

CONTURA G2

Measuring Center

Coordinate Measuring Machine (CMM)
Located in room B1178 ME

Contacts: Erick Oberstar <oberstar@wisc.edu>
and Frank Pfefferkorn
<frank.pfefferkorn@wisc.edu>



1. Selection of Installation Site and Installation Conditions

When selecting the installation site, please make sure that the following conditions either already exist or can be implemented there.

The system comprises the following components:

1. Coordinate measuring machine
2. Controller
3. Control console
4. Data station (peripherals)

1.1 Required Room Height

This dimension equals the sum of the height of the coordinate measuring machine and a minimum overhead clearance of 200 mm.

Example: Contura G2

| | |
|--------------------------------|---------|
| Height of CMM | 2800 mm |
| Minimum installation clearance | 200 mm |

Required minimum room height above floor or foundation **3000 mm**

1.2 Required Floor Surface

A cutout layout plan is included in this brochure to give you a quick overview of the required floor surface. When preparing the space assignment plan, make sure that your CMM is well accessible from all sides.

Please select the installation site so that there is a distance of at least 800 mm between the CMM and the wall.

1.3 Transport Lanes

Please check the ground-floor and upper-storey floor loading capacity of all transport lanes leading to the installation site. The doorways must be at least 5 cm wider and higher than the largest packaged unit, including the transport vehicle. The dimensions and weights of the transport units are specified in this brochure.

1.4 Ambient Conditions

Bridge-type coordinate measuring machines are high-tech products. Their specified quality is attainable only if you ensure that the following conditions are met.

Permissible Storage Temperature Range

5°C to 40°C

Pay special attention to the storage temperature during winter. Avoid storing at temperatures below 5°C.

Ambient Conditions for Operational Readiness

Permissible ambient temperature: +17°C to +35°C

Permissible air humidity:

40% - 60% without condensation

Sound level at installation site: <90dB

Max. altitude above sea level: for 100 - 125 V 3000 m
for 220 - 240 V 2000 m

Temperature Conditions for Operation of CMM:

The measuring uncertainty specified for your CMM can be guaranteed if:

1. you use a measurement correction program and enter the workpiece and CMM temperatures as well as the temperature expansion coefficients of the workpiece material.
2. the following temperature conditions are observed:

| CMM Type | Temp. Range (°C) | Temperature Gradient | | |
|---------------------------|------------------|----------------------|----------------|--------------|
| | | per hour (°K/h) | per day (°K/d) | per m (°K/m) |
| CONTURA G2 | 18 - 22 | 1.0 | 1.5 | 1.0 |
| CONTURA G2 HTG (optional) | 18 - 26 | 1.0 | 1.5 | 1.0 |

Please make sure that sufficient lighting is available.



The use of sources of heat near the CMM must be avoided wherever possible.

1.5 General Protective Measures

The CMM must be protected against dirt and foreign particles (e.g. casting sand, metal filings and bore chips, oil, coolants, lubricants and soot). Deposits of materials such as casting sand and swarf may lead to increased expenses for cleaning and maintenance.

1.6 Vibrations at the Installation Site

The following diagram(s) show(s) the permissible floor vibrations.

Vibrations are often caused by heavy processing machinery, transport vehicles (cranes or stackers) and stamping or forging machines located in adjacent rooms.

A measurement is required to determine the actual magnitude of local floor vibrations. You can order such a vibration analysis from Carl Zeiss Oberkochen. Please call or e-mail your contact person for more details.

In any case, the results must be made available to CZO for evaluation.

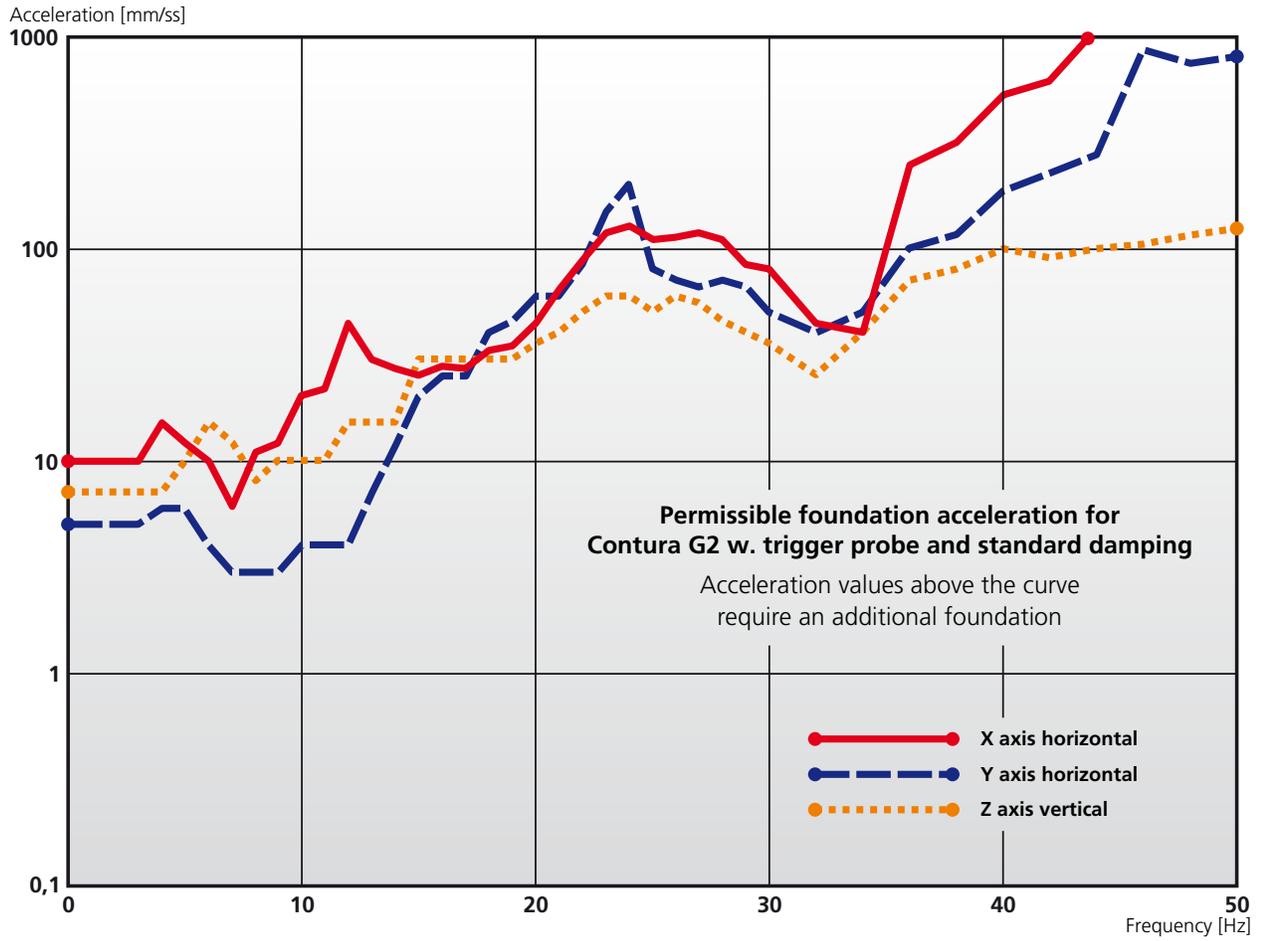
1.7 Floor Load

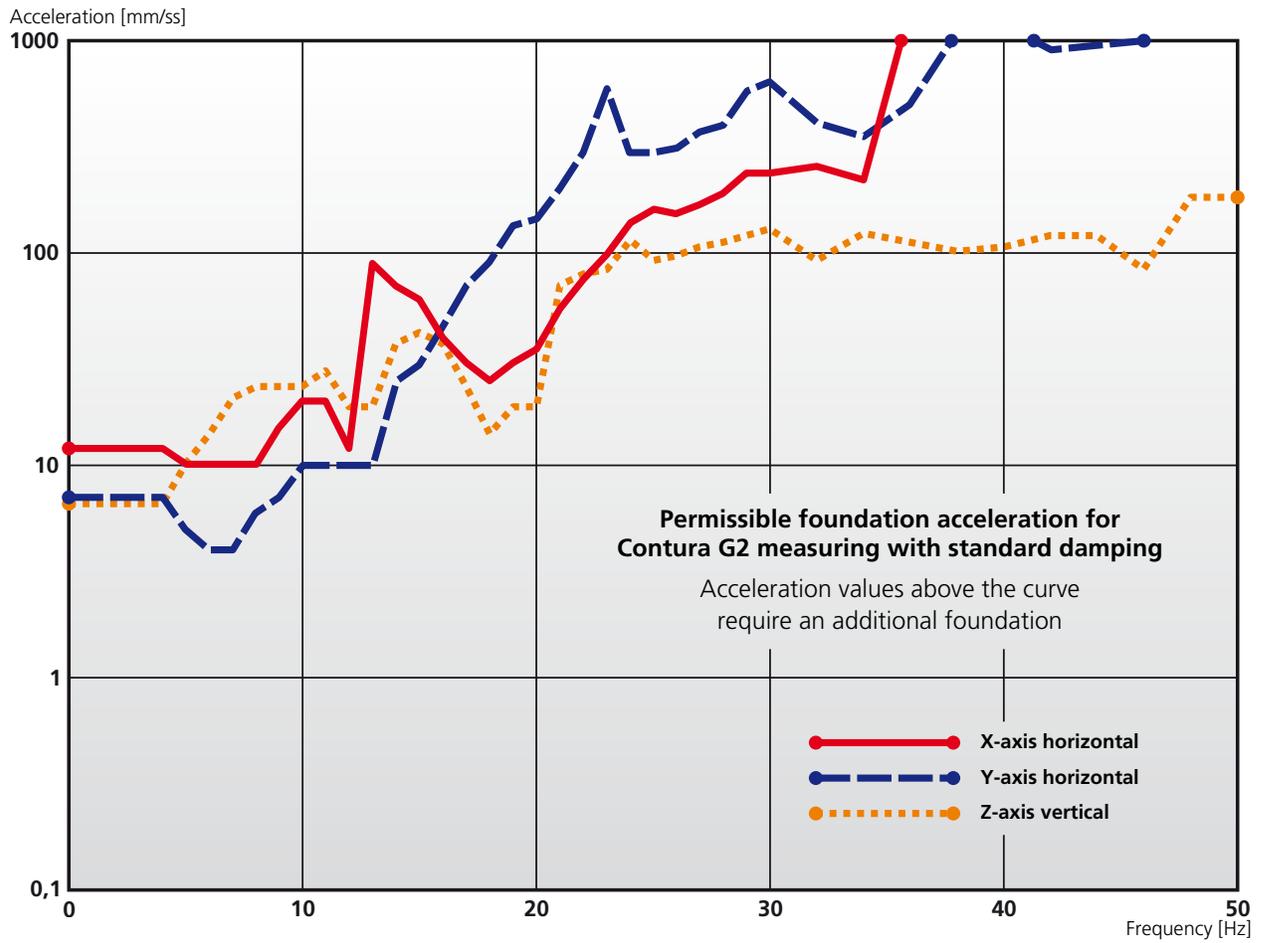
When calculating or planning any floor reinforcement (foundation etc.) which may be required, it is advisable to



consult a statics engineer who is familiar with your local floor conditions. To determine the floor load exerted by

the CMM, see the pertaining information in this brochure.





2. Preparation for installation/Required connections/Transport/Storage

The following preparations must be made prior to the installation date:

2.1 Preparing the Floor Surface

The floor surface must be clean and the unevenness of the bearing surfaces must not exceed max. 25 mm.

2.2 Electric Power Supply

We recommend connecting the system to a power source which does not supply electricity to peak-load or high-consumption equipment (elevators, air conditioning systems). Due to the possibility of negative influences, avoid installing the CMM near

- **High-consumption equipment**
(e.g. welding machines)
- **High-interference (EMI) equipment**
(e.g. electron discharge machines).

The use of mobile telephones or walkie talkies within a radius of 3m surrounding the CMM is also prohibited. This precaution is necessary to prevent malfunctions, **especially in connection with data processing systems.**

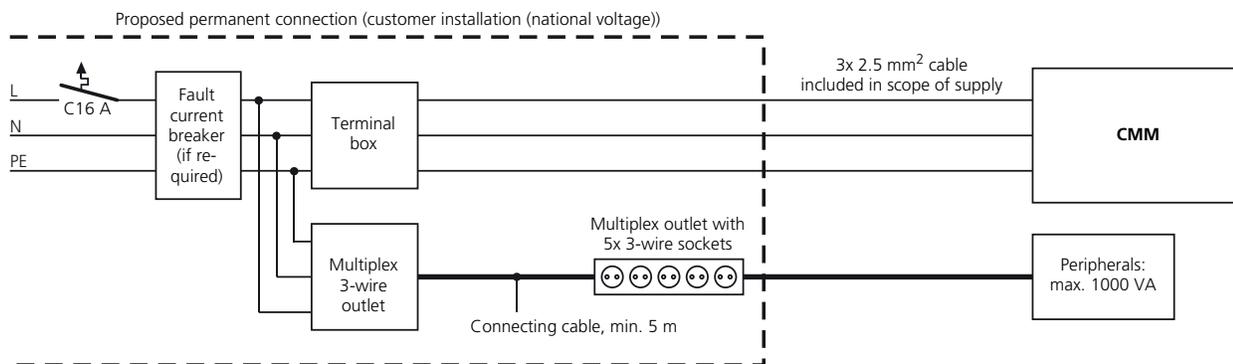
A permanent connection (max. 16A) must be provided for the system. Alternatively, a 3-wire CEE-form plug connection is also acceptable. A 5-plug multiplex outlet must be provided by you (the customer) for the data station. We recommend the on-site installation of a surge arrester, e.g. Phoenix Flashtrab FLT 25-400, as basic protection against surge voltage.

We recommend making the connection as shown in the following drawing, **taking into account that all pertaining national regulations also must be observed.**

2.3 Electric Power Supply Parameters

To ensure trouble-free data transmission between the

Connection diagram



CMM and the data station, the line power supply must comply with the following specifications.

Line power supply:

- **Line voltage:**
1/N/PE 100/110/115/120/125/230/240 VAC
- **Max. voltage fluctuations:** $\pm 10\%$
- **Frequency:** 50 or 60 Hz
- **Max. frequency fluctuations:** $\pm 3.5\%$
- **Max. power sag:** 10 ms
(Max. one half-wave may be missing at 50 Hz)
- **Interference peaks**
Max. rise time at 5 ns: ± 500 V
Max. rise time at 50 μ s: ± 1000 V

Max. amount of heat generated:

3600 kJ/h

Max. total power requirement:

CMM: max. 1000 VA

Peripheral workstation: max. 1000 VA

2.4 EMC

EN 61326-1 Appendix A, Class A

Warning !

This is a class A device, and may therefore cause radio interference in the surrounding area. In such cases, the operator may be required to take appropriate action and bear any costs thus incurred.

2.5 Stabilizing the line voltage

If out-of-tolerance r.m.s. fluctuations of the nominal voltage briefly occur, a line analysis must be performed. Please contact us if you have such a requirement. We will be glad to advise you and suggest suitable measures. In most cases, it is sufficient to install a separate stub cable from the main distributor to the CMM.



2.6 Machine parameters

- **Overvoltage category:** III
- **Pollution degree:** 2
- **Protection class:** 1

2.7 Teleservice

You will require an Internet connection for Teleservice. For more details, please refer to the "**Teleservice**" brochure.

2.8 Compressed Air Supply

Please make sure that the air pressure required to operate your CMM is available as described below:

- Minimum pressure 6 bar, max. pressure 10 bar.
- Prefiltered air; completely free of contaminating particles, oil vapors and water residues.
- Air quality in compliance with ISO 8573 Part 1 Classification 4, which includes:
 - Par. 6.1: Max. particle size 15 μm , max. dirt particle concentration 8 mg/m^3
 - Par. 6.2: Max. compressed air dew point +3 $^{\circ}\text{C}$
 - Par. 6.3: Max. oil concentration of 5 mg/m^3

If the above air quality is not attained, it may be necessary to add an additional downstream air filtration unit and, in some cases, a membrane dryer to the compressed air line of the CMM. These units can be ordered from CZ. Please ask your contact person for more information.



Note! Failure to comply with the above air quality specifications could result in damage not covered by your warranty.

Air consumption of CMM:

Max. 30 l/min at 5 bar (150 normal liters/min at 1 bar)

Connecting point for compressed air

A connection with a compressed air coupling for a 1/4" NPT plug-in fitting is required to connect the machine to the compressed air supply. This connection must be provided by you as illustrated in the section entitled "**CMM installation dimensions and arrangement of the steel plates**". A compressed air hose with a 1/4" NPT plug-in fitting (included in the scope of supply) must be laid and connected during installation.

When laying the connection up to the CMM, make sure that the connecting parts are readily accessible and are not obstructed by the base of the CMM.

2.9 Transport Vehicles

Please provide a forklift with sufficient carrying capacity and fork length to unload the packaged units and transport them to the storage or installation site. The loading capacities required of these vehicles are specified on the following pages.

All transport lanes and approaches should be kept open during the entire installation and startup period to help ensure trouble-free installation.

The transport locks and braces on the CMM, pallet (*shipping crate*) and lashing straps must be returned to CZ.



Note! Packing materials such as e.g. foils or styrofoam chips ("popcorn") are recycled by Carl Zeiss and should be returned to CZ along with the transport stops and braces if they are clean and no dirt has been mixed in with them.

2.10 Unloading/Storing/Unpacking

With outdoor temperatures below 0 $^{\circ}\text{C}$, CMM assemblies with granite guideways are not enclosed in a protective PVC bag, but sealed air-tight along with a drying agent in an aluminum-coated foil (insulated packaging).

Unloading and transport must be performed only with transport lugs or pallets. **Be careful not to damage the insulated packaging!** Please remember that your CMM is a valuable, high-precision instrument. For this reason, you should avoid jolting or knocking the crate at all times.

Please leave the crates packed and store them in a sheltered location as close as possible to the installation site.

Adaptation to room temperature:

Store the crates in a room with a minimum ambient temperature of 15 $^{\circ}\text{C}$ at least 2 days before our system specialist arrives. The crates may be unpacked and the insulated packaging may be removed only by our system specialist! Please also make sure that a place suitable for depositing the empty containers is provided.

2.11 Moving the CMM to another location



Note! A system specialist should always be present when moving the CMM to another location as a precaution to ensure that it is not damaged.



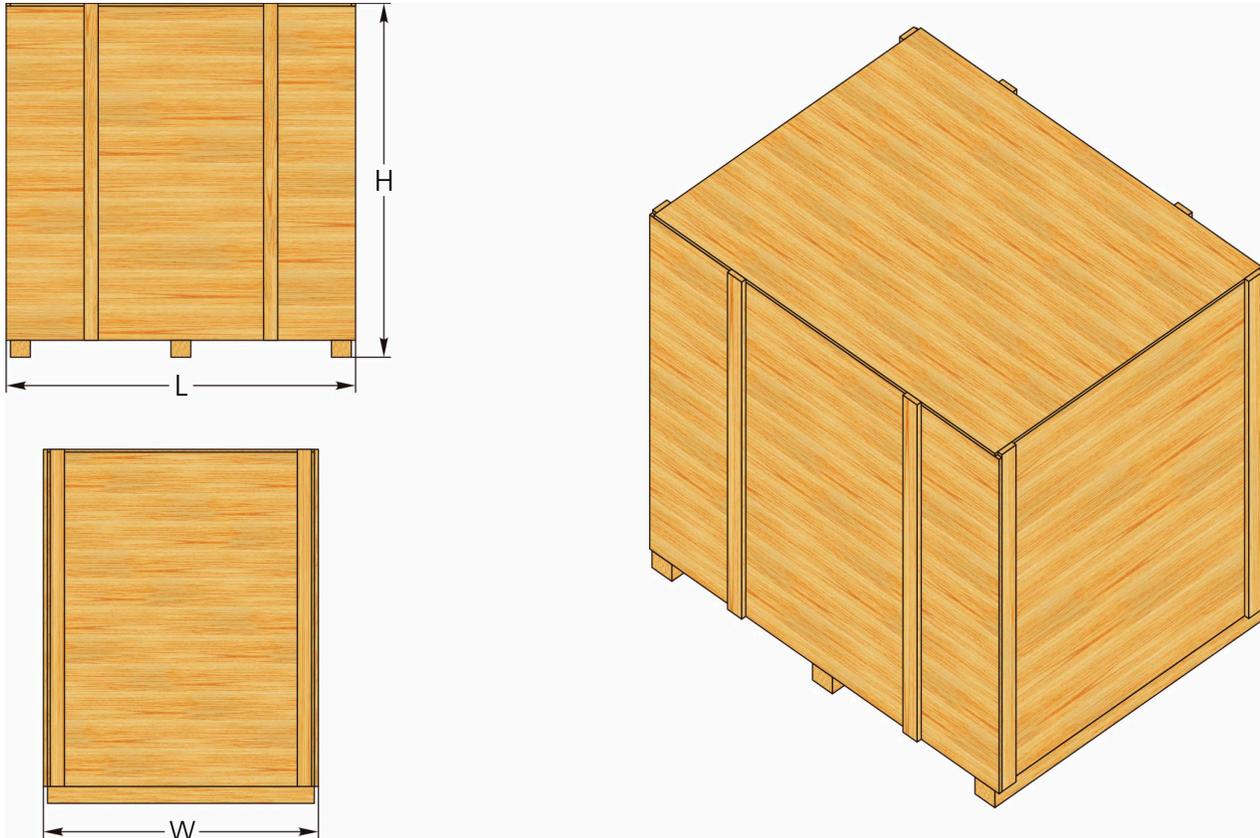
3. Shipping Crates and Pallets

3.1 Dimensions and Weights



The machine components are delivered on transport pallets with insulated packaging. They are delivered in a shipping crate only for air cargo and overseas shipments.

Note!



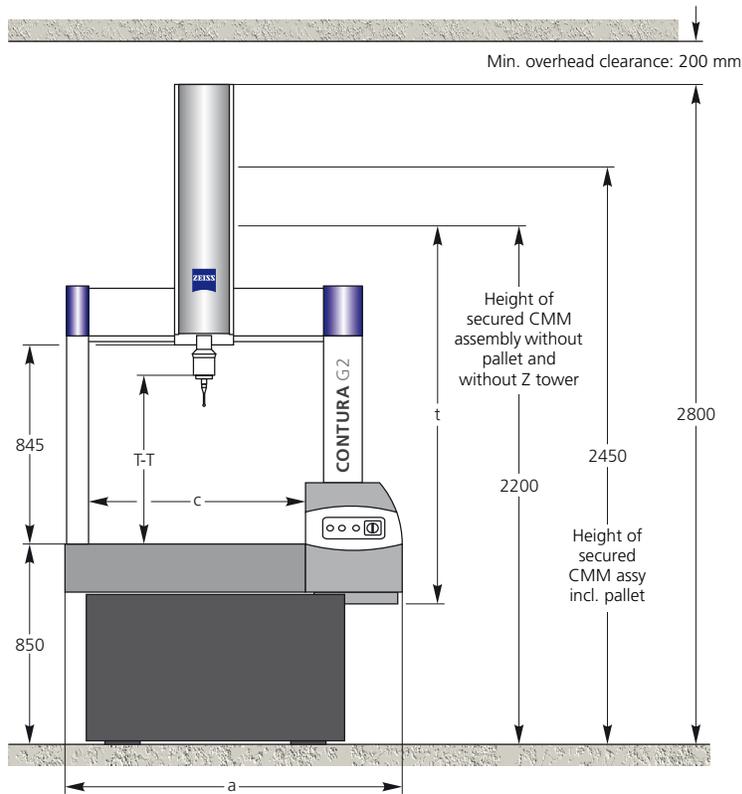
| Shipping crate for | Crate dimensions in mm (max.) | | | m ³ | Max. tare wt. (kg) | | Max. gross wt. (kg) | |
|--|-------------------------------|------|------|----------------|---------------------|--------------|------------------------|-------------------|
| | L | W | H | | Sea/air cargo crate | Truck pallet | w. sea/air cargo crate | with truck pallet |
| CONTURA G2 | | | | | | | | |
| X=700, Y=700, Z=600 | 2820 | 1960 | 2515 | 13.9 | 696 | 407 | 1986 | 1692 |
| X=700, Y=1000, Z=600 | 2820 | 1960 | 2515 | 13.9 | 696 | 407 | 2236 | 1951 |
| X=1000, Y=1200, Z=600 | 2870 | 2265 | 2515 | 16.4 | 883 | 545 | 3176 | 2851 |
| X=1000, Y=1600, Z=600 | 2870 | 2265 | 2515 | 16.4 | 883 | 545 | 4016 | 3358 |
| X=1000, Y=2100, Z=600 | 3280 | 2265 | 2515 | 18.7 | 826 | 540 | 5997 | 5625 |
| CONTURA G2 (opt. granite U-profile) | | | | | | | | |
| Upper part, X=1000, Y=1200, Z=600 | 2870 | 2265 | 2515 | 16.4 | 852 | 555 | 3092 | 2795 |
| Upper part, X=1000, Y=1600, Z=600 | 2845 | 2110 | 2515 | 15.1 | 958 | 727 | 3602 | 3372 |
| Upper part, X=1000, Y=2100, Z=600 | 3330 | 2110 | 2515 | 17.7 | 987 | 761 | 6084 | 5857 |
| CONTURA G2 (opt. granite U-profile) | | | | | | | | |
| Base, X=1000, Y=1200, Z=600 | 1805 | 1755 | 765 | 2.5 | 164 | 60 | 284 | 180 |
| Base, X=1000, Y=1600, Z=600 | 2210 | 1755 | 765 | 3.0 | 171 | 76 | 304 | 209 |
| Base, X=1000, Y=2100, Z=600 | 2515 | 1755 | 740 | 3.3 | 209 | 64 | 394 | 249 |
| Pal box with accessories | 1475 | 1070 | 1095 | 1.8 | 69 | | 206 | |
| Controller | 1100 | 1100 | 1100 | 1.4 | 90 | | 227 | |

Note: All values specified above are maximum values. Any values not entered were not available at the time of printing. For **technical reasons** the dimensions of the shipping crates (L, W and H) may deviate from the values specified here **by as much as +50 mm**.



4. CMM Installation Dimensions and Arrangement of Steel Plates

4.1 Installation Dimensions for CONTURA G2 (all dimensions in mm, scale 1:30)

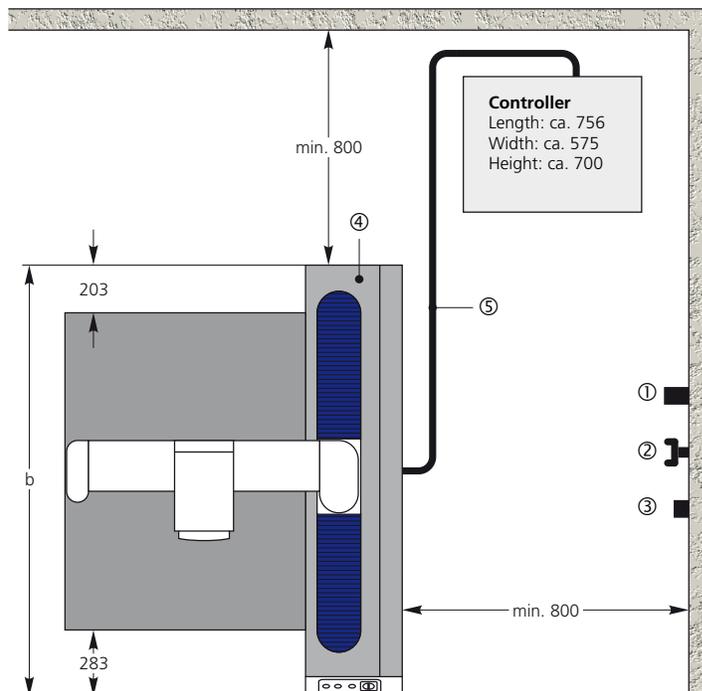


CONTURA G2

| X/Y/Z measuring range | Net weight of CMM | Max. permissible workpiece weight |
|-----------------------|-------------------|-----------------------------------|
| 700/700/600 | ca. 1280 kg | 560 kg |
| 700/1000/600 | ca. 1550 kg | 730 kg |
| 1000/1200/600 | ca. 2310 kg | 1150 kg |
| 1000/1600/600 | ca. 2810 kg | 1500 kg |
| 1000/2100/600 | ca. 5171 kg | 1814 kg |

T-T = Distance between table and bottom of probe

| | |
|--------------------------|-----|
| VAST _{XT} probe | 716 |
| RDS probe | 665 |



| X/Y/Z measuring range | Length - a - | Length - b - | Length - c - | Length - t - |
|-----------------------|--------------|--------------|--------------|--------------|
| 700/700/600 | 1430 | 1525 | 920 | 1603 |
| 700/1000/600 | 1430 | 1830 | | |
| 1000/1200/600 | 1743 | 2030 | 1225 | 1756 |
| 1000/1600/600 | 1743 | 2430 | | |
| 1000/2100/600 | 1743 | 2945 | | |

① = On-site air supply connection, precleaned compressed air supply with pressure of 6-10 bar.

② = Power supply (two outlets with max. 16 A) to be installed by the customer.

③ = Telephone connection (ISDN)

④ = CMM compressed air supply connection

⑤ = CMM ↔ control connecting cable

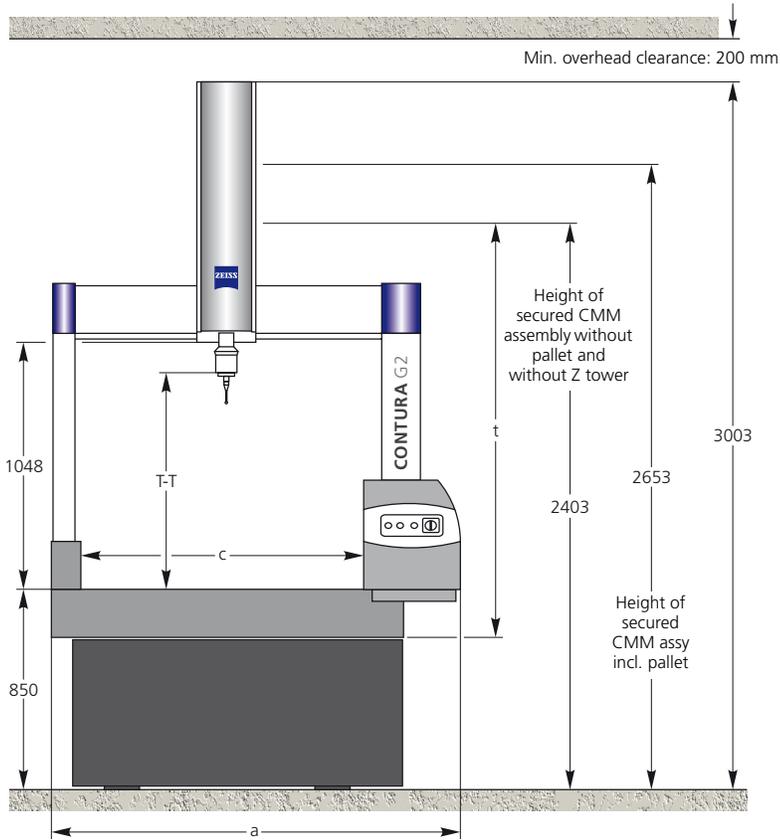
t = Transport height without base

CONTURA G2

| X/Y/Z measuring range | Max. cable leng CMM ↔ control ⑤ |
|-----------------------|---------------------------------|
| 700/700/600 | ca. 3700 mm |
| 700/1000/600 | ca. 3550 mm |
| 1000/1200/600 | ca. 6300 mm |
| 1000/1600/600 | ca. 6000 mm |
| 1000/2100/600 | ca. 5700 mm |



4.2 Installation Dimensions for CONTURA G2 with opt. U-profile (all dimensions in mm, scale 1:30)



CONTURA G2 with optional U-profile

| X/Y/Z Measuring range | Net weight of CMM | Max. permissible workpiece weight |
|-----------------------|-------------------|-----------------------------------|
| 1000/1200/600 | ca. 2583 kg | 1150 kg |
| 1000/1600/600 | ca. 3163 kg | 1500 kg |
| 1000/2100/600 | ca. 5755 kg | 1814 kg |

T-T = distance betw. table and lower edge of probe

| | |
|--------------------------|-----|
| VAST _{XT} probe | 919 |
| RDS probe | 868 |

CONTURA G2 with optional U-profile

| X/Y/Z Measuring range | Length - a - | Length - b - | Length - c - | Length - t - |
|-----------------------|--------------|--------------|--------------|--------------|
| 1000/1200/600 | 1743 | 2030 | 1200 | 1806 |
| 1000/1600/600 | 1743 | 2430 | | 1806 |
| 1000/2100/600 | 1743 | 2945 | | 1959 |

① = On-site air supply connection, precleaned compressed air supply with pressure of 6-10 bar.

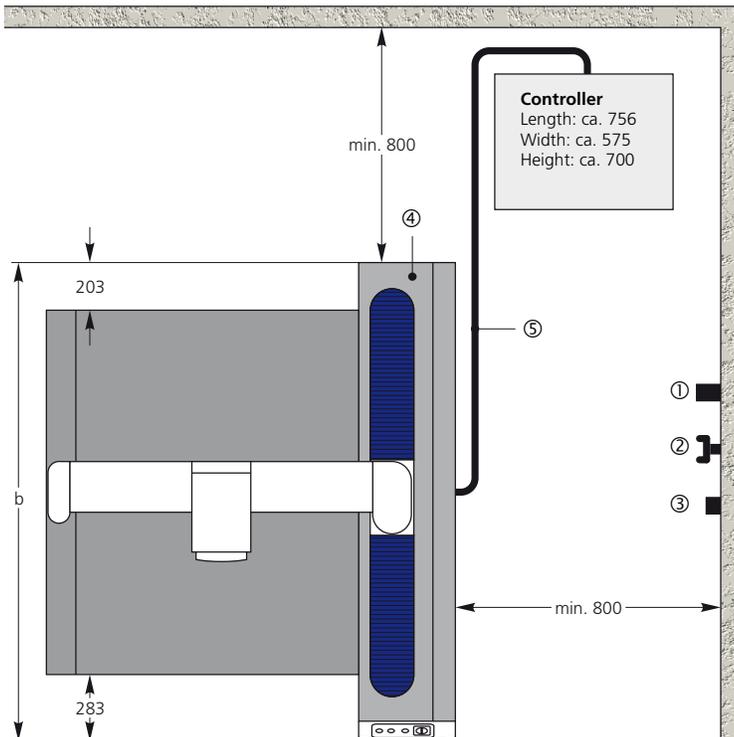
② = Power supply (two outlets with max. 16 A) to be installed by the customer.

③ = Telephone connection (ISDN)

④ = CMM compressed air supply connection

⑤ = CMM ↔ control connecting cable

t = Transport height without base



CONTURA G2

| X/Y/Z Measuring range | Max. cable leng. CMM ↔ control ⑤ |
|-----------------------|----------------------------------|
| 1000/1200/600 | ca. 6300 mm |
| 1000/1600/600 | ca. 6000 mm |
| 1000/2100/600 | ca. 5700 mm |



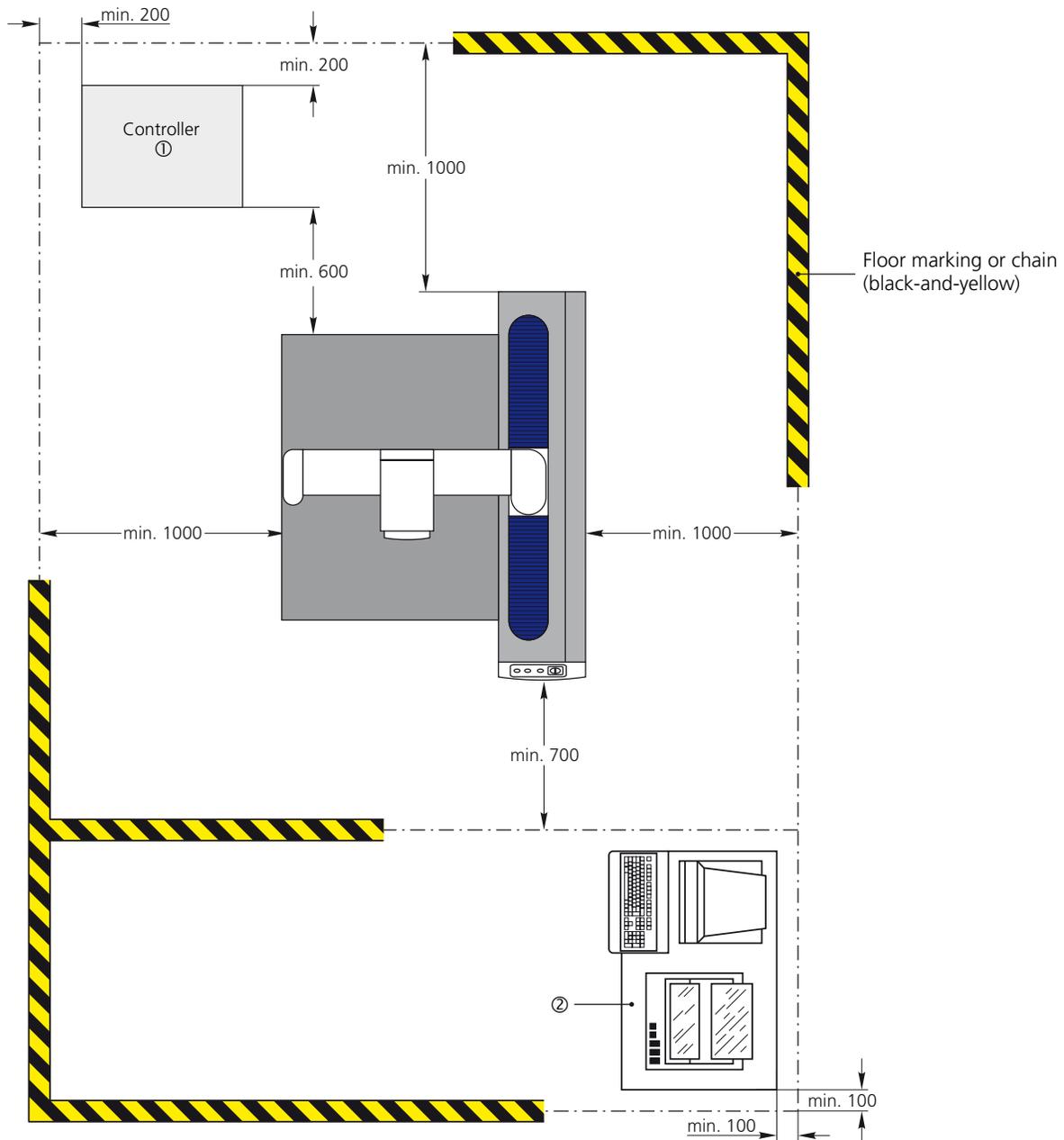
4.3 Installation of Floor Stripe or Chain

The dangers posed by the CMM are impossible - or at least difficult - for untrained personnel to recognize. For this reason, a restricted-access zone must be set up around the machine to prevent damage or injury caused by untrained personnel.

The entrance to this area should be clearly marked by a warning sign reading:

"Admittance only for authorized personnel"

and may be entered only by persons who have received proper training (operators).



Note!

① The back door of the controller cabinet must be located at least 200mm away from the wall. Moreover, the air exchange with the surrounding environment should not be blocked. The control cabinet should be placed so that the rear side of the controller always faces away from the CMM.

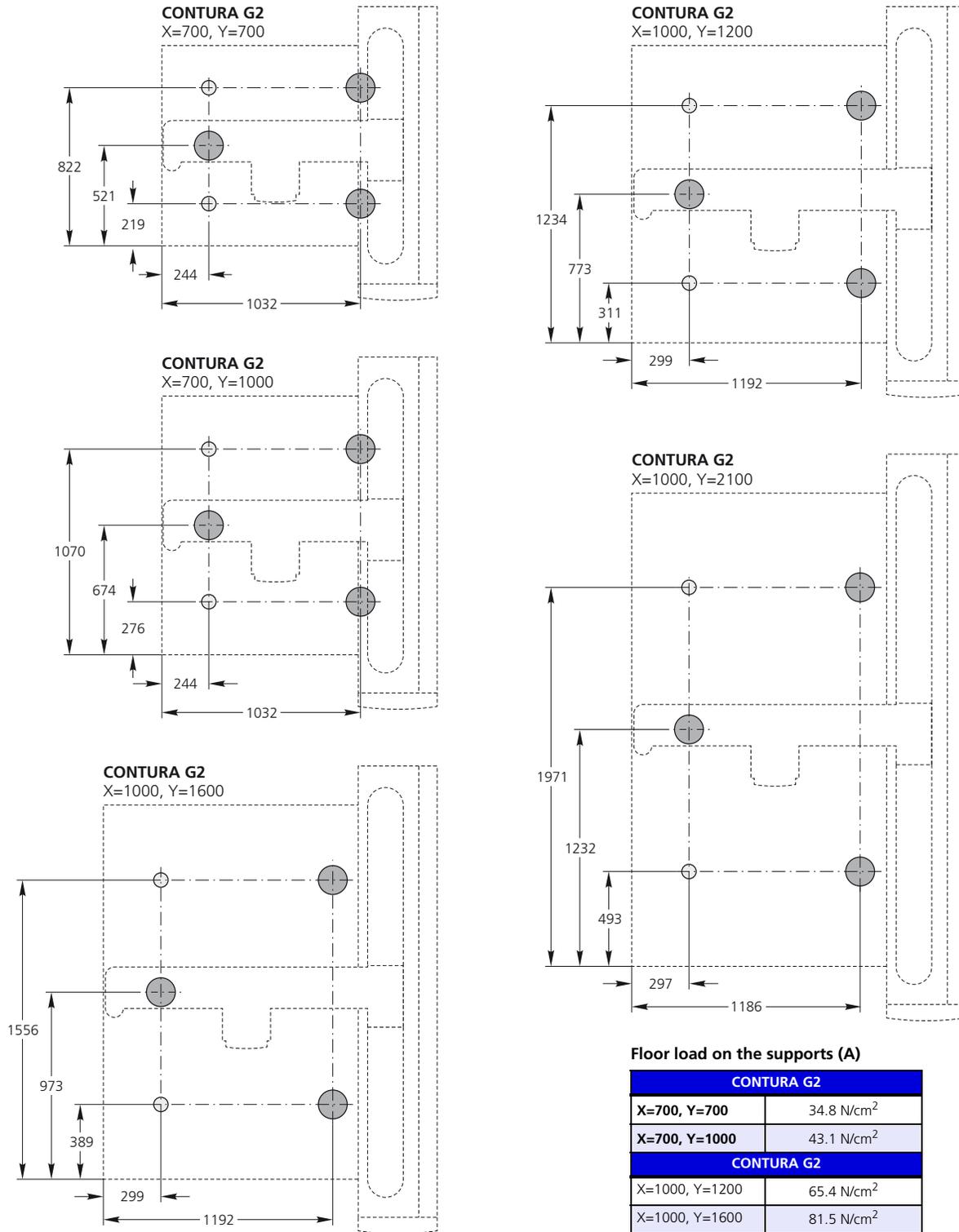
② CMM table (optional) with computer and printer



4.4 Arrangement of the Steel Plates for Contura G2

The relative unevenness of the bearing surfaces must not exceed max. 25mm (1").

The deviation tolerance for the center-to-center plate distance is (A) ± 10 mm (all dimensions in mm)



- **Support (A):** Cast iron plate \varnothing 150 (included in delivery)
- **Point of support** (tilt protection only)

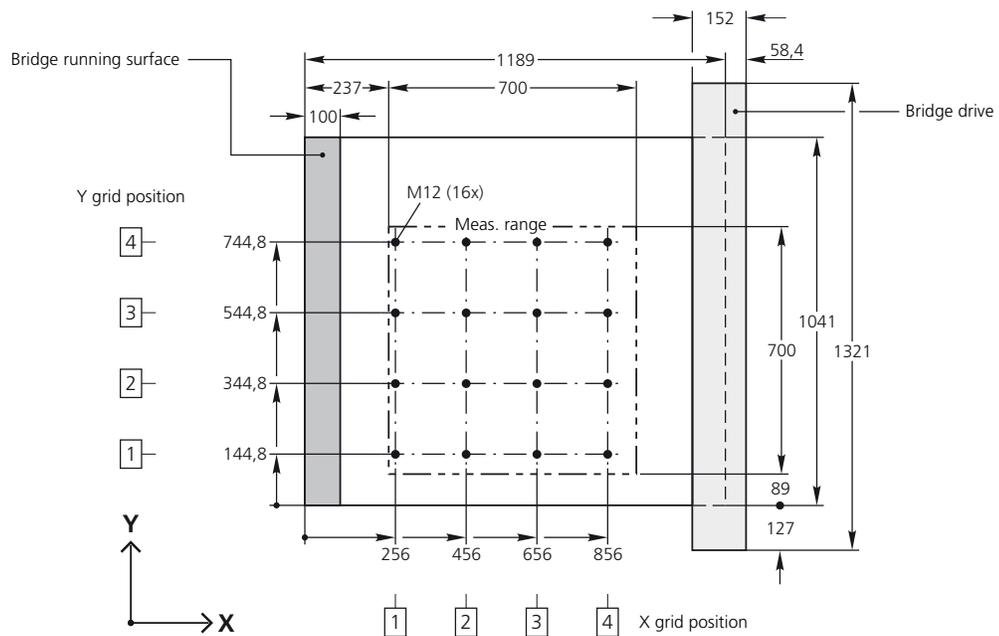
Floor load on the supports (A)

| CONTURA G2 | |
|--|-------------------------|
| X=700, Y=700 | 34.8 N/cm ² |
| X=700, Y=1000 | 43.1 N/cm ² |
| CONTURA G2 | |
| X=1000, Y=1200 | 65.4 N/cm ² |
| X=1000, Y=1600 | 81.5 N/cm ² |
| X=1000, Y=2100 | 132.1 N/cm ² |
| CONTURA G2 w. granite U-table (option) | |
| X=1000, Y=1200 | 70.6 N/cm ² |
| X=1000, Y=1600 | 88.2 N/cm ² |
| X=1000, Y=2100 | 143.1 N/cm ² |

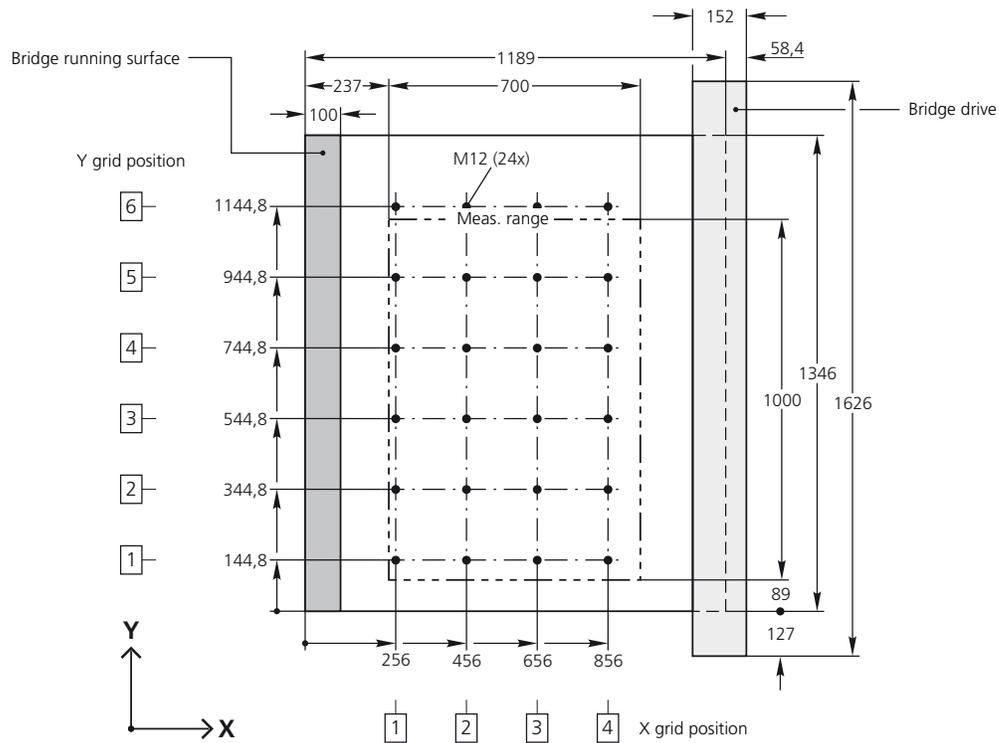


5. Dimensions of Granite Table and Fastening Hole Matrix

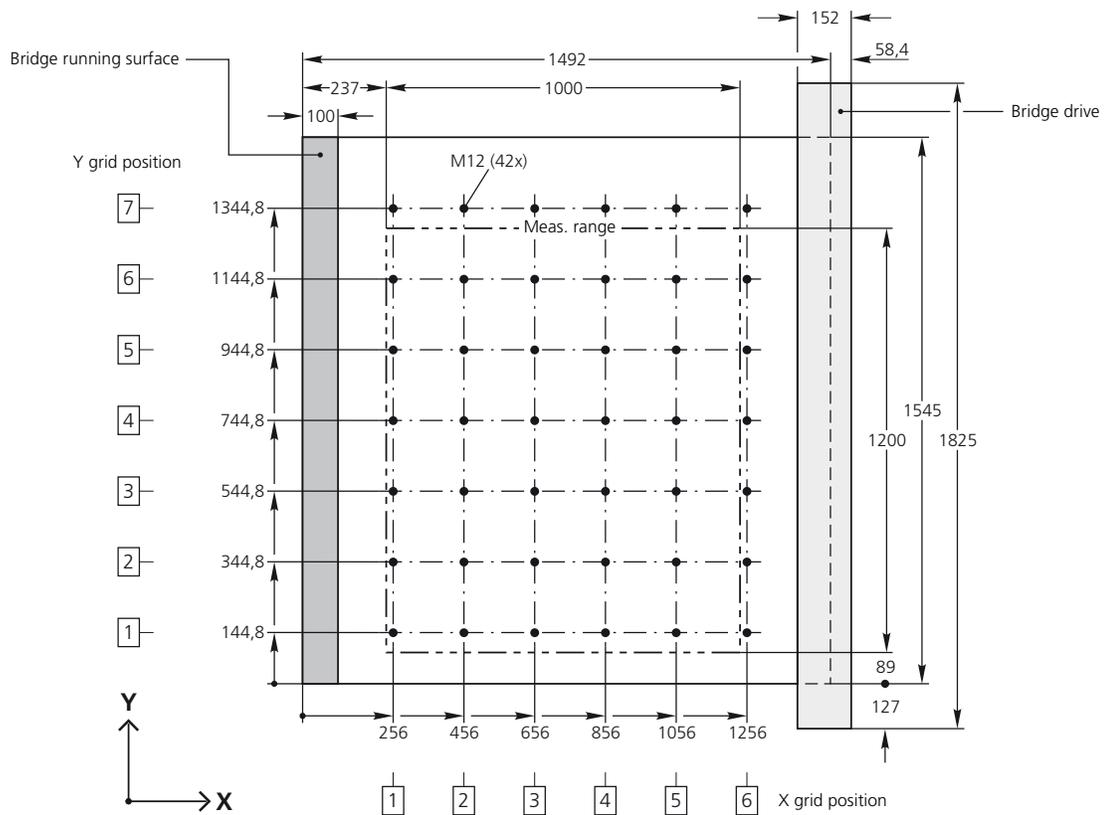
5.1 Measuring Table for Measuring Range of X=700, Y=700



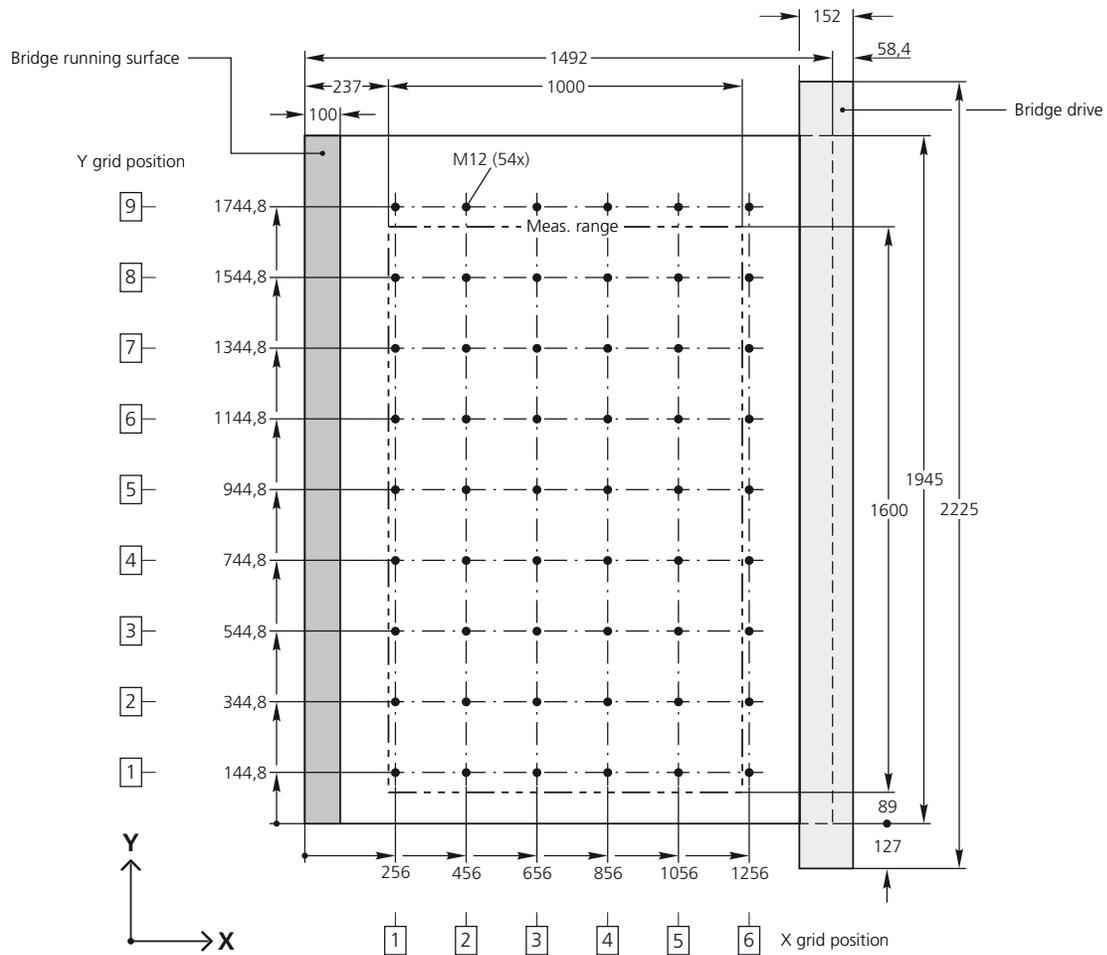
5.2 Measuring Table for Measuring Range of X=700, Y=1000



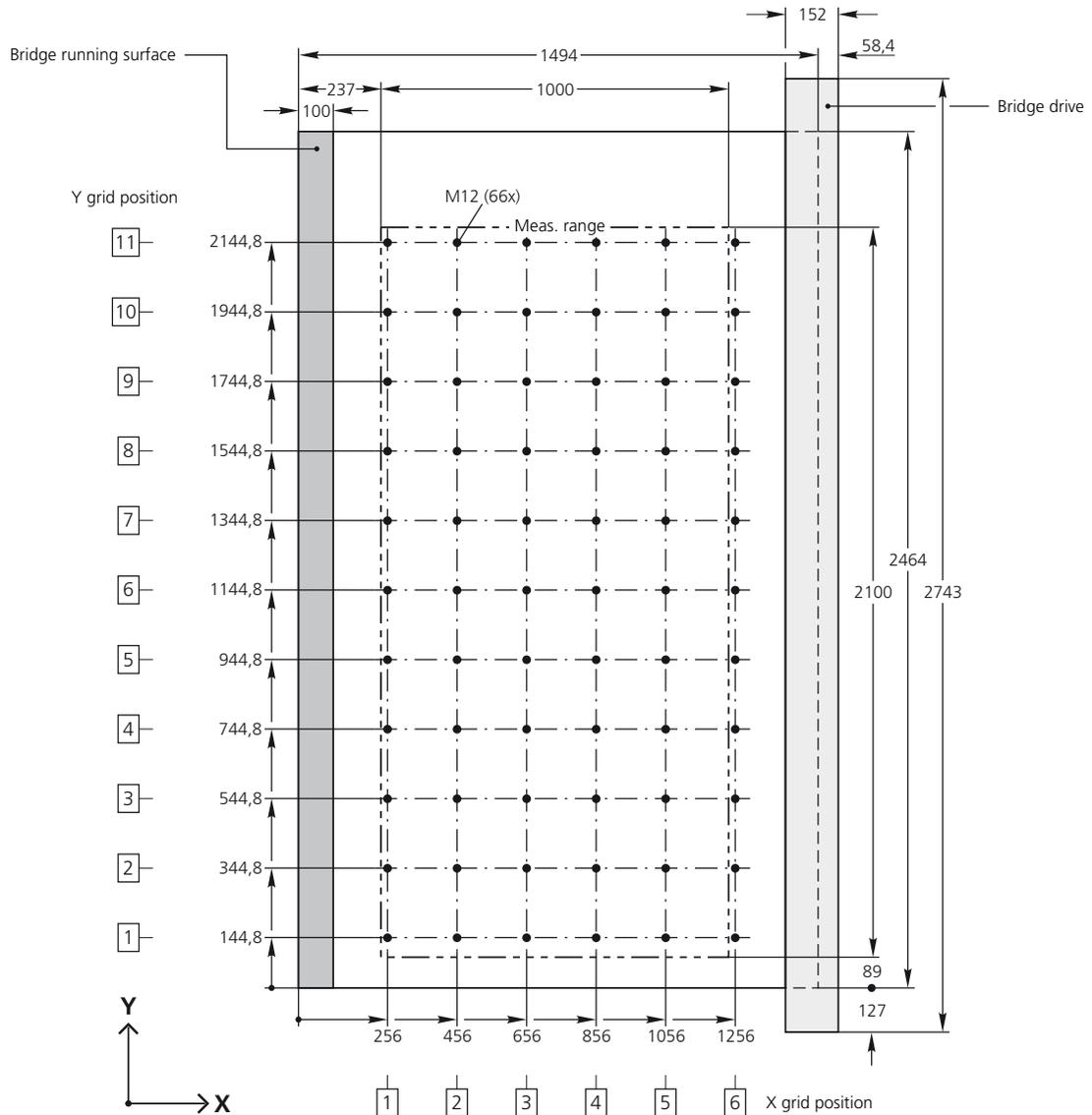
5.3 Measuring Table for Measuring Range of X=1000, Y=1200



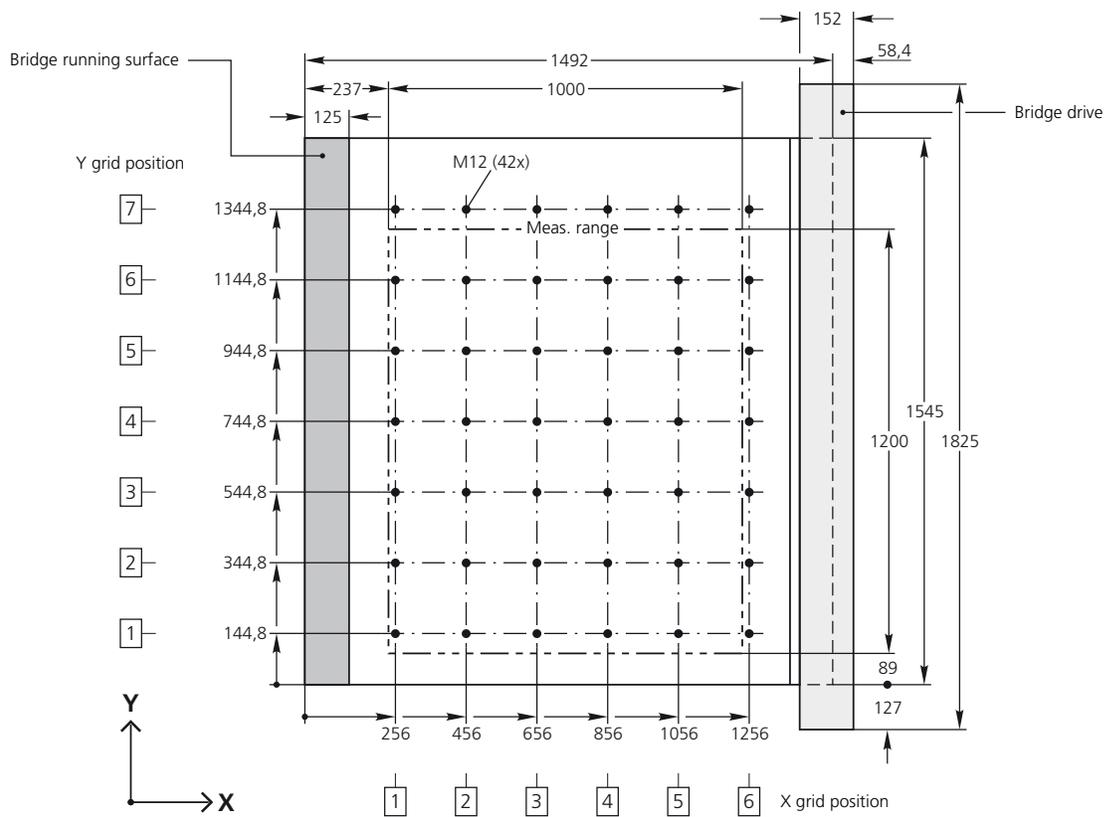
5.4 Measuring Table for Measuring Range of X=1000, Y=1600



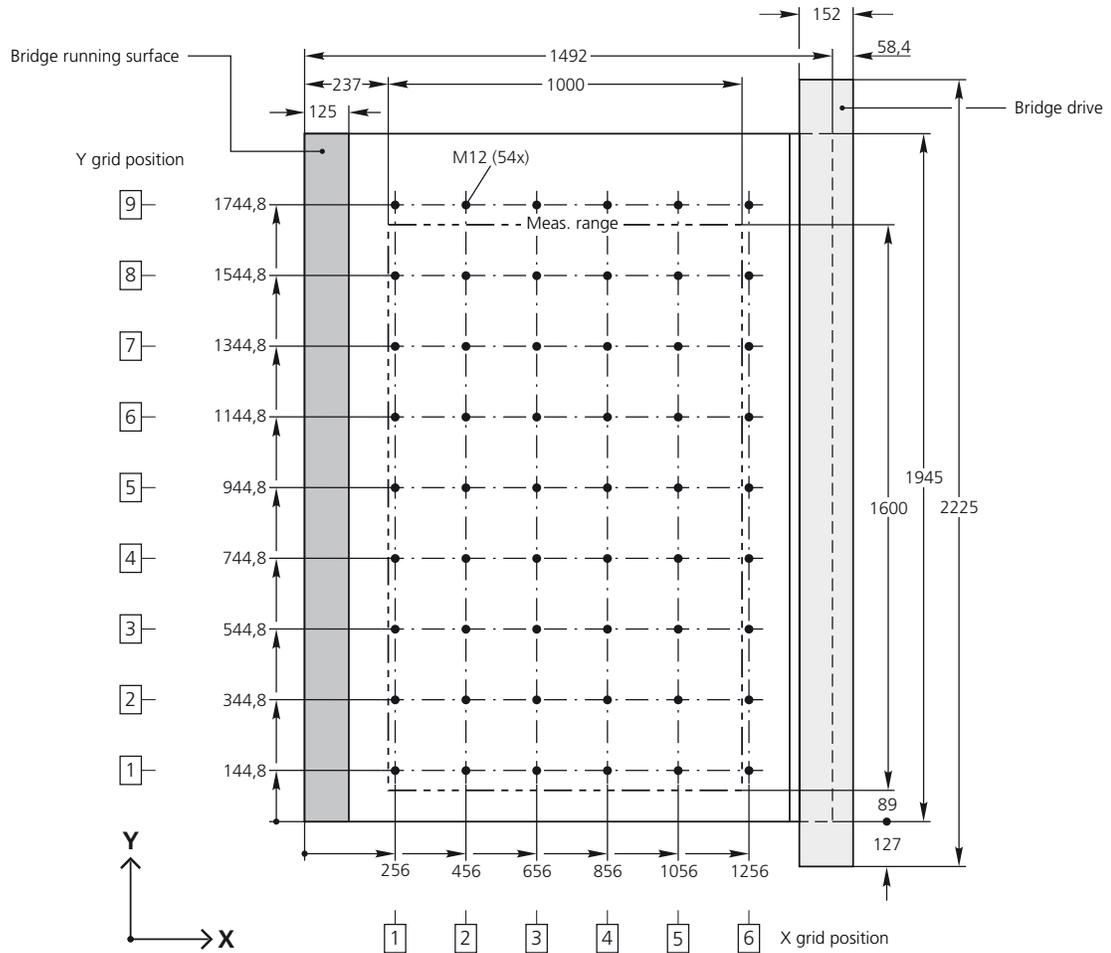
5.5 Measuring Table for Measuring Range of X=1000, Y=2100



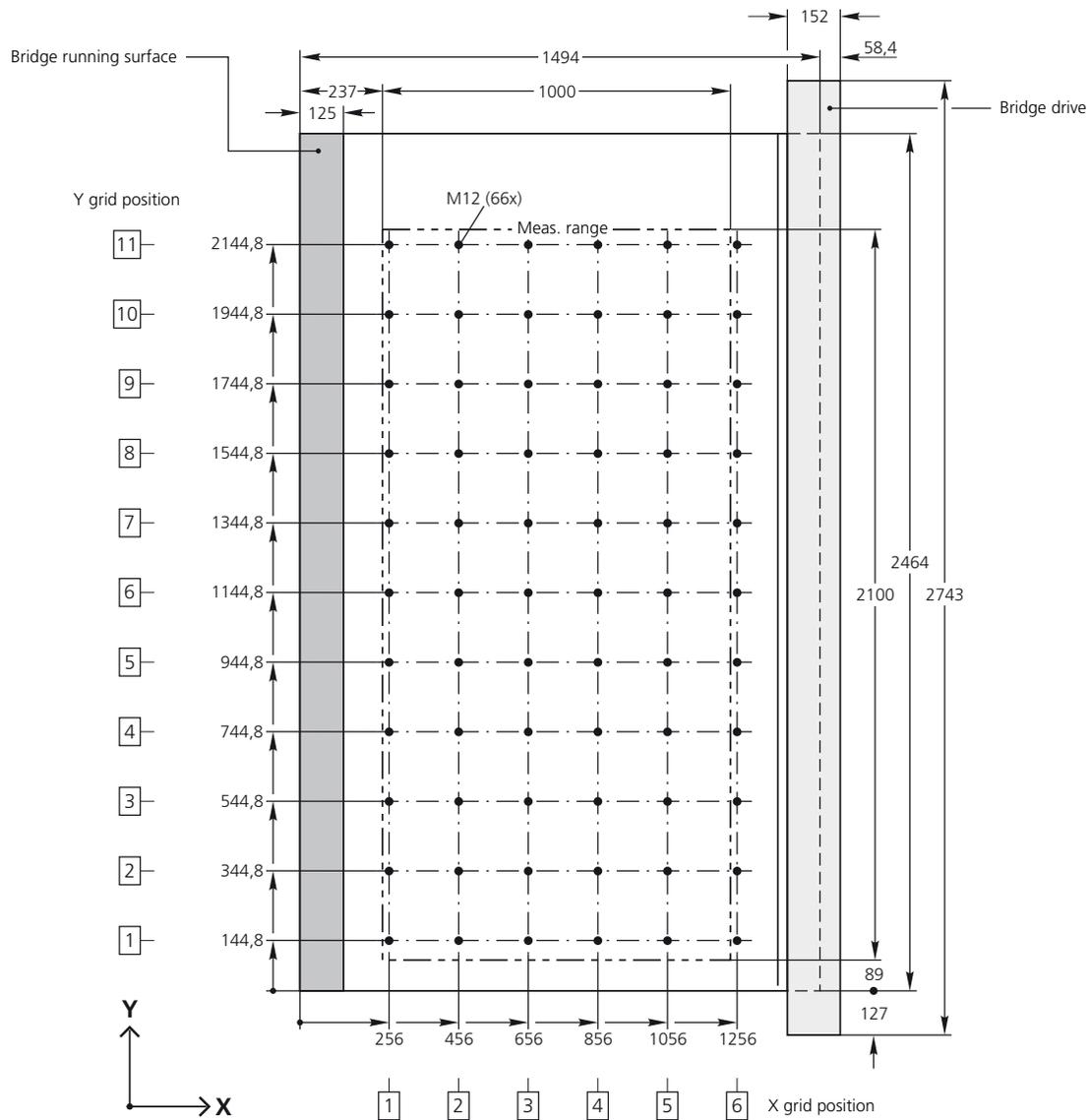
5.6 Measuring Table with U-Profile for Measuring Range of X=1000, Y=1200



5.7 Measuring Table with U-Profile for Measuring Range of X=1000, Y=1600



5.8 Measuring Table with U-Profile for Measuring Range of X=1000, Y=2100



6. Cutout Patterns for Customer Floor Plan

6.1 Cutout Patterns for Contura G2

Scale: 1:30

