



Superior Clamping and Gripping



Product Information

Force/torque sensor FT-AXIA

FT-AXIA

Force/torque sensor

Precise. Reliable. Robust.

6-axis force/torque sensor FT-AXIA

Rigid 6-axis force/torque sensor for precision measuring in all six degrees of freedom

Field of application

Universally applicable in robotic applications such as haptics, medicine, grinding, testing, inserting, and research and development



Advantages – Your benefits

Compact design due to space-saving set-up with integrated electronics

Two calibrations are available whereby two measurement ranges can be controlled via web interface

Plug & Work directly compatible for KUKA and Universal Robots via software module

Cost saving despite high precision due to optimized manufacturing

Robust design ensures due to a high overload range with protection against damage even with short-term overload

Version with LED display for status display on the sensor without evaluation via the controller



Sizes
Quantity: 3



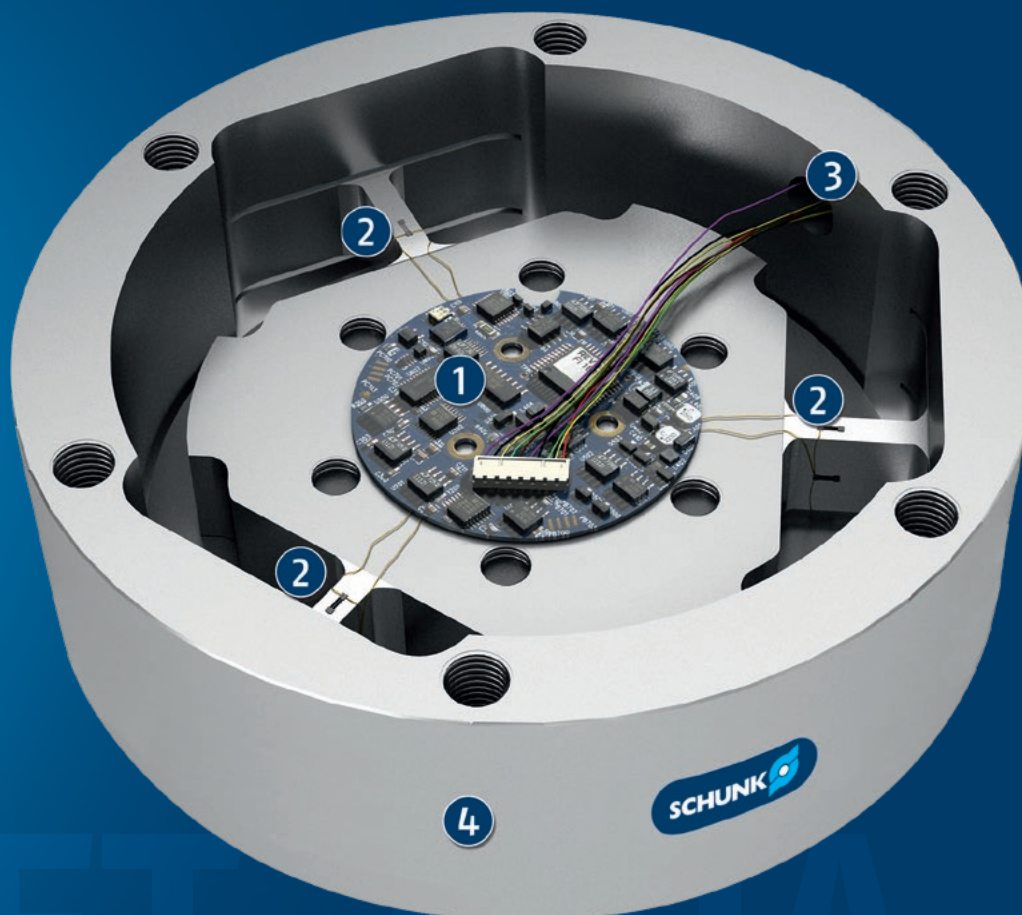
Measuring range of
force
 $\pm 75 \dots 4000 \text{ N}$



Measuring range of
moment load
 $\pm 4 \dots 300 \text{ Nm}$

Functional description

The strain gauges (DMS) of the 6-axis force/torque sensors measure the strain applied in all six degrees of freedom (Fx, Fy, Fz, Mx, My and Mz). The signals of the DMS are evaluated in the sensor and provided.



- | | |
|---|---|
| <p>① Electronics
no interfering contour, as integrated in the housing</p> <p>② Resistance strain gauges
Silicon gauges provide a signal 75 times stronger than conventional foil gages. This signal is amplified resulting in near-zero noise distortion.</p> | <p>③ Interfaces
Data evaluation via Ethernet, EtherCAT, RS-422 or RS-485</p> <p>④ IP protection class
FT-AXIA 80 with IP64
Sizes FT-AXIA 90 and FT-AXIA 130 with IP67</p> |
|---|---|

FT-AXIA

Force/torque sensor

Detailed functional description



The 6-axis force/moment sensor is connected to the control line via the sensor cable. The control line is divided into voltage supply and data transfer. The connection between the controller and sensor is made via EtherNet or EtherCAT depending on the model. The following components are included in the scope of delivery:

- ① FT-AXIA
- ② Sensor cable
- ③ Control line

FT-AXIA

Force/torque sensor

General notes about the series

Measuring accuracy: < 2% of the upper limit value of the measuring range at 22 °C

evaluation via: EtherCAT, Ethernet, RS-422, RS-485

Warranty: 12 months

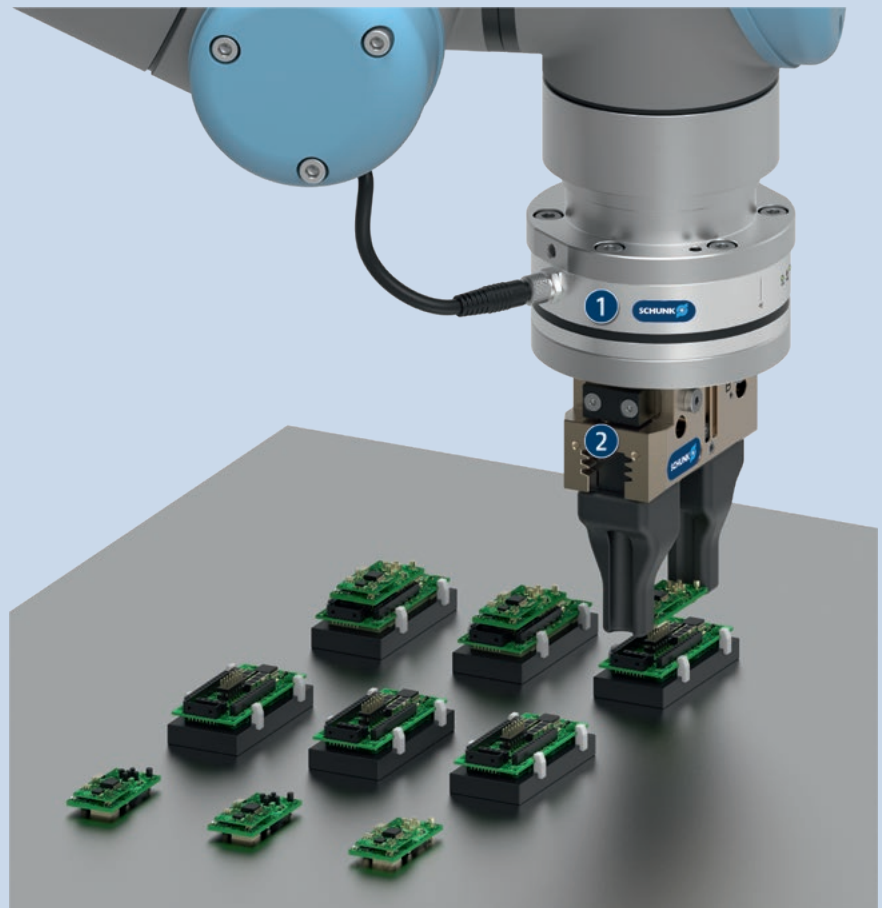
Harsh environmental conditions: Please note that use under harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service life of the units, and we will not take over any warranty. However, in many cases we can find a solution. Please contact us for assistance.

Handling weight: is the weight of the total load attached to the flange. When designing, the permissible forces and moments have to be paid attention to. Please note that exceeding the recommended handling weight will shorten the lifespan.

Application example

Gripping unit in combination with force/torque sensor for delicate assembly of printed circuit boards

- ① 6-axis force/torque sensor FT-AXIA
- ② 2-finger parallel gripper PGN-plus-P



SCHUNK offers more ...

The following components make the product even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.



Manual change system



Quick change system



Rotary feed-through



Universal gripper



Universal gripper

For more information on these products can be found on the following product pages or at schunk.com.

Options and special information

6-axis force/torque sensor: Strain gauges (DMS) measure the strain applied in all six degrees of freedom (F_x , F_y , F_z , M_x , M_y and M_z). The signals from the DMS are directly processed in the sensor, and are made available as forces and moments via various communication protocols.

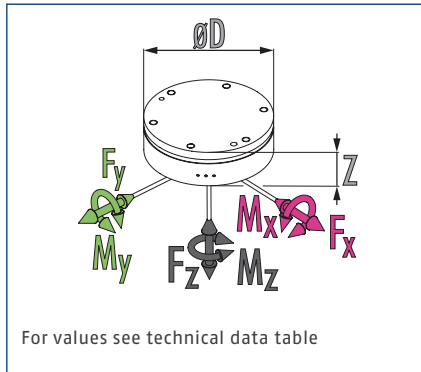
Sensor cable: The sensor cable connects the sensor to the control line via an M8 connector or an M12 connector through an 8-pin M12 connector. The voltage supply and communication line are integrated into the sensor cable and shielded. The highly flexible sensor line protects the sensor signals against electrical fields and mechanical loads.

Control line: The control line is a Y-distribution cable and is connected to the sensor line via an M12 socket. It supplies the sensor with voltage via a 3-pin open wire strand and allows separate communication with the sensor via EtherNet or EtherCAT via an RJ-45 connector, depending on the version.

FT-AXIA 80

Force/torque sensor

Dimensions and maximum loads

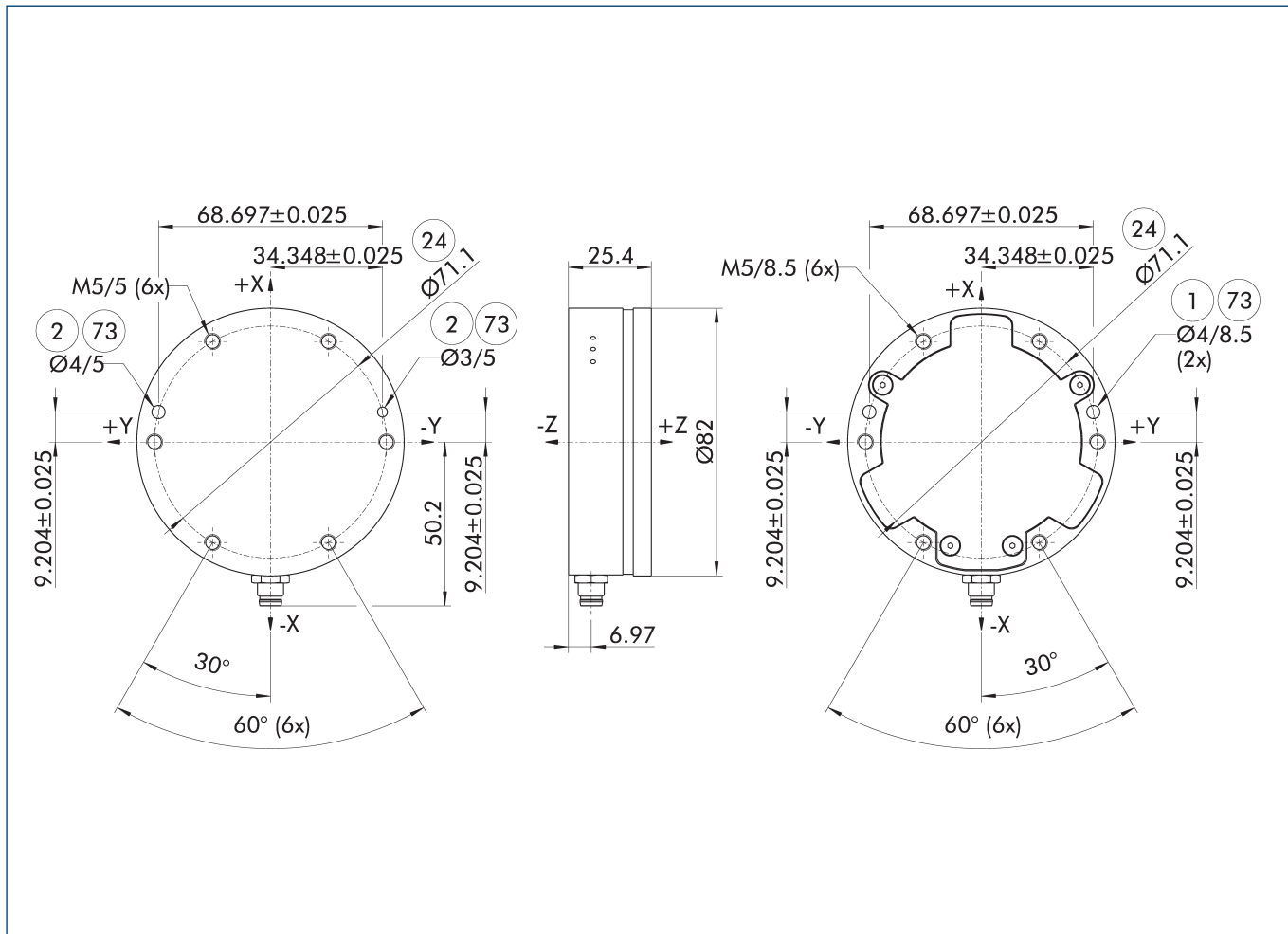


ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data

Description		FTN-AXIA80-DUAL SI-75-4/ SI-150-8	FTN-AXIA80-DUAL SI-200-8/ SI-500-20	FTN-AXIA80-DUAL SI-480-20/ SI-1200-50	EOA-UR3510-FTN-AXIA 80
ID		1392568	1324513	1392572	1357169
evaluation via		EtherNet	EtherNet	EtherNet	EtherNet
Housing material		Aluminum	Aluminum	stainless steel	Aluminum
Weight	[kg]	0.28	0.3	0.68	0.51
Calibration 1		SI-75-4	SI-200-8	SI-480-20	SI-200-8
Range of measurement Fx, Fy/range of measurement Fz	[N]	±75/±235	±200/±360	±480/±800	±200/±360
Range of measurement Mx, My/ range of measurement Mz	[Nm]	±4/±4	±8/±8	±20/±20	±8/±8
Calibration 2		SI-150-8	SI-500-20	SI-1200-50	SI-500-20
Range of measurement Fx, Fy/range of measurement Fz	[N]	±150/±470	±500/±900	±1200/±2000	±500/±900
Range of measurement Mx, My/ range of measurement Mz	[Nm]	±8/±8	±20/±20	±50/±50	±20/±20
Overload Fx, Fy/overload Fz	[N]	±2350/±7500	±2500/±4500	±6000/±10000	±2500/±4500
Overload Mx, My/overload Mz	[Nm]	±40/±40	±100/±100	±210/±250	±100/±100
Resonant frequency Fx, Fy, Mz	[Hz]	1500	2200	2500	2200
Resonant frequency Fz, Mx, My	[Hz]	1500	2600	2500	2600
Resolution Fx, Fy/resolution Fz	[N]	0.04/0.04	0.1/0.1	0.4/0.4	0.1/0.1
Resolution Mx, My/resolution Mz	[Nm]	0.002/0.002	0.005/0.005	0.01/0.01	0.005/0.005
IP protection class		64	64	64	64
Dimensions Ø D x Z	[mm]	82 x 25.4	82 x 25.4	82 x 25.4	85 x 63.4
Plug & Work					Universal Robots
Technical data deviations for FTE					
Description		FTE-AXIA80-DUAL SI-75-4/ SI-150-8	FTE-AXIA80-DUAL SI-200-8/ SI-500-20	FTE-AXIA80-DUAL SI-480-20/ SI-1200-50	
ID		1392577	1324514	1392580	
evaluation via		EtherCAT	EtherCAT	EtherCAT	
Technical data deviating from FTRS					
Description		FTRS485-AXIA80-DUAL SI-75-4/SI-150-8	FTRS485-AXIA80-DUAL SI-200-8/SI-500-20	FTRS485-AXIA80-DUAL SI-480-20/SI-1200-50	
ID		1392581	1392582	1392583	
evaluation via		serial interface (RS-485)	serial interface (RS-485)	serial interface (RS-485)	

Main view



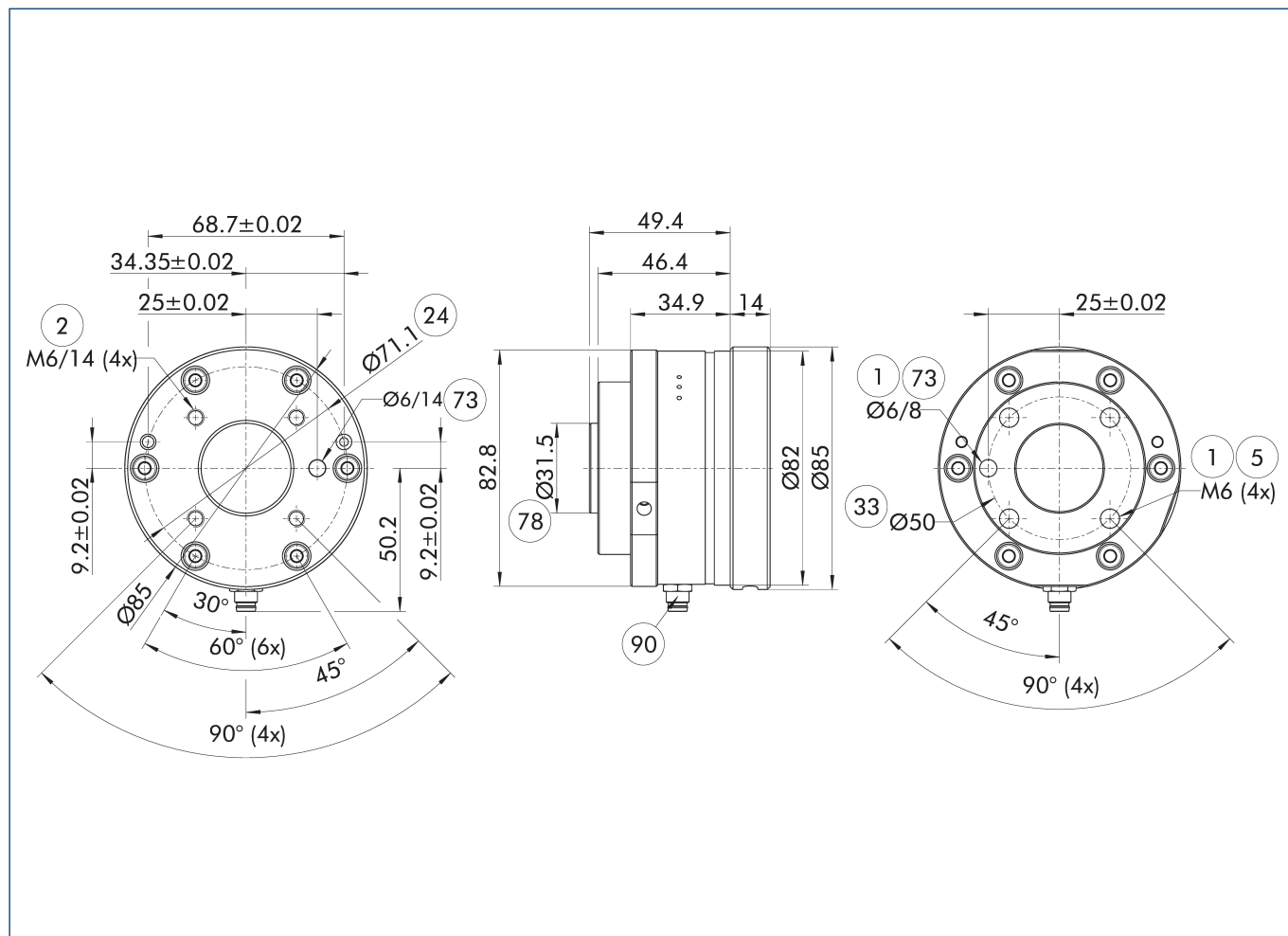
The drawing shows the unit in the basic version.

- ① Robot-side connection
- ② Tool-side connection
- ④ Bolt circle
- ⑦ Fit for centering pins

FT-AXIA 80

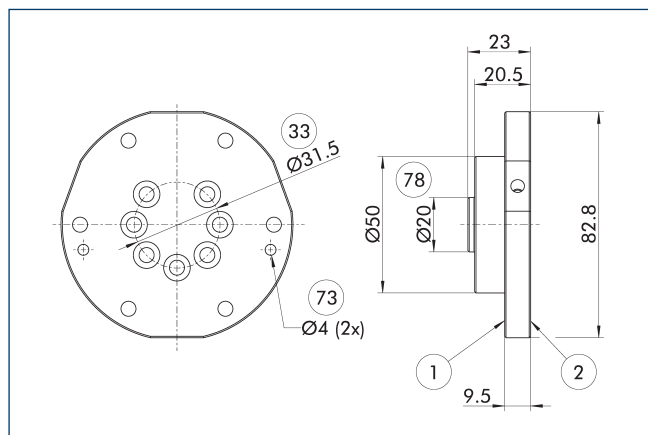
Force/torque sensor

Main view Plug & Work Universal Robots EOA-UR3510-FTN-AXIA 80



- | | |
|---|-----------------------------|
| ① Robot-side connection | ③③ DIN ISO-9409 bolt circle |
| ② Tool-side connection | ⑦③ Fit for centering pins |
| ⑤ Through hole for connection with screws | ⑦⑧ Fit for centering |
| ②④ Bolt circle | ⑨⑩ Electrical connection |

Adapter plate ISO-A31.5-R

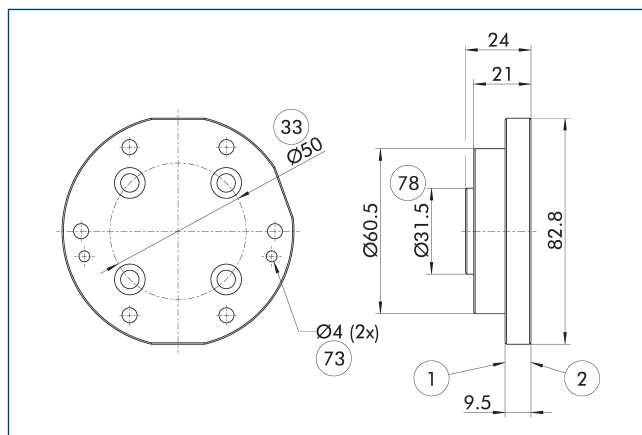


- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID
Adapter plate	
A-AXIA-80-ISO-A-31.5-7xM5-20.5	1412454

① The adapter plate has a direct mounting pattern for KUKA Agilus KR6 robots

Adapter plate ISO-A50-R



- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

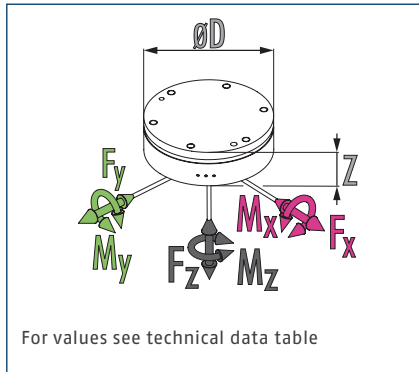
Description	ID
Adapter plate	
A-FT-AXIA-80-ISO-A50-R	1329263

FT-AXIA 90

Force/torque sensor



Dimensions and maximum loads

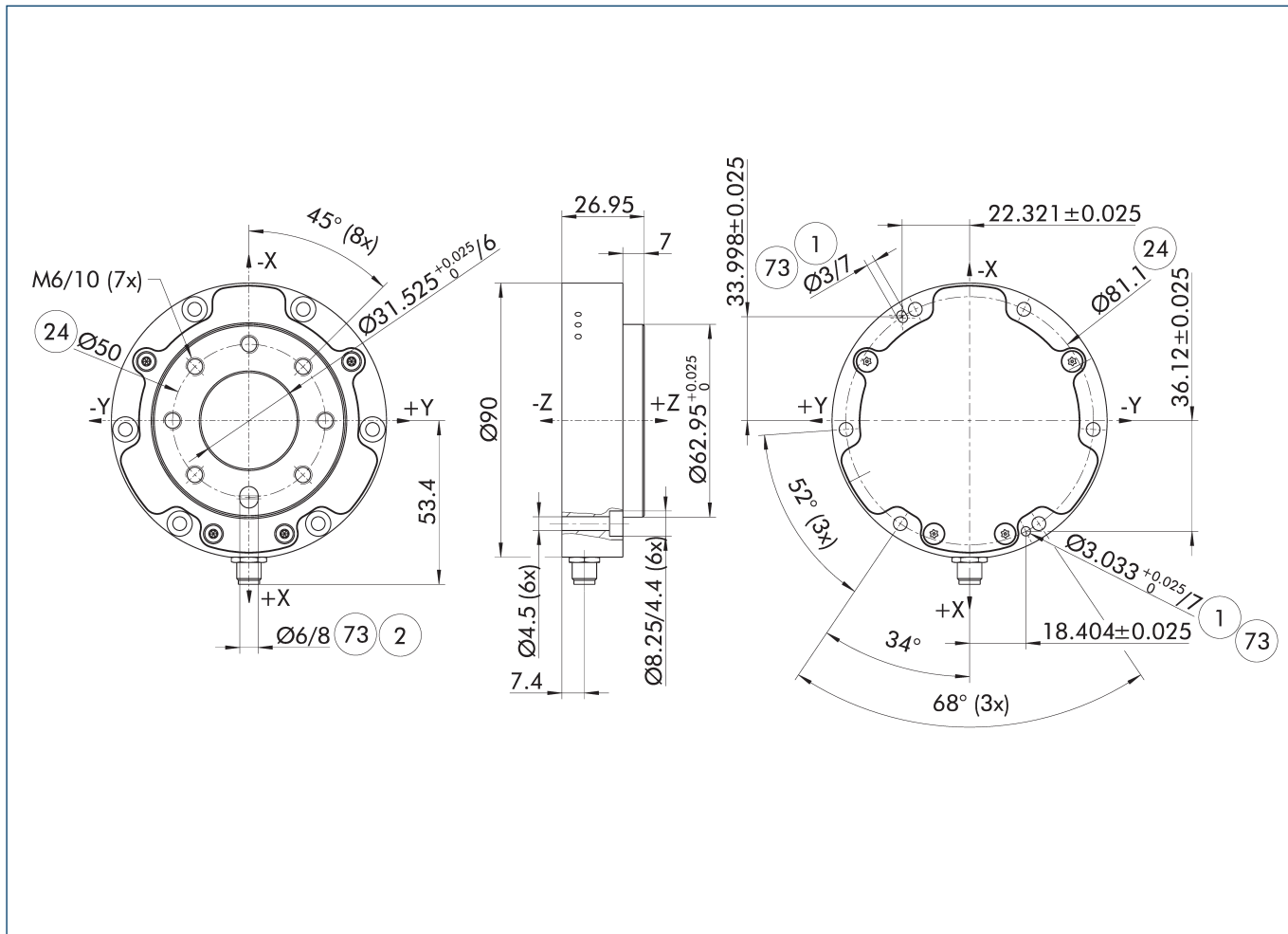


ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data

Description		FTN-AXIA90 SI-1000-50
ID		1512819
evaluation via		EtherNet
Housing material		Aluminum
Weight	[kg]	0.744
Calibration 1		SI-1000-50
Range of measurement F_x, F_y /range of measurement F_z	[N]	$\pm 1000/\pm 2000$
Range of measurement M_x, M_y /range of measurement M_z	[Nm]	$\pm 50/\pm 50$
Overload F_x, F_y /overload F_z	[N]	$\pm 5000/\pm 10000$
Overload M_x, M_y /overload M_z	[Nm]	$\pm 250/\pm 250$
Resonant frequency F_x, F_y, M_z	[Hz]	2300
Resonant frequency F_z, M_x, M_y	[Hz]	2900
Resolution F_x, F_y /resolution F_z	[N]	0.4/0.4
Resolution M_x, M_y /resolution M_z	[Nm]	0.01/0.01
IP protection class		67
Dimensions $\varnothing D \times Z$	[mm]	89.9 x 26.9
Technical data deviations for FTE		
Description		FTE-AXIA90 SI-1000-50
ID		1512827
evaluation via		EtherCAT
Technical data deviating from FTRS		
Description		FTRS422-AXIA90 SI-1000-50
ID		1512848
evaluation via		serial interface (RS-422)

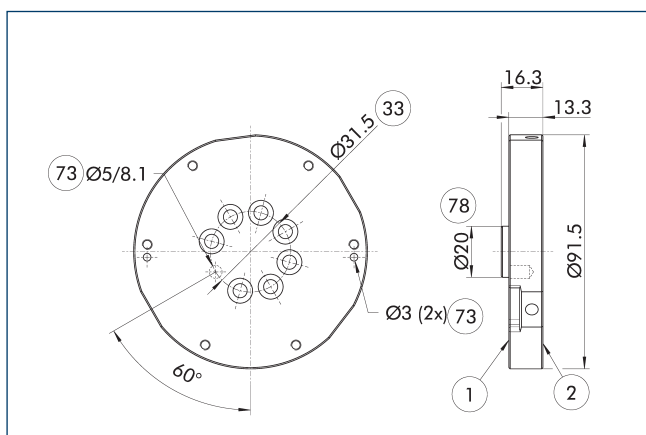
Main view



The drawing shows the unit in the basic version.

- ① Robot-side connection
- ② Tool-side connection
- ②④ Bolt circle
- ⑦③ Fit for centering pins

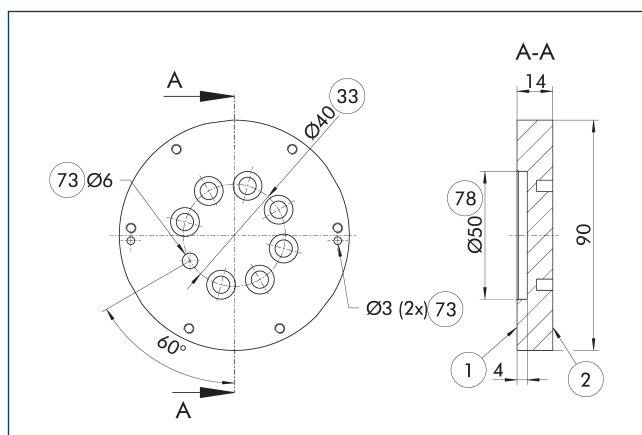
Adapter plate ISO-A31.5-R



- ① Robot-side connection
- ② Tool-side connection
- ③③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-90-ISO-A31.5-R	1512882

Adapter plate ISO-A40-R



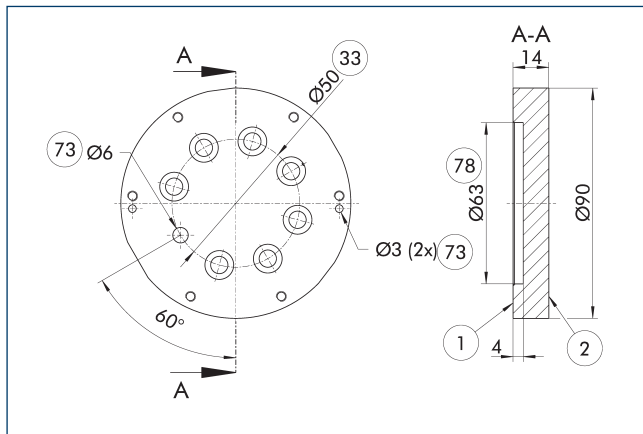
- ① Robot-side connection
- ② Tool-side connection
- ③③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-90-ISO-A40-R	1512880

FT-AXIA 90

Force/torque sensor

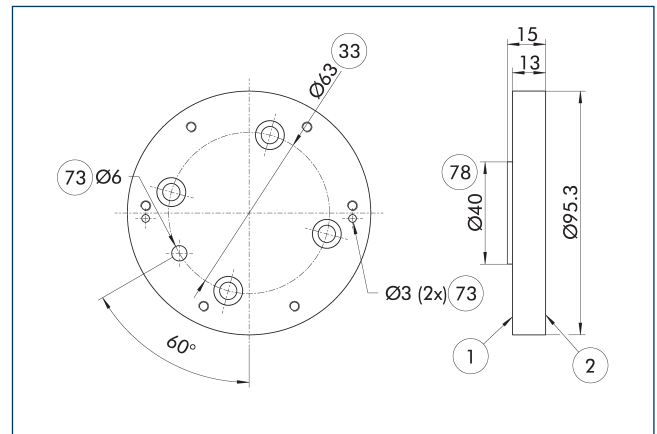
Adapter plate ISO-A50-R



- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-90-ISO-A50-R	1512866

Adapter plate ISO-A63-R



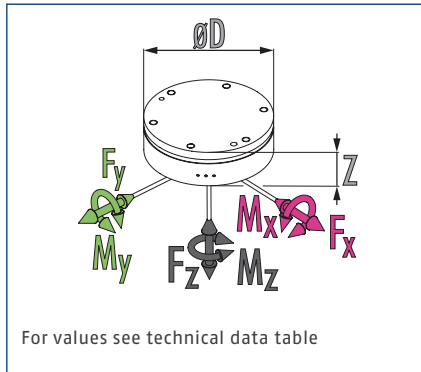
- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-90-ISO-A63-R	1512885

FT-AXIA 130

Force/torque sensor

Dimensions and maximum loads

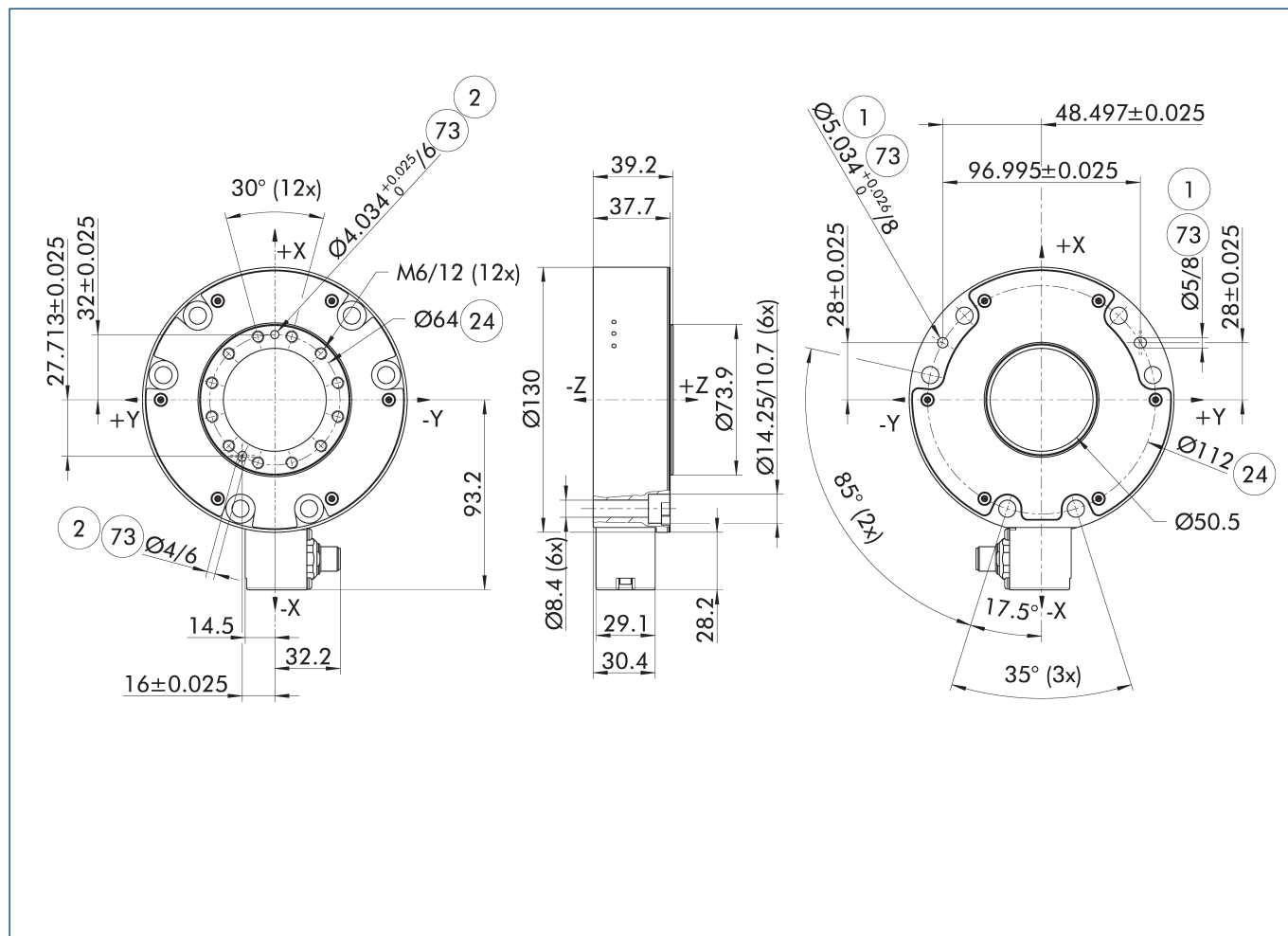


ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data

Description		FTN-AXIA130 SI-2000-125	FTN-AXIA130 SI-4000-300
ID		1512886	1512788
evaluation via		EtherNet	EtherNet
Housing material		Aluminum	stainless steel
Weight	[kg]	0.86	1.88
Calibration 1		SI-2000-125	SI-4000-300
Range of measurement F_x, F_y /range of measurement F_z	[N]	$\pm 2000/\pm 4000$	$\pm 4000/\pm 6000$
Range of measurement M_x, M_y /range of measurement M_z	[Nm]	$\pm 125/\pm 125$	$\pm 300/\pm 300$
Overload F_x, F_y /overload F_z	[N]	$\pm 10000/\pm 20000$	$\pm 20000/\pm 30000$
Overload M_x, M_y /overload M_z	[Nm]	$\pm 620/\pm 620$	$\pm 1500/\pm 1500$
Resonant frequency F_x, F_y, M_z	[Hz]	2500	2450
Resonant frequency F_z, M_x, M_y	[Hz]	4000	2900
Resolution F_x, F_y /resolution F_z	[N]	0.625/0.625	1.67/1.67
Resolution M_x, M_y /resolution M_z	[Nm]	0.025/0.025	0.07/0.07
IP protection class		67	67
Dimensions $\varnothing D \times Z$	[mm]	130 x 39.2	130 x 39.2
Technical data deviations for FTE			
Description		FTE-AXIA130 SI-2000-125	FTE-AXIA130 SI-4000-300
ID		1512887	1512871
evaluation via		EtherCAT	EtherCAT
Technical data deviating from FTRS			
Description		FTRS422-AXIA130 SI-2000-125	FTRS422-AXIA130 SI-4000-300
ID		1512783	1512877
evaluation via		serial interface (RS-422)	serial interface (RS-422)

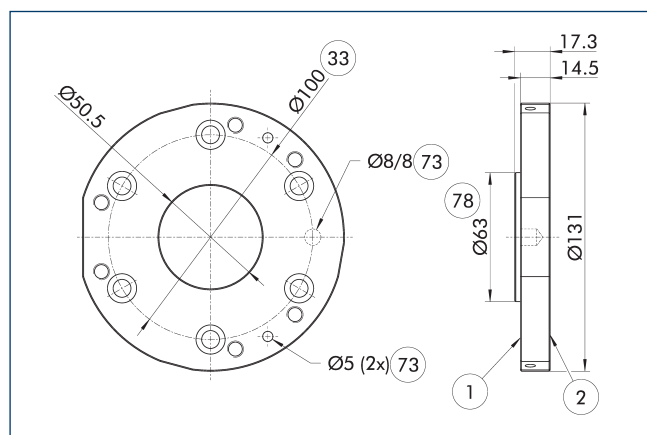
Main view



The drawing shows the unit in the basic version.

- ① Robot-side connection
- ② Tool-side connection
- ⑲ Bolt circle
- ⑳ Fit for centering pins

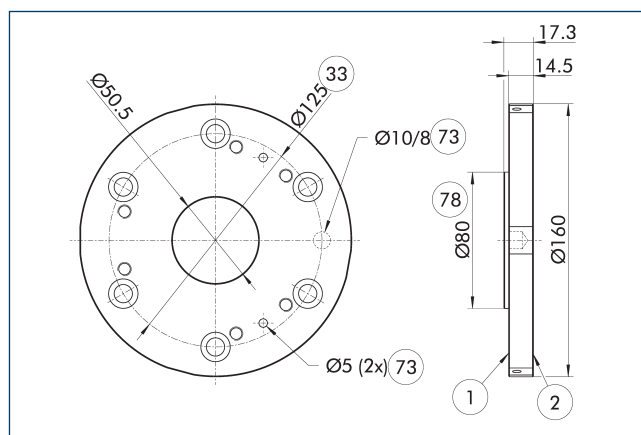
Adapter plate ISO-A100-R



- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑳ Fit for centering pins
- ㉑ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-130-ISO-A100-R	1512897

Adapter plate ISO-A125-R



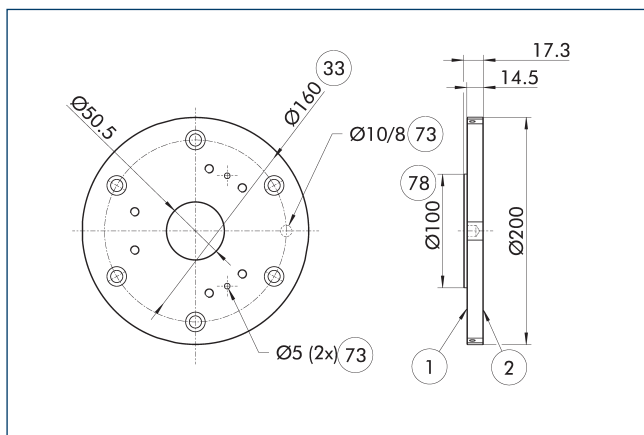
- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑳ Fit for centering pins
- ㉑ Fit for centering

Description	ID
Adapter plate	
A-FT-AXIA-130-ISO-A125-R	1512898

FT-AXIA 130

Force/torque sensor

Adapter plate ISO-A160-R



- ① Robot-side connection
- ② Tool-side connection
- ③ DIN ISO-9409 bolt circle
- ⑦③ Fit for centering pins
- ⑦⑧ Fit for centering

Description	ID	
Adapter plate		
A-FT-AXIA-130-ISO-A160-R	1512899	



SCHUNK GmbH & Co. KG
Spann- und Greiftechnik

Bahnhofstr. 106 - 134
D-74348 Lauffen/Neckar
Tel. +49-7133-103-0
Fax +49-7133-103-2399
info@de.schunk.com
schunk.com

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