Optionally totally closable iris diaphragm

TECHNICAL DATA

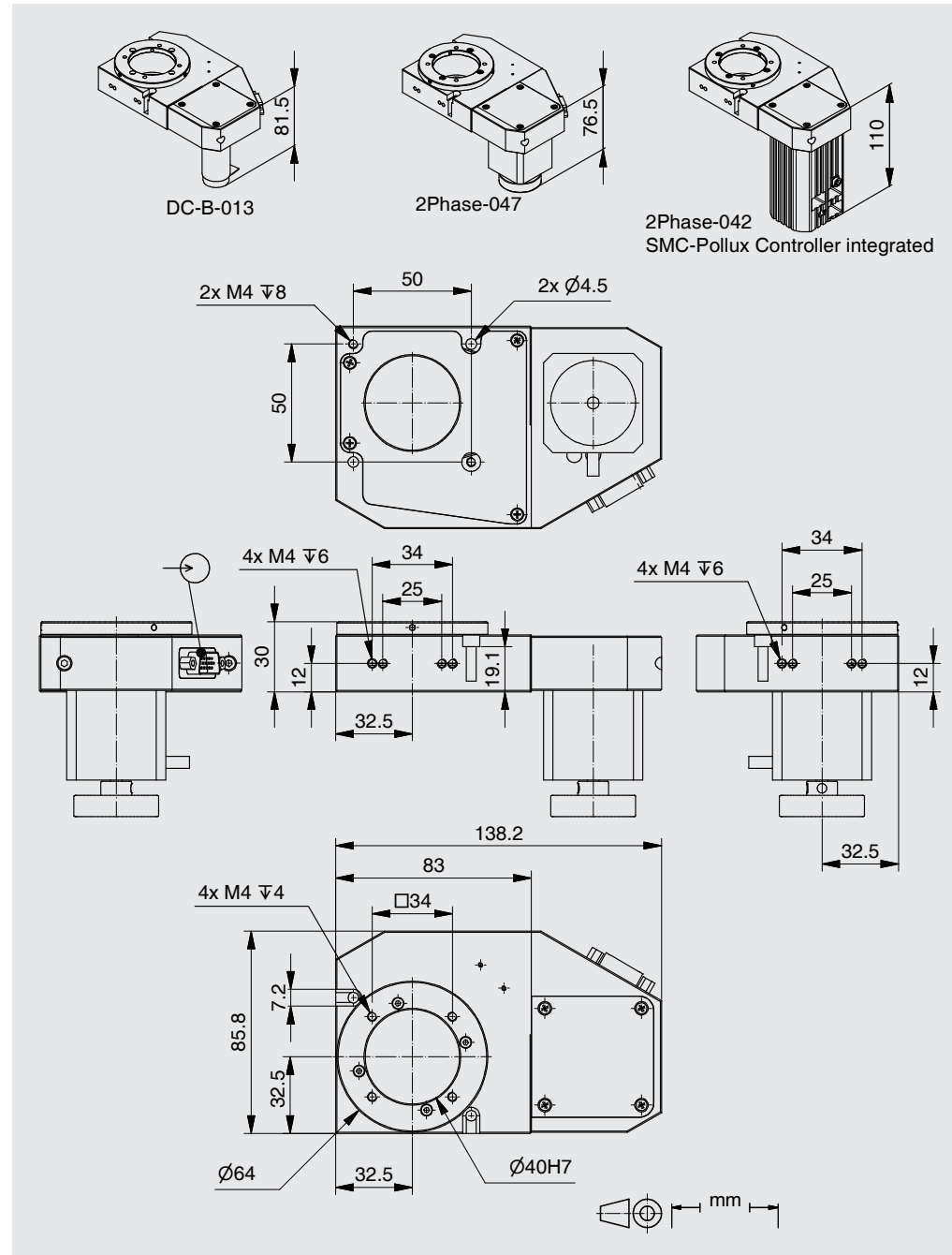
Travel range (°)	360, endless		
Flatness (Bearings) (µm)	± 30		
Eccentricity (Bearings) (µm)	± 30		
Wobble (Bearings) (µrad)	± 100		
Weight (kg)	0.8		
Motor	DC-B-013	2Phase-047	2Phase-042
Speed max. (°/sec)	270	900	1170
Resolution calculated (°)	0.0014825 (RE)	0.225 (FS)	0.45 (FS)
Resolution typical (°)	0.004	0.004	0.004
Bi-directional Repeatability (°)	± 0.02	± 0.03	± 0.03
Uni-directional Repeatability (°)	0.01	0.015	0.015
Nominal Current (A)	0.28	1.2	0.5
Voltage Range (V)	24		
Belt Drive Reduction	4:1		
Accuracy	on request		
Velocity range (°/sec)	0.001 ... 1170		
Material	Aluminum, black anodized, red brass		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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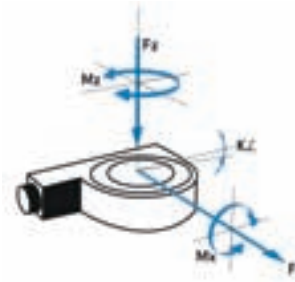
- UPR-270 AIR
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- UPR-160
- UPR-120 AIR
- UPR-120
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- UPR-100
- TRS-65
- PRS-200
- PRS-110
- DT-65 N
- RS-40
- DT-80
- DT-80 R**
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- DT-34
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- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6450-9-	0	0	1
DC-B-013		1		
2Phase-047		2		
2Phase-042		3		

FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-029	5	10	5	0.15	150
2Phase-047	5	10	5	0.15	150
2Phase-042	5	10	5	0.15	150



The DT-50 rotation stages are a low cost and lower accuracy alternative to the PI miCos RS-40 stage. The belt driven DT-50 rotation stage allows a much higher speed of rotation in comparison to other stages. The clear aperture of 20 mm diameter is suitable for many applications in the microscopy area. The belt driven combination is preloaded to produce near zero backlash and a smooth motion. The DT-50 rotation stages are equipped with hall reference switches and are driven by a DC or 2-phase stepper motor. Additionally the DT-50 can be ordered with our SMC pollux motor-controller module.



KEY FEATURES

- Uni-directional repeatability down to 0.015 °
- Maximum speed 4000 °/sec
- Load capacity up to 1 kg
- Integrated hall reference switch
- Clear aperture 20 mm

TECHNICAL DATA

Travel range (°)	360, endless		
Weight (kg)	0.14		
Motor	DC-B-029	2Phase-047	2Phase-042
Speed max. (°/sec)	4000	1100	1560
Resolution calculated (°)	0.06 (RE)	0.3 (FS)	0.6 (FS)
Resolution typical (°)	0.005	0.005	0.005
Bi-directional Repeatability (°)	± 0.03	± 0.03	± 0.03
Uni-directional Repeatability (°)	0.015	0.015	0.015
Nominal Current (A)	1.17	1.2	0.5
Voltage Range (V)	24		
Belt Drive Reduction	3:1		
Accuracy	on request		
Velocity range (°/sec)	0.05 ... 4000		
Material	Aluminum, black anodized		

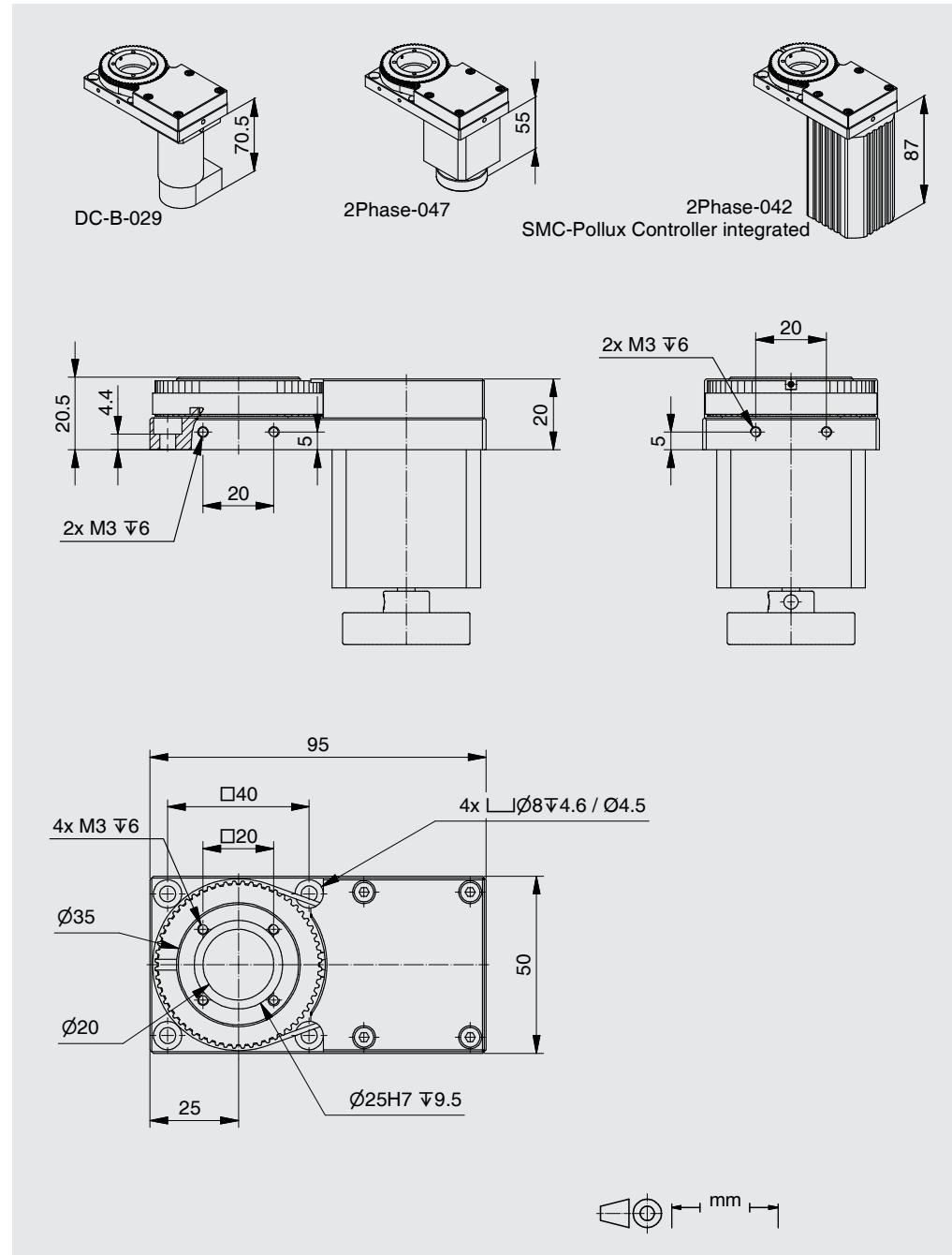
Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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- DT-80 R
- DT-50**
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65



Order No.	6435-9-	0	0
DC-B-029		1	
2Phase-047		2	
2Phase-042		3	
HLS-010, Hall switch		1	

FACTS

Load characteristics	$F_x(N)$	$F_z(N)$	$M_x(Nm)$	$M_z(Nm)$	$k+x(\mu rad/Nm)$
DC-B-010	2.5	15	2.5	0.9	200
2Phase-010	2.5	5	2.5	0.3	200



The DT-34 rotation stages are a very compact low cost alternative to the PI miCos RS-40 stage but the belt driven design allows a much higher speed of rotation in comparison to other stages. The clear aperture of 10 mm diameter is suitable for many applications in the microscopy area. The belt driven combination is preloaded to produce near zero backlash and a smooth motion. The DT-34 rotation stages are equipped with optical reference switches and are driven by a DC or 2 phase stepper motor.



KEY FEATURES

- Uni-directional repeatability down to 0.01 °
- Load capacity up to 0.5 kg
- Integrated optical reference switch
- Clear aperture 10 mm

TECHNICAL DATA

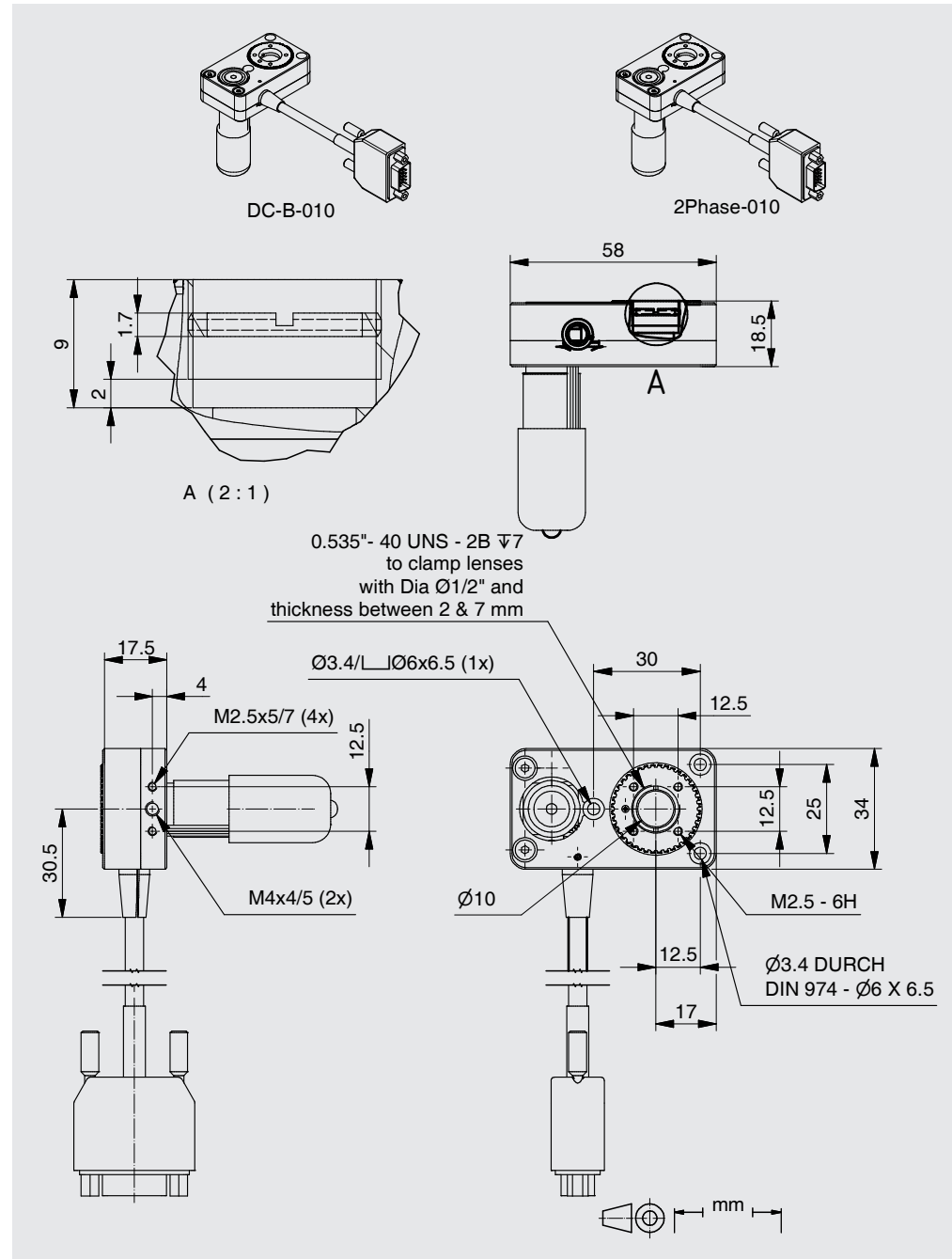
Travel range (°)	360, endless	
Motor	DC-B-010	2Phase-010
Speed max. (°/sec)	675	195
Resolution calculated (°)	0.00004 (RE)	0.001098 (FS)
Resolution typical (°)	0.00044	0.005
Bi-directional Repeatability (°)	± 0.04	± 0.04
Uni-directional Repeatability (°)	0.01	0.015
Nominal Current (A)	0.32	0.25
Voltage Range (V)	12	
Accuracy	on request	
Velocity range (°/sec)	0.05 ... 675	
Material		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

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- DT-50
- DT-34**
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- WT-100
- WT-85
- TT-65
- AFW-65

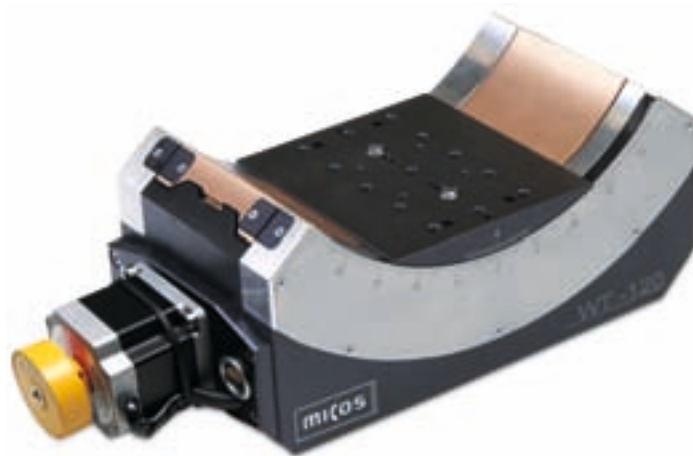


Order No.	3215-9-	0	0	0
DC-B-010		1		
2Phase-010		2		
OLS-030, Optical limit switch		3		



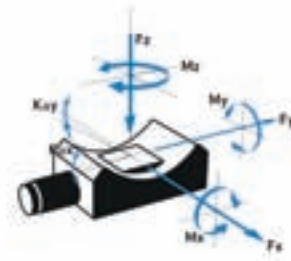
FACTS

Load characteristics	F <sub>x</sub> (N)	F <sub>y</sub> (N)	F <sub>z</sub> (N)	M <sub>x</sub> (Nm)	M <sub>y</sub> (Nm)	M <sub>z</sub> (Nm)	k <sup>+x</sup> (μrad/Nm)	k <sup>+y</sup> (μrad/Nm)
DC-B-082	90	90	200	8	25	25	15	15
2Phase-070	90	90	200	8	25	25	15	15



KEY FEATURES

- Uni-directional repeatability down to 0.001 °
- Max. speed 30 °/sec
- Load capacity up to 20 kg
- integrated Mechanical Limit Switches
- Limit switch adjustable
- Option: angular scale
- Uni-directional repeatability down to 0.001 °
- Maximum speed 30 °/sec
- Load capacity up to 20 kg
- Integrated mechanical limit switches
- Limit switch adjustable
- Option: angular scale
- Together with WT-90 one centre of rotation



space conditions. Typical uses are applications in the area of laser positioning and radiology. The WT-120 and WT-90 goniometer stages are matched to work together. When mounted orthogonal to each other they have a common center of rotation. The WT-120 stage is equipped with a ground bearing guide. The ground and hardened worm screw and worm gear combination produces a very quiet and smooth motion. The stages are directly driven by a DC or 2-phase stepper motor and can achieve a relatively high speed. The WT-120 stages can be equipped with an optical angular scale system and have two limit switches.

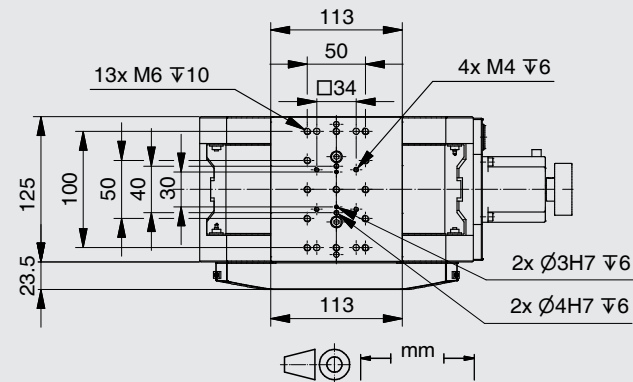
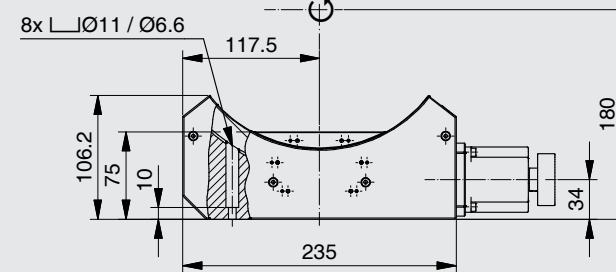
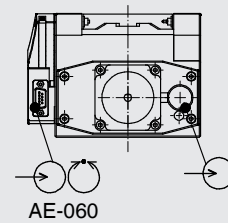
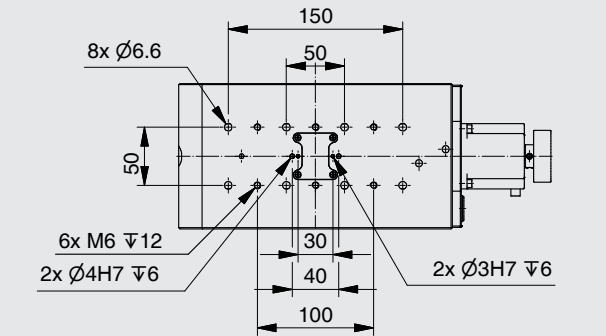
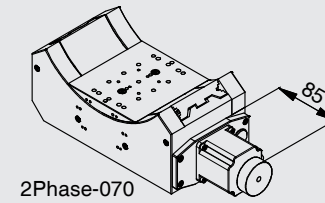
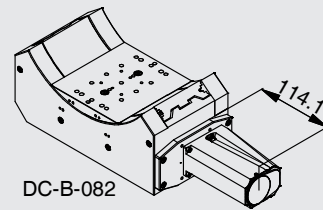
The WT-120 goniometer stage is designed for all tasks where conventional rotation stages cannot be used due to limited

TECHNICAL DATA

Travel range (°)	90		
Wobble (Bearings) (μrad)	± 125		
Weight (kg)	11.5		
Motor	DC-B-082	2Phase-070	AE-060
Linear scale			
Speed max. (°/sec)	30	25	
Resolution calculated (°)	0.0001 (RE)	0.01 (FS)	0.00009
Resolution typical (°)	0.004	0.004	0.001
Bi-directional Repeatability (°)	± 0.02	± 0.02	± 0.001
Uni-directional Repeatability (°)	0.005	0.005	0.001
Nominal Current (A)	3.33	2	
Voltage Range (V)	48		
Worm gear reduction	180:1		
Accuracy	on request		
Velocity range (°/sec)	0.001 ... 30		
Material	Aluminum, black anodized, stainless steel, red brass		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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- UPR-100 AIR
- UPR-100
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- PRS-110
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- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120**
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65

Order No.	6560-9-	1
DC-B-082		1
2Phase-070		2
without AE-060		0
AE-060, Angular scale		1



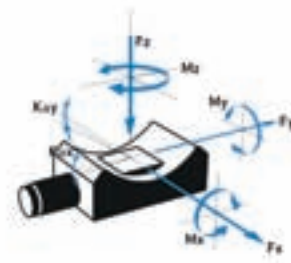
FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$	$M_x(Nm)$	$M_y(Nm)$	$M_z(Nm)$	$k^{+x}(\mu rad/Nm)$	$k^{+y}(\mu rad/Nm)$
DC-B-040	50	50	80	2.5	12	12	25	25
2Phase-048	50	50	80	2.5	12	12	25	25



KEY FEATURES

- Uni-directional repeatability down to 0.001 °
- Maximum speed 15 °/sec
- Load capacity up to 8 kg
- Integrated mechanical limit switches
- Together with WT-120 one centre of rotation
- Option: Integrated angular scale



space conditions. Typical uses are applications in the area of laser positioning and radiology. The WT-120 and WT-90 goniometer stages are matched to work together. When mounted orthogonal to each other they have a common center of rotation. The WT-90 is equipped with a ground bearing guide. The ground and hardened worm screw and worm gear combination produces a very quiet and smooth motion. The stages are directly driven by a DC or 2-phase stepper motor and can achieve a relatively high speed. The WT-90 stages can be equipped with an optical angular scale system and have two limit switches.

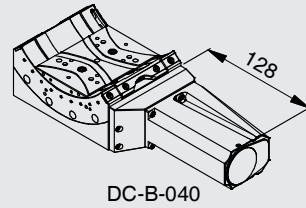
The WT-90 goniometer stage is designed for all tasks where conventional rotation stages cannot be used due to limited

TECHNICAL DATA

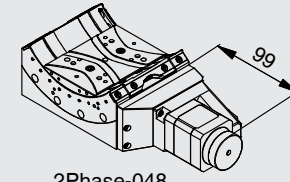
Travel range (°)	90		
Wobble (Bearings) (μrad)	± 125		
Weight (kg)	2.8		
Motor	DC-B-040	2Phase-048	
Linear scale			AE-060
Speed max. (°/sec)	15		
Resolution calculated (°)	0.00005 (RE)	0.001 (FS)	0.0001542
Resolution typical (°)	0.003		0.001
Bi-directional Repeatability (°)	± 0.02		± 0.001
Uni-directional Repeatability (°)	0.005		0.001
Nominal Current (A)	3.8	1.2	
Voltage Range (V)	24		
Worm gear reduction	360:1		
Accuracy	on request		
Velocity range (°/sec)	0.001 ... 15		
Material	Aluminum, black anodized, stainless steel, red brass		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

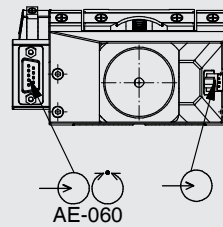
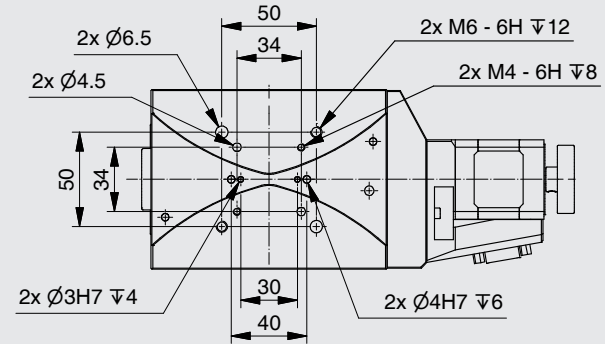
Error and technical modifications are subject to change



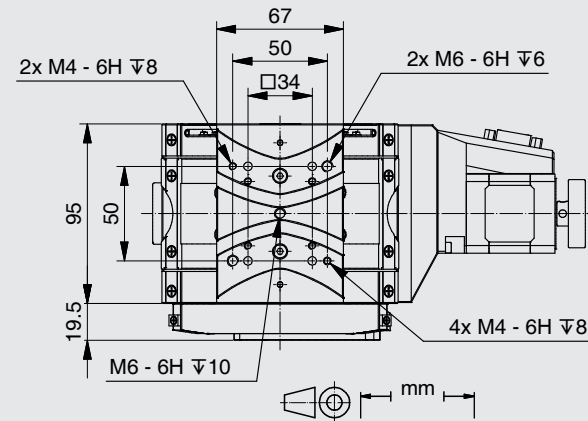
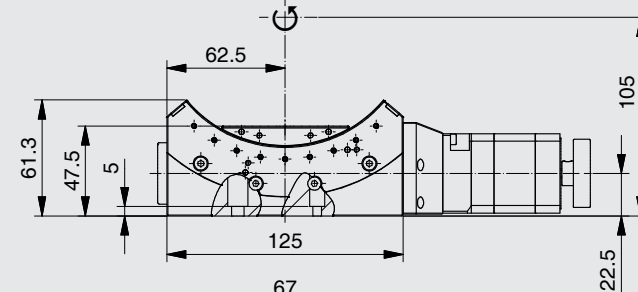
DC-B-040



2Phase-048



AE-060



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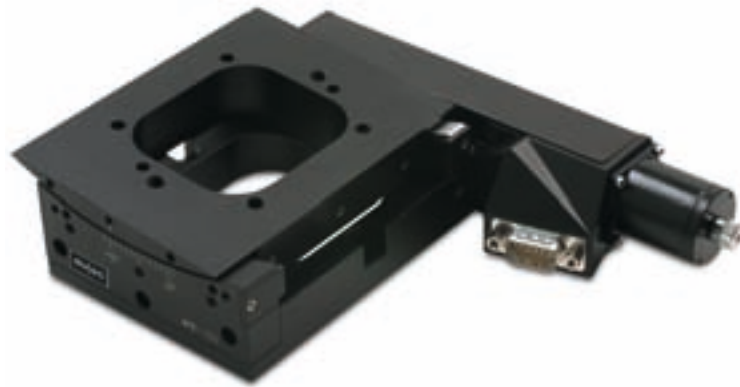
- UPR-270 AIR
- UPR-270
- UPR-160 AIR
- UPR-160
- UPR-120 AIR
- UPR-120
- UPR-100 AIR
- UPR-100
- TRS-65
- PRS-200
- PRS-110
- DT-65 N
- RS-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90**
- WT-100
- WT-85
- TT-65
- AFW-65

Order No.	6550-9-	0
DC-B-040		1
2Phase-048		2
without AE-060		0
AE-060, Angular scale		1



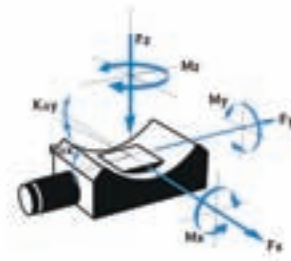
## FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$	$M_x(Nm)$	$M_y(Nm)$	$M_z(Nm)$	$k^+x(\mu rad/Nm)$	$k^+y(\mu rad/Nm)$
DC-B-070	15	15	20	0.75	4	4	80	80
2Phase-020	15	15	20	0.75	4	4	80	80



## KEY FEATURES

- Uni-directional repeatability down to  $0.0005^\circ$
- Maximum speed  $15^\circ/sec$
- Load capacity up to 2 kg
- Integrated mechanical limit switches
- Clear aperture  $60 \times 25 \text{ mm}$
- Precise, smooth continuous  $10^\circ$  motion
- Together with WT-85 one centre of rotation
- Option: Integrated angular scale



space conditions or where a clear aperture is needed. Typical applications are metrology tasks in the area of laser technology and radiology. The WT-100 and WT-85 goniometer stages are designed to work together. When mounted orthogonal to each other they have a common center of rotation. The WT-100 has a  $60 \times 25 \text{ mm}$  clear aperture. A unique driving mechanism insures a very quiet and smooth motion. The stages are driven directly by a DC or 2-phase stepper motor and can achieve a relatively high speed. The WT-100 stage is available with optional optical angular scales and is equipped with two limit switches.

The WT-100 goniometer stage is designed for all tasks where conventional rotation stages cannot be used due to limited

## TECHNICAL DATA

Travel range ( $^\circ$ )	10		
Wobble (Bearings) ( $\mu rad$ )	$\pm 125$		
Weight (kg)	0.9		
Motor	DC-B-070	2Phase-020	AE-060
Linear scale			
Speed max. ( $^\circ/sec$ )	15	7	
Resolution calculated ( $^\circ$ )	0.0002 (RE)	0.002 (FS)	0.00009
Resolution typical ( $^\circ$ )	0.001	0.001	0.0005
Bi-directional Repeatability ( $^\circ$ )	$\pm 0.004$	$\pm 0.004$	$\pm 0.0005$
Uni-directional Repeatability ( $^\circ$ )	0.004	0.004	0.0005
Nominal Current (A)	0.931	1.2	
Voltage Range (V)	36		
Reduction	900:1		
Accuracy	on request		
Velocity range ( $^\circ/sec$ )	0.001 ... 15		
Material	Aluminum, black anodized		

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change



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UPR-160

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UPR-120

UPR-100 AIR

UPR-100

TRS-65

PRS-200

PRS-110

DT-65 N

R5-40

DT-80

DT-80 R

DT-50

DT-34

WT-120

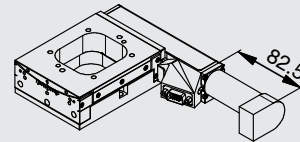
WT-90

**WT-100**

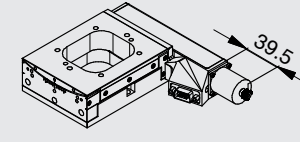
WT-85

TT-65

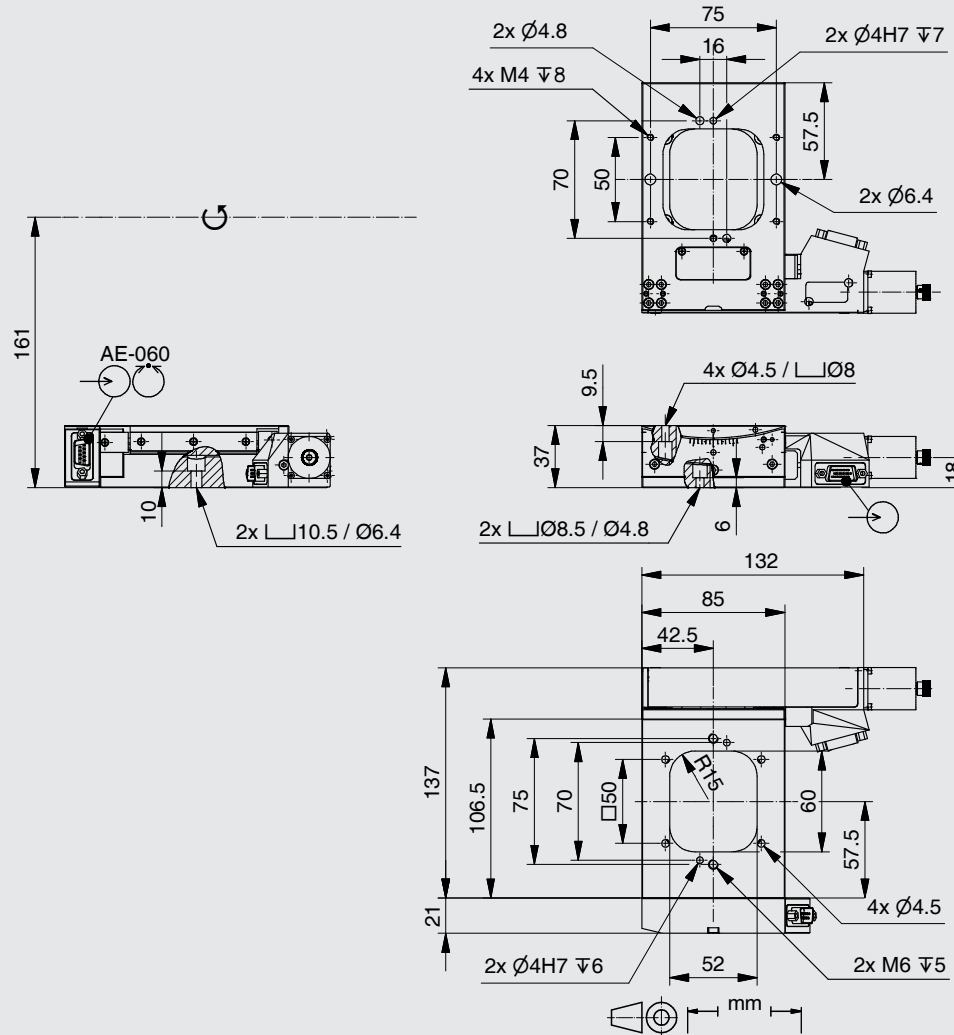
AFW-65



DC-B-070



2Phase-020

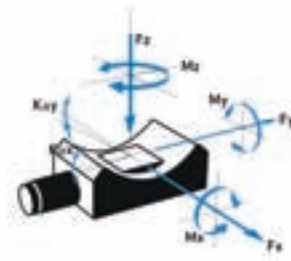
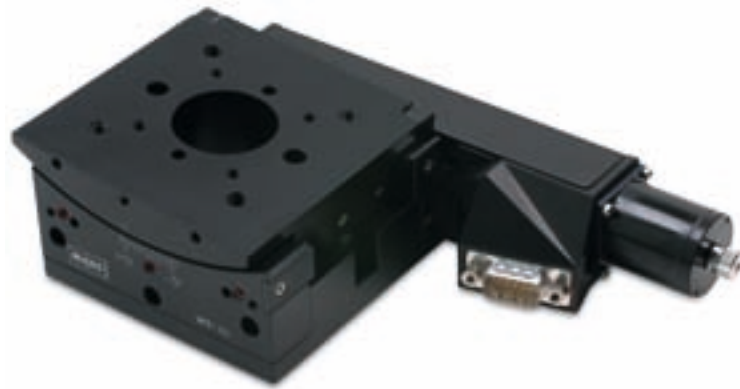


Order No.	6541-9-	0
DC-B-070		1
2Phase-020		2
without AE-060		0
AE-060, Angular scale		1



FACTS

Load characteristics	F <sub>x</sub> (N)	F <sub>y</sub> (N)	F <sub>z</sub> (N)	M <sub>x</sub> (Nm)	M <sub>y</sub> (Nm)	M <sub>z</sub> (Nm)	k <sup>+x</sup> (μrad/Nm)	k <sup>+y</sup> (μrad/Nm)
DC-B-070	15	15	20	0.75	4	4	80	80
2Phase-020	15	15	20	0.75	4	4	80	80



space conditions or where a clear aperture is needed. Typical applications are metrology tasks in the area of laser technology and radiology. The WT-85 and WT-100 goniometer stages are designed to work together. When mounted orthogonally to each other they have a common center of rotation. The WT-85 has a 30 mm clear aperture. A unique driving mechanism insures a very quiet and smooth motion. The stage is driven directly by a DC or 2-phase stepper motor and can achieve a relatively high speed. The WT-85 stages are available with an optional optical angular scale and are equipped with two limit switches.

The WT-85 goniometer stage is designed for all tasks where conventional rotation stages cannot be used due to limited

KEY FEATURES

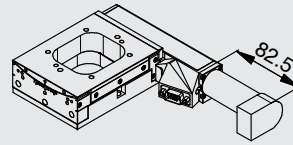
- Uni-directional repeatability down to 0.0005 °
- Maximum speed 15 °/sec
- Load capacity up to 2 kg
- Integrated mechanical limit switches
- Clear aperture 30 mm
- Precise, smooth continuous 10° motion
- Option: Integrated angular scale
- Together with WT-100 one centre of rotation

TECHNICAL DATA

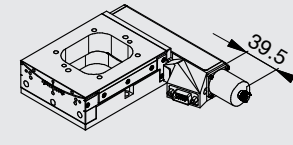
Travel range (°)	10		
Wobble (Bearings) (μrad)	± 125		
Weight (kg)	0.9		
Motor	DC-B-070	2Phase-020	AE-060
Linear scale			
Speed max. (°/sec)	15	7	
Resolution calculated (°)	0.0002667 (RE)	0.0026665 (FS)	0.0001208
Resolution typical (°)	0.001	0.001	0.0005
Bi-directional Repeatability (°)	± 0.004	± 0.004	± 0.0005
Uni-directional Repeatability (°)	0.004	0.004	0.0005
Nominal Current (A)	0.931	1.2	
Voltage Range (V)	36		
Reduction	675:1		
Accuracy	on request		
Velocity range (°/sec)	0.001 ... 15		
Material	Aluminum, black anodized		

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

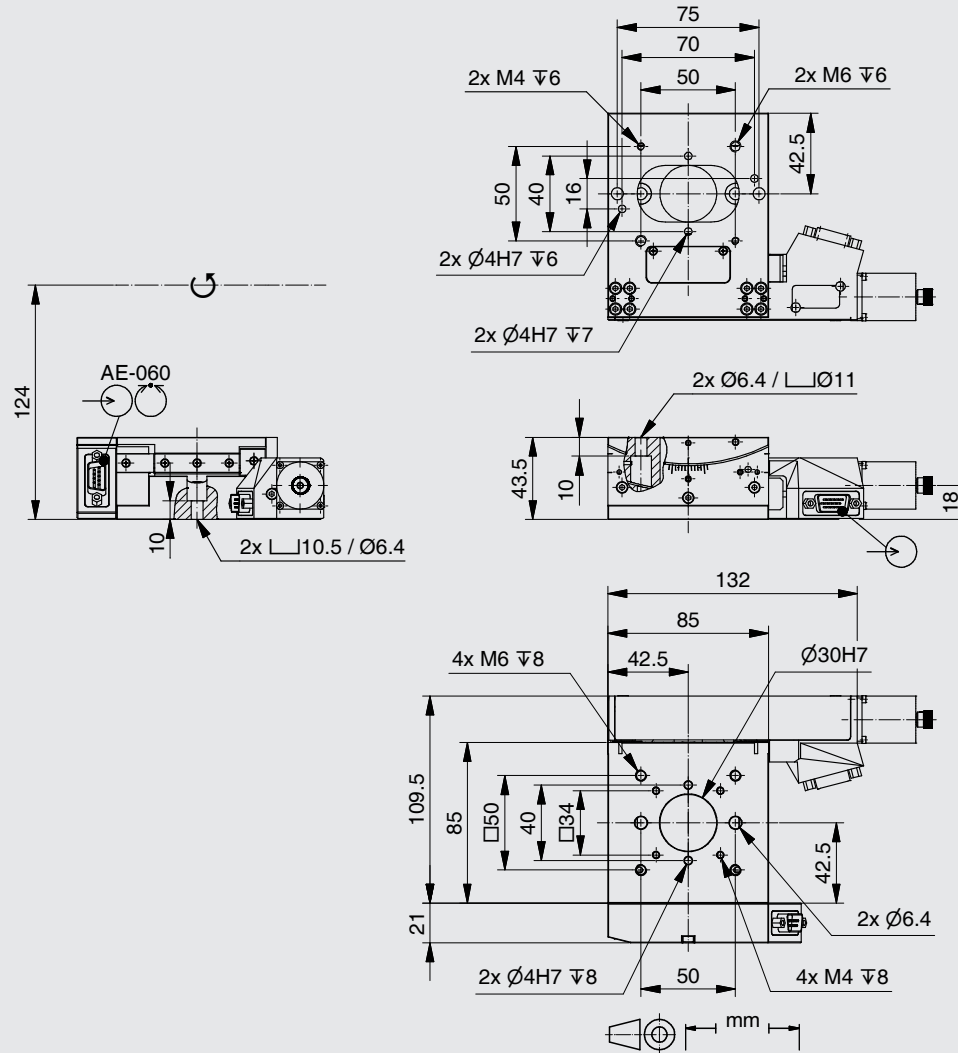
Error and technical modifications are subject to change



DC-B-070



2Phase-020



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- ROTATION STAGES**
- PIEZO STAGES
- MANUAL STAGES
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- UPR-270
- UPR-160 AIR
- UPR-160
- UPR-120 AIR
- UPR-120
- UPR-100 AIR
- UPR-100
- TRS-65
- PRS-200
- PRS-110
- DT-65 N
- R5-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85**
- TT-65
- AFW-65

Order No.	6540-9-	0
DC-B-070		1
2Phase-020		2
without AE-060		0
AE-060, Angular scale		1

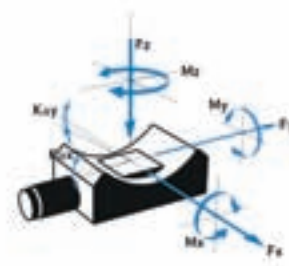
## 5.194 Tip-Tilt Stage TT-65

NEW

V

### FACTS

Load characteristics	$F_x(N)$	$F_y(N)$	$F_z(N)$	$M_x(Nm)$	$M_y(Nm)$	$M_z(Nm)$
DC-B-005	1	1	5	0.05	0.05	0.3



The TT-65 tip-tilt stage was designed for applications where optical elements have to be remotely tilted in an optical beam path. The tilt range in both axes is 5°. The stage can be mounted horizontally on linear stages like LS-65 or vertically, for example in our CAMPUS systems. The tip-tilt stage is equipped with a reference switch and is offered with a DC or stepper motor.

### KEY FEATURES

- Uni-directional repeatability down to 0.004 °
- Travel range in tip, tilt 5 °
- Maximum speed 0.25 °/sec
- Load capacity up to 0.5 kg
- Integrated mechanical limit switches
- Clear aperture 25 mm diameter

### TECHNICAL DATA

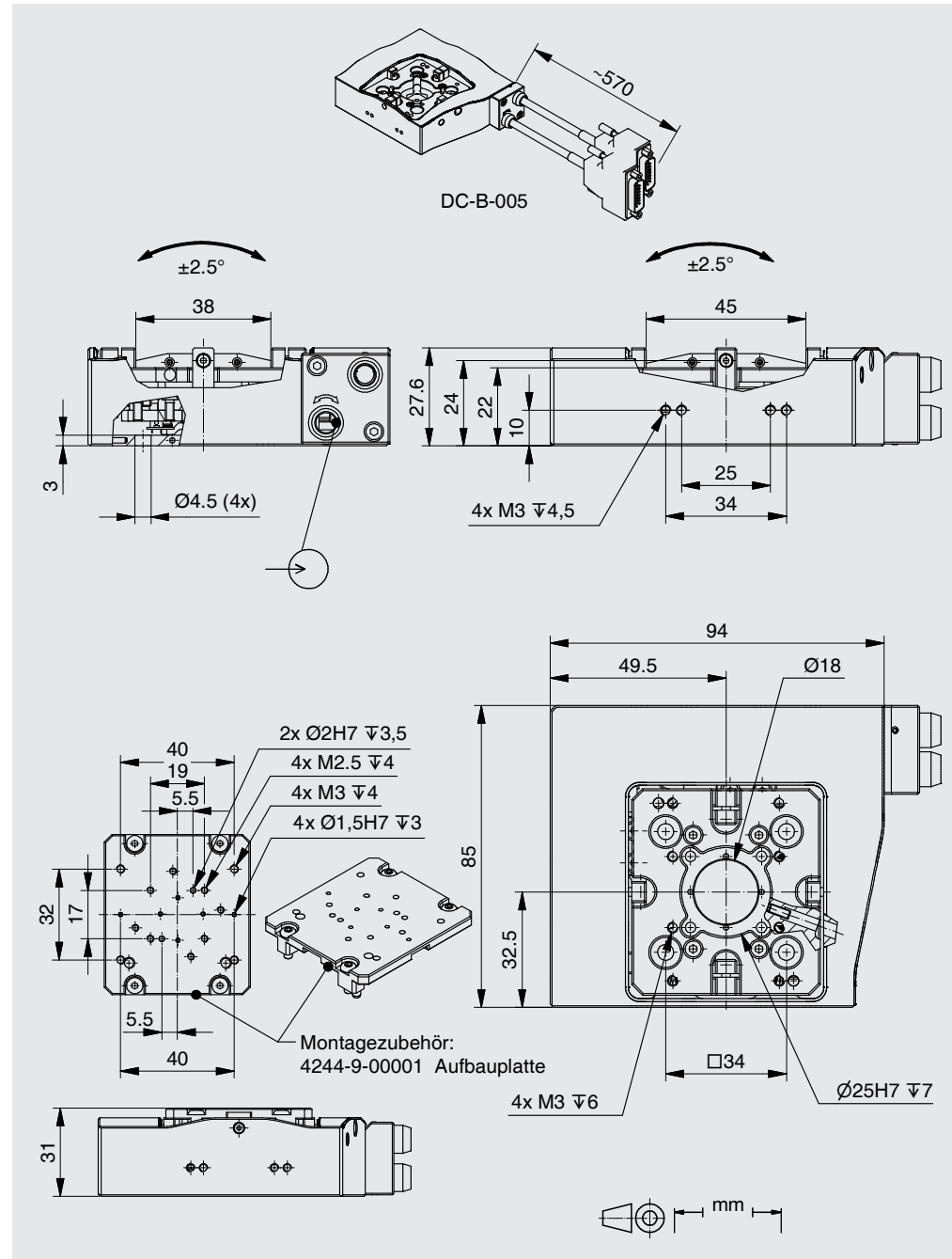
Travel range (°)	5
Weight (kg)	0.45
Motor	DC-B-005
Speed max. (°/sec)	0.25
Resolution calculated (°)	0.0018675 (RE)
Resolution typical (°)	0.001
Bi-directional Repeatability (°)	± 0.004
Uni-directional Repeatability (°)	0.004
Nominal Current (A)	0.08
Voltage Range (V)	12
Accuracy	on request
Velocity range (°/sec)	0.00025 ... 0.25
Material	Aluminum, black anodized

Note: FS = full step, RE = rotary encoder  
More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- UPR-160
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- UPR-120
- UPR-100 AIR
- UPR-100
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- PRS-200
- PRS-110
- DT-65 N
- R5-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65**
- AFW-65



Order No.	4244-9-	1	0	0
DC-B-005		1		
OLS-010, Optical limit switches			3	



The AFW-65 filter wheel was designed for rotating 6 filters with diameter of 25.4 mm. It can be mounted in a linear setup and fits in our Albatros optical bench as well as in the optical height of the LINOS microbench rail with carrier. The filter wheels are equipped with a reference switch and are offered with DC or stepper motors. The filters can be fixed with a screw or with filter mounts.

KEY FEATURES

- Uni-directional repeatability down to 0.1 °
- Maximum speed 360 °/sec
- Integrated hall reference switch
- Up to 6 filters
- Clear aperture 25 mm

TECHNICAL DATA

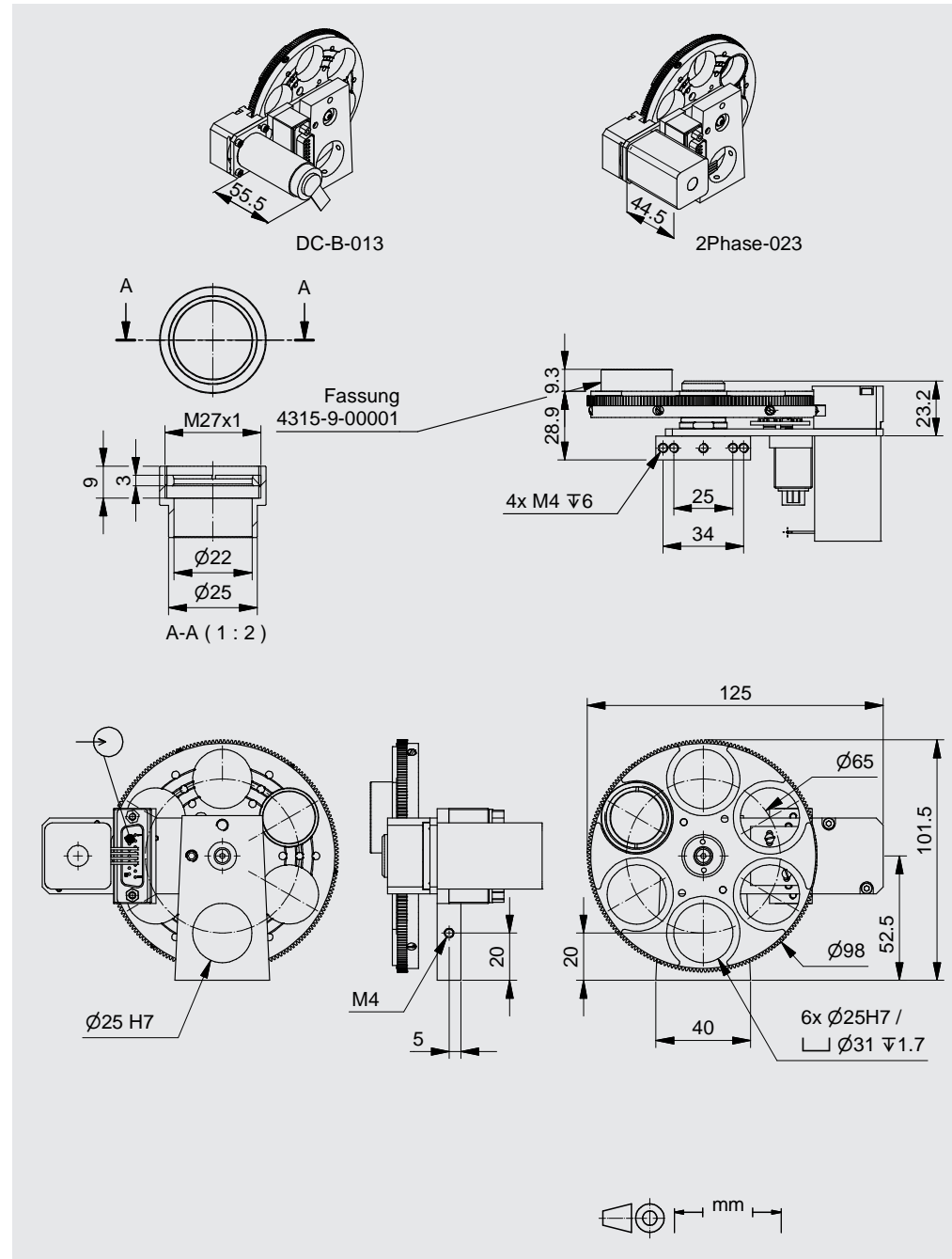
Travel range (°)	360, endless	
Weight (kg)	0.7	
Motor	<a href="#">DC-B-013</a>	<a href="#">2Phase-023</a>
Speed max. (°/sec)	90	360
Resolution calculated (°)	0.0014881 (RE)	0.4517 (FS)
Resolution typical (°)	0.001	0.05
Bi-directional Repeatability (°)	± 0.5	± 0.5
Uni-directional Repeatability (°)	0.1	0.1
Nominal Current (A)	0.28	1.3
Voltage Range (V)	24	
Accuracy	on request	
Velocity range (°/sec)	... 360	
Material	Aluminum, black anodized	

Note: FS = full step, RE = rotary encoder  
 More info: Detailed information concerning motors and encoders, see appendix.

Error and technical modifications are subject to change

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- PRS-110
- DT-65 N
- R5-40
- DT-80
- DT-80 R
- DT-50
- DT-34
- WT-120
- WT-90
- WT-100
- WT-85
- TT-65
- AFW-65**



Order No.	4315-9-	0	0
DC-B-013		1	
2Phase-023		2	
HLS-010, Hall switches		1	

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