Measuring in all 6 Degrees of Freedom. Force Measuring Range up to 40,000 N, and a Moment Measuring Range up to 6,000 N.

Measuring

6-Axis Force / Moment Sensor FT

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Robust. Flexible. Precise.

6-Axis Force / Moment Sensor FT

Rigid 6-axis force / torque sensor for precision measurements 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 benefit

Many sizes with different ranges of measurement

The sensor measures in all 6 degrees of freedom forces as well as moments

Rotation and translation of the coordinates system in all three directions

Integrated temperature compensation to guarantee the defined measuring accuracy

Easy integration into the process due to easy interface compatibility

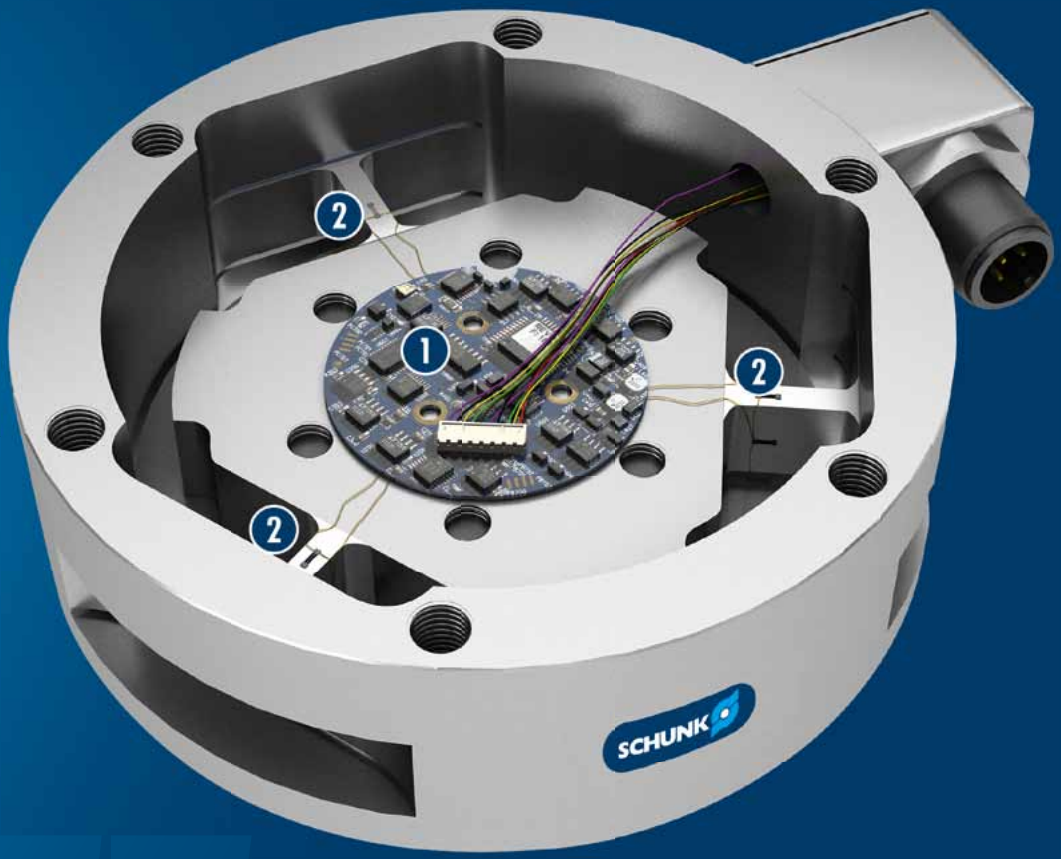
Robust design due to a higher overload range for a long tool life

IP protection IP60, 65, 68 available as an option

Sizes	Measuring range of force	Measuring range of moment load
Quantity: 15	±8 .. 40000 N	±0.05 .. 6000 Nm

Functional Description

The resistance strain gauges (DMS) of the 6-axis force moment sensor measure the occuring forces in all 6 degrees of freedom (F_x, F_y, F_z, T_x, T_y, and T_z). The signals of the DMS are reinforced inside the sensor.



① **Electronics**
integration into housing means no interfering contours (starting from size gamma)

② **Resistance strain gauges**
Silicon gages provide a signal 75 times stronger than conventional foil gages. This signal is amplified resulting in near-zero noise distortion.

CAD data, operating manuals and other current product documents are available at **www.schunk.com**

General Notes to the Series

Measuring accuracy: less than +/- 1 % of the upper range value at 22 °C

Evaluation via: Ethernet, ProfiNet, DeviceNet, DAQ, USB, RS232, Analog

Splash protection: IP60, 65, 68

Housing: Aluminum and stainless steel

Scope of delivery: Electronic processor and connection cable

Warranty: 12 months (details, general terms and conditions and operation manuals can be downloaded under www.schunk.com)

Harsh environmental conditions: Please note that the use in harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service lifetime of the units, and will void warranty. However, in many cases we can find a solution. Please contact us.

Handling weight: The weight of the total load attached to the flange. The design must take into account the permissible forces and moments. Please note that the life span will be reduced if the maximum handling weight is exceeded.

Application example

Application of sharpening with force-torque-sensor to measure and control the robot.

1. FT-Delta 6-Axis-Sensor
2. PZN-plus 64 3-Finger Centric Gripper
3. Robot-supported deburring of round bars

SCHUNK offers more ...

The following components make the FT even more productive – the perfect complement for highest functionality, flexibility, and process reliability.

FTN Ethernet Version

FTD DAQ Version

FTD Stand-Alone Version FTS

Adapter Plates

ⓘ Further information regarding the products can be found on the following products pages or at www.schunk.com. Please contact us for further information: SCHUNK technical hotline +49-7133-103-2696

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, T_x, T_y, T_z). The DMS signals are amplified in the sensor. Due to the size, the interface board for the Nano and Mini series is located in the power supply box (IFPS) instead of the sensor.
Power supply box: In the voltage supply box is the potential transformer, which changes the 5 V tension of the PC into tension usable for the sensor. With nano and mini system also the amplifier board is integrated in the box beside the potential transformer.
Sensor cable: With the nano and mini sensors the sensor cables are soldered in the sensor. With larger sensors a plug on the sensor housing is for the attachment of the sensor cables. The highly flexible sensor cable protects the sensor signals against electrical fields and mechanical loads.
Amplifier / Multiplex board / NetBox: The amplifier board converts the signals from the strain gauges into a signal usable for the DAQ Card and NetBox. The MULTIPLEX board strengthens the signals from the strain gauges and transfers them to the controller.
NetBox: The primary function of the NetBox is to communicate with the sensor and with the equipment of the user and to process the data. Communication is done via Ethernet/IP and CANbus. Via the CANbus connection, the NetBox can react and communicate to DeviceNet instructions.
Stand-Alone-Controller: The Stand-Alone-Controller is connected to the sensor or the Multiplex Box. It converts the multiplexed DMS signals to forces and moments. Functions such as tool transformation are implemented in the controller.

General Information

SCHUNK 6-axis force / torque sensors measure the full 6 components of force and torque **(F_x, F_y, F_z, M_x, M_y, M_z)** through the use of a monolithic instrumented transducer. SCHUNK FT sensors are equipped with silicon strain gauges, which provide for excellent noise immunity. The following interfaces are available for all sizes: **FTN (Ethernet, DeviceNet optionally with ProfiNet), FTD (PCI, USB), FTS (analog voltage 0 – 10 V, DIO) or FTW (Wireless).**

Characteristics

SCHUNK FT sensors feature diverse high-performance functions:

- **Zero offset:**
  Moves and / or rotates the FT reference system.
- **Demo program:**
  Enables settings and data logging.
- **Zeroing:**
  Provides a simple way to compensate for the tool weight.
- **Threshold comparison:**
  Generates an output code if a user-defined threshold is exceeded (FTN and FTS).
- **Built-in temperature compensation:**
  Ensures accuracy of the measurements over a large temperature range.
- **Overload:**
  SCHUNK FT sensors are especially robust and durable. The safety factor can be as high as 40 times the measurement range, depending on the particular size.
- **Immune measuring signal:**
  Silicon strain gauges provide a signal 75 times stronger than conventional foil strain gauges and reduce the signal noise to virtually zero.
- **IP protection class:**
  SCHUNK FT sensors are optionally available in versions with IP60, 65 or 68 protection.

Accuracy

Accuracy is the difference between the applied load and the actual measured load.
The maximum measuring inaccuracy refers to the maximum value that can be measured with the sensor (see example below for Gamma SI-32-2.5).
The reproducibility or repeatability is the difference between the measured values when the same load is applied each time.

Note:
Often it is irrelevant to know the size of the actual measured load. It is crucial that the same load always results in the same measured values.

Example: Gamma SI-32-2.5

Name	Calibration	F_x	F_y	F_z	T_x	T_y	T_z
Gamma	SI-32-2.5	0.75 %	1.00 %	0.75 %	1.00 %	1.25 %	1.00 %

F_x max. measurement range is 32 N, max. measuring inaccuracy is 0.24 N.
F_z max. measurement range is 100 N, max. measuring inaccuracy is 0.75 N.

Resolution

The resolution is the smallest change in the load that represents a change in the output values of the measured forces and moments.
The smaller the resolution of an FT sensor, the larger is the sensitivity of the sensor. This is important when the application requires a "tactile sense".

Technical Data

Type	Analysis	Output speed	Latency time
FTN	Via Ethernet, DeviceNet optionally with ProfiNet	7000 Hz 7000 Hz	500 µs 288 µs
FTD	Via DAQ card (PCI)	16.67 kHz to 41.67 kHz	1 / Output speed
FTS	Analog voltage 0 – 10 V or DIO	560 Hz 2500 Hz	2585 µs 800 µs

Application in Practice

SCHUNK 6-axis force / torque sensors are already in use in numerous robot-controlled applications:

- **Joining processes:**
  Joining or assembly of workpieces by using a robot.
- **Deburring, polishing, grinding:**
  Optimal results due to constant contact pressures.
- **Force / moment feedback:**
  Control of manipulators (e.g. defusing of bombs).
- **Medicine:**
  Development of artificial limbs and simulation of surgery.
- **Product tests:**
  Tactile measurements for automotive parts and smartphone displays.
- **Research and development:**
  Used at many universities and research facilities due to very precise and reproducible measurements.
- **Service robotics**
  Flexible and versatile due to the compact design.

The force / torque feedback between the robot and the SCHUNK FT sensor allows a significant increase in quality of the automated grinding of air supply chambers for fireplaces.

FTN – the All-round Sensor for your Interfaces

The FTN sensor is connected by means of Ethernet or DeviceNet (optional ProfiNet) to the system.
The web browser interface facilitates configuration and adjustment of the FTN sensor.

Product features

- Fully ODVA™-compliant Ethernet/IP interface (optionally available with ProfiNet).
- The FTN NetBox has IP65 protection.
- The NetBox is supplied using Power over Ethernet (PoE) or an external power supply (11 V to 24 V).
- Up to 16 sensor calibrations can be stored permanently in the system for selection by the user.

Scope of delivery:
FT sensor, sensor cable, NetBox, optional RJ45 adapter

1. FT sensor
2. Sensor cable
3. NetBox
4. Optionally with RJ45 adapter

FTD – for simple Data Acquisition via PC

The FTD sensor is connected to the PC by means of a DAQ card. The 6 analog output signals of the sensor are converted to digital signals by means of the electronics in the DAQ card. Afterwards, the software (provided by the customer) uses the calibration matrix to graphically display the occurring forces and moments on the PC.

Product features

- Highest possible output speed (see table on page 629)
- Numerous DAQ cards can be used
- Dual calibration possible

Scope of delivery:
FT sensor, sensor cable, power supply box, optionally with DAQ card (PCI or USB)

1. FT sensor with sensor cable
2. Voltage supply box
3. Optionally with DAQ card (PCI)
4. Optionally with DAQ card (USB)
5. Cable for DAQ card

FTS – the autonomous Measuring System

The SCHUNK FTS sensor is connected by means of the RS-232 interface, analog outputs and / or single I/O connections. The stand-alone controller digitalizes the 6 analog output signals of the sensor and uses the calibration matrix to calculate the occurring forces and moments (F_x, F_y, F_z, M_x, M_y, M_z).

Product features

- Autonomous measuring system
- Dual calibration possible
- Discrete I/O (e.g. good / bad inspection)
- Integrated RS-232 interface allows direct configuration on the PC
- Measured forces and moments are output via analog voltages (±5 V / ±10 V)

Scope of delivery:
FT sensor, sensor cable, stand-alone controller

1. FT sensor with sensor cable
2. Stand-alone controller (left: rear view; right: front view)
3. Amplifier box (MUX box)
4. Connecting cable from amplifier box to stand-alone controller

Selection Scheme for Sensors

1. Calculation of the expected forces and moments

Generally, the moment load is the decisive variable in selecting a sensor. The tool weight and the application process generate forces that can act upon the sensor as moments. The moment is calculated from the applied force (static and dynamic) multiplied by the lever arm. The lever arm is the distance from the point of application of the force to the zero point of the sensor. The design must also take into account forces and moments that can act upon the sensor outside of normal operation.

2. Pre-selection of the sensor based on forces and moments

Use the table below for this step.

3. Definition of the resolution

Check whether the resolution of the sensor matches your requirements. It is possible that the sensor selected based on the forces and moments does not fulfill the requirements for the resolution.
As a rule of thumb, the larger the measurement range, the smaller the resolution.

Example

The maximum expected force that will act upon the sensor is 98 N (10 kg). This force acts upon the sensor from a distance of 25 cm. The moment is therefore 24.5 Nm.

The FT-Delta-SI-330-30 would be suitable for this application (measuring range 330 N and 30 Nm). The overload safety is 230 Nm (M_{xy}).

Information for robot applications

In a crash situation, enormous forces and moments act upon the sensor due to the inertia and braking deceleration of the robot.
To protect the sensor, we recommend using collision and overload protection of the type OPS or OPR.

FT Quick Overview

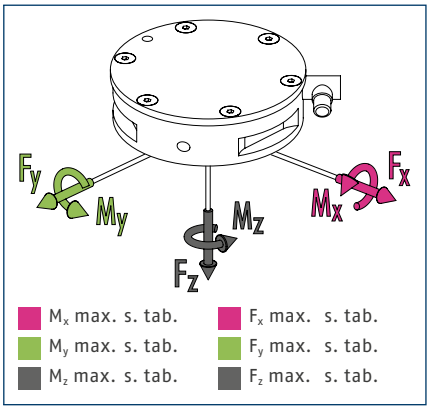
Designation	Max F_x, F_y [±N]	Max F_z [±N]	Max M_x, M_y, M_z [±Nm]	Mass [kg]	Diameter [mm]	Height [mm]
Nano17 Titanium	32	56.4	0.2	0.00907	17	14
Nano17	50	70	0.5	0.00907	17	14
Nano17 IP65/IP68	50	70	0.5	0.0408	20	22
Nano25	250	1000	6	0.0635	25	22
Nano25 IP65/IP68	250	1000	6	0.136	28	27
Nano43	36	36	0.5	0.0408	43	11
Mini27 Titanium	80	160	4	0.0318	27	18
Mini40	80	240	4	0.0499	40	12
Mini40 IP65/IP68	80	240	4	0.272	53	21
Mini45 Titanium	240	480	12	0.0998	45	18
Mini45	580	1160	20	0.0907	45	16
Mini45 IP65/IP68	580	1160	20	0.39	58	25
Mini58	2800	6800	120	0.499	58	30
Mini58 IP60	2800	6800	120	0.522	82	36
Mini58 IP65/IP68	2800	6800	120	0.803	66	38
Mini85	1900	3800	80	0.635	85	30
Gamma	130	400	10	0.254	75	33
Gamma IP60	130	400	10	0.467	99	40
Gamma IP65	130	400	10	1.09	110	52
GammaIP68	130	400	10	1.98	110	52
Delta	660	1980	60	0.912	94	33
Delta IP60	660	1980	60	1.81	120	47
Delta IP65	660	1980	60	1.77	130	52

Designation	Max F_x, F_y [±N]	Max F_z [±N]	Max M_x, M_y, M_z [±Nm]	Mass [kg]	Diameter [mm]	Height [mm]
Delta IP68	660	1980	60	2.63	100	52
Theta	2500	6250	400	4.99	150	61
Theta IP60	2500	6250	400	8.62	190	74
Theta IP65/IP68	2500	6250	400	9	160	75
Omega85	1900	3800	80	0.658	85	34
Omega85 IP65/IP68	1900	3800	80	1.91	93	39
Omega160	2500	6250	400	2.72	160	56
Omega160 IP60	2500	6250	400	7.67	190	58
Omega160 IP65/IP68	2500	6250	400	7.26	170	66
Omega191	7200	18000	1400	on request	on request	on request
Omega191 IP60	7200	18000	1400	on request	on request	on request
Omega191 IP65/IP68	7200	18000	1400	on request	on request	on request
Omega250 IP60/IP65/IP68	16000	32000	2000	31.8	290	95
Omega331	40000	88000	6000	47	330	110

FT Nano17

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

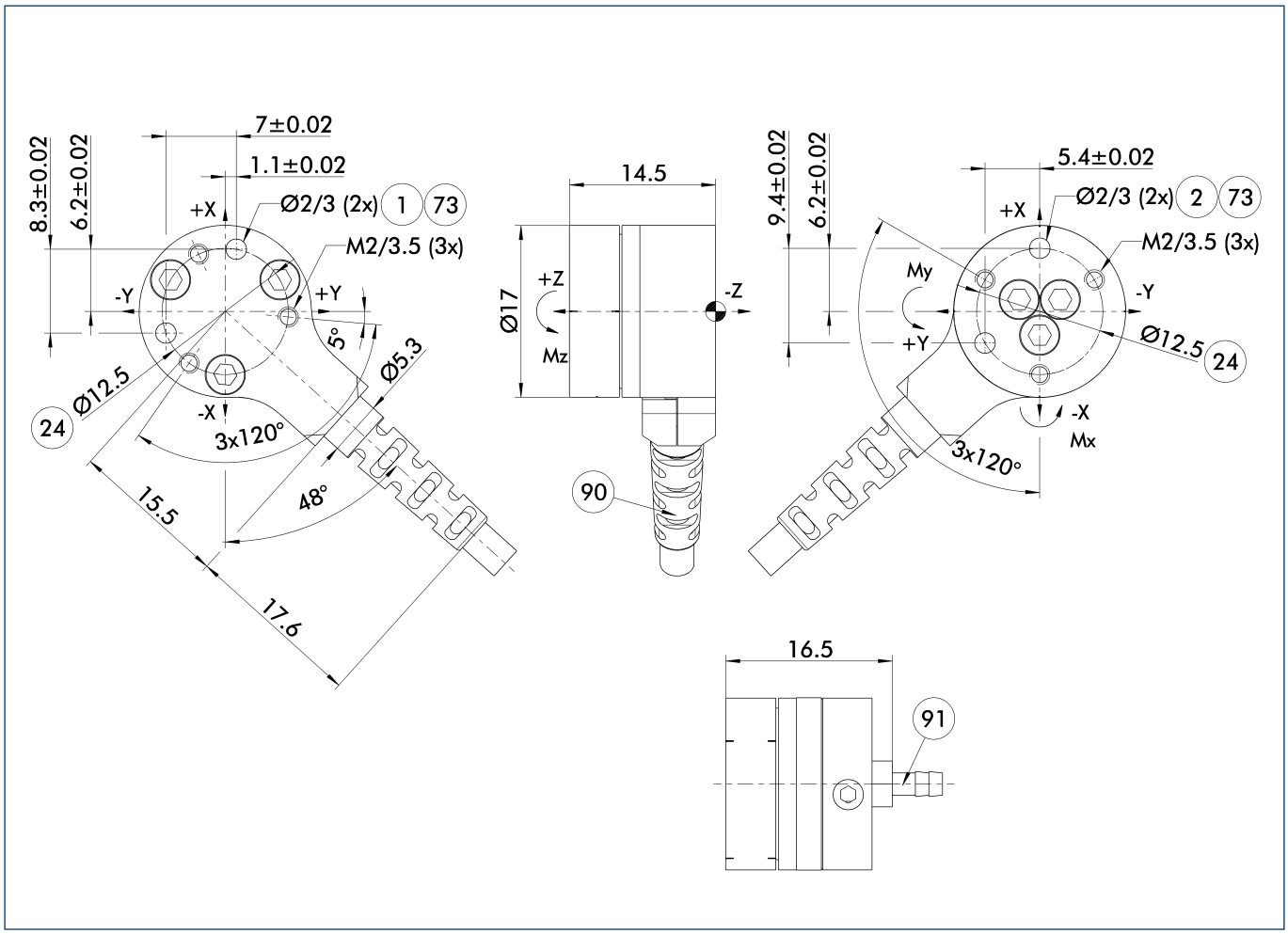


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Nano-17	FTN-Nano-17	FTN-Nano-17
Calibration		SI-12-0.12	SI-25-0.25	SI-50-0.5
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.0091	0.0091	0.0091
Measuring range F_x, F_y	[N]	±12	±25	±50
Measuring range F_z	[N]	±17	±35	±70
Measuring range M_x, M_y	[Nm]	±0.12	±0.25	±0.5
Measuring range M_z	[Nm]	±0.12	±0.25	±0.5
Overload F_x, F_y	[N]	±350	±350	±350
Overload F_z	[N]	±800	±800	±800
Overload M_x, M_y	[Nm]	±2.6	±2.6	±2.6
Overload M_z	[Nm]	±3.1	±3.1	±3.1
Resonant Frequency F_x, F_y, M_z	[Hz]	7200	7200	7200
Resonant Frequency F_z, M_x, M_y	[Hz]	7200	7200	7200
Resolution F_x, F_y	[N]	1/320	1/160	1/80
Resolution F_z	[N]	1/320	1/160	1/80
Resolution M_x, M_y	[Nmm]	1/64	1/32	1/16
Resolution M_z	[Nmm]	1/64	1/32	1/16
Technical data deviating from FTD				
Description		FTD-Nano-17	FTD-Nano-17	FTD-Nano-17
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/320	1/160	1/80
Resolution F_z	[N]	1/320	1/160	1/80
Resolution M_x, M_y	[Nmm]	1/64	1/32	1/16
Resolution M_z	[Nmm]	1/64	1/32	1/16
Technical data deviating from FTS				
Description		FTS-Nano-17	FTS-Nano-17	FTS-Nano-17
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/160	1/80	1/40
Resolution F_z	[N]	1/160	1/80	1/40
Resolution M_x, M_y	[Nmm]	1/32	1/16	1/8
Resolution M_z	[Nmm]	1/32	1/16	1/8

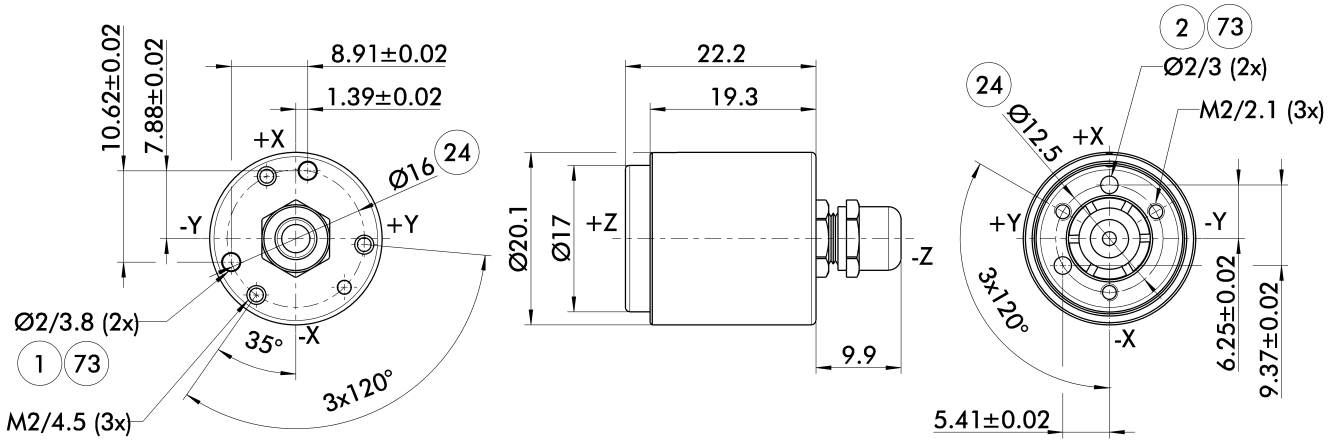
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
90 Radial cable outlet with strain relief
91 Axial cable outlet

IP65 / IP68 main view



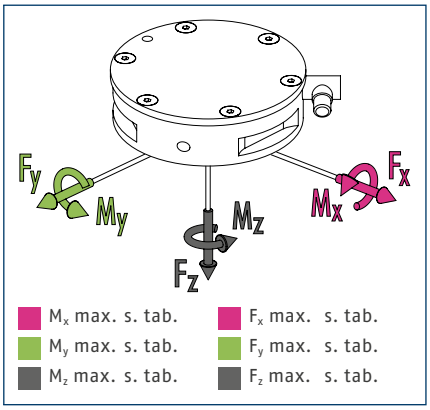
The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin

FT Nano17-Titan

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

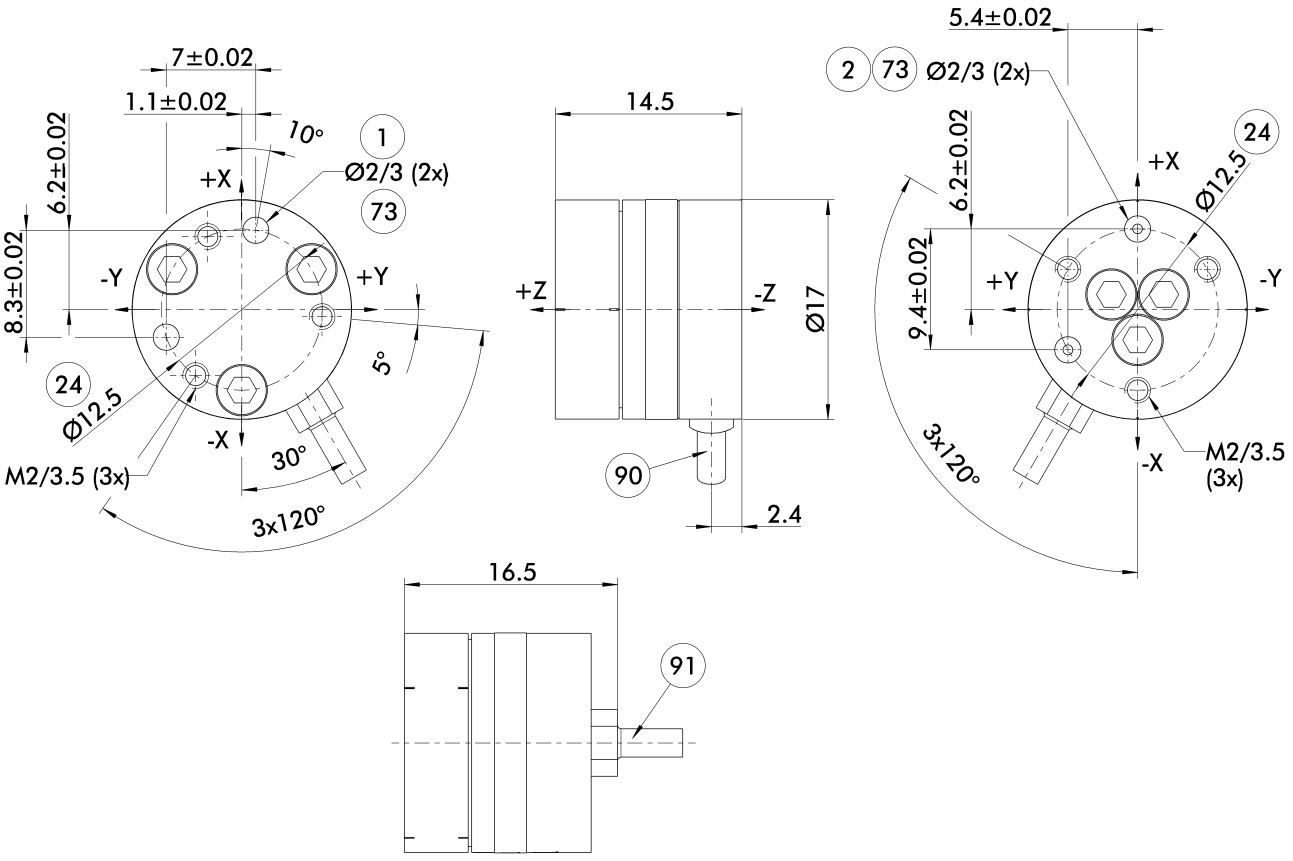


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Nano-17-T	FTN-Nano-17-T	FTN-Nano-17-T
Calibration		SI-8-0.05	SI-16-0.1	SI-32-0.2
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.01	0.01	0.01
Measuring range F_x, F_y	[N]	±8	±16	±32
Measuring range F_z	[N]	±14.1	±28.2	±56.4
Measuring range M_x, M_y	[Nm]	±0.05	±0.1	±0.2
Measuring range M_z	[Nm]	±0.05	±0.1	±0.2
Overload F_x, F_y	[N]	±160	±160	±160
Overload F_z	[N]	±310	±310	±310
Overload M_x, M_y	[Nm]	±500	±500	±500
Overload M_z	[Nm]	±610	±610	±610
Resonant Frequency F_x, F_y, M_z	[Hz]	3000	3000	3000
Resonant Frequency F_z, M_x, M_y	[Hz]	3000	3000	3000
Resolution F_x, F_y	[N]	1/682	1/341	1/171
Resolution F_z	[N]	1/682	1/341	1/171
Resolution M_x, M_y	[Nmm]	3/364	3/182	3/92
Resolution M_z	[Nmm]	5/728	5/364	5/184
Technical data deviating from FTD				
Description		FTD-Nano-17-T	FTD-Nano-17-T	FTD-Nano-17-T
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/682	1/341	1/171
Resolution F_z	[N]	1/682	1/341	1/171
Resolution M_x, M_y	[Nmm]	3/364	3/182	3/92
Resolution M_z	[Nmm]	5/728	5/364	5/184
Technical data deviating from FTS				
Description		FTS-Nano-17-T	FTS-Nano-17-T	FTS-Nano-17-T
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/341	2/341	2/171
Resolution F_z	[N]	1/341	2/341	2/171
Resolution M_x, M_y	[Nmm]	3/182	3/91	3/46
Resolution M_z	[Nmm]	5/364	5/182	5/92

Main view



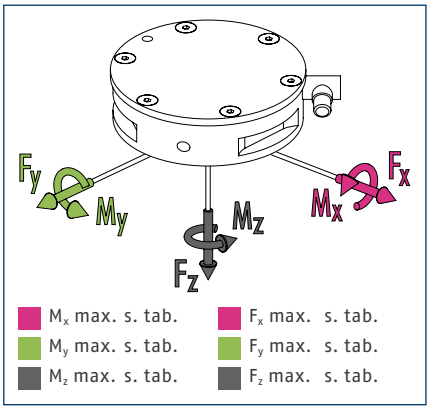
The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
90 Radial cable outlet with strain relief
91 Axial cable outlet

FT Nano25

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

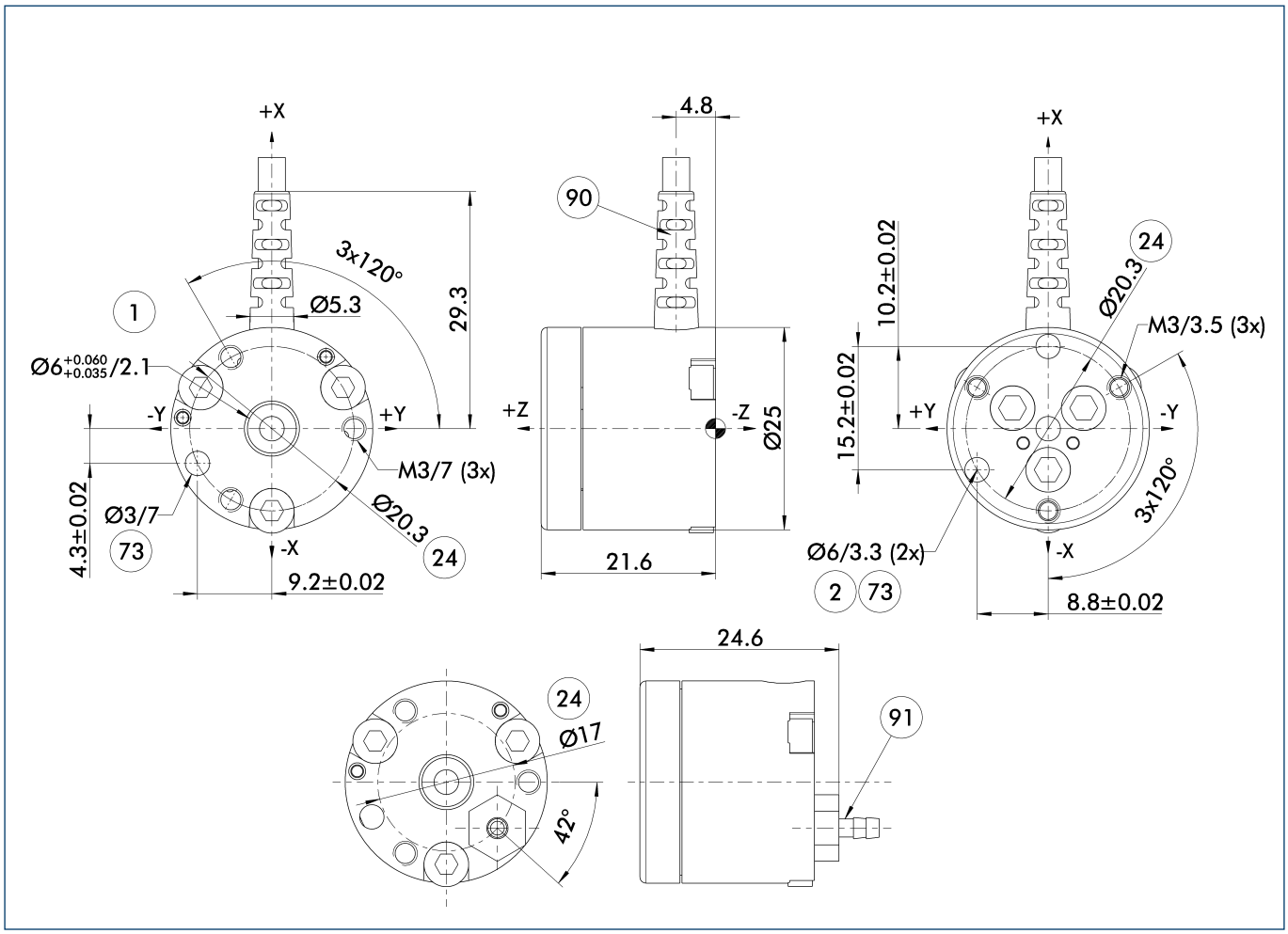


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Nano-25	FTN-Nano-25
Calibration		SI-125-3	SI-250-6
Evaluation via		Ethernet	Ethernet
Mass	[kg]	0.063	0.063
Measuring range F_x, F_y	[N]	±125	±250
Measuring range F_z	[N]	±500	±1000
Measuring range M_x, M_y	[Nm]	±3	±6
Measuring range M_z	[Nm]	±3	±3.4
Overload F_x, F_y	[N]	±2300	±2300
Overload F_z	[N]	±7300	±7300
Overload M_x, M_y	[Nm]	±43	±43
Overload M_z	[Nm]	±63	±63
Resonant Frequency F_x, F_y, M_z	[Hz]	3600	3600
Resonant Frequency F_z, M_x, M_y	[Hz]	3800	3800
Resolution F_x, F_y	[N]	1/48	1/24
Resolution F_z	[N]	1/16	1/8
Resolution M_x, M_y	[Nm]	1/1320	1/660
Resolution M_z	[Nm]	1/2640	1/1320
Technical data deviating from FTD			
Description		FTD-Nano-25	FTD-Nano-25
Evaluation via		DAQ	DAQ
Resolution F_x, F_y	[N]	1/48	1/24
Resolution F_z	[N]	1/16	1/8
Resolution M_x, M_y	[Nm]	1/1320	1/660
Resolution M_z	[Nm]	1/2640	1/1320
Technical data deviating from FTS			
Description		FTS-Nano-25	FTS-Nano-25
Evaluation via		Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/24	1/12
Resolution F_z	[N]	1/8	1/4
Resolution M_x, M_y	[Nm]	1/660	1/330
Resolution M_z	[Nm]	1/1320	1/660

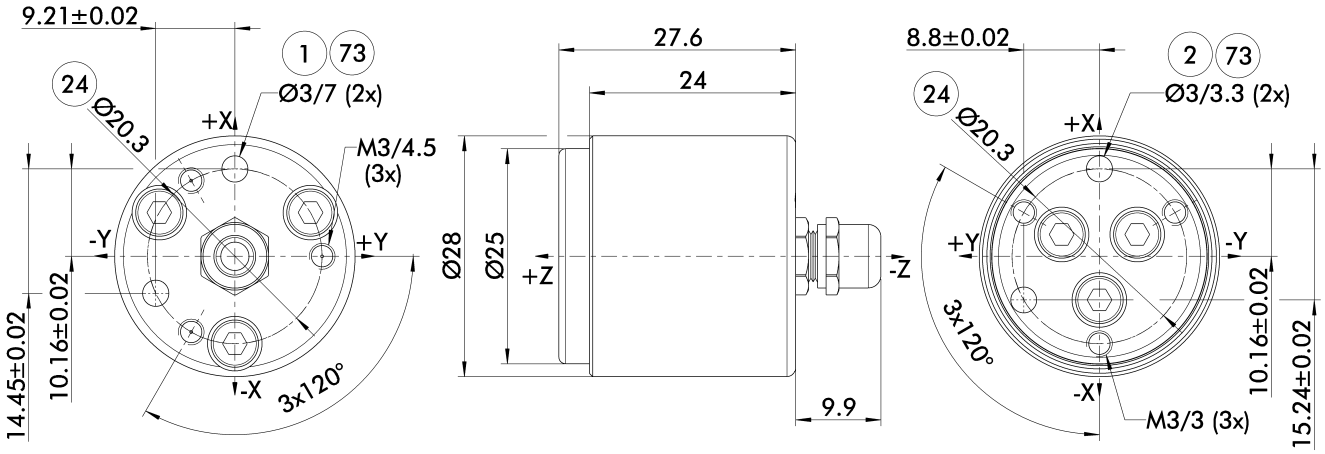
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
90 Radial cable outlet with strain relief
91 Axial cable outlet

IP65 / IP68 main view

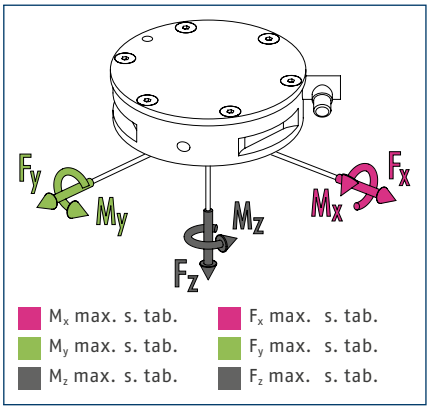


The main view shows the product with IP-protection.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

FT Nano43

Forces and moments

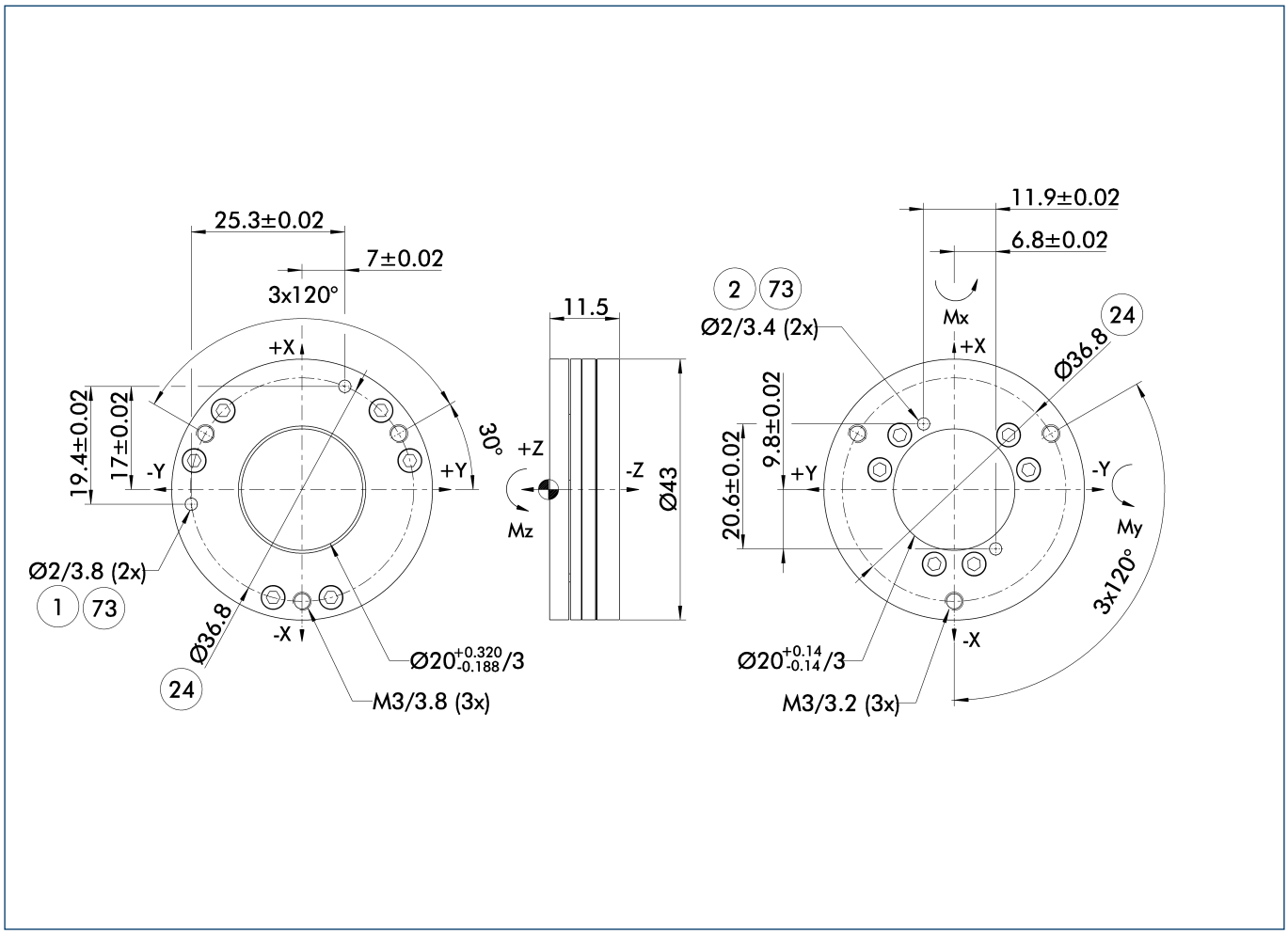


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Nano-43	FTN-Nano-43	FTN-Nano-43
Calibration		SI-9-0.125	SI-18-0.25	SI-36-0.5
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.039	0.039	0.039
Measuring range F_x, F_y	[N]	±9	±18	±36
Measuring range F_z	[N]	±9	±18	±36
Measuring range M_x, M_y	[Nm]	±0.13	±0.25	±0.5
Measuring range M_z	[Nm]	±0.13	±0.25	±0.5
Overload F_x, F_y	[N]	±300	±300	±300
Overload F_z	[N]	±380	±380	±380
Overload M_x, M_y	[Nm]	±3.2	±3.2	±3.2
Overload M_z	[Nm]	±4.6	±4.6	±4.6
Resonant Frequency F_x, F_y, M_z	[Hz]	2800	2800	2800
Resonant Frequency F_z, M_x, M_y	[Hz]	2300	2300	2300
Resolution F_x, F_y	[N]	1/512	1/256	1/128
Resolution F_z	[N]	1/512	1/256	1/128
Resolution M_x, M_y	[Nmm]	1/40	1/20	1/10
Resolution M_z	[Nmm]	1/40	1/20	1/10
Technical data deviating from FTD				
Description		FTD-Nano-43	FTD-Nano-43	FTD-Nano-43
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/512	1/256	1/128
Resolution F_z	[N]	1/512	1/256	1/128
Resolution M_x, M_y	[Nmm]	1/40	1/20	1/10
Resolution M_z	[Nmm]	1/40	1/20	1/10
Technical data deviating from FTS				
Description		FTS-Nano-43	FTS-Nano-43	FTS-Nano-43
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/256	1/128	1/64
Resolution F_z	[N]	1/256	1/128	1/64
Resolution M_x, M_y	[Nmm]	1/20	1/10	1/5
Resolution M_z	[Nmm]	1/20	1/10	1/5

Main view



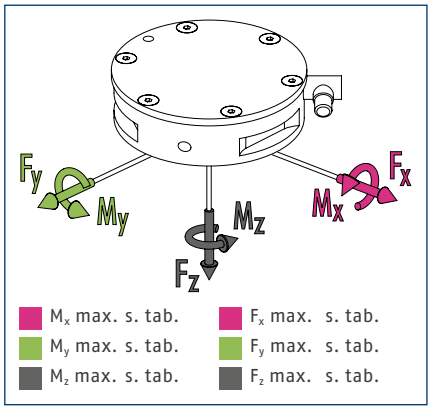
The main view shows the unit in its basic version.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

FT Mini40

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

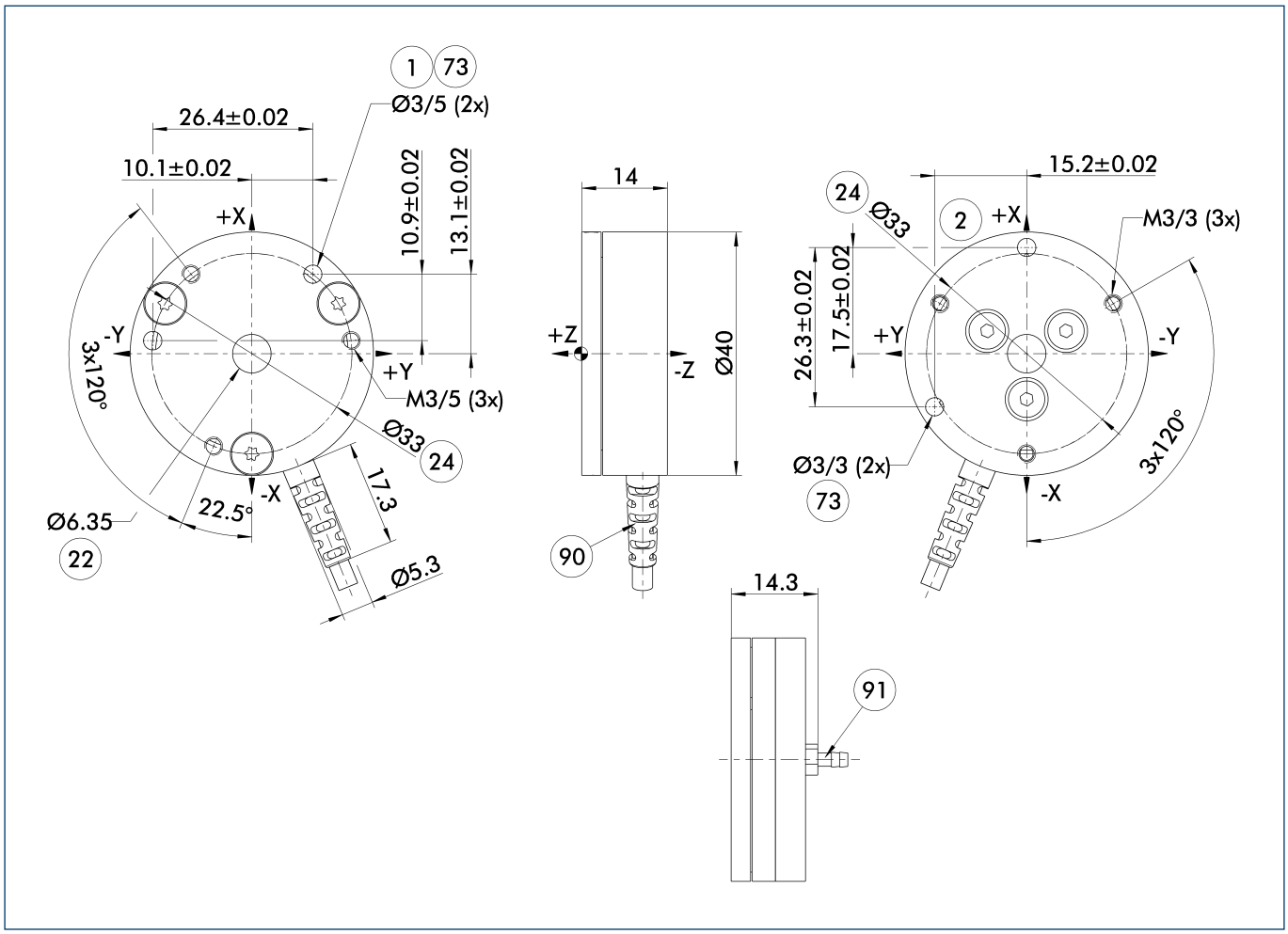


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Mini-40	FTN-Mini-40	FTN-Mini-40
Calibration		SI-20-1	SI-40-2	SI-80-4
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.049	0.049	0.049
Measuring range F_x, F_y	[N]	±20	±40	±80
Measuring range F_z	[N]	±60	±120	±240
Measuring range M_x, M_y	[Nm]	±1	±2	±4
Measuring range M_z	[Nm]	±1	±2	±4
Overload F_x, F_y	[N]	±810	±810	±810
Overload F_z	[N]	±2400	±2400	±2400
Overload M_x, M_y	[Nm]	±19	±19	±19
Overload M_z	[Nm]	±20	±20	±20
Resonant Frequency F_x, F_y, M_z	[Hz]	3200	3200	3200
Resonant Frequency F_z, M_x, M_y	[Hz]	4900	4900	4900
Resolution F_x, F_y	[N]	1/200	1/100	1/50
Resolution F_z	[N]	1/100	1/50	1/25
Resolution M_x, M_y	[Nm]	1/8000	1/4000	1/2000
Resolution M_z	[Nm]	1/8000	1/4000	1/2000
Technical data deviating from FTD				
Description		FTD-Mini-40	FTD-Mini-40	FTD-Mini-40
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/200	1/100	1/50
Resolution F_z	[N]	1/100	1/50	1/25
Resolution M_x, M_y	[Nm]	1/8000	1/4000	1/2000
Resolution M_z	[Nm]	1/8000	1/4000	1/2000
Technical data deviating from FTS				
Description		FTS-Mini-40	FTS-Mini-40	FTS-Mini-40
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/100	1/50	1/25
Resolution F_z	[N]	1/50	1/25	2/25
Resolution M_x, M_y	[Nm]	1/4000	1/2000	1/1000
Resolution M_z	[Nm]	1/4000	1/2000	1/1000

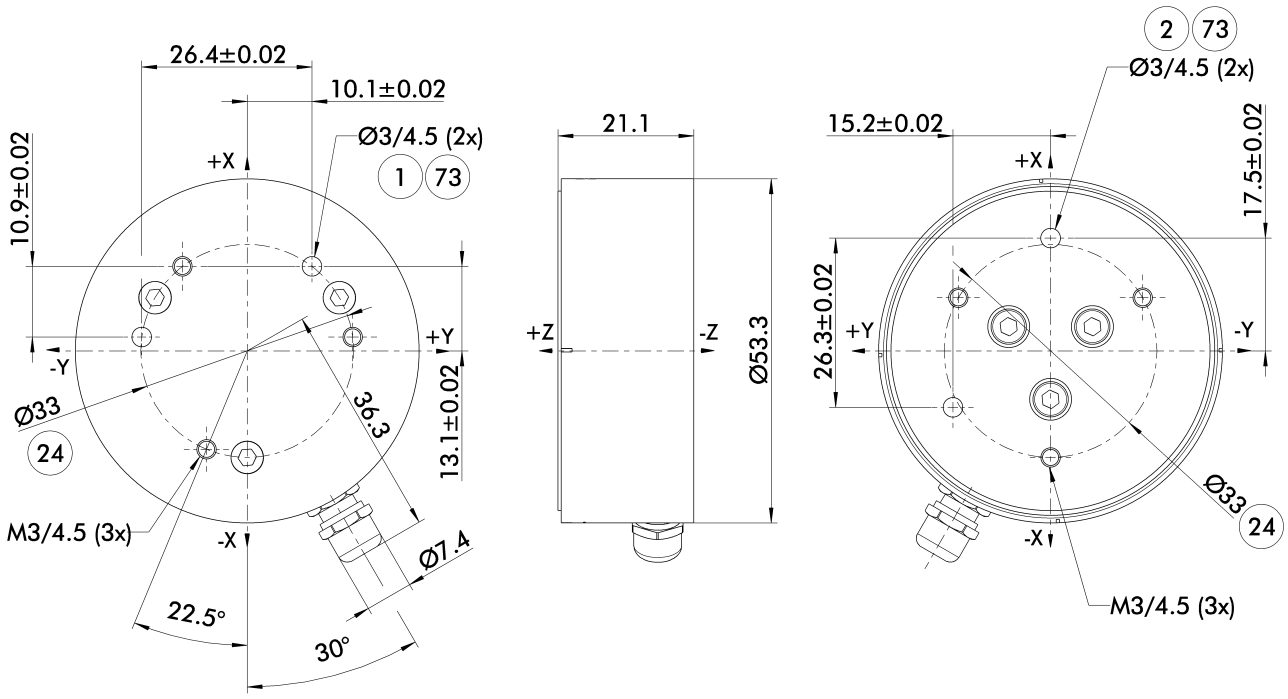
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
22 Center bore
24 Bolt circle
73 Fit for a centering pin
90 Radial cable outlet with strain relief
91 Axial cable outlet

IP65 / IP68 main view



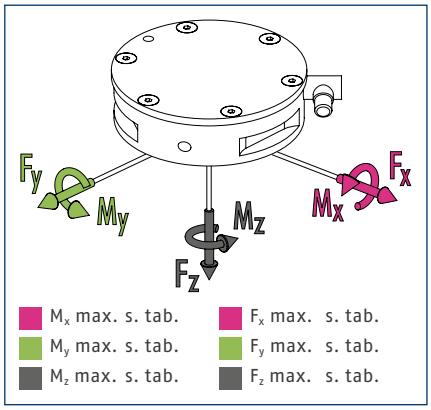
The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin

FT Mini45

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

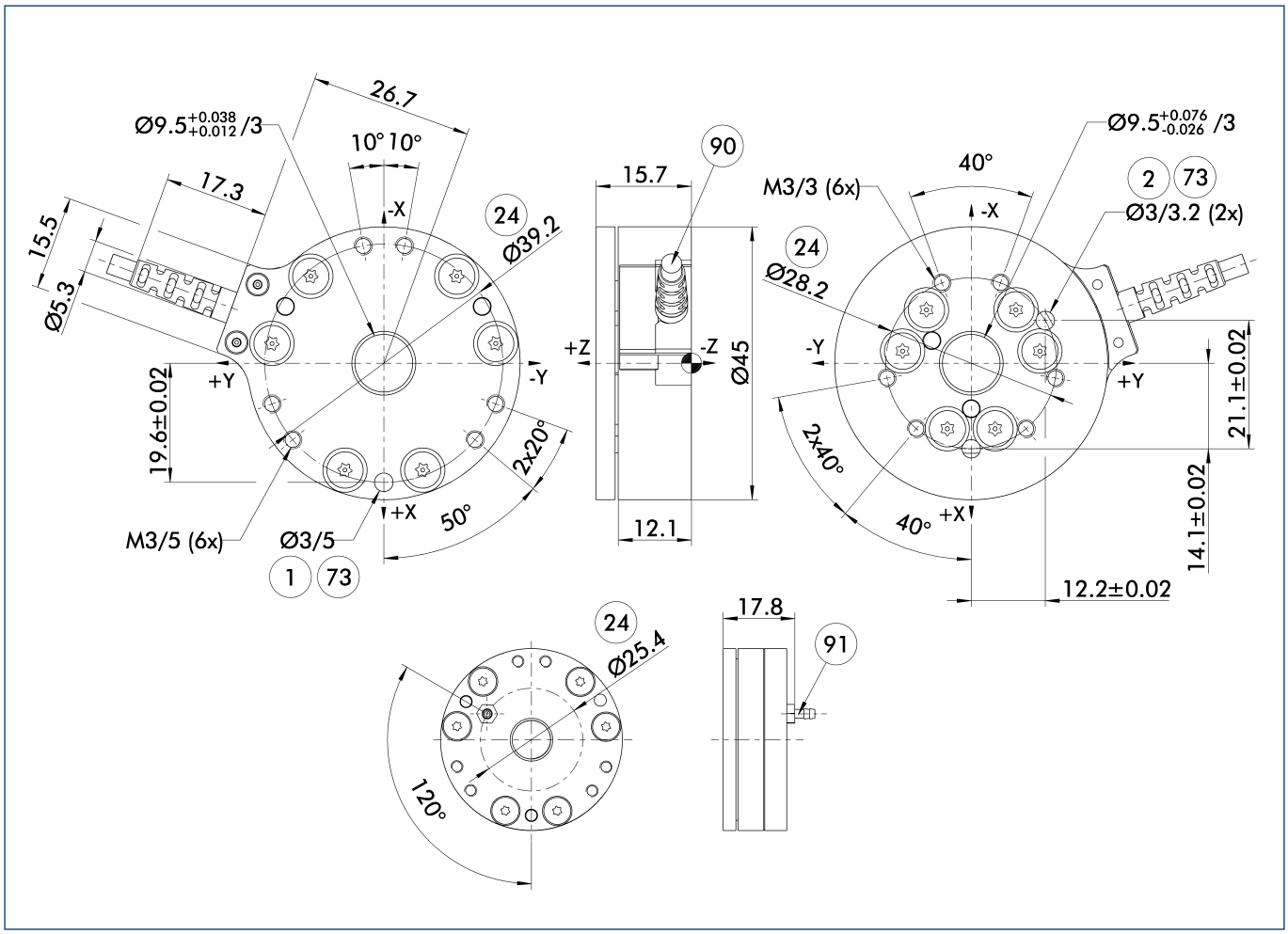


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Mini-45	FTN-Mini-45	FTN-Mini-45
Calibration		SI-145-5	SI-290-10	SI-580-20
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.091	0.091	0.091
Measuring range F_x, F_y	[N]	±145	±290	±580
Measuring range F_z	[N]	±290	±580	±1160
Measuring range M_x, M_y	[Nm]	±5	±10	±20
Measuring range M_z	[Nm]	±5	±10	±20
Overload F_x, F_y	[N]	±5100	±5100	±5100
Overload F_z	[kN]	±10000	±10000	±10000
Overload M_x, M_y	[Nm]	±110	±110	±110
Overload M_z	[Nm]	±140	±140	±140
Resonant Frequency F_x, F_y, M_z	[Hz]	5600	5600	5600
Resonant Frequency F_z, M_x, M_y	[Hz]	5400	5400	5400
Resolution F_x, F_y	[N]	1/16	1/8	1/4
Resolution F_z	[N]	1/16	1/8	1/4
Resolution M_x, M_y	[Nm]	1/752	1/376	1/188
Resolution M_z	[Nm]	1/1504	1/752	1/376
Technical data deviating from FTD				
Description		FTD-Mini-45	FTD-Mini-45	FTD-Mini-45
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/16	1/8	1/4
Resolution F_z	[N]	1/16	1/8	1/4
Resolution M_x, M_y	[Nm]	1/752	1/376	1/188
Resolution M_z	[Nm]	1/1504	1/752	1/376
Technical data deviating from FTS				
Description		FTS-Mini-45	FTS-Mini-45	FTS-Mini-45
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/8	1/4	1/2
Resolution F_z	[N]	1/8	1/4	1/2
Resolution M_x, M_y	[Nm]	1/376	1/188	1/94
Resolution M_z	[Nm]	1/752	1/376	1/188

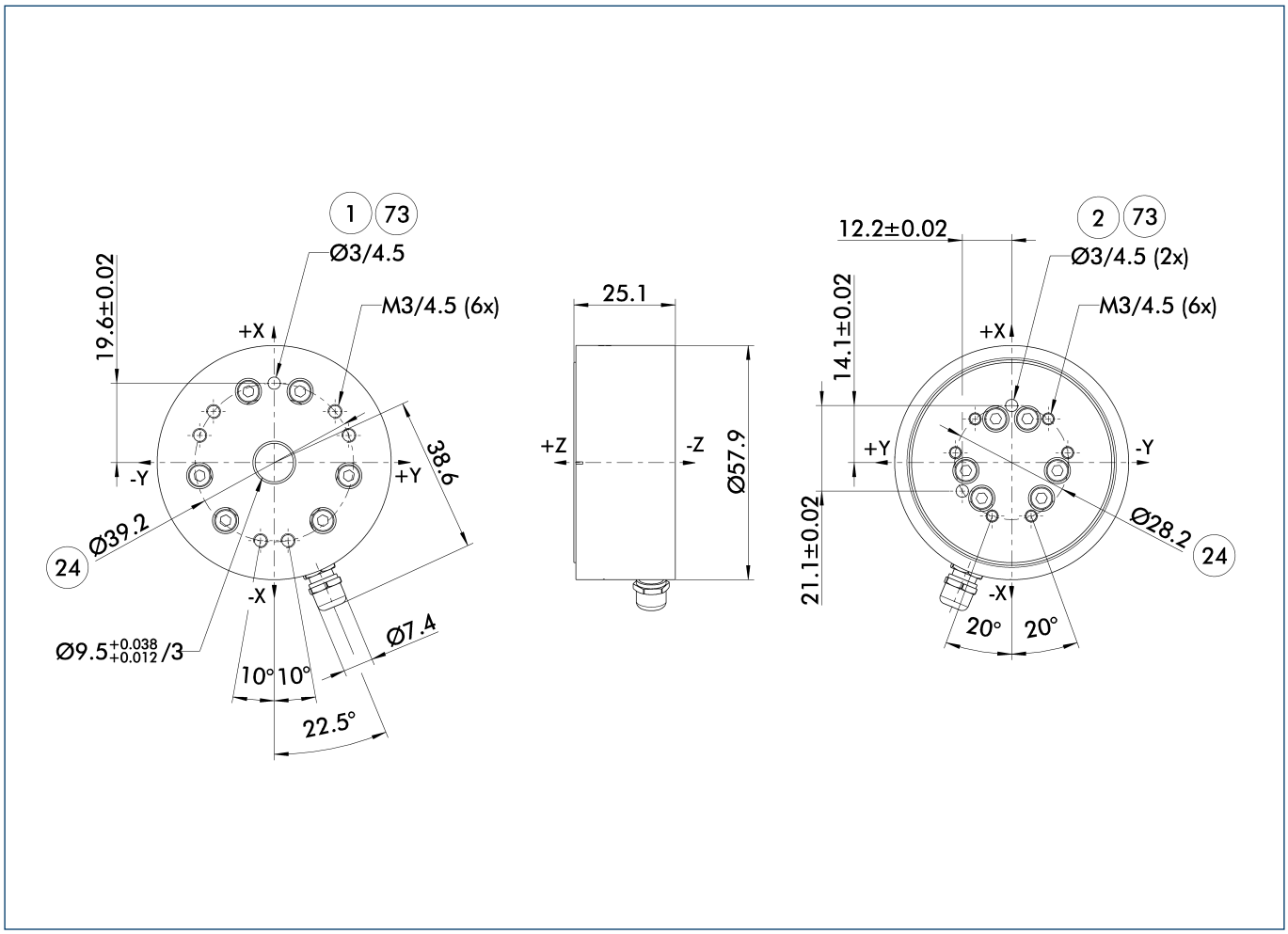
Main view



The main view shows the unit in its basic version.

1. Robot side connection
2. Tool side connection
24. Bolt circle
73. Fit for a centering pin
90. Radial cable outlet with strain relief
91. Axial cable outlet

IP65 / IP68 main view



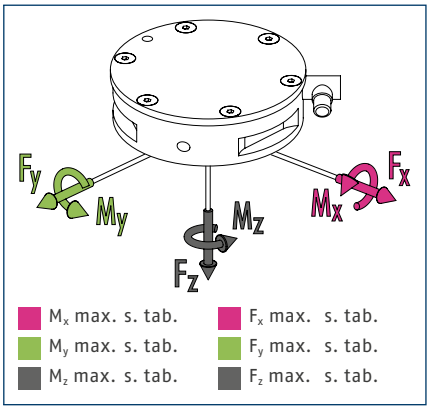
The main view shows the product with IP-protection.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

FT Mini85

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

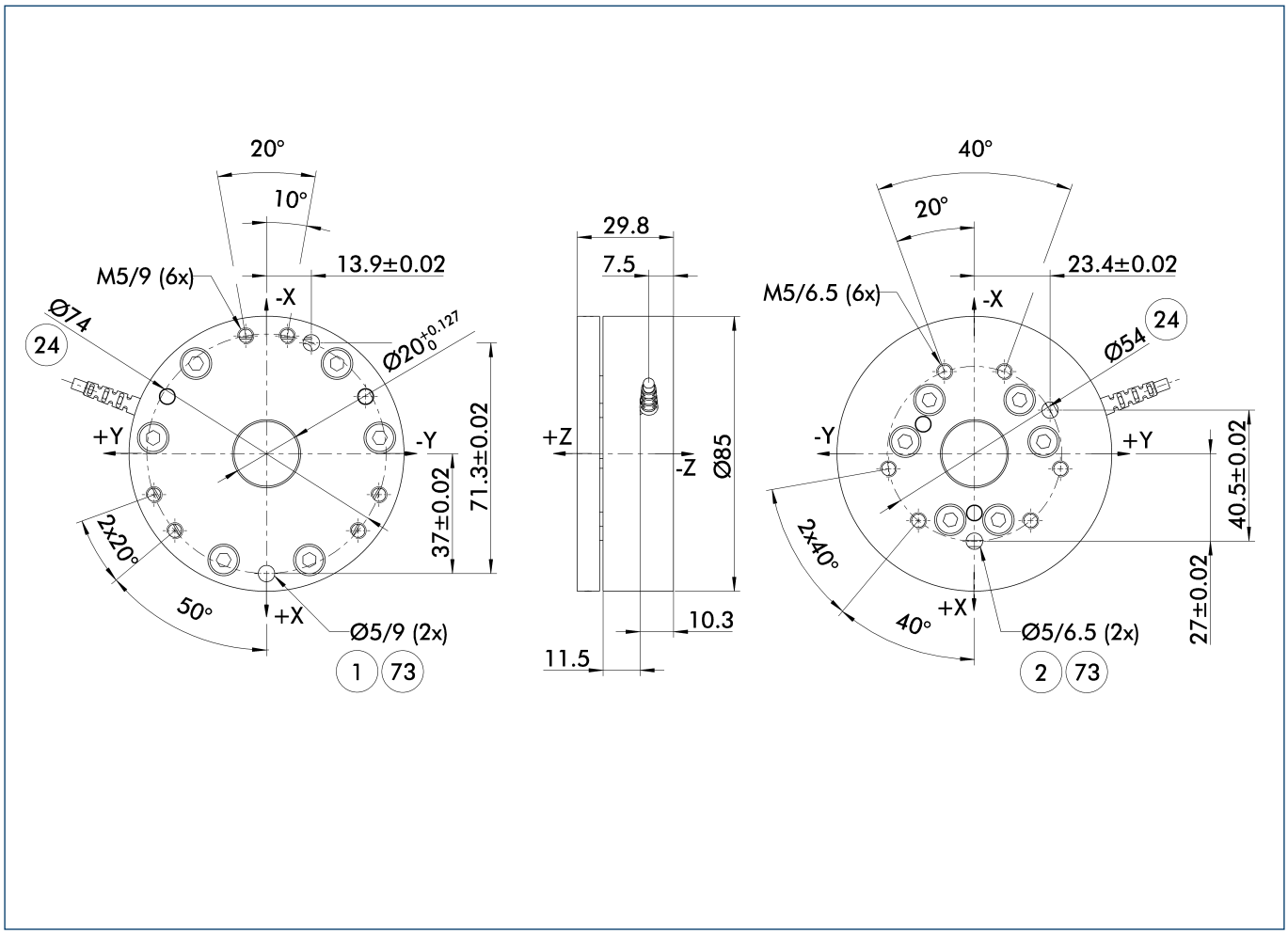


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Mini85	FTN-Mini85	FTN-Mini85
Calibration		SI-475-20	SI-950-40	SI-1900-80
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.635	0.635	0.635
Measuring range F_x, F_y	[N]	±475	±950	±1900
Measuring range F_z	[N]	±950	±1900	±3800
Measuring range M_x, M_y	[Nm]	±20	±40	±80
Measuring range M_z	[Nm]	±20	±40	±80
Overload F_x, F_y	[N]	±13000	±13000	±13000
Overload F_z	[N]	±27000	±27000	±27000
Overload M_x, M_y	[Nm]	±500	±500	±500
Overload M_z	[Nm]	±610	±610	±610
Resonant Frequency F_x, F_y, M_z	[Hz]	2400	2400	2400
Resonant Frequency F_z, M_x, M_y	[Hz]	3100	3100	3100
Resolution F_x, F_y	[N]	9/112	9/56	9/28
Resolution F_z	[N]	3/28	3/14	3/7
Resolution M_x, M_y	[Nm]	5/1496	5/748	5/374
Resolution M_z	[Nm]	7/2992	7/1496	7/748
Technical data deviating from FTD				
Description		FTD-Mini85	FTD-Mini85	FTD-Mini85
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	9/112	9/56	9/28
Resolution F_z	[N]	3/28	3/14	3/7
Resolution M_x, M_y	[Nm]	5/1496	5/748	5/374
Resolution M_z	[Nm]	7/2992	7/1496	7/748
Technical data deviating from FTS				
Description		FTS-Mini85	FTS-Mini85	FTS-Mini85
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	9/56	9/28	9/14
Resolution F_z	[N]	3/14	3/7	6/7
Resolution M_x, M_y	[Nm]	5/748	5/374	5/187
Resolution M_z	[Nm]	7/1496	7/748	7/374

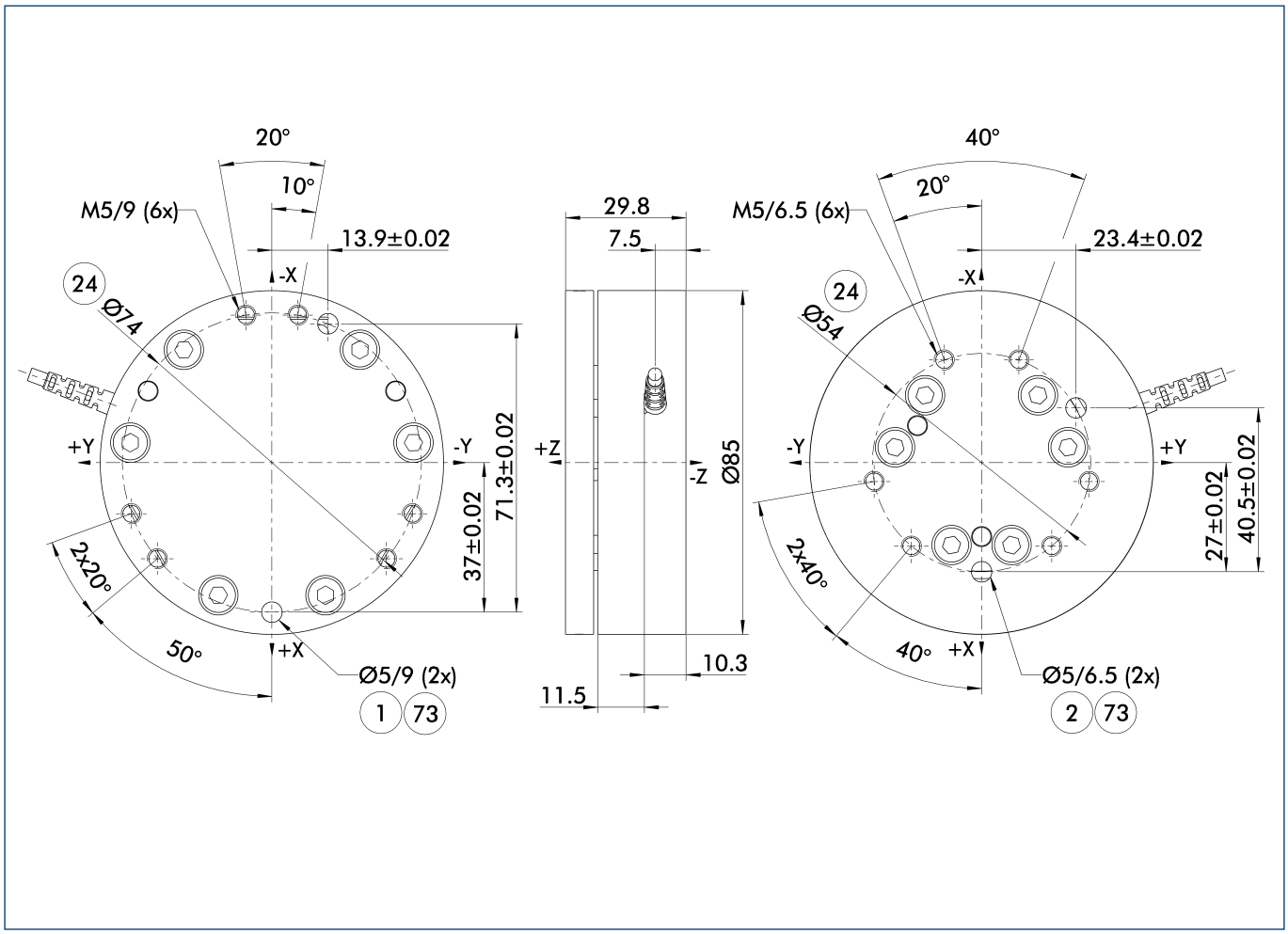
Main view



This view shows the unit with a through-bore.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

Main view



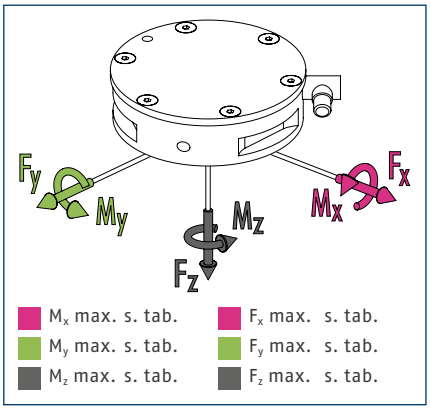
The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin

FT Gamma

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

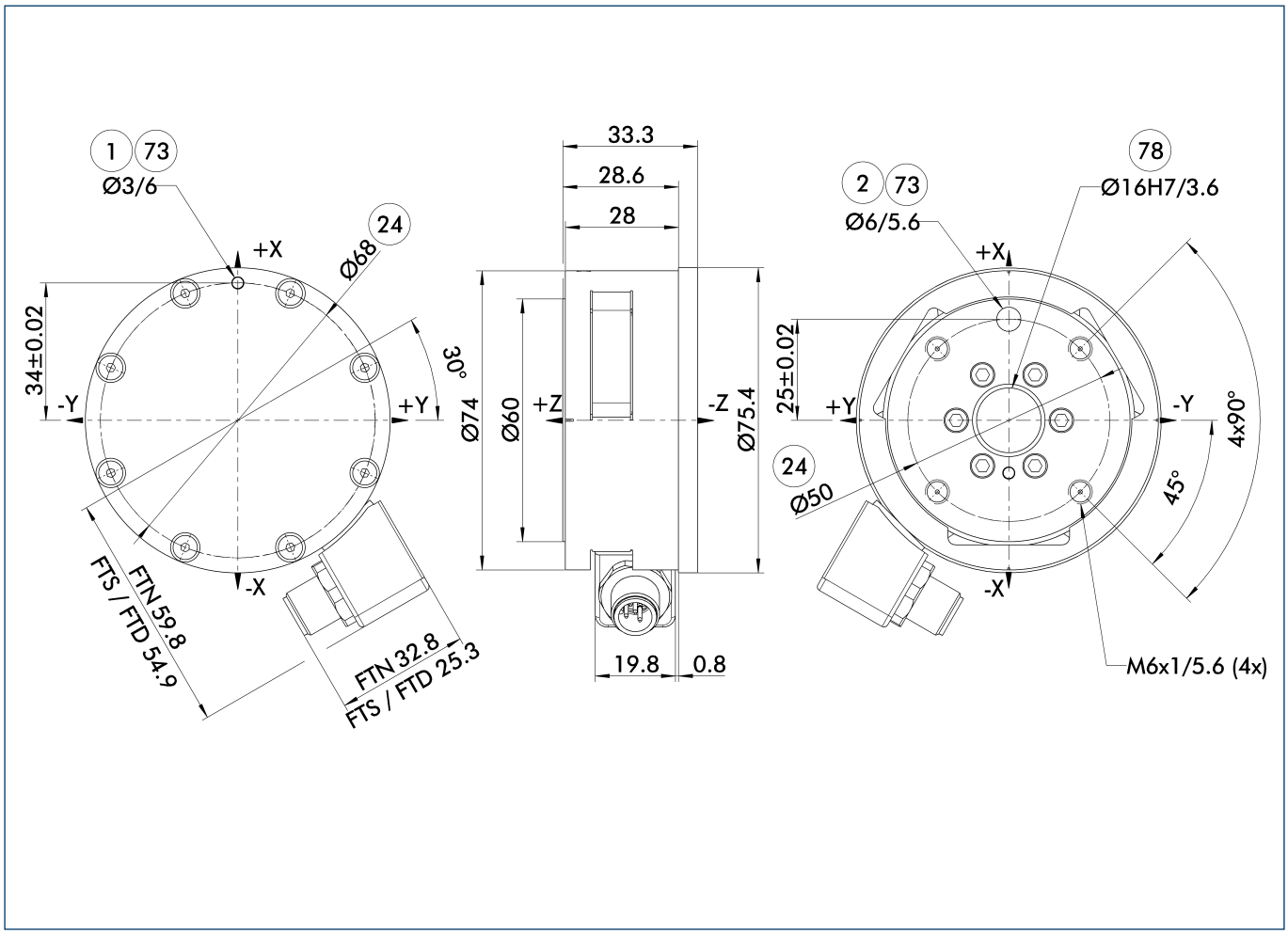


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Gamma	FTN-Gamma	FTN-Gamma
Calibration		SI-32-2.5	SI-65-5	SI-130-10
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.225	0.225	0.225
Measuring range F_x, F_y	[N]	±32	±65	±130
Measuring range F_z	[N]	±100	±200	±400
Measuring range M_x, M_y	[Nm]	±2.5	±5	±10
Measuring range M_z	[Nm]	±2.5	±5	±10
Overload F_x, F_y	[N]	±1200	±1200	±1200
Overload F_z	[N]	±4100	±4100	±4100
Overload M_x, M_y	[Nm]	±79	±79	±79
Overload M_z	[Nm]	±82	±82	±82
Resonant Frequency F_x, F_y, M_z	[Hz]	1400	1400	1400
Resonant Frequency F_z, M_x, M_y	[Hz]	2000	2000	2000
Resolution F_x, F_y	[N]	1/160	1/80	1/40
Resolution F_z	[N]	1/80	1/40	1/20
Resolution M_x, M_y	[Nm]	1/2000	10/13333	1/800
Resolution M_z	[Nm]	1/2000	10/13333	1/800
Technical data deviating from FTD				
Description		FTD-Gamma	FTD-Gamma	FTD-Gamma
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/160	1/80	1/40
Resolution F_z	[N]	1/80	1/40	1/20
Resolution M_x, M_y	[Nm]	1/2000	10/13333	1/800
Resolution M_z	[Nm]	1/2000	10/13333	1/800
Technical data deviating from FTS				
Description		FTS-Gamma	FTS-Gamma	FTS-Gamma
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/80	1/40	1/20
Resolution F_z	[N]	1/40	1/20	1/10
Resolution M_x, M_y	[Nm]	1/1000	5/3333	1/400
Resolution M_z	[Nm]	1/1000	5/3333	1/400

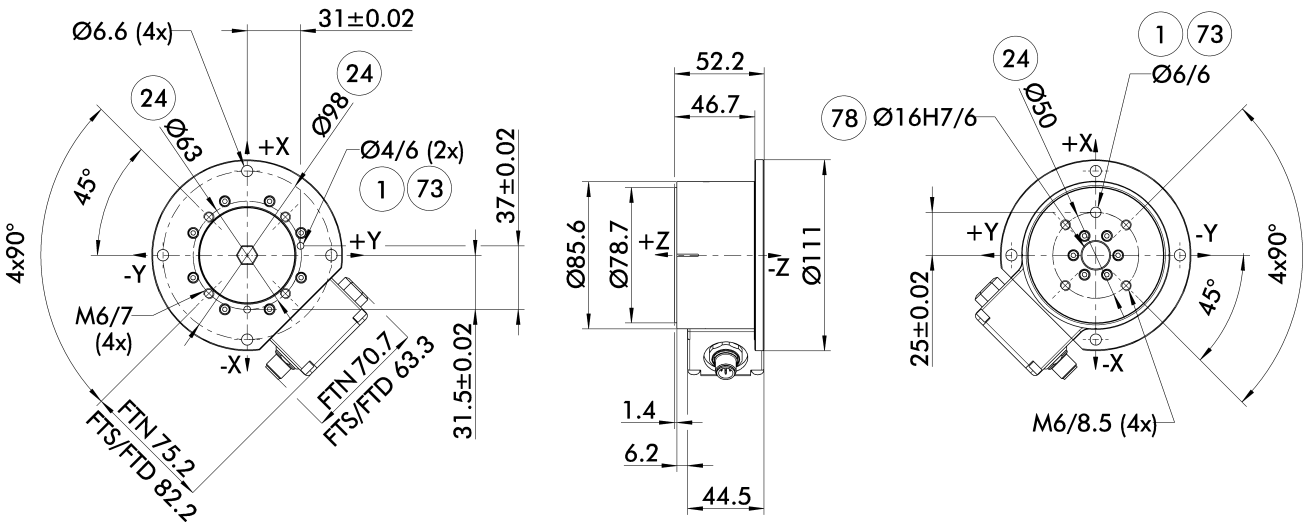
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

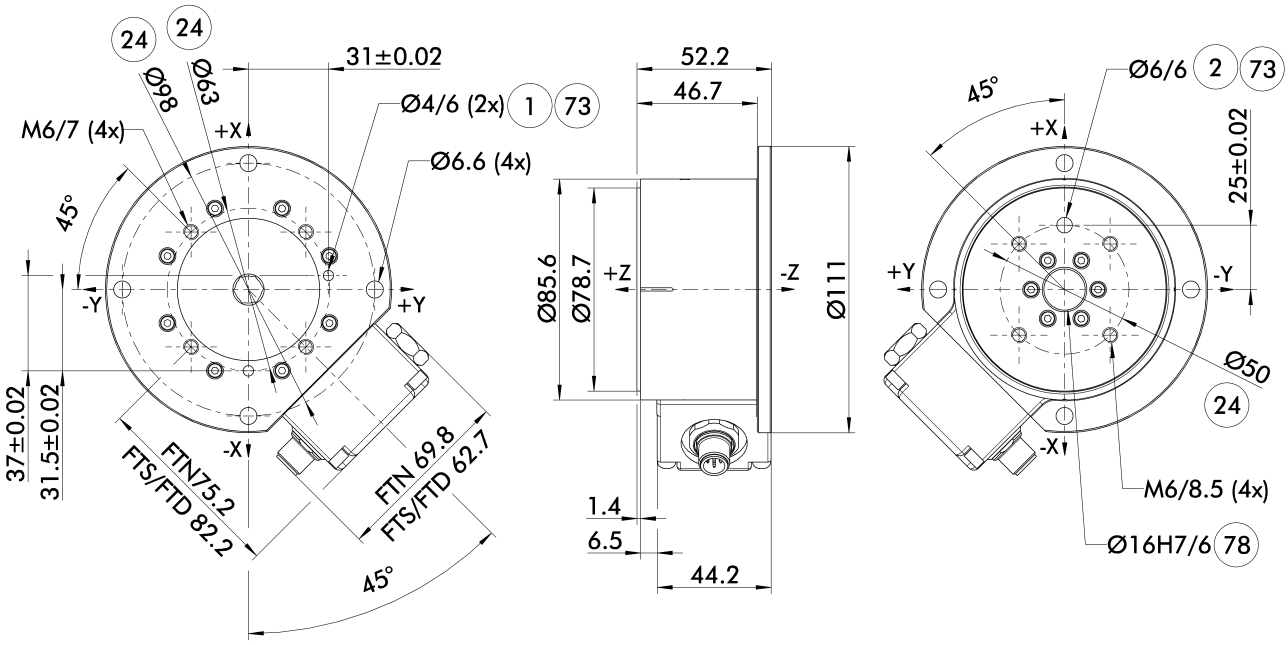
Main view IP65



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

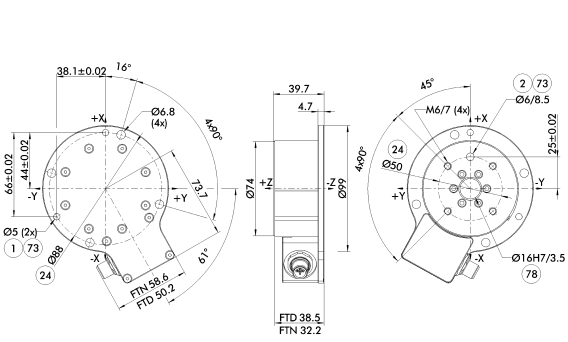
Main view IP68



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

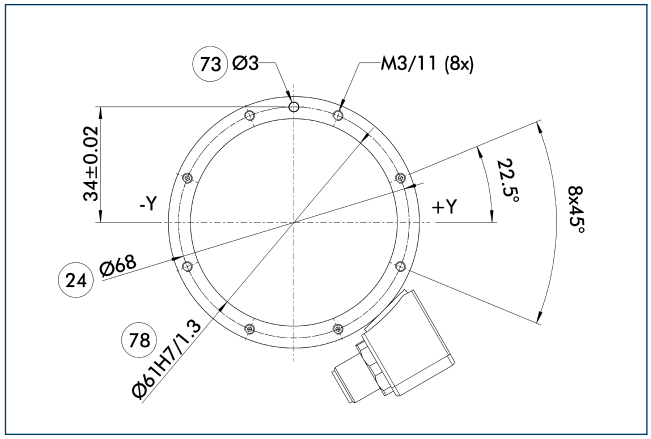
Main view IP60



1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

The main view shows the product with IP-protection.

Adapter plate design



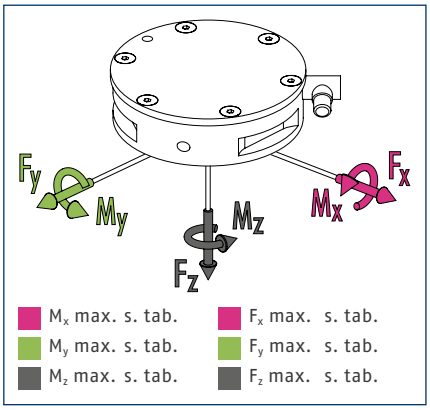
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

The additional view shows the product without cover plate. The adapter plate acts as a cover for the standard version.

FT Delta

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

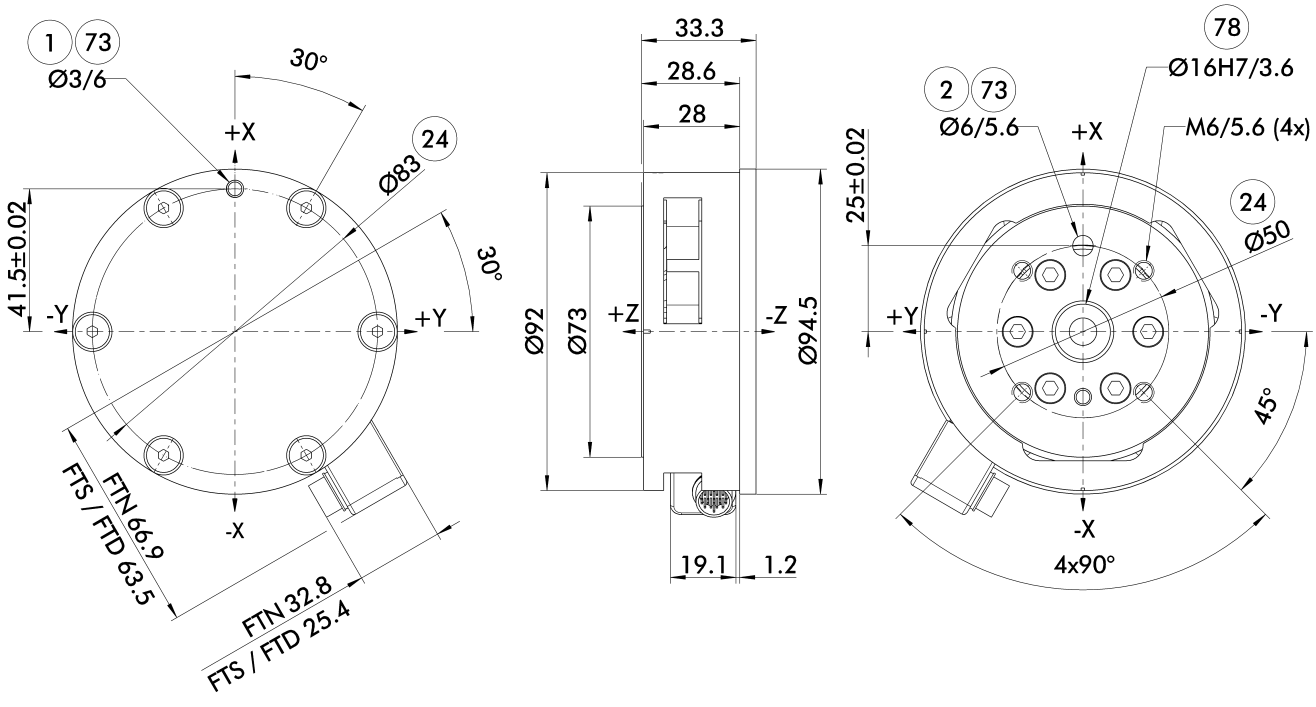


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Delta	FTN-Delta	FTN-Delta
Calibration		SI-165-15	SI-330-30	SI-660-60
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.913	0.913	0.913
Measuring range F_x, F_y	[N]	±165	±330	±660
Measuring range F_z	[N]	±495	±990	±1980
Measuring range M_x, M_y	[Nm]	±15	±30	±60
Measuring range M_z	[Nm]	±15	±30	±60
Overload F_x, F_y	[N]	±3700	±3700	±3700
Overload F_z	[N]	±10000	±10000	±10000
Overload M_x, M_y	[Nm]	±280	±280	±280
Overload M_z	[Nm]	±400	±400	±400
Resonant Frequency F_x, F_y, M_z	[Hz]	1500	1500	1500
Resonant Frequency F_z, M_x, M_y	[Hz]	1700	1700	1700
Resolution F_x, F_y	[N]	1/32	1/16	1/8
Resolution F_z	[N]	1/16	1/8	1/4
Resolution M_x, M_y	[Nm]	1/528	5/1333	10/1333
Resolution M_z	[Nm]	1/528	5/1333	10/1333
Technical data deviating from FTD				
Description		FTD-Delta	FTD-Delta	FTD-Delta
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/32	1/16	1/8
Resolution F_z	[N]	1/16	1/8	1/4
Resolution M_x, M_y	[Nm]	1/528	5/1333	10/1333
Resolution M_z	[Nm]	1/528	5/1333	10/1333
Technical data deviating from FTS				
Description		FTS-Delta	FTS-Delta	FTS-Delta
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/16	1/8	1/4
Resolution F_z	[N]	1/8	1/4	1/2
Resolution M_x, M_y	[Nm]	1/264	10/1333	5/333
Resolution M_z	[Nm]	1/264	10/1333	5/333

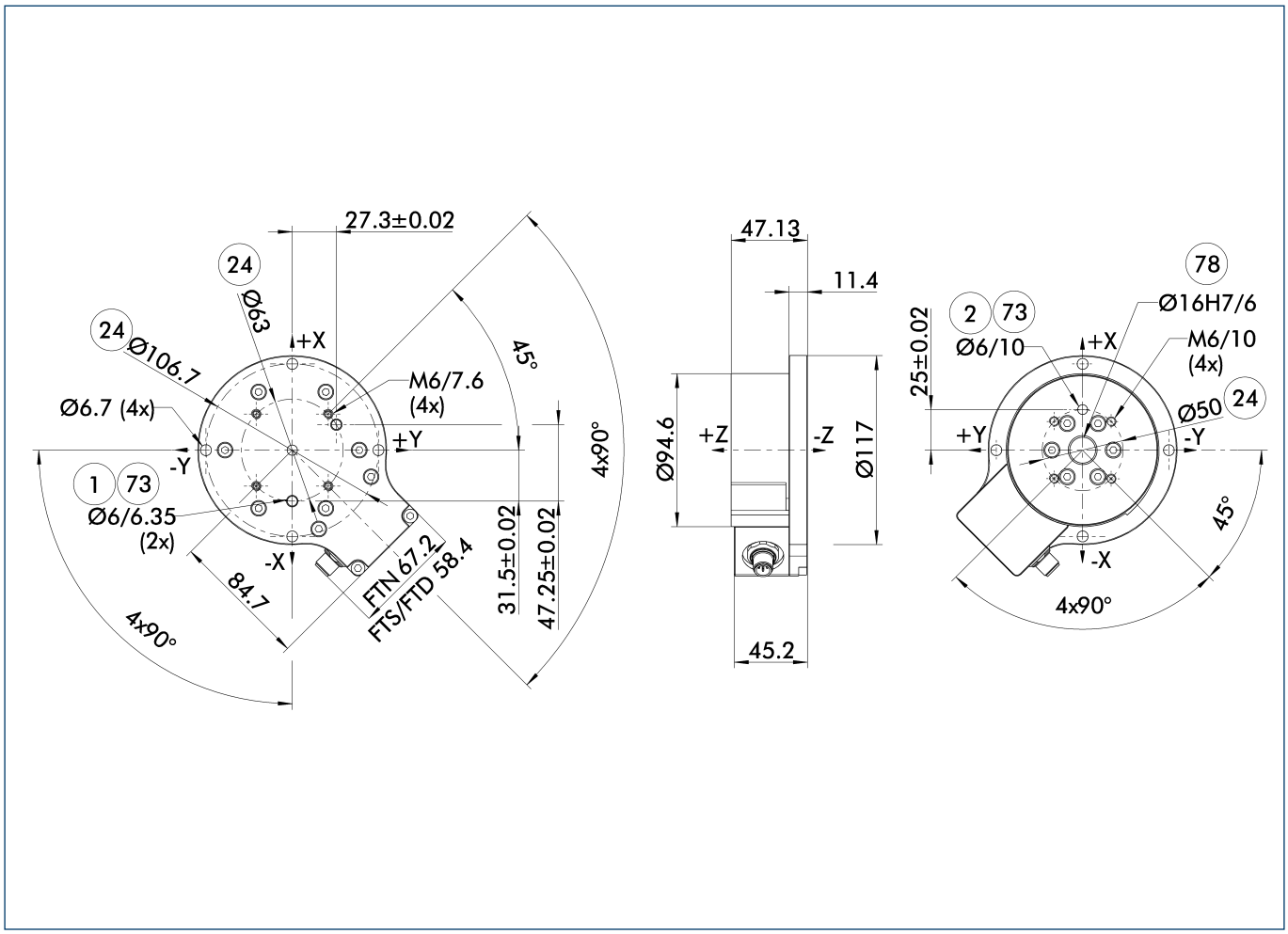
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

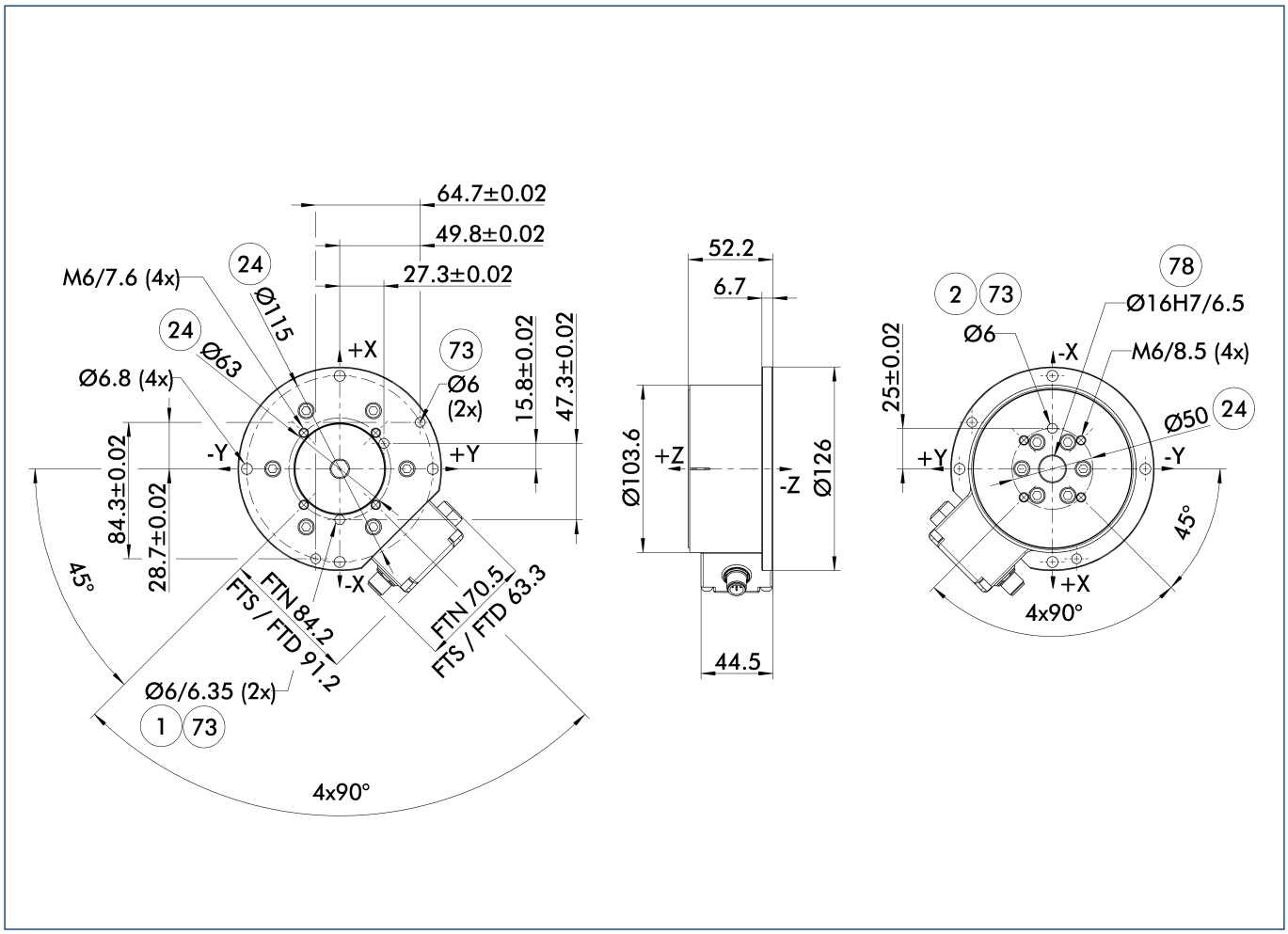
Main view IP60



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

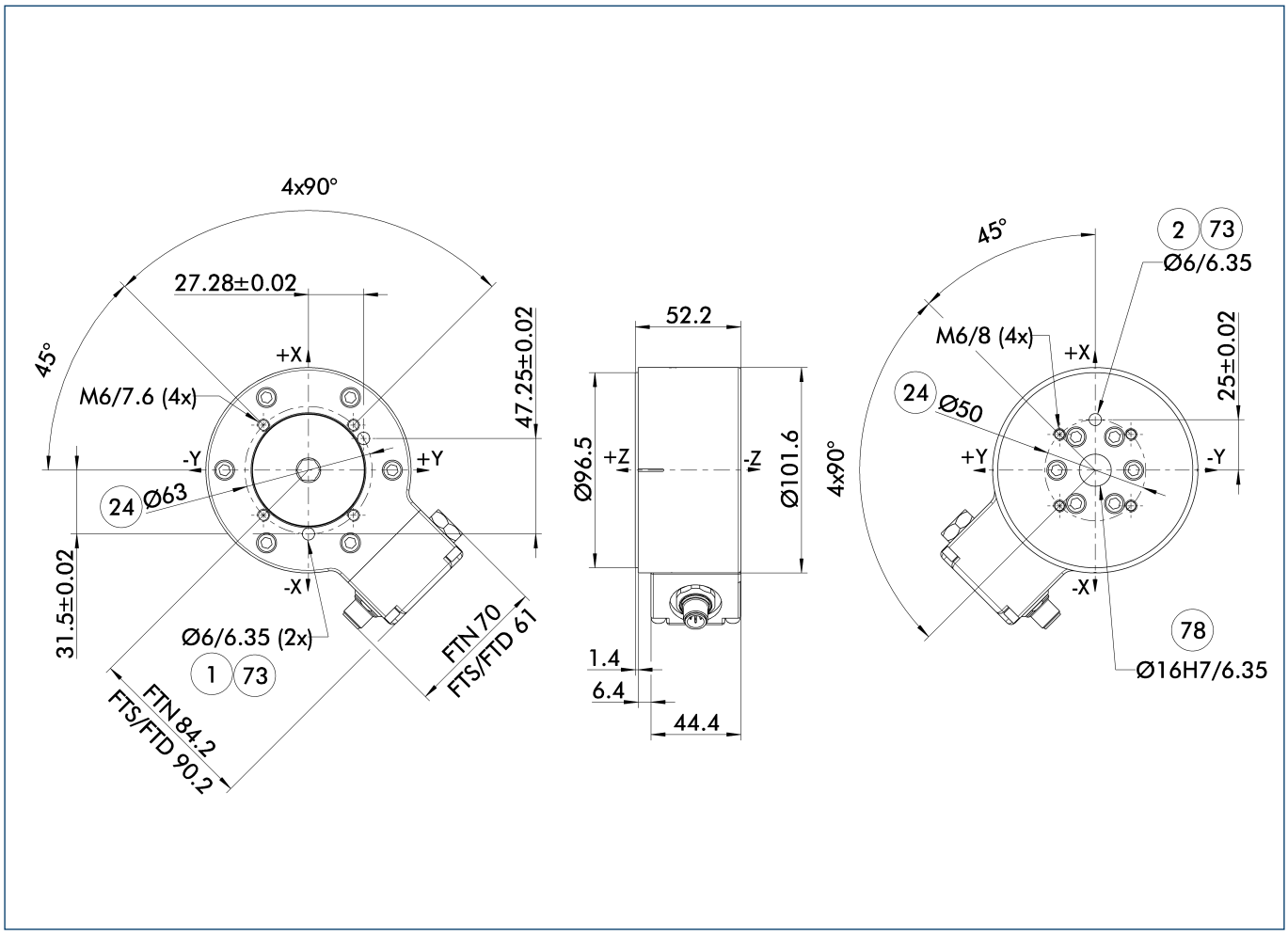
Main view IP65



The main view shows the product with IP-protection.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin
(78) Fitting for centering

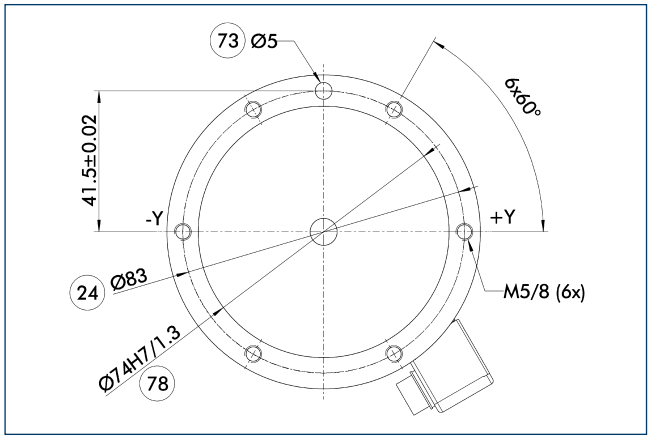
Main view IP68



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

Adapter plate design

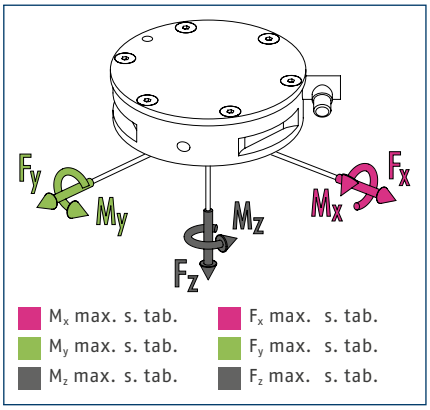


24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

The additional view shows the product without cover plate. The adapter plate acts as a cover for the standard version.

FT Theta

Forces and moments

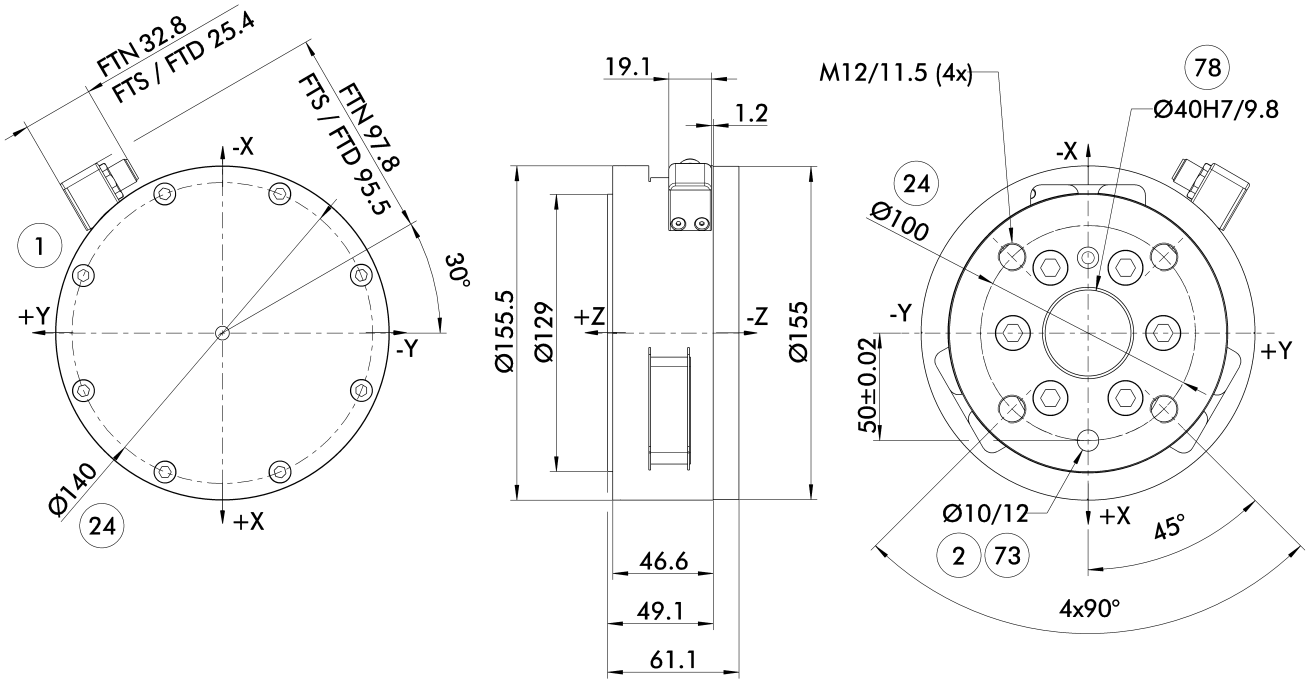


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Theta	FTN-Theta	FTN-Theta
Calibration		SI-1000-120	SI-1500-240	SI-2500-400
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	4.99	4.99	4.99
Measuring range F_x, F_y	[N]	±1000	±1500	±2500
Measuring range F_z	[N]	±2500	±3750	±6250
Measuring range M_x, M_y	[Nm]	±120	±240	±400
Measuring range M_z	[Nm]	±120	±240	±400
Overload F_x, F_y	[N]	±20000	±20000	±20000
Overload F_z	[N]	±51000	±51000	±51000
Overload M_x, M_y	[Nm]	±2000	±2000	±2000
Overload M_z	[Nm]	±2000	±2000	±2000
Resonant Frequency F_x, F_y, M_z	[Hz]	680	680	680
Resonant Frequency F_z, M_x, M_y	[Hz]	820	820	820
Resolution F_x, F_y	[N]	1/4	1/2	1/2
Resolution F_z	[N][kN]	1/4	1/2	1/1
Resolution M_x, M_y	[Nm]	1/40	1/20	1/20
Resolution M_z	[Nm]	1/80	1/40	1/20
Technical data deviating from FTD				
Description		FTD-Theta	FTD-Theta	FTD-Theta
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/4	1/2	1/2
Resolution F_z	[N]	1/4	1/2	1/1
Resolution M_x, M_y	[Nm]	1/40	1/20	1/20
Resolution M_z	[Nm]	1/80	1/40	1/20
Technical data deviating from FTS				
Description		FTS-Theta	FTS-Theta	FTS-Theta
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/2	1/1	1/1
Resolution F_z	[N]	1/2	1/1	2/1
Resolution M_x, M_y	[Nm]	1/20	1/10	1/10
Resolution M_z	[Nm]	1/40	1/20	1/10

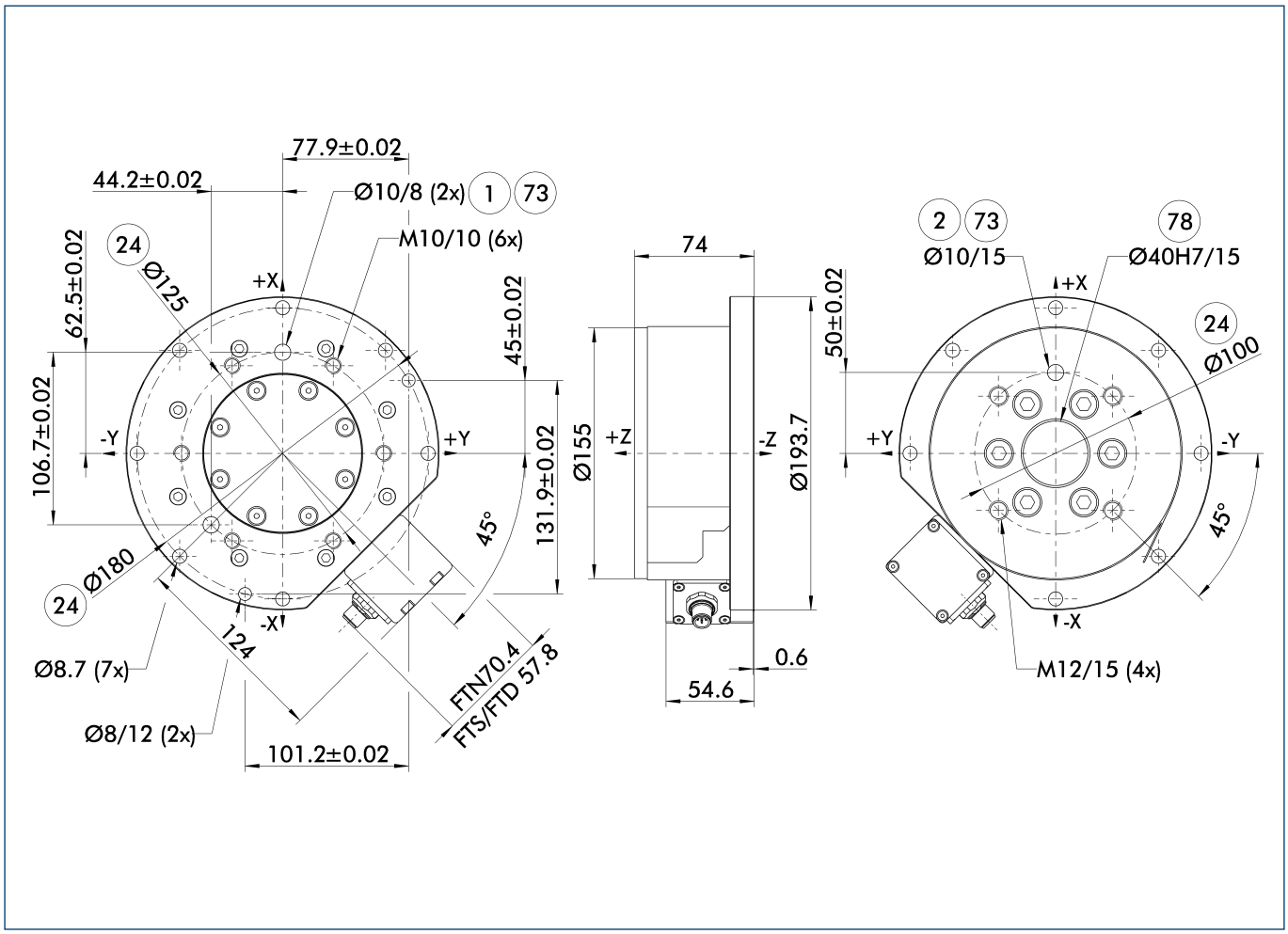
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

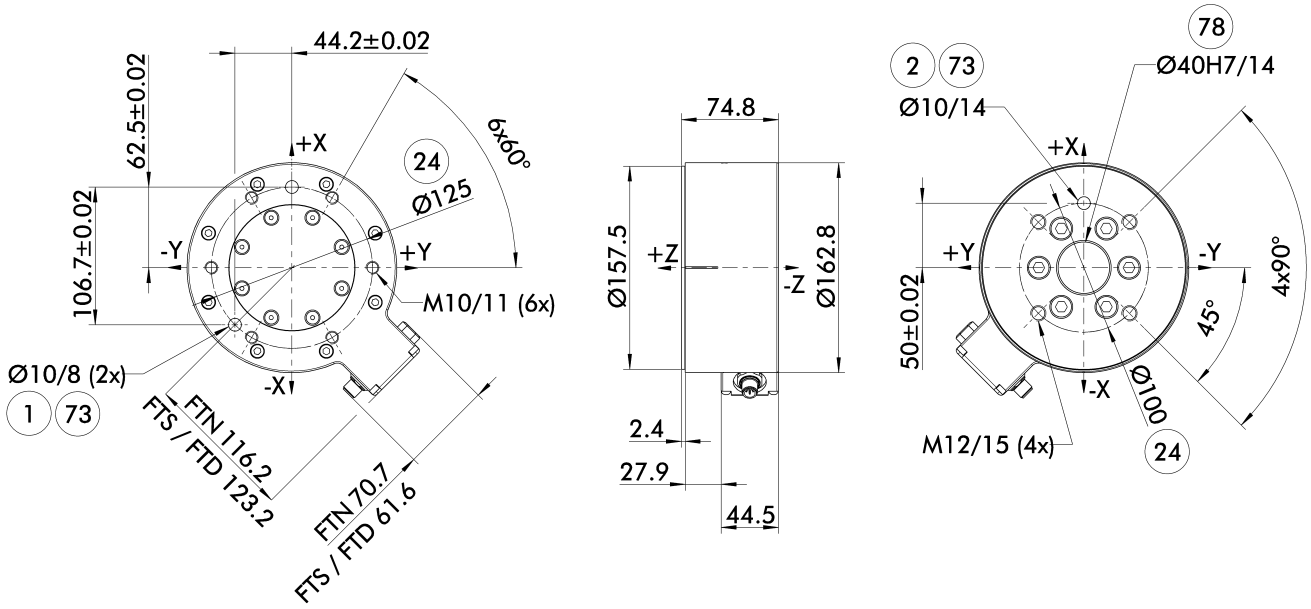
Main view IP60



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

IP65 / IP68 main view



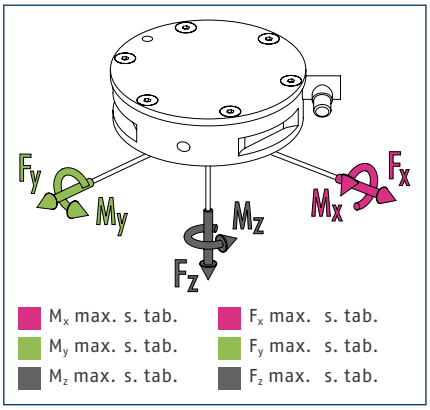
The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

FT 0mega85

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

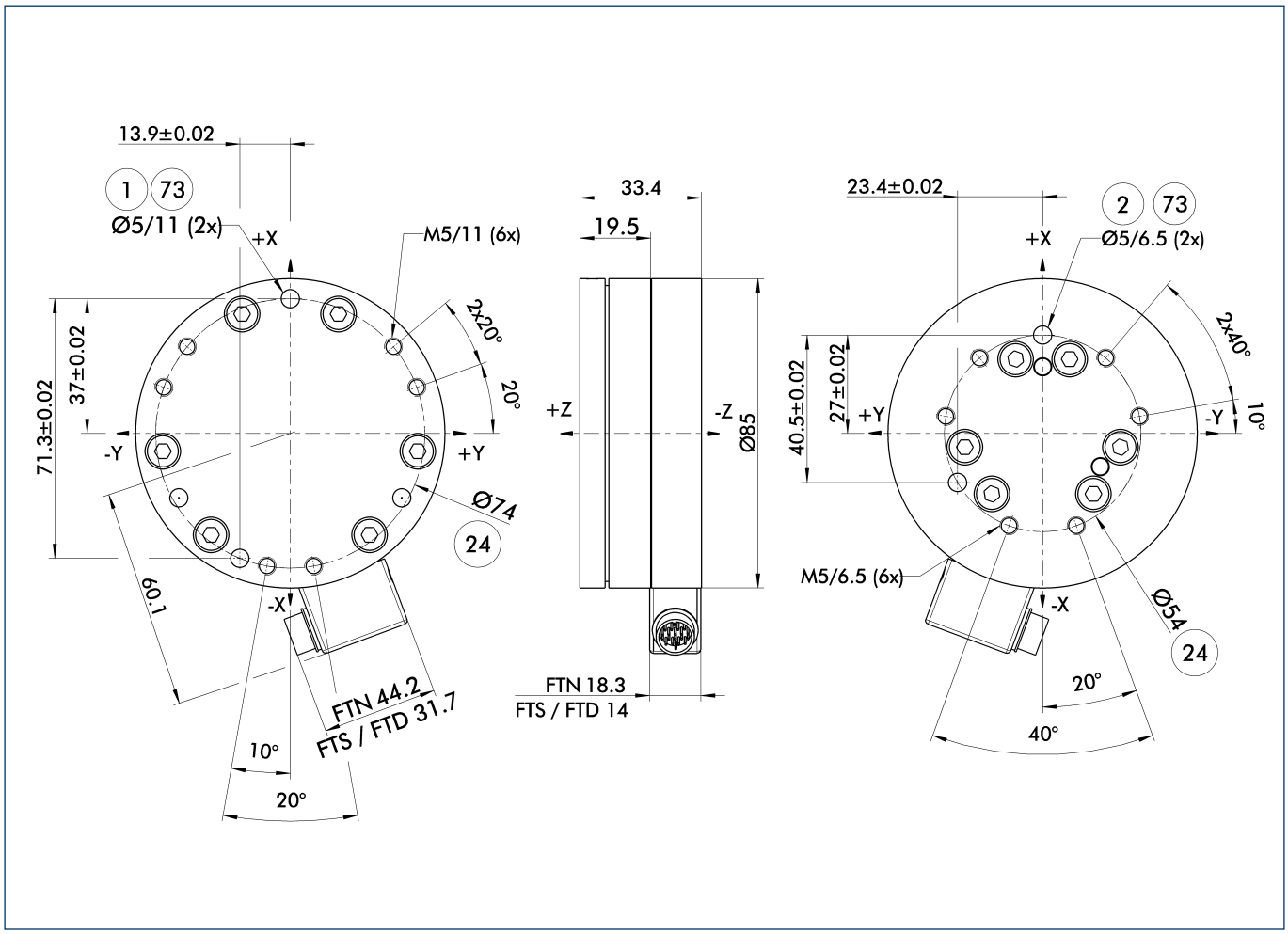


ⓘ For load index see technical data table.

FTN technical data

Description		FT-0mega85	FT-0mega85	FT-0mega85
Calibration		SI-475-20	SI-950-40	SI-1900-80
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	0.658	0.658	0.658
Measuring range F_x, F_y	[N]	±475	±950	±1900
Measuring range F_z	[N]	±950	±1900	±3800
Measuring range M_x, M_y	[Nm]	±20	±40	±80
Measuring range M_z	[Nm]	±20	±40	±80
Overload F_x, F_y	[N]	±13000	±13000	±13000
Overload F_z	[N]	±27000	±27000	±27000
Overload M_x, M_y	[Nm]	±500	±500	±500
Overload M_z	[Nm]	±610	±610	±610
Resonant Frequency F_x, F_y, M_z	[Hz]	2100	2100	2100
Resonant Frequency F_z, M_x, M_y	[Hz]	3000	3000	3000
Resolution F_x, F_y	[N]	1/14	1/7	2/7
Resolution F_z	[N]	3/28	3/14	3/7
Resolution M_x, M_y	[Nm]	5/1496	5/748	5/374
Resolution M_z	[Nm]	7/2992	7/1496	7/748
Technical data deviating from FTD				
Description		FT-0mega85	FT-0mega85	FT-0mega85
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/14	1/7	2/7
Resolution F_z	[N]	3/28	3/14	3/7
Resolution M_x, M_y	[Nm]	5/1496	5/748	5/374
Resolution M_z	[Nm]	7/2992	7/1496	7/748
Technical data deviating from FTS				
Description		FTS-0mega85	FT-0mega85	FT-0mega85
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/7	2/7	4/7
Resolution F_z	[N]	3/14	3/7	6/7
Resolution M_x, M_y	[Nm]	5/748	5/374	5/187
Resolution M_z	[Nm]	7/1496	7/748	7/374

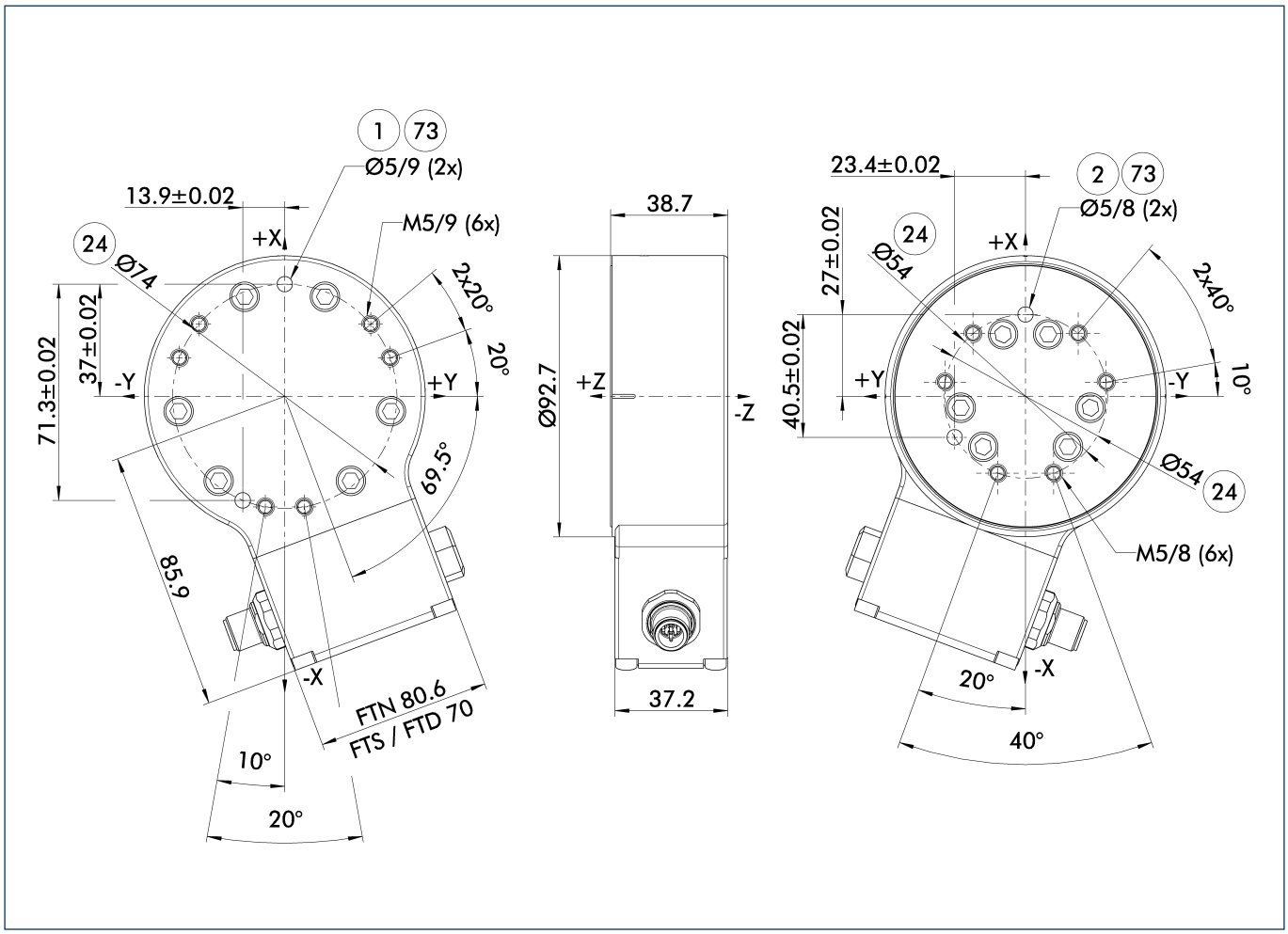
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin

IP65 / IP68 main view

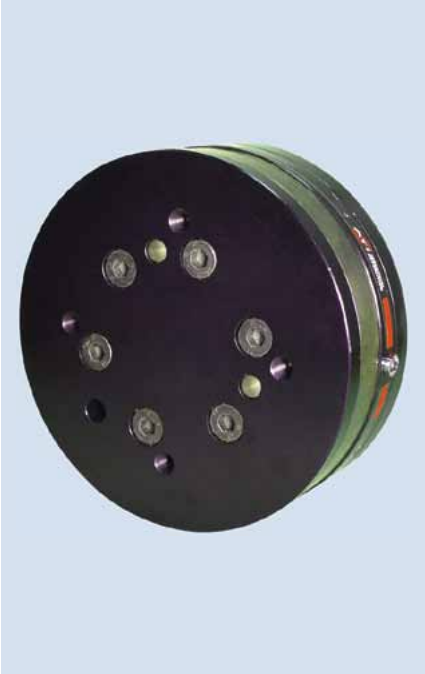


The main view shows the product with IP-protection.

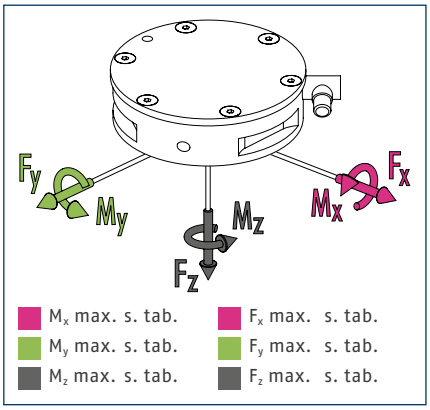
(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

FT 0mega160

Robot Accessories | Measuring | Force / Torque Sensor



Forces and moments

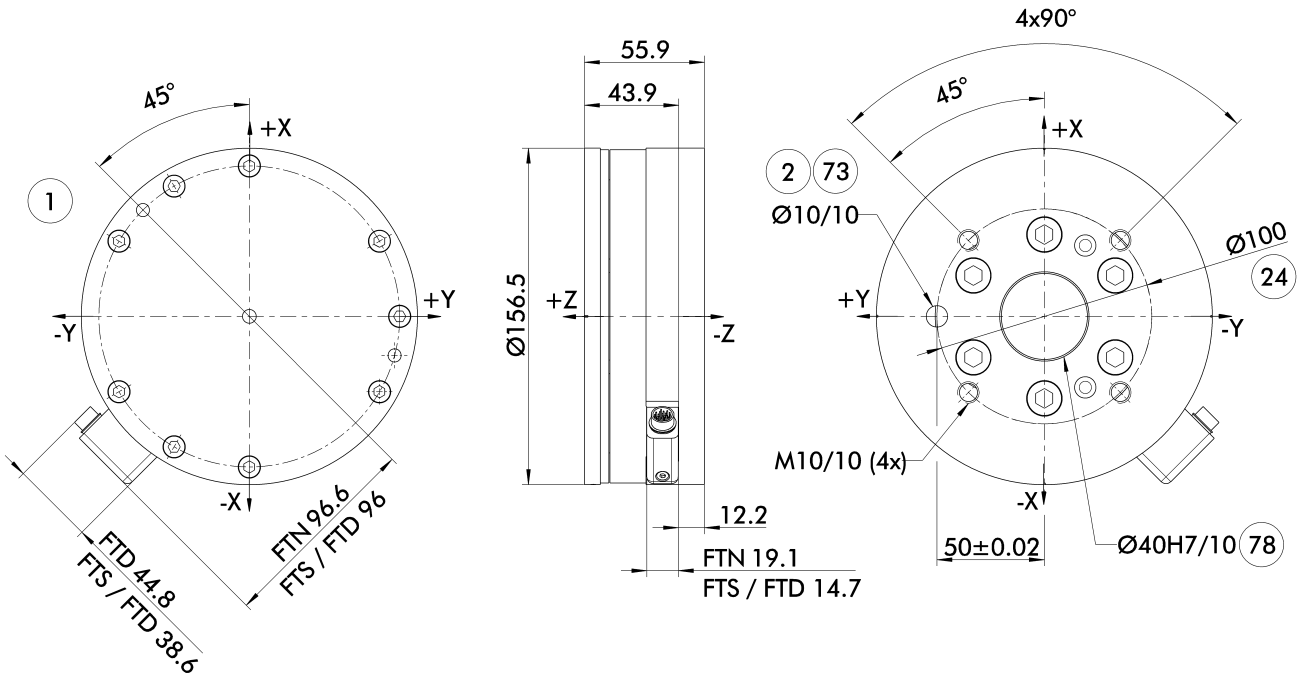


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-0mega-160	FTN-0mega-160	FTN-0mega-160
Calibration		SI-1000-120	SI-1500-240	SI-2500-400
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	2.72	2.72	2.72
Measuring range F_x, F_y	[N]	±1000	±1500	±2500
Measuring range F_z	[N]	±2500	±3750	±6250
Measuring range M_x, M_y	[Nm]	±120	±240	±400
Measuring range M_z	[Nm]	±120	±240	±400
Overload F_x, F_y	[N]	±18000	±18000	±18000
Overload F_z	[N]	±48000	±48000	±48000
Overload M_x, M_y	[Nm]	±1700	±1700	±1700
Overload M_z	[Nm]	±1900	±1900	±1900
Resonant Frequency F_x, F_y, M_z	[Hz]	1300	1300	1300
Resonant Frequency F_z, M_x, M_y	[Hz]	1000	1000	1000
Resolution F_x, F_y	[N]	1/4	1/4	1/2
Resolution F_z	[N]	1/4	1/2	3/4
Resolution M_x, M_y	[Nm]	1/40	1/20	1/20
Resolution M_z	[Nm]	1/80	1/40	1/20
Technical data deviating from FTD				
Description		FTD-0mega-160	FTD-0mega-160	FTD-0mega-160
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/4	1/4	1/2
Resolution F_z	[N]	1/4	1/2	3/4
Resolution M_x, M_y	[Nm]	1/40	1/20	1/20
Resolution M_z	[Nm]	1/80	1/40	1/20
Technical data deviating from FTS				
Description		FTS-0mega-160	FTS-0mega-160	FTS-0mega-160
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	1/2	1/2	1/1
Resolution F_z	[N]	1/2	1/1	3/2
Resolution M_x, M_y	[Nm]	1/20	1/10	1/10
Resolution M_z	[Nm]	1/40	1/20	1/10

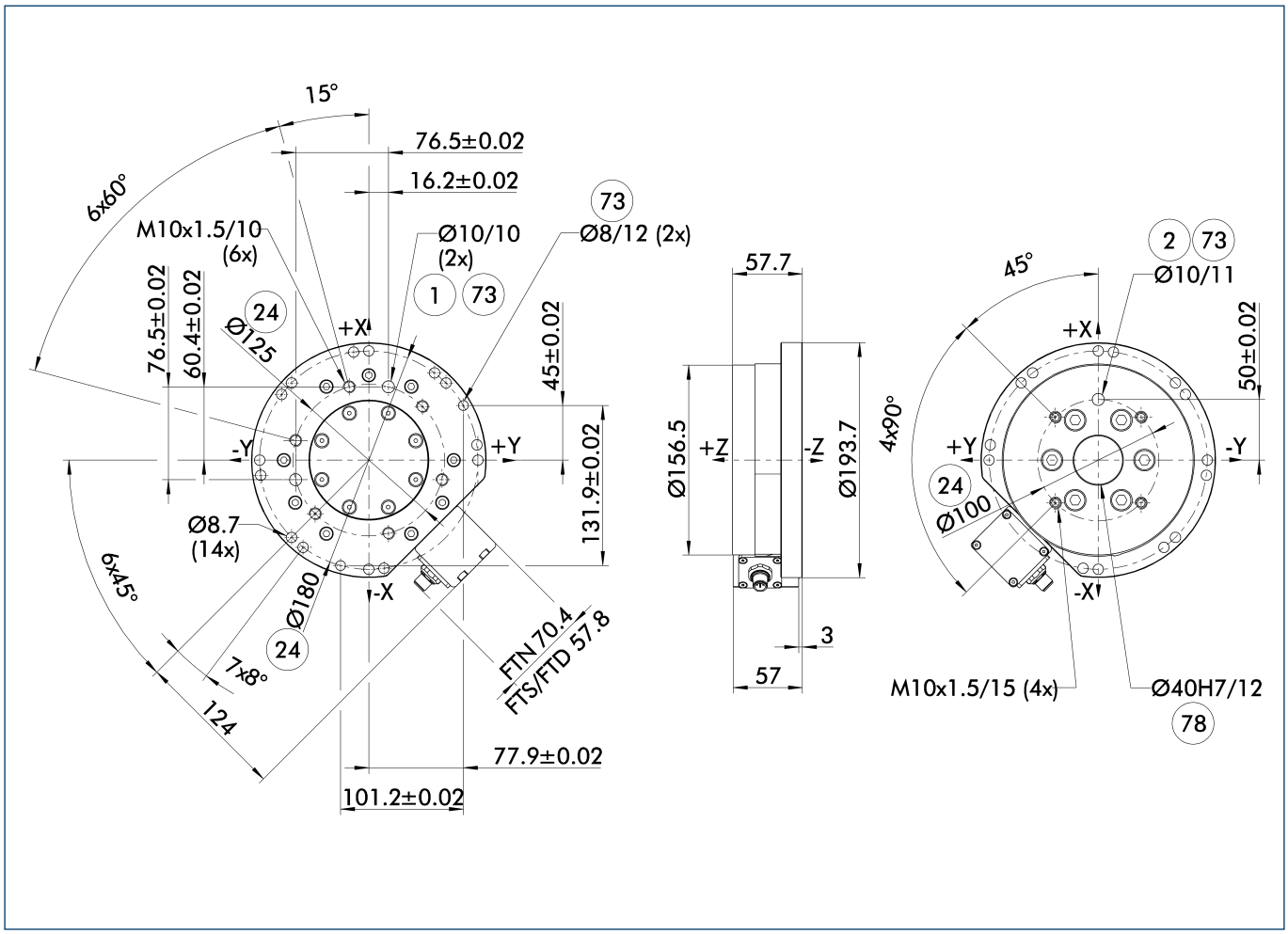
Main view



The main view shows the unit in its basic version.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

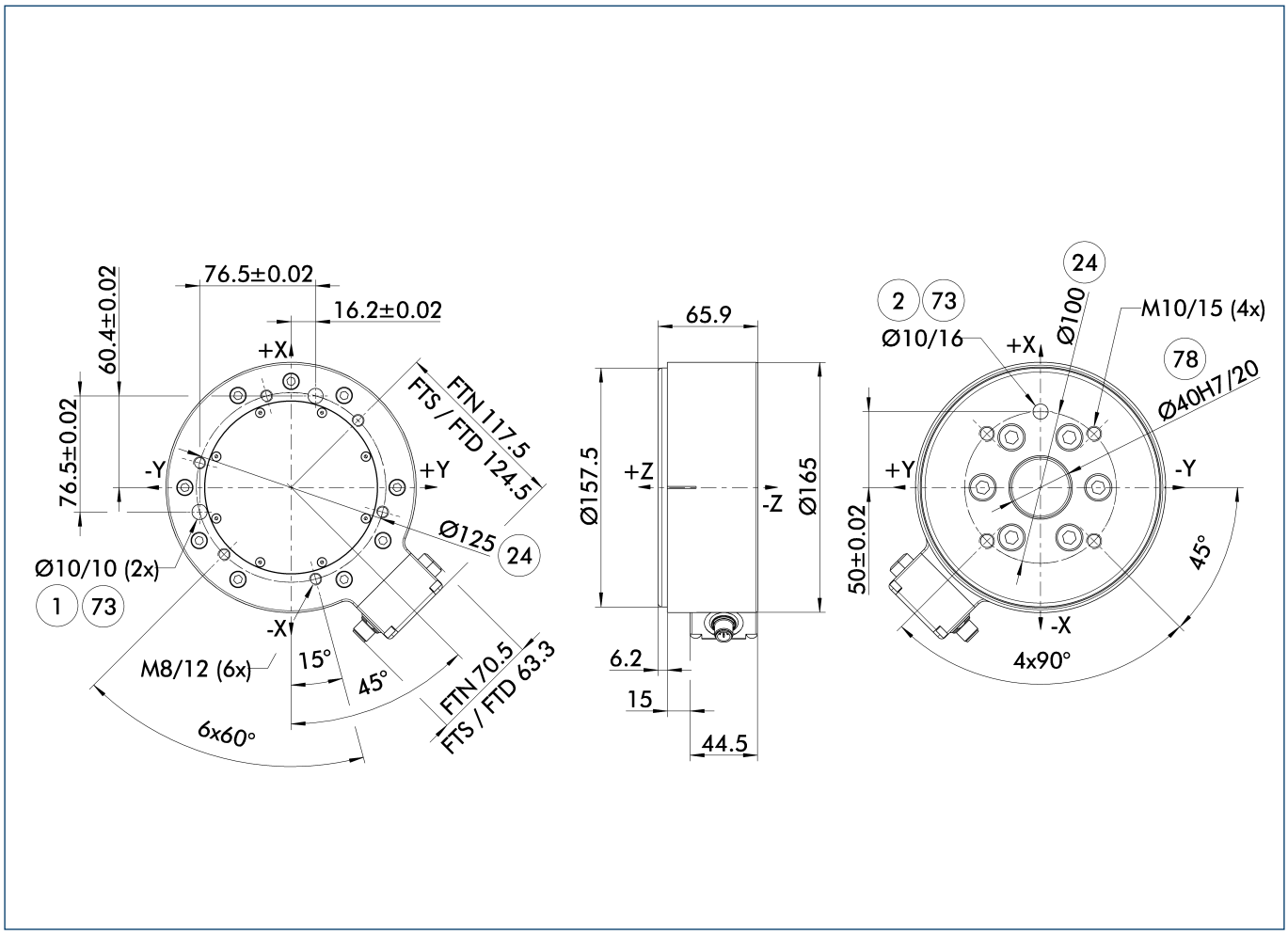
Main view IP60



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

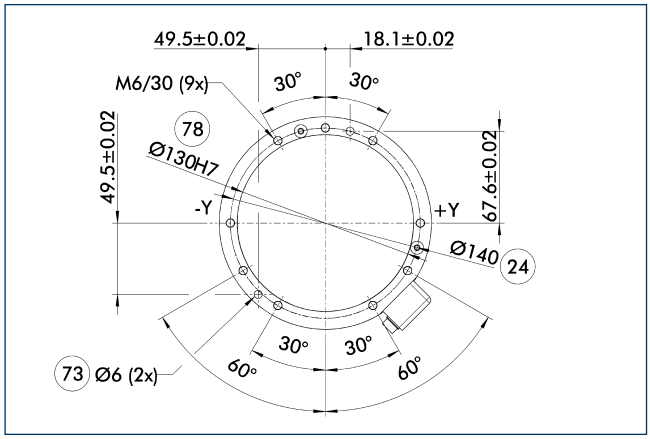
IP65 / IP68 main view



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

Adapter plate design



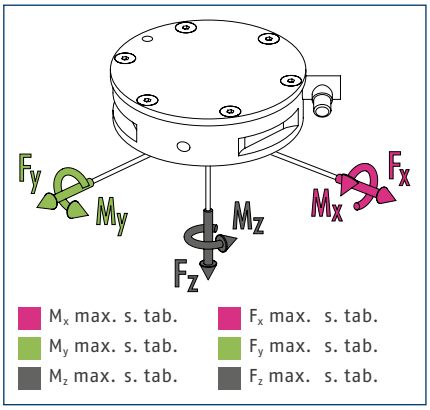
24 Bolt circle
73 Fit for a centering pin
78 Fitting for centering

The additional view shows the product without cover plate. The adapter plate acts as a cover for the standard version.

FT Omega191

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

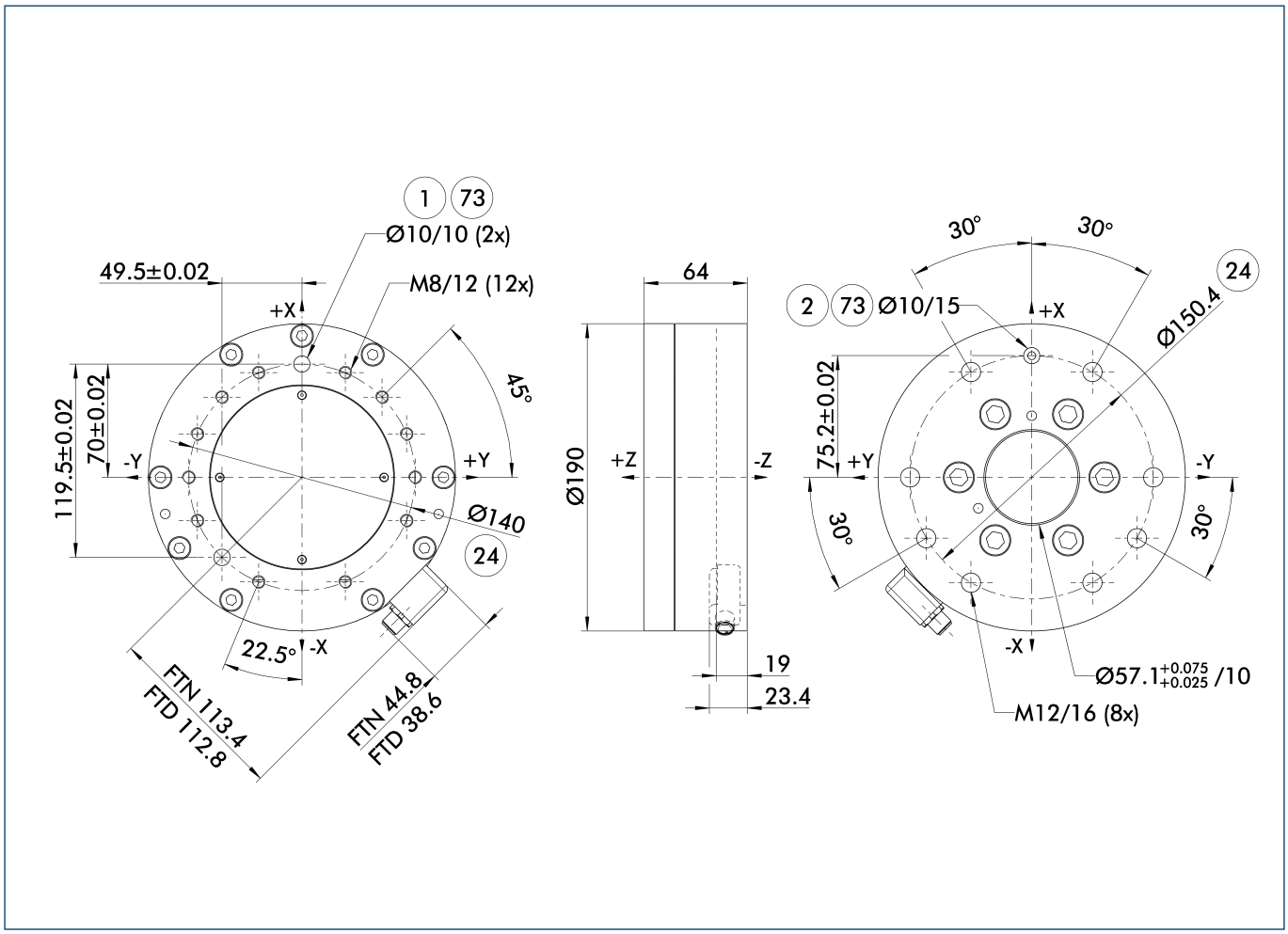


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Omega-191	FTN-Omega-191	FTN-Omega-191
Calibration		SI-1800-350	SI-3600-700	SI-7200-1400
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	10.15	10.15	10.15
Measuring range F_x, F_y	[N]	±1800	±3600	±7200
Measuring range F_z	[N]	±4500	±9000	±18000
Measuring range M_x, M_y	[Nm]	±350	±700	±1400
Measuring range M_z	[Nm]	±350	±700	±1400
Overload F_x, F_y	[N]	±36000	±36000	±36000
Overload F_z	[N]	±11000	±11000	±11000
Overload M_x, M_y	[Nm]	±6800	±6800	±6800
Overload M_z	[Nm]	±6800	±6800	±6800
Resolution F_x, F_y	[N]	3/8	3/4	3/2
Resolution F_z	[N]	3/4	3/2	3/1
Resolution M_x, M_y	[Nm]	5/96	5/48	5/24
Resolution M_z	[Nm]	5/144	5/72	5/36
Technical data deviating from FTD				
Description		FTD-Omega-191	FTD-Omega-191	FTD-Omega-191
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	3/8	3/4	3/2
Resolution F_z	[N]	3/4	3/2	3/1
Resolution M_x, M_y	[Nm]	5/96	5/48	5/24
Resolution M_z	[Nm]	5/144	5/72	5/36
Technical data deviating from FTS				
Description		FTS-Omega-191	FTS-Omega-191	FTS-Omega-191
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	3/4	3/2	3/1
Resolution F_z	[N]	3/2	3/1	6/1
Resolution M_x, M_y	[Nm]	5/48	5/24	5/12
Resolution M_z	[Nm]	5/72	5/36	5/18

Main view



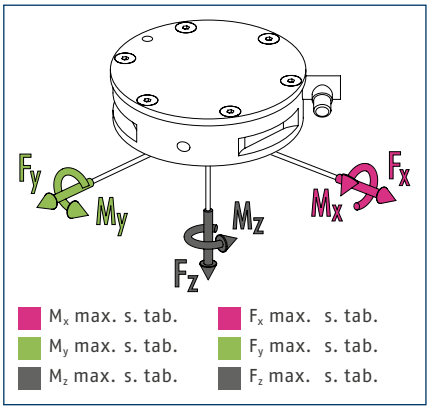
The main view shows the unit in its basic version.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin

FT 0mega250

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

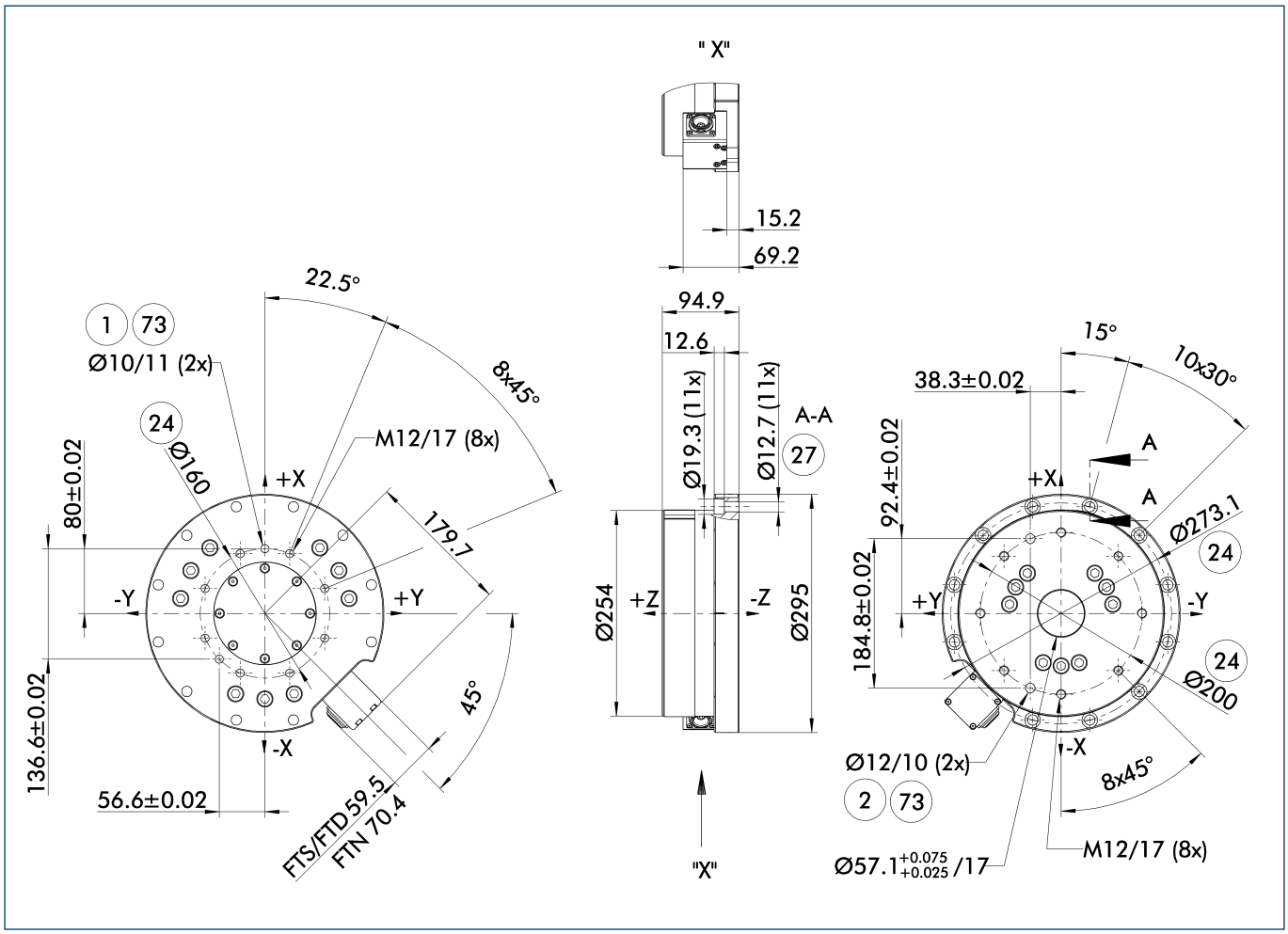


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-0mega-250-IP60	FTN-0mega-250-IP60	FTN-0mega-250-IP60
Calibration		SI-4000-500	SI-8000-1000	SI-16000-2000
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	31.8	31.8	31.8
Measuring range F_x, F_y	[N]	±4000	±8000	±16000
Measuring range F_z	[N]	±8000	±16000	±32000
Measuring range M_x, M_y	[Nm]	±500	±1000	±2000
Measuring range M_z	[Nm]	±500	±1000	±2000
Overload F_x, F_y	[N]	±160000	±160000	±160000
Overload F_z	[N]	±330000	±330000	±330000
Overload M_x, M_y	[Nm]	±21000	±21000	±21000
Overload M_z	[Nm]	±25000	±25000	±25000
Resolution F_x, F_y	[N]	1/1	2/1	4/1
Resolution F_z	[N]	2/1	4/1	8/1
Resolution M_x, M_y	[Nm]	1/8	1/4	1/2
Resolution M_z	[Nm]	1/8	1/4	1/2
Technical data deviating from FTD				
Description		FTD-0mega-250-IP60	FTD-0mega-250-IP60	FTD-0mega-250-IP60
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[N]	1/1	2/1	4/1
Resolution F_z	[N]	2/1	4/1	8/1
Resolution M_x, M_y	[Nm]	1/8	1/4	1/2
Resolution M_z	[Nm]	1/8	1/4	1/2
Technical data deviating from FTS				
Description		FTS-0mega-250-IP60	FTS-0mega-250-IP60	FTS-0mega-250-IP60
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[N]	2/1	4/1	8/1
Resolution F_z	[N]	4/1	8/1	16/1
Resolution M_x, M_y	[Nm]	1/4	1/2	1/1
Resolution M_z	[Nm]	1/4	1/2	1/1

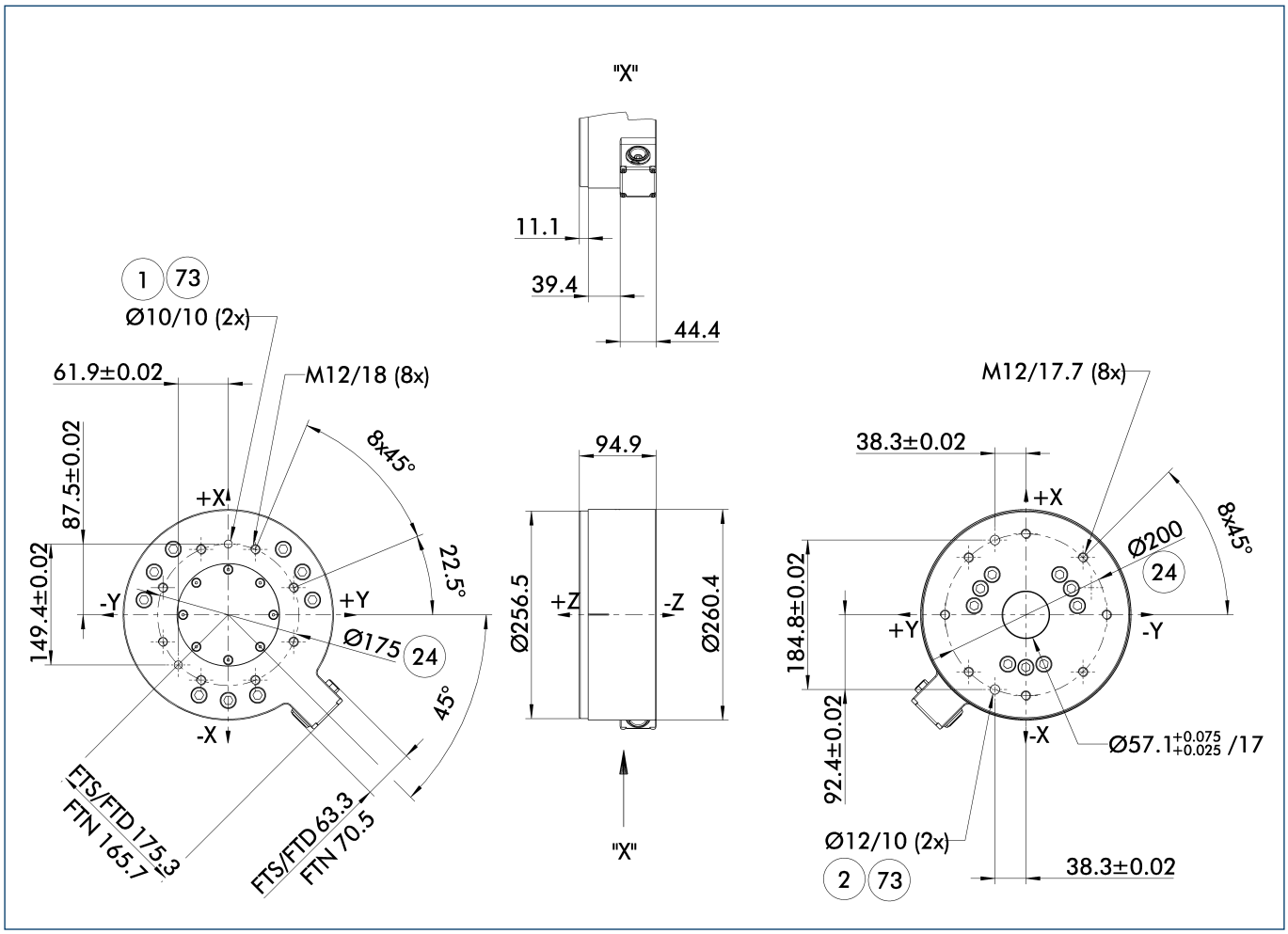
Main view IP60



The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
27 Through-holes for screw connections
73 Fit for a centering pin

IP65 / IP68 main view



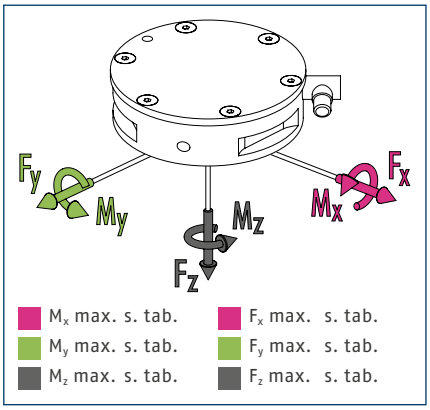
The main view shows the product with IP-protection.

1 Robot side connection
2 Tool side connection
24 Bolt circle
73 Fit for a centering pin

FT Omega331

Robot Accessories | Measuring | Force / Torque Sensor

Forces and moments

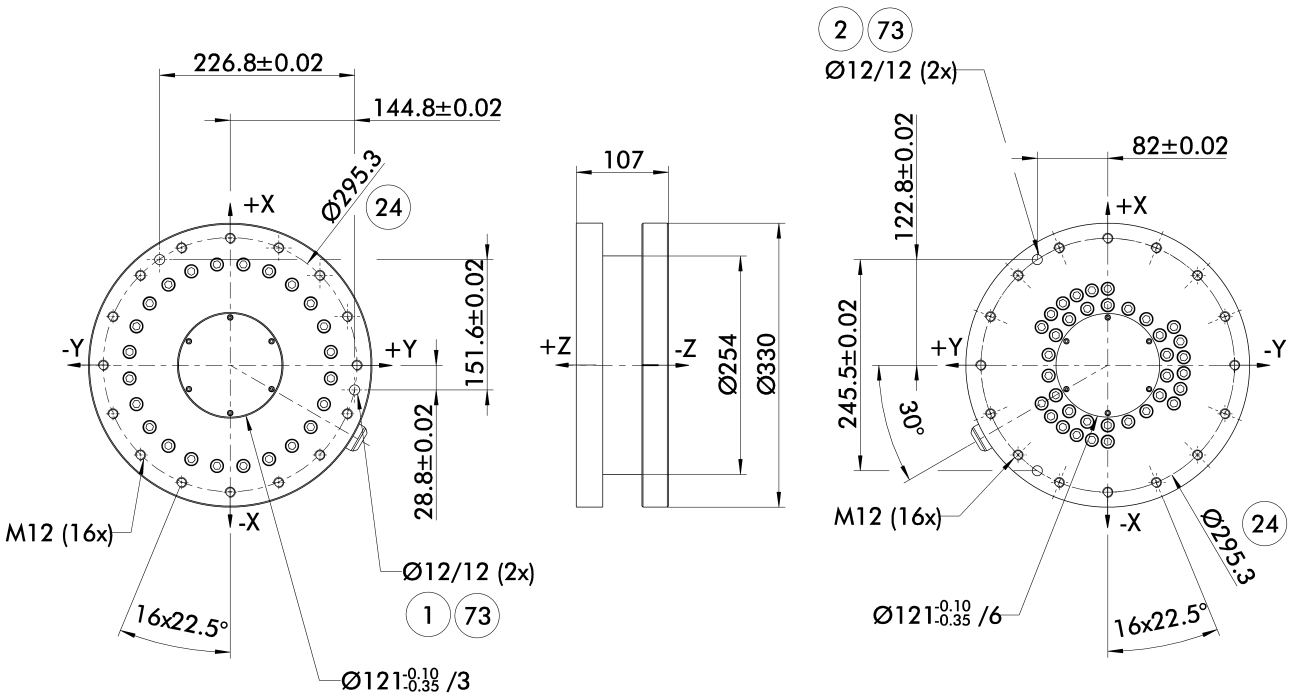


ⓘ For load index see technical data table.

FTN technical data

Description		FTN-Omega-331	FTN-Omega-331	FTN-Omega-331
Calibration		SI-10000-1500	SI-20000-3000	SI-40000-6000
Evaluation via		Ethernet	Ethernet	Ethernet
Mass	[kg]	47	47	47
Measuring range F_x, F_y	[N]	±10000	±20000	±40000
Measuring range F_z	[N]	±22000	±44000	±88000
Measuring range M_x, M_y	[Nm]	±1500	±3000	±6000
Measuring range M_z	[Nm]	±1500	±3000	±6000
Overload F_x, F_y	[N]	±260000	±260000	±260000
Overload F_z	[N]	±520000	±520000	±520000
Overload M_x, M_y	[Nm]	±32000	±32000	±32000
Overload M_z	[Nm]	±46000	±46000	±46000
Resolution F_x, F_y	[kN]	1/480	1/240	1/120
Resolution F_z	[kN]	1/240	1/120	1/60
Resolution M_x, M_y	[kNm]	3/8000	3/4000	3/2000
Resolution M_z	[kNm]	3/16000	3/8000	3/4000
Technical data deviating from FTD				
Description		FT-Omega-331	FTD-Omega-331	FTD-Omega-331
Evaluation via		DAQ	DAQ	DAQ
Resolution F_x, F_y	[kN]	1/480	1/240	1/120
Resolution F_z	[kN]	1/240	1/120	1/60
Resolution M_x, M_y	[kNm]	3/8000	3/4000	3/2000
Resolution M_z	[kNm]	3/16000	3/8000	3/4000
Technical data deviating from FTS				
Description		FTS-Omega-331	FTS-Omega-331	FTS-Omega-331
Evaluation via		Stand-Alone	Stand-Alone	Stand-Alone
Resolution F_x, F_y	[kN]	1/240	1/120	1/60
Resolution F_z	[kN]	1/120	1/60	1/30
Resolution M_x, M_y	[kNm]	3/4000	3/2000	3/1000
Resolution M_z	[kNm]	3/8000	3/4000	3/2000

Main view



The main view shows the unit in its basic version.

(1) Robot side connection
(2) Tool side connection
(24) Bolt circle
(73) Fit for a centering pin