GageMax
Installation site requirement

Coordinate measuring machine (CMM)

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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

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

IP rating of the controller cabinet

Controller cabinet	Identifier
MCC 800	IP54
MCC 2000	IP54

Logistics and In-plant Transport

Unloading/ in-plant transport

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 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

WARNING

Risk of injury through falling components if they are improperly secured.
Crushing and severing of body parts.

- Secure the CMM assemblies being transported to prevent them from slipping and tipping.

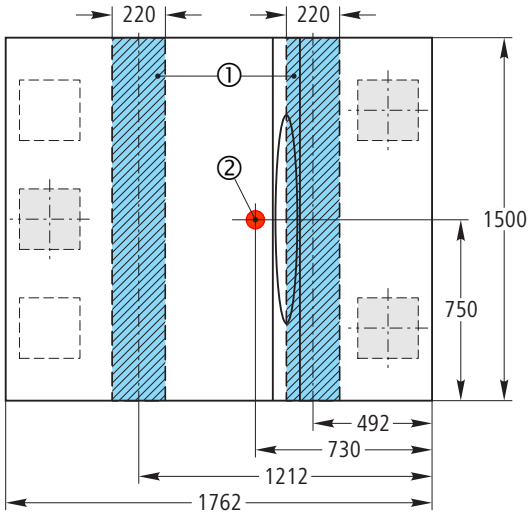
  A high center of gravity increases the risk of tipping.
- Secure the individual loose parts so that they cannot move.
- Move the CMM assembly very carefully, slowly and smoothly.

Transport options

NOTE
Transport specifications must be complied with, otherwise permanent damage to the CMM can occur.

Transport with forklift

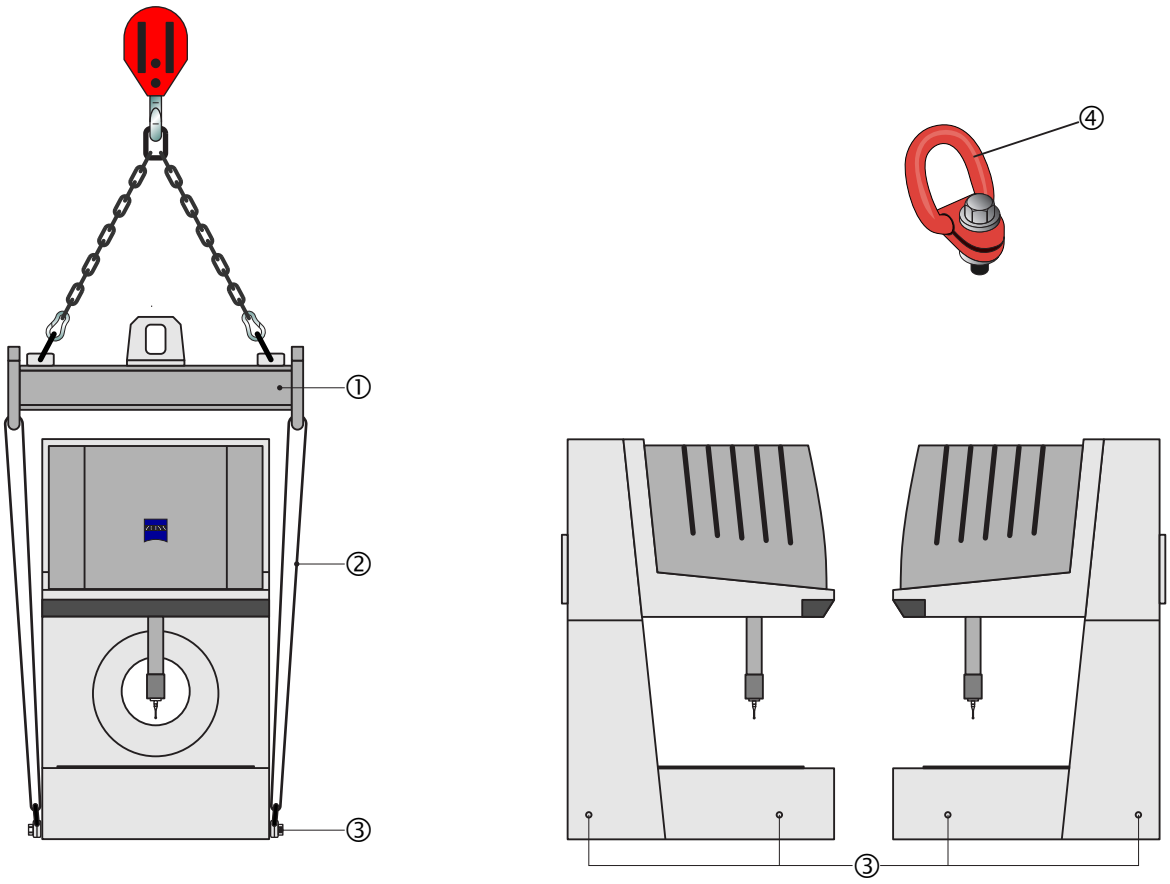
Transport equipment and required accessories must be provided by the customer. For transport with a forklift, you must take the net weight of GageMax (approx. 5000 kg) into account when selecting the transport equipment! The dimensions in the following drawing are based on the polymer concrete surfaces (not the cover parts).



1 Transport rails in the base, area for forks when a forklift is used for transport; load-bearing capacity of forklift: at least 7 t.

2 The center of gravity in the X-Y plane is located 245 mm above the measuring plate.

Crane transport via lifting anchor with X bridge and hoisting rig or lug



1 X bridge with a cross beam length of approx. 1800 mm
2 Carrying cable (4x), carrying capacity per cable at least 2000 kg
3 Mounting holes (each 2x M24 for hoisting rig or lug)
4 Hoisting rigs (4x) or lug to fasten to polymer concrete.
Note: Ring bolts are not allowed for this transport.

Shipping crates for GageMax

NOTE

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

Contents	Shipping method		Length [mm]	Width [mm]	Height [mm]	Volume [m^3]	Tare wt. [kg]	Gross [kg]
GageMax	Air/sea	Crate	2360	2090	3150	16.0	1100	6100
	Truck	Pallet	2240	2280	2960	-	300	5300
Controller cabinet MCC 800	Air/sea and truck	Pallet	1300	1135	1000	-	37	180
Controller cabinet MCC 1200 (optional)	Air/sea and truck	Pallet	1300	1135	2750	-	37	210
Accessories	Air/sea and truck	Card-board						

All values are maximum values. Unspecified values are not yet available. For production reasons, the dimensions of the shipping crates (length, width and height) may deviate by as much as 50 mm. Subject to change.

Intermediate storage/unpacking

– Store the packed CMM assemblies in a sheltered location as close as possible to the installation site.

– Storage temperature: +5° to +40°C.

Risk of corrosion if protective cover missing.

- If the machine is stored for any length of time, the protective cover must **not** be removed. The cover is a component of the CMM packaging and should always be kept with it.
- The CMM must remain inside the protective cover at its final installation site for at least 24 hours before the cover is opened or removed. This is the only way to prevent rust damage due to condensation.
- Only a ZEISS service technician or specially trained personnel are authorized to remove the protective cover.

NOTE

Packing materials such as disposable transport packaging, covers or Styrofoam chips are reused by ZEISS and can be returned to ZEISS.

ZEISS recommends storing the disposable packaging and the transport locks 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

General protection measures

The CMM must be protected against direct contamination (e.g. casting sand, metal filings, blasting equipment, oil, coolants, lubricants, soot, etc.). Deposits may require additional cleaning and maintenance and could lead to 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 secured CMM with base and without shipping pallet.

The dimensions of the CMM modules 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 in the chapter on "installation dimensions".

Floor

The floor must be clean.

Maximum difference in level between the 3 support surfaces: ≤4 mm

Maximum tilt per support surface: 1 mm/m

The dimensions of your CMM can be found in the chapter on installation dimensions/ sample layouts/ weights, foundation and floor load.

Floor plan

If you create a floor plan on a CAD system, you can produce a DXF and/or a DWG file containing the dimensions. If you require further assistance, please contact your ZEISS representative.

Note: When creating a floor plan, ensure that your coordinate measuring machine can be easily accessed from all sides. Installation near transport routes must be avoided.

Floor load

When calculating or planning any necessary floor reinforcements, we recommend consulting a structural engineer familiar with your local soil conditions. The floor load resulting from the CMM can be found in the chapter on "installation dimensions".

Vibrations at the installation site

Vibrations are frequently caused by heavy machinery, transport equipment (cranes or forklifts), presses and forging machines in adjacent rooms and can impair measuring accuracy.

To prevent as many of these impairments as possible, the CMM is equipped with an integrated damping system and is therefore largely vibration-resistant.

A measurement is required to evaluate the extent of the floor vibrations.

ZEISS can be requested to complete a vibration analysis; If required, contact your ZEISS representative. The results must be made available to ZEISS.

Various parameters, such as frequency and amplitude of the prevalent acceleration, must be captured and analyzed for a comparable evaluation. The results of the vibration analysis will be subsequently evaluated by our specialists.

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

Environmental conditions

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 properly operate the coordinate measuring machine.

Permissible humidity (without condensation) **Note:** Humidity values that exceed the permissible range require an additional air conditioner on the controller cabinet (option).		40-70%
Permissible environmental temperature		10-40°C
Height above MSL	At 100-125 V	3000 m
	At 230-240 V	2000 m
Permissible sound pressure level at the installation site		<90 dBA

Environmental conditions for measuring operations

To comply with the accuracy values, the following measures must be implemented:

– The CMM must rest at the installation site for at least one day before the start of measuring operations.

– Enter the expansion coefficients of the workpiece in the measuring software.

– Comply with the temperature conditions. See table.

Permissible humidity (without condensation)		40-70%
Reference temperature		15-40°C
Temperature fluctuation	Per day	10.0 K/d
	Per hour	3.0 K/h
	Spatial	2.0 K/m

Compressed air

Compressed air supply

Compressed air is not required to operate the CMM.

A separate compressed air supply line is required for the optional ProMax changer rack.

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: EMV - 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 take adequate 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 MCC 2000 is a combination of the MCC 800 controller cabinet and the MCC 1200 top-mounted cabinet.

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

MCC 800

Category			Value
Line voltage			100/110/115/120/125/230/240 V~ (±10%)
Type of current			1/N/PE
Frequency			50-60 Hz (±3.5%)
Power consumption	CMM and MCC 800	Maximum	3000 VA
		Typical	380 W
Fuse	230-240 V		C 16 A
	100-125 V		25 A

MCC 1200

Category			Value
Line voltage			100-240 V~ (±10%)
Type of current			1/N/PE
Frequency			50-60 Hz (±3.5%)
Power consumption	MCC 1200	Maximum	2500 VA
		Typical	200 W (Varies depending on the installed options.)
Fuse	230-240 V		C 16 A
	100-125 V		25 A

NOTE
If air conditioning is used for climate control, the nominal voltage depends on the cooling unit used. It is 115 V or 230 V.

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.

– Alternatively, a 3-pin CEE plug (in accordance with IEC/EN 60309 for 32A) can also be used.

Protection

Protect the connection 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

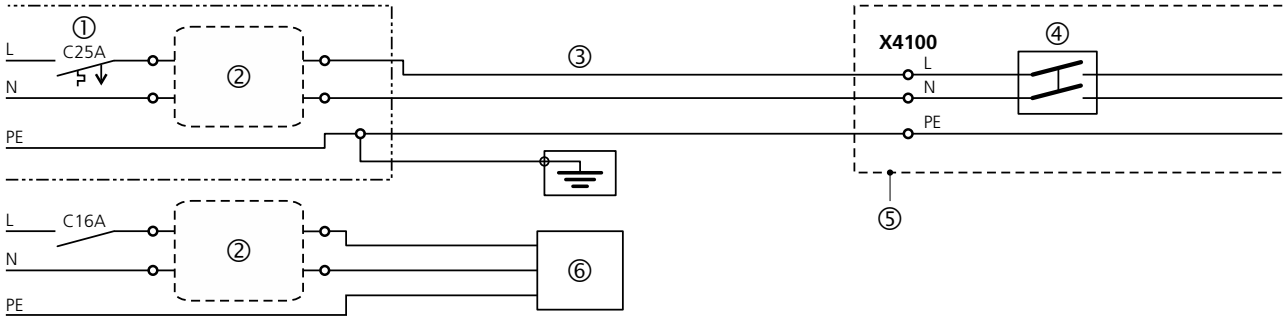
For maintenance work on the CMM with a permanent connection, an additional protective ground connection and an outlet must be provided due to ESDS and VDE regulations. Max. distance to controller: <1 m. (see drawing for shock-proof outlet)

Wiring plan for MCC 800 controller cabinet

We recommend installing the connection in accordance with the following diagram.

Note: Comply with applicable national regulations.

Customer installation of local voltage (suggested)



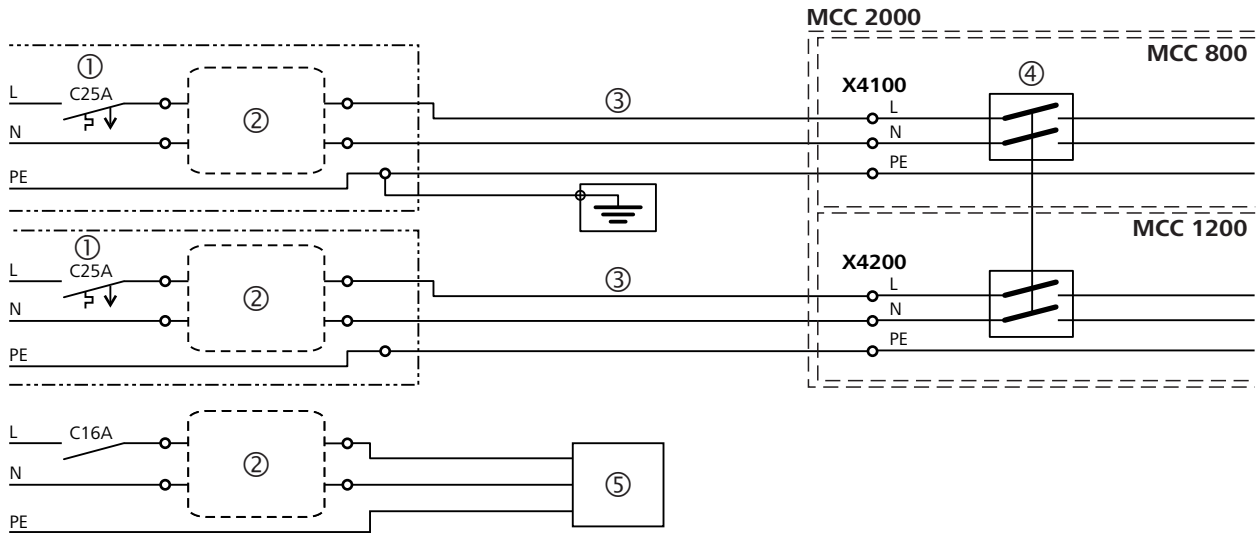
① Circuit breaker
② Recommended: residual current circuit breaker
③ Cable (included with delivery)
④ Main switch
⑤ Controller
⑥ Shock-proof outlet

Wiring plan for MCC 2000 controller cabinet

We recommend installing the connection in accordance with the following diagram.

Note: Comply with applicable national regulations.

Customer installation of local voltage (suggested)



1 Circuit breaker
2 Recommended: residual current circuit breaker
3 Cable (included with delivery)
4 Main switch
5 Shock-proof outlet

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.

Footprint/ sample installation/ weights

MCC 800/MCC 1200 controller cabinet installation

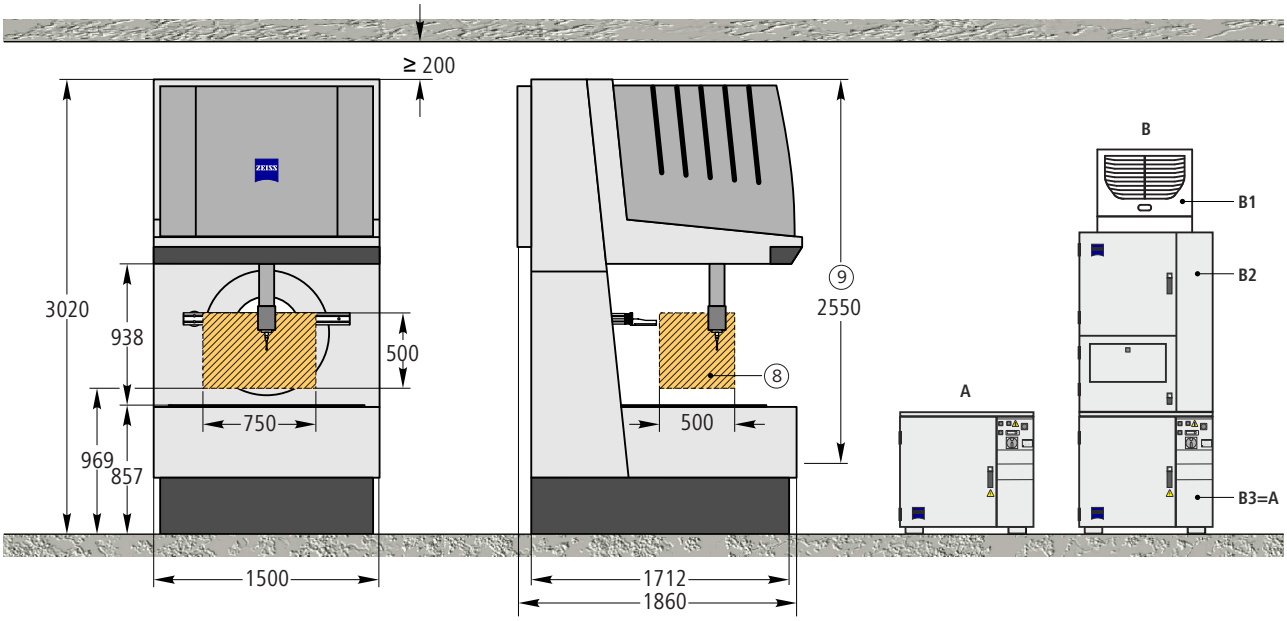
NOTE

Pay attention to the following when installing the controller cabinet:

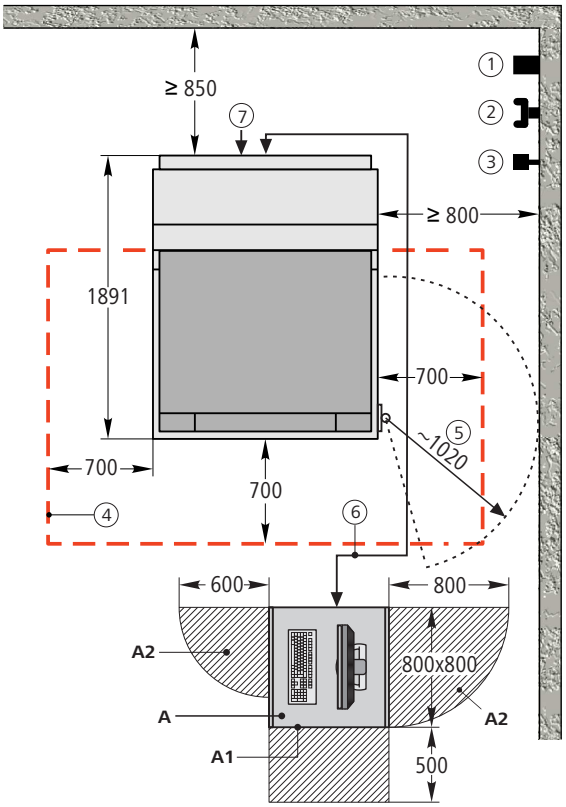
- The controller cabinet must be positioned so that the exhaust air from the controller cabinet is not directed towards the CMM.
- The distance between the back of the controller cabinet and the wall must be at least 500 mm. When the back is fully open, the distance to the wall must be at least 800 mm.
- The air exchange between the controller cabinet and the environment must not be obstructed.

Dimensions	Height [mm]	Width [mm]	Depth [mm]
MCC 800 controller cabinet	800	800	800
MCC 800 controller cabinet with cooling unit on the back door (option)	800	800	1060
MCC 800 controller cabinet with MCC 1200 (optional)	2000	800	800
MCC 800 controller cabinet with MCC 1200 (optional) and roof-mounted cooling unit (optional)	2550	800	800

GageMax installation dimensions



Front and side view/ M 1:50/ dimensions in millimeters



Top view

A MCC 800 (standard) controller cabinet with cooling unit on the back door (option)

Controller cabinet, (see ➤ *Controller cabinet installation [⇨ 16]*)

A1 Removable side walls on controller cabinet

A2 Required clearance for controller cabinet doors and side wall

B MCC 2000

B1 Roof-mounted cooling unit (option)

B2 MCC 1200 (option)

B3 MCC 800

1 Network connection for data backup and Internet (Teleservice)

2 Power supply

3 Compressed air supply (option)

4 Scanner protective field (700 mm around the CMM must be clear)

5 Control console swivel arm (option)

6 CMM <-> controller connection cable, max. cable length approx. 6 m

7 Compressed air supply on CMM (compressed air is required for a ProMax active changer rack)

8 Measuring range

9 Transport height

Note: All CMM components must be accessible for service work. All crushing hazards must be eliminated.

Weight			Value
CMM		[kg]	5000
Workpiece, max.	On measuring plate	[kg]	250
	On rotary table	[kg]	80

Safety zone

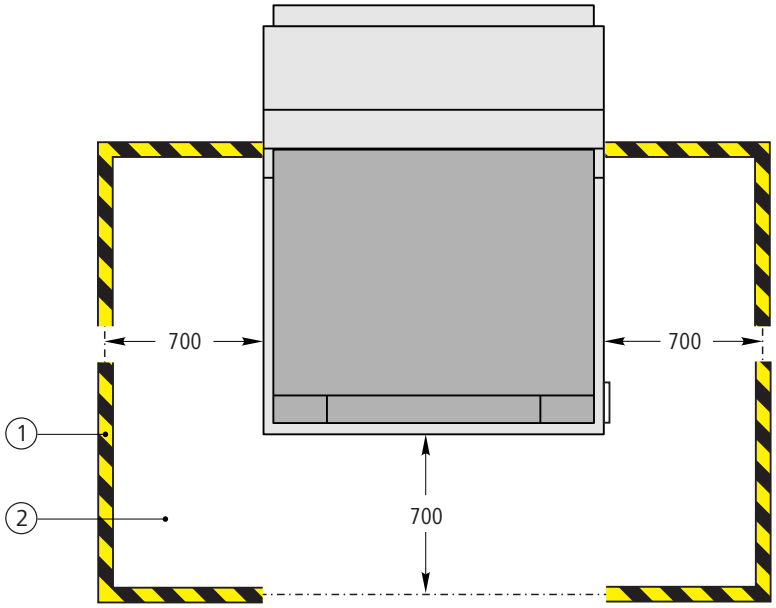
NOTE
CMM operation without external protective equipment is not permitted.

Boundary for safety laser scanner

NOTE
The laser scanner monitors the danger zone of the CMM. As soon as a person or an object breaches the protective field, the travel speed is reduced in all axes and safely monitored. A risk due to travel movements is thus reduced to a minimum. Once the protected are is cleared, the CMM moves again at maximum speed.

- Using floor markings, mark the boundary of the protective field of the safety laser scanner to clearly identify the protected area around the CMM.

  It is important to maintain the clearance distances on all sides of the CMM. See illustration.



1 Floor marking or barrier tape (black/yellow).
2 Scanner protective field (700 mm left and 700 mm right, top and bottom around the CMM must be clear)

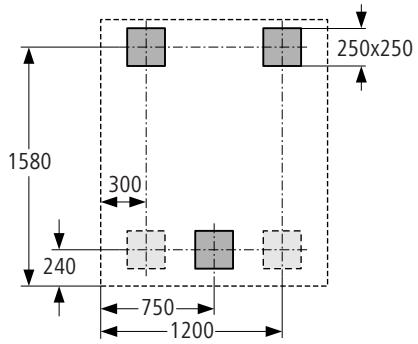
Foundation and floor load

Information about surface pressure

NOTE

The specified surface pressure indicates the maximum load applied to the floor covering. This value must not be used to calculate the permissible floor or ceiling load. The load conditions at the installation site vary individually and must be clarified and/or calculated by a structural engineer before installation of the CMM. See the chapter on installation dimensions for the required information.

Position of the support surfaces for the GageMax adjustable feet



Requirements on the support surfaces	Value
Maximum difference in level between the 3 support surfaces:	≤4 mm
Maximum tilt per support surface:	1 mm/m

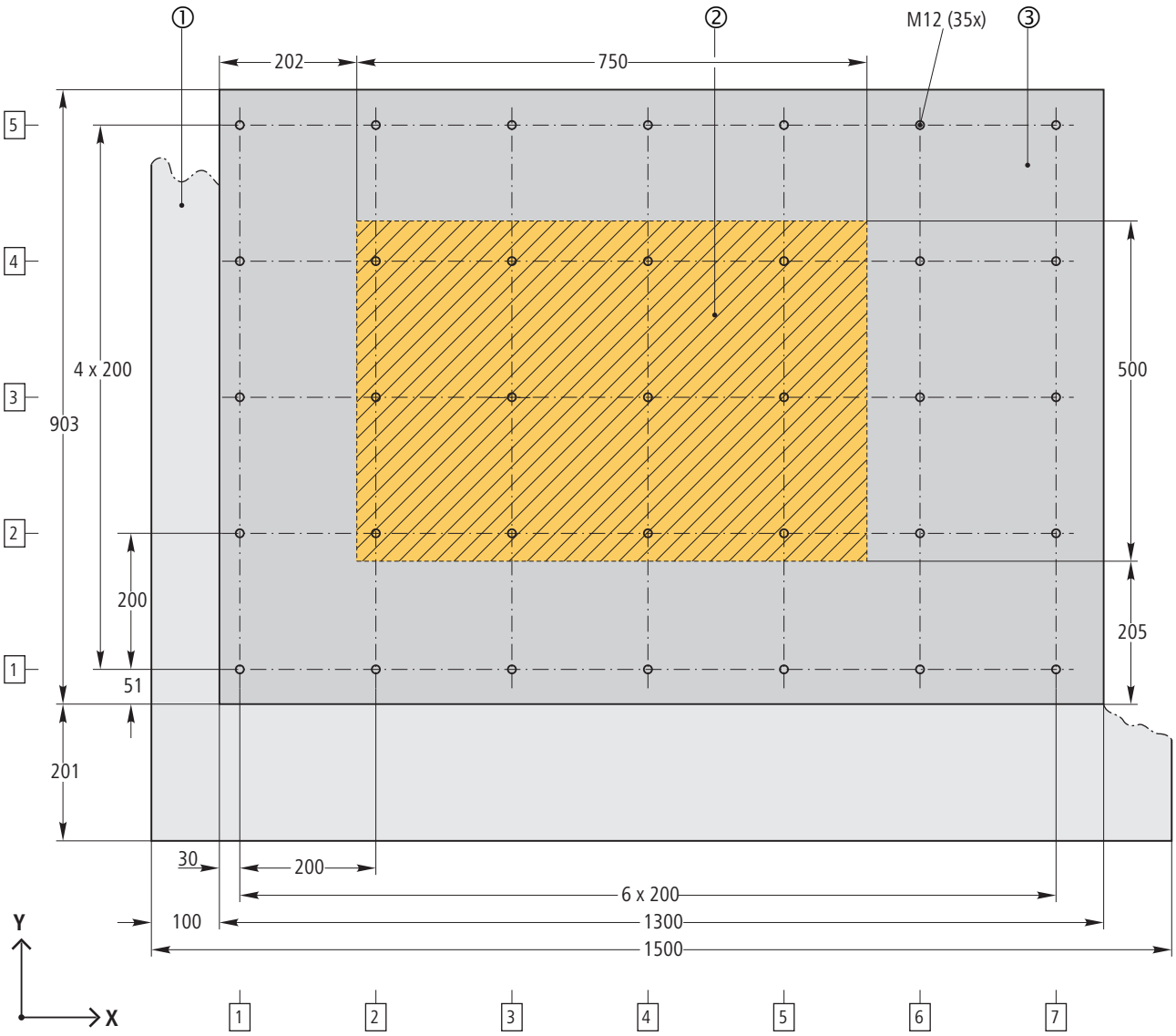
NOTE

The tolerances must not be exceeded.

Floor load	Value
Mean surface pressure on the 3 support surfaces.	30 N/cm^2
Determined from CMM weight and maximum permissible workpiece weight distributed over the 3 support surfaces.	

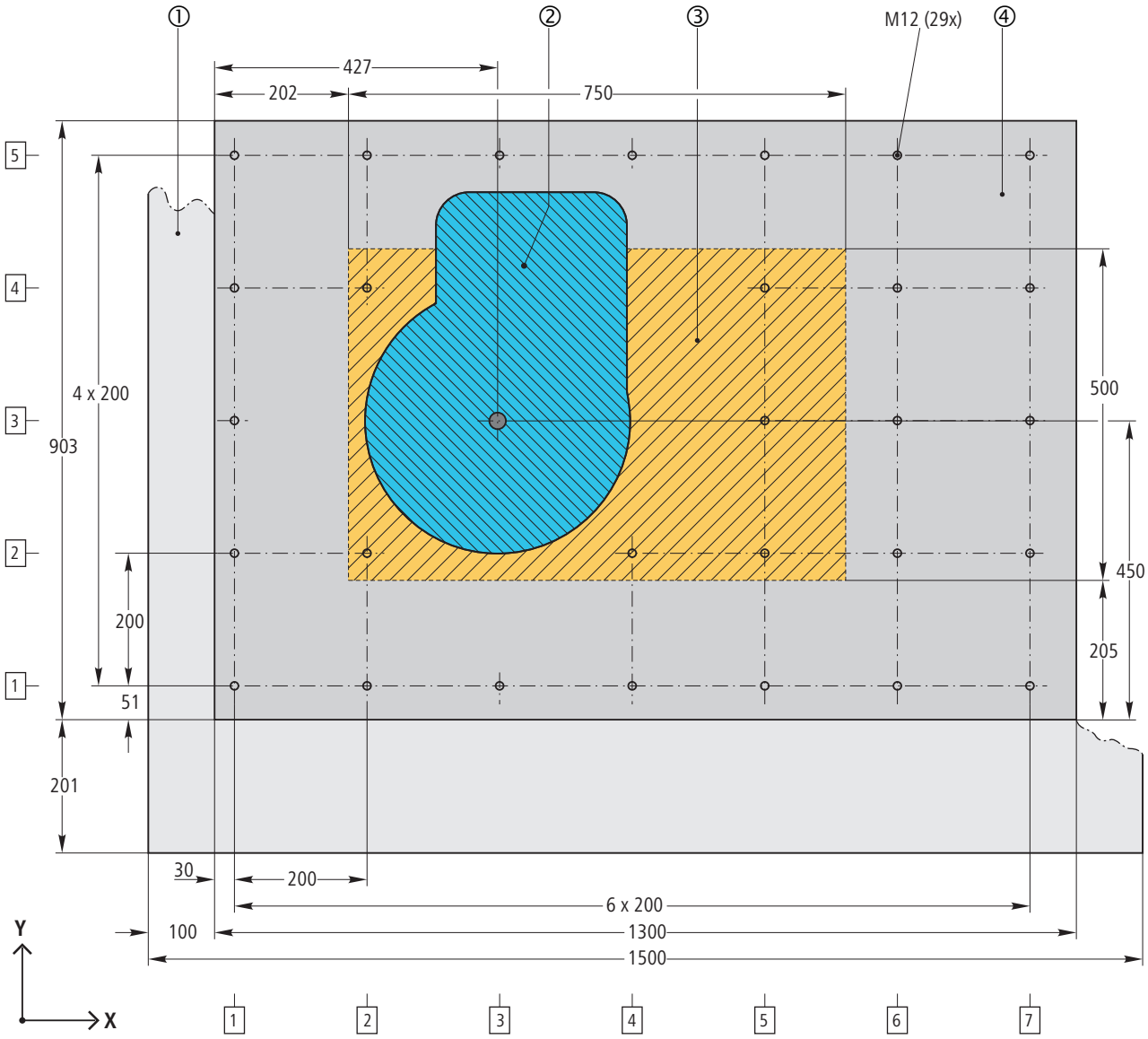
Table dimensions and position of the mounting holes

GageMax standard measuring plate with threaded holes



X X grid position
Y Y grid position
1 GageMax outer edge
2 Measuring range
3 Table with mounting holes

GageMax measuring plate with rotary table and threaded holes

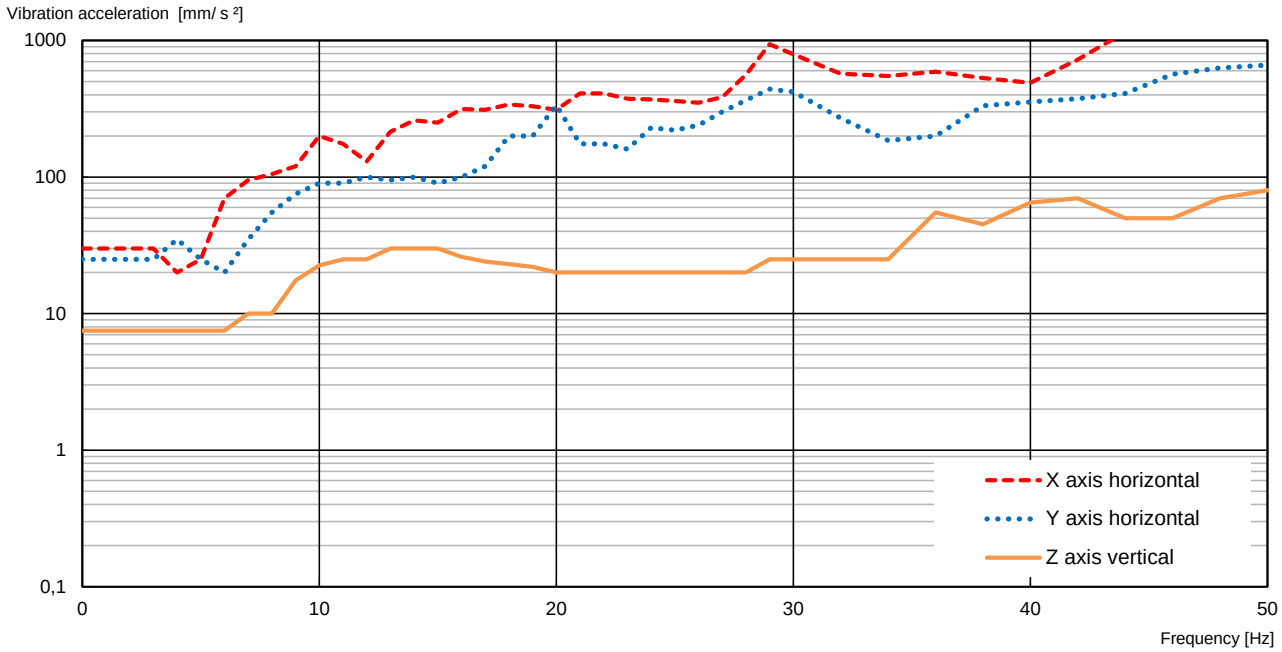


X X grid position
Y Y grid position
1 GageMax outer edge
2 Rotary table area and position of center of the rotary table (option)
3 Measuring range
4 Table with mounting holes

Limit curves of permissible floor vibrations at the installation site

Permissible foundation acceleration for GageMax

Note: Acceleration values above the corresponding curve require an additional foundation.



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