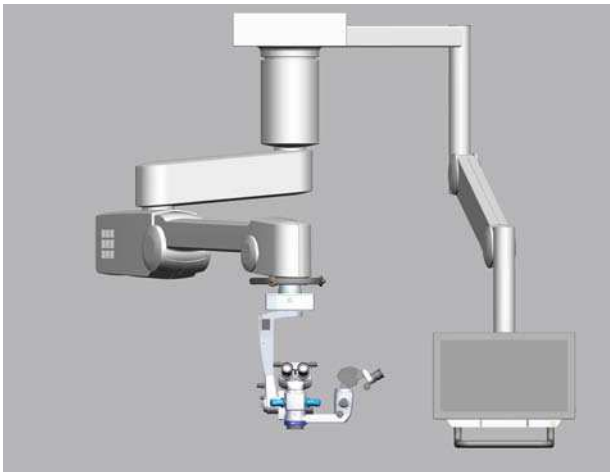
2 Installation requirements

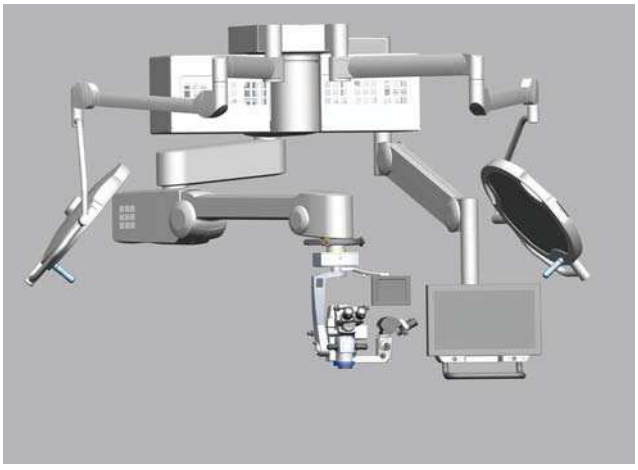
2.1 Structural analysis

2.1.1 Initial Forces and torques of the ceiling

Basic configuration	Force N	Torque Nm
	3900	3800



Maximum configuration	6900	7000



2.1.2 Interface arms

The ceiling unit can be equipped with more interface arms, for example for operating lights. Each arm can be loaded with the following maximum values:

Load per arm	Maximum torque 810 Nm

Weight of arm	Total weight 62 kg

Note: The forces of all arms to be installed have already been considered in the maximum configuration. See 3.1.1.

2.1.3 Fastening material according to structural engineer

Weight of arm	See “Checklists” on page 32.

2.1.4 Ceiling stiffness

Ceiling stiffness	A sufficient stiffness, or rigidity, of the ceiling is an on-site requirement. This must be taken into account during the planning phase of the ceiling mount. The stiffness/rigidity should be greater than the specified reference value so that the system is attached with low vibration.

2.1.5 Vibrations

Vibrations	Consider a low-vibration design of the ceiling in the operating room. Always bear in mind that surgery will take place at magnification factors of up to 30 x through the operating microscope. Two general types of vibration excitation factors exist: • Single event excitation Single event excitations, for example knocks against the ceiling unit, cannot be avoided/accounted for. However, they are the least critical excitations. The integrated damping system of the ceiling unit will extinguish most of the resulting vibrations in short time. • Constant and/or frequently repeated excitations Excitations which come from elevators, air conditioning systems, construction work or traffic do not easily reach the ceiling unit via the building. In extreme cases, however, these excitations may lead to constant vibration of the ceiling unit. This would necessitate constructional damping measures in the ceiling installation.

2.2 Intermediate body

Intermediate body

Attention

An intermediate body tailor-made for the customer is always required and will be delivered according to the installation drawings of the ceiling unit.

This intermediate body must be installed in the operating room prior to installation of the ceiling unit.

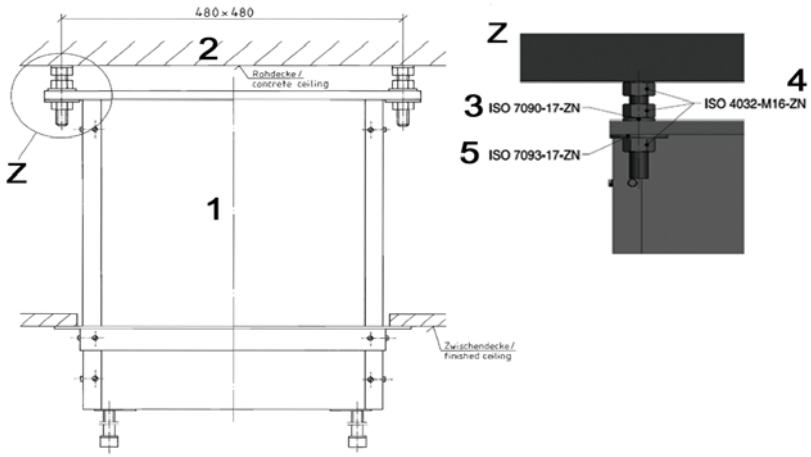
Attention

Make absolutely sure to install the intermediate body levelled out.

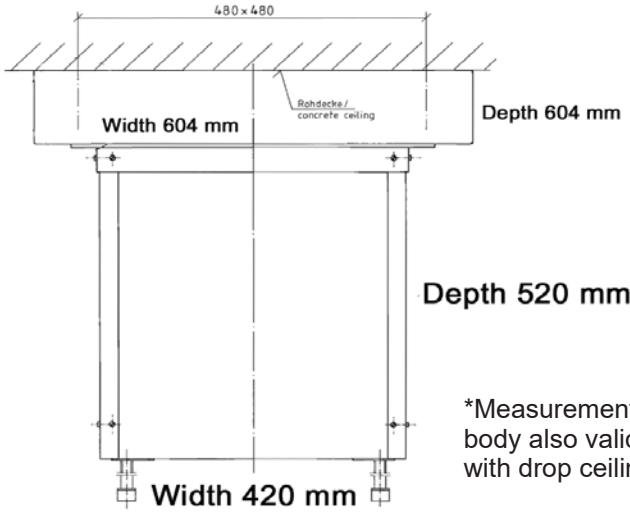
The intermediate body is a square tube, cased by sheet metal, and painted in the same colour as the ceiling unit (1).

The intermediate body is directly mounted to the solid ceiling (2) of the operating room.
The bolts have been calculated and determined by the structural engineer (see “Confirmation of structural analysis“ on page 32).
The following nuts and washers must be used according to the directions of the structural engineer.

Example of intermediate body on ceiling with drop ceiling:



Example of intermediate body on ceiling without drop ceiling*:



*Measurements of intermediate body also valid for installation with drop ceiling

Required space in intermediate ceiling	540 x 540 mm	
Outer dimensions of intermediate body	530 x 530 mm	The intermediate body is mounted to the ceiling with: (3) 4 x 1 washer ISO 7090-17-Zn (4 washers) (4) 4 x 3 nut ISO 4032-M16-Zn (12 nuts) (5) 4 x 1 washer ISO 7093-17-Zn (4 washers) It is then aligned at the girders. The distances between the fixing bolts are 480x480 mm.
Intermediate body weight	Maximum 140 kg	Depending on length L 40 kg + 64 kg/m*L
Carrying capacity of the ceiling	must amount to 500 kg/sq	In case of lower carrying capacity, girders must be installed to increase the carrying capacity for mounting the unit. This solution should be chosen in case there are heavily used rooms and vibrations that could be transferred from the ceiling to the unit.
Mains leads/cables	All mains leads are put into the ceiling unit from above and inside the intermediate body and are connected to a PC board and a terminal block inside the basic unit of the CU. The cables should reach from the ceiling to the floor in order to facilitate mounting the ceiling unit.	