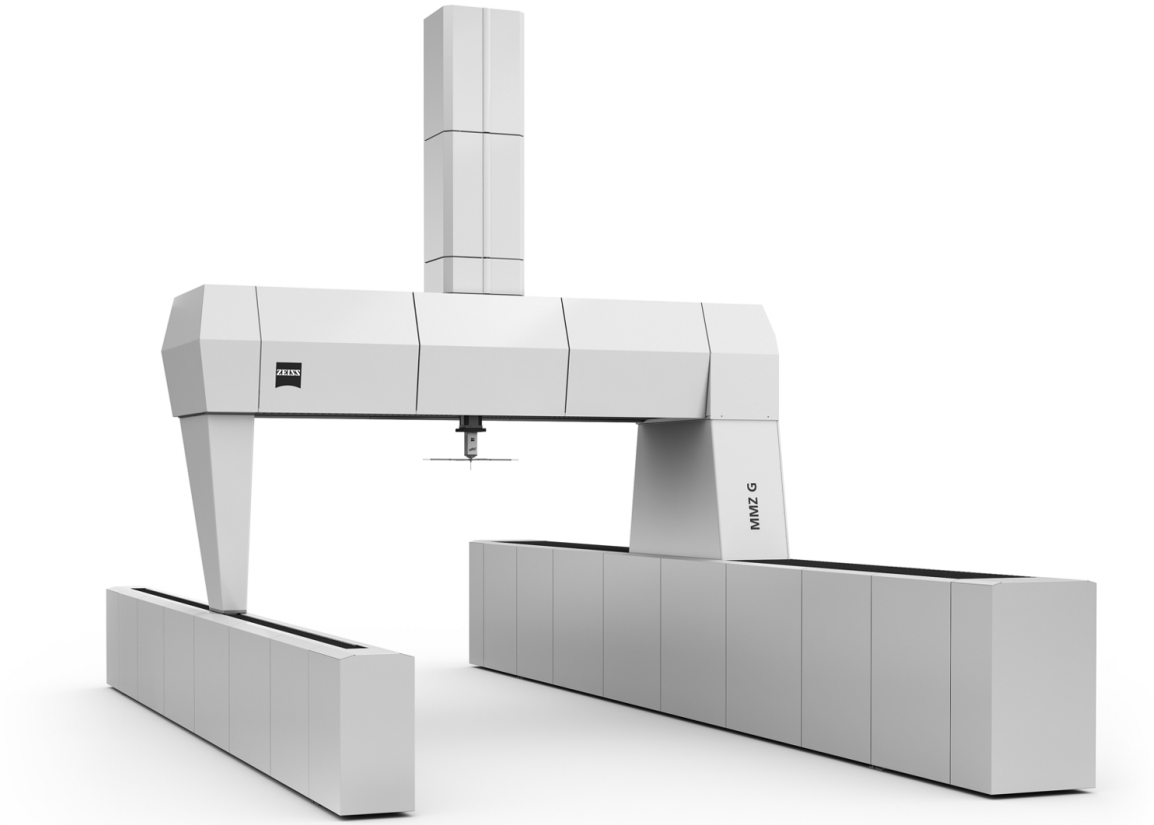


MMZ G
Installation site requierements

(Here is a selection of sizes – additional sizes upon request)
Coordinate measuring machine

Table of Contents

General

Safety during transport and installation

Requirements for safe working conditions:

- The hoisting equipment and lifting tackle (e.g. rope) used, must be in proper working order and checked in accordance with the applicable standards and directives.
- Personnel operating such equipment must be trained in the required work and be able to safely operate this hoisting equipment.
- The hoisting equipment must be designed to accommodate the size and weight of the transported material.

Delivery package

The CMM is comprised of the following components:

- Coordinate measuring machine (CMM)
- Controller cabinet
- Control console
- Data system and peripheral devices (optional)

Note on data systems

NOTE

Data systems for coordinate measuring machines are CMM-based systems and cannot be compared to computer systems for office applications. To ensure trouble-free operation of the coordinate measuring machine, you must only use computer systems tested and approved by ZEISS.

If the customer provides the computer systems, the computers must first be tested and approved by ZEISS. The customer is responsible for any additional costs.

Coordinate measuring machine parameters

Category	Parameter
Overvoltage category	III
Degree of contamination	2
Protection class	1

Logistics and In-plant Transport

Unloading/ in-plant transport

During technical clarification, you (customer) will receive a CMM-specific installation checklist. You (customer) must enter your information and work through the checklist.

Requirements

- Sufficient floor and ceiling load capacity of the transport routes.
- Transport routes must be clear.
- The transport routes and doorways must be at least 10 cm wider and higher than the CMM assemblies, including transport equipment. The transport routes depend on the X, Y and Z measuring range. The dimensions of the CMM assemblies can be found under "Shipping crates."
- The CMM assemblies may only be unloaded and transported using transport lugs or pallets.

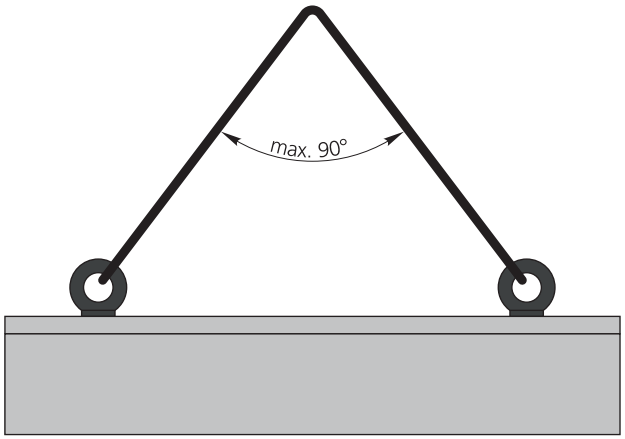
  Note: Ensure that you do not damage the insulated packaging in the process!
- To unload and transport to the storage location or installation site, suitable transportation equipment and operating personnel must be provided. The type of transport equipment depends on the local conditions and the weight of the CMM assembly being transported. The dimensions and weights can be found under Shipping crates and Installation dimensions.

  Examples of suitable transportation equipment: overhead crane, mobile crane, forklift

Avoid transport damage

During transport of the measuring column container, pay attention to its center of gravity. It is marked with the standard international symbol. While transporting the measuring plate, the aperture angle of the cable fastened to the ring bolts may be no more than 90° on the transport hook (see figure).

It is vital to shield the CMM from hard jolts or strong vibrations while moving it with the crane!



Shipping crates for MMZ G (Y 3000, Y 4000, Y 5000, Y 6000, Y 7000)

NOTE

The coordinate measuring machine comes disassembled on shipping pallets. For overseas shipments, the individual parts are wrapped in insulated packaging. For overseas shipping, the individual parts are also packed in shipping crates.

Crate	Contents	Size	Length	Width	Height	Volume	Max. net weight	Max. gross weight
				[mm]		[m³]	[kg]	[kg]
1	**Y columns 1 and 2**	Y 3000	5800	1600	1850	17.2	6200	7000
		Y 4000	6800	1600	1850	20.1	7800	8800
		Y 5000	7850	1700	1900	25.4	9800	11000
		Y 6000	8850	1700	1900	28.6	11000	12300
		Y 7000	9850	1700	1900	31.8	12400	13800
2	**Crossbeam**	X 2000	4250	1800	1400	10.7	2150	2700
		X 2500	4750	1800	1400	12.0	2400	3000
		X 3000	5300	1800	1400	13.4	2700	3400
		X 3500	5600	1800	1400	14.1	3000	3700
		X 4000	6300	1800	1400	15.9	3400	4200
		X 5000	7300	1800	1400	18.4	4000	5000
		X 6000	8300	1800	1400	20.9	4500	5600
		X 8000	10400	1800	1550	29.0	5800	7700
3	**Z axis arms**	Z 1200 and Z 1600	3500	2150	1300	9.8	1050	1600
		Z 2000 and Z 2500	4300	2380	1300	13.3	1700	2300
		Z 3000 and Z 3500	5100	2380	1300	15.8	1800	2600
4	**Switch cabinet**		1700	900	2400	3.7	460	570
5	**Covers**		4000	2200	2280	20.1	850	1600
6	**Covers Accessories**		4400	2050	1500	13.5	450	1050

All values are maximum values. Unspecified values are not yet available.

For production reasons, the dimensions of the shipping crates may deviate by as much as 50 mm.

Subject to change.

Shipping crates for MMZ G (Y 8000, Y 10000)

Crate	Contents	Size	Length	Width	Height	Volume	Max. net weight	Max. gross weight
				[mm]		[m^3]	[kg]	[kg]
1	**Y column 1**	Y 8000	11000	1700	2400	44.9	11900	13500
2	**Y column 2**		9500	1000	2000	19.0	6300	7300
1	**Y column 1**	Y 10000	13000	1700	2400	53.0	15500	17500
2	**Y column 2**		11500	1000	2000	23.0	8500	9800
3	**Crossbeam**	X 2000	4250	1800	1400	10.7	2150	2700
		X 2500	4750	1800	1400	12.0	2400	3000
		X 3000	5300	1800	1400	13.4	2700	3400
		X 3500	5600	1800	1400	14.1	3000	3700
		X 4000	6300	1800	1400	15.9	3400	4200
		X 5000	7300	1800	1400	18.4	4000	5000
		X 6000	8300	1800	1400	20.9	4500	5600
		X 8000	10400	1800	1550	29.0	5800	7700
4	**Z axis arms**	Z 1200 and Z 1600	3500	2150	1300	9.8	1050	1600
		Z 2000 and Z 2500	4300	2380	1300	13.3	1700	2300
		Z 3000 and Z 3500	5100	2380	1300	15.8	1800	2600
5	**Switch cabinet**		1700	900	2400	3.7	460	570
6	**Covers**		4000	2200	2280	20.1	850	1600
7	**Covers Accessories**		4400	2050	1500	13.5	450	1050

All values are maximum values. Unspecified values are not yet available.

For production reasons, the dimensions of the shipping crates may deviate by as much as 50 mm.

Subject to change.

Intermediate storage/unpacking

For overseas shipment: after a desiccant is added, CMM assemblies are wrapped with an aluminum-coated foil and sealed (moisture protection).

For inner-Europe transport: CMM assemblies are stretch-wrapped to keep the parts together; however, this does not provide protection against corrosion.

– Store the packed CMM assemblies at 5-40°C as close as possible to the installation site. **Note:** The CMM assemblies wrapped in foil must be stored in closed, dry rooms.

– Provide a location to store the transport material and the packaging material.

NOTE

The shipping crates may only be opened by a ZEISS service technician.

The shipping crates may only be opened by a ZEISS service technician.

NOTE

Packing materials such as disposable transport packaging for the covers, PC and accessories, foil or Styrofoam chips can be returned to ZEISS if they are clean.

NOTE

ZEISS recommends storing the disposable packaging and the transport braces in a safe location (to protect them against damage) in case the CMM has to be moved to another site at a later date.

Adaptation to room temperature

– If possible, move the CMM assemblies to a storage location with an ambient temperature of at least +15°C 2 days before the arrival of the ZEISS service engineer.

Relocating an installed CMM

NOTE

To avoid damage, the CMM may only be transported when a ZEISS service engineer is involved.

Planning and Measuring Lab Preparation

Customer note

When selecting the installation site, make sure that the site fulfills the requirements mentioned below or that measures are taken to fulfill the requirements. For this machine type, a ZEISS project manager supervises the project implementation after order confirmation up to the final acceptance at the customer's facilities. Please coordinate all technical, structural and schedule-related issues with your project manager.

Safety device

CMMs with high travel speed are equipped with a safety barrier which resets the CMM into a safe travel mode after interruption.

General protection measures

The CMM must be protected against heavy contamination. Deposits require additional cleaning and maintenance and can result in malfunctions and damage to the CMM.

Doorway dimensions in the measuring lab

The doorways to the measuring lab must be at least 10 cm wider and higher than the dimensions of the CMM.

The dimensions of the CMM can be found under "Shipping crates" and "Installation dimensions".

Room height of the measuring lab

The required room height is the sum of the height of the CMM and the minimum sub-ceiling installation clearance. The required minimum room height above the floor or foundation is listed under "Installation dimensions".

Note: Additional installation work resulting from insufficient distances will be invoiced accordingly.

Floor

To correctly determine the space requirements of the system, first clarify the following points:

- System loading?
- Predominate operating mode?
- Is the environment suitable for unprotected use of a computer and peripheral devices?
- Safety clearances which might be necessary according to the regulations and layout specifications applicable to your facility.
- You must ensure that the foundation has is laid in good time and properly designed prior to installation of the CMM.

All these points influence the positioning and space requirements around the system. When creating a floor plan, ensure that your CMM is easily accessible (see Installation dimensions and safety area).

Note: Note on room height and installation surface: the floor plan created by us and approved by you (customer) is binding.

Vibrations at the installation site

Floor vibrations caused by a variety of reasons are found with varying severity at every installation site.

- Neighboring systems (lathes, presses, etc.).
- Transport equipment (forklifts, cranes, etc.).
- Nearby traffic ways (highways, train tracks).
- People walking.

They can considerably interfere with the measuring accuracy of a coordinate measuring machine and should be prevented as much as possible or kept to a minimum.

If you are not sure if your installation site is suitable for a ZEISS coordinate measuring machine, a vibration analysis can be completed at your site and our specialists will provide you with a non-binding recommendation. Please contact your ZEISS representative if you require more information about this.

The diagrams for vibrations at the installation site can be found in the chapter on limit curves of permissible floor vibrations.

Insulation against vibrations using steel springs or air springs can be integrated into the foundation design. Designs are planned in accordance with the specifications and evaluation of the vibration measurement during "foundation plan creation" by ZEISS. Planning costs, as well as delivery and installation of the dampers are the responsibility of the customer. Delivery and installation of the dampers should be completed by ZEISS.

Subsoil and foundation

Requirements

For this series, the foundation is included in the overall concept as an integrated load-bearing CMM assembly. Therefore, we provide the necessary foundation plan together with you or your geologist.

The soil type is crucial for the creation of the foundation. The subsoil is described by the modulus of subgrade reaction C in MN/m^3. It stands for the load per 1 m^2, which causes sinking of the subsoil to a depth of 1 m. To lay the foundation, the subsoil should have the modulus of subgrade reaction specified by us C = 10 MN/m^3. The foundation measures must be planned and monitored onsite by a geologist.

Furthermore, the maximum load caused by the workpiece and its fixture must be known.

The vibration measurement and its evaluation can be used to determine if vibration insulation is necessary.

For the soil assessment and any necessary soil improvements (foundation etc.), we recommend contacting a geologist familiar with the soil conditions.

Curing time

After the foundation is laid, you must leave it for 90 days before the CMM can be placed on the foundation because the concrete will shrink due to water evaporation. The temperature conditions must be complied with at least 4 days before the adjustment and acceptance of the CMM.

NOTE

Foundation work is not included with delivery, but can be offered separately.

In the first few years following completion, the cement foundation and constructions undergo shrinkage that can be seen as reductions, bending and torsion. For this reason, in the 3 years following completion of foundations, you must expect additional adjustment or recalibration work in order to operate the CMM with the specified basic accuracy.

Readjustment or recalibration is recommended annually.

Therefore, Carl Zeiss Industrielle Messtechnik GmbH is not responsible for any defects resulting from shrinkage or events similar to those listed above. In such cases, readjustment will be invoiced separately.

Environmental conditions

The operator must ensure that the required environmental conditions are maintained in the measuring lab and document them during the entire operating time (measuring operations, idle times and downtimes).

NOTE

The environmental conditions are vital to compliance with the accuracy specifications:

- Avoid direct heat (e.g. controller cabinets of machine tools, heaters, lighting, sun).
- Avoid cold air and drafts (e.g. outside walls, windows, doors).
- Additional information can be found in VDI/VDE 2627.

Environmental conditions for operational readiness

The following conditions must be met to ensure proper operation of the CT scanner.

Permissible ambient temperature	10-35°C
Permissible humidity (without condensation)	40-70%
Height above mean sea level	Max. 2000 m

Environmental conditions for measuring operations

To comply with the accuracy values, the following conditions must be met:

– Temperature fluctuations must not exceed certain values. Limit values: 1 K/day and 0.5 K/hour.

– Comply with the temperature conditions. See table.

Reference temperature **Note:** Maintain the reference temperature for at least 48 hours before starting the measurements.		18-22°C
Temperature fluctuation	per day	2.0 K/d
	per hour	1.0 K/h
	spatial	0.5 K/m

Compressed Air

Connection point for compressed air

You must prepare the compressed air connection point in accordance with the specifications in this document. It has to be installed in the direct vicinity of the controller and must be provided by you.

The CMM comes with a 7.5 m long compressed air hose with a nominal diameter of 9.0 mm.

The supply line from the compressed air connection point to the connection point of the CMM is laid during installation.

NOTE

The compressed air hose must be protected.

The compressed air connection point must be easily accessible. If the air connection is on the floor, it must not be covered by the CMM base.

Compressed air supply

Compressed air is required for:

- An RDS probe carrier
- Vibration-isolated foundation on air spring insulators

NOTE

If the compressed air requirements are not met, an additional air filtration unit and, if necessary, a membrane dryer must be connected upstream in the service unit. If the required air quality is still not achieved, ZEISS recommends involving a pneumatics specialist. If the required air quality is not provided, it can result in damage not covered by the warranty.

Requirements:	Pressure		6-10 bar (87.0226-145.038 psi)	
	Air quality according to ISO 8573-1:2010 [6:4:4]	Max. particle concentration:	5 mg/m^3	(Class 6)
		Max. pressure dew point:	+3°C	(Class 4)
		Max. oil concentration:	5 mg/m^3	(Class 4)
Air consumption:	For RDS		1.3 l/min per 6 bar (87.0226 psi) (8 Nl/min at 1 bar (14.5038 psi))	
	Air consumption when a foundation is insulated on air bearings depends on the project-specific requirements. Please clarify these requirements during technical consultation with the ZEISS project manager.			

Electrical Specifications and Network Data

Safety instructions

Electric voltage

WARNING

Danger to life due to electric shock resulting from contact with electrical lines and components.

Cardiac arrest, burns, and death.

✓ Any work on the controller must be carried out only by a certified electrician. The cover of the controller may only be removed when the CMM is out of operation. The following measures need to be taken for this:

- Turn off the drives and the controller.
- Turn off the main switch on the controller and secure it against being turned on again unintentionally.

  Warning: some components in the controller cabinet remain live even when the main switch is turned off. These places are marked with warning signs. If necessary, completely disconnect the controller from the power supply (MCC 800 and MCC 1200, if provided).
- If you do not have a permanent connection, pull the power plug as well.

Routing the connecting cables

CAUTION

Tripping hazard due to exposed cables.

Light to moderate bruises and scrapes. Concussions also possible.

- Route the cables in a cable conduit or cable duct. The cable conduit is fastened to the floor. The cable duct is embedded in the floor.

NOTE

The cable conduit is not included with delivery. The cable conduit or cable duct must accommodate all cables and hoses.

Notes on electrical power supply

Malfunctions resulting from insufficient power supply.
Continuous power supply must be ensured to operate the CMM, particularly for the data system. Other systems with permanently high power consumption and systems with peak loads should not be connected to the same electrical circuit as the CMM. This avoids malfunctions.

Malfunctions resulting from stray radiation.
Stray radiation impairs the operation of the CMM.

- Do not operate the CMM near systems that emit strong stray radiation.
- Do not use mobile phones or walkie-talkies within 3 meters of the CMM.

NOTE
The CMM complies with the requirements of the following standard:

EN/IEC 61326-1: EMC-Interference immunity: Table 2; interference emission: Class A.

Information about electromagnetic compatibility (EMC)

The CMM is a class A device and may cause radio interference in living areas. In such cases, operators may be required to implement appropriate measures at their own expense.

For peripheral devices (e.g. computer, monitor, etc.), the specifications of the respective manufacturer apply.

Electrical power supply parameters

The system requires a TN-S net: 3-phase (L1, L2, L3) and ground wire. A neutral conductor (N) is not required. The switch cabinet has a line matching transformer and can be set to 3 phases (400 V, 208 V and 200 V). The switch cabinet comes ex works set to 400 V.

To ensure trouble-free data transmission between the CMM and the data system, the electrical power supply must meet the following specifications.

Category				Value
Line voltage				400/208/200 VAC~ (±10%)
Type of current				3/PE
Frequency				50-60 Hz (±3.5%)
Power consumption	ZEISS C99 controller in the RITTAL VX25 controller cabinet.	Maximum		7500 VA
		Typical		600 W
	Data systems and peripheral devices	Maximum		1000 VA
	PC	Typical		Approx. 100 W
Fuses	230-240 V	EU variation	3x 400 V/ground wire	3x C 16 A
		Optional	3x 200 V/ground wire	3x C 25 A
			3x 208 V/ground wire	

Power supply stabilization

A line-voltage analysis should be performed when brief, out-of-tolerance r.m.s. fluctuations of the nominal voltage occur. If required, please contact us for more information. We will be glad to assist you and recommend suitable measures. Usually, separate stub cables from the main distribution frame to the connection point of the CMM are sufficient.

Required connections

A permanent connection must be provided for the system. The cross section of the power cords must be at least 4 mm^2.

Fuse protection

The permanent connection must be protected with a circuit breaker. Alternatively, equivalent protective equipment can also be used. We recommend installing a lightning arrester, e.g. Phoenix Flashtrab FLT 25-400, for general protection against overvoltage.

NOTE

For maintenance work on CMMs with a permanent connection, an additional protective ground connection and an outlet must be provided due to ESDS and VDE regulations. Max. distance to controller: <1 m.

Network connection

A network connection is required for:

- Data backup
- Teleservice (this is a ZEISS-recommended service and requires an Internet connection).

An Internet connection is not required for the installation of the CMM.

Network topology

System components are networked during start-up by a ZEISS service engineer (or a specialist authorized by ZEISS) in accordance with the applicable specifications and must not be modified by the customer. Any change may lead to connection problems.

Installation Dimensions/ Sample Installation/ Weights

Controller cabinet installation

NOTE

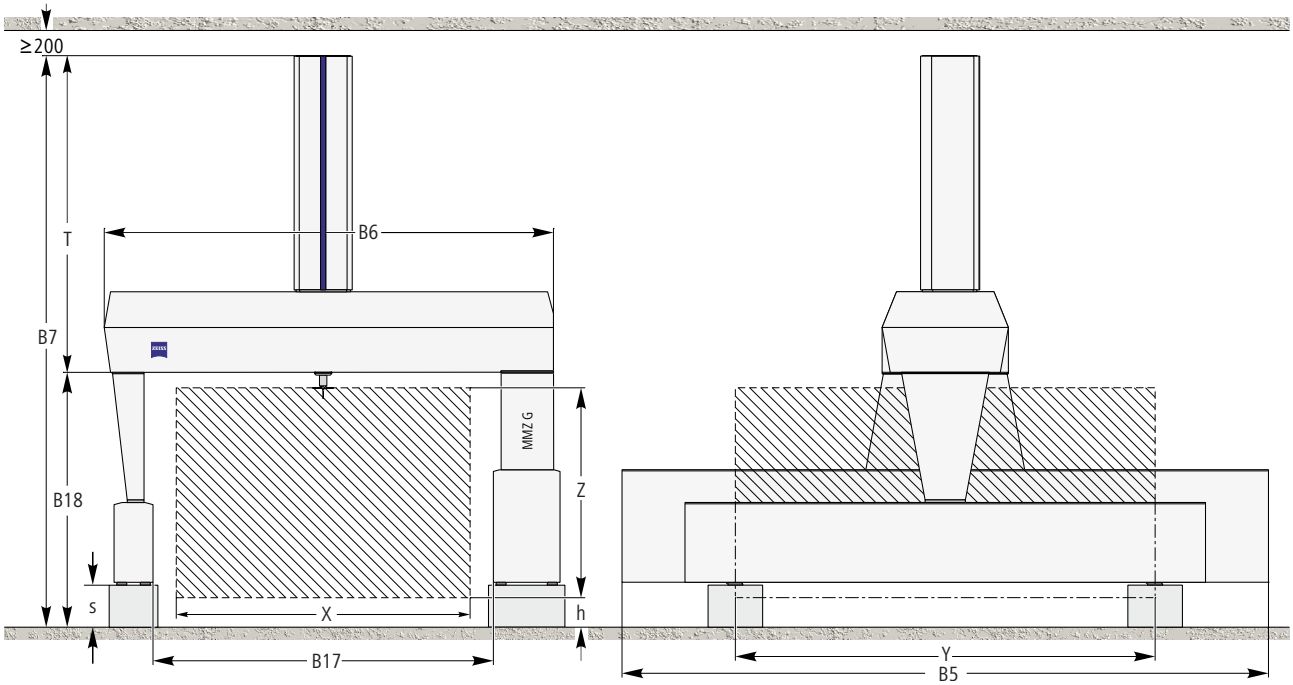
Pay attention to the following when installing the controller cabinet:

- The controller cabinet must be positioned so that the exhaust air from the controller cabinet is not directed towards the CMM.
- Air exchange between the controller cabinet and the environment must not be obstructed.
- Because of the specified cable lengths, the controller must be set up on the side with the long guideway. Maintain the distances. If there are any special requirements, coordinate them with the ZEISS project manager or ZEISS representative. Additional costs due to longer cables or cable extensions are the responsibility of the customer.

Dimensions/weight	Width [mm]	Depth [mm]	Height [mm]	Weight [kg]
	1500	600	2100	465

MMZ G installation dimensions

This is only for your information, the layout plan created by us and approved by you is binding for your CMM.



Front and side view, dimensions in millimeters

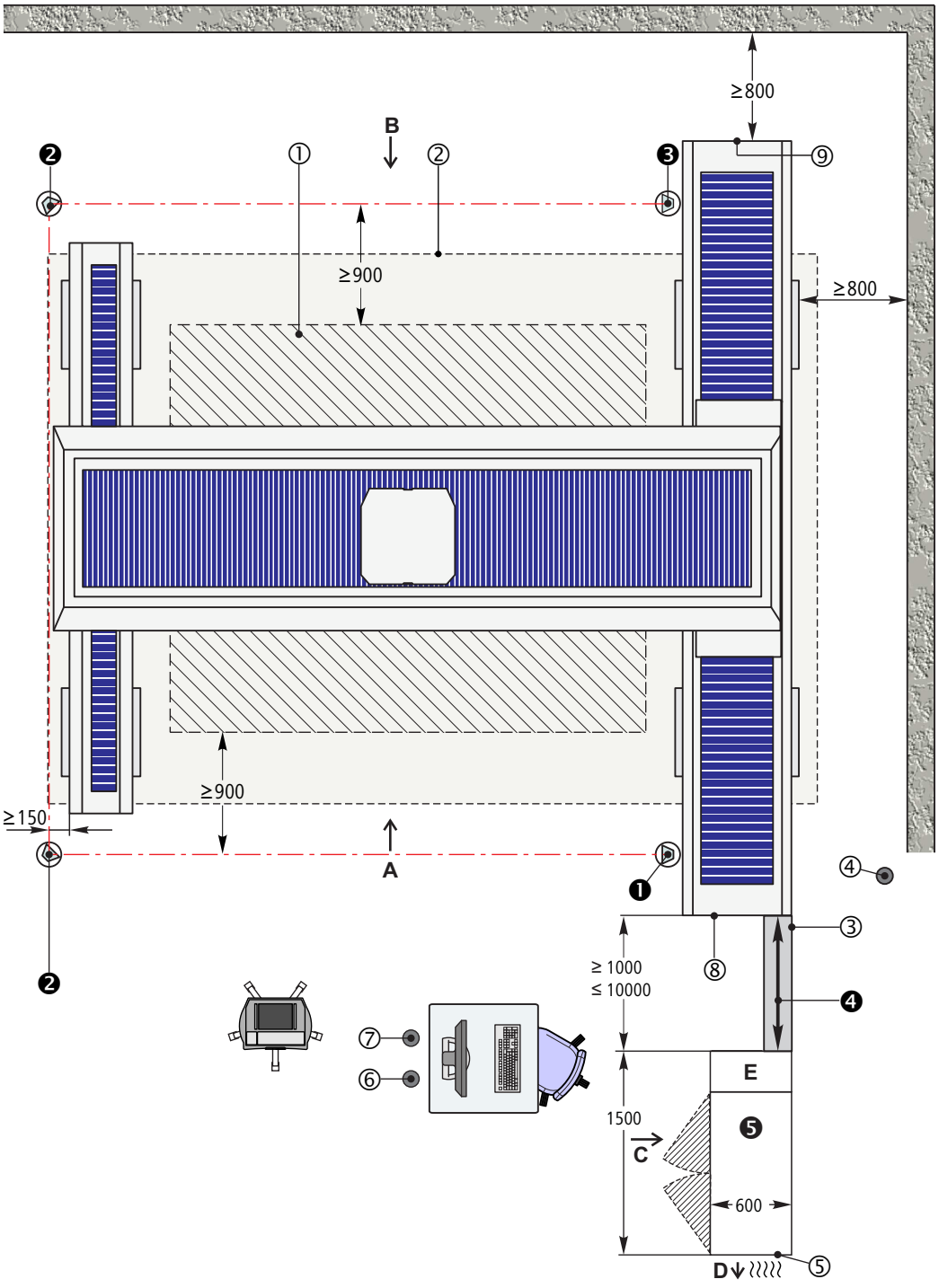
Size	Overall dimensions			Working range (mm)				Transport	CMM
X/Y/Z	Width	Length	Height	Width	Height	Height	Base	Height	Weight [kg]
MMZ G	B6	B5	B7	B17	B18	h	s	T	
20/40/20	3929	6700	5807	2555	2535	310	0	3272	15500
20/70/16	3929	10100	5007	2555	2135	310	200	2872	15100
25/40/25	4429	6700	6807	3055	3035	310	500	3772	16500
25/50/25	4429	7700	6807	3055	3035	310	500	3772	17800
30/40/20	4929	6700	5807	3555	2535	310	0	3272	16100
30/40/30	4929	6700	7807	3555	3535	310	1000	4272	13090
30/50/20	4929	8100	5807	3555	2535	310	0	3272	14100
30/50/25	4929	7700	6807	3555	3035	310	500	3772	14140
30/60/20	4929	9100	5807	3555	2535	310	0	3272	15700

Size	Overall dimensions			Working range (mm)				Transport	CMM
X/Y/Z	Width	Length	Height	Width	Height	Height	Base	Height	Weight [kg]
MMZ G	B6	B5	B7	B17	B18	h	s	T	
30/60/25	4929	9100	6807	3555	3035	310	500	3772	15750
30/60/30	4929	9100	7807	3555	3535	310	1000	4272	15800
30/70/20	4929	10100	5807	3555	2535	310	0	3272	17000
30/80/20	4929	11200	5707	3555	2535	310	0	3272	22700
30/80/25	4929	11200	6807	3555	3035	310	0	3772	23240
35/40/30	5429	6700	7807	4055	3535	310	1000	4272	18500
35/50/25	5429	7700	6807	4055	3035	310	500	3772	17200
40/50/20	5929	8100	5807	4555	2535	310	0	3272	15500
40/50/25	5929	8100	6807	4555	3035	310	500	3772	15550
40/60/25	5929	9100	6807	4555	3035	310	500	3772	16510
40/60/30	5929	9100	7807	4555	3535	310	1000	4272	16900
40/70/25	5929	10100	6807	4555	3035	310	500	3772	18200
40/70/30	5929	10100	7807	4555	3535	310	1000	4272	18250
40/80/30	5929	11200	7807	4555	3535	310	500	4272	24400
40/100/25	5929	13200	6807	4555	3035	310	0	3772	28710
45/50/12	6429	7700	4407	5055	1935	510	0	2472	15200
50/50/16	6933	8100	5007	5555	2135	310	200	2872	16100
50/60/12	6933	9100	4407	5555	1935	510	0	2472	16970
50/60/20	6933	9100	5807	5555	2535	310	0	3272	17830
50/70/25	6933	10100	6807	5555	3035	310	500	3772	19200
50/70/35	6933	10100	8807	5555	4035	310	1500	4772	23200
50/80/30	6933	11200	7807	5555	3535	310	500	4272	25500
50/100/25	6933	13200	6807	5555	3035	310	0	3772	29800
60/60/12	7933	9100	4407	6555	1935	510	0	2472	18000
60/60/16	7933	9100	5007	6555	2135	310	200	2872	18400
60/70/30	7933	10100	7807	6555	3535	310	1000	4272	20300
60/80/30	7933	11200	7807	6555	3535	310	500	4272	26500
60/100/25	7933	13200	6807	6555	3035	310	0	3772	30900

Maximum workpiece weight depends on the thickness of the foundation.

Safety zone and connections for MMZ G

This is only for your information, the layout plan created by us and approved by you is binding for your CMM. (Dimensions in mm, scale 1:50)



A CMM user side
B CMM component side
C Controller cabinet user side
D Controller cabinet exhaust air
E Location of the lubricating equipment and the service unit
① Measuring range
② Foundation block
③ Cable duct
④ Compressed air supply connection point (only needed for RDS sensors or with an air-cushioned foundation).
⑤ Controller power supply

Note: The Drives on or Acknowledge buttons must not be reachable from the danger zone. Install the controller cabinet outside the danger zone (≥1000 mm).

⑥ Peripheral device power supply
⑦ Customer network
⑧ Standard cable outlet to controller
⑨ Optional cable outlet to controller Must be specified prior to completion of the CMM
❶ Transmitter column
❷ Deflecting mirror
❸ Receiver column
❹ Connecting cable for the controller cabinet to the CMM; standard length 10 m, other lengths upon request.
❺ Controller cabinet, see ➤ *Controller cabinet installation [⇨ 17]*

Limit curves of permissible floor vibrations at the installation site

Explanation for the diagrams

The following diagrams shown the frequency-dependent limit values for the coordinate measuring machine. However, these are non-binding and apply only to the specified combination of size and probe. Furthermore, the following requirements must be met (otherwise minor deviations must be expected and a certain distance to the limit values should be maintained):

- No loading workpieces >10% of CMM weight
- Stylus tip distance <100 mm relative to the stylus mount on contact probes

If there are any harmonic floor vibrations (sinusoidal oscillations, e.g. caused by nearby, rotating machine tools), the limit values must be compared with the square mean (RMS value) of the measured floor vibrations. If there are any pulse-shaped floor vibrations (e.g. caused by a nearby press), the limit values must be compared with the maximum value (peak hold) of the measured floor vibrations. If there are two peaks near each other in the frequency spectrum (regardless of the excitation direction), the amplitudes of these peaks must be added and compared with the limit curves.

If none of the given diagrams applies to your configuration, the diagrams for other sizes can be used for orientation. Please contact your ZEISS representative if you require more information about this.

Permissible foundation acceleration for MMZ G measuring (without damping)

Acceleration values above the curve (depending on the Z axis) require passive or active vibration insulation.