

Planning aids

Building installations

Cable routing and underfloor systems for administrative and functional buildings including architectural solutions



Towards the future

Because, for us, product features such as installation speed, load capacity, functionality and availability are at the forefront of every innovation, OBO systems are always reliable, safe and of the highest quality. A high production depth and strong process automation also allow us to deal with the requirements of our customers in a targeted manner.

For the new edition of our catalogue, we have once again questioned our own processes. Is OBO a progressive, flexible company? Are our structures effective and our processes efficient? Do we know our markets to a sufficient level? And primarily: Are we actually the best possible partner that you could imagine?

For us to be able to answer these questions with a confident “Yes”, we have optimised our structures once again, sharpened our profile and defined our services more clearly. This allows us to react more quickly and reliably in future - both nationally and internationally - and also address the requirements of each individual customer even better.

This optimisation is best reflected in the three new installation areas. Thanks to this considerably more slender design, we can emphasise the product benefit even further and make the appropriate areas of application more tangible.

Because it is better:
OBO – simply better

OBO Product Worlds



Industrial installations

Cable support systems and connection and fastening systems for industry and construction project infrastructure

- Cable trays
- Mesh cable trays
- Cable ladders
- Industrial ducts and trunking
- Support structures
- Electrical installation pipes
- Wiring ducts and trunking
- Power supply units
- Distributors
- Junction boxes
- Concealed and cavity wall installations
- Terminals
- Cable glands
- Installation and fastening clips
- Anchors and fastening systems



Building installations

Cable routing and underfloor systems for administrative and functional buildings including architectural solutions

- Electrical installation ducts and trunking
- Device installation ducts and trunking
- Skirting ducts and trunking
- Service poles
- Underfloor applications in screed
- Underfloor applications in concrete
- Underfloor applications, on-floor
- Service outlets for underfloor applications
- Floor sockets and floor boxes
- Installation housings and supports
- Tabletop sockets
- Sockets, switches, data and multimedia technology



Safety and protection installations

Lightning, surge and fire protection systems


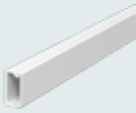


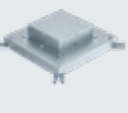






- Surge protection
- Explosion protection
- Lightning protection
- Earthing
- Equipotential bonding
- Insulation
- Cable bandages – prevention of the spread of fire
- Escape route installations – false ceiling mounting
- Fire protection ducts – protection of escape routes
- Fire protection ducts
- Systems for the maintenance of electrical functionality – cable-specific routing variants
- Systems for the maintenance of electrical functionality – standard support structures and routing systems
- Systems for the maintenance of electrical functionality – FireBox T series junction boxes
- Anchoring



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Cable routing and underfloor systems for administrative and functional buildings including architectural solutions

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High demands are placed on products that are used in building installations. This means that electrical installations utilised in buildings are subject to different usage needs and must meet a range of architectural requirements. But all spaces have one thing in common: they need to be supplied with power and data. There are always three dimensions for this supply: floor, ceiling and wall.

That is why the properties of the materials used and the design of the surfaces are critical when selecting building installations. Depending on where they will be used, flexible supply access points, design requirements and function are just some of the key selection criteria.

This catalogue is intended to be both a source of information and a decision-making aid. It provides information on materials, surface refinements, sound insulation measures, testing procedures and protection ratings, among other things. It also explains how cable volumes and loads are calculated and how these can be used to select the appropriate trunking. Different types of flooring are also addressed, as are the halogen-free product variants for comprehensive fire protection.

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Inclusion of the cable routing systems and metal service poles in the service measures



Specifications for protective measures

If there is a fault, touchable metallic parts must not carry voltage. For this reason, it is necessary to carry out appropriate safety measures. These are specified in the currently valid standards. DIN EN 50085-1 and DIN EN 50085-2-1 apply to the set-up of the cable routing system, whilst the erection regulations DIN VDE 0100 Parts 410 and 540 apply to the installation (protection measure against dangerous shock currents).

Different installation types in the European standard

The European standard DIN EN 50085-1 takes different installation types into account, as they are used in different countries within the EU. While only equipotential bonding testing was previously required for installation trunking systems, now the listed component standards also require protective conductor functions. This is because, in some countries, it is possible to route insulated cable in trunking.

All the metallic components must be included

DIN EN 50085-1 requires that all the metallic components can be included in the protective measures. The manufacturers must carry out the appropriate tests and document them. OBO installation trunking is also tested and certified by an external testing office – the VDE.

Testing the effectiveness by the installation engineers

The erection engineer (installation engineer) must test the effectiveness of the protection measures in accordance with DIN VDE 0100 Part 610 after completion. Ensuring the tightening torque of the contact screws on the earthing terminals and the proper mounting of the couplings.





Continuous protection measures

If the trunking is interrupted at a wall penetration, then continuation of the protective measures is required, as, in this case, the trunking is a foreign, conductive part, which spreads through different areas of a building.

The connection between the covers and the device installation trunking is made using the self-contacting cover. This guarantees self-contacting and continuous protection of the trunking covers and of the device installation trunking. A continuous protection measure is made without additional wiring.

The connection between the bases is made via the joint connector. Joint connectors guarantee equipotential bonding between the bases. Important: Powder-coated metallic covers do not count as mixed construction and are thus not considered as insulating! They should thus be included in the protection measures. The sheet-steel partitions are self-contacting. Also from the aspect of capacitive coupling and the potential static charges, the inclusion of metal device installation trunking covers into the protective conductor function should be considered. This shielding measure reduces electro-smog and generally achieves improved EMC protection. Protective conductor connections should be created permanently. If there is a change to the system, e.g. for retro-installations, it is important to guarantee the maintenance of the protective functions.

Who needs to observe which standards?



OBO as a manufacturer

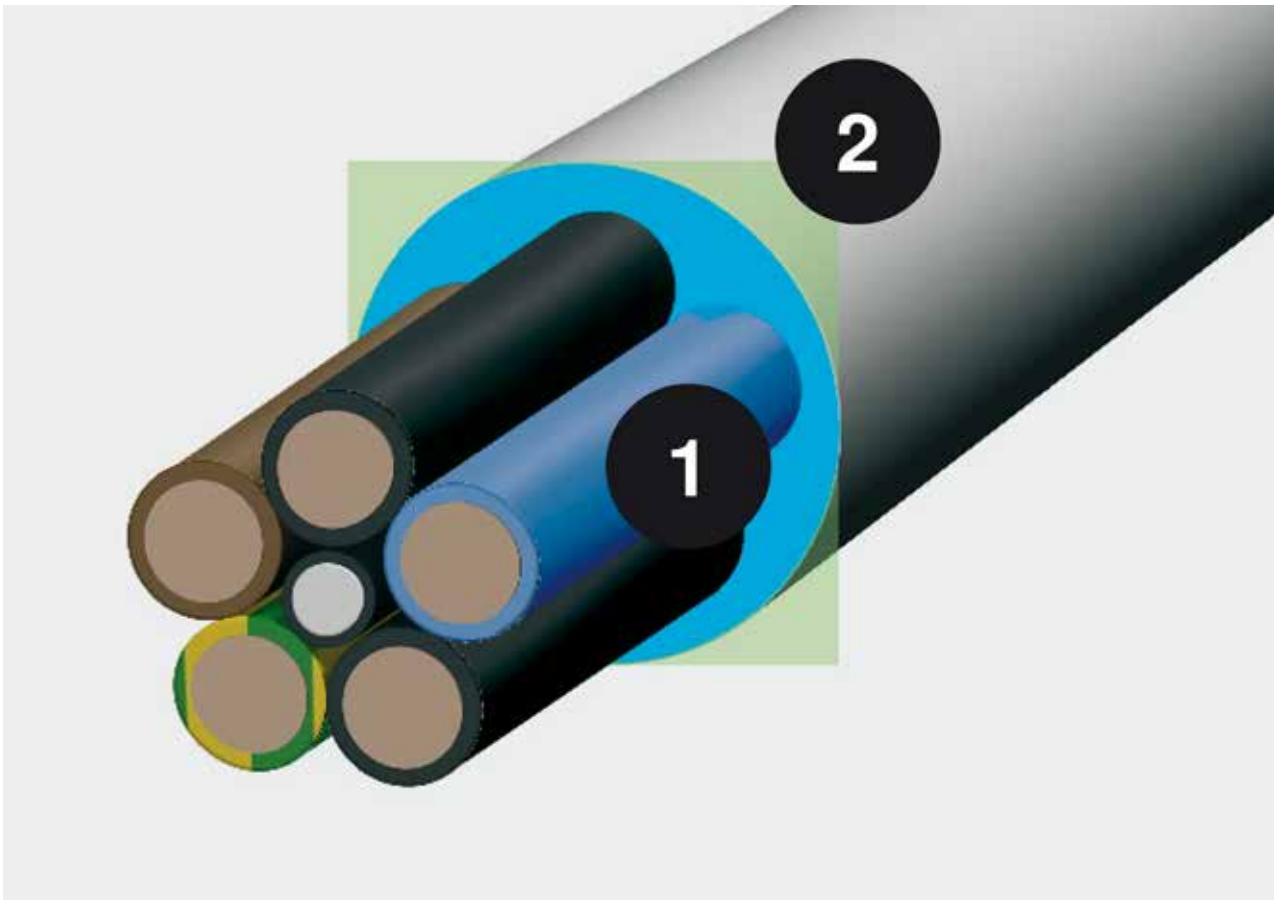
Standard	Title	OBO system
DIN EN 50085-1 Device testing directive	Electrical installation trunking systems for electrical installations – Part 1: General requirements	All systems
DIN EN 50085-2-1	Special requirements for electrical installation trunking systems on walls or ceilings.	WDK, LKM, SKL, GEK-K, GEK-S, GEK-A
DIN EN 50085-2-2	Special requirements for electrical installation systems for underfloor, flushfloor or onfloor installation.	UFS
DIN EN 50085-2-3	Special requirements for wiring trunking systems for installation in switchgear cabinets.	VK
DIN EN 50085-2-4	Special requirements for freestanding installation units.	ISS

The installation engineer as systems engineer

Standard	Title	OBO system
VDE 0100 Part 410	Set-up of electrical systems with rated voltages of up to 1,000 V. Protection against electric shock.	All systems
VDE 0100 Part 520	Set-up of electrical systems with rated voltages of up to 1,000 V. Cables.	All systems
VDE 0100 Part 540	Set-up of electrical systems with rated voltages of up to 1,000 V. Equipotential bonding.	All systems
VDE 0100 Part 610	Set-up of electrical systems with rated voltages of up to 1,000 V. First testing of electrical systems before handover to the operator.	All systems
VDE 0298	Set-up of electrical systems with rated voltages of up to 1,000 V. Insulated cables in heavy current systems.	All systems
DIN EN 50310	Application of equipotential bonding and earthing in buildings with information technology equipment.	All systems



How can I work out the cable volume?



Cable diameter and space required; 1 = diameter in mm, 2 = space required in cm²

An important criterion for the selection of the right duct size is the cable volume. As the cables are never very close and laying in parallel, it is insufficient to base the volume calculation on just the cable diameter. A realistic calculation is provided by the formula $(2r)^2$. To simplify your work, on the next page you will find a list of the diameters and space requirements of the most important cable types. Important: These values are average values, which may vary from manufacturer to manufacturer. Please refer to the manufacturer's specifications for the exact values.

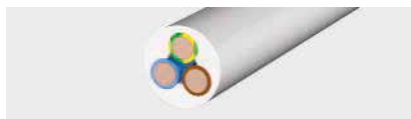
The right choice

The table on the next page will help you to select the correct trunking size. Besides the usable cross-section of the appropriate trunking, please observe the current DIN/VDE standards for the fill factor and the approved cable heating.

Calculation with the formula $(2r)^2$

The diameter says little about the actual space required by a cable. Calculate: $(2r)^2$. This value reflects the realistic space requirements, including the compartments.

Basic values for calculation of the cable volume



Insulated power cables

Type	Diameter mm	Usable cross-section cm ²
1 x 4	6.5	0.42
1 x 6	7	0.49
1 x 10	8	0.64
1 x 16	9.5	0.9
1 x 25	12.5	1.56
3 x 1.5	8.5	0.72
3 x 2.5	9.5	0.9
3 x 4	11	1.21
4 x 1.5	9	0.81
4 x 2.5	10.5	1.1
4 x 4	12.5	1.56
4 x 6	13.5	1.82
4 x 10	16.5	2.72
4 x 16	19	3.61
4 x 25	23.5	5.52
4 x 35	26	6.76
5 x 1.5	9.5	0.9
5 x 2.5	11	1.21
5 x 4	13.5	1.82
5 x 6	14.5	2.1
5 x 10	18	3.24
5 x 16	21.5	4.62
5 x 25	26	6.76
7 x 1.5	10.5	1.1
7 x 2.5	13	1.69

Insulated power cables

Type	Diameter mm	Usable cross-section cm ²
1 x 10	10.5	1.1
1 x 16	11.5	1.32
1 x 25	12.5	1.56
1 x 35	13.5	1.82
1 x 50	15.5	2.4
1 x 70	16.5	2.72
1 x 95	18.5	3.42
1 x 120	20.5	4.2
1 x 150	22.5	5.06
1 x 185	25	6.25
1 x 240	28	7.84
1 x 300	30	9
3 x 1.5	11.5	1.32
3 x 2.5	12.5	1.56
3 x 10	17.5	3.06
3 x 16	19.5	3.8
3 x 50	26	6.76
3 x 70	30	9
3 x 120	36	12.96
4 x 1.5	12.5	1.56
4 x 2.5	13.5	1.82
4 x 6	16.5	2.72
4 x 10	18.5	3.42
4 x 16	21.5	4.62
4 x 25	25.5	6.5
4 x 35	28	7.84
4 x 50	30	9
4 x 70	34	11.56
4 x 95	39	15.21
4 x 120	42	17.64
4 x 150	47	22
4 x 185	52	27
4 x 240	58	33.6
5 x 1.5	13.5	1.82
5 x 2.5	14.5	2.1
5 x 6	18.5	3.42
5 x 10	20.5	4.2
5 x 16	22.5	5.06
5 x 25	27.5	7.56
5 x 35	34	11.56
5 x 50	40	16

Telecommunications cables

Type	Diameter mm	Usable cross-section cm ²
2 x 2 x 0.6	5	0.25
4 x 2 x 0.6	5.5	0.3
6 x 2 x 0.6	6.5	0.42
10 x 2 x 0.6	7.5	0.56
20 x 2 x 0.6	9	0.81
40 x 2 x 0.6	11	1.12
60 x 2 x 0.6	13	1.69
100 x 2 x 0.6	17	2.89
200 x 2 x 0.6	23	5.29
2 x 2 x 0.8	6	0.36
4 x 2 x 0.8	7	0.49
6 x 2 x 0.8	8.5	0.72
10 x 2 x 0.8	9.5	0.9
20 x 2 x 0.8	13	1.69
40 x 2 x 0.8	16.5	2.72
60 x 2 x 0.8	20	4
100 x 2 x 0.8	25.5	6.5
200 x 2 x 0.8	32	10.24



Coax cable (Standard)

Type	Diameter mm	Usable cross-section cm ²
SAT/BK cable	6.8	0.48



IT cables type Cat...

Type	Diameter mm	Usable cross-section cm ²
Cat. 5	8	0.64
Cat. 6	8	0.64



Processing materials with the correct tool

Different materials must be processed differently. Coping saws have proved to be very useful when routing device installation ducts. This allows exact cutting.

For ducts made of PVC and PC/ABS:

- Hand saw, fine-tooth (iron saw)
- Piercing saw with iron or plastic saw blade with fine teeth
- Circular saw with plastic saw blade, 350 mm diameter, 80–108 teeth/inch and 2,800 rpm

For ducts made of sheet steel and aluminium:

- Ribbon saw with saw ribbon for hard metals
- Circular saw with saw blade for hard metals, 350 mm diameter, 80–108 teeth/inch and 2,800 rpm
- Angle grinder with metal separating disc

Thermal expansion coefficient

- Steel: 14×10^{-6} 1/K
- Aluminium: 23.1×10^{-6} 1/K
- Hard PVC: 71×10^{-6} 1/K

Taking the length expansion of the materials into account

Different materials expand differently and this must be taken into account. The expansion of the materials PVC, steel and aluminium can be calculated using the formula below.

$$\Delta L = L \cdot \alpha \cdot \Delta T$$

L = Length m

α = Thermal expansion co-efficient

ΔT = Temperature change

Examples

At a temperature difference ΔT of 20 °C, the 2,000 mm standard length changes as follows:

- For hard PVC, 2.84 mm
- For steel, 0.56 mm
- For aluminium, 0.924 mm

Perfect interplay for more efficient working

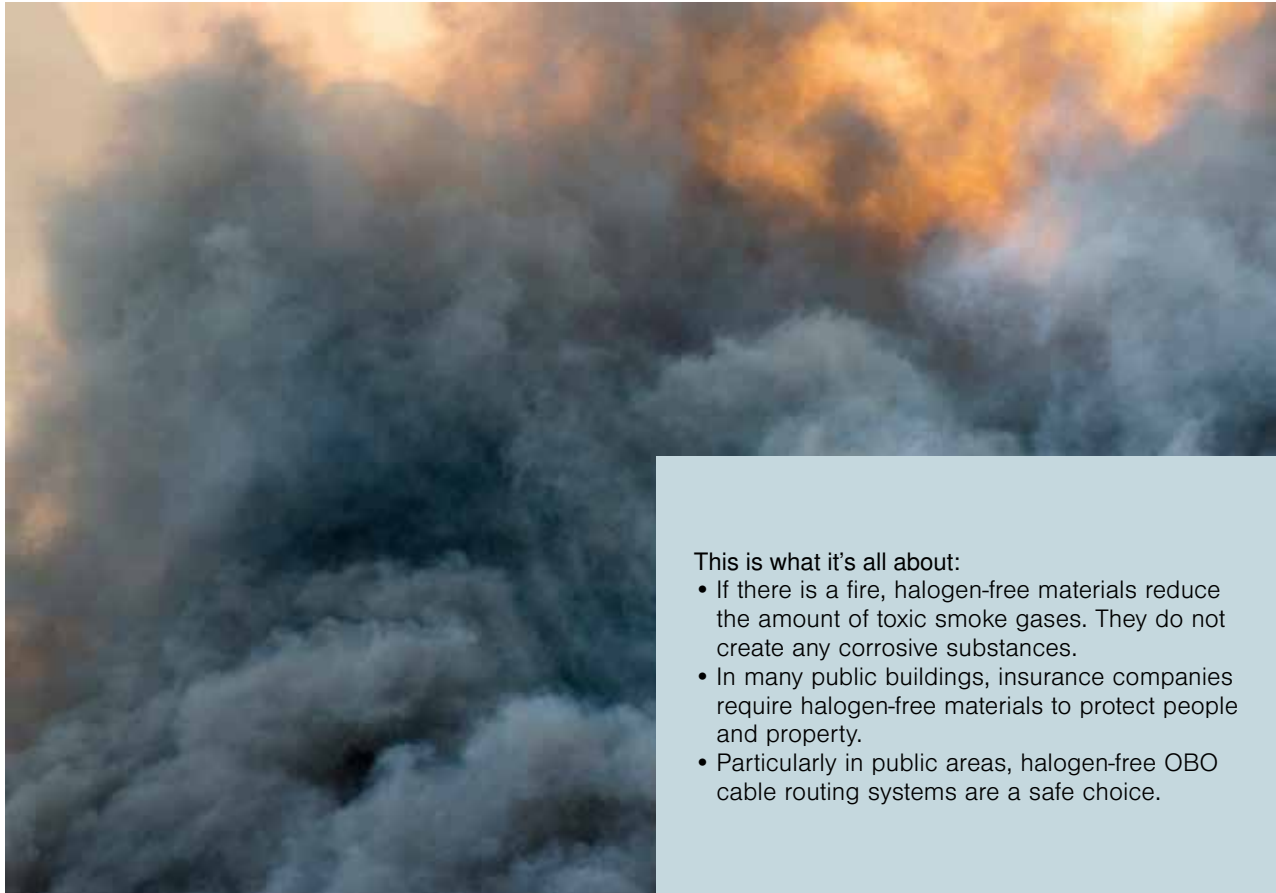
Faster and better installation sequences – this is the aim of both ourselves and the manufacturers of electrical devices. Previously used bolt-firing devices have thus become modern nail guns. With its Pulsa 700E, Spit can offer devices of the highest quality for this area of the electrical industry. Many OBO products can be processed particularly efficiently using the devices. This is proved by tests for mounting cable and device installation trunking, carried out with Spit devices.

Properties of the hard PVC used

Property	Value	DIN
Material designation	PVC-U-E-D-08-04-28	to DIN 7748
Tensile strength	min. 40 N/mm ²	to DIN 53 455
Crack expansion	min. 85%	to DIN 53 455
Breakdown voltage	min. 20 KV/mm	to DIN 53 481
Surface resistance	min. 1010 Ohm	to DIN 53 455
Shape heat resistance	min. 75 °C	to DIN 53 400/B
Temperature resistance in the application	max. 65 °C	
Flammability	Level V0	to UL 94

You can find more details in the chapter "Chemical resistance of hard PVC" in the "Additional information" part.

Halogen-free cable routing systems



This is what it's all about:

- If there is a fire, halogen-free materials reduce the amount of toxic smoke gases. They do not create any corrosive substances.
- In many public buildings, insurance companies require halogen-free materials to protect people and property.
- Particularly in public areas, halogen-free OBO cable routing systems are a safe choice.

Low smoke gas production, low corrosion, safe. Halogen-free installation materials belong in any fire protection plan.

Dangerous fumes from plastics have good insulating properties and can be processed easily. However, during a fire they can create aggressive gases. A danger to people and property.

Heavy smoke creation

Flame-protection agents, based on halogen compounds such as fluorine, iodine, chlorine and bromine, are used to keep the flammability of PVC low. If there is a fire, this safety aspect becomes a dangerous disadvantage: toxic smoke gases, such as carbon dioxide and carbon monoxide, are created. These usually endanger people far faster than flames and heat. For example, in the fire catastrophe at Düsseldorf Airport in 1996 or in the Tauern Tunnel in 1999, considerable quantities of burned plastics contributed to the formation of smoke and hazardous substances. A highly toxic mixture, which can be lethal after just a few breaths.

Corrosive fire gases

PVC releases corrosive hydrogen chloride gas, which, in conjunction with water, forms hydrochloric acid. Hydrochloric acid has a highly caustic effect on the respiratory channels. As an electrically conductive substance, it can cause short circuits and destroy devices. Further corrosive combustion gas products are cyanide and ammonia. In addition, extremely toxic dioxins can damage the building to such an extent that the reconstruction of parts of the building is very expensive or even impossible.

Therefore, from a fire protection perspective, halogen-free installation materials are a safe alternative. The Association of Property Insurers also prescribes halogen-free materials for building areas in which many people meet. The term "halogen-free" excludes any organic chlorine or bromine compounds.





OBO halogen-free cable routing systems protect people, the environment and property. All the products are made from high-quality PC/ABS (polycarbonate/acrylonitrile butadiene styrene). This material is one of the self-extinguishing plastics.

For safe cable routing, OBO offers halogen-free WDKH wall and ceiling trunking and Rapid 80 device installation trunking. Both cable routing systems are available in all the standard dimensions. They are easy to mount and are stable, are produced to a high level of quality and are dimensionally stable.

The safety aspects

- Low smoke creation
- Low toxicity of the smoke gases
- Scarcely any release of corrosive gases
- Perfectly suited for public areas

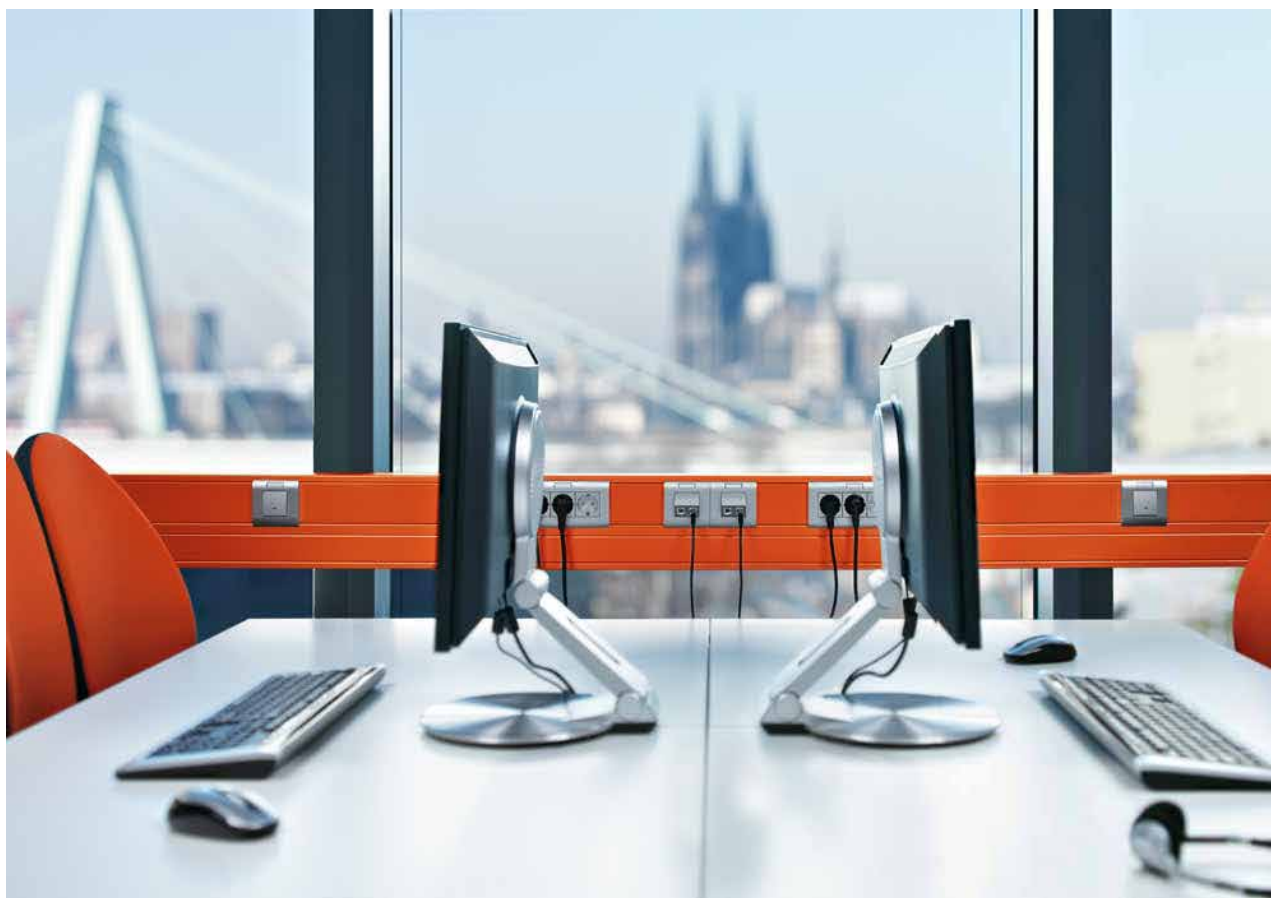
Rapid 80 GKH halogen-free

Rapid 80 device installation trunking allows flexible and quick access to energy and data on the wall. It is primarily used in public facilities and offices.

WDKH halogen-free

OBO wall and ceiling trunking ensures safe cable routing. They can be used as wall or ceiling trunking.

Individual special colours



Plastic trunking

The wide range of standard colours and the many possible special colours mean that it is possible to integrate the colour of the cable routing systems into any office landscape. The plastic cable routing trunking and device installation trunking systems are available in the RAL colours pure white (RAL 9010), light grey (RAL 7035), grey (RAL 7030) and cream (RAL 9001) as standard.

Sheet steel and aluminium trunking

The device installation trunking systems and service poles are made of sheet steel or aluminium and are available in the standard colours pure white, light grey and cream. Powder coating means that all the other RAL colours are possible on sheet steel and aluminium trunking. Alternatively to the RAL standard, both NCS and DB colours can be applied on request.

Colour deviations

Material-dependent colour deviations may occur on PVC trunking and fittings. Causes for this are the differences in gloss on the different surfaces. They only absorb a part of the light. "Silky matt" painted surfaces and "matted" surfaces on moulded parts have different structures and thus different levels of gloss. Absolute evenness is impossible. With a shiny surface, a colour appears lighter (greater reflection) and, with a matt surface, darker (greater absorption). Measurement of the differences is therefore extremely difficult.



Powder coatings for indoor use and plastic surfaces



Versatile. Attractive. Robust.

Powdered surface coatings offer a wide range of options. They turn a standard product into an individual solution, whose colour and function are matched exactly to your requirements. The colour and structure ensure a decorative exterior, whilst the coating properties offer high resistance to chemicals, very good corrosion protection and the best possible insulation properties.

Plastic surfaces

OBO uses high-quality plastics with the best material properties. The PVC withstands high and low temperatures, as well as UV radiation, various chemicals and high mechanical loads. In addition, the halogen-free variants possess perfect fire protection properties, as they prevent corrosive smoke gases.

Basic	Sheet steel or aluminium
Coating	Epoxy powder coating
Standard colours	RAL 9010, pure white RAL 9001, cream RAL 7035, light grey
Special colours	RAL, NCS and DB colours Metallic colours
Surface structure	Standard structure: Smooth transitions Diverse variants from fine to coarse
Surface shine level	Standard gloss level: approx. 22% Diverse variants from matt to high-gloss
Variants	Anti-bacterial High resistance to abrasion

Plastic types	Polyvinylchloride (PVC) Polycarbonate/acrylonitrile butadiene styrene (PC/ABS)
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Plastic materials

ABS/ ASA	Acrylonitrile butadiene styrene
Temperature resistance:	to about minus 40 °C*, permanently up to 70 °C, briefly up to 85 °C
Resistant to:	Formic acid, citric acid, lactic acid
Unstable with:	Acetone, petrol, benzene, solvents for paints and butyric acid, chlorine, acetic acid, nitric acid.
Conditionally resistant to:	Hydrochloric acid, sulphuric acid.
Risk of stress cracks:	Relatively high, similar to polystyrene.

PA	Polyamide
Temperature resistance:	permanently up to approx. 90 °C, briefly up to around 130 °C, and to around minus 40 °C*
Resistant to:	Petrol, benzene, diesel oil, acetone, solvents for paints and lacquers, oils and greases
Unstable with:	Bleach, most acids, chlorine.
Risk of stress cracks:	Low in humid conditions; only with some aqueous salt solutions. Highly desiccated parts (high temperature and extremely low air humidity) are highly sensitive to fuels and various solvents.

PA/ GF	Polyamide, fibre-glass reinforced
Temperature resistance:	permanently up to approx. 100–110 °C, briefly up to around 160 °C, and to around minus 40 °C*
Resistant to:	Petrol, benzene, diesel oil, acetone, solvents for paints and lacquers, oils and greases. Slightly susceptible to stress cracking.
Unstable with:	Bleach, most acids, chlorine.
Risk of stress cracks:	Low in humid conditions; only with some aqueous salt solutions. Highly desiccated parts (high temperature and extremely low air humidity) are highly sensitive to fuels and various solvents.

PBPT	Polybutylene terephthalate
Temperature resistance:	permanently up to approx. 120 °C, briefly up to around 140 °C and to around minus 40 °C*.
Resistant to:	Petrol, diesel oil, most weak acids, oils and greases.
Unstable with:	Strong acids, chlorine, fluorine, bromine vapour, bleach, trichloroethylene, methylene chloride.
Conditionally resistant to:	Acetone, ammonia, benzene.
Risk of stress cracks:	

PE	Polyethylene
Temperature resistance:	hard types permanently up to approx. 90 °C, briefly up to approx. 105 °C, soft types permanently up to approx. 80 °C, briefly up to approx. 100 °C and to approx. minus 40 °C*.
Resistant to:	Alkalis and inorganic acids.
Unstable with:	Chlorine, hydrocarbons, oxidising acids.
Conditionally resistant to:	Acetone, organic acids, petrol, benzene, diesel oil, most oils.
Risk of stress cracks:	Stress cracks can be caused by, among other things, acetone, various alcohols, formic acid, ethanol, petrol, benzene, butyric acid, acetic acid, formaldehyde, various oils, petroleum, propanol, nitric acid, hydrochloric acid, sulphuric acid, soap solutions, turpentine, trichloroethylene, citric acid.

PP/GF	Polypropylene, fibre-glass reinforced
Temperature resistance:	permanently up to approx. 90 °C, briefly up to around 110 °C, and to around minus 30 °C. Chem. resistance generally as for polyethylene
Resistant to:	Alkalis and inorganic structures
Unstable with:	Chlorine, hydrocarbons, oxidising acids.
Risk of stress cracks:	Low, only with some acids such as chromic acid, hydrofluoric acid and hydrochloric acid, as well as nitrogen oxide.

PC	Polycarbonate
Temperature resistance:	permanently up to approx. 110 °C (in water 60 °C), briefly up to 125 °C, and to below minus 35 °C. *
Resistant to:	Petrol, turpentine, most weak acids.
Unstable with:	Acetone, benzene, chlorine, methylene chloride, most concentrated acids.
Risk of stress cracks:	Relatively low, media which can cause tension cracking include petrol, aromatic hydrocarbons, methanol, butanol, acetone, turpentine.

PC/ABS	Polycarbonate/acrylonitrile butadiene styrene
Temperature resistance:	-30 °C to + 90 °C, briefly up to approx. 105 °C, melting range at approx. 200 °C, thermal decomposition at 300 °C. Material thicknesses of 1.5 mm or more can achieve UL94 V-0. At material thicknesses of 1 mm or more, the glow wire temperature of 960 °C according to IEC 60695-2-12 is achieved.
Resistant to:	Mineral acids, organic acids and aqueous salt solutions
Conditionally resistant to:	Alkalis, hydrocarbons, aromatics and (in trace form) a series of greases and oils.

POM	Polyacetal
Temperature resistance:	permanently up to approx. 100 °C, briefly up to around 130 °C and to around minus 40 °C*
Resistant to:	Acetone, ether, petrol, weak acetic acid, benzene, heating oil, oils and greases, toluene.
Unstable with:	Methylene chloride, trichloroethylene, hydrochloric acid, nitric acid, sulphuric acid.
Risk of stress cracks:	Low

PP	Polypropylene
Temperature resistance:	permanently up to approx. 90 °C, briefly up to around 110 °C, and to around minus 30 °C. Chemical resistance generally as for polyethylene.
Resistant to:	Alkalis and inorganic acids.
Unstable with:	Chlorine, hydrocarbons, oxidising acids.
Conditionally resistant to:	Acetone, organic acids, petrol, benzene, diesel oil, most oils.
Risk of stress cracks:	Low, only with some acids such as chromic acid, hydrofluoric acid and hydrochloric acid, as well as nitrogen oxide.

PS	Polystyrene
Temperature resistance:	Because of its relatively high sensitivity to the effects of chemicals, its use is not recommended at temperatures above normal room temperature, about 25 °C. Resistance to cold: to about minus 40 °C*.
Resistant to:	Alkalis, most acids, alcohol.
Unstable with:	Butyric acid, concentrated nitric acid, concentrated acetic acid, acetone, ether, petrol and benzene, solvents for paints and lacquers, chlorine, diesel fuel.
Conditionally resistant to:	Oils and greases.
Risk of stress cracks:	Relatively high. Stress cracks can be caused by, among other things, acetone, ether, petrol, cyclohexane, heptane, methanol, propanol and the softeners of some mixes used in PVC cables.

PVC	Polyvinylchloride
Temperature resistance:	permanently up to approx. 65 °C, briefly up to around 75 °C and to around minus 30 °C.
Resistant to:	Weak acids, alkalis, oils and greases, petrol
Unstable with:	Strong acids, benzene, acetone, iodine, toluene, trichloroethylene.
Risk of stress cracks:	Low, only with some solvents such as benzene and acetone.
Material designation according to DIN 7748:	PVC-U-E-D-080-04-28
Tensile strength to DIN 53 455:	min. 40 N/mm ²
Elongation at tear according to DIN 53 455:	min. 65%
Impact resistance according to DIN 53 481:	min. 20 KV/mm
Surface resistance according to DIN 5 3 482:	min. 10 10
Thermoforming resistance according to DIN 53 460/B:	min. 75 °C
Flammability according to UL 94:	Level V0
Materials classification according to DIN EN 4102:	Class B1 and B2 tested

The minus values apply only for parts in the idle condition with no severe impact stress. There is no plastic that is resistant to every chemical. The agents listed are only a small selection. Plastic parts are especially at risk in the presence of chemicals and high temperatures. Stress cracks may occur. If in doubt, please consult us and/or ask for a detailed chemical resistance table. Stress crack formation: Stress cracks may occur if plastic parts under tension are exposed to chemicals at the same time. Parts made of polystyrene and polyethylene are particularly susceptible. Stress cracks may even be caused by

agents to which the plastic in question is resistant in the absence of stress. Typical examples of parts under constant stress when used as intended: grip clips, intermediate connectors of cable glands, ribbon clips.



European classification according to EN 50085-1

		WDK cable trunking	WDKH cable trunking	LKM cable trunking	SKL skirting trunking	VK wiring trunking	VKH wiring trunking	Rapid 45-2 GK PVC device installation trunking	Rapid 45-2 GA aluminium device installation trunking	Rapid 80 GK PVC device installation trunking	Rapid 80 GKH PC/ABS device installation trunking	Rapid 80 GS steel device installation trunking	Rapid 80 GA aluminium device installation trunking	ISS service pole
6.1	According to material	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
6.2	According to impact resistance for installation and application			*1										
6.2.1	Electrical installation trunking systems for impact energy 0.5 J	x	x	*1										
6.2.2	Electrical installation trunking systems for impact energy 1 J			*1										
6.2.3	Electrical installation trunking systems for impact energy 2 J			*1	x									
6.2.4	Electrical installation trunking systems for impact energy 5 J			*1						x				
6.2.5	Electrical installation trunking systems for impact energy 20 J			*1								x	x	x
6.3	According to temperature, as specified in the Tables 1, 2 and 3													
	Table 1: Minimum storage and transport temperatures $\pm 2\text{ }^{\circ}\text{C}$													
	-45													
	-25			x								x	x	x
	-15				x					x				
	-5	x	x			x	x							
	Table 2: Minimum installation and application temperatures $\pm 2\text{ }^{\circ}\text{C}$													
	-25			x								x	x	x
	-15									x				
	-5	x	x		x									
	+5													
	+15					x	x							
	Table 3: Maximum application temperatures $\pm 2\text{ }^{\circ}\text{C}$													
	+60	x	x		x	x	x			x		x	x	x
	+90													
	+105													
	+120													
6.4	According to the resistance against fire spread													
6.4.1	Electrical installation trunking systems which permit the spread of fire	x	x			x	x			x				
6.4.2	Electrical installation trunking systems which do not permit the spread of fire			x	x							x	x	x

x appropriate classification, *1 in test, *2 in consultation

		WDK cable trunking	WDKH cable trunking	LKM cable trunking	SKL skirting trunking	VK wiring trunking	VKH wiring trunking	Rapid 45-2 GK PVC device installation trunking	Rapid 45-2 GA aluminium device installation trunking	Rapid 80 GK PVC device installation trunking	Rapid 80 GKH PC/ABS device installation trunking	Rapid 80 GS steel device installation trunking	Rapid 80 GA aluminium device installation trunking	ISS service pole
6.5	According to the electrical conductivity													
6.5.1	Electrical installation trunking system with electrical conductivity			x								x	x	x
6.5.2	Electrical installation trunking system without electrical conductivity	x	x		x	x	x			x				
6.6	According to the electrical insulation property													
6.6.1	Electrical installation trunking system without electrical insulation property			x								x	x	x
6.6.2	Electrical installation trunking system with electrical insulation property	x	x		x	x	x			x				
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991													
6.7.1	According to protection against ingress of solid foreign bodies	IP 20	IP 20	IP 30	IP 41			IP 40	IP 40	IP 30	IP 30	IP 30	IP 30	IP 30
6.7.2	According to protection against ingress of water													
6.7.3	According to protection against contact with dangerous parts													
6.8	According to protection against corrosive or impure substances	-	-	-	-	-	-	-	-	-	-	-	-	-
6.9	According to the fastening type of the system trunking cover													
6.9.1	Only open the trunking cover of the electrical installation trunking system without tools	x	x	x		x	x							
6.9.2	Only open the trunking cover of the electrical installation trunking system with tools									x		x	x	
6.10	According to the electrical protection separation													
6.10.1	Electrical installation trunking systems without internal protection separation element			x		x	x					x	x	
6.10.2	Electrical installation trunking systems with internal protection separation element	x	x		x					x	x			

x Appropriate classification, *2 under consultation



		WDK cable trunking	WDKH cable trunking	LKM cable trunking	SKL skirting trunking	VK wiring trunking	VKH wiring trunking	Rapid 45-2 GK PVC device installation trunking	Rapid 45-2 GA aluminium device installation trunking	Rapid 80 GK PVC device installation trunking	Rapid 80 GKH PC/ABS device installation trunking	Rapid 80 GS steel device installation trunking	Rapid 80 GA aluminium device installation trunking	ISS service pole
6.101.3	Concealed/surface-mounded electrical installation trunking on the wall or ceiling.													
6.101.3.1	Concealed/surface-mounded electrical installation trunking on the wall.	x	x	x						x		x	x	
6.101.3.2	Concealed/surface-mounded electrical installation trunking on the ceiling.	x	x	x				x	x	x	x	x	x	
6.101.3.3	Electrical installation trunking on the wall and supported by the base.				x									
6.101.3.4	Electrical installation trunking on the wall and supported by a different horizontal surface to the floor.													
6.101.4	Electrical installation trunking system, mounted at a distance to the wall or ceiling with fastenings									x		x	x	
6.102	According to the protection against contact between liquids and insulated cables and parts carrying voltage in the case of skirting trunking and wet cleaning of the floor													
6.102.1	No data													
6.102.2	Add to the instructions of the manufacturer, which limit the installation position of the electrical installation trunking system.													
6.102.3	Add to the instructions of the manufacturer, which allow all the installations of the electrical installation trunking system, but limits the layers of insulated cables and parts carrying voltage in the electrical installation trunking system.													
6.102.4	Add to the instructions of the manufacturer, which allow all the installations of the electrical installation trunking system and allows the layers of insulated cables and parts carrying voltage in the electrical installation trunking system.													
6.103	According to type													
6.103.1	Type 1 Electrical installation trunking system				x									
6.103.2	Type 2 Electrical installation trunking system (distribution electrical installation trunking system)	x	x	x										
6.103.3	Type 3 Electrical installation trunking system (installation electrical installation trunking system)					x	x			x		x	x	

x appropriate classification

Chemical resistances of hard PVC

A = very good resistance
 B = average resistance
 C = not resistant

Medium	Temp. °C	Resistance
1,3-benzole disulphonic acid	20	A
1,3-butadiene	20	A
2,4-chlorobenzoyl chloride	20	A
2-amino-2,2-diphenylacetic acid	20	A
4-chlorine-2-nitroaniline	20	C
4-chlorobenzaldehyde-2-sulphonic acid	20	A
5-amino-2-hydroxybenzoic acid	20	A
Abietic acid	20	A
Acetaldehyde 100%	20	C
Acetaldehyde 40%	20	A
Acetaldehyde 40%	40	B
Acetaldehyde, acetic acid ratio 90:10	20	B
Acetanilide 100%	20	A
Acetates (ammonium-, Na- and others)	50	A
Acetic acid 10%	60	A
Acetic acid 100%	20	A
Acetic acid 100%	60	B
Acetic acid 25%	40	A
Acetic acid 25-70%	40	A
Acetic anhydride	20	C
Acetone	20	C
Acetophenone (methyl phenyl ketone)	20	C
Acetylacetone (2,4-pentanedione)	20	C
Acetylene 100%	20	B
Acetylsalicylic acid	20	A
Adipic acid	20	A
Adipic acid	60	B
Alcoholic drinks	< 40	A
Alizarin 100%	20	A
Alkanoic sulphonic acids	50	A
Allyl alcohol 100%	20	B
Allyl alcohol 100%	60	C
Allyl chloride	20	C
Aminobenzene (p-)	20	A
Aminobenzenesulphonic acid (m-, o-, p-)	20	A
Aminosalicylic acid (p-)	20	A
Ammonia (vapours of all concentrations)	40	A
Ammonia (vapours of all concentrations)	60	B
Ammonia, anhydrous, liquid	< 60	B
Ammonium hydroxide	60	A
Aniline 100%	20	A
Aniline chloride, saturated solution	20	C
Apple juice	60	A
Ascorbic acid	20	A
Aspartic acid	20	A
Beer	60	A
Benzene, containing benzole	20	C
Benzene, free from aromatic hydrocarbons	60	A
Benzoic acid	40	A
Benzoic anhydride	30	A
Benzole	20	C
Benzophenone 100%	20	C
Benzosulphonic acid	60	A
Benzotrifluoride	20	C
Benzotrifluoride	20	C
Benzoylbenzoic acid	20	A
Benzyl chloride	20	C
Betene	20	A
Bleaching liquor, 12% active chlorine	40	A
Bleaching liquor, 12% active chlorine	60	B
Blood	40	A
Boiled oil	60	C
Borates (NA-)	20	A
Borax	40	A
Boric acid	20	A
Brewer's wort	20	A
Brine	60	A
Bromates (K-, Na-)	40	A
Bromic acid	20	A
Bromides (K-, Na- and others)	60	A
Bromine water	20	A
Bromine, gaseous, dry	20	A
Bromine, liquid	20	C
Bromobenzene	20	C
Bromochloromethane	20	C
Bromochloropropane	20	C
Bromoform 100%	20	C
Butane, gaseous, 30%	20	A
Butanediol over 60%	40	B
Butanediol over 60%	20	C
Butanediol to 10%	20	A
Butanol	60	A
Buttermilk	20	A
Butyl acetate	20	C
Butyl butyrate	20	C
Butyl chloride	20	C
Butyl glycolate	20	C

A = very good resistance
 B = average resistance
 C = not resistant

Medium	Temp. °C	Resistance
Butyl phenoles	20	C
Butyric acid 100%	20	C
Butyric acid 20%	20	A
Butyric acid 20%	60	C
Carbon dioxide	60	A
Carbon disulphide 100%	20	B
Carbon monoxide	60	A
Castor oil	60	A
Chlorates (K-, Na- and others)	20	A
Chlorates (K-, Na- and others)	60	B
Chlorates (K-, Na- and others)	60	A
Chloric acid to 20%	40	A
Chloric acid to 20%	60	B
Chlorides (ammonium-, Na- and others)	20	A
Chlorine cyanide	20	A
Chlorine water (saturated solution)	20	B
Chlorine, gaseous, dry 0.5%	20	A
Chlorine, gaseous, dry 100%	20	B
Chlorine, gaseous, moist 5%	20	B
Chlorine, liquid	20	C
Chloroacetaldehyde	20	C
Chloroacetic acid	20	A
Chloroacetones	20	C
Chloroacetylchloride	20	C
Chloroanilines	20	C
Chlorobenzaldehyde	20	C
Chlorobenzene	20	C
Chlorobenzotrifluoride	20	C
Chlorobenzoylchloride	20	C
Chlorocresoles	20	C
Chloroethylbenzene	20	C
Chloroform	20	C
Chloronaphthalines	20	C
Chloronitrobenzoic acid	20	A
Chromates (K-, Na- to 50%)	50	A
Chrome alum	60	A
Chromic acid	30	A
Chromic acid to 50%	40	A
Citrates (ammonium-, Na)	20	A
Citric acid	20	A
Citric acid	60	B
Cresol	20	C
Cumene	20	C
Cyanacetic acid	20	C
Cyanamide	20	A
Cyanides (K-, Na- to 50%)	60	A
Cyclohexanol	20	C
Cyclohexanone	20	C
Developer	40	A
Dextrose	50	A
Dibromomethylene	20	C
Dibutyl phthalate	20	C
Dibutylxalate	20	C
Dichloroethylene	20	C
Dichloropropylene	20	C
Dichromates (K-, Na-)	50	C
Diethyl ether	20	C
Diethylamine 100%	20	C
Diethylene glycol	60	C
Dimethylether	20	C
Di-n-butylether	20	C
Diethylphthalate	20	C
Dioxan	20	C
Diphenyl	20	C
Diphenylamine	20	C
Ethane	20	A
Ethanol	40	A
Ethanolamine	20	B
Ethyl acetate	20	C
Ethyl acrylate	20	C
Ethyl chloride	20	C
Ethylbenzene	20	C
Ethylene glycol	20	A
Fish oil	20	A
Fixing bath	60	A
Fluorides (ammonium-, K-, Na- and others)	60	A
Fluorine	20	B
Fluorine	60	C
Formaldehyde	60	A
Formamide 100%	20	C
Formiates (ammonium- and others)	20	A
Formic acid 100%	20	B
Formic acid 100%	60	C
Formic acid 50%	40	A
Furfural	20	C
Furfuryl alcohol	20	C
Gelatine	60	A

A = very good resistance
 B = average resistance
 C = not resistant

Medium	Temp. °C	Resistance
Gluconic acid	20	A
Glucose	60	A
Glutamic acid	20	A
Glycerine	60	A
Glycine	40	A
Glycol	60	A
Heptanes	20	A
Hexachloroethane	20	C
Hexacyanoferrates-II (Na-)	40	A
Hexacyanoferrates-III (K-)	40	A
Hexafluorosilicates (ammonium-, K- and others)	60	A
Hexafluorosilicic acid 32%	60	A
Hexamethylenetetramine (urotropine) 40% aqueous solution	60	A
Humic acids	20	A
Hydrazine, diluted solution 100%	20	C
Hydrazine, diluted solution 30%	20	A
Hydrobromic acid to 40%	60	A
Hydrochloric acid to 30%	20	A
Hydrochloric acid to 30%	60	B
Hydrochloric acid to 37%	20	A
Hydrochloric acid to 37%	40	B
Hydrofluoric acid to 40%	40	A
Hydrofluoric acid to 60%	60	B
Hydrogen bromide 100%	20	A
Hydrogen bromide 100%	60	B
Hydrogen chloride (gaseous, dry and moist)	40	A
Hydrogen cyanide	40	A
Hydrogen peroxide to 30%	60	A
Hydrogen peroxide to 90%	20	A
Hydrogen sulphide	60	A
Hydroxides (alkaline-earth metal)	60	A
Hydroxides (K-, Na-)	60	A
Hypochlorites (K-, Na- and others)	60	A
hypochlorous acid	60	A
illuminating gas	20	A
Iodates (K-, Na- and others)	60	A
Iodides (K-, Na-)	60	A
Iodine	20	C
Isobutylphosphate	20	C
Lactic acid 10%	20	A
Lactic acid 10%	60	C
Lactic acid 100%	20	C
Lard	20	A
Linoleic acid	60	A
Linseed oil	60	A
Malic acid	20	A
Methanol 100%	40	A
Methanol 100%	60	B
Methyl bromide	20	C
Methyl chloride	20	C
Methyl methacrylate	20	C
Methylamine	20	B
Methylene dichloride	20	C
Milk	20	A
Mineral oils	60	C
N,N-diethyl aniline	20	C
Naphthalene	20	C
Nitrates (ammonium-, K-, Na- and others)	60	A
Nitric acid 25%	20	A
Nitric acid 25%	60	B
Nitric acid 50%	20	A
Nitric acid 50%	50	B
Nitric acid 95%	20	C
Nitrites (K-, Na- and others)	60	A
Nitrobenzene	20	C
Nitrogen oxide	20	C
Nitroglycerine	20	B
Nitrous acid to 50%	50	A
Nitrous acid to 98%	20	C
Oleic acid	60	A
Oxalates (ammonium-, K-, Na- and others)	60	A
Oxalic acid	40	A
Oxygen	60	A
Ozone 10%	30	A
Ozone 10%	60	B
Palmitic acid	20	A
Paraffin	40	A
Pentyl laurate	20	C
Pentylacetate	20	C
Pentylalcohol	60	A
Pentylchloride	20	C
Perbonate (K-)	60	A
Perchlorate	40	A
Perchloric acid 70%	20	A
Permanganate (K-) 6 to 15%	40	A

A = very good resistance
 B = average resistance
 C = not resistant

Medium	Temp. °C	Resistance
Permanganate (K-) 6 to 15%	60	B
Permanganate (K-) to 6%	60	A
Peroxymonosulphuric acid (Caro's acid)	20	A
Persulphate (Ammonium-, K-, Na- and others)	40	A
Petroleum	60	A
Phenol 1%	20	A
Phenol 90%	45	B
Phenylhydrazine	20	C
Phenylhydrazine chloride	20	B
Phenylhydrazine chloride	60	C
Phosgene, gaseous	20	A
Phosgene, gaseous	60	B
Phosgene, liquid	20	C
Phosphates (ammonium-, K-, Na- and others)	60	A
Phosphoric acid	40	A
Phosphoric acid	60	B
Phosphorus pentoxide	20	A
Propane	20	A
Propanol	60	A
Pyridine	20	A
Rhodianides (ammonium-, K-, Na- and others)	60	A
Salicylic acid	20	A
Silicates (K-)	20	A
Soap solution	40	A
Stearic acid	60	A
Sulphates (ammonium-, K-, Na- and others)	60	A
Sulphites (ammonium-, K-, Na- and others)	60	A
Sulphur dioxide, gaseous, dry and moist 100%	60	A
Sulphuric acid to 40%	20	C
Sulphuric acid to 50%	50	A
Sulphuric acid to 50%	60	A
Sulphuric acid to 80%	40	C
Sulphuric acid to 80%	60	B
Sulphuric acid to 96%	20	A
Sulphuric acid to 96%	60	B
Sulphuric acid, fuming (10% oleum)	20	C
Sulphurous acid	60	A
Tallow	60	A
Tan bark	20	A
Tar, free from aromatic hydrocarbons	20	A
Tartaric acid	60	A
Tetraethyl lead	60	A
Tetrafluoroboric acid	20	A
Tetrahydrofurane	20	C
Thickness	60	A
Toluene	20	A
Transformer oil	60	A
Trichloroethylene	20	C
Turpentine	20	A
Urea	60	C
Vegetable oils	40	A
Vinyl acetate	20	C
Viscose spinning solutions	60	A
Water	40	A
Water	60	B
Wine	40	A
Wine vinegar	50	A
Wood tar	20	C
Xylenes	20	C

Material properties of the hard PVC used
 Material description according to DIN 7748 PVC-U-E-D-080-04-28
 Tensile strength according to DIN 53 455 min. 40 N/mm²
 Elongation at tear according to DIN 53 455 min. 65%
 Puncture strength according to DIN 53 481 min. 20 KV/mm
 Surface resistance according to DIN 53 482 min. 10 10
 Thermoforming resistance according to DIN 53 460/B min. 75 °C
 Temperature resistance in the application max. 65 °C
 Flammability according to UL 94 Level V-0
 Material classification to DIN EN 4102, Class B1 and B2-tested

Planning and selection of underfloor systems



Installation requirements

The following belong to the installation requirements to be taken into account when planning and selecting an underfloor system:

- Number of services (power, communications, data)
- Filling factor of the electrical installation ducts and trunking
- Cable bend radii
- Reserve
- Concurrency factors
- Planned for indoor use

Requirements from construction planning

The architectural building planning produces, amongst other things, the following preconditions:

- Type of room (dry or wet)
- Floor covering version (dry or wet-cleaned)
- Thickness of the floor covering
- Type and version of the screed
- Traffic loads
- Ambient temperature (underfloor heating)
- Indoors

Organisation requirements

Areas of application and user requirements with regard to electrical installations determine the organisation requirements for an underfloor system. This produces, among other things, the following criteria:

- Flexibility of use (e.g. simple adaptation to changing use specifications)
- Easy changing of device equipment
- Use of fixed or movable installations

Safety requirements

The topic of safety is playing an ever more important role, in particular in the data technology sector. Therefore, when selecting and designing an underfloor installation, this point can also be of importance. This is the case, for example, when data networks must be protected against unauthorised access.



Inter-unit work



The electrical installation engineer should arrange the coordination of inter-unit work with the responsible construction management, in order to guarantee flawless mounting of the electrical installation duct systems, along with quality across all the construction sections.

Screed work

Screed-flush trunking systems and the underfloor boxes of the screed-covered trunking system serve as a binding draw-off gauge for the screed. The adjustment height of the system components is aligned to the structural specifications of the construction management.

In the area of the draw boxes and the trunking, the person laying the screed must carefully work, compact and draw-off the screed.

Screed can be destroyed by crack formation. To avoid crack formation, adjacent screed-flush systems and system components may not be subjected to loads before final hardening.

Floor covering work

The company laying the floor covering is responsible for ensuring that the floor covering is cut out exactly and adjusted to the sockets and outlet points of the trunking system. The joint dimensions must be matched with the construction management. The lids of the screed-flush underfloor boxes and trunking must be covered with floor covering. Carpets used must be securely laid and resistant to cuts.

Building cleaning

Particularly during first cleaning of the floor areas, device installation units must be carefully cleaned free of building dust and other impurities, in order to prevent impairment of their function.

During the use phase, device installation units must be checked for correct use and possible damage, in order to avoid subsequent damage.

In particular, device installation units for wet-cleaned floors (e.g. tube body cassettes, GRAF9 or GES R2) must be maintained regularly and the function of the seal checked. For this, regular lubrication of the seal is required.

Underfloor duct and trunking systems

The cables are laid in electrical installation duct and trunking systems. Ackermann made by OBO can offer various duct and trunking systems, which are suited to different applications and structural requirements.



EÜK screed-covered duct system

The screed-covered duct system is suitable for all screed types in all routing types, also in hot screed. The electrical installation ducts form a tight, hidden cable routing

grid in the screed. Underfloor sockets allow the expansion with device installation units and access to the electrical installation.



OKA open trunking system

The Electrical installation ducts and trunking can be adjusted to the millimetre to the upper edge of the screed. OKA trunking is suitable for screeds in all routing types, with the exception of heated screed. The benefit when changing the use of the room: The screed-flush Electrical

installation ducts and trunking can be opened along their entire length, allowing flexible cable routing. Depending on the screed height, device installation units are either installed in the trunking route or in extension units that are mounted at the side.



OKB open trunking system

The OKB trunking system uses the trunking sections for cable routing and as installation space for electrical installations. The OKB trunking is suitable for routing in front of floor-height windows or walls. Cables exit via a

surrounding brush bar. The trunking can be adjusted exactly to the top edge of the screed to the millimetre and can be opened along the entire length.



IBK in-concrete system

The IBK system is used in buildings with concrete core activation or direct use of the concrete surface, for ex-

ample with high loads. The IBK duct system is installed in the raw building when creating the floor plates or raw concrete screed.



System 55 for thin screed layers

Low floor structure heights require special solutions for underfloor installations. System 55 is used for screed heights of 55 mm or higher.



AIK on-floor trunking system

The AIK on-floor trunking system is installed on the finished floor. The system is particularly useful in places where classic underfloor systems cannot be installed:

during building renovation, particularly in listed buildings. Device installation units above the floor (Telitanks) are used for the installation of electrical devices.

Screed structure



Nominal screed thickness for EÜK screed-covered duct system

An important precondition for a proper underfloor installation is the screed structure. In the case of a screed-covered system, it is important that the screed thickness over the duct corresponds to the values in the standard, to avoid the formation of cracks. The nominal screed thickness is dependent on the insulation layer, the individual load and the screed type. More detailed information on the nominal thickness of the screed in Germany can be found in DIN 18560.

Here, under certain circumstances, chemical or thermal loads may occur, which require special additional measures to protect the mounted system.

The OKA and OKB screed-flush trunking systems, as well as the UZD underfloor box, only obtain their load capacity for correct use when jointed to the neighbouring screed.

The following points are, therefore, important:

- The duct or trunking system may not be walked upon or subjected to similar loads after it has been mounted on the raw concrete.
- The duct or trunking system must form a composite system with the adjacent screed.

The following points should particularly be taken into account with the OKA and OKB system:

- Line the side profiles with screed to achieve good static support in the screed. The screed should be worked and compacted carefully.
- The opened trunking system may not be walked upon nor subjected to similar loads. Measures to provide suitable protection should be agreed with the works supervisor.

Aggressive screed (e.g. magnesia screed)

All the metallic parts coming into contact with an aggressive screed must be protected during construction using a tested epoxy resin-based corrosion protection agent. A second coating is required.



Use in float finishes

When using screed-covered duct and screed-flush trunking systems in float finishes, seal off any openings in the systems using suitable agents (e.g. adhesive tape). In so doing, ensure that the sealing process does not create any cavities between the components and the screed.

With screed-covered duct systems, openings may be created through duct joints on connection shackles and vertical bends and on the underfloor socket bodies. In addition, the top ends such as the mounting protection lid, mounting lid and the blanking lid should be covered or stuck down using suitable means.

With screed-flush trunking systems, openings may be created through joints of the trunking units, at junctions, extension units and end sections, and at the transition of the trunking bases to the side profiles. The side profiles and lid joints on the trunking covers should also be covered.

Use in poured asphalt

When using electrical installation duct systems in poured asphalt, it is important to protect the duct system against the impact of heat.

The screed-covered ducts may not, under any circumstances, have a direct connection with the poured asphalt. The high installation temperature of approximately 250 °C means that changes to the shape of metallic parts cannot be ruled out. An insulation layer, e.g. made of Fasoperl plates or bitumen corrugated card, protects the duct sections from the impact of heat.

Also, the screed-flush ducts may not, under any circumstances, have a direct connection with the poured asphalt. Screed anchors are the exception here. An approximately 15–20 mm thick insulation strip is fastened to both sides of the ducts before the poured asphalt is added. After cooling, the insulation strip between the duct and the screed plate is removed and filled using a suitable casting compound.

Device installation units

Device installation units offer installation space for power, data and multimedia connections in the floor structure. Various solutions are available, depending on the application.



GES service outlets

The GES service outlets are the tried-and-true solution for office installations with carpeted floors. They are available in plastic or metal. The service outlets possess countless intelligent details, such as cable routing clips, carpet protection frames, reliable edge protection and a locking lid closure system with automatic lid opening.



Cassettes

The compact, flush-floor cassettes can be adjusted to the height of the floor and can be completely decoupled from the socket base. Cassettes are particularly suitable for floor coverings such as tiles or parquet. There are various versions for dry, moist and wet-cleaned floor coverings. Stainless steel and brass not only look good, they also provide lasting quality.



GES R2 floor sockets

The OBO GES R2 floor sockets are an ideal underfloor solution, when a discreet appearance, a high load capacity and varied functionality are required. Their handling is simple: Pipelines are inserted in the compact installation space and that space is closed off with a lid. The installation socket of the GES R2 floor sockets is pre-equipped with two sockets. To the side of the socket, there is space for up to two connection sockets for data technology applications, as an option.

UDHOME floor sockets and floor boxes

Completely pre-equipped mounting units are available under one order number. The floor sockets and floor boxes of the UDHOME family are mounted directly on the raw concrete and connected with flexible installation pipes – it couldn't be simpler.



Modul 45® devices

For maximum flexibility, the device installation units can, depending on requirements, be equipped with the comprehensive Modul 45® series from OBO Bettermann or with standard accessories. Both the sockets and data and multimedia technology of the Modul 45® series are simply snapped in, without tools, making work quicker and thus cheaper.

Selection of the right device installation units



IP protection class to EN 50085-2-2

Electrical installation duct and trunking systems and device installation units can be used only in interior areas of buildings and, depending on the construction type, in dry, moist or wet-cleaned floors. The cleaning type of the floor covering is the decisive criterion for the selection of the matching device installation unit. The matching of the device installation unit to the floor care type ensures that the electrical installation is protected against the ingress of moisture and dirt.

Ackermann made by OBO device installation units are tested according to EN 50085 and labelled appropriately. With a protection rating of at least IPX4 when closed, all the device installation units for wet-cleaned floors completely fulfil the requirements of EN 50085-2-2.

Device installation units with a tube body also protect the electrical installation against the ingress of water when used – despite a reduced protection level of IP20. The tube body ring meets the standard requirements of EN 50085-2-2 and protrudes 10 mm above the top edge of the floor covering. Up to this height, puddles or waves of water cannot ingress into the installation compartment.

IK protection types

The IK classification to EN 50102 grades the mechanical stability of electrical installation duct systems.





Protection ratings to IP and IK for device installation units



	IP when used	IP when unused	IK
Plastic GES	20	40	08
Stainless steel GESM	20	40	10
Metal GRAF9	20	65	10
Cassette, cord outlet RKS	20	40	10
Cassette, tube body RKF	20	65	10
Cassette, blank	20	65	10
UDHOME	20	40	10
UDHOME tube body	20	65	10
GES R2 metal	20	66	10
GES R2 plastic	20	40	10

Dry care

Textile floor coverings, cleaned by sucking up the dirt without or with only a little fluid, are considered as dry-cleaned. If a cleaning solution is used, then the dosage must be so low that there is no chance of puddle formation or saturation of the floor covering.

Moist care

Smooth floor coverings such as linoleum, PVC, sealed wooden floors or polished stone floors fulfil the requirements for moist care. The building cleaning trade defines this type of cleaning as a dust-collecting wipe using moist or prepared cleaning textiles.

Wet care

Wet care occurs primarily with stone floors, tiles, ceramic floors, linoleum and PVC. This cleaning method removes particularly tough and bonded soiling.

In the first step, cleaning textiles apply as much cleaning fluid as is necessary to soften and dissolve strongly adhering soiling. In the second step, the remaining fluid and soiling is wiped up using cleaning textiles.

Standardisation and testing

Responsibilities in standardisation

Standards can be divided into two categories: erection specifications and device testing specifications. The installation engineer is primarily responsible for compliance with the erection specifications. In Germany, the standards of the DIN VDE 0100 series define the most important requirements for electrical installations.

European standardisation

Device testing specifications are product standards, which specify the testing criteria for specific products. The manufacturer is responsible for compliance with these regulations. Conformity with a specific testing specification is often documented by a symbol approval certificate. This confirms that an independent testing and certification institute has carried out the appropriate tests and documented the results.

Device testing specifications are particularly important for:

- Safety (protection against electric shocks)
- The definition of the application areas
- The function definition
- The evaluation of load capacities

The standard EN 50085 defines the requirements for electrical installation duct systems. Part 2-2 deals with underfloor and on-floor systems and was published in July 2009. Underfloor systems from Ackermann made by OBO meet EN 50085-2-2 and have the corresponding VDE certificates of approval.

Classification for underfloor systems

EN 50085-1, as a general part for electrical installation duct systems, and EN 50085-2-2, as a system-specific part for underfloor systems, both require classification of the products. This means there is a standard Europe-wide specification of product properties. For the first time, a standard for installation systems also contains optional load tests for vertical loads, which affect a large area (heavy load).

Classification to EN 50085-1

6.1	According to material
6.2	According to impact resistance
6.3	According to temperatures
6.4	According to the resistance to flame propagation
6.5	According to the electrical conductivity
6.6	According to electrical insulation capability
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991
6.8	According to protection against corrosive or impure substances
6.9	According to the fastening type of the system duct cover
6.10	According to the electrical protection separation

Classification to EN 50085-2

6.101	Depending on the type of floor care
6.102	According to resistance to vertical loads affecting a small surface area
6.103	Optional classification according to resistance to vertical loads affecting a large surface area



Installation specifications

Erection regulations are used particularly for:

- Safety (protection against electric shocks)
- Maintaining the electrical function
- Electromagnetic compatibility
- Preventing fires

The erection specifications according to DIN VDE describe numerous points, which the electrical installation engineer must take into account when setting up and mounting an underfloor system. Here are some of the most important points:

Mechanical loads of cables

According to DIN VDE 0298, with heavy current and data cables, it must be ensured that specific values for strain loads and bend radii are not exceeded. The standard also describes the approved cable fastening types with clips and strain reliefs.

Protective measures and equipotential bonding

Metallic duct systems must be included in the protective measure and the equipotential bonding. This should thus ensure the protection against electric shocks to DIN VDE 0100-410 and the electromagnetic compatibility to EN 50310, EN 50173 and EN 50174-2.

Separation of different services

According to DIN VDE 0100-520, cables of different current types may be installed together in a routing system if all the cables are insulated against the next highest occurring voltage.

Fire protection

The main causes of fire in heavy current cables are

- high-resistance short circuits or faults to earth, e.g. on mechanically or thermally damaged cables
- faulty electrical connections, e.g. due to a loose contact
- heat build-ups

The transmission of fire and smoke into other fire sections must always be prevented for a sufficiently long period. This supports both attempts to escape and also extinguishing measures. This also applies to underfloor systems, which run under the fire section and emergency and escape routes. The cable system directives (M)LAR and the system floors directive (M)SysBöR regulate this in greater detail.

Heavy current cables and other electrical resources in underfloor installations

Select the size of the electrical installation ducts so that the required number of cables can be routed without damage.

When selecting the heavy current cables for routing in electrical installation ducts, observe DIN VDE 0100, particularly Part 520. With regard to the current carrying capacity of heavy current cables, see DIN VDE 0100 Part 430 and Part 523 and DIN VDE 0298, particularly Part 4.

Equipotential bonding in underfloor systems



According to EN 50085, electrically conductive electrical installation duct systems and their expansion components must offer the connection options to be included in the equipotential bonding of a building.

The inclusion in the equipotential bonding prevents dangerous potential differences according to DIN EN 50310. All the underfloor systems from Ackermann made by OBO are equipped in such a way that inclusion in the protection measure is possible without a great amount of work.

The protective conductor connection bracket 8AWR, for example, can be used to include a duct system in the equipotential bonding. The protective conductor connection bracket is inserted in the existing installation markings or in appropriate grooves. The fastening screw must be tightened with a torque of at least 1.2 Nm. The clamping range is designed for two connection cables of 1.5 to 4 mm².

DIN EN 50174-2 (VDE 0800-174-2) "Information technology – Cabling installation" requires the inclusion of conductive installation systems in the additional functional equipotential bonding up to the connection point. This equipotential bonding does not serve as protective equipotential bonding, but serves as functional equipotential bonding for EMC protection.

The electrical planner and the electrical installation engineer is responsible for the implementation of the protective measure and compliance with the erection requirements valid on-site.



Footfall sound



The underfloor systems from Ackermann made by OBO are intended for installation in floating wet screeds. Normally, there are requirements for the transmission of air and footfall sound, both for vertical sound transmission, i.e. from storey to storey, and for horizontal sound transmission, i.e. from adjacent rooms.

As the underfloor systems are also run under partitions, there is frequently the question of the influence of the system on noise transmission. These influences were evaluated in qualified tests to determine the transmission of air and footfall sound carried out together with the MÜLLER BBM GmbH testing institute in Planegg, Munich, for the EÜK duct and OKA, OKB trunking systems and the UD-HOME4 floor boxes.

For office buildings, a distinction must be made between the binding construction law requirements to DIN 4109 [4], which must be observed with regard to air and footfall sound insulation between foreign areas of use, and between the recommendations for protection against air and footfall sound in the same office, e.g. to Supplementary Sheet 2 for DIN 4109 [4] or the VDI directive 2569 [5]. The VDI directive 2569 is currently being revised.

The following table summarises the requirements of DIN 4109 [4] and the recommendations according to Supplementary Sheet 2 of DIN 4109.

Component	Evaluated noise insulation dimension R' _w in dB to DIN 4109 and Supplementary Sheet 2 to DIN 4109	Evaluated noise insulation dimension R' _w in dB to DIN 4109 and Supplementary Sheet 2 to DIN 4109
Ceilings		
Separating ceilings within own use areas	52...55	46...53
Separating ceilings between other use areas (construction law requirement)	54...55	53
Walls¹		
Walls between rooms with normal office activities or between corridors and such rooms	37...42	-
Walls between training rooms or similar and between corridors and such rooms	47	-
Walls of rooms for concentrated mental work or for dealing with confidential matters or walls between corridors and such rooms	45...52	-
Doors²		
Doors in corridor partitions of rooms with usual office activity	27	-
Doors in corridor partitions of training rooms	32	-
Doors in corridor partitions of rooms for concentrated mental work or for dealing with confidential matters	37	-

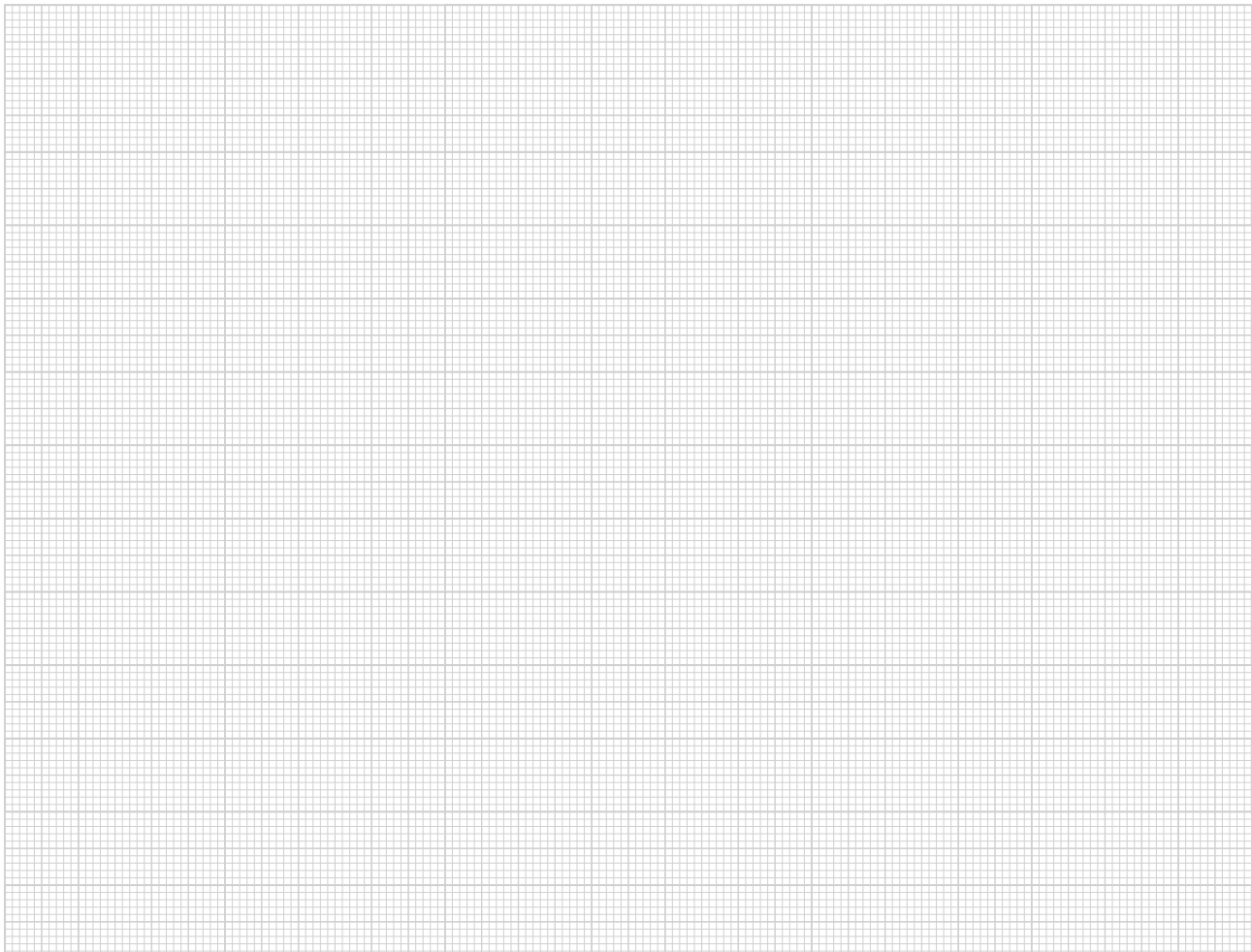
¹ Without taking doors into account.

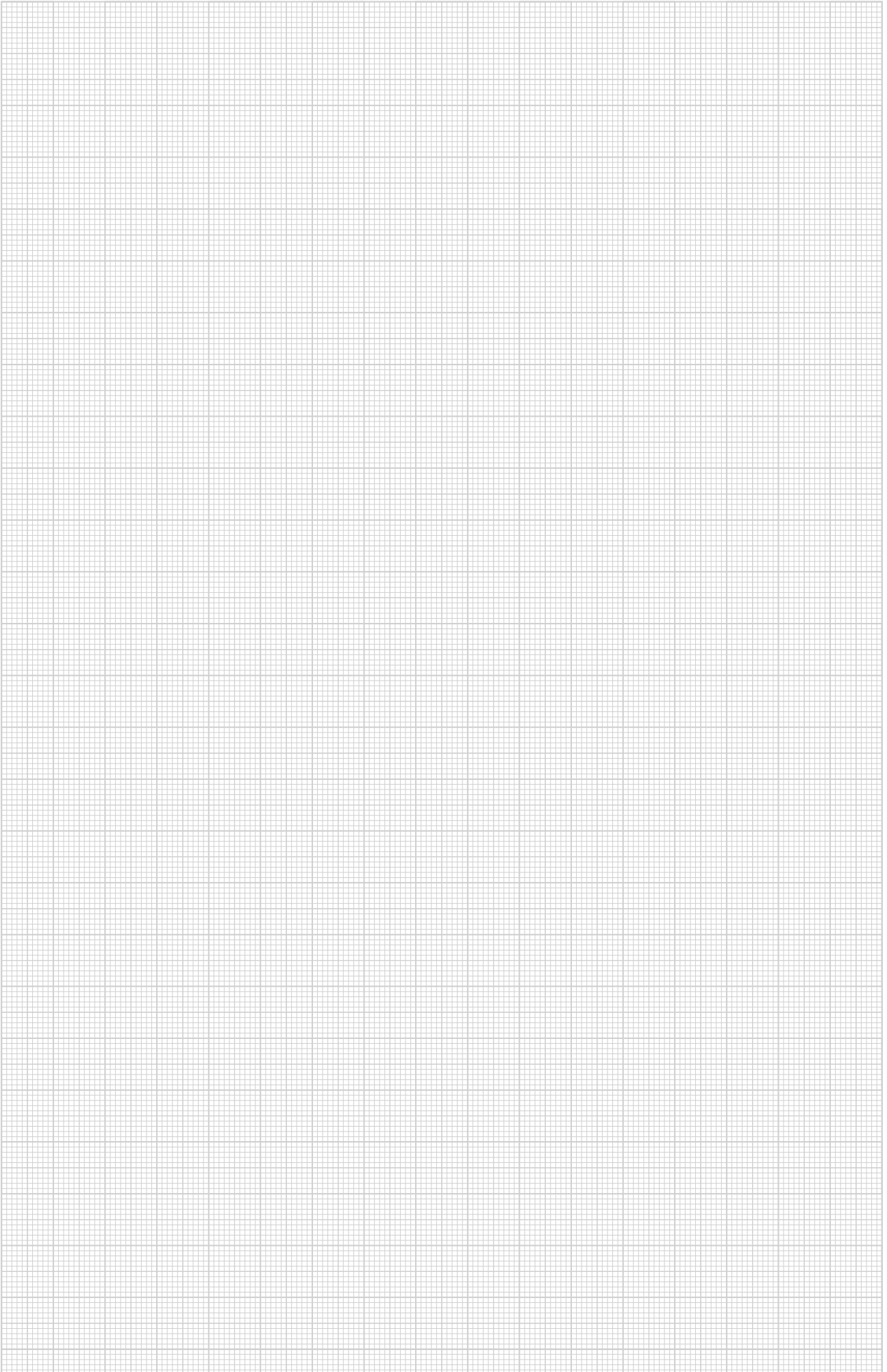
² With doors, the evaluated sound insulation dimension R'_w applies as the value for sound insulation for sole transmission through the door in a function, installed state.

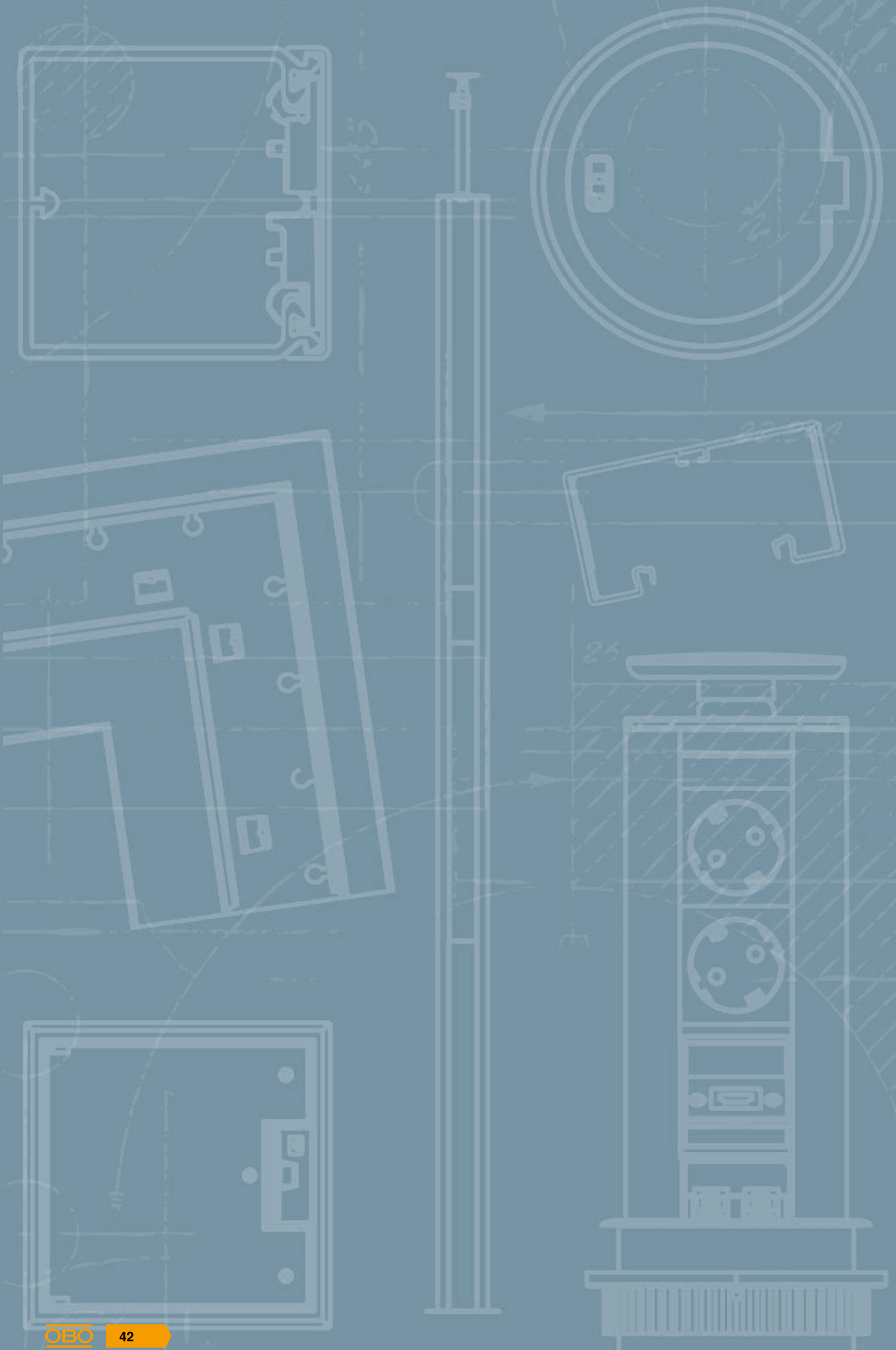
Planning checklist

The following points should be observed for the correct installation of an underfloor system and may need to be agreed with different units:

- ✓ **Agreement of the specified metre setting out points with the construction company for checking the building shell dimensions and for adjustment of the trunking system's height**
- ✓ **Testing of the mounting surface for unevenness to DIN 18202 Tab. 3**
- ✓ **The installation area must be protected from the weather and free of building debris and foreign material, i.e. swept clean**
- ✓ **Observation of fire protection directives, load requirements and impact sound measures**
- ✓ **Detailed routed diagram including positioning of the necessary system components**
- ✓ **Parameters for floor structure, floor type and cleaning, screed height**
- ✓ **Parts list of the articles used in the project**
- ✓ **Floor design of the responsible architect**







Electrical installation ducts and trunking



WDK cable trunking

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Rapid 45-2 device installation trunking

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Rapid 80 device installation trunking

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Device installation trunking accessories

64



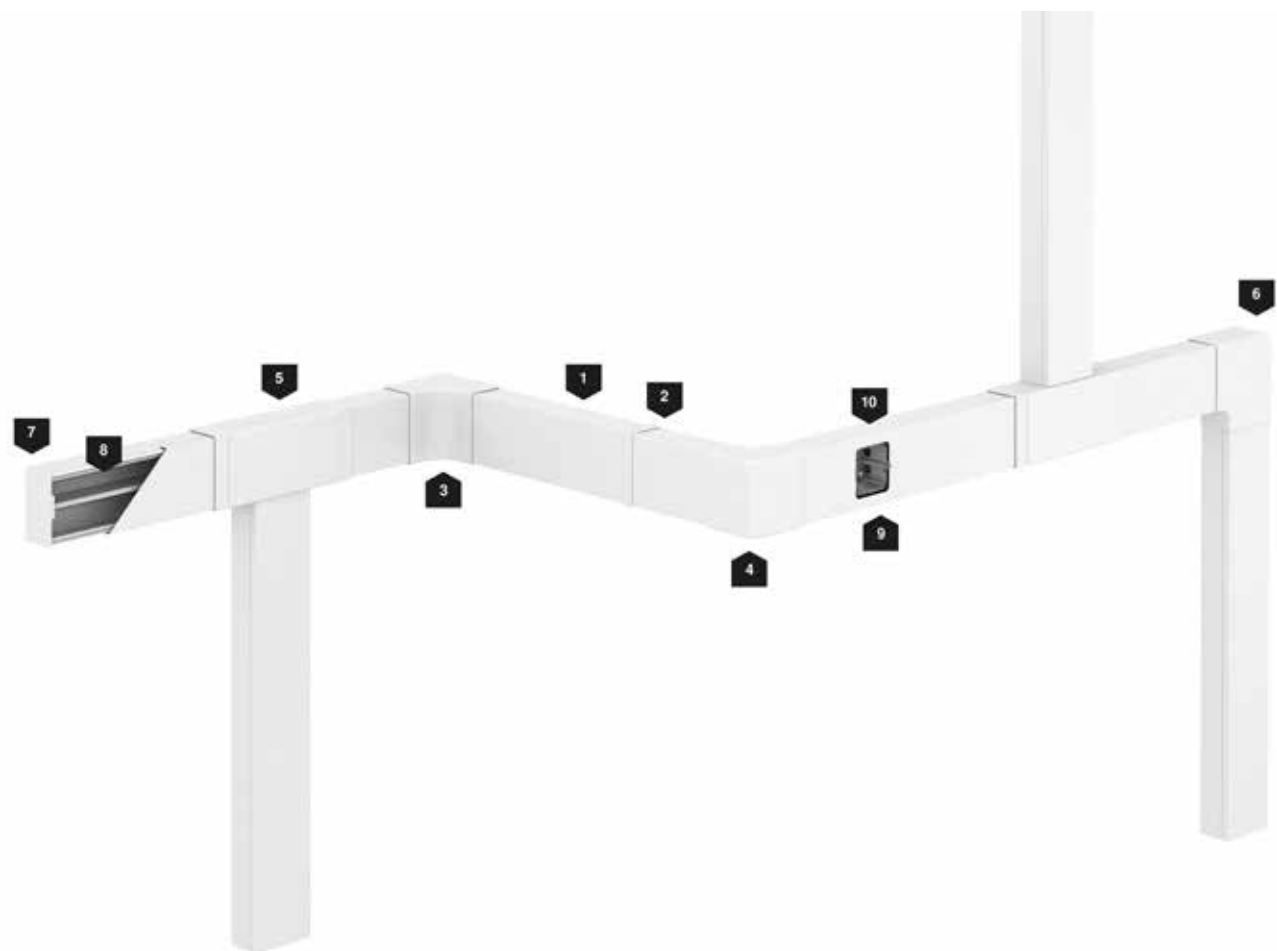
System description



WDK trunking is particularly suited for areas in which appearance is not a key factor – for example, workshops, production facilities and residential cellars. Devices of width 60110 to 60210 can be installed in the PVC wall and ceiling trunking. Together with the accessory mount-

ing box, any standard accessory from any manufacturer can be installed. A wide range of fittings guarantees solutions for all kinds of applications. The trunking, made of halogen-free material, guarantees compliance with the highest safety standards.

Installation principle



- 1** Trunking
- 2** Joint cover
- 3** Internal corner cover
- 4** External corner hood
- 5** T and cross-section cover
- 6** Flat angle cover
- 7** End piece
- 8** Partition
- 9** Accessory mounting box
- 10** Cover for single accessory mounting box

Mounting examples



Mini trunking mounting
Remove the protective film. Stick the trunking to a dust-free, adherent substrate.



Cutting mini trunking
The OBO shears can be used to create an exact straight cut for the WDK trunking. The shears can be used for trunking sizes of up to 25 x 45 mm.



WDK for workshops
Together with accessory mounting boxes, WDK cable trunking of 60 mm trunking height can be used as device installation trunking.



WDK with nail strip
The nail strip means that WDK trunking can be mounted with steel nails. At the same time, it prevents nail damage to the cables. Of course, the nail strip can also be used as a separating retainer for routing different voltage levels.



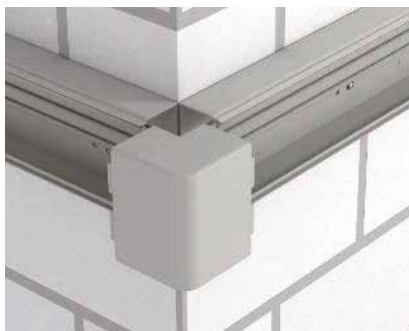
Cover clip mounting
The cover clip is locked into the cover contour. To insert the cables, it can be moved forward through 30°. The clip stabilises the WDK trunking and keeps the cables in the trunking.



Internal corner cover mounting
The hood fitting is placed over the mounted WDK trunking and locks into the cover contour.



External corner hood mounting
The bases of the WDK trunking are mounted on the wall up to the corner.



External corner hood mounting
After the cables have been routed, the external hood fitting is placed on the bases.



Device socket mounting
The device socket is locked onto the floor connectors.



Device socket mounting
Then the device socket is fixed to the WDK trunking using the bolt located in the base.



Mounting with nail gun
Mounting of the cable routing trunking is fast and efficient with a Spit nail gun.



RK universal trunking
The universal duct hides the cables inserted in distributors and counter cabinets.



RK clip mounting
The clips (OBO Quick clip Pg16) are mounted using knock-in anchors on the left and right of the switching cabinets. The knock-in anchors are contained in the scope of delivery.



RK end piece mounting
The end pieces are fastened by locking them in the clips.



Cutting RK covers
The covers are cut to the appropriate length using a standard coping saw.



RK cover mounting
Simply lock the cover in the end pieces.



RK front cover mounting
Attach the front cover to the cover clips.



RK complete mounting
The universal trunking allows tidy routing, even if a lot of cables need to be hidden.

System description



The Rapid 45 generation unites symmetrical design, homogeneous colour quality and technical flexibility in a single system. Innovative fittings allow practical wall installation in administration buildings, commercial areas and in industry. In three dimensions, the Rapid 45-2 device installation trunking offers a wide range of applications.

Rapid 45-2 combines straightforward design and the highest quality with perfect handling in termination and processing. Accessory parts, such as end pieces or variable fittings, fit both the plastic and also the aluminium trunking. The Rapid 45-2 in anodised aluminium is always an elegant solution for offices and administrative areas. A very high level of quality can be seen in all the system details.

Installation principle

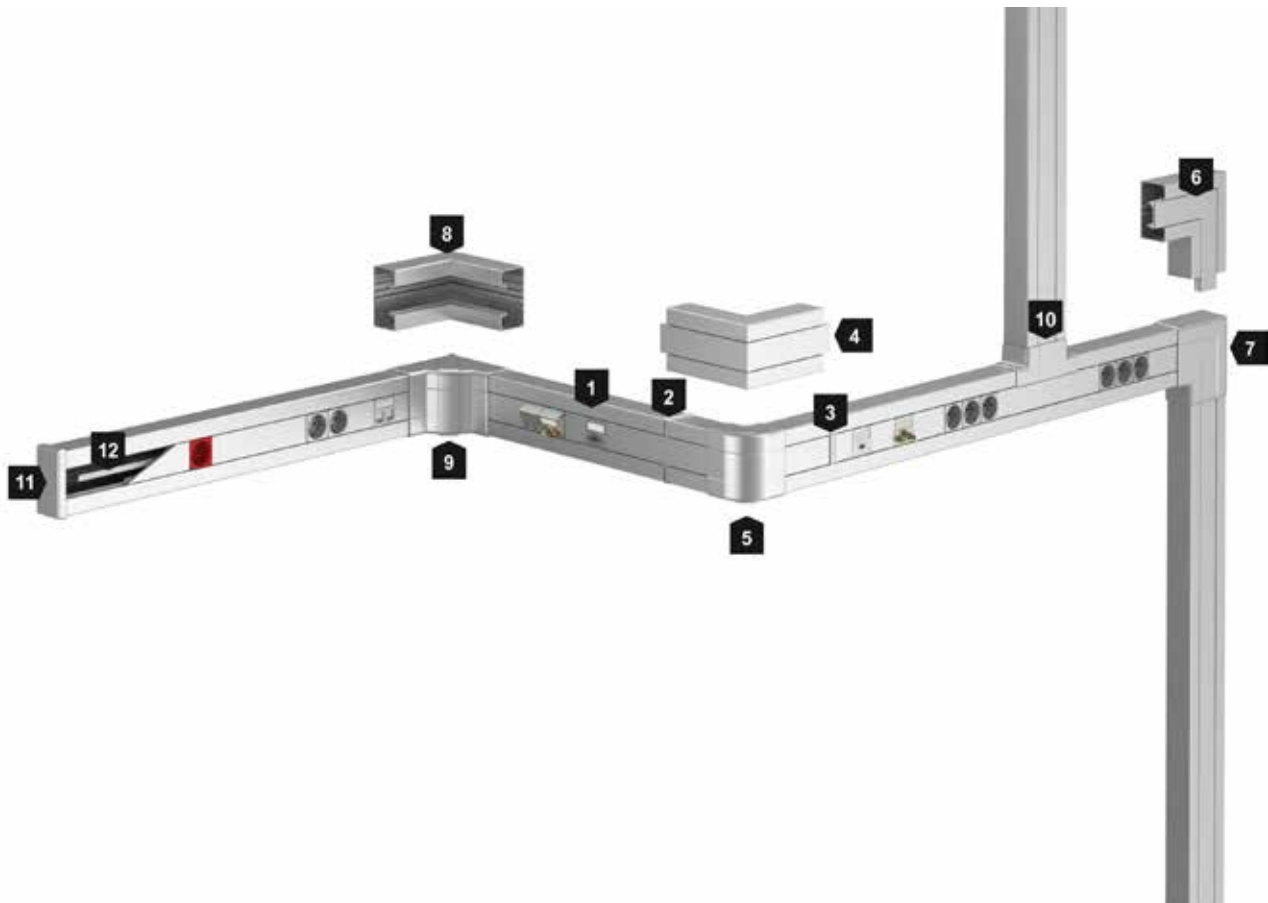
Rapid 45-2 plastic device installation trunking



- 1** Device installation trunking
- 2** Trunking connector and joint cover
- 3** Joint cover
- 4** External corner
- 5** External corner cover
- 6** Flat angle
- 7** Flat angle cover
- 8** Internal corner
- 9** Internal corner cover
- 10** T piece adapter
- 11** T piece adapter on WDK
- 12** End piece
- 13** Partition

Installation principle

Rapid 45-2 aluminium device installation trunking



- 1** Device installation trunking
- 2** Trunking connector and joint cover
- 3** Joint cover
- 4** External corner
- 5** External corner cover
- 6** Flat angle
- 7** Flat angle cover
- 8** Internal corner
- 9** Internal corner cover
- 10** T piece adapter
- 11** End piece
- 12** Partition

Mounting aid



Office application area

The many practical fittings permit easy integration of the Rapid 45-2 device installation trunking system into any office situation. Switches, sockets and data technology are just clicked into place.



Cutting trunking

The Rapid 45-2 PVC device installation trunking can be processed using a standard coping saw, whilst the Rapid 45-2 aluminium trunking should be cut with an electrical circular or capping saw.



Trunking mounting

The Rapid 45-2 device installation trunking can be mounted quickly on the wall, for example, using knock-in anchors.



Variable fitting mounting

The variable fittings allow an attractive cover, even for corners which are not at a right angle. Fastening takes place in the cover contour.



Fixed fitting mounting

The fixed fittings are integrated in the trunking base installation.



Joint connector mounting

The joint connectors can be separated from their stalk and serve both as a joint connector and a joint cover for cut edges.



Joint connector mounting

The joint connectors are attached to the trunking bases as joint covers. This provides an optically attractive connection for the trunking bases.



Joint connector mounting

In this way, the joint connectors can be used for both PVC trunking and aluminium trunking.



End piece mounting

The end piece is attached to the C profile rail on the trunking base. A spring attached to the end piece locks it securely in place.



Socket mounting

The cables are connected to the socket.



Socket mounting

The socket is pushed into the Rapid 45-2 device installation trunking without additional aids.



Socket mounting

The module socket locks into the cover contour.



British Standard socket mounting

Lock the socket in the trunking closing contour and secure it with locking brackets on both sides. Mount the covers.



Finished mounting

The flexibility ensures clean and quick mounting.



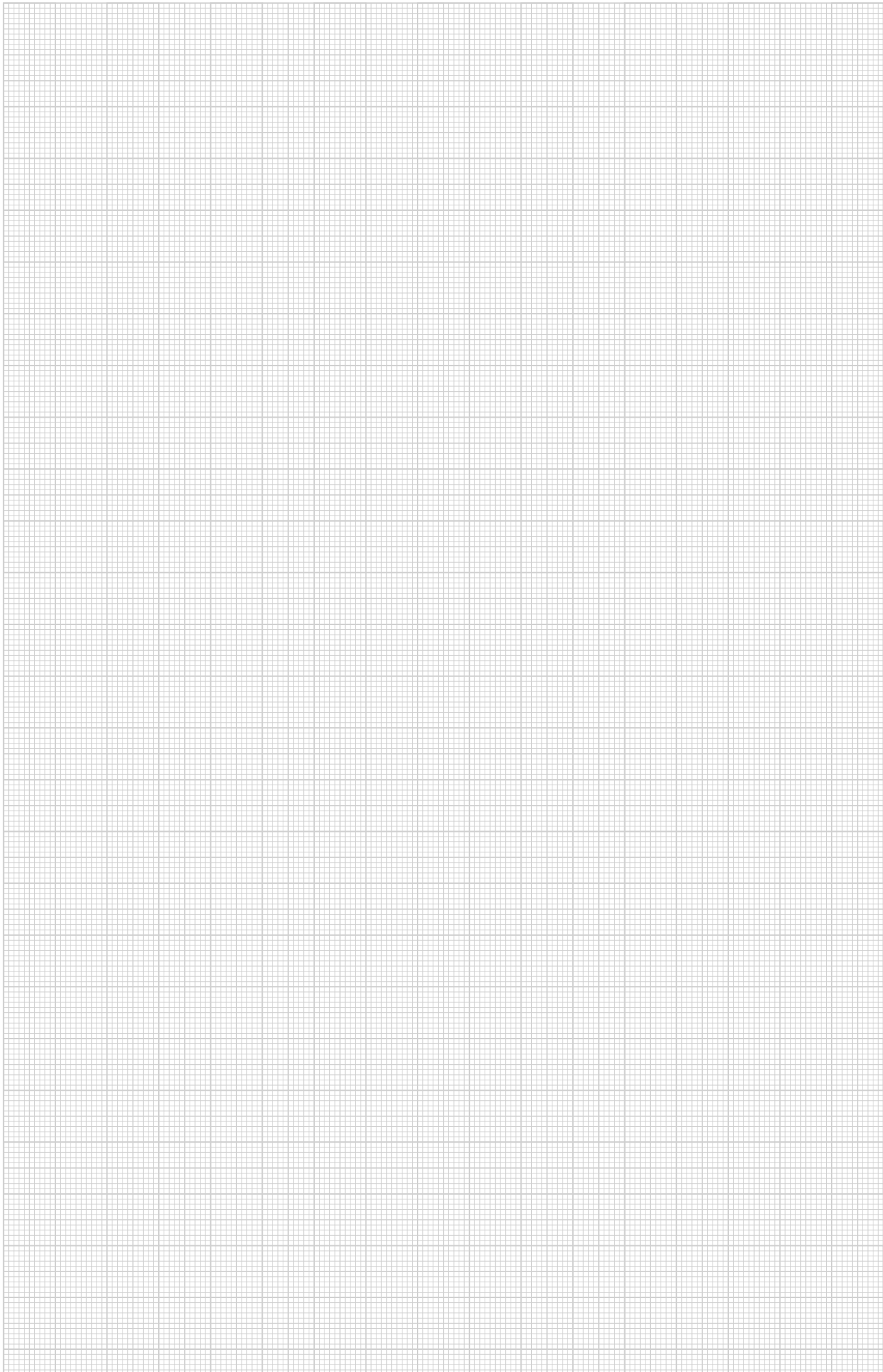
Earthing of aluminium Rapid 45

The cover for the aluminium trunking system consists of a PVC base profile and an aluminium screen and thus need not be connected conductively to the trunking base.

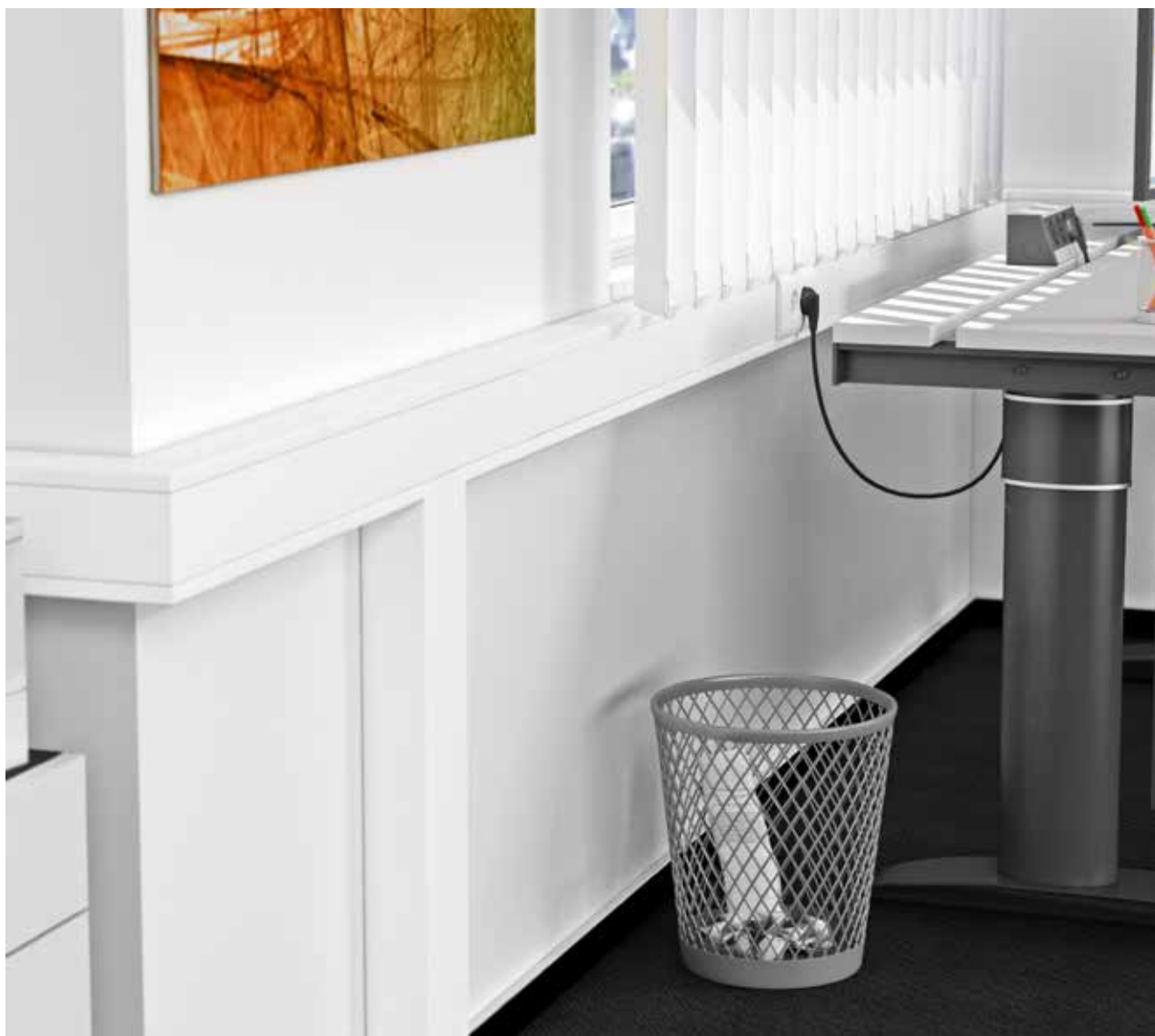


T piece adapter mounting

Easy-to-mount hood fittings are available for creating rising and falling T pieces.



System description

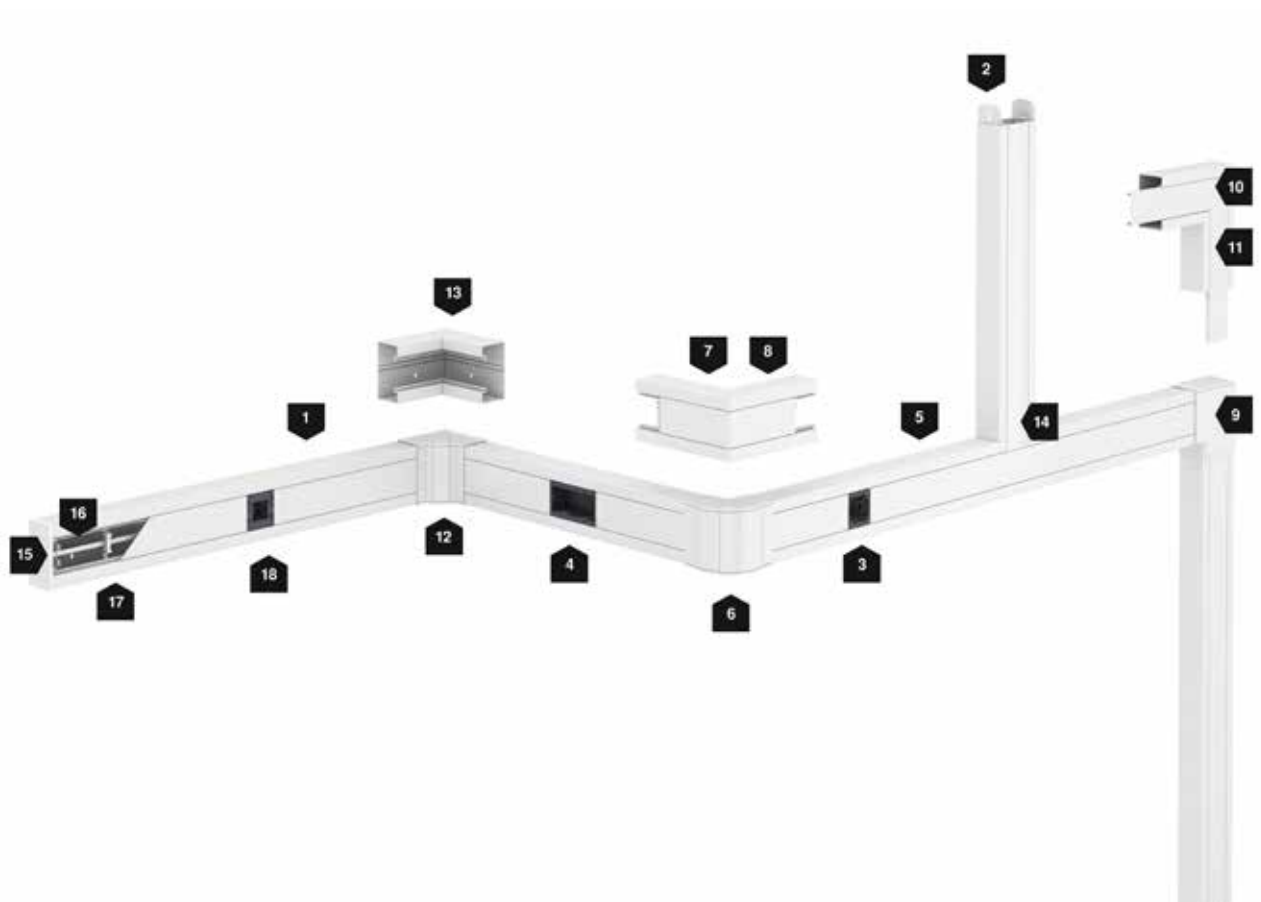


Rapid 80 combines design and function into a single system in an unfussy and convincing manner. Thanks to the consistent standardisation of system components, the three types of trunking in plastic, sheet steel and aluminium can be used either as individual variants or in combination.

Rapid 80 is thus the right choice in any location where there is a lot to install. Function and an attractive appearance simply go well together in this device installation trunking. The clear advantage is also its flexibility. The right system is available for every building.

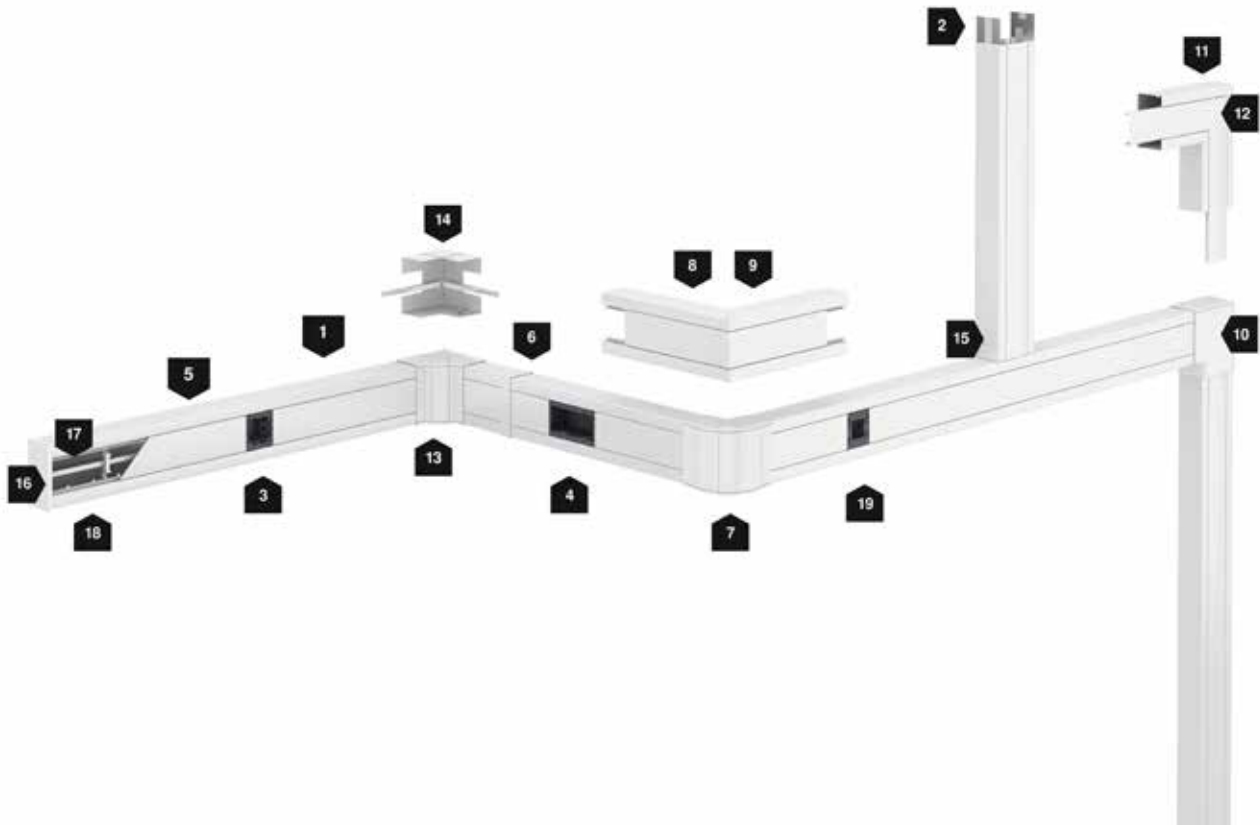
Installation principle

Rapid 80 plastic device installation trunking



- | | |
|--|--|
| 1 Trunking | 11 Flat angle cover |
| 2 Coupling | 12 Internal corner cover |
| 3 Single accessory mounting box | 13 Internal corner |
| 4 Double accessory mounting box | 14 T piece |
| 5 Trunking cover | 15 End piece |
| 6 External corner cover, variable | 16 Partition |
| 7 External corner | 17 Duct clamp |
| 8 External corner cover | 18 Single accessory mounting box, Modul 45° |
| 9 Flat angle cover | |
| 10 Flat angle | |

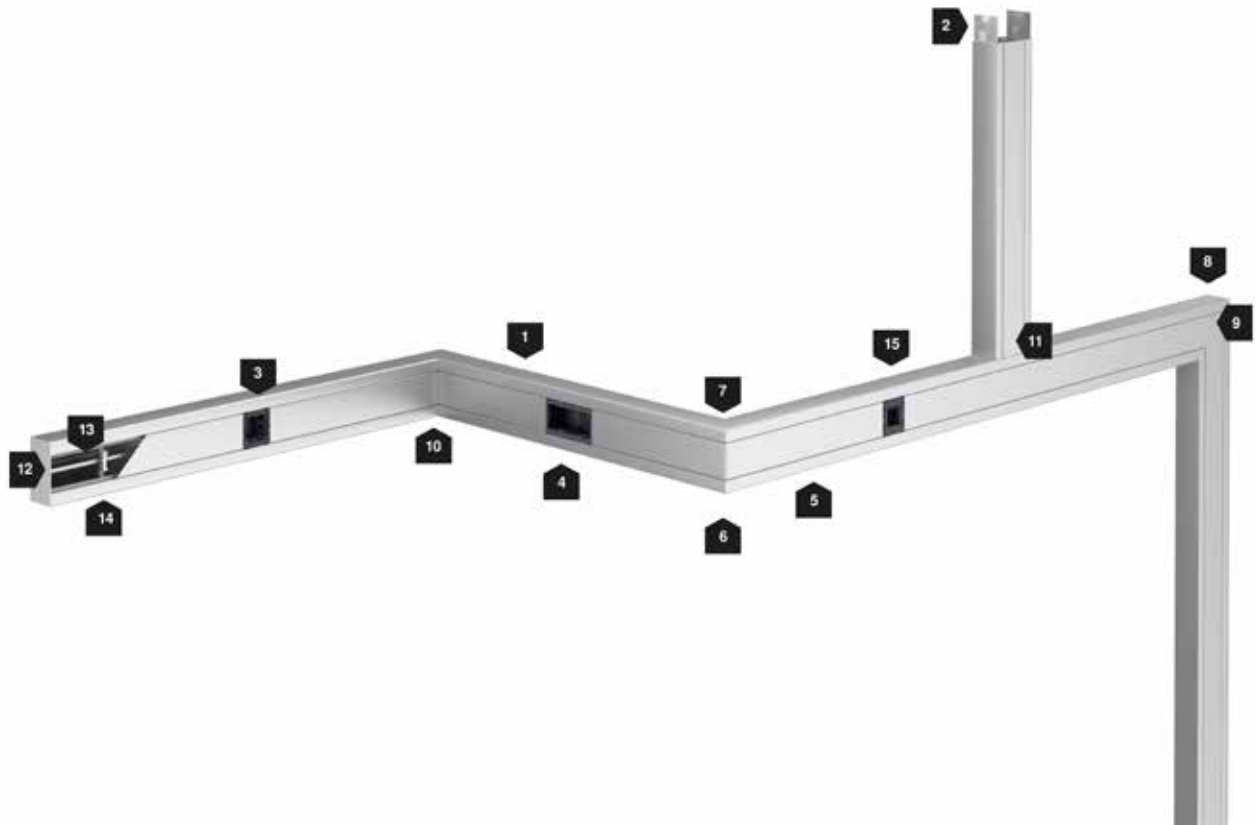
Installation principle Rapid 80 steel device installation trunking



- | | |
|--|--|
| 1 Trunking | 11 Flat angle |
| 2 Coupling | 12 Flat angle cover |
| 3 Single accessory mounting box | 13 Internal corner cover |
| 4 Double accessory mounting box | 14 Internal corner |
| 5 Trunking cover | 15 T piece |
| 6 Joint cover | 16 End piece |
| 7 External corner cover, variable | 17 Partition |
| 8 External corner | 18 Duct clamp |
| 9 External corner cover | 19 Single accessory mounting box, Modul 45® |
| 10 Flat angle cover | |

Installation principle

Rapid 80 aluminium device installation trunking



- 1** Trunking
- 2** Coupling
- 3** Single accessory mounting box
- 4** Double accessory mounting box
- 5** Trunking cover
- 6** External corner
- 7** External corner cover
- 8** Flat angle
- 9** Flat angle cover
- 10** Internal corner
- 11** T piece
- 12** End piece
- 13** Partition
- 14** Duct clamp
- 15** Single accessory mounting box, Modul 45®

Mounting aid



GK flexible office installation

The large product range of fittings and installation options allows flexible installation, for which changes and additions are not a problem.



GK coupling mounting

The coupling of the GK device installation trunking is contained in the scope of delivery and is pre-mounted. It is pulled out of the trunking and automatically locks in the correct position. This allows simple mounting of additional trunking sections.



GK/GS/GA coupling mounting

A coupling pair must be ordered separately to connect two trunking bases.



Checking locking lugs

To ensure a tight fit of the accessory mounting box, it is necessary to check the correct position of the locking lugs. This prevents unintentional removal of the accessory mounting boxes.



GK/GS/GA accessory mounting box mounting

Lock the accessory mounting boxes of series 71GD... into the cover contour. They can be moved lengthwise in the trunking.



Accessory mounting box mounting

All the front-locking accessory mounting boxes of the 71GD... series can simply be inserted into the system opening of the Rapid 80 GK, GS and GA device installation trunking from the front.



Checking locking lugs

To ensure a tight fit of the accessory mounting box, it is necessary to check the correct position of the locking lugs. This prevents unintentional removal of the accessory mounting boxes.



Vertical movement

The accessory mounting boxes must be secured against movement, in accordance with the table. This is done by mounting the covers, which come very close to the accessory mounting boxes.



GK/GS/GA device mounting

Switching and connection devices of all well-known manufacturers can be used. If a particularly large amount of space is required for the use of, for example, data boxes, various mounting supports are available without protective housings.



GK/GS/GA accessory mounting box mounting
The real trunking opening width of 76.5 mm ensures that even switches of a greater external radius do not leave visible openings between the top trunking cover and the series cover.



GK/GS/GA Modul 45° device installation
The Modul 45° accessory mounting box system and the appropriate covers of the S990 series allow space- and time-saving installation in all the device installation trunking systems and service poles.



GS/GA cover earthing
With cut covers, the locking springs can be installed at a later date as necessary. They must be mounted at a distance of 50 mm from the end of the cover.



GS/GA cover earthing
The self-contacting cover earthing guarantees continuous protection without any additional wiring. The locking springs are pre-mounted in the cover.



GK/GS/GA duct clamp mounting
Together with the partition, the duct clamp prevents the cables from falling out and supports the stability of the systems when the upper parts are inserted.



GS protective conductor connection bracket mounting
The protective conductor connection bracket is turned into the appropriate recesses in the trunking base and fastened using a screwdriver.



GA protective conductor connection bracket mounting
The protective conductor connection bracket is turned into the appropriate C rail in the trunking base and fastened using a screwdriver.

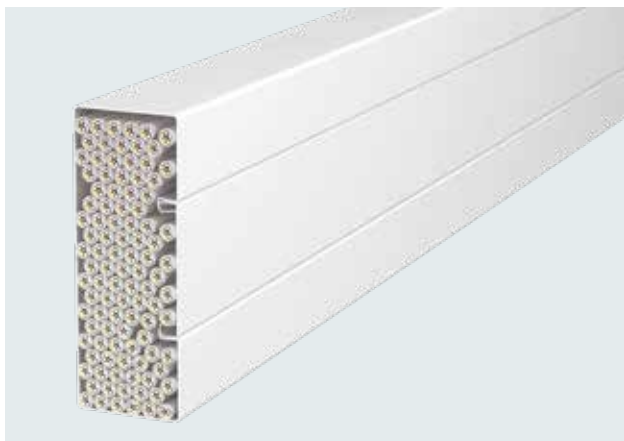


GK/GS end piece components
The end piece consists of a fastening element and a screen. The screen guides are suitable for each trunking type (symmetrical, asymmetrical or duoduct) as well as left and right end pieces. The pictograms on the screen help to select the appropriate guide.



GK/GS end piece mounting
Place the pre-mounted end piece on the trunking and fix it to the trunking using the two bolts. Then mount the cover.

Usable cross-section and quantity of cables



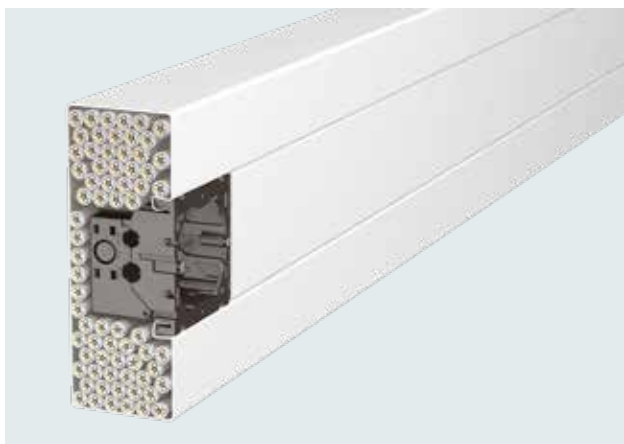
Usable cross-section without accessory mounting box

Usable cross-section without device installation

The usable cross-section of the device installation trunking is not restricted by device installation. The entire interior can be used for cable routing. The value "gross" in the tables indicates this usable trunking cross-section.



The installation of an accessory mounting box reduces the usable cross-section available for cable routing. The value "net" in the tables indicates this usable trunking cross-section.



Usable cross-section with accessory mounting box

Usable cross-section with installed device installation units

The number of cables and the cable types are of key importance for the correct selection of trunking sizes. Even during the selection of the trunking system, it must be taken into account that the installation of accessory mounting boxes or device installation units means the loss of part of the usable cross-section. Refer to the tables for the usable cross-sections, which will help you to choose the correct device installation trunking.

Usable cross-section and quantity of cables, plastic, sheet steel and aluminium

Usable cable cross-section in cm²

Nominal size	Trunking height 70		Trunking height 90	
	Gross approx.	Net approx.	Gross approx.	Net approx.
110	60.36	28.80	83.00	50.10
130	74.80	46.85	100.50	71.70
170	100.10	72.90	134.50	105.75
170 D top	51.50	23.65	63.60	40.55
170 D bottom	44.95	44.95	59.95	60.50
210	127.00	99.00	168.50	139.75
210 D top	65.72	37.84	87.85	59.05
210 D bottom	55.30	27.34	74.20	45.45
Desk trunking	99.50	73.10	-	-

Gross = trunking without service unit

Net = trunking with service unit

Number of cables to be laid in device installation trunking, filling factor 50%

Nominal size	Trunking height ST = 70		Trunking height ST 90	
	9 mm gross/net	11 mm gross/net	9 mm gross/net	11 mm gross/net
110	37/18	25/12	51/31	33/21
130	47/29	30/19	43/40	40/28
170	63/44	41/30	80/63	54/42
170 D top	32/15	21/10	41/24	27/16
170 D bottom	28/28	19/19	36/36	24/24
210	78/62	53/41	100/84	68/56
210 D top	40/24	27/16	53/35	35/23
210 D bottom	40/24	27/16	53/35	35/23
Desk trunking	61/45	41/30	-	-

Gross = trunking without service unit

Net = trunking with service unit

Decentral protection



Decentral protection – IKR in-trunking flush-mount unit

With decentral protection, a single cable with a large cross-section is run as the supply cable from the distributor to the IKR. The circuits are then tapped at suitable points, the cable cross-section reduced and decentral-ly protected using cable safety switches. From the IKR, smaller cross-sections continue to the consumers. The in-trunking installation unit IKR is suitable for all the de-vice installation trunking with a system opening of 80 mm.

You hold the advantages in your hand

There are fewer cables in the device installation trunk- ing and the larger cross-sections up to the cable pro- tection switches give a higher current load capacity in the sockets. The IKR in-trunking installation units contain everything in a single housing which is required for de- centralised protection.

Noise protection



Air conduction of noise

To prevent air conduction of noise, the free cross-section of the trunking remaining after cabling must be filled with a noise insulation, e.g. air noise barrier, type 7 LSB. The same applies to any gaps between the trunking and the adjoining wall. When used correctly, the air noise barrier, type 7 LSB, can achieve attenuation of up to 40 dB. The air noise barrier is made of Rockwool and is provided in individual plaits, with 15 plaits in each package. Multiple plaits are usually required to fully insulate the trunking. The following table contains the required number of plaits for standard trunking sizes.

When walls whisper

In modern office buildings, device installation trunking is often run through office partitions, creating a connection between multiple offices. Here, there is the problem that noise may be carried through the trunking penetration. This air noise transmission can be prevented by using insulating wool in the area of the trunking wall penetration.

Required number of plaits according to the trunking size

Trunking width	Trunking height 70 mm	Trunking height 90 mm
Width 110 mm	12	15
Width 130 mm	13	17
Width 170 mm	15	20
Width 210 mm	19	24

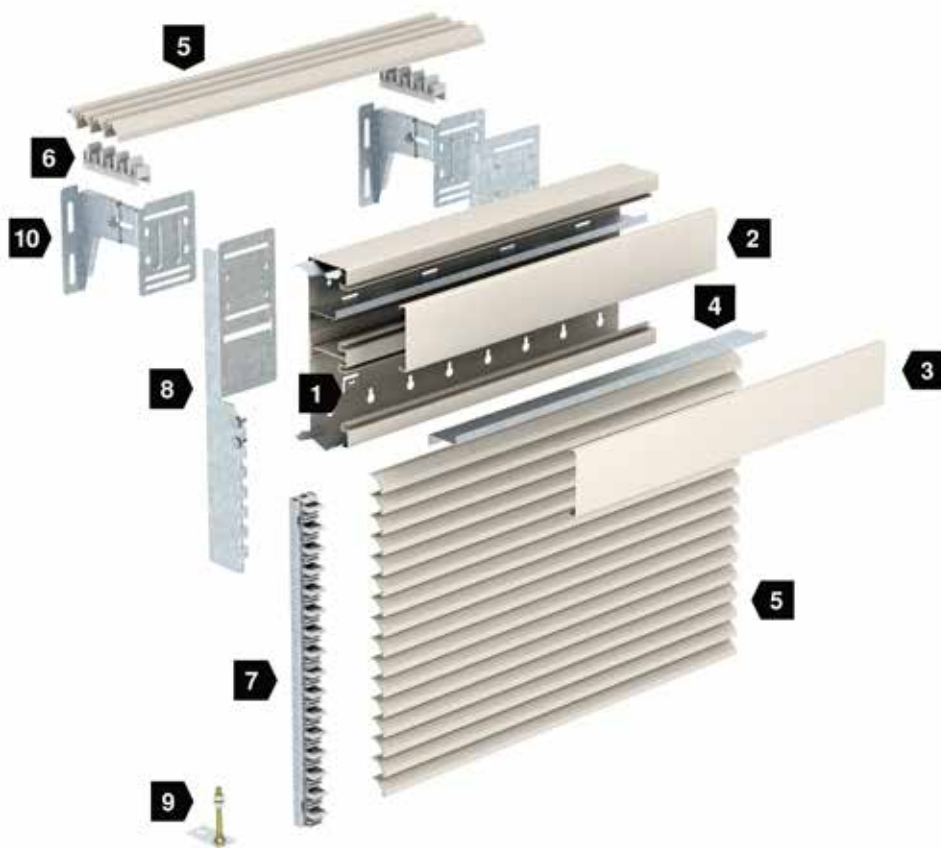
System description



External appearance is particularly important in residential spaces and offices: attractive aluminium convection grids are ideal for horizontal and vertical panelling in conjunction with device installation trunking. The standard colours are pure white, light grey, cream white and naturally anodised, but all the other RAL colours can also be

provided. Structural factors often require device installation trunking to be mounted at a specific distance from the wall or breastwork. Here, depth-adjustable panels are used, allowing exact fastening.

Installation principle



- 1** Device installation trunking, steel
- 2** Steel cover
- 3** Plastic cover
- 4** Partition
- 5** Convection grid profile
- 6** Profile connector, horizontal
- 7** Profile connector, vertical
- 8** Mounting and connection profile
- 9** Floor panel
- 10** Fastening panel

Mounting aid



Panelling with convection grids

Convector panelling can also be fully created using convection grids. The spaces between the lamellae support circulation and create a visually attractive solution.



Wall panel mounting

The holes for fastening the wall panels are drilled and the wall panels fastened to the walls using bolts and anchors.



Wall panel mounting

The height and depth of the wall panels are aligned one after the other and then the panels are locked.



Stabilisation profile mounting

The stabilisation profile is required to install GEK device installation trunking with a trunking height of 210 mm. It is simply locked into the front of the existing panels.



Connection profile mounting

When combined with the vertically aligned convection grids or convector panelling, the appropriate installation and connection profiles are locked to the front of the fastening panels.



Connection profile mounting

The mounting and connection profiles, type 6VG3/... are required to install convection grid profiles. Type 6VV3/... are required for closed convector panelling.



Mounting of device installation trunking on wall panel

The GEK device installation trunking is mounted on the wall panel and fastened using the M5 fastening screws. This also creates a conductive connection between the trunking and the wall panel.



Profile connector mounting

The profile connectors for horizontal convection grids are attached to the wall brackets and locked with the clamp.



Mounting spaces for convection grid mounting

When mounting convection grids on the wall panels, ensure that a maximum spacing of 150 mm is maintained between the end of the grid lamellae and the wall panels.



Convection grid mounting

The convector grid lamellae are inserted and locked in the profile connector one after another.



Convection grid mounting

The profile connectors are available in different lengths for accommodating between two and twelve convection grid lamellae. If necessary, they can be mounted one behind the other on the fastening panels.



Convection grid with device installation trunking

The horizontal convection grids present a high-quality appearance and a perfect transition between the device installation trunking and the wall. They also allow the room air to circulate.



Mounting of vertical convection grids

The convection grid profiles are also simply locked into the profile connectors for vertical mounting.



Fire protection systems

OBO KBK-K fire protection cushions are the ideal solution for running PVC device installation trunking or cable trunking through walls classified as fire resistant.



Noise limit barrier

The noise limit barrier is fitted in the trunking in the area of a wall penetration between two rooms. These achieve noise insulation of approx. 40 dB.



Wall cover mounting

The wall cover is mounted on the already mounted device installation trunking. For this, pull off the double-sided adhesive tape on the bottom side and stick it on the wall cover.

Service poles



Service poles

70

System description



In modern offices, technology must be completely flexible and also aesthetically pleasing. The solution: service poles. They allow free positioning of power supply points near workstations. The location can be changed at any time. This gives both users and architects the greatest possible freedom. In open-plan offices and administrative buildings, as well as in cash desk areas of shops or in

production facilities, they provide more order and safety. ISS service pole systems fulfil all the technical and architectural requirements of modern cable routing – and make an active contribution to the interior architecture.

Selection criteria

Application

Floor to ceiling service poles

The poles can be positioned anywhere in the room. The poles are braced against the ceiling using a clamping device, to ensure a secure hold. This is concealed by the false ceiling.

Floor service poles

These poles are mounted directly to the floor and supplied from below, e.g. through an underfloor system or cavity/raised floors.



Requirements

Number of accessories

When choosing the correct service pole, it is important to specify the number of switching and connection devices in order to determine the installation space. 2-compartment service poles, such as the ISS140110, provide a large amount of installation space.



Design

Round and oval, square or rectangular: the OBO ISS service pole range offers a solution for any design. The service poles, primarily available in white or aluminium anodised designs, are available on request in all possible RAL shades.



Mounting aid Sheet steel service poles



Clamping service poles

The service pole is tensioned between the ceiling and floor at the stand, using a wrench.



Connection of the service pole in a false ceiling

The connection cables are fed into the service pole through the top opening of the telescopic profile.



Equipotential bonding of the service pole

The continuous equipotential bonding between the cover and base is made automatically via the locking brackets in the closing contour.

Service poles with clamping device



Screwing the service pole to the floor

If the service pole is to be screwed to the floor, then the existing floor panel can be removed and replaced with a larger floor plate. The service pole can now be fastened to the floor using bolts and anchors.



Mounting of the clamping device

The cover of the service pole is removed and the clamping device screwed on.



Clamping device features

The telescopic clamping device is extended by repeatedly pressing the lever and clamps the pole between the floor and ceiling. The clamping device can also be screwed to the ceiling.

Service pole with a hose to ceiling



Stable stand

The service poles with a hose to the ceiling are fitted with a large floor plate, in order to ensure safe and stable positioning.



Variable positioning

Poles with a hose to the ceiling can be moved at a later point within a radius of approx. 1.5 m.



Connecting service poles to a consolidation point

Service poles are supplied with data and power cables via the false ceiling. A consolidation point is a suitable connection point.

Floor service poles



Screwing the floor service pole to the floor

The floor service poles are fastened to the floor using bolts and anchors.



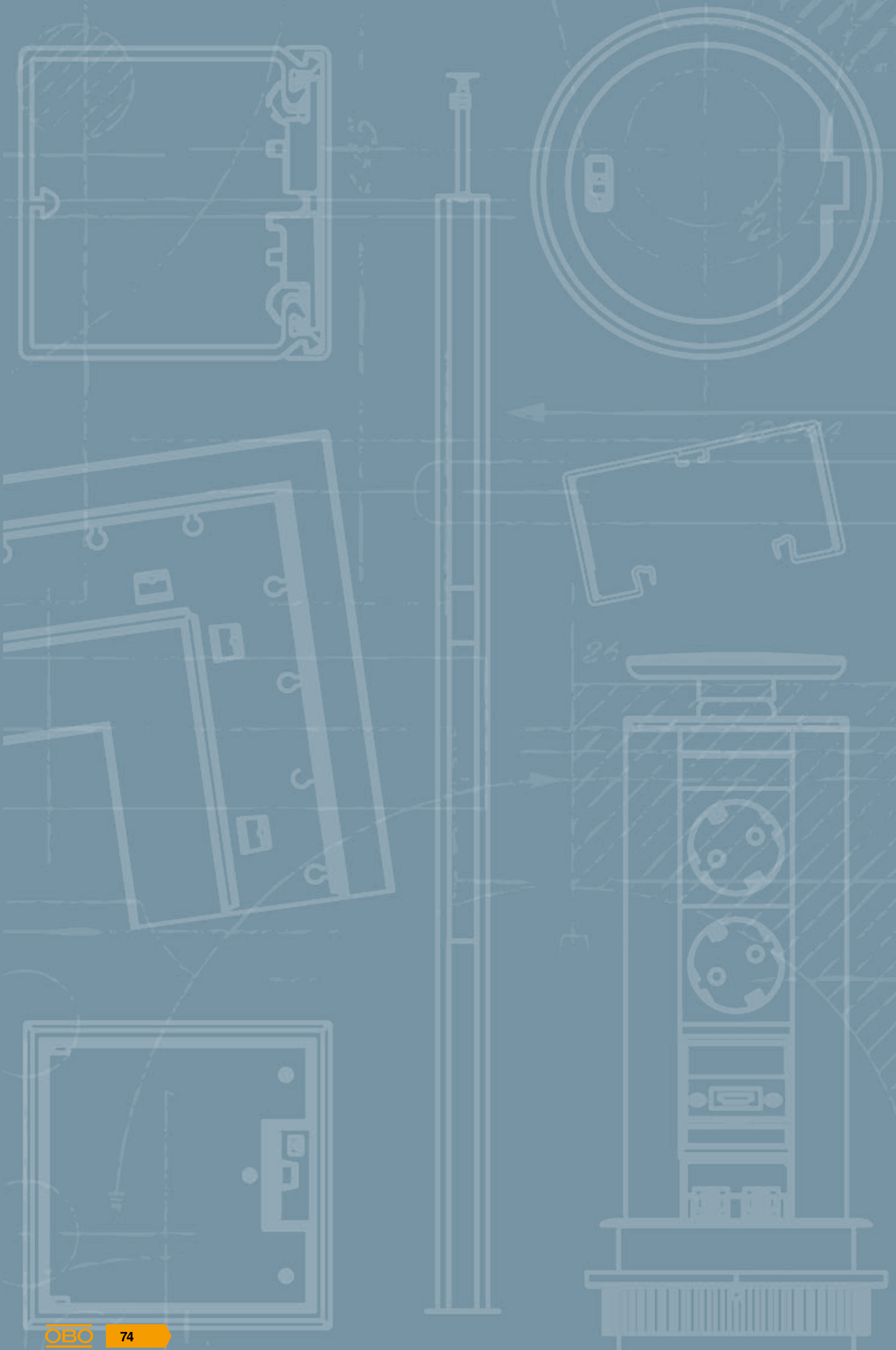
Connecting floor service poles to a raised floor

The floor service pole can be supplied with power and data cables via a raised floor. A UPS power supply is a suitable connection point.



Connecting floor service poles to an underfloor system

The floor service pole can be connected to an underfloor system. Power is fed in through an underfloor box.



Underfloor applications in screed



EÜK underfloor installation duct

76



OKA underfloor installation trunking

94



OKB trunking unit with brush bar

110



Underfloor installation duct for thin screed layers

118

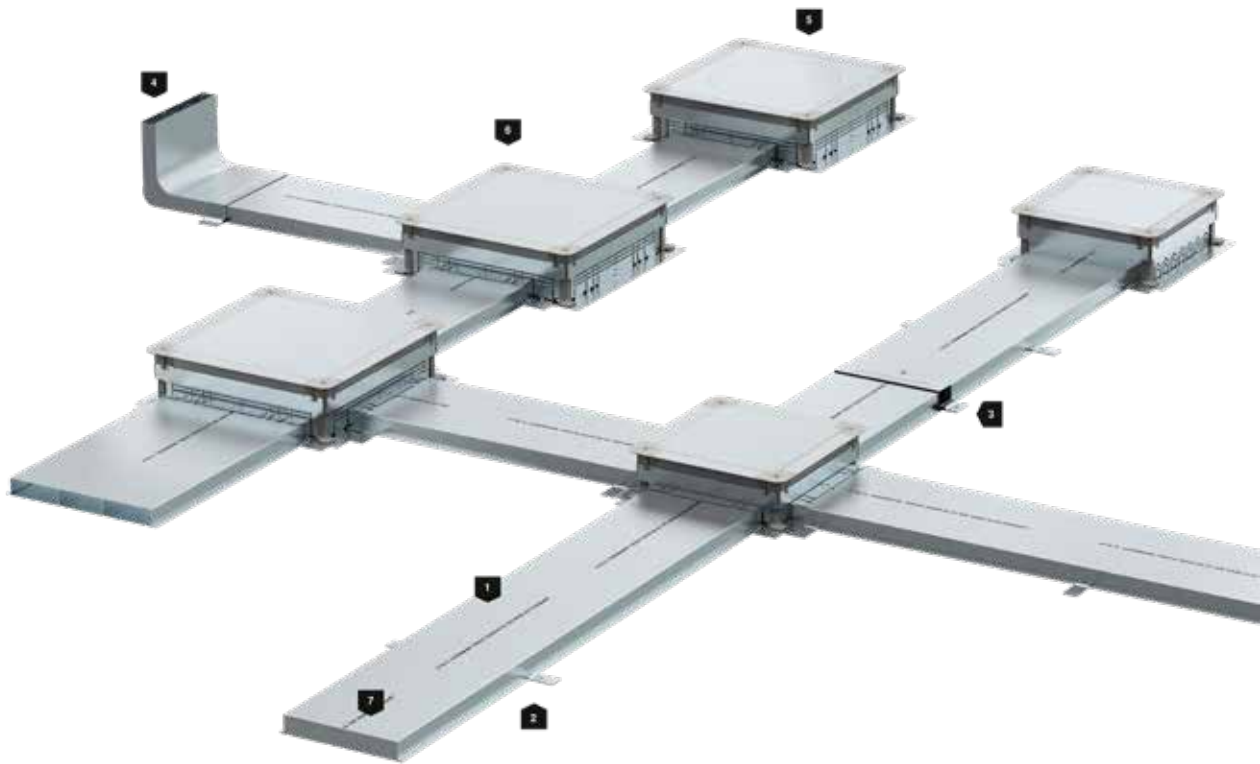
System description



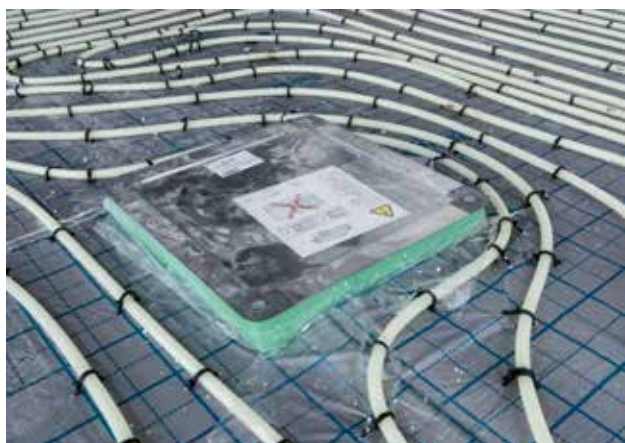
The EÜK screed-covered duct system from Ackermann made by OBO is the ideal electrical installation system for large areas with fixed furnishing plans, for example in office or administration buildings. Duct sections and

underfloor boxes form a tight grid, hidden in the screed, for cable routing. When combined with device installation units, access is given to power, data and multimedia technology.

Installation principle

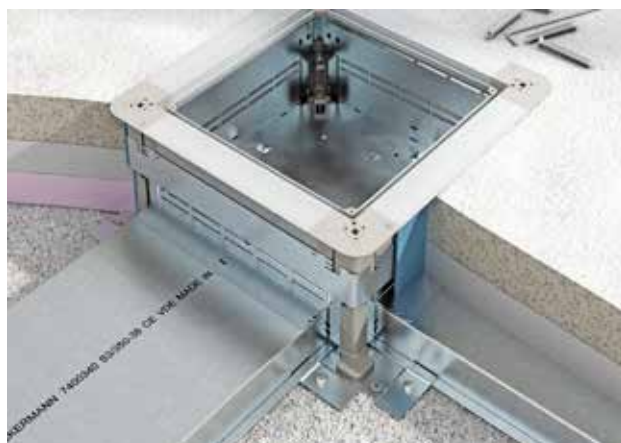


- 1 Underfloor installation duct
- 2 Duct connection bracket
- 3 Connection shackle
- 4 Vertical bend
- 5 Underfloor device socket with mounting lid and lid blanking plate (UGD)
- 6 Underfloor junction and branch box (UZD)
- 7 End piece



The ducts and underfloor boxes of the EÜK system are mounted directly on the raw concrete. To protect against heat losses and the reduction of footfall sound, insulation layers are inserted, which surround the duct system completely.

Optionally, underfloor heating can be installed for wide-area heat distribution and is then covered by the screed. The screed thickness above the duct is to be specified in accordance with DIN 18560.



When installed, the underfloor socket is securely anchored in the screed. The screed can be worked particularly well around the drip edge of the socket, which also serves as a broad support in the screed.

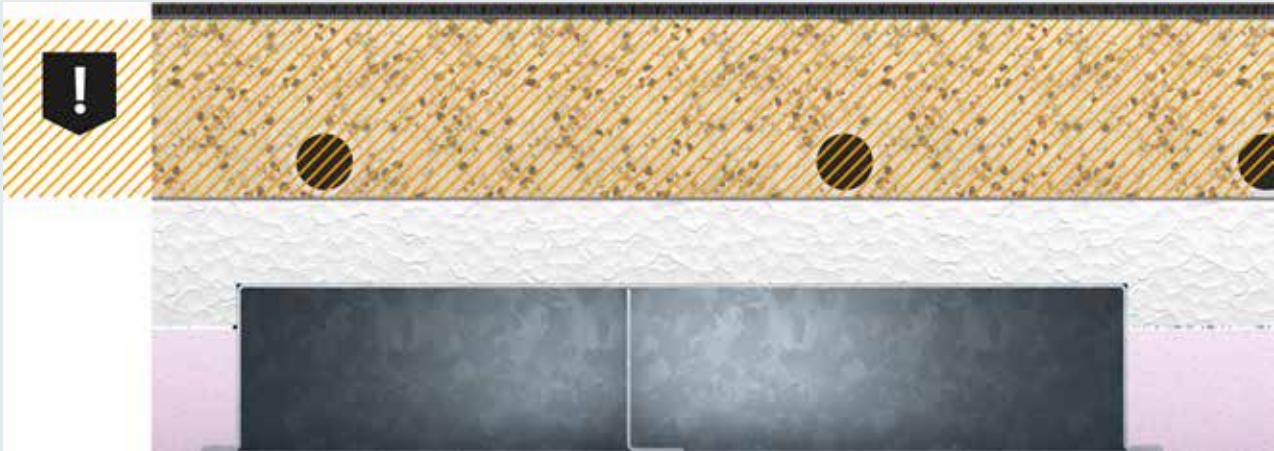


The underfloor boxes have a minimum structure height of 70 mm and a height-adjustment range of an additional 55 mm. The height adjustment takes place in two stages: First, the underfloor box is pre-adjusted approximately to the screed height using the integrated quick height-adjustment function. In the second step, the fine adjustment to the top edge of the screed is carried out using a screwdriver.



Device installation units, in the form of cassettes and service outlets, can be installed in underfloor sockets with a mounting lid. The device installation units accept sockets, data and multimedia connections.

Screed thickness



Usable cross-section without accessory mounting box

Avoiding crack formation

An important precondition for a proper underfloor installation is the screed structure. In the case of a screed-covered system, it is important that the screed thickness over the duct corresponds to the values in the standard, to avoid the formation of cracks.

Nominal screed thickness

The nominal screed thickness is dependent on the insulation layer, the individual load and the screed type. More detailed information for Germany can be found in DIN 18560.

Working the screed



Working the screed

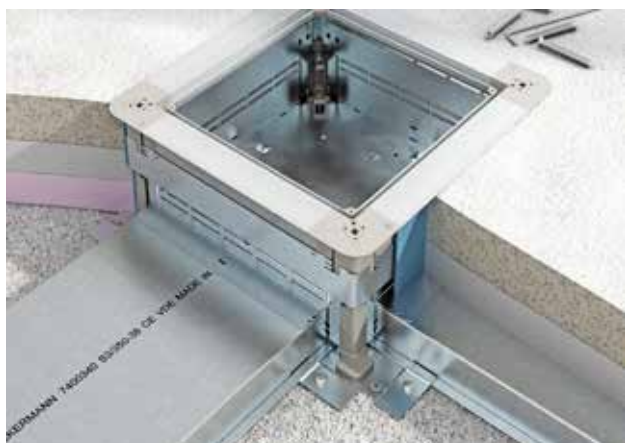
The excess height of the underfloor boxes must be completely surrounded with screed, in order to guarantee the stability of the sockets in the screed.



Use of a separating layer

When used in floating screed or in heated screeds on insulation layers, the box can be separated from the screed by a separating layer. The edge insulation strips can be up to 3 mm thick and must reach to under the top frame of the socket.

Floor types



Floating screed application

Underfloor installation ducts can be mounted in floating screed without complications. For noise reduction reasons, the ducts are laid inside the insulation.



Poured asphalt application

Underfloor installation ducts can be used in a composite screed system made of floating poured asphalt. The installation temperature of the poured asphalt is around 250 °C. Bitumen corrugated card must be laid to provide protection to the ducts during the pouring and cooling phase of the poured asphalt. Cables are only installed after cooling.



Composite screed application

In cement composite screed, the underfloor installation duct can be mounted quickly and easily. Additional protective measures are not required: The cement screed can be applied directly to the galvanised sheet steel duct.

Floating screed

When used in floating screeds, ensure that the duct system is sealed by the appropriate unit before the screed is applied.



Use in the area of high loads

No insulation strips may be attached to the underfloor socket. This ensures the maximum support area of the screed support frame. You can find system accessories, such as heavy-duty supports and heavy-duty mounting lids for the installation of cassettes of load classes SL1 and SL2, in the heavy-duty chapter of our catalogue.

Inclusion in the local equipotential bonding

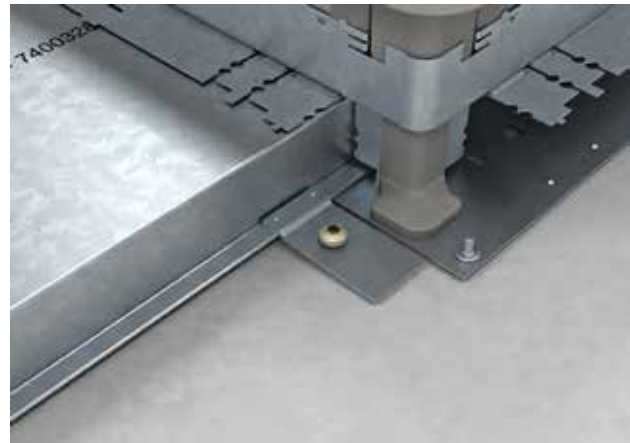
We recommend including the EÜK screed-covered duct system in the equipotential bonding. The EÜK system offers the necessary connection options for protective conductors. All the system components are fully conductive.

The EMC regulations according to DIN EN 50174-2 (VDE 0800-174-2) require the inclusion of all the metallic system components up to the connection point as functional equipotential bonding.



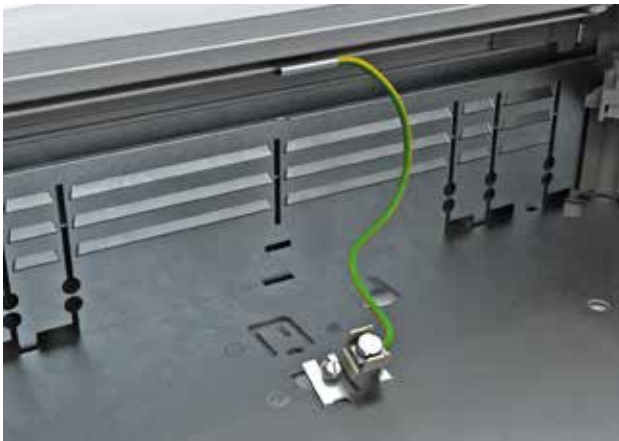
Connection strap mounting

Connection straps create the conductive connection of the two inserted pieces of duct.



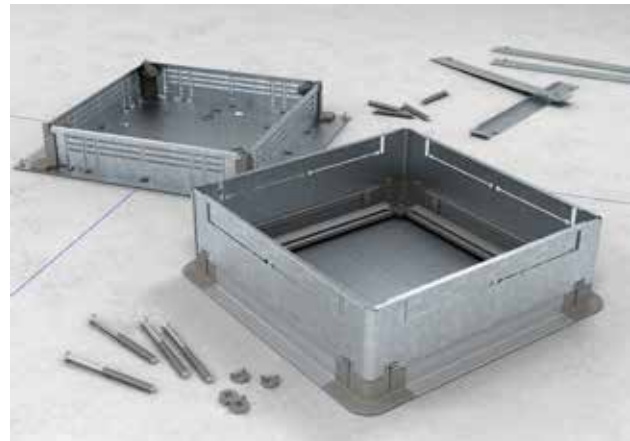
Earthing of the duct system

The VW E connection bracket forms the conductive connection between the duct and underfloor box.



Earthing of the socket cover frame

If there is a fault, metallic parts will carry voltage. The protective conductor connection bracket 8AWR includes the underfloor sockets in the protective measures. Tighten the contact bolt with at least 1.2 Nm. Alternatively, conductive connections can be created between construction elements using external connections, by soldering, welding, riveting or screwing.



Height compensation of the underfloor socket

The underfloor sockets of type UGD and UZD are available in three different height-adjustment ranges:

- 70–125 mm
- 115–170 mm
- 165–220 mm

Using height compensation construction kits (raising aids), it is also possible to convert the underfloor sockets to screed heights of up to 320 mm. System 55 is used for screed heights of 70 mm or less.

Fire protection



PYROSIT® NG fire protection foam

The PYROSIT® NG fire protection foam is a quick and simple type of cable insulation for use in underfloor ducts. If, during an electrical installation, underfloor ducts pass below walls classified for fire protection, then the ducts must be closed against smoke gas penetration and fire. PYROSIT® NG is the ideal solution for use in screed-covered underfloor ducts: Mounting is carried out starting from the underfloor boxes on both sides of the wall. Empty plastic installation pipes, serving as a reserve for later retroinstallations, can also be foamed in.

System benefits

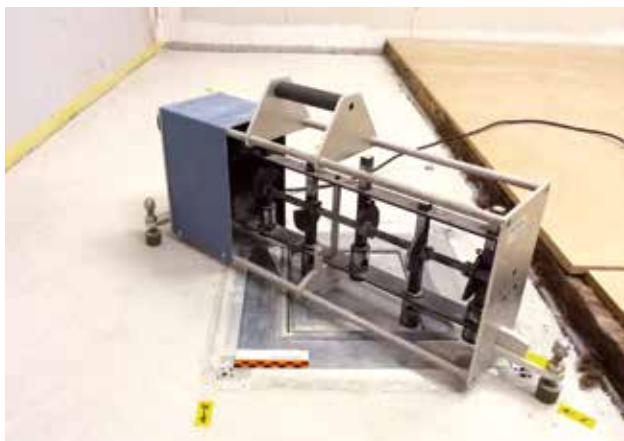
- Applications covered by surveyor's comments
- Easy processing, even with brief interruptions
- Good substrate adhesion, even on metal ducts
- Foam volume per cartridge up to 2.1 litres
- Soft consistency – easy retroinstallation
- Empty pipes can also be foamed in as a reserve opening
- No surface coatings required!
- Dust- and fibre-free installation

Foam rubber fitting with fire protection additives

Fire resistance class	To EI120
Proof of application	European technical approval of the OIB, Vienna in conjunction with surveyor's report
Approval number	ETA-11/0527
Testing standard	EN 1366 Part 3
Min. insulation thickness	30 (2 x 15) cm
Max. duct size	35 x 5 cm
Min. screed thickness	3.5 cm

Maximum approved assignment of the opening area with installations: 60%. The data in the named proofs of use apply.

Footfall sound



Minimum requirements

The minimum requirements for structural sound insulation are defined in DIN 4109 "Sound insulation in buildings". Qualified tests to determine the transmission of air and footfall sound for the EÜK duct system were carried out together with the MÜLLER BBM GmbH testing institute in Planegg, Munich. The transmission of air and footfall sound was investigated for both vertical, i.e. from storey to storey, and horizontal sound transmission, i.e. from adjacent rooms. The test was carried out in a floating screed construction.

Noise evaluation

With regard to the evaluated reduction of footfall sound of the screed without a floor system, statements made below can be considered as approved. The following recommendations for the OBO Bettermann underfloor systems relate to screed constructions which are spatially separated.

The required noise measures for the use of the type EÜK duct system in offices can be summarised as follows:

The EÜK system can run beneath floating screeds, through partitions with noise protection requirements, in accordance with Section 3. During measurement checking, it should be ensured that the connection sockets have a spacing of 2 m to the partition. This wall spacing of the floor socket should be maintained if there are sound requirements.

If the floor socket is closer to the partition, then there may be a reduction in noise insulation. However, this has not been investigated in detail. In the case of floor sockets close to the wall, it may be advisable to insert noise protection insulation in the duct system, in order to exclude sound bypass transmission via the floor sockets.

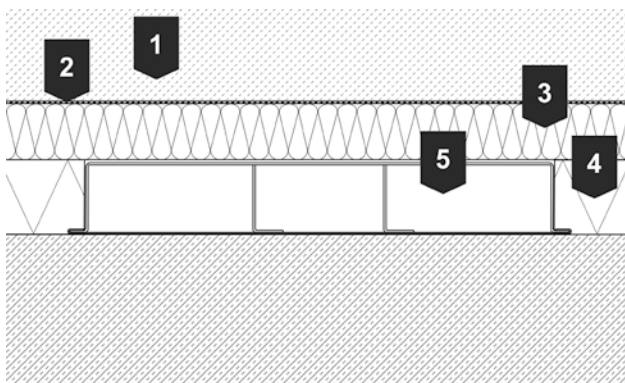
Horizontal transmission of air and footfall sound

With horizontal transmission of footfall sound, the system is suitable for fulfilling the increased recommendations in the sense of Supplementary Sheet 2 of DIN 4109 [4], provided that the screed is separate in the area of the partition.

Vertical transmission of footfall sound

The EÜK floor system, including underfloor connection sockets, does not lead to a decrease of the required evaluated footfall sound reduction of a floating cement screed with regard to vertical transmission of footfall sound, should the underfloor sockets be decoupled.

Data taken from Report M88034/06 of 29 July 2014.



1	50 mm cement screed, CEMI 52.2 N, mass relative to area $m' = 15 \text{ kg/m}^2$
2	0.2 mm PE film
3	30 mm footfall sound damping, dynamic stiffness $s' = 15 \text{ MN/m}^3$
4	40 mm heat insulation, polystyrene EPS 100/035
5	38 mm installation trunking

Underfloor boxes



Function matrix, underfloor boxes, nominal size 250

Underfloor box	Insertable duct widths, nominal size	Height-adjustment range upper edge screed mm	Decouplable ¹	Suitable for SL application ²	Possible device installation, nominal sizes	Mounting lid in scope of supply
UZD 250-3	190, 250	70–125	Yes	Yes ³	2, 4, 6, 9, R4	No ⁴
UZD 115170 250-3	250	115–170	Yes	Yes	2, 4, 6, 9, R4	No ⁴
UZD 165220 250-3	250	165–220	Yes	Yes	2, 4, 6, 9, R4	No ⁴
UZD 250-3 R	Installation pipes	70–125	Yes	Yes ³	2, 4, 6, 9, R4	No ⁴
UGD 250-3 4	190, 250	70–125	Yes	Yes ³	4	Yes
UGD 250-3 6	190, 250	70–125	Yes	Yes ³	6	Yes
UGD 250-3 9	190, 250	70–125	Yes	Yes ³	9	Yes
UGD 250-3 R4	190, 250	70–125	Yes	Yes ³	R4	Yes

¹ Separate the screed contact frame from the box body. Not for SL application

² Application for areas with increased load requirements with separately available system accessories.

³ At lower screed heights, the floor construction must be agreed with technical planners.

⁴ Device installation units are installed in DUG blanking lids

Function matrix, underfloor boxes, nominal size 350

Underfloor box	Insertable duct widths, nominal size	Height-adjustment range upper edge screed mm	Decouplable ¹	Suitable for SL application ²	Possible device installation, nominal sizes	Mounting lid in scope of supply
UZD 350-3	190, 250, 350	70–125	Yes	Yes ³	4, 6, 9, R4, R7, R9	No ⁴
UZD 115170 350-3	250, 350	115–170	Yes	Yes	4, 6, 9, R4, R7, R9	No ⁴
UZD 165220 350-3	250, 350	165–220	Yes	Yes	4, 6, 9, R4, R7, R9	No ⁴
UZD 350-3 R	Installation pipes	70–125	Yes	Yes ³	4, 6, 9, R4, R7, R9	No ⁴
UGD 350-3 4	190, 250, 350	70–125	Yes	Yes ³	4	Yes
UGD 350-3 6	190, 250, 350	70–125	Yes	Yes ³	6	Yes
UGD 350-3 9	190, 250, 350	70–125	Yes	Yes ³	9	Yes
UGD 350-3 R4	190, 250, 350	70–125	Yes	Yes ³	R4	Yes
UGD 350-3 R7	190, 250, 350	70–125	Yes	Yes ³	R7	Yes
UGD 350-3 R9	190, 250, 350	70–125	Yes	Yes ³	R9	Yes

¹ Separate the screed contact frame from the box body. Not for SL application

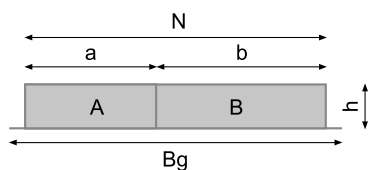
² Application for areas with increased load requirements with separately available system accessories.

³ At lower screed heights, the floor construction must be agreed with technical planners.

⁴ Device installation units are installed in DUG blanking lids

Cable routing planning

Function matrix, underfloor boxes, nominal size 250



The following tables provide support when planning the cable routing in the underfloor duct and show the recommended number of cables for each duct type. The recommended number of cables takes into account a reserve of 50% in the duct, in order to guarantee retro-installation of cables.

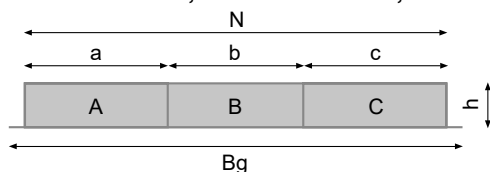
Duct type	S2 19028	S2 25028	S2 19038	S2 25038	S2 19048	S2 25048
Duct height h (mm)	28	28	38	38	48	48
Nominal width N (mm)	190	250	190	250	190	250
Total width Bg	210	270	210	270	210	270
Compartment width a (mm)	80	110	80	110	80	110
Compartment width b (mm)	110	140	110	140	110	140
Compartment A						
Cross-section A (mm ²)	2,028	2,808	2,808	3,888	3,588	4,688
Number of NYM ¹³ cables	10	14	14	19	18	23
Number of CAT ²³ cables	13	17	17	24	22	29
Compartment B						
Cross-section B (mm ²)	2,808	3,588	3,888	4,968	4,968	6,348
Number of NYM ¹³ cables	10	18	19	25	25	32
Number of CAT ²³ cables	17	22	24	30	30	39

¹ Heavy current cables NYM-J ³ x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²

² CAT6 data cable, diameter = 9 mm, space requirement = 81 mm²

³ The calculation of the number of cables relates to an assignment of 50%, meaning that an appropriate reserve remains

Function matrix, underfloor boxes, nominal size 250



Duct type	S3 25028	S3 35028	S3 25038	S335038	S3 25048	S3 35048
Duct height h (mm)	28	28	38	38	48	48
Nominal width N (mm)	250	350	250	350	250	350
Total width Bg	270	370	270	370	270	370
Compartment width a (mm)	90	120	90	120	90	120
Compartment width b (mm)	70	110	70	110	70	110
Compartment width c (mm)	90	120	90	120	90	120
Compartment A						
Cross-section A (mm ²)	2,288	3,068	3,168	4,248	4,048	5,428
Number of NYM ¹³ cables	11	15	16	21	20	27
Number of CAT ²³ cables	14	19	19	26	25	33
Compartment B						
Cross-section B (mm ²)	1,794	2,834	2,484	3,924	3,174	5,014
Number of NYM ¹³ cables	9	14	12	19	16	25
Number of CAT ²³ cables	11	17	15	24	19	31
Compartment C						
Cross-section C (mm ²)	2,288	3,068	3,168	4,248	4,048	5,428
Number of NYM ¹³ cables	11	15	16	21	20	27
Number of CAT ²³ cables	14	19	19	26	26	33

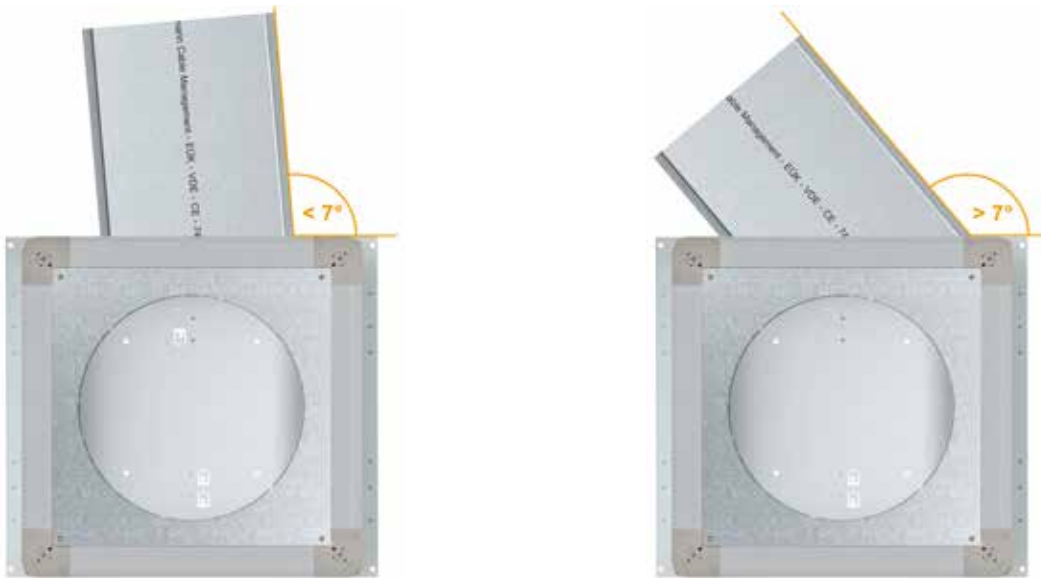
¹ Heavy current cables NYM-J ³ x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²

² CAT6 data cable, diameter = 9 mm, space requirement = 81 mm²

³ The calculation of the number of cables relates to an assignment of 50%, meaning that an appropriate reserve remains

Directional correction and sloping duct entries

The prepared duct openings of the underfloor sockets allow a slight change in direction or the sloping insertion of cables. The appropriate values can be found in the following tables.



Duct directional corrections (RK)

Small duct direction corrections (up to 7°) can be compensated in the entry openings of the underfloor boxes with an adaptation cut.

Sloping duct entries (SE)

With appropriate adaptation cuts, sloping duct entries (> 7°) can be created according to the box size and entry opening.

Box size	Nominal size of duct insertion opening	Nominal duct size 190		Nominal duct size 250		Nominal duct size 350	
		RK bracket	SE bracket	RK bracket	SE bracket	RK bracket	SE bracket
250	190	7°	7°	-	-	-	-
	250	-	40°	7°	7°	-	-
350	190	7°	7°	-	-	-	-
	250	-	40°	7°	7°		
	350	-	53°	-	42°	7°	7°

Mounting aid



Draw mounting planning

The planned duct routes and the crossing points and points relevant for junction and branch boxes or underfloor sockets should be marked on the floor in advance, e.g. using a chalk line.



Mounting of underfloor sockets

Underfloor sockets are aligned and fastened on the lines and the crossing points. This allows the required duct length to be determined.



Preparations for duct mounting

The length of the duct sections can now be determined exactly. The material can be laid out on the floor.



Cutting the duct

The simplest way to adjust the sheet steel duct is using a single-handed angle grinder. Clean cuts and subsequent deburring are important for beneficial installation of the cables.



Connection strap mounting

After cutting the ducts, the connection straps can be positioned.



Equipotential bonding

Connection straps create the conductive connection of the two inserted pieces of duct. Alternatively, conductive connections can be created between construction elements using external connections, by soldering, welding, riveting or screwing.



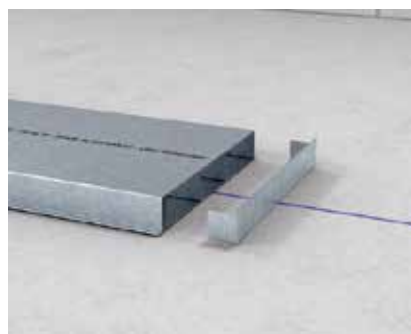
Connector fastening

The underfloor ducts are fastened to the substrate using the connection strap. Additional fastening within a duct length is not required.



Mounting of vertical bend

Vertical bends can be easily mounted as wall connections for insertion of cables in the underfloor system. The connection is simple to make and uses a duct connector.



Mounting of end closure section

The underfloor duct is closed with an end closure section, suitable for each duct size. The end connection can simply be inserted into the duct without any screwing.



Finished duct mounting

The cable routing system is mounted. The cables can be laid before the screed is applied (except for poured asphalt) or after the screed is applied, as for any installation at a later date.



Floating screed application

When used in floating screed/heated screeds on insulation layers, the box is completely installed in the screed. If necessary, the box can be separated from the screed by a separating layer (of up to 3 mm thick), which reaches to under the box top frame.



Cement screed (CT) application

The underfloor boxes UZD-3 and UGD-3 can be used in cement composite screed without any additional sealing measures.



Anhydrite floating screed (CAF) application

Thin anhydrite floating screed is applied. For this, seal off all the openings of the box using suitable agents (e.g. adhesive tape).



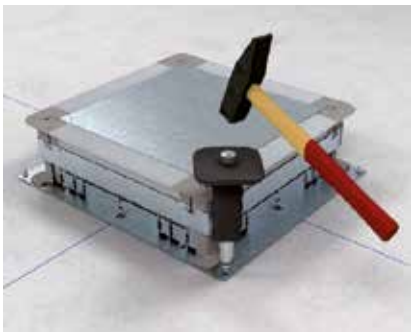
Poured asphalt (AS) application

It is possible to mount the underfloor boxes UZD-3 and UGD-3 in poured asphalt composite screed. The high temperatures during the application of the hot mass are not a problem. The screed-flush box top frame is fully embedded in the screed.



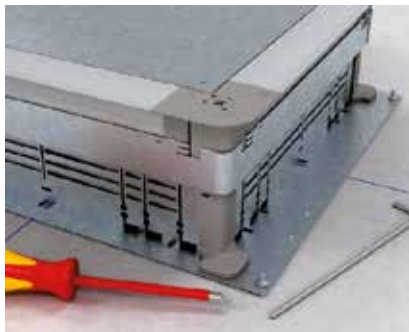
Alignment of the underfloor sockets

You can draw a chalk line on the raw floor to show the planned duct routes and crossing points. Then the underfloor sockets are positioned.



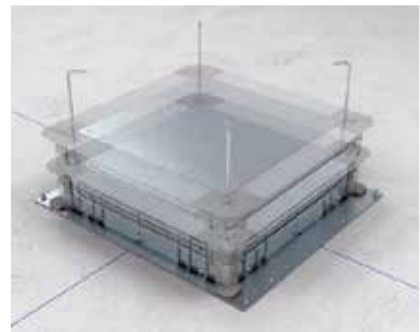
Fastening the underfloor socket

Fasten the underfloor socket to the raw screed.



Adjusting the socket height

The underfloor sockets have a minimum structure height of 70 mm and a height-adjustment range of + 55 mm. Differences between the socket construction height and the set screed height can either be compensated using height-adjustment screws or using the quick release aid.



Pre-adjustment of the socket height

The 4 pins of the quick release aid are inserted in the holes. Then the socket height can be adjusted by lifting it. When the height has been adjusted, remove the pins.



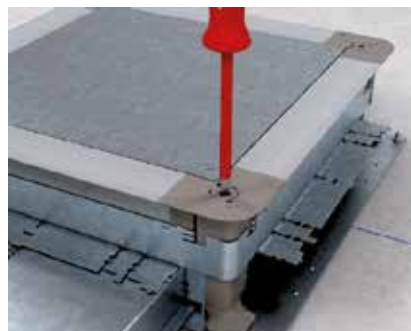
Process sidewalls

The sidewalls of the underfloor sockets are opened using pliers appropriate to the duct sizes (e.g. side cutters), and the strap created bent upwards.



Insertion of the ducts

The duct is inserted into the socket body up to the stop. When routing other asymmetrical (2-compartment) ducts, ensure that the printing on the joints match.



Fine adjustment of the socket height

The fine adjustment of the socket height is carried out via the height-adjustment screws using a screwdriver (Posidriv size 2). The height adjustment should be agreed with the construction/screed company (metre cracks).



Earthing of the duct system

The VW/E connection bracket forms a conductive connection between the duct and underfloor socket.



Use of a separating layer

When used in floating screed/heated screeds on insulation layers, the socket body can be separated from the screed by a separating layer (of up to 3 mm thick), which reaches to under the socket cover frame.



Incorrect processing

Always talk to the screed layer. Installation errors such as those shown here mean that the firm seat of the socket is not guaranteed.



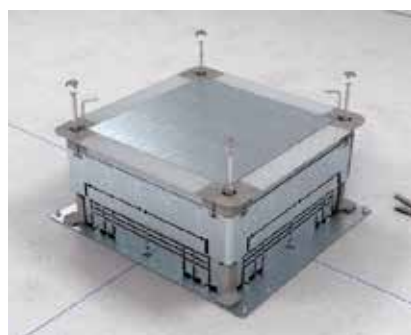
Mounting the raising aid

Release the locking lid and lightly turn out the bolts. Insert a quick release aid and lift out the bolt.



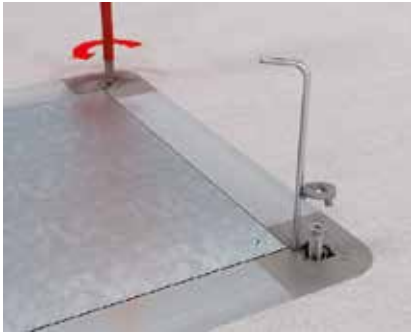
Mounting the raising aid

Remove the box top cover upwards and replace any existing fall plates with the new fall plates.



Mounting the socket top frame

Reattach the new socket top frame, insert the screws, remove the quick unlocking aid, cover the screws with the locking lids.



Decoupling from outside

After screed laying, the cover frame of the underfloor socket can be decoupled from the socket base. To do this, release the locking lid, insert the quick release aids and remove the height-adjustment screws.



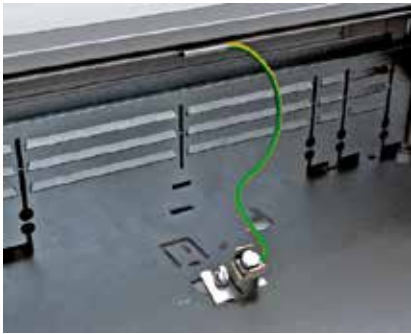
Decoupling from inside

Remove the mounting protection lid and the four locking lids from the underfloor socket. Grip the slider with two fingers and pull it inwards. Remove the height-adjustment screws upwards.



After decoupling

Place the locking lid back in the socket cover frame.



Earthing of the socket cover frame

Mount the protective conductor connection bracket 8AWR in the floor plate and connect the earth conductor to the earthing cable.



Insert the mounting lid

The mounting protection lid is replaced with a mounting lid after screed laying. Note: During the construction phase, openings must be protected against footfall.



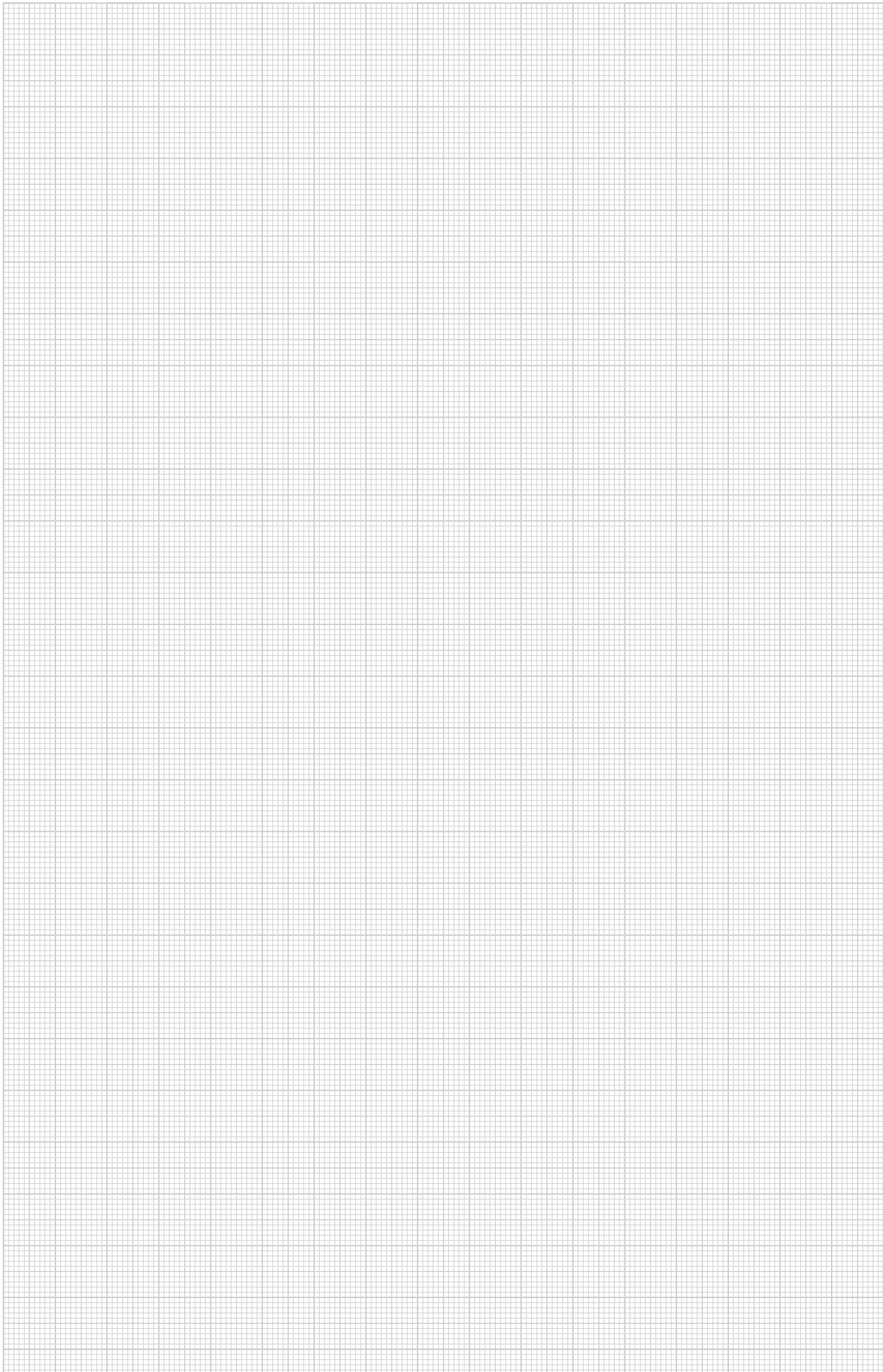
Finished mounting

Replacing the mounting protection lid with a DUG... mounting lid turns a UZD junction and branch box into a UZD underfloor socket.



Applications with installation pipes

Underfloor boxes end flush with the top edge of the screed. Function lids create installation openings for installation units or inspection covers.



Standard data according to DIN EN 50085-1 and DIN EN 50085-2-2

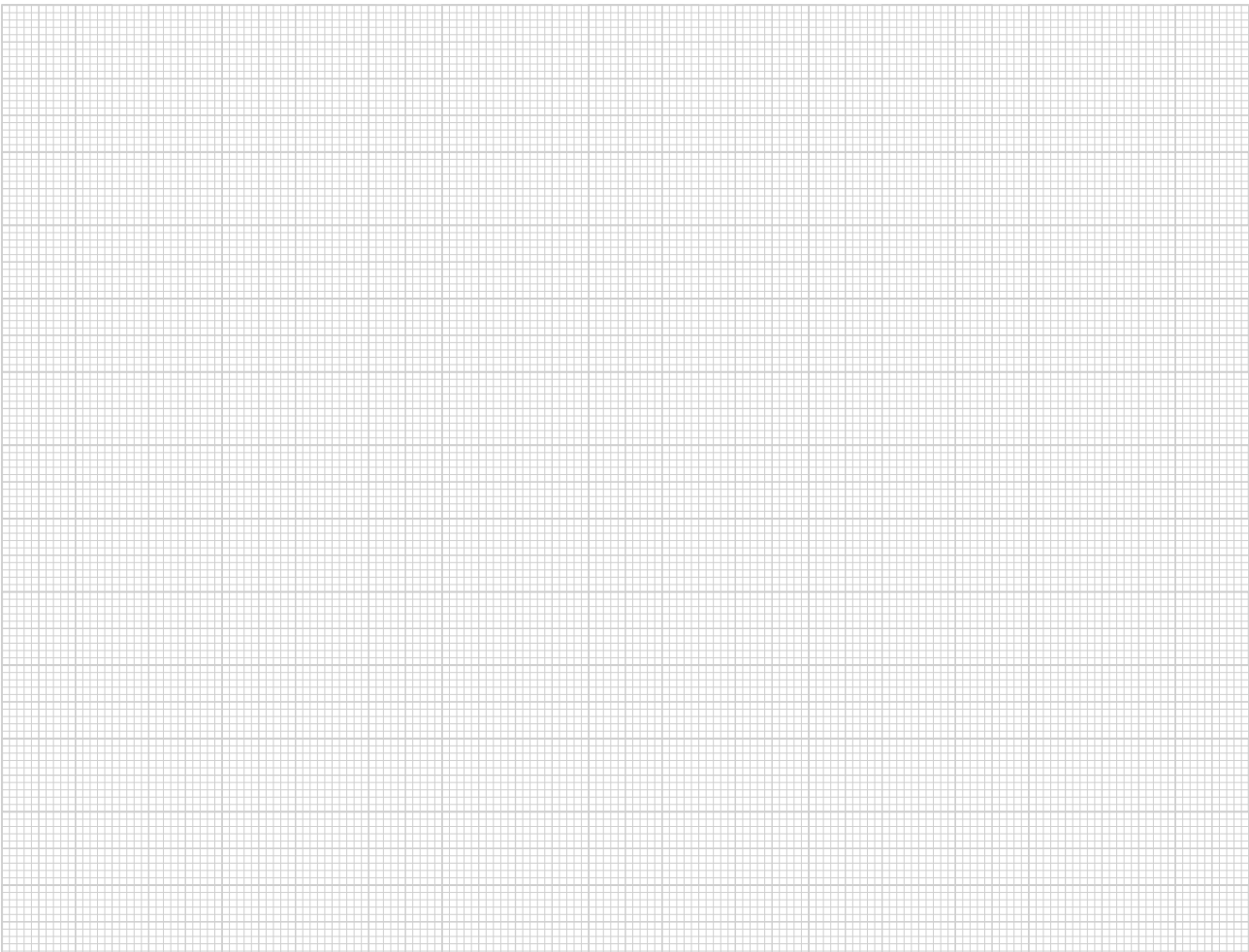
Class		Underfloor ducts type S2 / S3	Underfloor boxes type UZD / UGD
6.2	According to impact resistance for installation and application		
6.2.7	Electrical installation duct systems for impact energy 20 J	20 J	20 J
6.3	According to temperatures, as specified in Tables 1, 2 and 3		
Table 1	Minimum storage and transport temperatures ± 2 °C	-25 °C	-25 °C
Table 2	Minimum installation and application temperatures ± 2 °C	+5 °C	+5 °C
Table 3	Application temperatures ± 2 °C	+60 °C	+60 °C
6.4	According to the resistance against fire spread		
6.4.2	Electrical installation duct systems which do not permit the spread of fire	x	x
6.5	According to the electrical conductivity		
6.5.1	Electrical installation duct systems with electrical conductivity	x	x
6.6	According to the electrical insulation property		
6.6.1	Electrical installation duct systems without electrical insulation capability	x	x
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991		
6.7.1	According to protection against ingress of solid foreign bodies	x	x
6.7.2	According to protection against ingress of water		
6.102	According to resistance to vertical loads affecting a small surface area		
6.102.2	Electrical installation duct systems for 750 N	x	
6.102.7	Electrical installation duct systems for 3,000 N		x
6.103	According to resistance to vertical loads affecting a large surface area		
6.103.3	Electrical installation duct systems for 5,000 N		x
6.103.5 ¹	Electrical installation duct systems for 15,000 N		x

¹ Test UZD with heavy-duty mounting lid DUG 250-3 4SL

Planning checklist

When planning a screed-covered underfloor system, the following points should be observed:

- ✓ **Match floor construction (screed height, screed type, insulation, sealing, etc.) to the architecture**
- ✓ **Observe minimum installation depth of device installation units**
- ✓ **Match the structural physics requirements (loads, footfall sound, etc.)**
- ✓ **Select device installation units according to the floor care**
- ✓ **Determine the distances between two under-floor sockets, taking into account strain loads and bend radii**



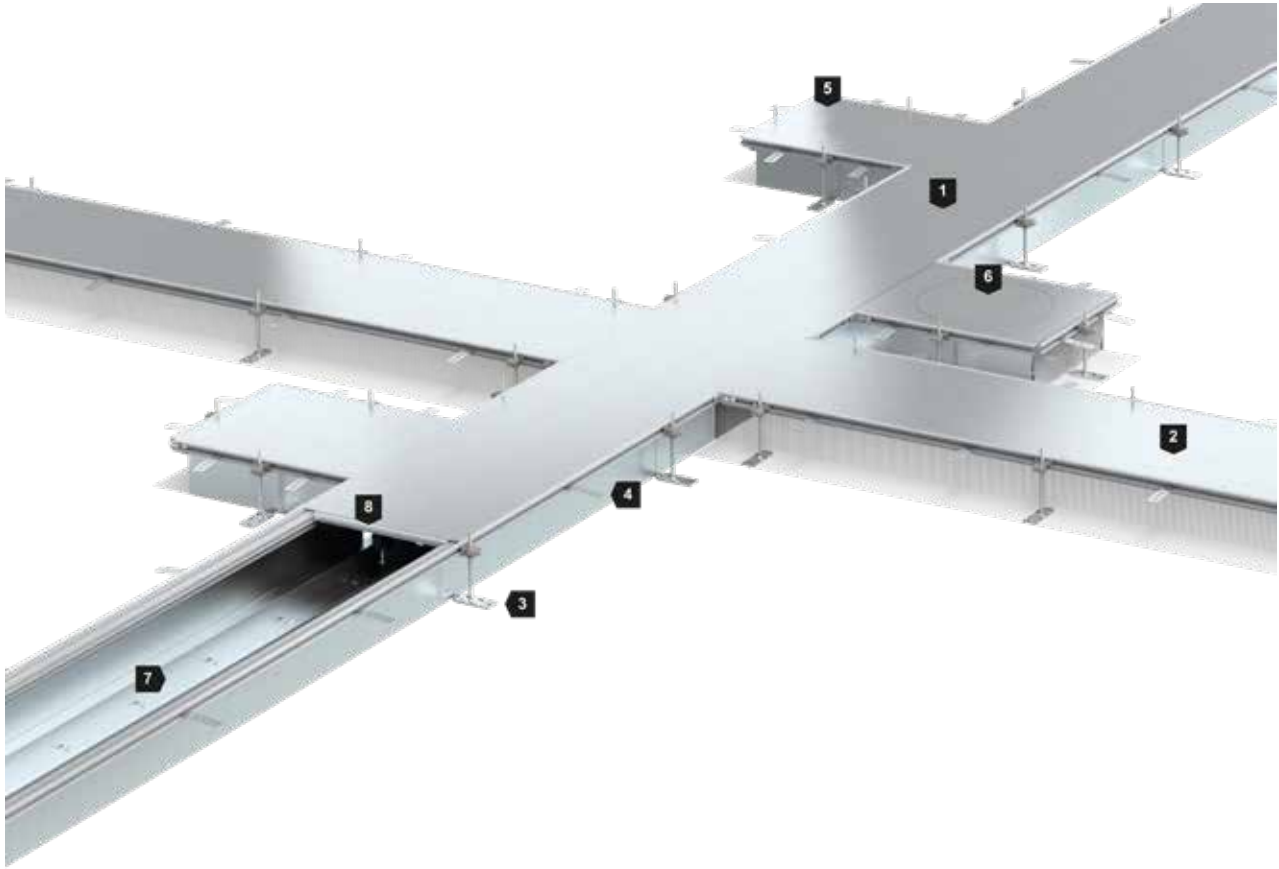
System description



The OKA open trunking system is a flexible system for in-screed cable routing. The trunking covers can also be opened along the whole length – even when installed with a floor covering. This means that the electrical installation in the trunking can be adapted at any time. Addi-

tional mounting benefits, such as lowerable floor covering profiles or rapid height-adjustment units, offer a great deal of flexibility and security for professional underfloor installations.

Installation principle



- 1** OKA-W installation trunking
- 2** OKA-G installation trunking
- 3** Height-adjustment unit
- 4** Screed tie
- 5** OKA-W extension unit with blank, closed mounting opening
- 6** OKA-G extension unit with blank, closed mounting opening
- 7** Separating retainer
- 8** Lid butt support



The screed-flush trunking of the OKA system is available in two versions – with a flexible sidewall and with a closed floor trough. The two variants can be combined easily. The trunking is mounted directly on the raw concrete. In thin-layered screed, trunking installation for pure cable routing is possible from 40 mm. The height of the trunking system is adjusted to the top edge of the screed, thus offering a drip edge for the subsequent screed work. For this reason, during planning, matching the screed height between units is particularly important.



The screed ties are hung in the aluminium side profile of the trunking at regular intervals. They create the connection between the trunking and the screed layer. To guarantee the most stable connection possible, no separating layer may be installed between the trunking and screed.



The trunking units are supplied, ready-to-mount, with three covers. On delivery, the trunking covers are screwed on and strapped on. The scope of delivery contains six height-adjustment units and screed anchors, and, depending on the nominal trunking width, three lid butt seals or six lid butt supports.



From a floor height plus floor covering of 55 mm, it is possible to install the service outlets of System 55. The standard GES service outlet is available for a screed height of 70 mm or more.

Screed and floor covering contact profiles



Application of the screed

When laying the screed, the side profiles of the trunking must be fully supported with screed. Loads may not be placed on the trunking until the screed has hardened. Impurities through the screed mortar should be avoided or removed later.



Lowering a floor covering contact profile

Floor covering contact profiles are used to protect the neighbouring floor covering cutting edges. In the as-delivered state, these profiles are flush, to allow finishing off the screed.



Using a floor covering contact profile

If the floor covering contact profile is required, then it can simply be mounted in the opposite direction. The profile is designed in such a way as to ensure the required lid play in the finished state.

Moisture protection and equipotential bonding



Insert moisture protection

The use of the OKAFD seal together with the OKARK... insertion cassettes permits the use of the OKA-G and OKA-W trunking systems for wet-cleaned hard floors. The OKAFD seal is inserted into the aluminium profile in the lengthwise direction at the position indicated.



Use of cassettes

When used in wet-cleaned floors, there is the option of equipping the trunking system with cassettes.



Creating equipotential bonding

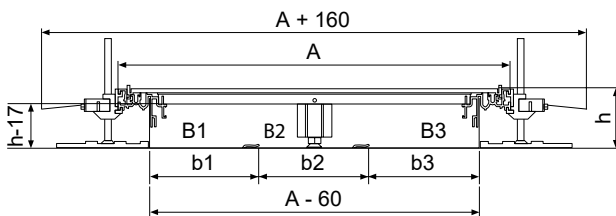
We recommend including the OKA screed-flush trunking system in the equipotential bonding. The OKA system offers the required connection options for protective conductors, as well as the continuous conductivity of all the system components via the height-adjustment units. The EMC regulations according to DIN EN 50174-2 (VDE 0800-174-2) require the inclusion of all the metallic system components up to the connection point as functional equipotential bonding.

Cable routing planning in the OKA-W



The following tables provide support when planning the cable routing in the OKA trunking system and show the recommended number of cables for each trunking type. The recommended number of cables takes into account a reserve of 50% in the trunking, in order to guarantee reinstallation of cables.

The adjustment of the height of the OKA trunking increases the usable trunking cross-section. If service outlets are installed in the trunking section, then the usable cross-section is reduced (refer to the relevant table).



Trunking cross-section and assignment OKA-W

Trunking type	OKA-W 200	OKA-W 200	OKA-W 200	OKA-W 300	OKA-W 300	OKA-W 300
System size A	200	200	200	300	300	300
System height h (mm)	40	60	100	40	60	100
Compartments	2	2	2	3	3	3
Internal trunking dimension A-68 (mm)	132	132	132	232	232	232
Usable trunking height H-17 (mm)	23	43	83	23	43	83
Total usable cross-section Bges (mm ²)	2,450	5,452	10,258	3,980	8,604	17,050
Compartment width b1 (mm)	66	66	66	77	77	77
Compartment width b2 (mm)	66	66	66	77	77	77
Compartment width b3 (mm)	-	-	-	77	77	77
Compartment 1						
Cross-section B1 (mm ²)	1,300	2,764	5,166	1,436	2,955	5,997
Number of NYM ¹³ cables	7	14	26	7	15	30
Number of CAT ²³ cables	8	17	32	9	18	37
Compartment 2						
Cross-section B2 (mm ²)	1,150	2,688	5,092	1,150	2,688	5,092
Number of NYM ¹³ cables	6	7	13	3	7	13
Number of CAT ²³ cables	7	8	16	4	8	16
Compartment 3						
Cross-section B3 (mm ²)	-	-	-	1,394	2,961	5,961
Number of NYM ¹³ cables	-	-	-	14	15	30
Number of CAT ²³ cables	-	-	-	17	18	37

¹ Heavy current cables NYM-J 3 x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²,

² Data cable CAT6, diameter = 9 mm, space requirement = 81 mm²

³ The stated number of cables refers to an assignment of 50%, meaning that an appropriate reserve remains

Trunking cross-section and assignment OKA-W

Trunking type	OKA-W 400	OKA-W 400	OKA-W 400	OKA-W 500	OKA-W 500	OKA-W 500
System size A	400	400	400	500	500	500
System height h (mm)	40	60	100	40	60	100
Compartments	3	3	3	3	3	3
Internal trunking dimension A-68 (mm)	332	332	332	432	432	432
Usable trunking height H-17 (mm)	23	43	83	23	43	83
Total usable cross-section Bges (mm ²)	6,086	11,897	24,250	8,331	16,097	32,413
Compartment width b1 (mm)	111	111	111	144	144	144
Compartment width b2 (mm)	111	111	111	144	144	144
Compartment width b3 (mm)	111	111	111	144	144	144
Compartment 1						
Cross-section B1 (mm ²)	2,197	4,366	8,746	2,952	5,773	11,497
Number of NYM ¹³ cables	11	22	44	15	29	58
Number of CAT ²³ cables	14	27	54	18	36	71
Compartment 2						
Cross-section B2 (mm ²)	1,824	3,267	6,903	2,567	4,674	9,608
Number of NYM ¹³ cables	9	12	35	13	24	48
Number of CAT ²³ cables	12	20	43	16	29	60
Compartment 3						
Cross-section B3 (mm ²)	2,065	4,264	8,601	2,812	5,650	11,308
Number of NYM ¹³ cables	21	43	86	28	57	113
Number of CAT ²³ cables	25	53	106	35	70	140

¹ Heavy current cables NYM-J 3 x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²,

² Data cable CAT6, diameter = 9 mm, space requirement = 81 mm²

³ The stated number of cables refers to an assignment of 50%, meaning that an appropriate reserve remains

Trunking type	OKA-W 600	OKA-W 600	OKA-W 600
System size A	600	600	600
System height h (mm)	40	60	100
Compartments	3	3	3
Internal trunking dimension A-68 (mm)	532	532	532
Usable trunking height H-17 (mm)	23	43	83
Total usable cross-section Bges (mm ²)	10,589	20,291	40,602
Compartment width b1 (mm)	177	177	177
Compartment width b2 (mm)	177	177	177
Compartment width b3 (mm)	177	177	177
Compartment 1			
Compartment volume B1 (mm ²)	3,693	7,159	14,199
Number of NYM ¹³ cables	19	36	71
Number of CAT ²³ cables	23	44	88
Compartment 2			
Compartment volume B2 (mm ²)	3,342	6,102	12,396
Number of NYM ¹³ cables	17	31	62
Number of CAT ²³ cables	21	38	77
Compartment 3			
Compartment volume B3 (mm ²)	3,554	7,030	14,007
Number of NYM ¹³ cables	36	70	140
Number of CAT ²³ cables	44	87	173

¹ Heavy current cables NYM-J 3 x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²,

² Data cable CAT6, diameter = 9 mm, space requirement = 81 mm²

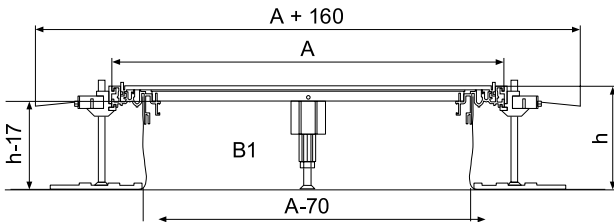
³ The stated number of cables refers to an assignment of 50%, meaning that an appropriate reserve remains

Cable routing planning in the OKA-G



The following tables provide support when planning the cable routing in the OKA trunking system and show the recommended number of cables for each trunking type. The recommended number of cables takes into account a reserve of 50% in the trunking, in order to guarantee reinstallation of cables.

The adjustment of the height of the OKA trunking increases the usable trunking cross-section. If service outlets are installed in the trunking section, then the usable cross-section is reduced (refer to the relevant table).



Trunking cross-section and assignment OKA-G

Trunking type	OKA-G 200	OKA-G 200	OKA-G 200	OKA-G 300	OKA-G 300	OKA-G 300
System size A	200	200	200	300	300	300
System height h (mm)	40	140	240	40	140	240
Internal trunking dimension A-70 (mm)	130	130	130	230	230	230
Usable trunking height H-17 (mm)	23	123	223	23	123	223
Cross-section B1 (mm ²)	2,700	15,900	29,100	5,050	28,250	51,450
Number of NYM ¹³ cables	14	80	146	26	142	258
Number of CAT ²³ cables	17	98	180	31	175	318

Trunking type	OKA-G 400	OKA-G 400	OKA-G 400	OKA-G 500	OKA-G 500	OKA-G 500
System size A	400	400	400	500	500	500
System height h (mm)	40	140	240	40	140	240
Internal trunking dimension A-70 (mm)	330	330	330	430	430	430
Usable duct height H-17 (mm)	23	123	223	23	123	223
Cross-section B1 (mm ²)	6,740	37,578	68,778	9,090	49,928	91,128
Number of NYM ¹³ cables	34	188	344	46	250	456
Number of CAT ²³ cables	42	232	425	56	308	564

Trunking type	OKA-G 600	OKA-G 600	OKA-G 600
System size A	600	600	600
System height h (mm)	40	140	240
Internal trunking dimension A-70 (mm)	530	530	530
Usable trunking height H-17 (mm)	23	123	223
Cross-section B1 (mm ²)	11,440	62,278	113,478
Number of NYM ¹³ cables	57	312	568
Number of CAT ²³ cables	71	385	701

¹ Heavy current cables NYM-J 3 x 2.5 mm, diameter = 10 mm, space requirement = 100 mm²,

² Data cable CAT6, diameter = 9 mm, space requirement = 81 mm²

³ The stated number of cables refers to an assignment of 50%, meaning that an appropriate reserve remains

Reduction of the trunking cross-section

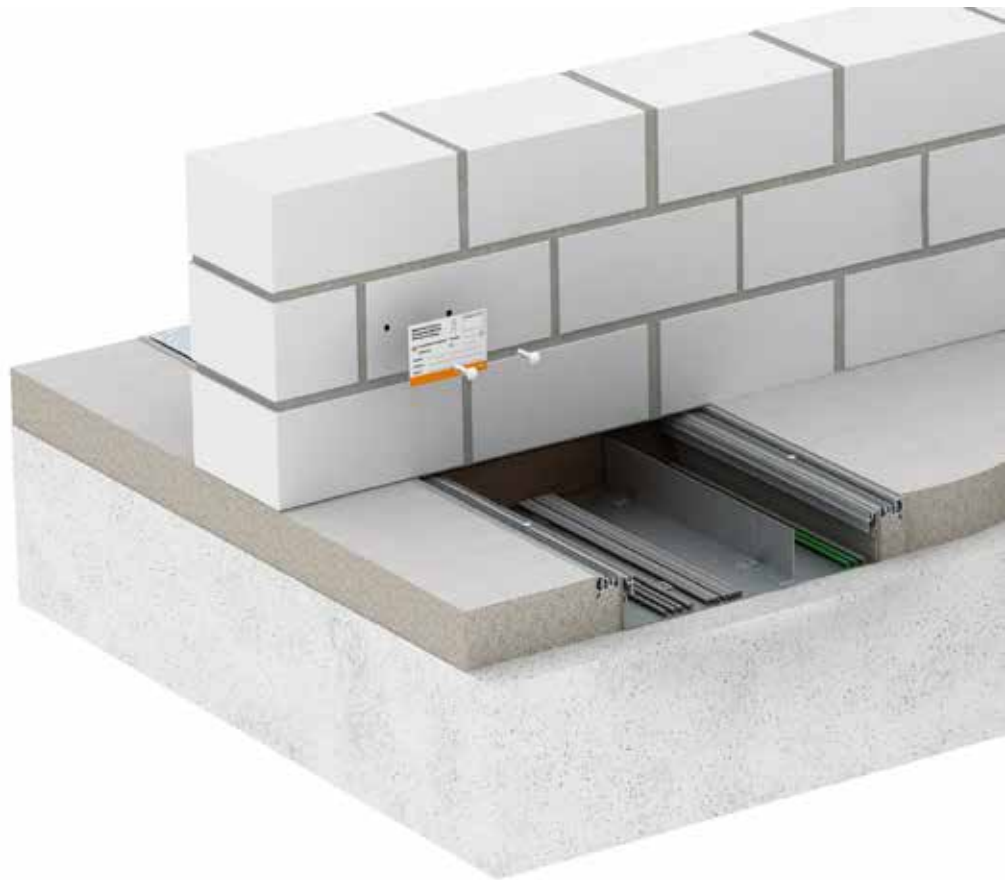


Reduction of the trunking cross-section through the installation of a service outlet in mm²

Service outlet type	Installation direction transverse to trunking course	Installation direction parallel to trunking course
GES4-2	11,000	11,000
GES6-2	14,238	11,243
GES9-2	13,673	13,673
GESR9-2	18,240	18,240
GESR9/10	23,935	24,960
GRAF9-2	19,608	19,608
GES9/55UV*	9,559	9,167
GESR9/55UV*	11,225	11,225
GRAF9-2 with MT45V0*	14,744	14,744

* Special systems for low screed heights

Fire protection



PYROPLUG® Block foam block

The OBO PYROPLUG® Block 200 cable insulation is the ideal cable insulation for use in underfloor trunking and ducts. If, during an electrical installation, underfloor trunking or ducts pass below walls classified for fire protection, then they must be closed against smoke gas penetration and fire. With the OKA system, the trunking lids are removed on both sides of the wall and the PYROPLUG® blocks inserted from both sides. Retroinstallations can be carried out very easily by removing individual blocks.

System benefits

- Mounting directly in underfloor trunking
- Cable insulation invisible on outside
- Mounting of empty pipes to prepare for retroinstallations
- Dust and fibre-free mounting
- Residual joints closed with PYROPLUG® screed filler (type FBA-SP)

Foam rubber fitting with fire protection additives

Fire resistance class	S90
Proof of application	General construction approval of DIBt, Berlin in conjunction with surveyor's report
Approval number	Z-19.15-1849
Testing standard	DIN 4102 Part 9
Min. insulation thickness	20 mm
Max. trunking size	60 x 16 mm

Footfall sound



Minimum requirements

The minimum requirements for structural sound insulation are defined in DIN 4109 "Sound insulation in buildings". General information on the topic of sound insulation and the installation of underfloor systems can be found in the general planner section of the catalogue.

Qualified tests to determine the transmission of air and footfall sound for the OKA trunking system were carried out together with the MÜLLER BBM GmbH testing institute in Planegg, Munich. The transmission of air and footfall sound was investigated for both vertical, i.e. from storey to storey, and horizontal sound transmission, i.e. from adjacent rooms.

The test was carried out in a floating screed construction.

Noise evaluation

The following section evaluations the test results. With regard to the evaluated reduction of footfall sound of the screed without a floor system, statements made below can be considered as approved.

The noise evaluation, based on the available test certificates, can be summarised as follows:

Horizontal transmission of air and footfall sound

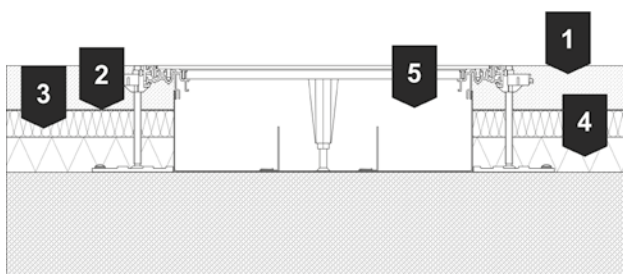
The system is suitable for construction situations with partition requirements up to $R'w = 52$ dB.

With horizontal transmission of footfall sound, the system fulfils the normal recommendations in the sense of Supplementary Sheet 2 of DIN 4109 [4]. Should there be requirements for increased footfall sound protection, then noise protection insulation should be added to the system in the area of the partition. Rockwool or polyester fibre materials can be used as noise protection insulation and should be inserted in the installation trunking to a length of at least 30 cm.

Vertical transmission of footfall sound

The OKA-W system (open trunking system, screed-flush) reduces the evaluated footfall sound reduction in comparison with an unaffected floor structure of a vertical screed in the vertical transmission direction by $\Delta Lw = 5$ dB.

Data taken from Report M88034/06 of 29 July 2014.



1	50 mm cement screed, CEMI 52.2 N, mass relative to area $m' = 15$ kg/m ²
2	0.2 mm PE film
3	30 mm footfall sound damping, dynamic stiffness $s' = 15$ MN/m ³
4	40 mm heat insulation, polystyrene EPS 100/035
5	38 mm installation trunking

Mounting aid



Preparations for mounting

The exact course of the OKA-G/OKA-W trunking section is measured and specified by tensioning a cord. Trunking branches are also marked on the raw screed.



Positioning of the trunking units

Positioning of the trunking units according to the measured and marked route. The blanking and function lids only need to be arranged during cabling.



Combine trunking units

When combining trunking units, ensure that all the metallic parts of the trunking system are included in the protective measure against indirect contact.



Mounting the trunking units

The fastening brackets with height-adjustment screws contained in the delivery are adjusted approximately to the given screed height and are then applied to the trunking units.



Version with fabric

With the OKA-G version, the side mesh apron should be run beneath the base plate of the height-adjustment unit.



Fastening the trunking units

Fasten the aligned trunking section to the raw ceiling using the fastening brackets.



Height adjustment

The height of previously aligned and fastened OKA trunking units can be adjusted to the screed height using their fastening brackets. This mounting step should be carefully agreed with the screed layer. After height adjustment, do not place any loads on the trunking system.



Mounting the screed tie

The supplied screed ties provide the joint between the screed and the trunking and are suspended in the aluminium side profile of the trunking units.



Adjusting the height-adjustment supports

Before applying the screed, shorten any height-adjustment bolts protruding over the top edge of the trunking (at least 5 mm beneath screed height).



Create trunking junction

The fitting set OKAFB2TX allows easy creation of trunking branches (T branch). The mesh of the OKA-G can be processed using shears or a knife and the floor trough of the OKA-W can be processed using the single-handed angle grinder.



Create 90° angle

Fitting sets are available for 90° angles to the left or right. They contain all the parts required for mounting.



Creating an cross-over

Cross-overs can be created like the junctions above using the fitting set OKAFB2TX. Two fitting sets are required. The work corresponds to two opposing junctions.



End piece mounting

There are standardised end pieces available for the OKA-G and OKA-W trunking systems, which can be adjusted to the appropriate trunking height and which are simple to mount.



Application of the screed

The screed should be installed directly after the OKA trunking system. The screed layer is obliged to line the side profiles well and to work the screed carefully and cleanly. Loads may not be placed on the trunking until the screed has hardened.



Creating equipotential bonding

All the metallic parts of the trunking system must be included in the protective measure against indirect contact with parts carrying voltage and are therefore equipped with the appropriate connection options for the protective conductor connection bracket.



Lid butt support mounting

For nominal trunking sizes of 400 mm or greater, lid butt supports are used for static support of the trunking lid. In the OKA-W system, they are equipped with the appropriate height-adjustment units for safe absorption of the traffic loads. Mounting is freely positionable along the aluminium side profiles of the trunking systems.



Expansion unit

The expansion units mean that the trunking system maintains its usable cross-section, even when service outlets are used – a great benefit, in particular for small trunking widths.



Laying floor covering contact profiles

Floor covering contact profiles are used to protect the neighbouring floor covering cutting edges. In the delivered state, these profiles are flush, to allow finishing of the screed.



Insertion of floor covering edge profile

If the floor covering contact profile is required, then it can simply be mounted in the opposite direction. The profile is designed in such a way as to ensure the required lid play in the finished state.



Insert moisture protection

The use of the OKAFD seal together with the OKARK... insertion cassettes permits the use of the OKA-G and OKA-W trunking systems for wet-cleaned hard floors. The OKAFD seal is inserted into the aluminium profile in the lengthwise direction at the position indicated.



Position cassette frame

The OKARK... insertion cassette fitted with the floor covering is laid on the trunking, which is pre-mounted with the OKAFD seal, thus forming an even floor with the remaining floor covering.



OKA-G trunking system with flexible sidewall

The trunking system with the flexible sidewall made of metal mesh can offer the greatest flexibility. It is particularly suited for applications with large height differences in the screed and the crossing of pipelines of other services.



OKA-W trunking system with floor trough

The closed trunking system with the closed floor trough can offer optimum safety for EMC-compatible cable routing and all-round cabling protection.



Solutions for every application

The correctly selected OKA trunking system offers a high level of flexibility and safety for professional installation.



Use of cassettes

Mount contact profiles and place the cassettes on the closed trunking.

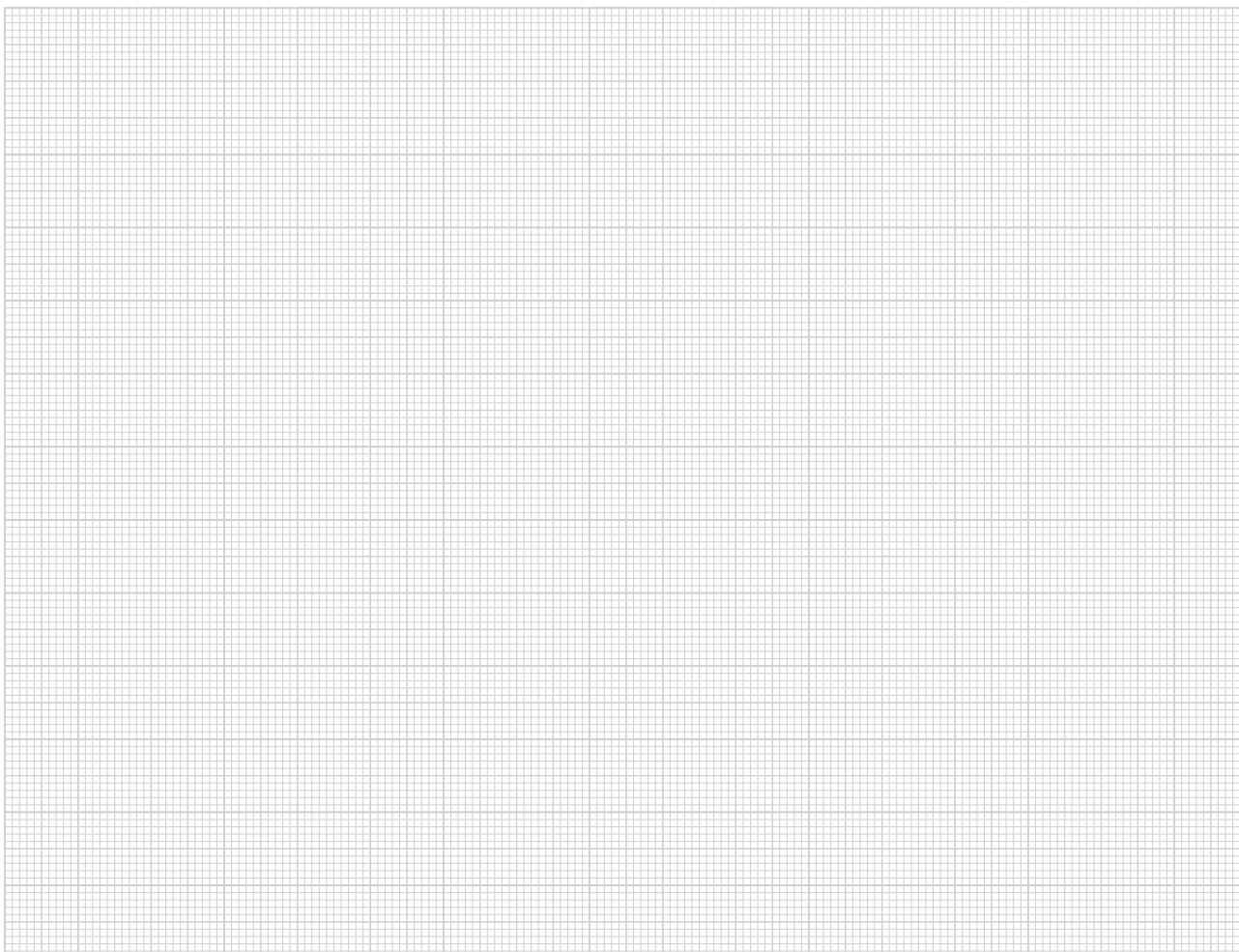
Standard data according to DIN EN 50085-1 and DIN EN 50085-2-2

Class		Trunking systems OKA-W / OKA-G
6.2	According to impact resistance for installation and application	
6.2.5	Electrical installation trunking systems for impact energy 20 J	20 J
6.3	According to temperatures, as specified in Tables 1, 2 and 3	
Table 1	Minimum storage and transport temperature ± 2 °C	-25 °C
Table 2	Minimum installation and application temperatures ± 2 °C	+5 °C
Table 3	Application temperatures ± 2 °C	+60 °C
6.4	According to the resistance against fire spread	
6.4.2	Electrical installation trunking systems which do not permit the spread of fire	x
6.5	According to the electrical conductivity	
6.5.1	Electrical installation duct systems with electrical conductivity	x
6.6	According to the electrical insulation property	
6.6.1	Electrical installation trunking systems without electrical insulation capability	x
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991	
6.7.1	According to protection against ingress of solid foreign bodies	x
6.7.2	According to protection against ingress of water	
6.102	According to resistance to vertical loads affecting a small surface area	
6.102.7	Electrical installation trunking systems for 3,000 N	x
6.103	According to resistance to vertical loads affecting a large surface area	Not tested

Planning checklist

When planning a screed-flush underfloor system, the following points should be observed:

- ✓ **Match floor construction (screed height, screed type, insulation, sealing, etc.) to the architecture**
- ✓ **Observe minimum installation depth of device installation units**
- ✓ **Match the structural physical requirements (loads, footfall sound, etc.)**
- ✓ **Select device installation units according to the floor care**
- ✓ **Take into account sufficient reserves when selecting the nominal trunking sizes**



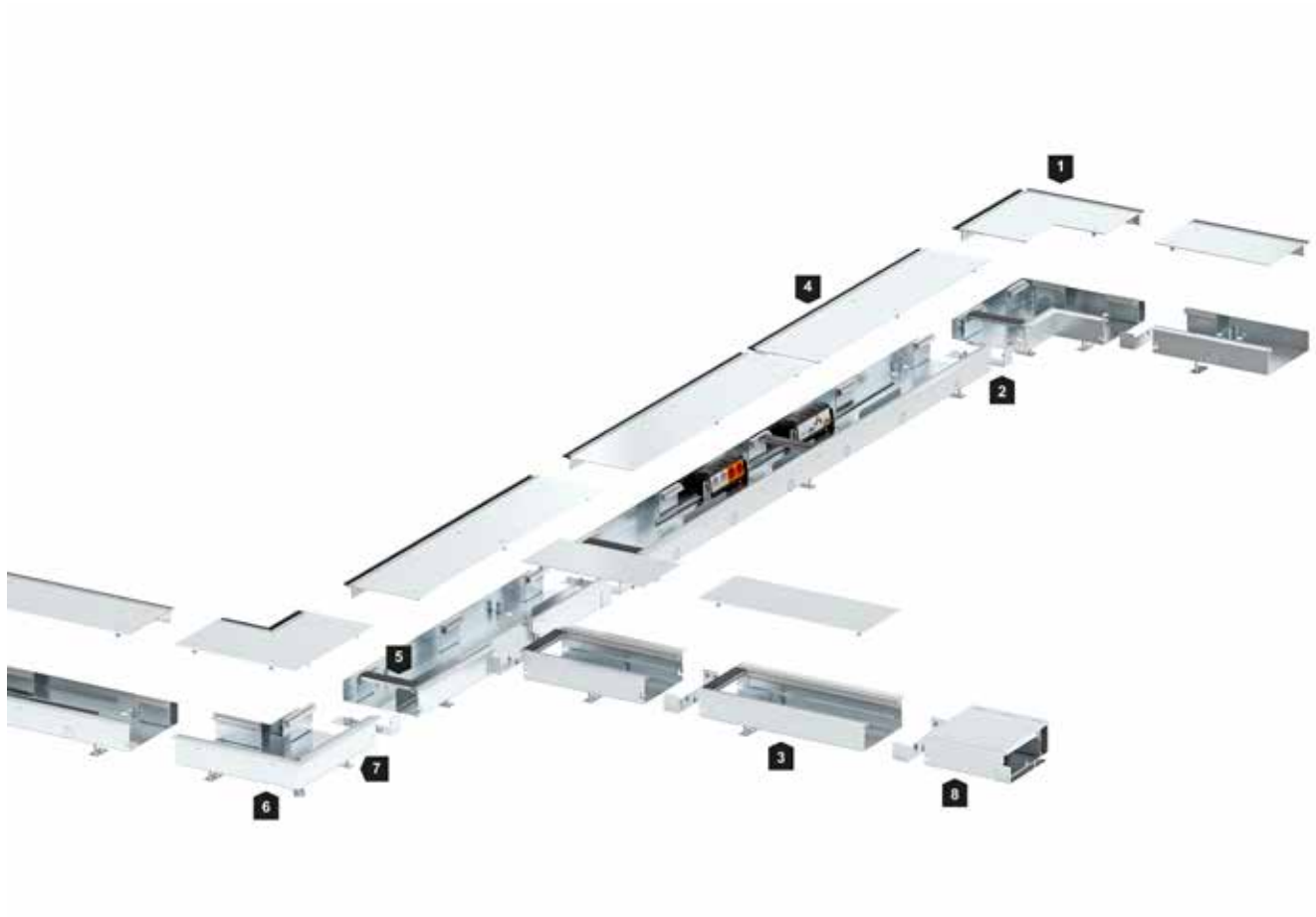
System description



The OKB brush bar trunking system runs along the wall and has an opening along its entire length. A brush bar covers this opening and serves as visually attractive sight and dust protection. The cables can be run out of the trunking at any location. The system can be adapted to the appropriate room situation at any time: The mounted trunking can be opened easily and re-equipped. The

combination with additional OBO products is very simple: Installation pipes can be used to connect floor sockets (GES R2 or UDHOME) with the trunking system. Use with other trunking systems to supply the area is also possible.

Installation principle



- 1** External corner
- 2** Connector for trunking unit
- 3** Supply trunking
- 4** Trunking unit with brush bar
- 5** Lid butt seal
- 6** Internal corner
- 7** Height-adjustment unit
- 8** Wall penetration



The OKB system runs directly on the wall or along floor-height windows. The system is mounted directly on the raw concrete before the screed work. Alternatively, it can be installed in a prepared opening in the screed. The 250 mm-wide trunking is separated into two compartments by means of a partition. Thus, data and power cables can be routed separately.



If additional connections are planned in the room – for example with a UDHOME floor socket – then the system can be connected without difficulty. Simply use the break-out openings to insert pipes and connect the flexible electrical installation pipes.



Firstly, the height adjustment units are screwed into the trunking. Then, the trunking bases are mounted using the supplied connectors. The system can be adjusted exactly to the planned screed height using the height-adjustment feet. The trunking can be adjusted to the appropriate room shape using the matching internal and external corners.



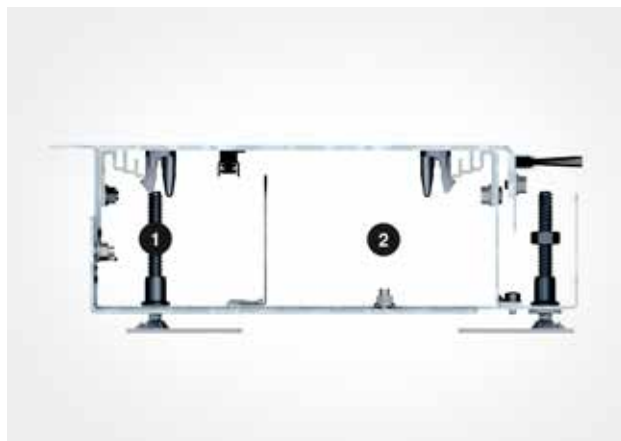
After screed laying, the trunking system can be equipped with sockets or data modules, according to the user's requirements. Using screws in the side profile, it is possible to adjust the floor covering contact edge of the trunking to the height of the top edge of the finished floor in an adjustment range of 25 mm. All the covers of the OKB system are covered with the selected finished floor after mounting.

Usable cross-sections



Supply trunking

The supply trunking has a usable cross-section of 11,008 mm². The table on this page indicates how many cables fit into the trunking.



Installation trunking

The first trunking compartment offers a usable cross-section of 4,231 mm². The second trunking compartment has a usable cross-section of 7,306 mm². Depending on the installation position of the devices, this area can only be used in a limited manner for cable routing.

Number of cables in a supply trunking

Cable diameter in mm	Cable cross-section in mm ²	Number of cables
5	25	440
6	36	306
7	49	225
8	64	172
9	81	136
10	100	110
11	121	91
12	144	76
13	169	65
14	196	56
15	225	49
16	256	43
17	289	38
18	324	34

Number of cables in an installation trunking

Cable diameter in mm	Cable cross-section in mm ²	Number of cables in trunking compartment 1	Number of cables in trunking compartment 2
5	25	173	292
6	36	120	203
7	49	88	149
8	64	68	114
9	81	53	90
10	100	43	73
11	121	36	60
12	144	30	51
13	169	26	43
14	196	22	37
15	225	19	32
16	256	17	29
17	289	15	25
18	324	13	23

Footfall sound

Minimum requirements

The minimum requirements for structural sound insulation are defined in DIN 4109 "Sound insulation in buildings". General information on the topic of sound insulation and the installation of underfloor systems can be found in the general planner section of the catalogue.

Qualified tests to determine the transmission of air and footfall sound for the OKB brush bar trunking system were carried out together with the MÜLLER BBM GmbH testing institute in Planegg, Munich.

The transmission of air and footfall sound was investigated for both vertical sound transmission, i.e. from storey to storey, and horizontal sound transmission, i.e. from adjacent rooms.

The test was carried out in a floating screed construction.

Noise evaluation

The following section evaluates the test results. With regard to the evaluated reduction of footfall sound of the screed without a floor system, statements made below can be considered as approved.

The required noise measures, based on the available test certificates, for the use of the OKB trunking system in offices can be summarised as follows:

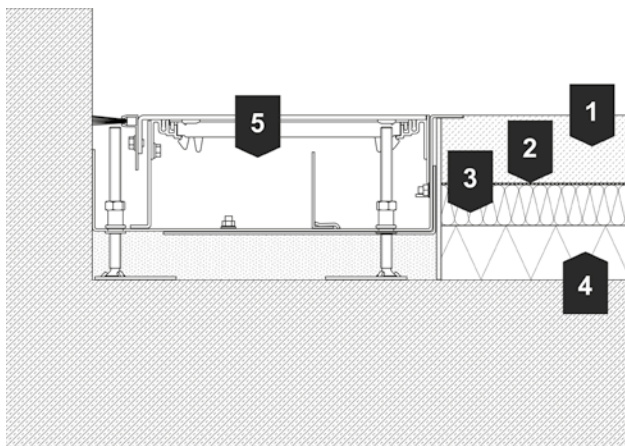
Horizontal transmission of air and footfall sound

In comparison with other systems, the brush formation at the edge produces higher sound transmission. If the trunking system runs under partitions with noise protection requirements, then noise protection insulation (cf. Point 4.2) must be installed in the partition area. It is then suitable for achieving the evaluated noise insulation dimensions of partitions up to $R'w = 48$ dB and evaluated standard footfall sound levels of $L'n, w \leq 53$ dB.

Vertical transmission of footfall sound

The OKB floor system (open trunking system, screed-flush) does not lead to a decrease of the required evaluated footfall sound reduction of a floating cement screed with regard to vertical transmission of footfall sound.

Data taken from Report M88034/06 of 29 July 2014.



1	50 mm cement screed, CEMI 52.2 N, mass relative to area $m' = 15$ kg/m ²
2	0.2 mm PE film
3	30 mm footfall sound damping, dynamic stiffness $s' = 15$ MN/m ³
4	40 mm heat insulation, polystyrene EPS 100/035
5	38 mm installation trunking

Mounting aid



Cable routing in the compartment

The OKB trunking system is run directly in front of a wall, allowing cable routing and covered device installation. Connection cables can be run out of the trunking at any point. The system is marked by simple handling and its load capacity.



Free use of sockets

Devices are either installed in closed mounting boxes or module supports, which are installed laying on their side. In this way, sockets can be used with straight connectors or angular connectors.



Safe cabling concept with Modul 45connect®

The OKB trunking system offers a high level of flexibility and security for professional installation. The Modul 45connect® system allows safe and quick implementation of heavy current cabling systems.



Preparations for mounting

Screw in the height-adjustment units. Interconnect the trunking bases using the connector. Safety: The connector creates the conductive connection between the trunking bases.



Adjustment of the system height

Fasten the floor plates of the levelling units on the raw ceiling. Adjust the trunking units to the top edge of the screed. Secure the height adjustment using a locknut. Fasten the trunking base on the raw ceiling.



Mounting of internal corner or external corner

Place the fitting on the trunking unit and fasten it. Adjust the required system height and secure it with a locknut.



Mounting of T piece

Install and fasten the T piece at the intended point in the trunking course. Adjust the required system height and secure it with a locknut.



Laying the screed

If necessary, seal the trunking joints. A 3–5 mm separation layer is permitted. Lay the screed. Note: Unstick the trunking system for the period of screed laying. Do not walk on it during screed laying.



Adjustment to finished floor height

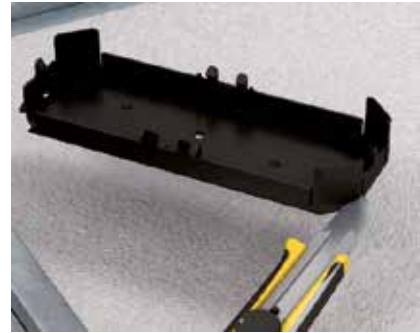
Adjust the floor covering contact edge to the top edge of the finished floor.



Cover lid with floor covering
Cover each individual lid with floor covering.



Adjust the height of the brush bar
Adjust the brush bar to the top edge of the finished floor.



Preparation of mounting box and module support
Prepare the mounting box and module support for cable feed (cut out the cable entry opening).



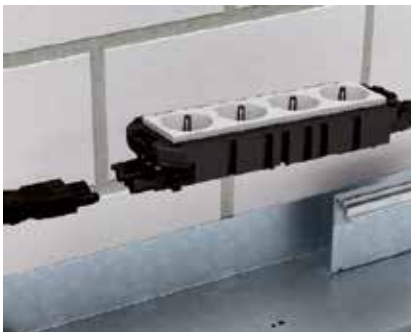
Socket mounting in mounting boxes
Connect the connection cable to the socket. Lock the cover plate on the mounting box.



Socket mounting in module support
Connect the connection cable to the socket and cover it with the protective housing. Safety: Use a protective housing.



Mounting of mounting box and module support in trunking base
After connection of the accessories, mount the device support on the module support or mounting box. Screw the complete unit into the trunking base.



Socket mounting with Modul 45connect®
Connect two double sockets using Modul 45connect® connectors and lock them into the module support. Lock the connector and socket part adapters onto the socket combination.



Connection of sockets
Insert the connection cables in the socket. Safety: Do not connect more than three socket combinations to any circuit.



Mounting of separating retainers
Only insert separating retainers after mounting of the fully wired mounting box and module support.



Use of the wall penetration

Connect the wall penetration to the trunking systems on both sides using the supplied connector.



Use of the screed limitation profile

When the screed is laid on both sides, mount the screed limitation profile on the wall side of the trunking system.



Trunking unit with blanking lid

Trunking unit with blanking lid for areas in which a cable outlet opening is not required.

System description

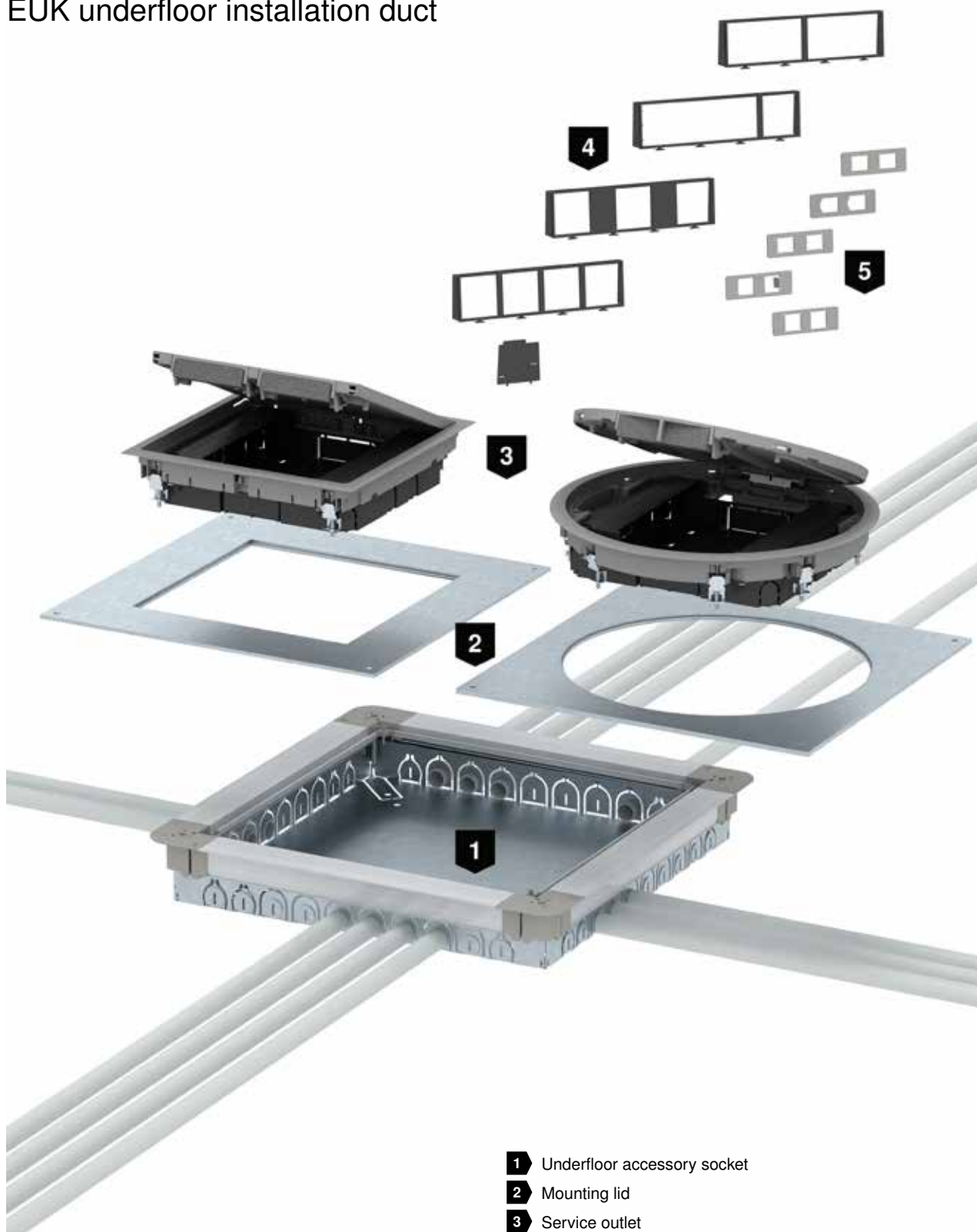


Low floor structure heights require special solutions for underfloor installations. System 55 is used for screed heights of 55 mm plus floor covering or higher. It is ideal for supplying large areas, particularly in offices and administrative buildings. The trunking system can be adapted to meet the specific requirements of the construction project and comprises screed-covered and screed-flush solution variants. The closed, screed-covered EÜK under-

floor system allows invisible cable routing, hidden in the screed, via installation pipes.

The open, screed-flush OKA trunking system provides the highest level of flexibility in cable routing. The covers of the trunking can be opened, meaning that the electrical installation can be accessed at any time.

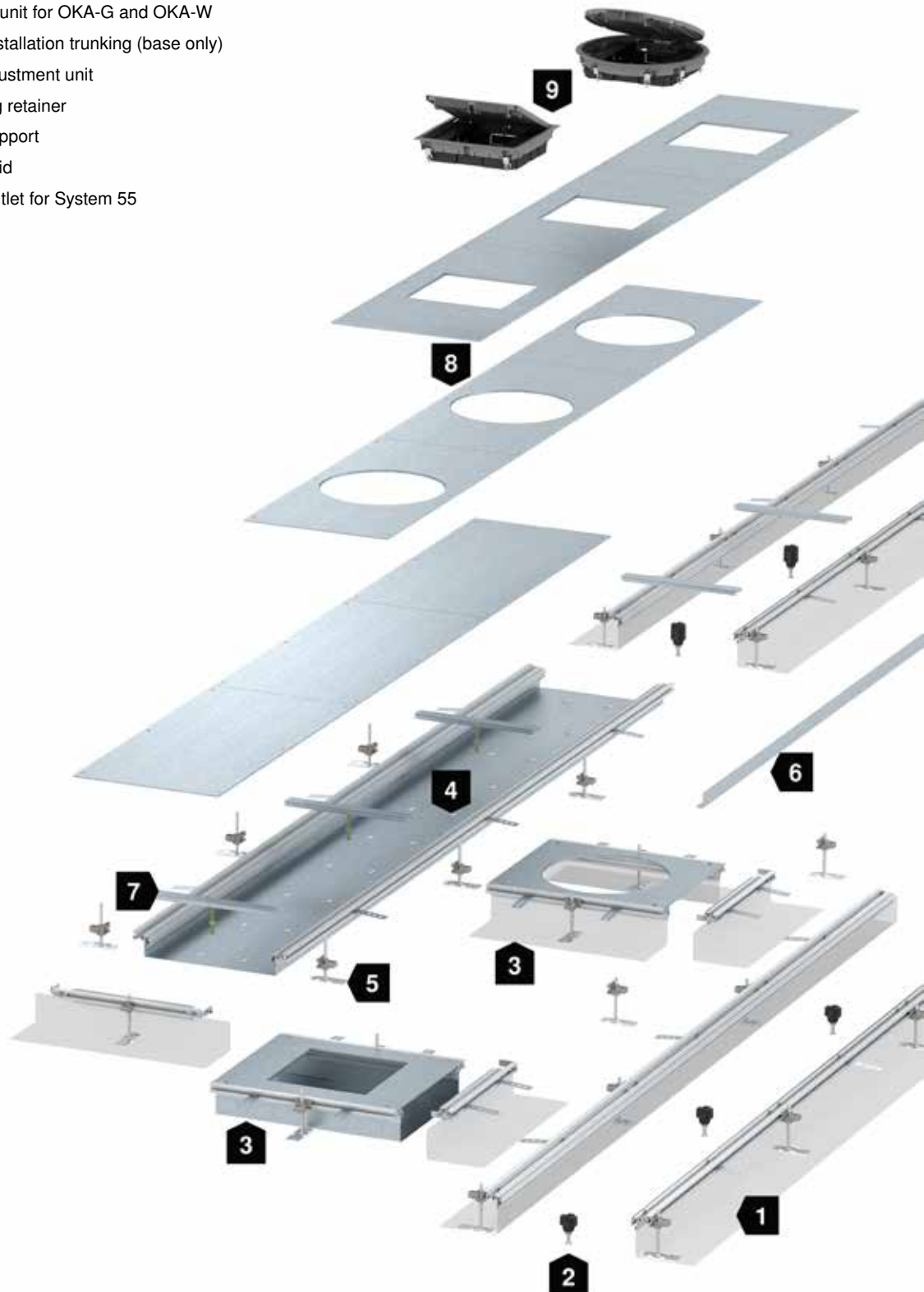
Installation principle
EÜK underfloor installation duct



- 1** Underfloor accessory socket
- 2** Mounting lid
- 3** Service outlet
- 4** Installation frame for Modul 45[®] accessories
- 5** Mounting plate for the installation of data sockets

Installation principle OKA underfloor installation trunking

- 1 OKA-G installation trunking (base only)
- 2 Height-adjustment unit for lid butt support
- 3 Extension unit for OKA-G and OKA-W
- 4 OKA-W installation trunking (base only)
- 5 Height-adjustment unit
- 6 Separating retainer
- 7 Lid butt support
- 8 Mounting lid
- 9 Service outlet for System 55



EÜK underfloor installation duct



Screed-covered system EÜK

Cables are routed via installation pipes of size M20 from a screed height of 55 mm. With greater screed heights, installation pipes of up to M32 are suitable. Up to ten installation pipes can be inserted per side, depending on the pipe size. The cable pipes are installed via a prepared empty pipe entry in the sidewalls of the underfloor sockets.



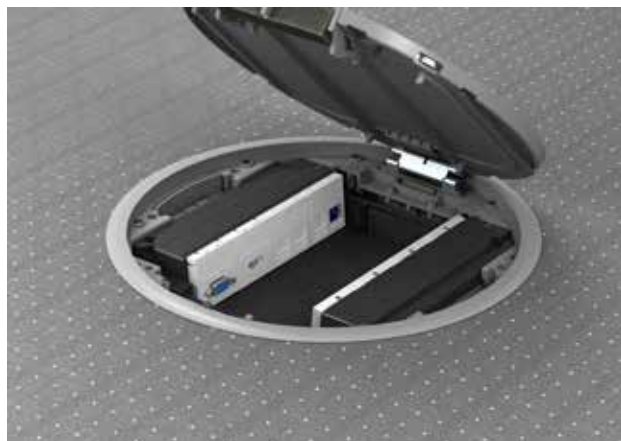
System sizes, EÜK

The device sockets and junction and branch boxes are available in two system sizes. In the system size 250, the dimensions are 367 x 410 mm, whilst in the 350 sizes, they are 467 x 510 mm.



Underfloor sockets EÜK

The underfloor sockets serve either as intersections of the cable sections or allow the installation of square and rectangular service outlets. The underfloor sockets can be adjusted to up to a screed height of 80 mm, as required.



Device mounting in System 55

Modul 45® devices are installed vertically in the System 55 service outlets. The different installation frames allow simple mounting of power, data and multimedia connections in the service outlet. Depending on the design of the installation frames and sockets, angular and/or straight connectors can be used. The installation of data connection modules is possible with Modul 45® data technology supports.

OKA underfloor installation trunking

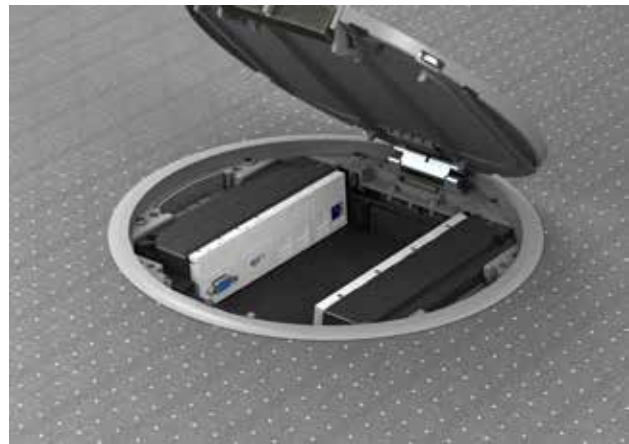


OKA screed-flush system

When using a lot of cables, the open, screed-flush OKA trunking system is ideal. The OKA installation trunking is available in the widths 200, 300, 400, 500 and 600 mm and allows secure, flexible cable routing.

Two OKA variants

The screed-flush trunking of the OKA system is available in two versions – with a flexible sidewall and with a closed floor trough. The two variants can be combined easily.



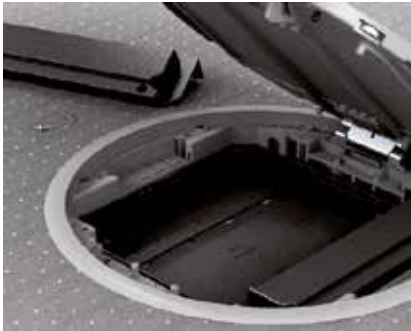
OKA device installation

With the OKA system, the installation of service outlets takes place using trunking installation units, which can be mounted at any point in the trunking section. This means that the trunking section is only used for cable routing, without any reduction of the usable cross-section.

Device mounting in System 55

Modul 45® devices are installed vertically in the System 55 service outlets. The different installation frames allow simple mounting of power, data and multimedia connections in the service outlet. Depending on the design of the installation frames and sockets, angular and/or straight connectors can be used. The installation of data connection modules is possible with Modul 45® data technology supports.

Mounting aid



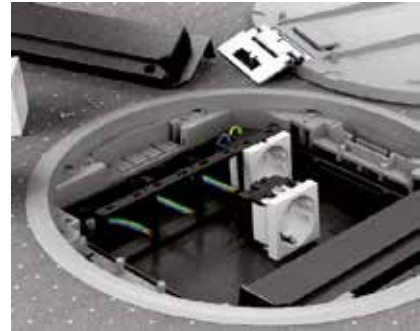
Preparation of mounting

Open the cover of the device support. To do this, slacken two screws and remove the cover.



Strain relief

Lock the strain relief on the cable insertion points in the base of the device support.



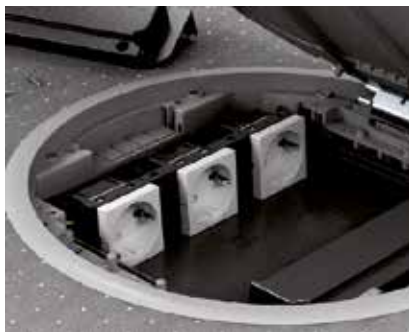
Modul 45[®] socket mounting

Insert the Modul 45[®] sockets in the installation frame and connect them.



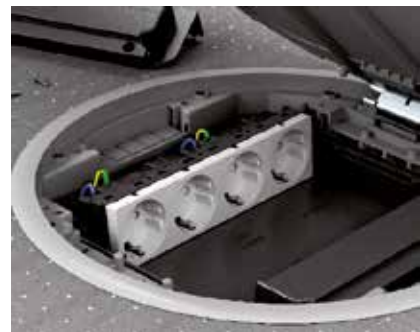
Use of installation frame 4x

Use a 4x frame for four individual Modul 45[®] devices. Mount the sockets at a 0° connection angle, as shown. Full use only with straight connectors.



Use of installation frame 3x

Use a triple frame for three individual Modul 45[®] devices. Mount the sockets at 0°, as shown. Suitable for angular connectors.



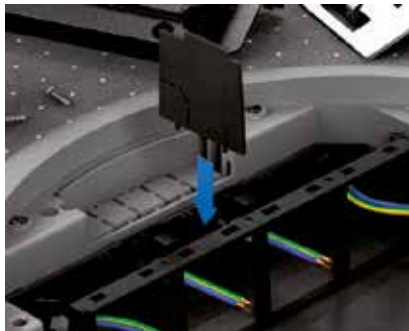
Use of installation frame 2x + 2x

Use 2x + 2x frames for 2x 0° 2x 0° with socket combinations. Full use only with straight connectors.



Use of installation frame 3x + 1x

Use 3x + 1x frames for 3x 0° 1x 0° with socket combinations. Full use only with straight connectors.



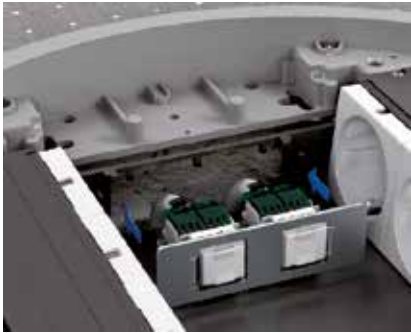
Mounting of separating retainer

Insert the separating retainer to separate the different circuits.



Installation of data modules with Modul 45[®] data technology support

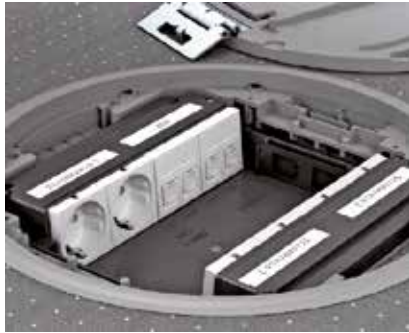
Run the feed line for the data modules through the installation frame. After connection, lock the data modules into the data technology support from behind. Lock the data technology support into the installation frame from the front.



Installation of data modules in support plate

After connection, lock the data modules into the support plate. Insert the support plate in the intended holder.

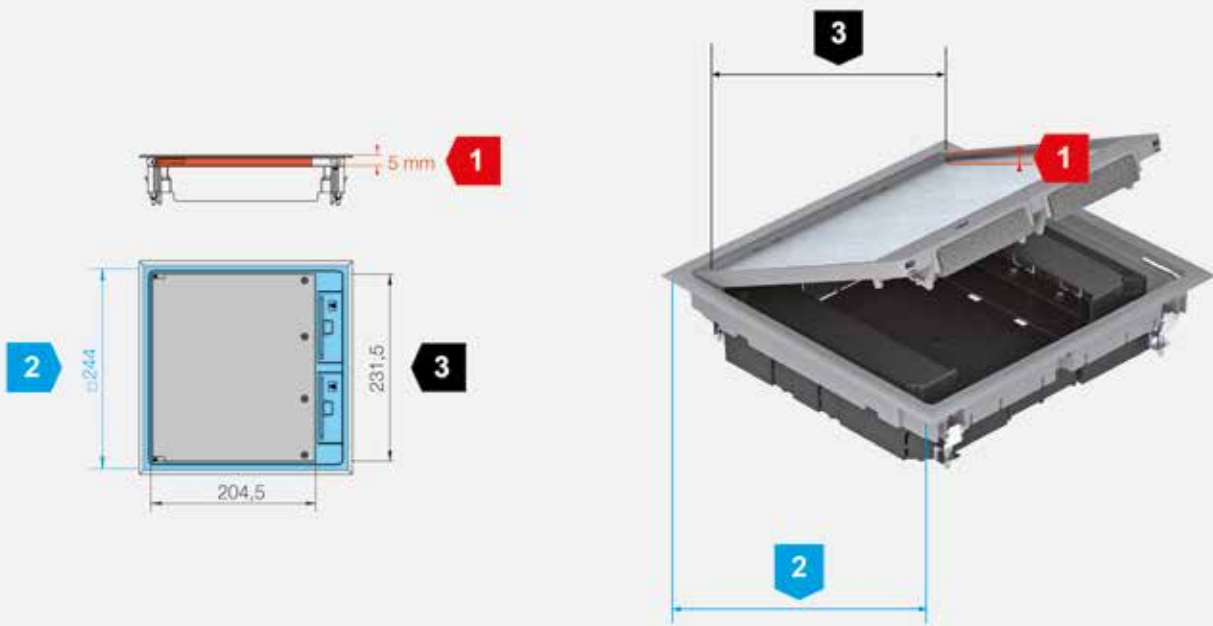
Note: Do not install data modules in front of the hinge in a round service outlet.



Module support labelling

Use standard labelling systems with a maximum width of 13 mm.

Installation and floor cut-out dimensions



1

Frame height for the floor covering in the lid (red dimensions)

The frame height data relates to the maximum floor covering thickness, including adhesive. If, in the figure, several heights are specified, then the frame height can be changed during construction: By adding or removing spaces, it is possible to adjust the desired frame height to the floor covering. In the as-delivered state, the frame height is usually 5 mm.

2

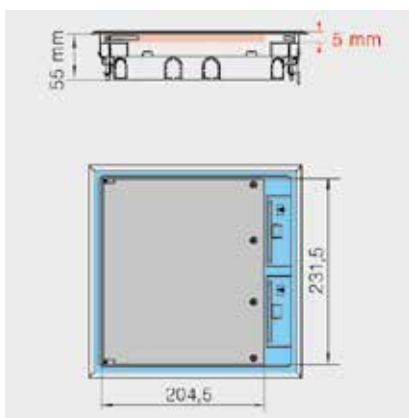
Floor cut-out for the installation of service outlets (blue dimensions)

The dimensions for the floor cut-out should be considered as target dimensions for correct installation of the service outlet in the floor. They are only generally required for the floor cut-out in system floors. When mounting service outlets in the EÜK screed-covered duct system or in the OKA open trunking system, they need not be taken into account, as these systems offer prefabricated mounting lids with matching installation openings.

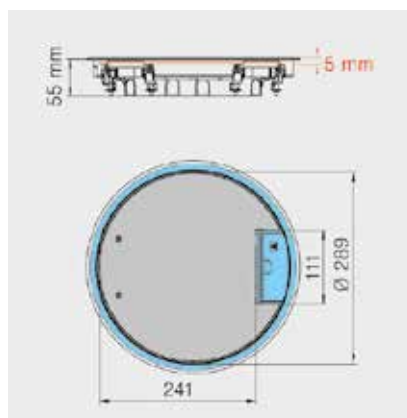
3

Internal dimension of the lid used to calculate the floor covering cut-out (black dimensions)

The dimension data relates to the internal dimension of the lid and is used to calculate the floor covering cut-out. Depending on the type of floor covering, appropriate reductions should be taken into account, e.g. for expansion gaps.



Nominal size 9, type GES9 55



Nominal size R9, type GESR9 55

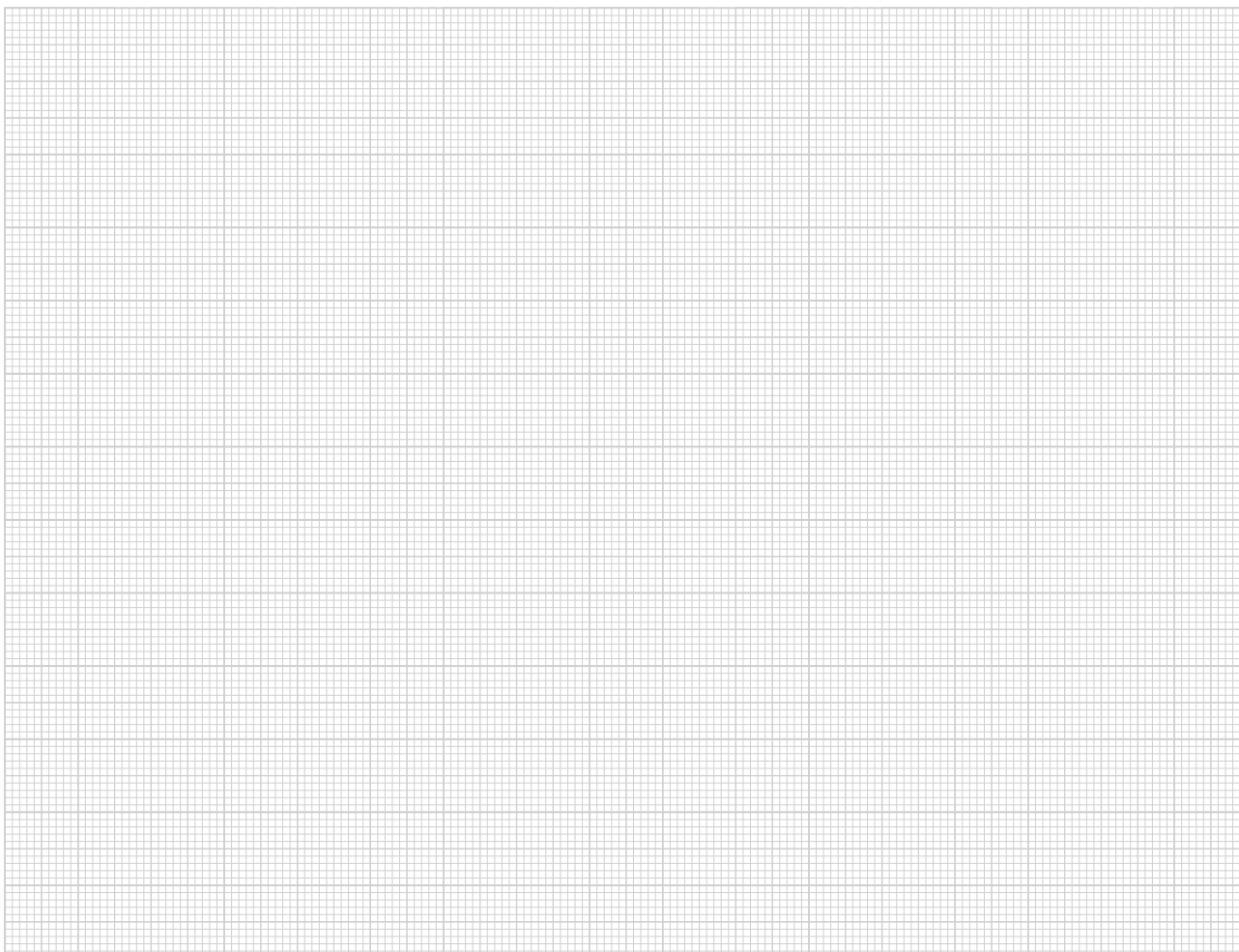
Standard data according to DIN EN 50085-1 and DIN EN 50085-2-2

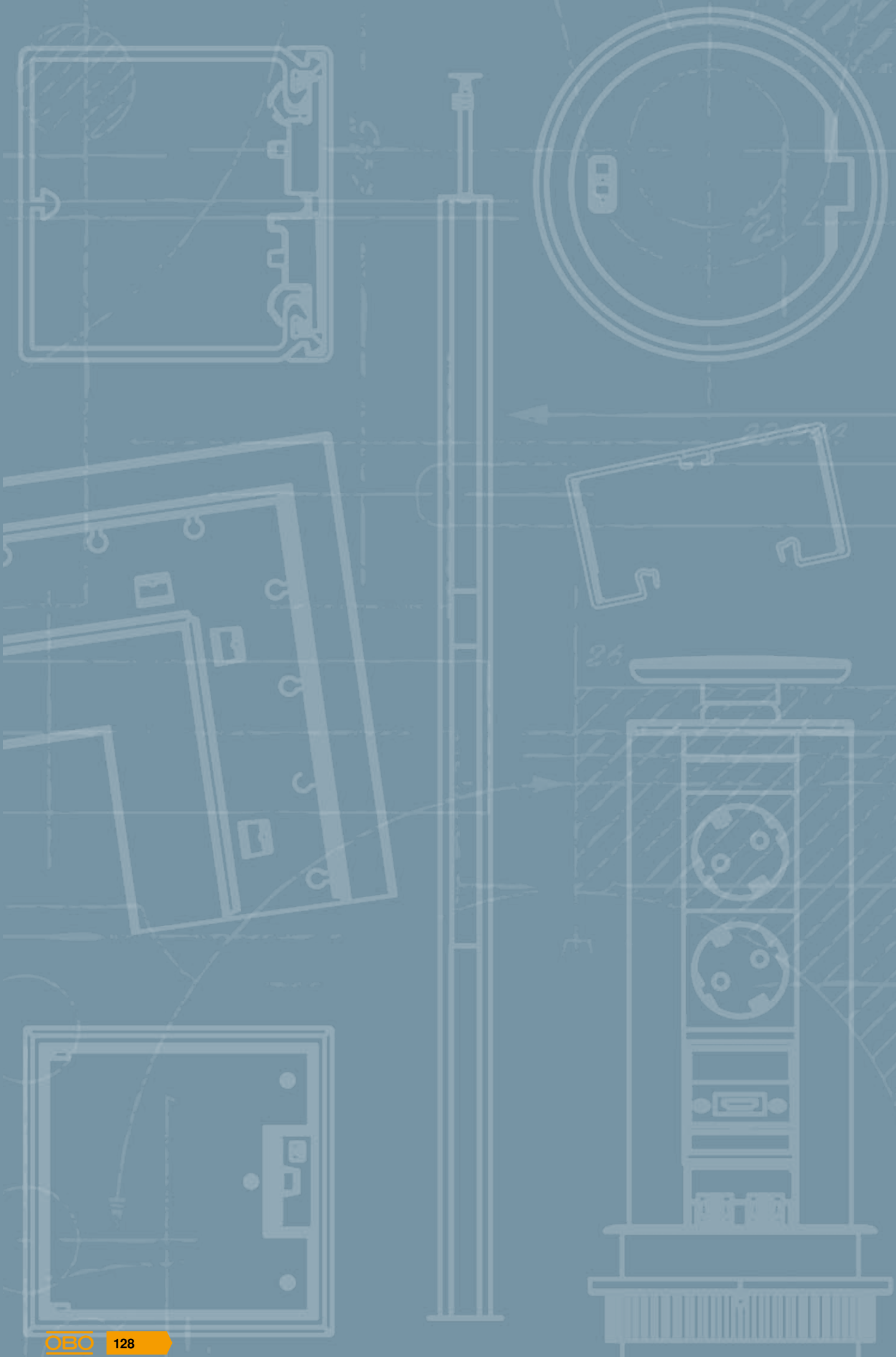
Class		Underfloor sockets type UGD 55	Trunking system OKA	GES 55
6.2	According to impact resistance for installation and application			
6.2.5	Electrical installation trunking systems for impact energy 20 J	20 J	20 J	5 J
6.3	According to temperatures, as specified in Tables 1, 2 and 3			
Table 1	Minimum storage and transport temperature ± 2 °C	-25 °C	-25 °C	-15 °C
Table 2	Minimum installation and application temperatures ± 2 °C	+5 °C	+5 °C	+5 °C
Table 3	Application temperatures ± 2 °C	+60 °C	+60 °C	+60 °C
6.4	According to the resistance against fire spread			
6.4.2	Electrical installation trunking systems which do not permit the spread of fire	x	x	x
6.5	According to the electrical conductivity			
6.5.1	Electrical installation trunking systems with electrical conductivity	x	x	
6.5.2	Electrical installation trunking systems without electrical conductivity			x
6.6	According to the electrical insulation property			
6.6.1	Electrical installation trunking systems with electrical insulation capability	x	x	
6.6.2	Electrical installation trunking systems without electrical insulation capability			x
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991			
6.7.1	According to protection against ingress of solid foreign bodies	x	x	x
6.7.2	According to protection against ingress of water	x		x
6.102	According to resistance to vertical loads affecting a small surface area			
6.102.2	Electrical installation trunking systems for 750 N			
6.102.7	Electrical installation trunking systems for 3,000 N	x	x	x
6.103	According to resistance to vertical loads affecting a large surface area			
6.103.3	Electrical installation trunking systems for 5,000 N		Not tested	

Planning checklist

When planning an underfloor system for low screed heights, the following points should be observed:

- ✓ **Match the floor structure (screed height, screed type, insulation, seals, etc.) to the architecture**
- ✓ **Observe minimum installation depth of device installation units**
- ✓ **Take into account sufficient reserves when selecting the nominal duct sizes**
- ✓ **Match the structural physical requirements (loads, footfall sound, etc.)**
- ✓ **Select device installation units according to the floor care**
- ✓ **Determine the distances between two under-floor sockets, taking into account strain loads and bend radii**





Underfloor applications in concrete



In-concrete duct system

130



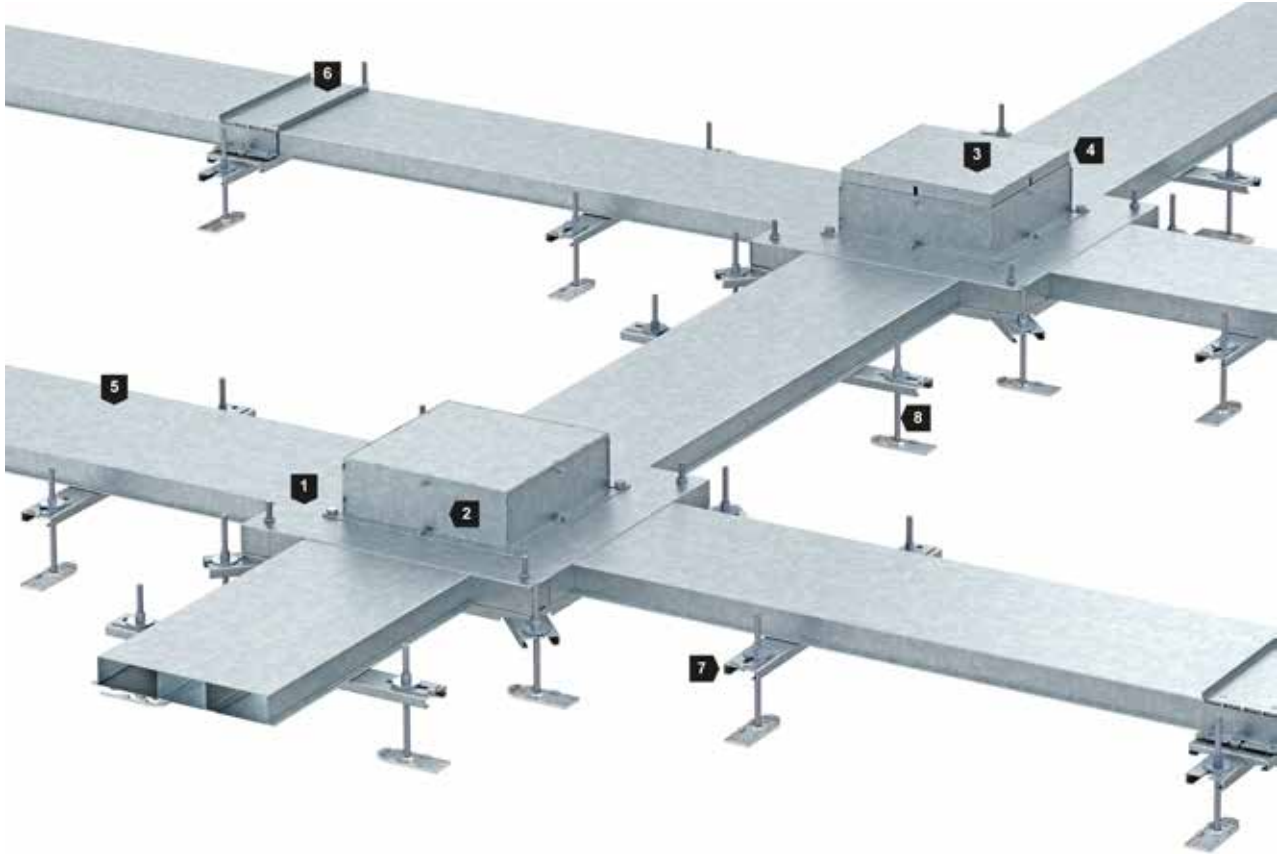
System description



Easy mounting, robustness and a perfect inclusion in the building – all of these are offered by the new in-concrete duct system. It is matched to the latest developments and trends in construction – both to the technology of concrete core activation and to current fire protection guidelines.

Thanks to many years of experience in development and project planning for underfloor installations, OBO knows the requirements for in-concrete duct systems. This is just one of the reasons OBO is the market leader in this field.

Installation principle



- 1** In-concrete socket
- 2** Cover socket for device installation
- 3** Protective mounting lid
- 4** Inner lined body
- 5** Electrical installation duct, 2 or 3-compartment, 38 or 48 mm high
- 6** Connection strap with equipotential bonding
- 7** Duct support
- 8** Height-adjustment unit



The requirements for installations in modern buildings develop continuously. The new OBO IBK system is matched to the latest technological standards.



The in-concrete duct system is suitable for use in concrete floor plates and concrete ceilings – irrespective of whether they are ceilings encased during construction or are ceilings made of filigree plates.

Thanks to its continuous height adjustment of ducts and sockets, the system can be adapted to all kinds of project requirements.





The IBK system is located between the upper and lower reinforcement of the concrete plate. This means that work between the strands of the steel mats makes mounting difficult. New, swivellable height-adjustment units now permit considerably simpler installation.

Height-adjustment units, standardised for the entire system, are used. The floor plate of the device socket, the connection elements and the supports are all the same height.



Details in the construction of the IBK system ensure very practical benefits. Thus, for example, the system remains closed off with a mounting protection lid up to device installation and is thus protected against dirt without any masking. The protection lid prevents workplace accidents during the construction phase and is so robust that it is unaffected by concrete working and the mechanical processing of concrete areas.

All the system components are designed for hard construction site use. They are subject to loads from walking, filling with concrete or compacting with a vibrator.



The integrated lined body of the in-concrete socket, its external wall, can be cast directly in the concrete. Thus, the concrete can be worked to the socket without any cavities requiring later filling. Whilst the outer wall is fixed in the concrete, the height of the inner lined body can be adjusted flexibly. Its sidewalls are designed for a standard height of 80 mm above the socket.

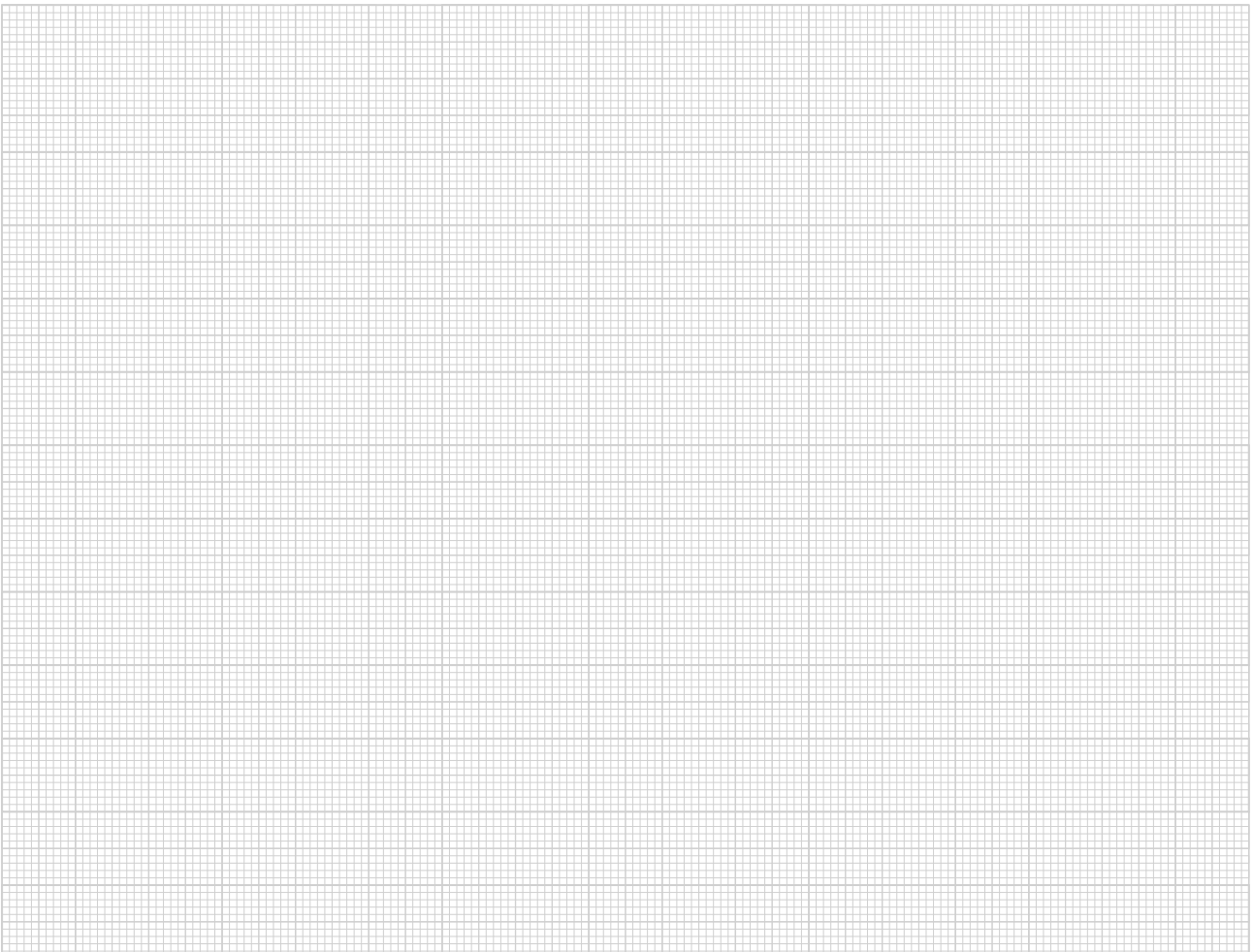
Devices are installed in the top of the IBK socket. No additional mounting lids or empty socket tops are required. Both service outlets and cassettes can be used.

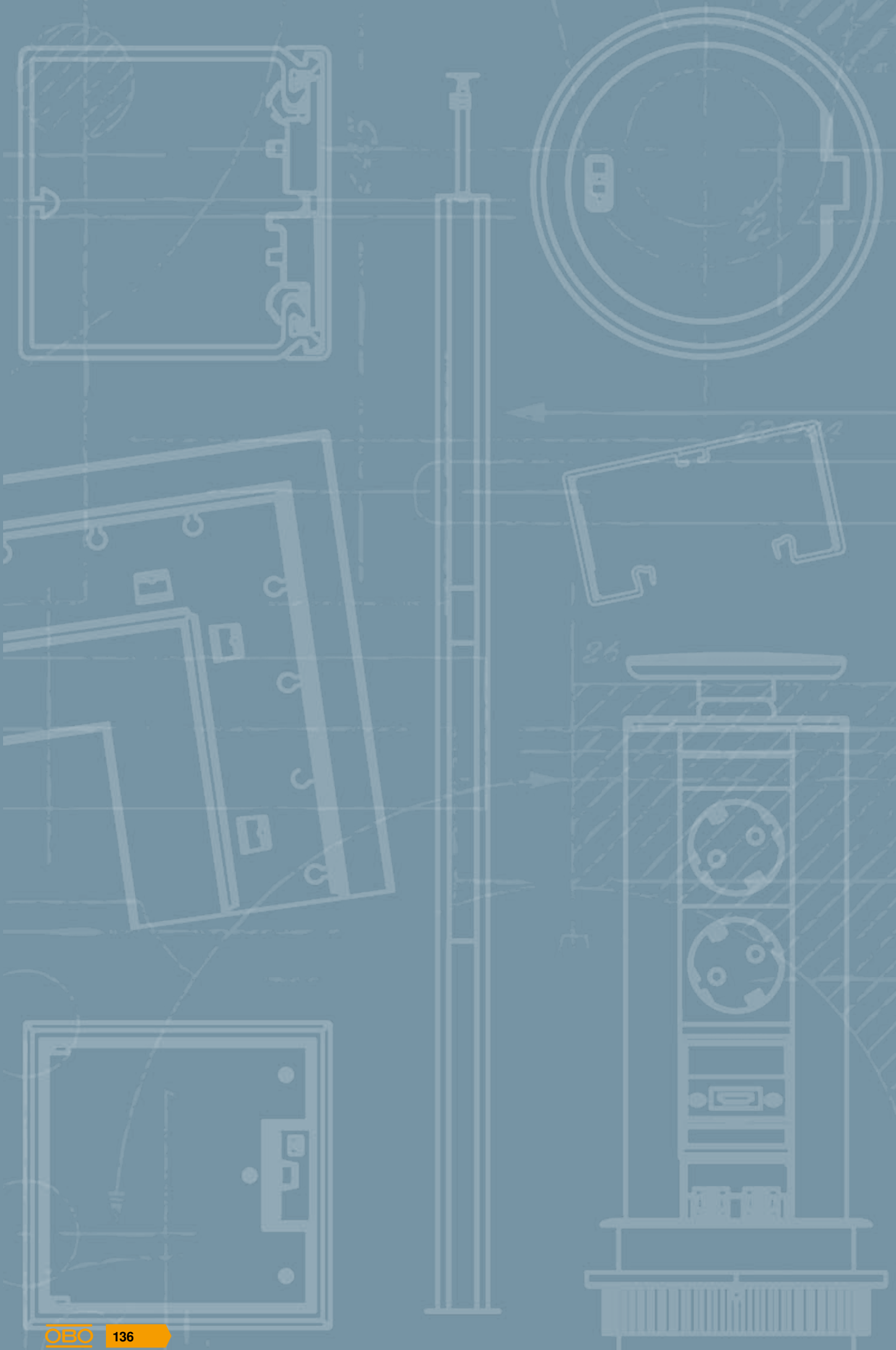


Planning checklist

When planning and building an in-concrete trunking system, the following factors must be included in the planning:

- ✓ **Match with architecture**
- ✓ **Match with statics**
- ✓ **Match with building systems**





Underfloor applications, on-floor



On-floor installation trunking

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System description

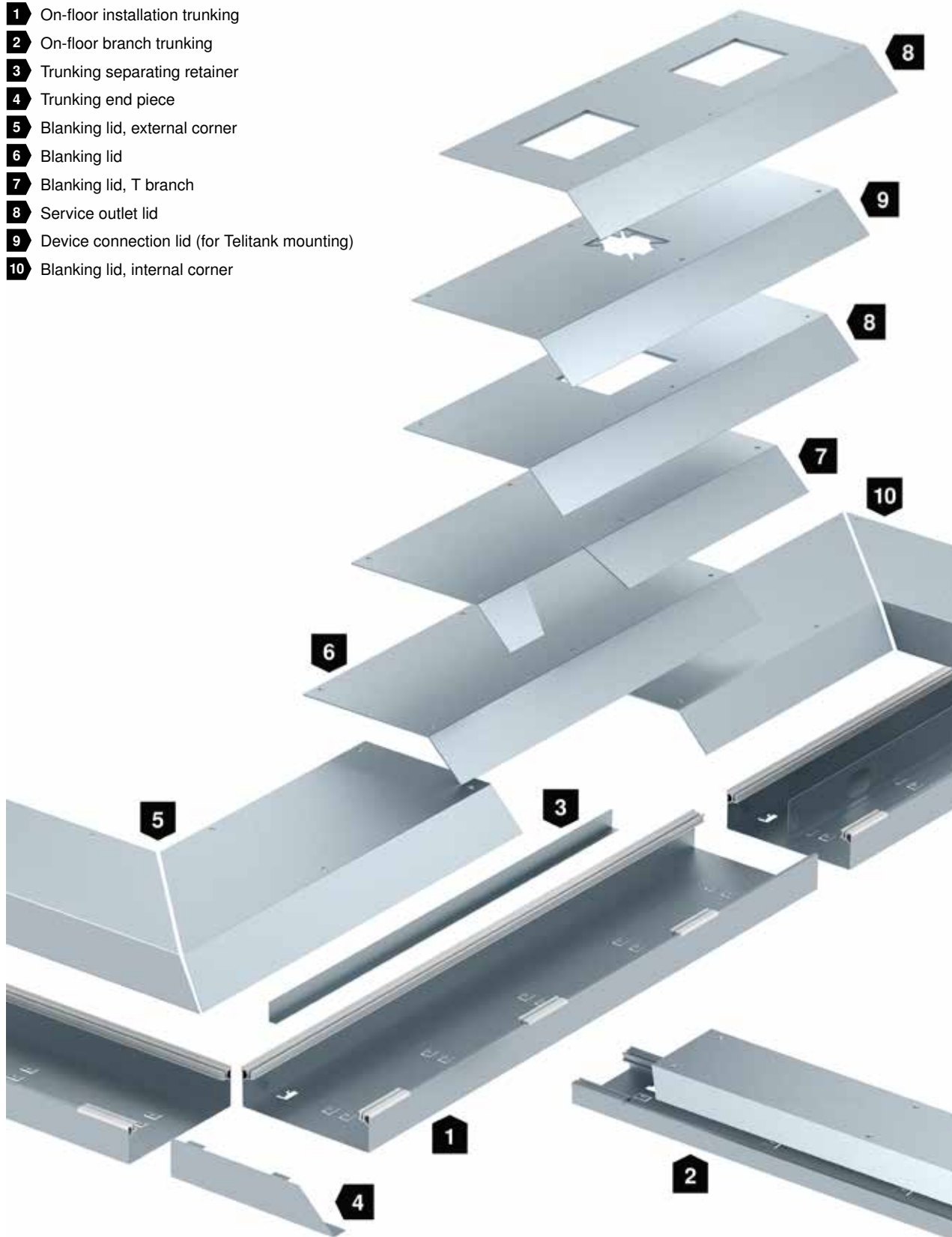


The AIK on-floor trunking system is installed on the finished floor. The system is particularly useful in places where classic underfloor systems cannot be installed: During building renovation, particularly in listed buildings.

Device installation units above the floor (Telitanks) are used for the installation of electrical devices.

Installation principle

- 1** On-floor installation trunking
- 2** On-floor branch trunking
- 3** Trunking separating retainer
- 4** Trunking end piece
- 5** Blanking lid, external corner
- 6** Blanking lid
- 7** Blanking lid, T branch
- 8** Service outlet lid
- 9** Device connection lid (for Telitank mounting)
- 10** Blanking lid, internal corner



Applications



Old building application

The main area of application of the AIK system is building renovation. Wherever a screed-flush trunking or screed-covered duct system cannot be used for construction or preservation reasons, the AIK system provides the electrical installation on the floor.



Office application

The AIK on-floor trunking system allows flexible installation at a later date at the edge of office space. The system can also adapt itself rapidly to a changed room situation: The position of the device lid can be changed.



Commercial application

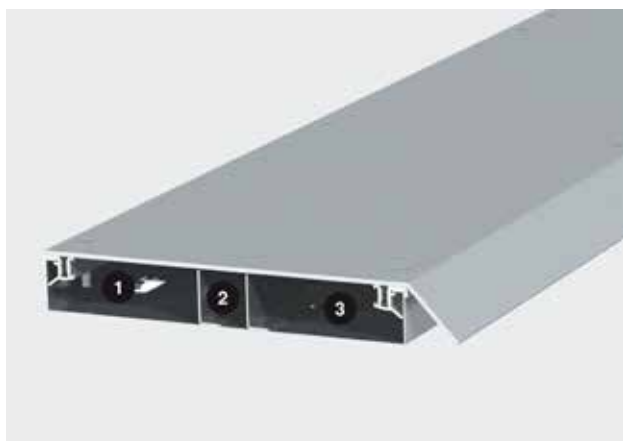
The robust structure and high stability means that the AIK on-floor installation system is also suited to industrial applications, such as workshops or laboratories.



Telitank installation unit

Telitanks are mounted on the trunking in device lids with the matching system opening. Telitanks offer direct installation options for Modul 45[®] accessories or accessories with a 50 mm central plate.

Usable cross-section



The ALK trunking is available in three different heights and four different widths. Please refer to the table on this page to find the correct trunking sizes for the required cable volume. The table provides information on the capacity of the individual trunking compartments, and also indicates the number of cables to be inserted for two typical application examples. The number of cables relates to a filling factor of 50%.

Number of layable cables

Nominal size	Nominal size	Available cross-section in mm ²	Available cross-section in mm ²	Available cross-section in mm ²	Total in mm ²	Number of cables	Number of cables
Trunking width	Trunking height	1	2	3		Data cables, Ø 9 mm	NYM 3 x 1.5 mm ² , Ø 11 mm
150	40	1,630	1,120	1,771	4,521	27	18
150	70	3,285	2,090	3,517	8,892	54	36
200	40	2,530	1,120	2,671	6,321	38	26
200	70	5,945	2,090	5,167	13,202	75	50
250	40	3,430	1,120	3,571	8,121	49	33
250	70	6,595	2,090	6,817	15,502	95	64
350	75	11,673	2,250	10,908	24,831	147	98

Equippable with Telitank

Nominal size	T4B	T4L	T8NL	T12L
150	+	+	-	-
200	+	+	-	-
250	+	+	+	+

Equippable with service outlets

Nominal size	GES2	GES4	GES6	GES9
150	-	-	-	-
200	+	-	-	-
250	+	-	-	-
350	-	+	+	+

Telitank variants

According to DIN EN 50085-2-2, Telitanks can be used in dry rooms with dry or wet-care floors. All Telitank housings are made of shock-resistant polyamide and thus have a very high load capacity.

Telitank T4L

Telitank T8NL

Telitank T4B

Telitank T12L

Mounting aid



Office application

Flexible installation at a later date at the edge of office space is a strength of the AIK on-floor installation system. The almost infinite position modification possibilities for function lids means that the system can adapt itself rapidly to a changed room situation.



Industrial application

Its robust structure and high stability means that the AIK on-floor installation system is also suited to industrial applications. For example, this system is also used in workshops and laboratories.



Old building application

Preservation or static reasons may be of prime importance for the use of the AIK on-floor installation system in residential environments, such as old buildings.



Preparations for installation

The trunking is mounted on the existing floor, before the floor covering is applied. The mounting surface must be clean and flat, in order to provide an interlocking connection of the trunking joints.



Preparation of trunking base

The trunking bases are completed by pushing onto the side profiles before fixing on the floor.



Connection of the trunking bases

For this, connect your joints by moving the side profiles so that they interlock. Earth conductor clamps are not contained in scope of delivery.



Protective measures

For the protective measures, it is necessary to connect the individual trunking bases and side profiles using sufficiently dimensioned cables with earth conductor clamps. On insertion, the trunking separating retainer automatically contacts with the base.



Direction changes

If there are right-angled directional changes in the course of the trunking, then the trunking bases must be adjusted to the appropriate angle situation. In the case of non-right-angled direction changes, the trunking covers must also be modified.



Internal corner

Right-angled trunking route as internal corner.



External corner
Right-angled trunking route as external corner.



T piece
With the T piece, the trunking base is not needed in the width of the junction trunking, whereas the rear side profile must completely bridge the reverse interruption. The junction trunking (AIK-F.), with the one-sided slope, is covered using internal corner lids.



T junction with connection trunking
For junction trunking with a slope on both sides (AIK-A.), the AIKF/D-T lids are used together with the AIKA-AD connection lids.



Nominal trunking size 350
For nominal trunking sizes of 350, support the lids with the TWL trunking divider.



Floor covering work
When laying the floor covering, ensure that it joins the trunking base. Cover the surface of the trunking lids completely with the floor covering. Pierce the floor covering on the lid fixing holes. Insert screws here and screw the lid to the trunking base.



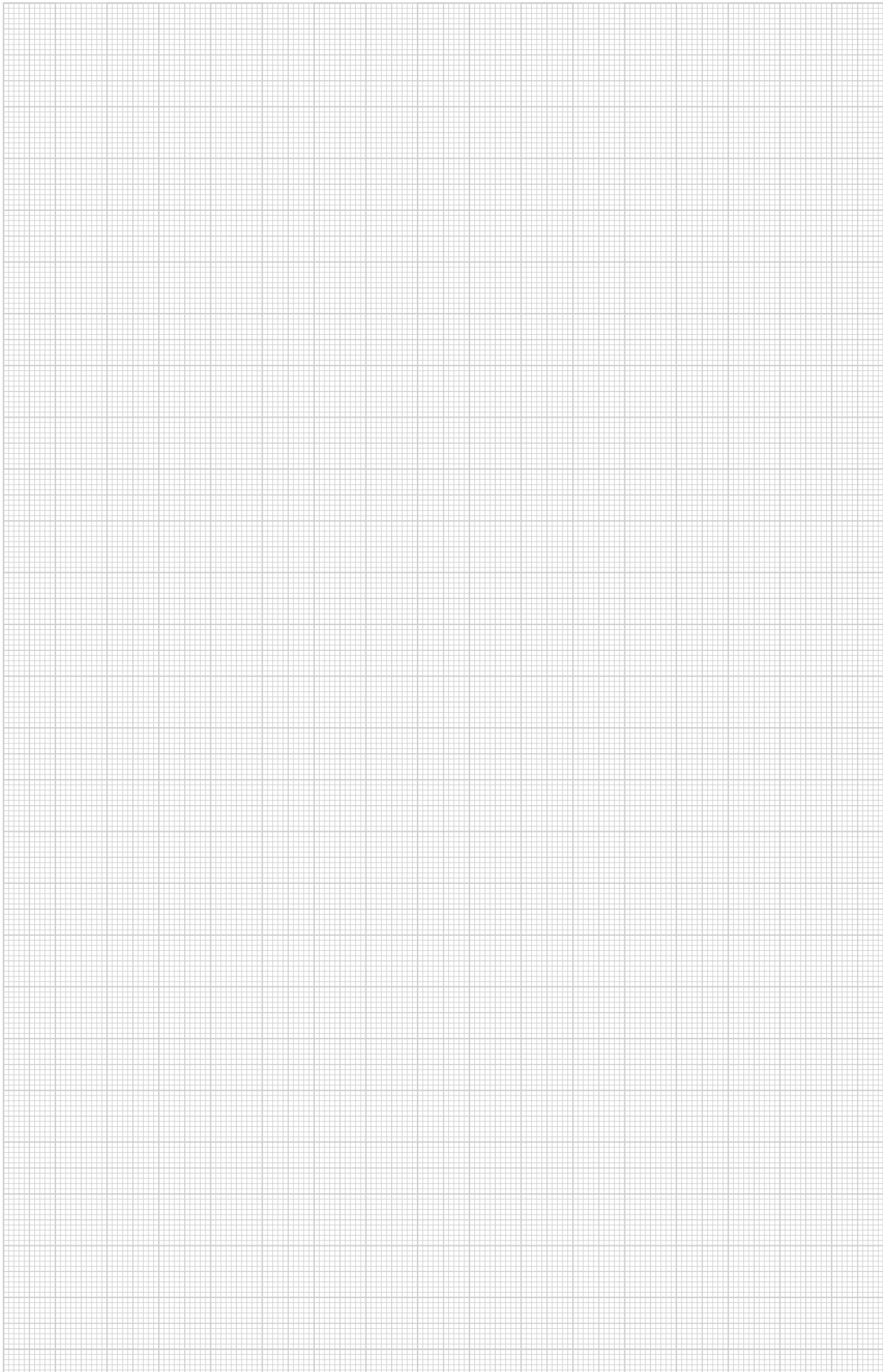
Floor covering work, mounting lid
For lids with installation or set-up openings, the protective mounting lids are removed and, after application of the floor covering, the mounting openings are cut out cleanly.

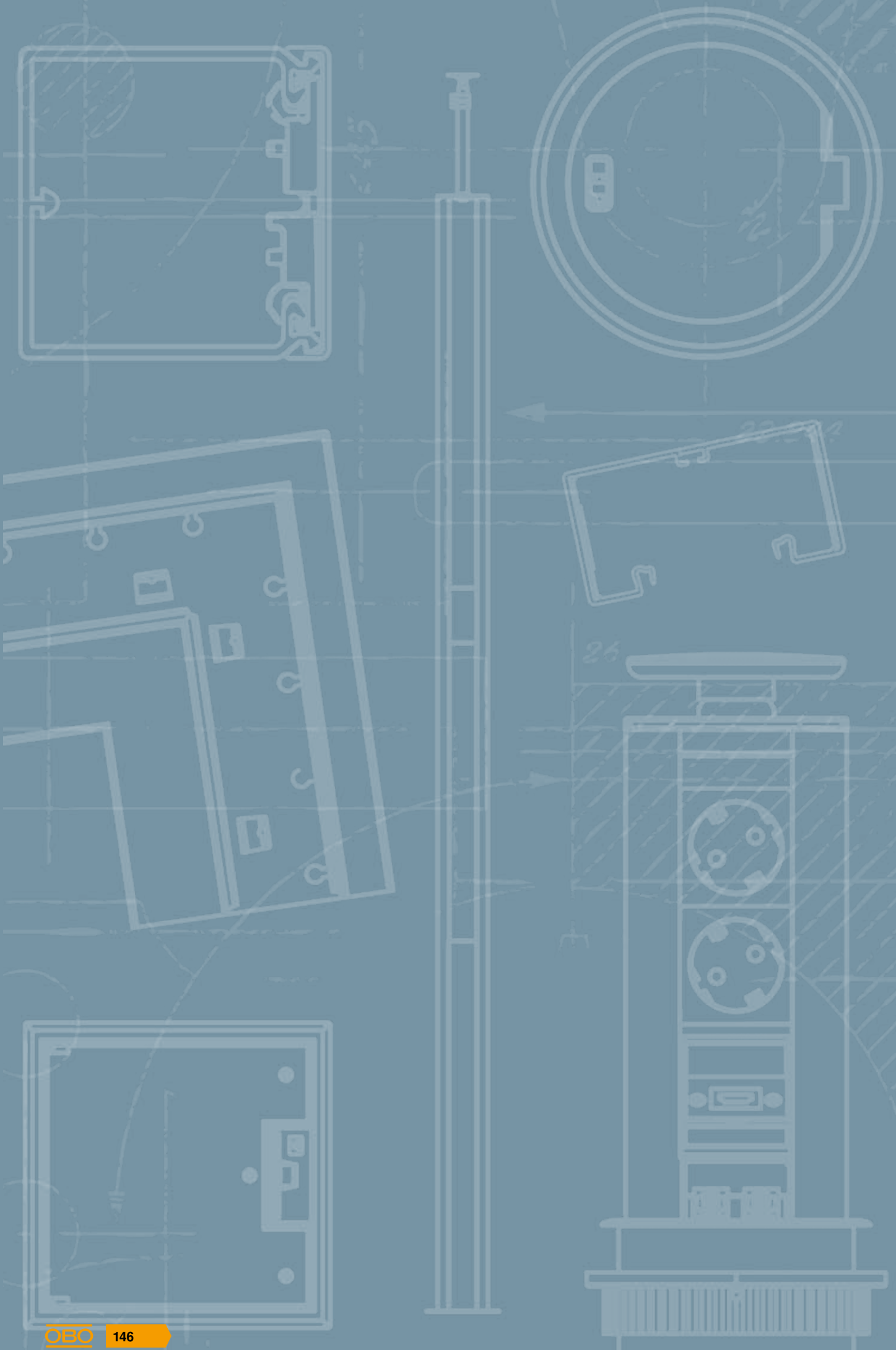


Telitank service outlet mounting
The prepared cut-outs can be equipped with a service outlet or equipped with a raised-height Telitank installation unit.



The finished AIK system
A flexible system for installation at a later date, which can be perfectly integrated into the overall appearance.





Service outlets for underfloor applications



Square and round service outlets

148



Wet-cleaned service outlets

160



Square and round height-adjustable cassettes

164



Heavy-duty cassettes

174



System description



Service outlets supply workstations and other areas in the centre of the room with power and data connections via the floor. There are versions for dry- and wet-care floors, in both round and square designs. Plastic or metal are used as materials.

Service outlets are suitable for installation in screed-flush and screed-covered underfloor systems, as well as in system floors. They are compatible with various underfloor systems, including the EÜK screed-covered system and the open OKA screed-flush system.

Installation principle

- 1** Service outlet, rectangular
- 2** Service outlet, round
- 3** Universal support
- 4** Cover plates
- 5** Mounting support



Selection overview

Polyamide, stainless steel or aluminium – the selection is broad, not only for the material of the GES service outlets. The system offers solutions for dry- and wet-cleaned floor coverings, such as carpet, PVC or linoleum, as well

as parquet, laminate, tiles and stone floors. With the colour range of iron grey, graphite black, grey-beige and stainless steel, the service outlets can be inserted discreetly in any floor covering.



Nominal size 2 with handle clamp

External dimension 118 x 194 mm
3x Modul 45



Nominal size 4 with locking slider

External dimension 222 x 222 mm
6x Modul 45



Nominal size 4 with handle clamp

External dimension 222 x 222 mm
6x Modul 45



Nominal size 4, stainless steel, with handle clamp

External dimension 222 x 222 mm
6x Modul 45



Nominal size 6 with locking slider

External dimension 274 x 221 mm
9x Modul 45



Nominal size 6 with handle clamp

External dimension 274 x 221 mm
9x Modul 45



Nominal size 6, stainless steel, with handle clamp

External dimension 274 x 220.5 mm
9x Modul 45



Nominal size 9 with locking slider

External dimension 264 x 264 mm
12x Modul 45



Nominal size 9 with handle clamp

External dimension 264 x 264 mm
12x Modul 45



Nominal size 9, stainless steel, with handle clamp

External dimension 265 x 265 mm
12x Modul 45



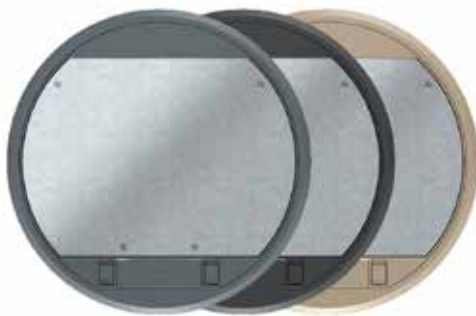
Nominal size R4 with handle clamp
External dimension \varnothing 234 mm
6x Modul 45



Nominal size R7 with handle clamp
External dimension \varnothing 294 mm
10x Modul 45



Nominal size R7, aluminium, with handle clamp
External dimension \varnothing 294 mm
10x Modul 45



Nominal size R9 with locking slider
External dimension \varnothing 324 mm
12x Modul 45



Nominal size R9 with handle clamp
External dimension \varnothing 324 mm
12x Modul 45



Nominal size R9, aluminium, with handle clamp
External dimension \varnothing 323 mm
12x Modul 45

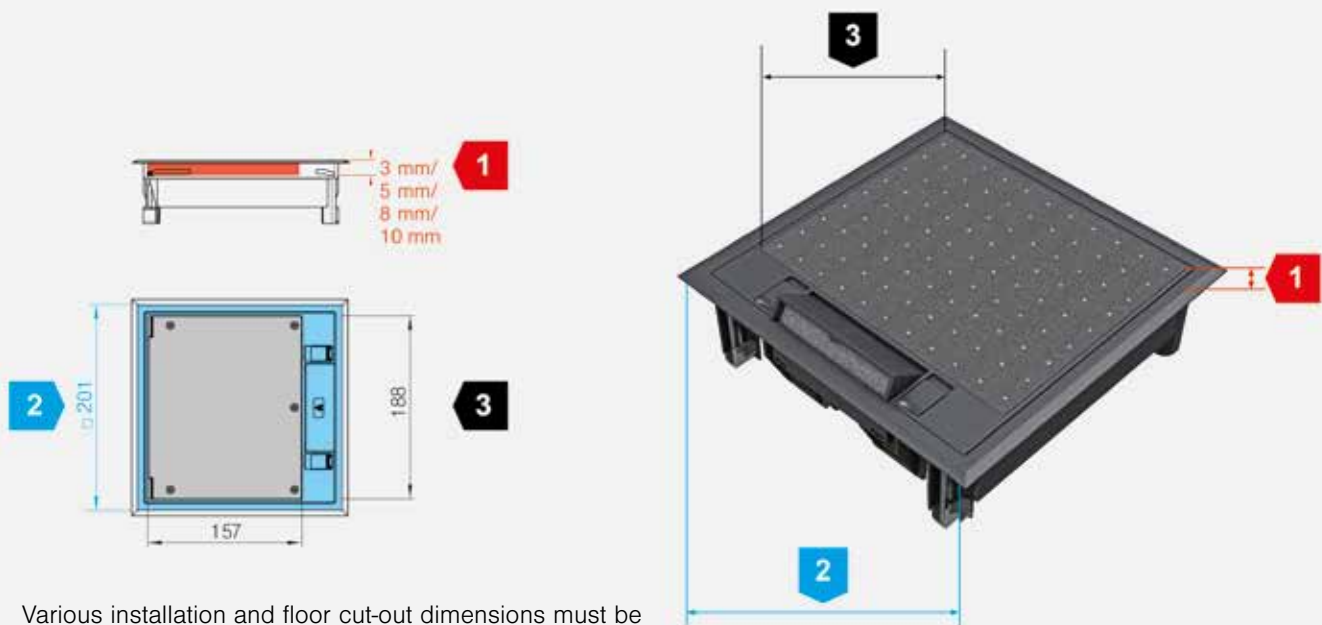


Nominal size R9, aluminium
External dimension \varnothing 325 mm
12x Modul 45



Nominal size R9, aluminium
External dimension \varnothing 325 mm
12x Modul 45

Installation and floor cut-out dimensions



Various installation and floor cut-out dimensions must be taken into account for the mounting of service outlets and the application of floor coverings in the device lids.

1

Frame height for the floor covering in the lid (red dimensions)

The frame height data relates to the maximum floor covering thickness, including adhesive. If, in the figure, several heights are specified, then the frame height can be changed during construction: By adding or removing spaces, it is possible to adjust the desired frame height to the floor covering. In the as-delivered state, the frame height is usually 5 mm.

3

Internal dimension of the lid used to calculate the floor covering cut-out (black dimensions)

The dimension data relates to the internal dimension of the cover and is used to calculate the floor covering cut-out. Depending on the type of floor covering, appropriate reductions should be taken into account, e.g. for expansion gaps.

2

Floor cut-out for the installation of service outlets (blue dimensions)

The dimensions for the floor cut-out should be considered as target dimensions for correct installation of the service outlet in the floor. They are only generally required for the floor cut-out in system floors. When mounting service outlets in the EÜK screed-covered duct system or in the OKA open trunking system, they need not be taken into account, as these systems offer prefabricated mounting lids with matching installation openings.



4

Floor cut-out for the installation of service outlets (blue dimensions)

The dimensions for the floor cut-out should be considered as target dimensions for correct installation of the service outlet in the floor. They are only generally required for the floor cut-out in system floors. When mounting service outlets in the EÜK screed-covered duct system or in the OKA open trunking system, they need not be taken into account, as these systems offer prefabricated mounting lids with matching installation openings.



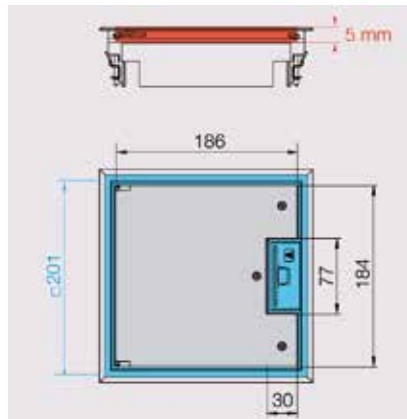
Minimum installation heights

Service outlet type	Frame height in the lid	Minimum floor structure height
GES2, GES4, GESR4, GESR9SR	5 mm	73 mm
GES4-2, GES6-2, GES9-3B, GES9-3S	5 mm	73 mm
GES4-2, GES6-2, GES9-3B, GES9-3S	10 mm	78 mm
GES6, GESR9	5 mm	73 mm
GESR7, GESRA7, GESRA9, GESR9/10	5 or 10 mm	78 mm
GES4M-2, GES6M-2, GES9M-2	5 or 10 mm	78 mm
GESR9-2	5 or 10 mm	76 mm
GRAF9	-	80 mm

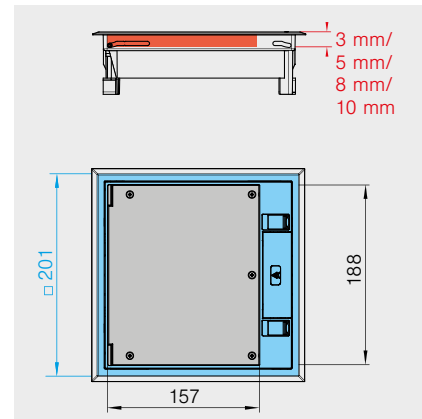
System dimensions, service outlets, rectangular



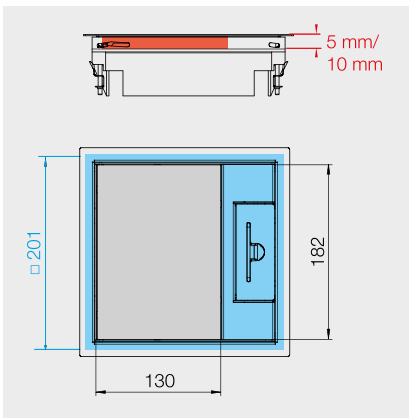
Nominal size 2, type GES2



Nominal size 4, type GES4



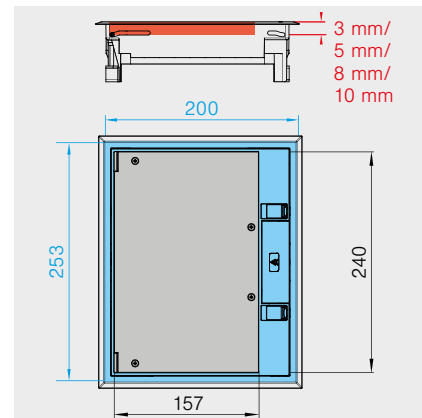
Nominal size 4, type GES4-2



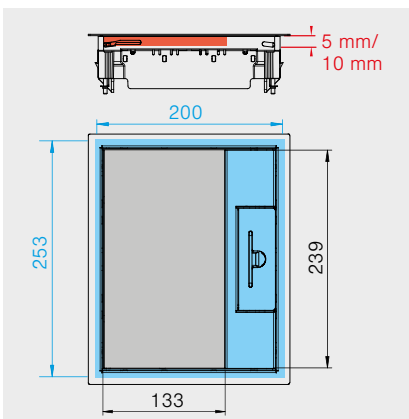
Nominal size 4, type GES4M-2



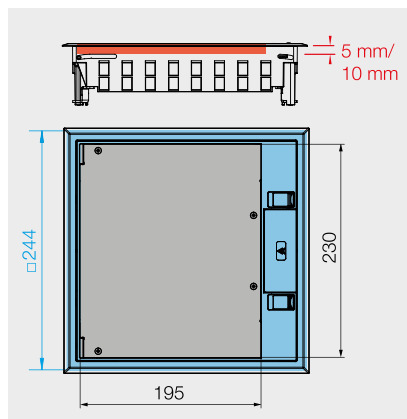
Nominal size 6, type GES6



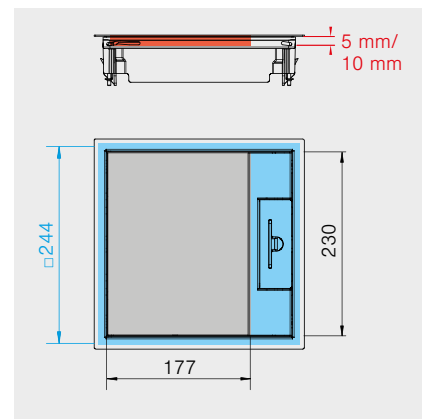
Nominal size 6, type GES6-2



Nominal size 6, type GES6M-2



Nominal size 9, type GES9-3S and GES9-3B

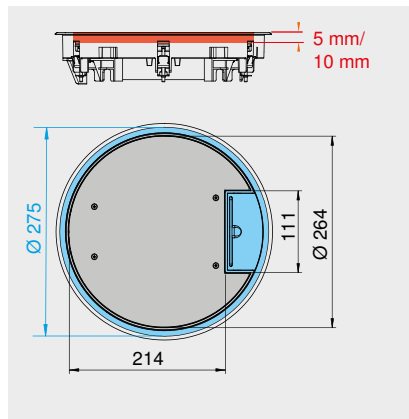


Nominal size 9, type GES9M-2

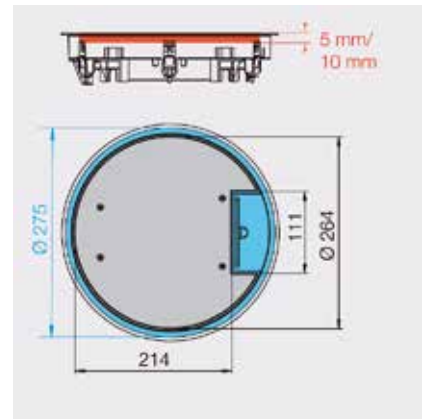
System dimensions, service outlets, round



Nominal size R4, type GESR4



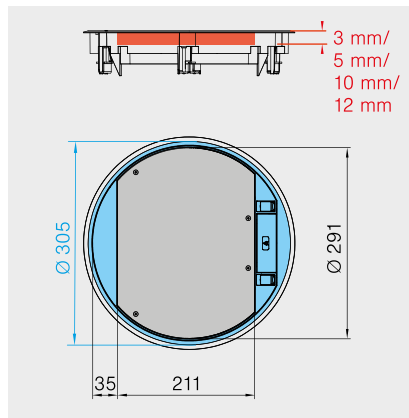
Nominal size R7, type GESR7



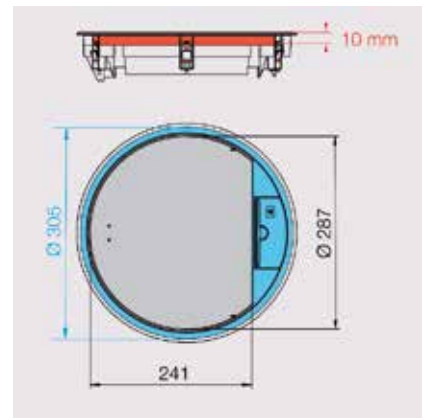
Nominal size R7, type GESRA7



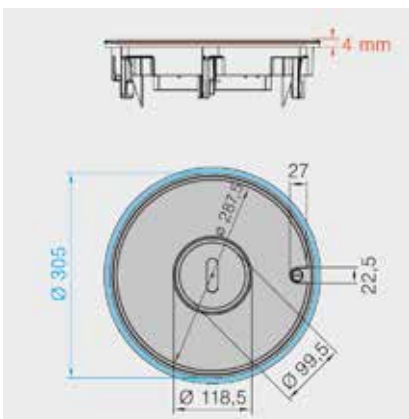
Nominal size R9, type GESR9



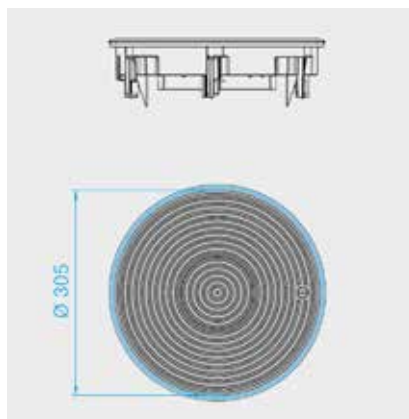
Nominal size R9, type GESR9-2



Nominal size R9, type GESRA9



Nominal size R9, type GRAF9-2 BA



Nominal size R9, type GRAF9-2



Mounting aid



Fixing in underfloor systems

When used in empty underfloor boxes and duct systems, the fastening unit reaches under the blanking lid and locks the installation unit in place.



Fixing in raised floors

When used in raised floors, the fixing bracket reaches under the raised floor plate (max. raised floor plate thickness = 50 mm), fixing the installation unit.



Installation of accessories

The accessories for power supply, telecommunications and data technology are mounted in separate mounting boxes or mounting box sections made of insulation material.



Laying the floor covering

Lay the floor covering up to the opening of the mounting lid.



GES mounting in duct systems

Insert the service outlet into the mounting lid from above and screw it tight. The fastening unit grips under the mounting lid.



GES mounting in raised floor

When used in raised floors, the fastening bracket reaches under the raised floor plate, fastening the service outlet.



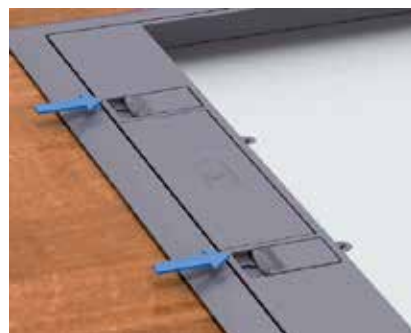
Removing the hinged cover

Before mounting accessories, turn the cover, pull it out of the frame on one side and remove it. When device mounting is complete, insert the cover again.



Turning the hinged cover through 180°

Remove the hinged cover and insert it on the opposite side of the frame.



Opening of the hinged cover

Actuate both locking sliders. The fitters push the hinged lid upwards. Lift the lid using the cord outlet.



Adjustment of the floor covering recess to 3 mm for GES4-2, GES6-2 and GES9-2

Slacken the 4 lid screws and the inserted 5 mm spacer frame and replace it with the 2 mm spacer bars. Screw the sheet steel lid on again.



GES9-2U universal fastening, raised floor mounting

The clamping range of the retaining profile is suitable for raised floor plates of a thickness of up to 45 mm.



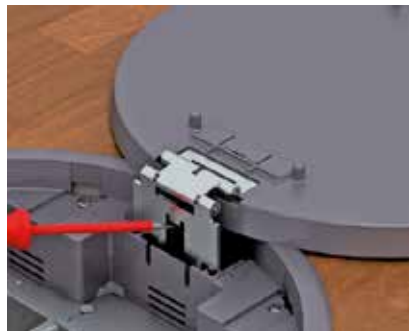
GES-2U universal fastening, raised floor mounting, $s \geq 47$ mm

Loosen the retaining profile from the screw and turn it round. Turn the screw back into the retaining profile. In this position, the clamping range is 37 to 75 mm.



Laying the floor covering for duct systems

Lay the floor covering up to the opening of the mounting lid.



Expansion of the hinged cover for GESR round service outlet

Lift the locking lug in the hinge seat of the frame using a screwdriver. Lift the cover out of the holder.



Installation of the hinged cover for GESR round service outlet

Insert the cover hinge in the bracket. Press on the lid above the lid hinge until the end position is reached.



Standard data according to DIN EN 50085-1 and DIN EN 50085-2-2

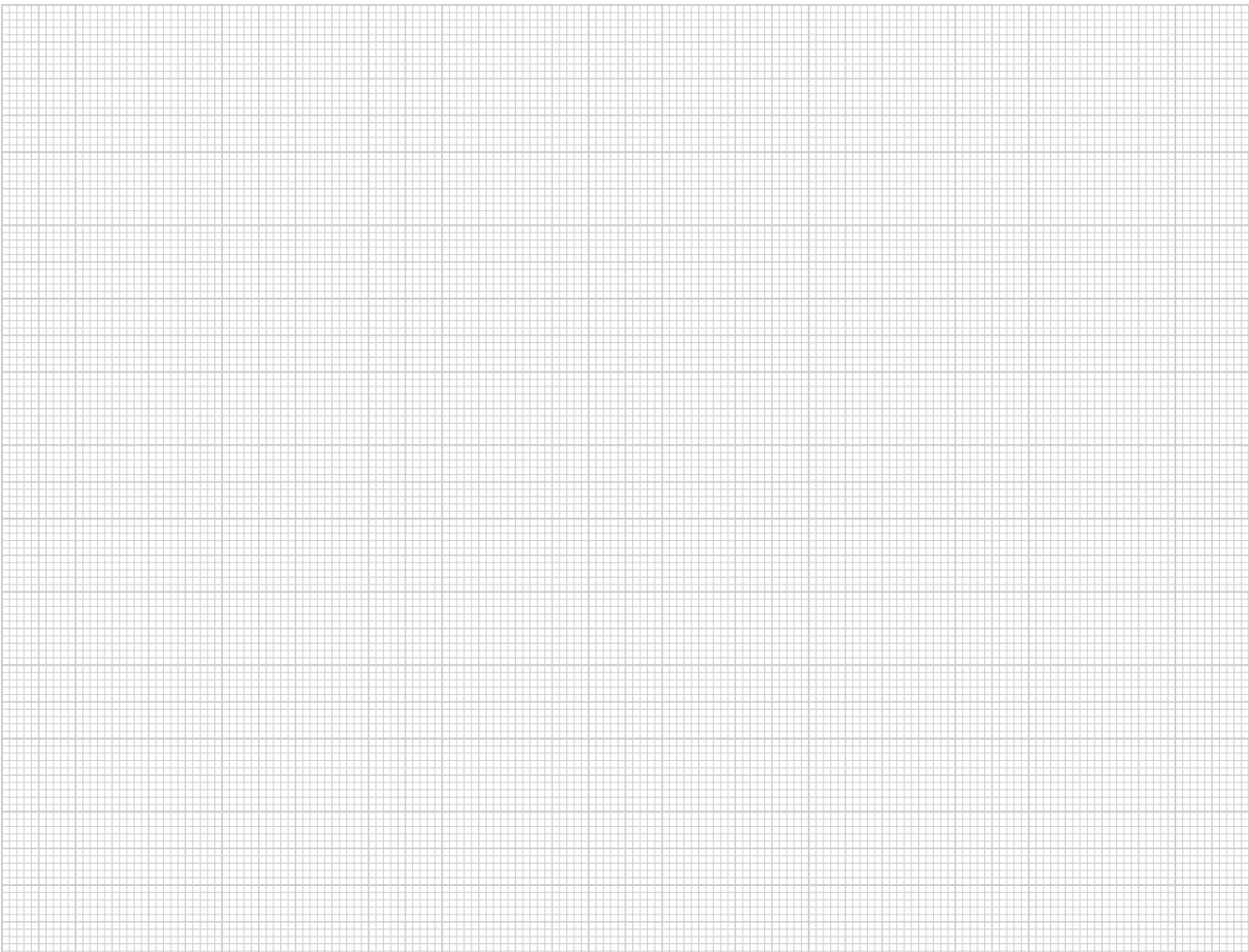
Class		Service outlets type GES	GRAF9 service outlet
6.2	According to impact resistance for installation and application		
6.2.4	Electrical installation duct systems for impact energy 5 J	5 J	5 J
6.3	According to temperatures, as specified in Tables 1, 2 and 3		
Table 1	Minimum storage and transport temperature ± 2 °C	-15 °C	-15 °C
Table 2	Minimum installation and application temperatures ± 2 °C	+5 °C	+5 °C
Table 3	Application temperatures ± 2 °C	+60 °C	+60 °C
6.4	According to the resistance against fire spread		
6.4.1	Electrical installation duct systems which permit the spread of fire	x	x
6.5	According to the electrical conductivity		
6.5.1	Electrical installation duct systems with electrical conductivity	x ¹	x
6.5.2	Electrical installation duct systems without electrical conductivity	x ²	
6.6	According to the electrical insulation property		
6.6.1	Electrical installation duct systems with electrical insulation capability	x ²	
6.6.2	Electrical installation duct systems without electrical insulation capability	x ¹	x
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991		
6.7.1	According to protection against ingress of solid foreign bodies	x	x
6.7.3	According to protection against contact with dangerous parts	x	x
6.101	Depending on the type of floor care		
6.101.1	Electrical installation duct systems for dry floor cleaning	x	
6.101.2	Electrical installation duct systems for wet floor cleaning when the service outlet is not in use		x
6.101.3	Electrical installation duct systems for wet floor cleaning when the service outlet is in use		x
6.102	According to resistance to vertical loads affecting a small surface area		
6.102.5	Electrical installation duct systems for 2,000 N	x ²	
6.102.7	Electrical installation duct systems for 3,000 N	x ¹	x
6.103	According to resistance to vertical loads affecting a large surface area		
6.103.2	Electrical installation duct systems for 3,000 N	x ²	
6.103.3	Electrical installation duct systems for 5,000 N	x ¹	
6.103.4	Electrical installation duct systems for 10,000 N		x

¹Applies to metallic GES, ² applies to polyamide GES

Planning checklist

When selecting underfloor systems with service outlets, the following planning criteria, amongst others, should be taken into account:

- ✓ **Take the type of floor covering into account. Use a service outlet with a tube body for wet-care floors**
- ✓ **Select the size of the service outlet according to the number of accessories to be installed**
- ✓ **Observe the minimum installation depth for the installation of sockets and data/multimedia connections**
- ✓ **Plastic service outlets are designed for normal loads in office and administrative buildings. Use metal service outlets for increased load requirements.**
- ✓ **Apply the floor covering in the service outlet lid, taking into account height adjustment and expansion gaps**



System description

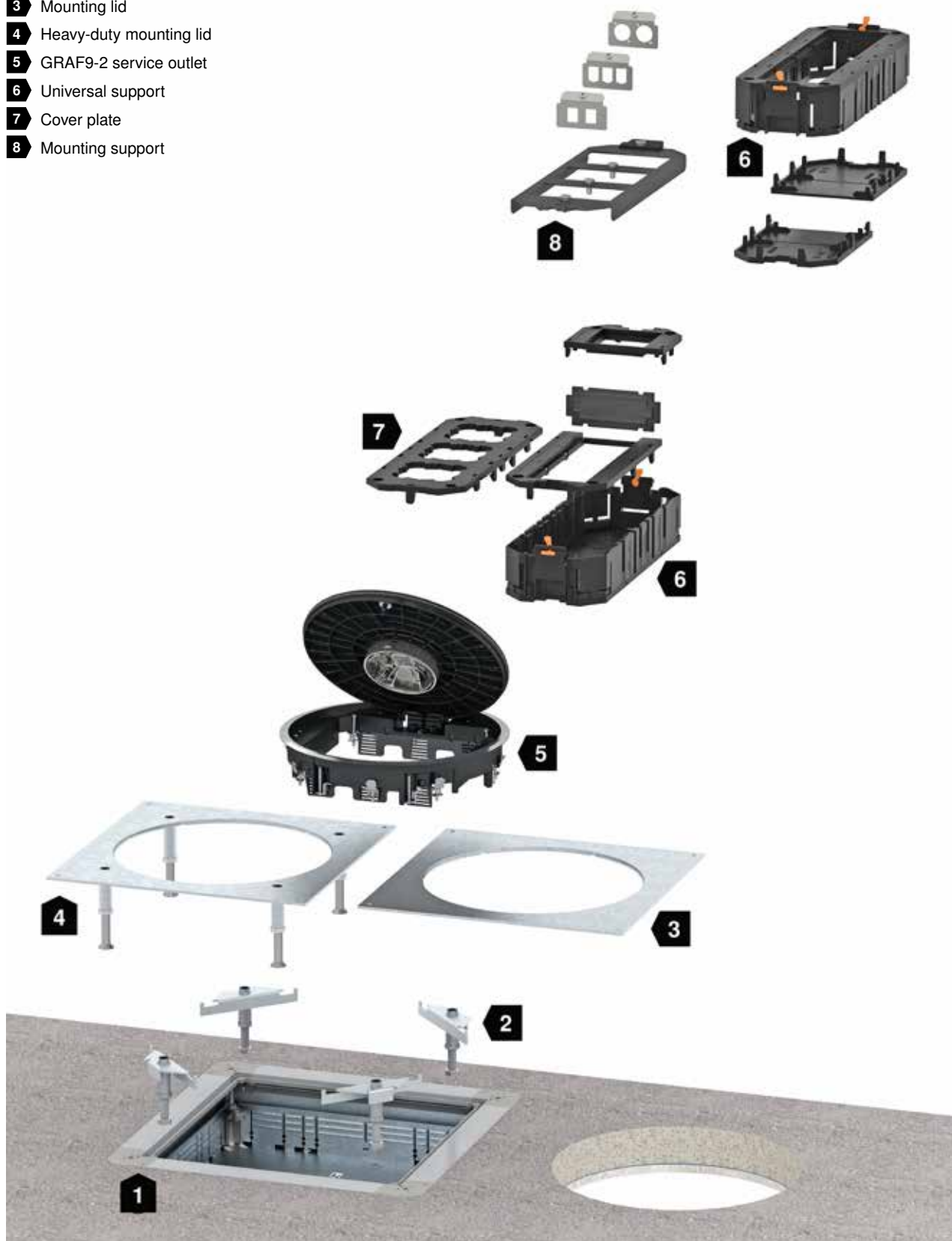


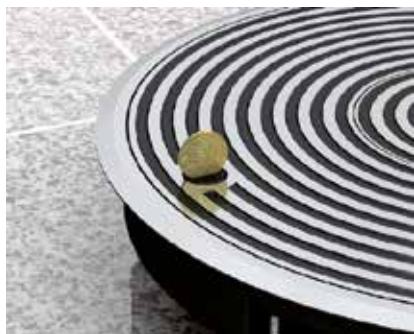
The solution for wet-care floors: The GRAF9 service outlet is ideally suited for wet-care floors. The GRAF9 is made completely of metal and offers a high load capacity. A variant is available with a ring-shaped structure in the lid

surface, along with a variant with a 4 mm floor covering recess in the hinged lid.

Installation principle

- 1** Underfloor junction and branch box
- 2** Heavy-duty lid support
- 3** Mounting lid
- 4** Heavy-duty mounting lid
- 5** GRAF9-2 service outlet
- 6** Universal support
- 7** Cover plate
- 8** Mounting support





Cover lock

A turn buckle closes the cover in the frame. After release (e.g. with a small coin), the lid is raised by spring force and can be opened simply.



Cable in-feed

The consumer cables are inserted through the opened tube body with the opened cover and then connected in the installed connection sockets. Then the cover is pushed down and locked and the tube body cover attached.



Removing the hinged cover

Push the hinge together and lift the cover upwards out of the holder.



Mounting in duct systems

Insert the service outlet into the mounting lid from above and screw it tight. The fastening unit grips under the mounting lid.



Mounting in raised and cavity floor

When used in raised and cavity floors, the universal fastening bracket acts as an expansion claw. Tighten the screw with max. 4 rotations. The claws fasten the service outlet in the mounting opening.



Installation of the hinged cover

Push the hinge together and insert in the holder in the frame.



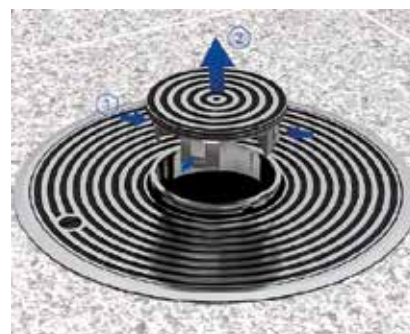
Lift tube body

Press the tube body out from the inside and lock it by turning it left from the top.



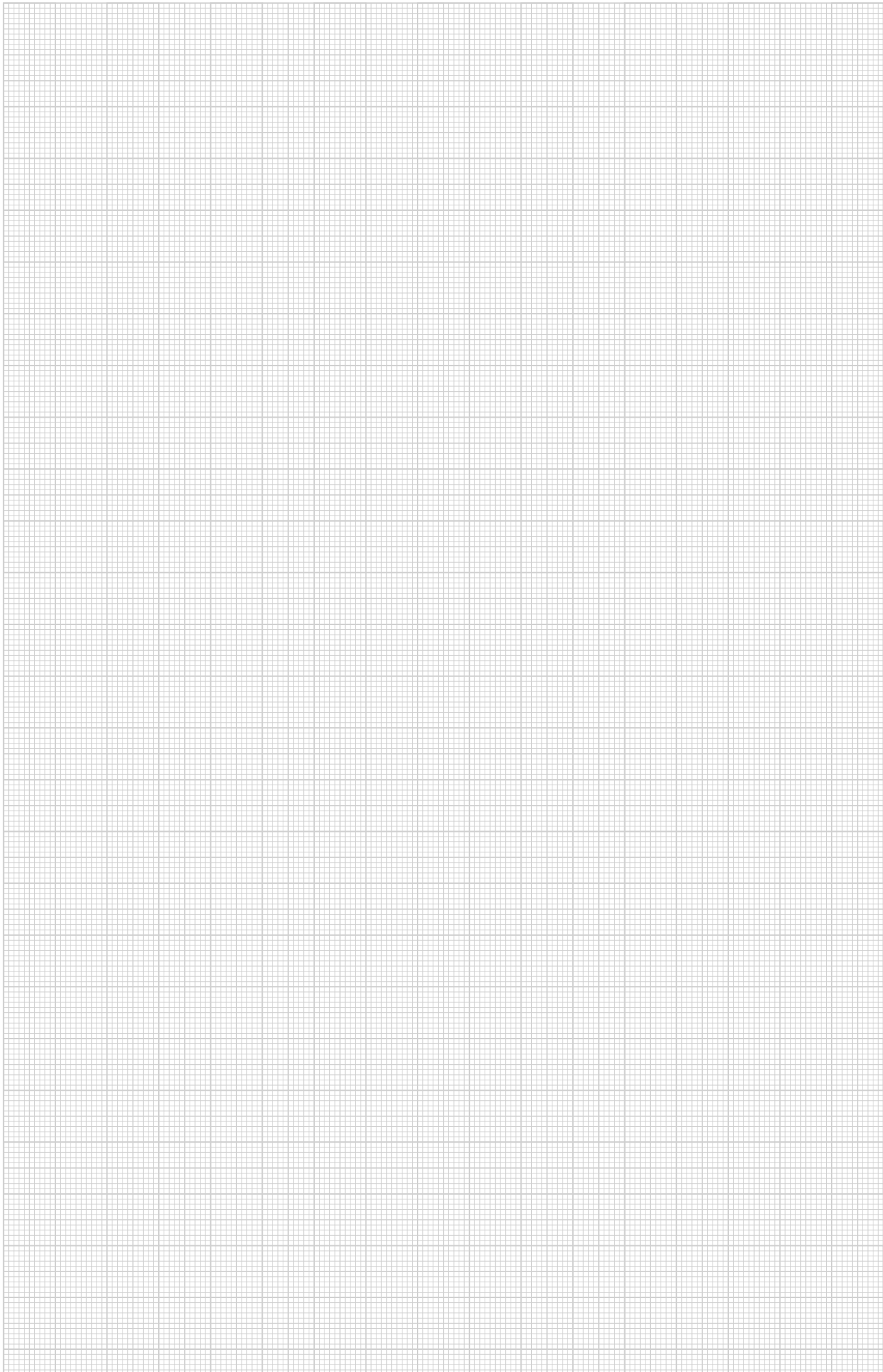
Lower the tube body

Lower the tube body cover by pressing the two pressure surfaces at the side, unlock it by turning it to the right and lower it completely.

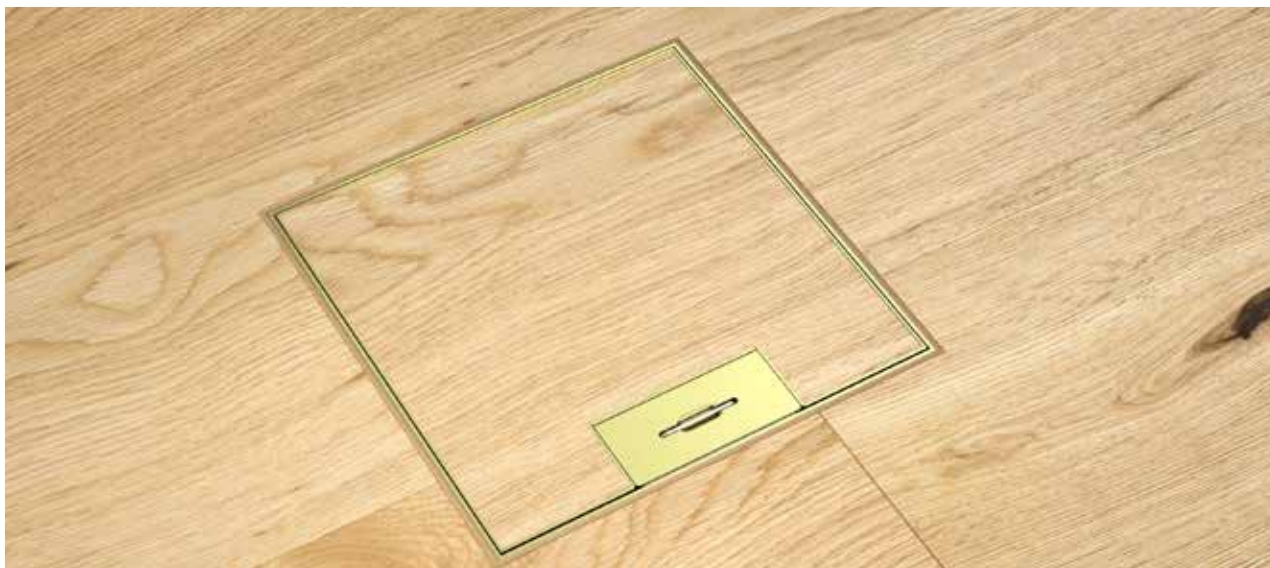


Opening of the tube body

Release the tube body cover from the base by pressing the two pressure surfaces at the side and lift it out.



System description



The compact, flush-floor cassettes from Ackermann made by OBO provide power, data and multimedia connections in a high-quality design. The cassettes can be adjusted to the height of the floor and can be installed completely decoupled as a special construction type. They are available in round and rectangular versions. There are versions for dry, moist and wet-care floor coverings. Cassettes are suitable for raised and cavity floors and all kinds of screed-flush underfloor systems, such as the EÜK screed-covered system and the open OKA screed-flush system.

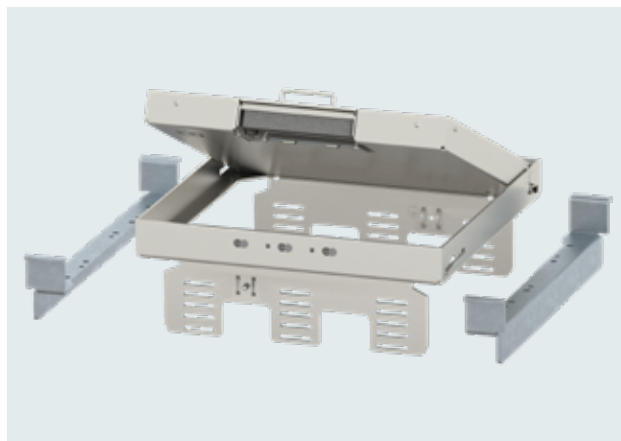
Height-adjustable cassettes are frequently used in natural stone floors and tiled floors. Here, stability and a long lifespan are required. The cassettes from Ackermann made by OBO stand out through their well-thought-out functions and high-quality materials.

Installation principle

- 1** Height-adjustable cassette with cord outlet
- 2** Height-adjustment bracket
- 3** Height-adjustable, decouplable cassette
- 4** Cassette for tube body
- 5** Tube body
- 6** Cassette for inspection opening
- 7** Threaded sleeve



Cassette types



Height-adjustable cassettes

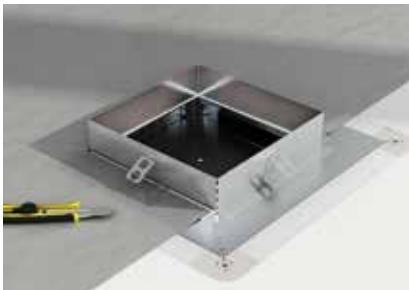
The height-adjustable cassettes can be adjusted exactly to the top edge of the floor covering. The cassettes can be installed inside underfloor duct systems in a screed box or in system floors, as shown below. They are fastened to the raw concrete using height-adjustment units.

Height-adjustable, decouplable cassettes

The height-adjustable, decouplable cassettes are not fixed on the raw concrete, but are fixed in underfloor sockets using height-adjustment brackets. In the installation example shown, the cassette is adjusted to the top edge of the finished floor using height-adjustment brackets, located in the socket top frame of the underfloor box. This prevents the transmission of footfall sound.



Cassette lined body for polished screeds



Mounting the duct system

According to the planning specifications, underfloor boxes are mounted at the intended points in the room. The underfloor ducts form the grid between the underfloor boxes, which are adjusted to the top edge of the insulation layer. The cassette lined body is mounted floating on the mounting lid of the underfloor box.

Mounting cassette lined bodies and cassettes

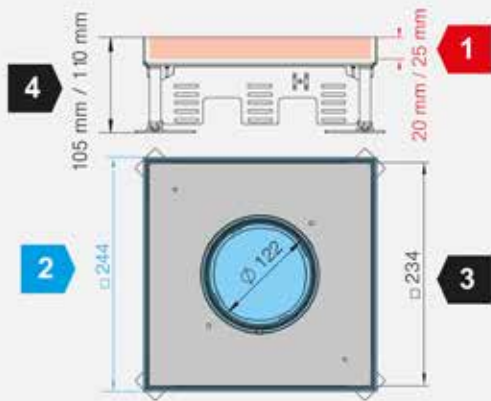
The cassette is fastened onto the raw concrete through the floor plate of the underfloor box and adjusted to the specified top edge of the finished screed floor. The mounting protection lid is inserted in the cassette frame. The screed is worked directly up to the cassette frame and the mounting protection lid is covered with the decorative screed layer.

Polishing the screed layer

The mounting protection lid is polished in the first polishing operations. During polishing, it is important that the screed can be worked up to existing edges and can be polished, in order to avoid joint edges. The screed is filled in the lid of the cassette and polished separately with suitable tools, in order to create an even surface.



Installation and floor cut-out dimensions



Various installation and floor cut-out dimensions must be taken into account for the mounting of height-adjustable cassettes and the application of floor coverings in the cassette lids.

1

Frame height for the floor covering in the lid (red dimensions)

The frame height data relates to the maximum floor covering thickness, including adhesive. The cassettes are available in various frame heights.

3

Internal dimension of the lid used to calculate the floor covering cut-out (black dimensions)

The dimension data relates to the internal dimension of the cassette cover and is used to calculate the floor covering cut-out. Depending on the type of floor covering, appropriate reductions should be taken into account, e.g. for expansion gaps.

2

Floor cut-out for the installation of cassettes (blue dimensions)

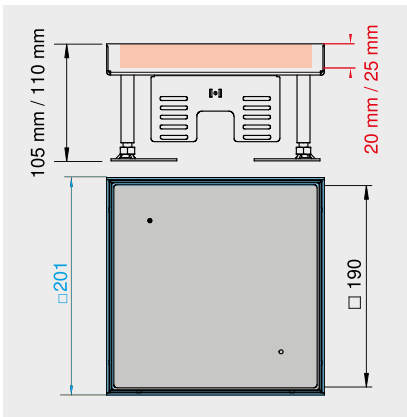
The dimensions for the floor cut-out should be considered as target dimensions for correct installation of the cassette in the floor. They are only generally required for the floor cut-out in system floors. The EÜK screed-covered duct system and the OKA open trunking system offer prefabricated mounting lids with matching installation openings.

4

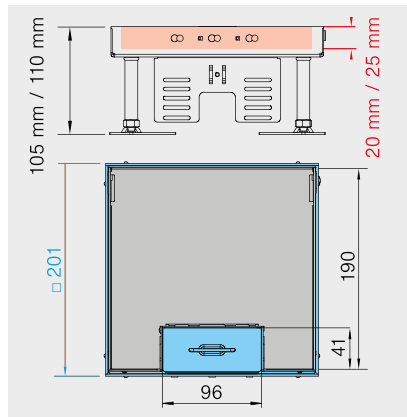
Minimum floor structure height (raw concrete ceiling to the finished floor)

The dimension describes the minimum floor structure height from the raw concrete ceiling to the top edge of the finished floor. It guarantees correct installation and use of accessories such as sockets, data and multimedia connections.

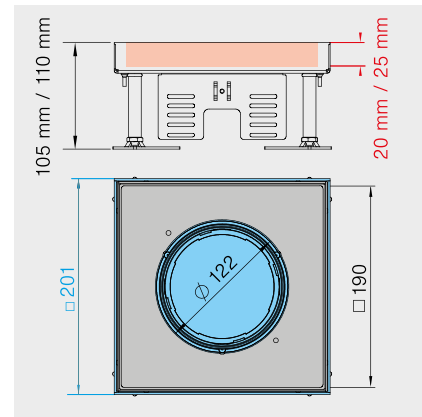
System dimensions, height-adjustable square cassettes



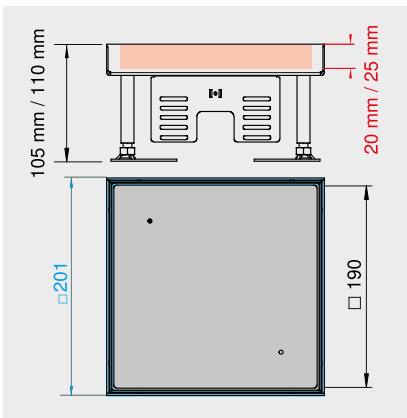
Nominal size 4, type RKN2



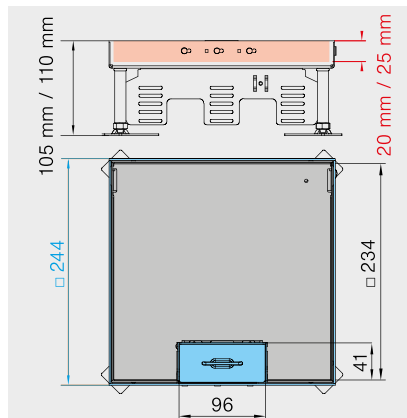
Nominal size 4, type RKSN2



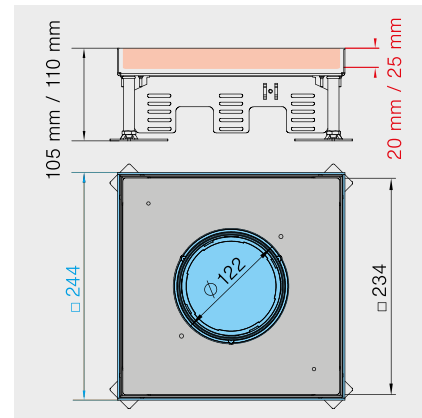
Nominal size 4, type RKFN2



Nominal size 9, type RKN2

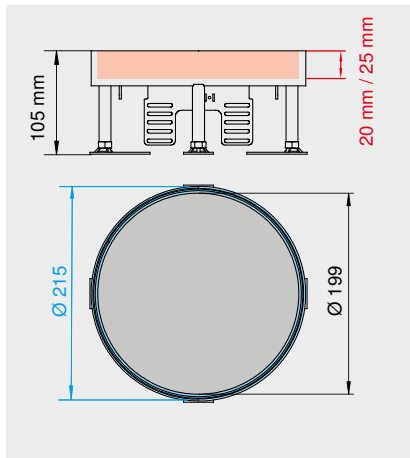


Nominal size 9, type RKSN2

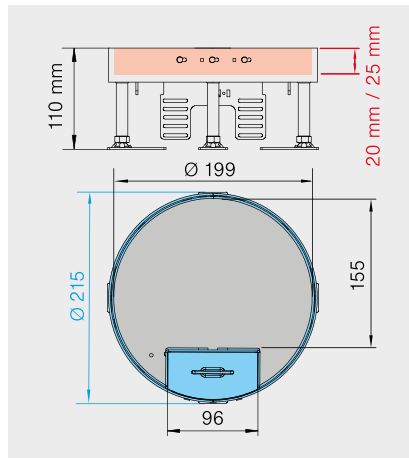


Nominal size 9, type RKFN2

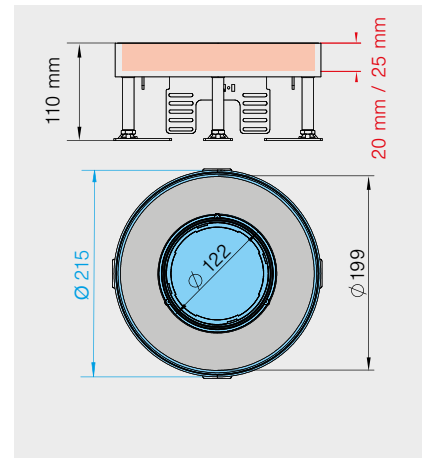
System dimensions, height-adjustable round cassettes



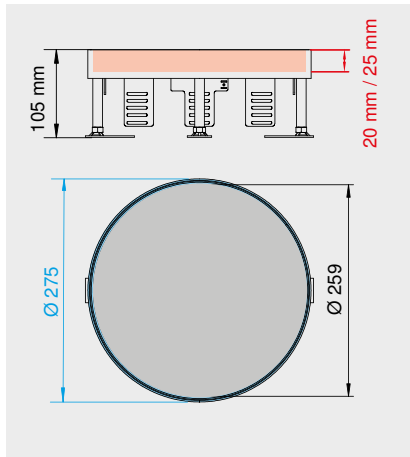
Nominal size R4, type RKR2 and RKR2



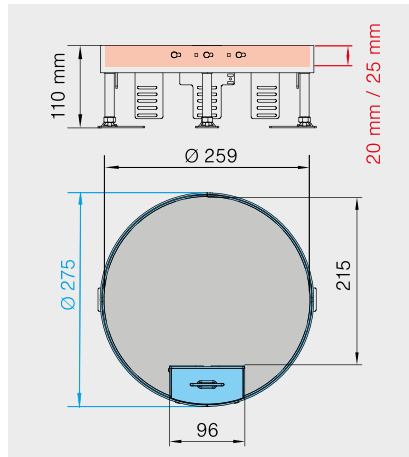
Nominal size R4, type RKS2 and RKSRN2



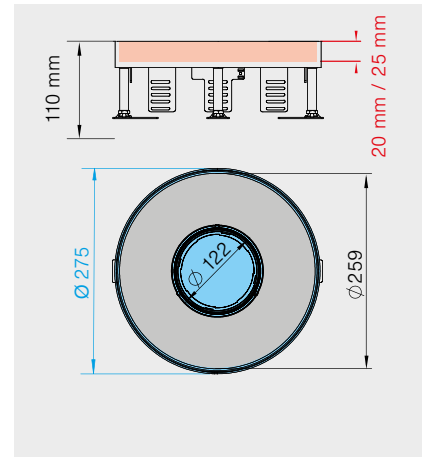
Nominal size R4, type RKFR2 and RKFRN2



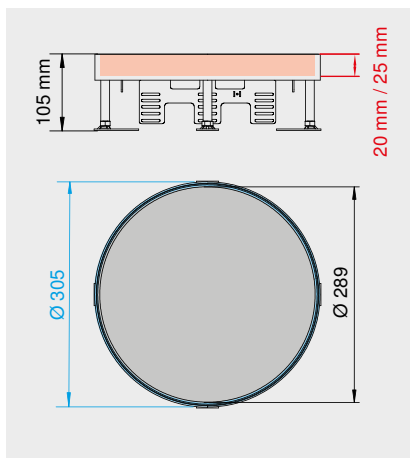
Nominal size R7, type RKR2 and RKR2



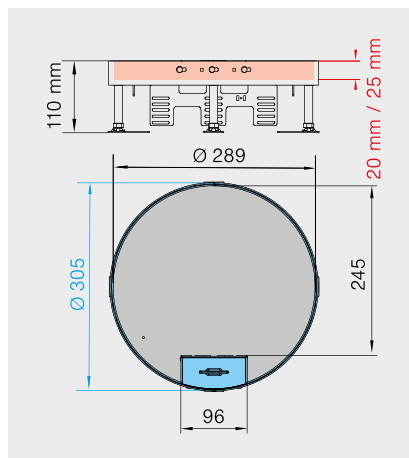
Nominal size R7, type RKS2 and RKSRN2



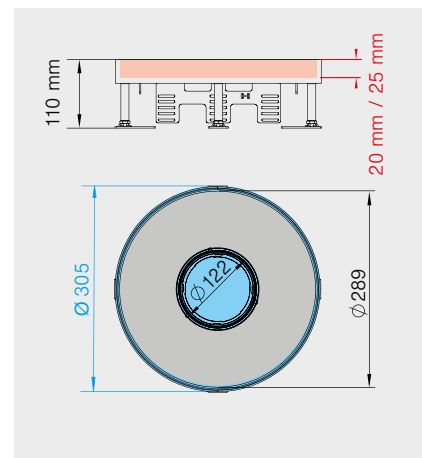
Nominal size R7, type RKFR2 and RKFRN2



Nominal size R9, type RKR2 and RKR2

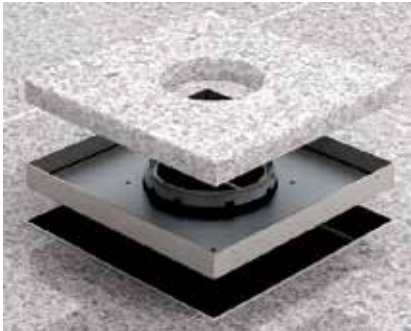


Nominal size R9, type RKS2 and RKSRN2



Nominal size R9, type RKFR2 and RKFRN2

Mounting aid



Lay the floor covering in the RKFN cassette

Lay the floor covering in the cassette and stick it down. Seal the remaining gap between the floor covering and the cassette with suitable materials.



Mounting of tube body

Insert the tube body cover into the tube body seat and lower it. Unlock the tube body by turning it to the right and close it flush to the floor.



Cleaning of the seals

To complete the mounting work, clean the interior of the cassette and the seals of the cassette and tube body. Apply Vaseline to the seals (contained in the scope of delivery).



Mounting of a threaded sleeve

This work step takes place before the floor covering is laid in the cassette. Drill a fastening hole for the threaded sleeve (Ø 8 mm). Insert the threaded sleeve and fasten it.



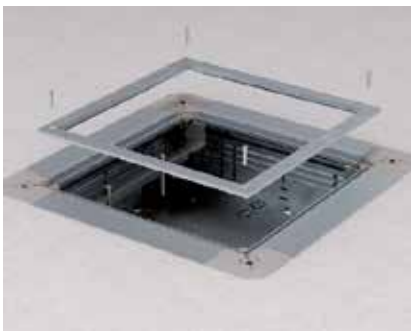
Preparation of a height-adjustment bracket

Screw the support screws M5x 40 (WAF 3) into the height-adjustment bracket.



Mounting of height-adjustment bracket

Insert the two height-adjustment brackets in the underfloor box. The distance X is the result of the mounting opening of the mounting lid.



Installation of mounting lids

Fasten the mounting lid on the underfloor box. The height-adjustment bracket must be visible in the mounting opening.



Mounting of cassette frame

Place the cassette frame on the height-adjustment bracket, align it and adjust it to the top edge of the floor covering using the support screws.



Use of the sealing rings

With the RKFN and RKN cassette version, place the O rings under the fastening screws M4x40 PZ 2 and screw the cassette frame tight.



Standard data according to DIN EN 50085-1 and DIN EN 50085-2-2

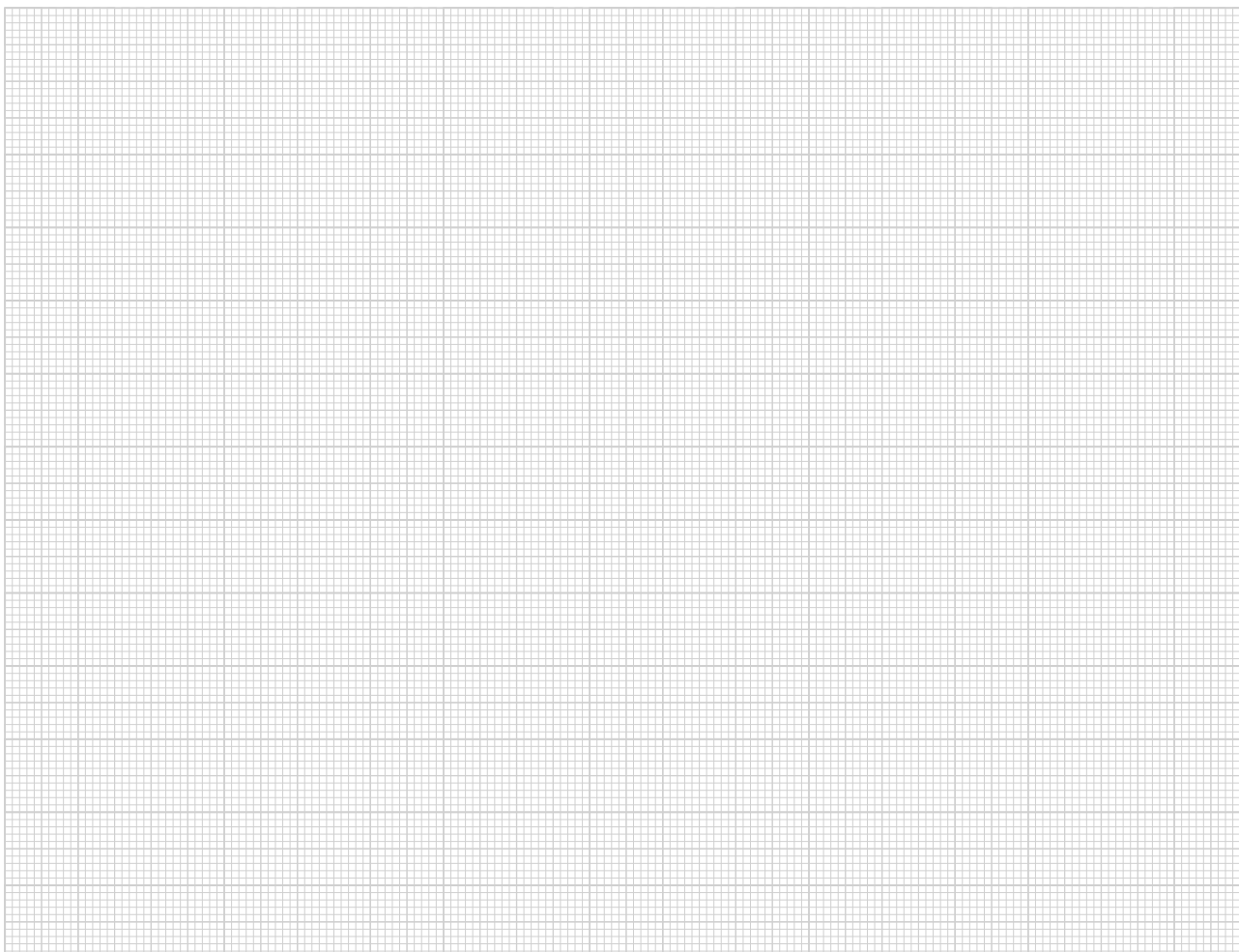
Class		Height-adjustable cassettes
6.2	According to impact resistance for installation and application	
6.2.4	Electrical installation duct systems for impact energy 5 J	5 J
6.3	According to temperatures, as specified in Tables 1, 2 and 3	
Table 1	Minimum storage and transport temperature ± 2 °C	-25 °C
Table 2	Minimum installation and application temperatures ± 2 °C	+5 °C
Table 3	Application temperatures ± 2 °C	+60 °C
6.4	According to the resistance against fire spread	
6.4.2	Electrical installation duct systems which do not permit the spread of fire	x
6.5	According to the electrical conductivity	
6.5.1	Electrical installation duct systems with electrical conductivity	x
6.6	According to the electrical insulation property	
6.6.2	Electrical installation duct systems without electrical insulation capability	x
6.7	According to the protection ratings offered by the housing or casing to EN 60529:1991	
6.7.1	According to protection against ingress of solid foreign bodies	x
6.7.2	According to protection against ingress of water	x
6.101	Depending on the type of floor care	
6.101.1	Electrical installation duct systems for dry floor cleaning	x ¹
6.101.2	Electrical installation duct systems for wet floor cleaning when the service outlet is not in use	x ²
6.101.3	Electrical installation duct systems for wet floor cleaning when the service outlet is in use	x ²
6.102	According to resistance to vertical loads affecting a small surface area	
6.102.7	Electrical installation duct systems for 3,000 N	x
6.103	According to resistance to vertical loads affecting a large surface area	
6.103.2	Electrical installation duct systems for 3,000 N	x
6.103.3	Electrical installation duct systems for 5,000 N	x ¹

x¹: Applies to cassettes with cord outlet, x²: Applies to cassettes with tube body and blanking lid

Planning checklist

When selecting underfloor systems with cassettes, the following planning criteria, amongst others, should be taken into account:

- ✓ **Take the type of floor covering into account.
Use a cassette with a tube body for wet-care floors**
- ✓ **Select the size of the cassette according to the number of accessories to be installed**
- ✓ **Observe the minimum installation depth of the height-adjustable cassettes**
- ✓ **Height-adjustable cassettes are designed for normal loads in office and administrative buildings.
Use stainless steel heavy-duty cassettes for increased load requirements**
- ✓ **Apply the floor covering in the cassette lid, taking into account height adjustment and expansion gaps**



System description

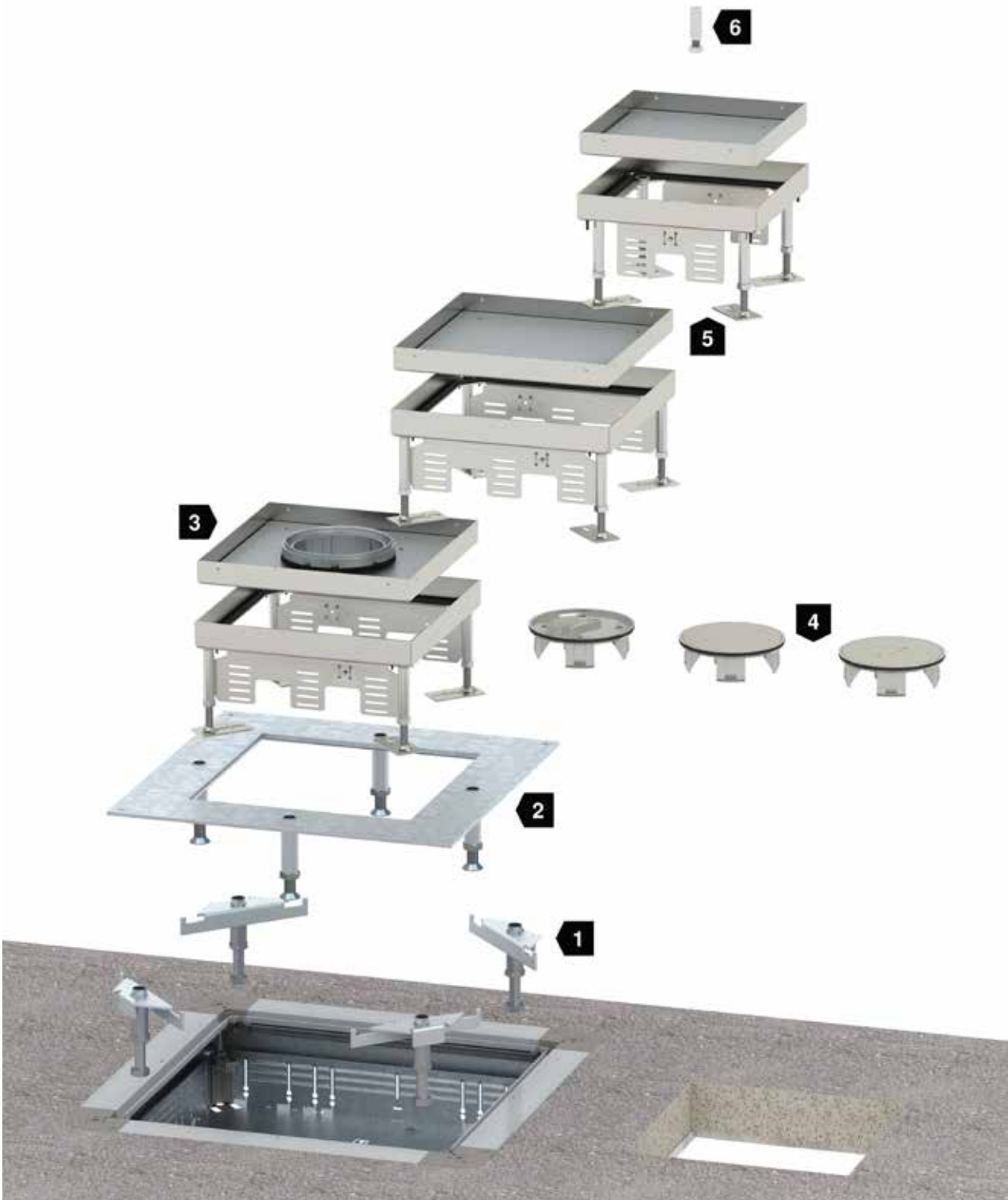


Heavy-duty systems reliably supply areas with high load requirements with power, data and multimedia technology via the floor. Car dealerships, museums, airports, stations or hotels are typical areas of application. The construction and the material thickness are specially matched to

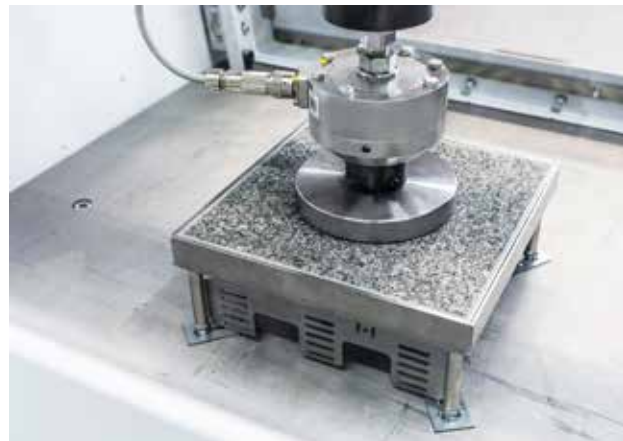
the high load requirements. With the heavy-duty system, Ackermann made by OBO guarantees a particularly robust, safe and long-lasting installation solution.

Installation principle Heavy-duty cassettes

- 1** Heavy-duty support
- 2** Heavy-duty mounting lid
- 3** Heavy-duty cassette for tube body
- 4** Tube body
- 5** Heavy-duty cassette, blank
- 6** Threaded sleeve



OBO test standard and heavy-duty classes



DIN EN 50085-2-2 specifies the load requirements for electrical installation systems. According to this standard, cassettes may only bend by a maximum of 6 mm when subjected to a load. However, with harder floor coverings, such as stone or tiles, bending of 6 mm will lead to breakage. For this reason, OBO has increased its internal quality criteria and goes a step further with the OBO testing standard: The maximum bend for heavy-duty systems was reduced from 6 mm to 2 mm. The tests according to the OBO testing standard take place in the company's own BET Test Centre.

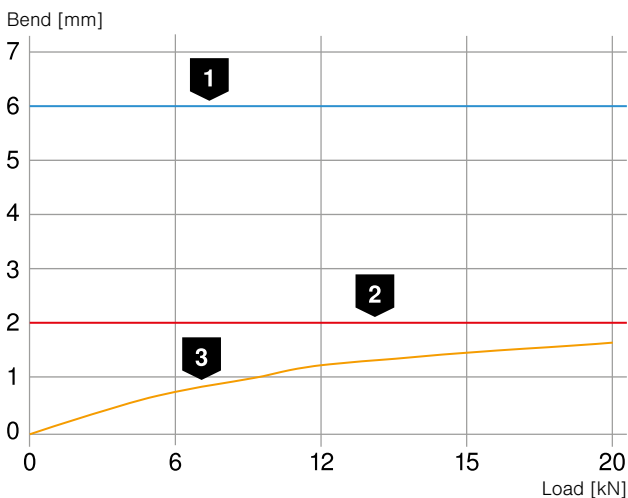
Heavy load testing

Tested heavy-duty system components:

- Underfloor junction and branch box of size 350-3
- Heavy-duty support, heavy-duty mounting lid
- Floor covering, tile, 20 mm
- Cassette RKF2 SL2 V3 35

Classification

DIN EN 50085-2-2 divides the load capacities of electrical installation duct systems into two classes. The classifications rate the articles according to resistance to vertical loads that act over a small (6.102) or large (6.103) surface area. The 6.103 classification and the test results from the BET Test Centre served as a basis for the development of the internal OBO classification into heavy-duty classes SL1 and SL2. Products of heavy-duty class SL1 are suitable for loads of up to 10 kN, whilst products of heavy-duty class SL2 are even suitable for loads of up to 20 kN. The maximum bending for both heavy-duty classes is 2 mm.



1	Bend to DIN EN 50085-2-2: 6 mm
2	Bend to OBO testing standard: 2 mm
3	Measured bend, OBO heavy-duty system

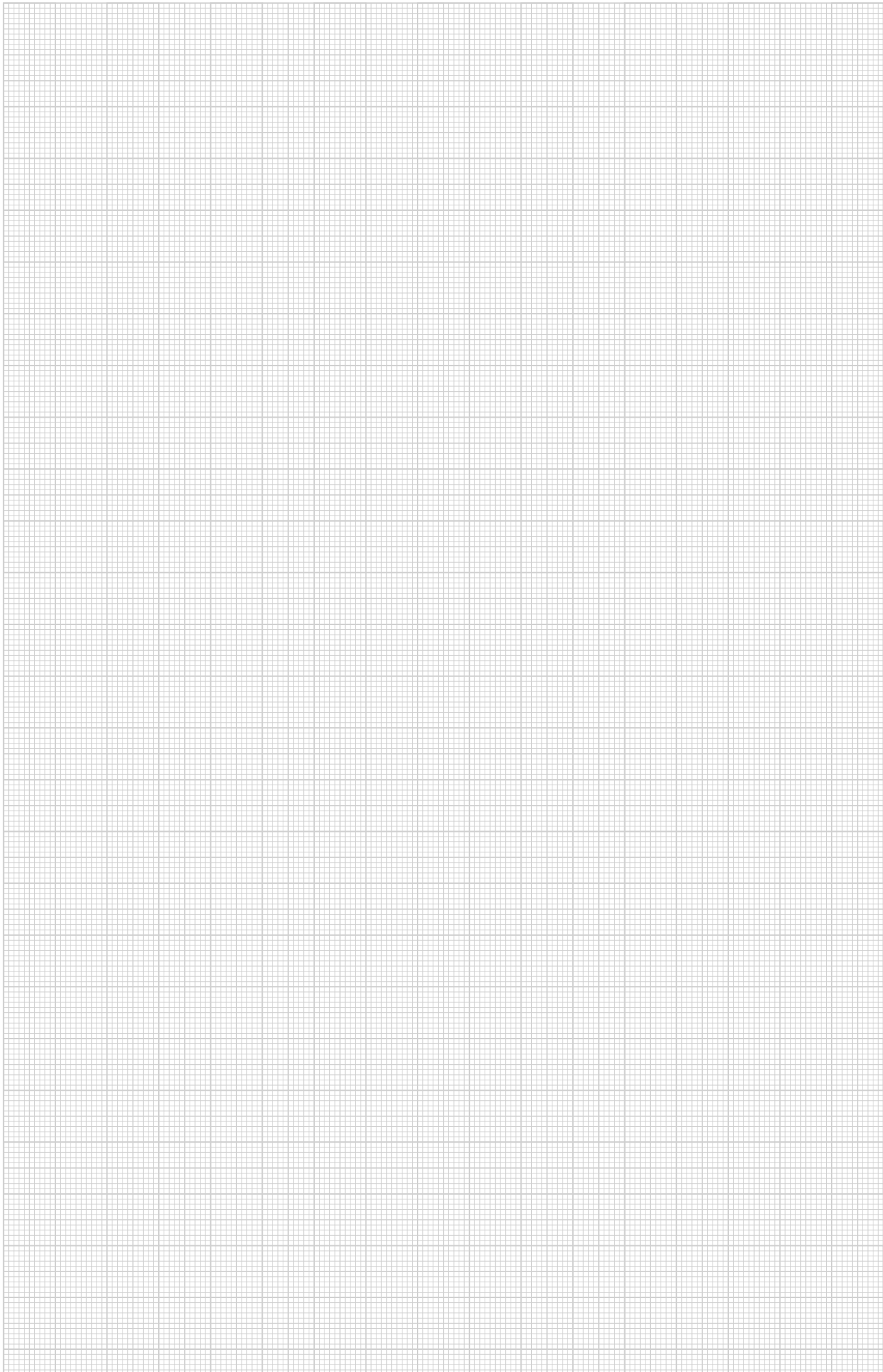
Class 6.103 according to DIN EN 50085-2-2

Classification*	Load in N
6.103.1	2,000
6.103.2	3,000
6.103.3	5,000
6.103.4	10,000
6.103.5	15,000

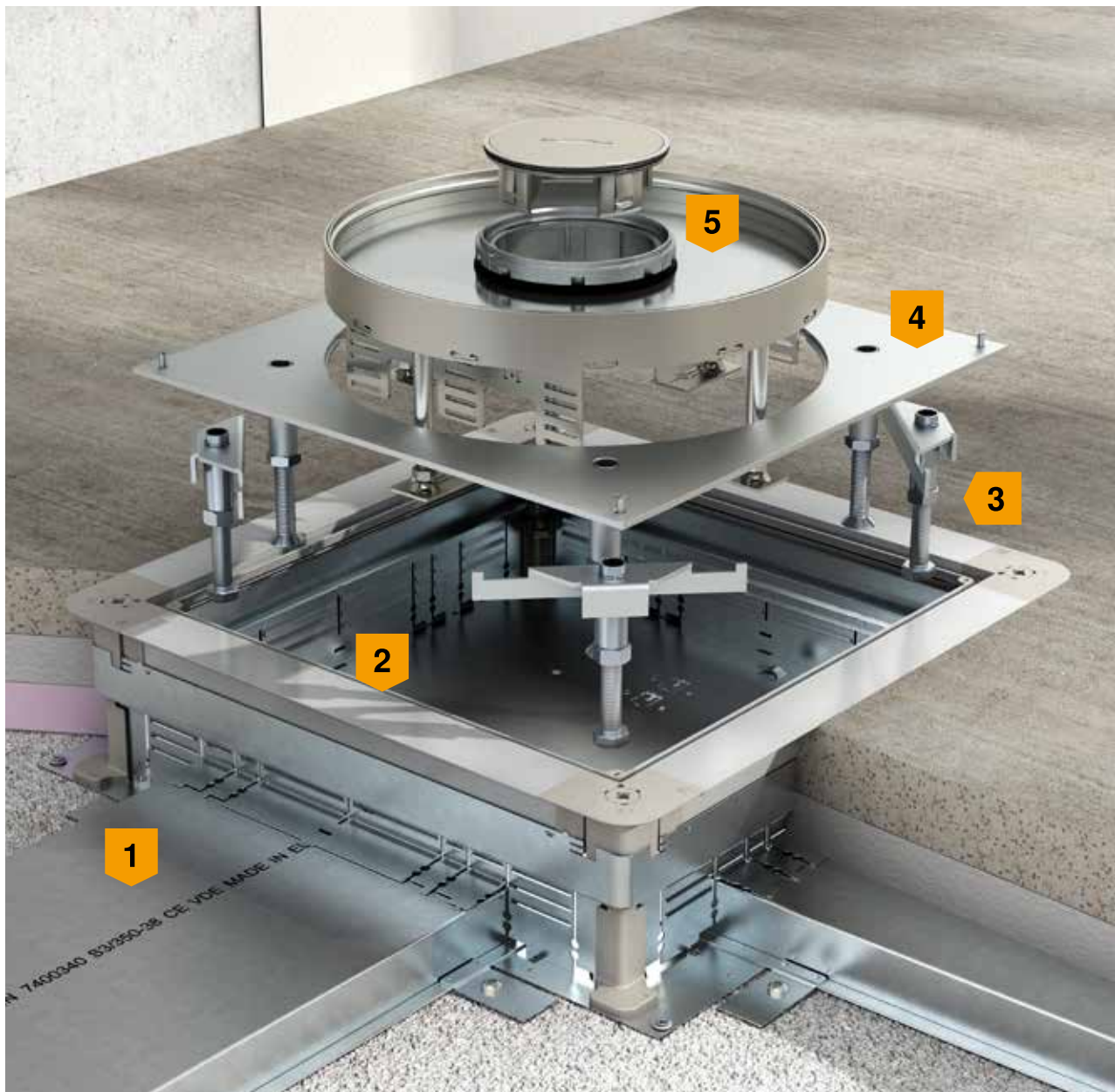
* The OBO heavy-duty classes were developed based on Class 6.103.

Classification according to the OBO testing standard

OBO heavy load class	Load in N
SL 1	10,000
SL 2	20,000



Screed-covered heavy-duty solution



The screed-covered heavy-duty solution consists of six system components: The underfloor ducts, underfloor sockets, heavy-duty supports, heavy-duty mounting lids, height-adjustment units and heavy-duty cassettes. The 2- or 3-compartment underfloor ducts are used for cable routing and can easily be connected to the prepared installation openings of the underfloor sockets. The underfloor boxes permit the installation of heavy-duty cassettes

for inspection purposes or for the mounting of installation accessories such as sockets, data or multimedia technology. The heavy-duty supports and the special heavy-duty mounting lid provide the necessary stability. The heavy-duty cassettes are inserted in the heavy-duty mounting lid, allowing access to the installed accessories.

1

Ducts

The screed-covered ducts are only subjected to loads during the mounting period. Before screed laying, the ducts are classified with a load capacity of 750 N according to DIN EN 50085-2-2. After screed laying, no loads impact on the ducts, as the screed accepts the loads as a static layer. For this reason, underfloor ducts from the standard product range can also be used in areas with high load requirements. Both 2- and 3-compartment underfloor ducts from the EÜK screed-covered duct system are available.

2

Underfloor junction and branch box

The underfloor boxes of the nominal sizes 250 and 350 must have a non-positive connection to the screed. To avoid a reduction in the load capacity and damage to the floor covering, no edge insulation strips can be laid around the underfloor junction and branch box.

3

Heavy-duty support

Heavy-duty supports are additional expansion parts for underfloor sockets and increase the load capacity. The supports are inserted in the corner areas of the underfloor socket and are tensioned under the socket frame.

4

Heavy-duty mounting lid

The heavy-duty mounting lid is selected according to the appropriate heavy-duty cassette. The height-adjustment units enable the screed-flush height adjustment of the heavy-duty mounting lid and are to be ordered separately.

5

Heavy-duty cassettes

Heavy-duty cassettes are suitable for creating inspection openings or for the installation of devices in areas with high load requirements. The cassettes are adequately dimensioned for absorbing traffic loads and are rated for individual static loads up to 10 kN (SL1) or 20 kN (SL2). The GRAF9 service outlet is available for smaller loads up to 7.5 kN.



Overview of the heavy-duty systems

Device installation units

Selection according to

- Load requirement
- Floor covering thickness
- Functional method
- Installation capacity

Cassettes for cable outlets and inspection purposes protect the electrical installation in the floor against water penetration. All heavy-duty solutions guarantee moisture protection according to DIN EN 50085-2-2 and are, therefore, approved for wet-cleaned floors indoors.

Heavy-duty mounting lid

Selection according to

- Shape of the selected service outlet or the cassette (nominal size)
- Screed height

With heavy-duty frame cassettes, a mounting set, not a mounting lid, must be used for the installation of devices.

Height adjustment units

Selection according to

- Screed height

Heavy-duty support for underfloor box

Selection according to

- Screed height

Underfloor socket (UZD)

Selection according to

- Screed height
- Shape of the cassette and the heavy-duty mounting lid
- Duct or trunking width

Ducts and trunking

Selection according to

- Cable volume

Load capacity

7.5 kN



Service outlet



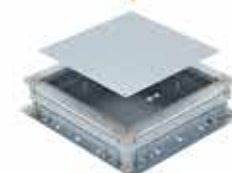
Heavy-duty mounting lid



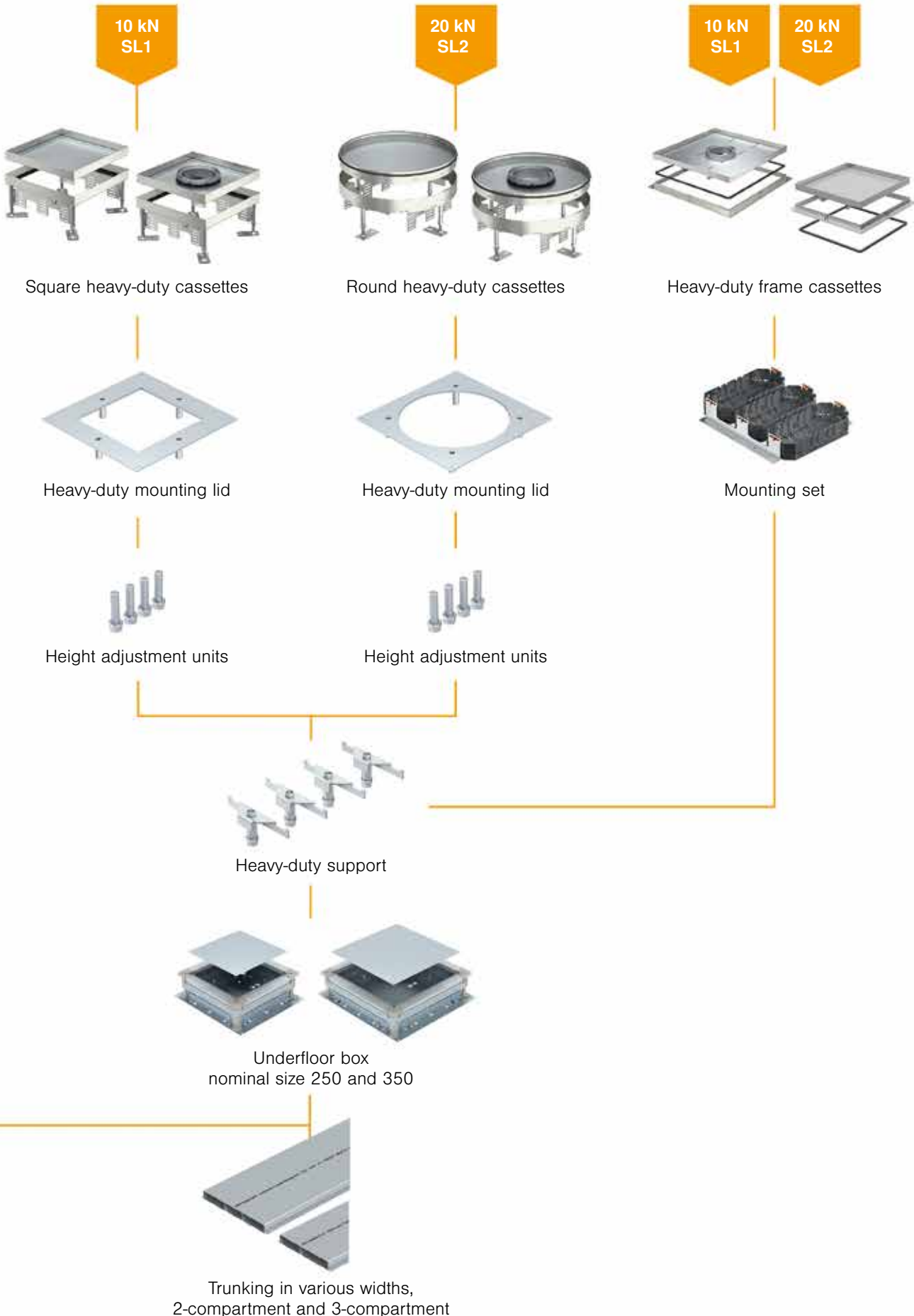
Height adjustment units



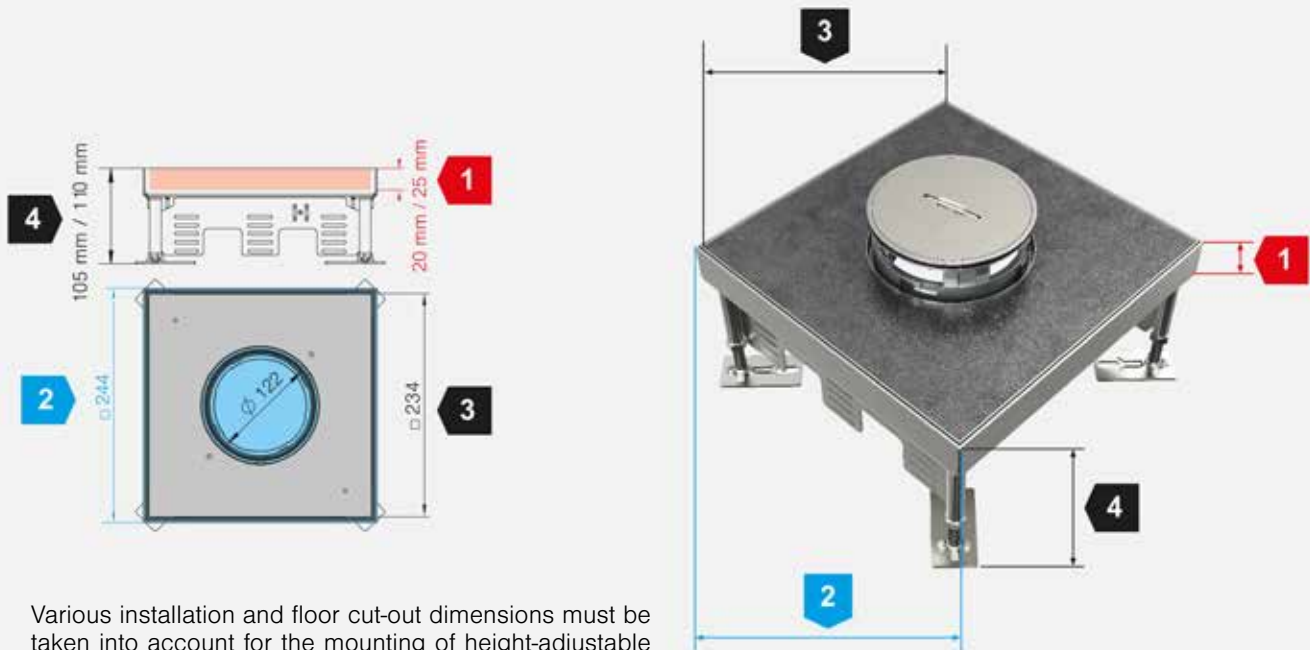
Heavy-duty support



Underfloor box
nominal size 350



Installation and floor cut-out dimensions



Various installation and floor cut-out dimensions must be taken into account for the mounting of height-adjustable cassettes and the application of floor coverings in the cassette lids.

1

Frame height for the floor covering in the lid (red dimensions)

The frame height data relates to the maximum floor covering thickness, including adhesive. The cassettes are available in various frame heights.

3

Internal dimension of the lid used to calculate the floor covering cut-out (black dimensions)

The dimension data relates to the internal dimension of the cassette cover and is used to calculate the floor covering cut-out. Depending on the type of floor covering, appropriate reductions should be taken into account, e.g. for expansion gaps.

2

Floor cut-out for the installation of cassettes (blue dimensions)

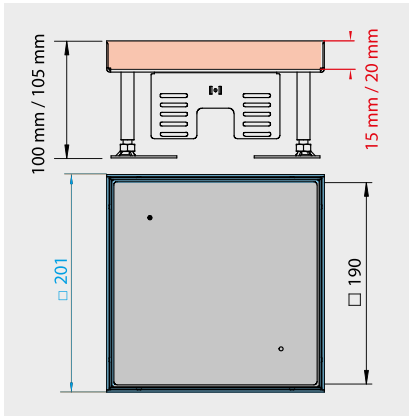
The dimensions for the floor cut-out should be considered as target dimensions for correct installation of the cassette in the floor. They are only generally required for the floor cut-out in system floors. The EÜK screed-covered duct system and the OKA open trunking system offer prefabricated mounting lids with matching installation openings.

4

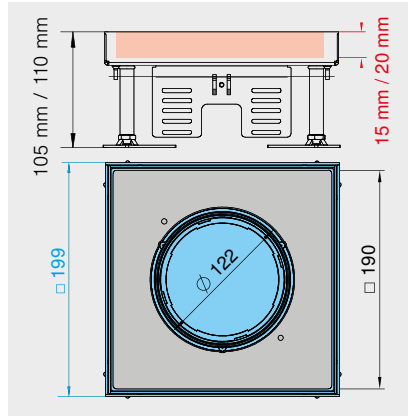
Minimum floor structure height (raw concrete ceiling to the finished floor)

The dimension describes the minimum floor structure height from the raw concrete ceiling to the top edge of the finished floor. It guarantees correct installation and use of accessories such as sockets, data and multimedia connections.

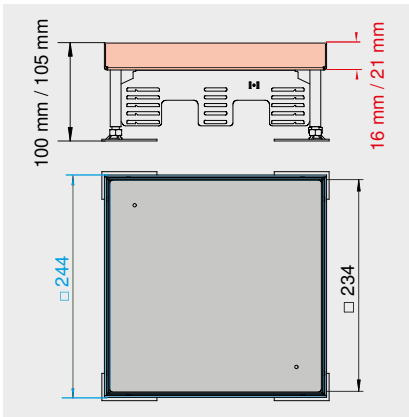
System dimensions, height-adjustable square cassettes



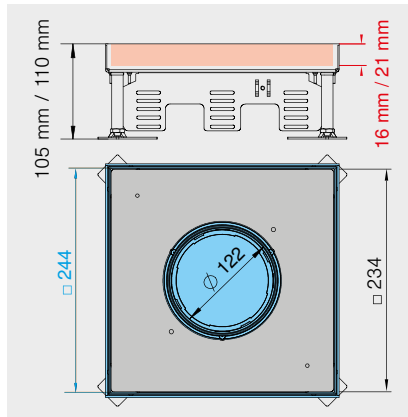
Nominal size 4, type RKN2 4



Nominal size 4, type RKFN 2 4



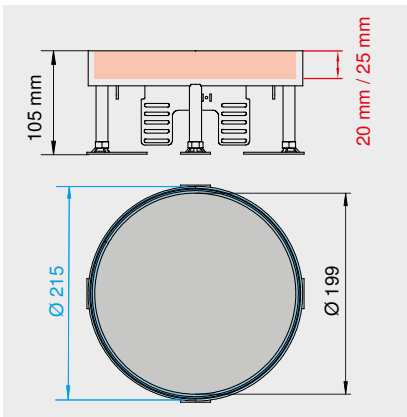
Nominal size 9, type RKN2 9



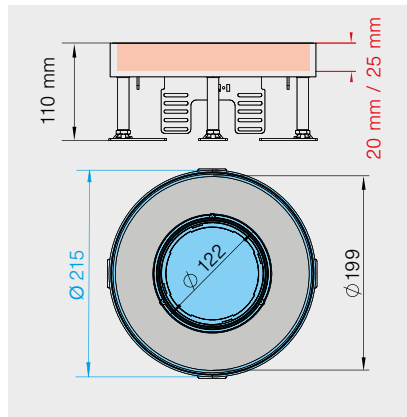
Nominal size 9, type RKFN 2 9



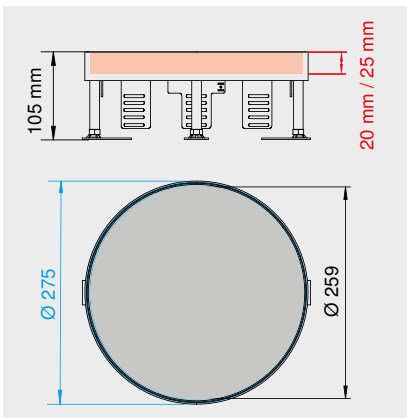
System dimensions, height-adjustable round cassettes



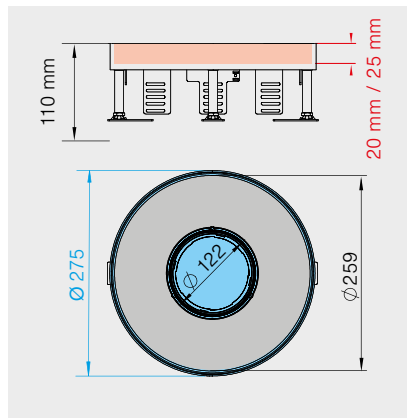
Nominal size R4, type RKR2 and RKR2N



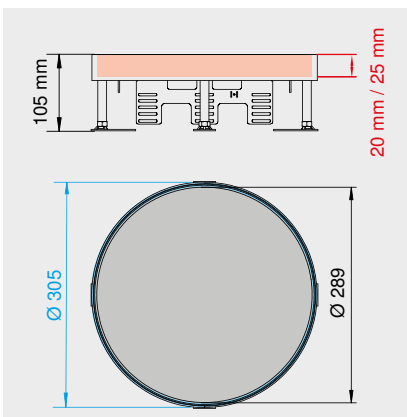
Nominal size R4, type RKFR2 and RKFR2N



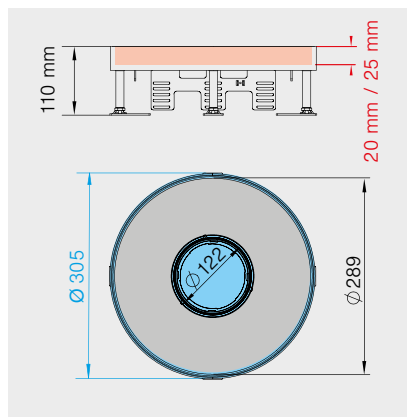
Nominal size R7, type RKR2 and RKR2N



Nominal size R7, type RKFR2 and RKFR2N

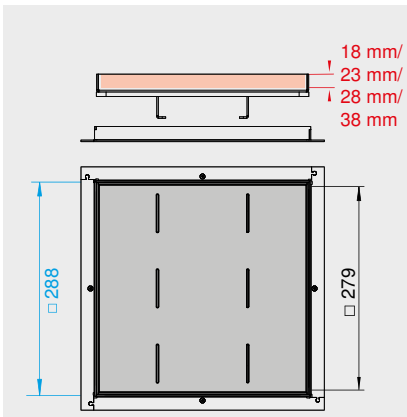


Nominal size R9, type RKR2 and RKR2N

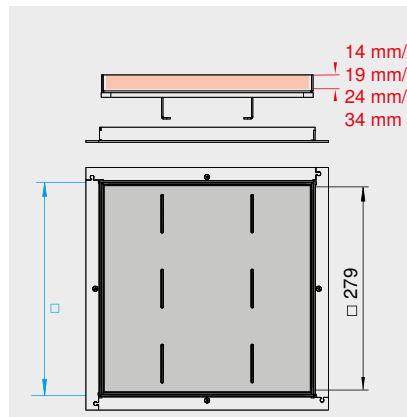


Nominal size R9, type RKFR2 and RKFR2N

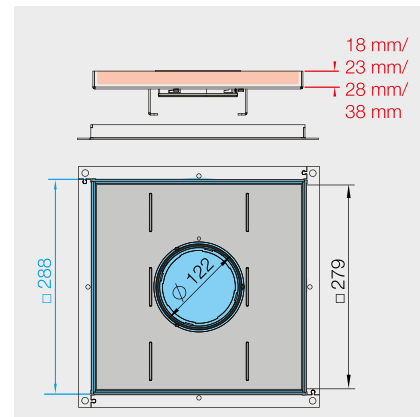
System dimensions, frame cassettes



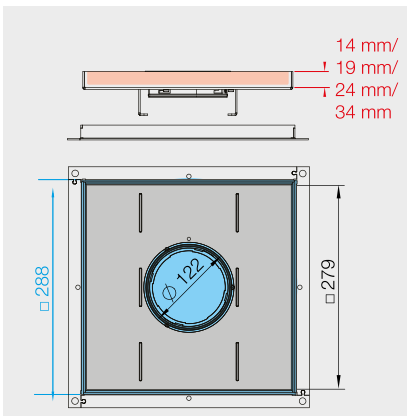
Nominal size 250-3, type RK SL1



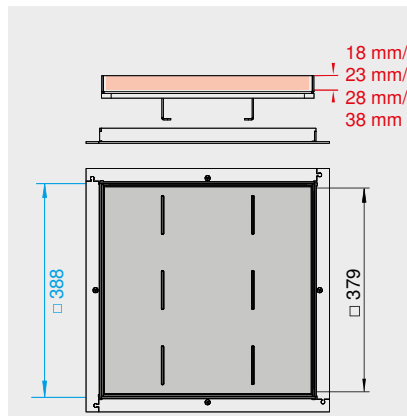
Nominal size 250-3, type RK SL2



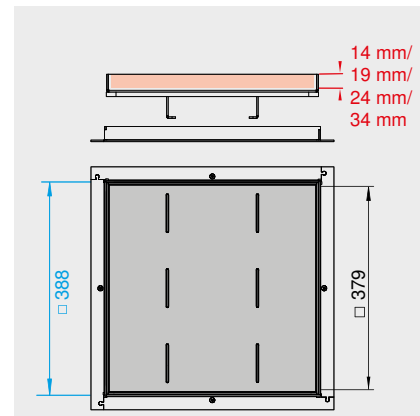
Nominal size 250-3, type RKF SL1



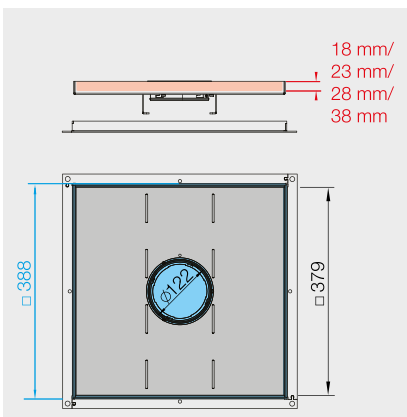
Nominal size 250-3, type RKF SL2



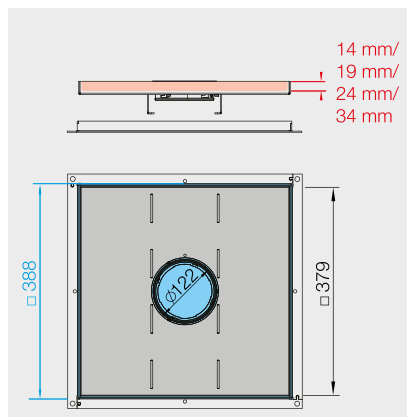
Nominal size 350-3, type RK SL1



Nominal size 350-3, type RK SL2



Nominal size 350-3, type RKF SL1



Nominal size 350-3, type RKF SL2



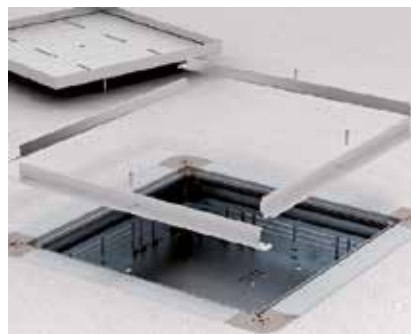
Mounting aid Heavy-duty cassettes



Sealing of the underfloor socket with silicone
Seal the frame of the underfloor socket in the corners using silicone (silicone is included in the scope of delivery of the cassette).



Fasten the cassette frame to the underfloor socket
Drill the fastening holes (Ø 3 mm) for the cassette frame at the marked points.



Mounting the cassette frame to the underfloor socket
Combine the cassette frame and mount it on the socket body (fastening screws contained in the scope of delivery).



Mounting of lid heavy-duty support
Insert the four heavy-duty lid supports in the corners of the underfloor socket and adjust them to the required height. Lock the support screw with a locknut.



Laying the floor covering on the cassette frames
Work the floor covering to the cassette frame. Seal the remaining gap between the floor covering and the cassette frame with suitable materials.



Insertion of the seal
Before sticking in the sealing ring, clean the mounting area.



Cleaning of the seals
To complete the mounting work, clean the interior of the cassette and the seals of the cassette and tube body. Apply Vaseline to the seals (contained in the scope of delivery).



Device mounting beneath the cassette
Lay the mounting set in the underfloor box and fasten it on the floor.



Mounting of a threaded sleeve
This work step takes place before the floor covering is laid in the cassette. Drill a fastening hole for the threaded sleeve (Ø 8 mm). Insert the threaded sleeve and fasten it.

Mounting aid Height-adjustable round heavy-duty cassettes



Preparation of the underfloor system

Insert the four heavy-duty lid supports in the corners of the underfloor socket and adjust them to the required height. Lock the support screw with a locknut.



Preparation of the underfloor system

Mounting the heavy-duty blanking lid on the underfloor box. Adjust the support feet to the right height and secure with a locknut.



Mounting of cassette frame

Fasten the height-adjustment units of the cassette on the raw ceiling.



Adjustment of the cassette height

Adjust the cassette frame to the top edge of the floor covering. Secure the height adjustment of the height-adjustment screws with locknuts.



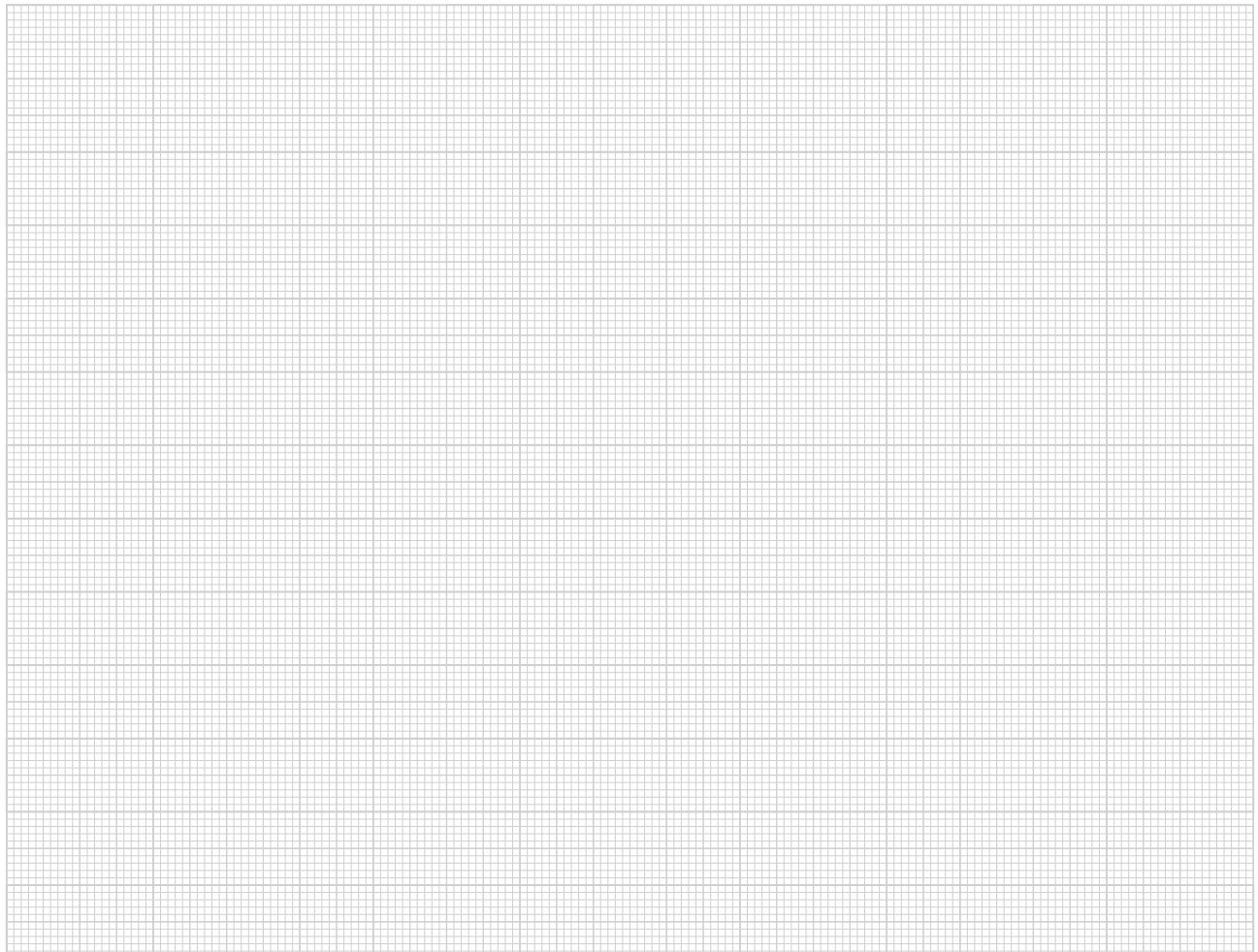
Laying the floor covering on the cassette frames

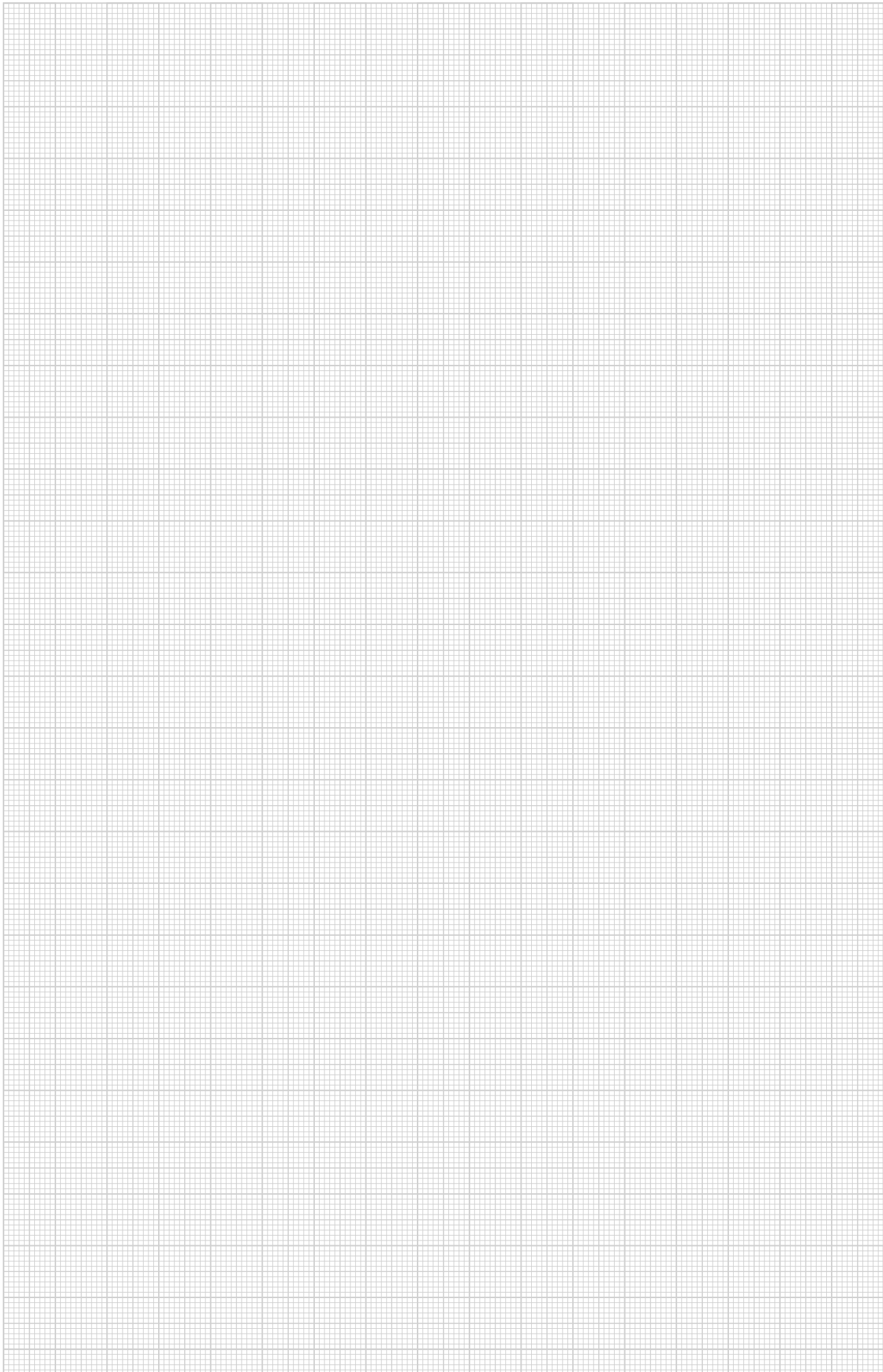
Work the floor covering to the cassette frame. Seal the remaining gap between the floor covering and the cassette frame with suitable materials.

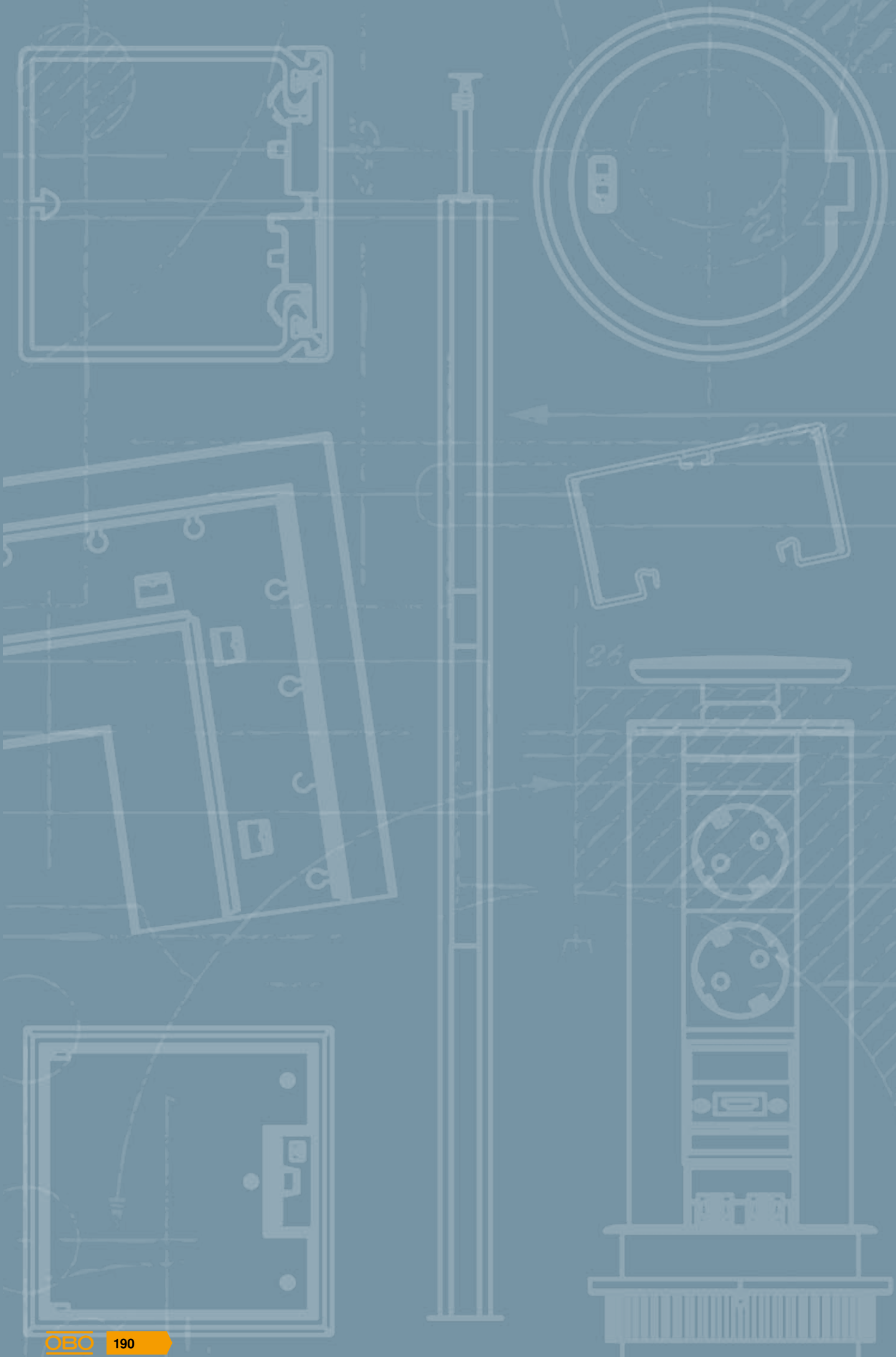
Planning checklist

When planning heavy-duty systems, the following points should be observed:

- ✓ **Match floor structure, payloads and area loads**
- ✓ **Observe minimum installation depth of device installation units**
- ✓ **The underfloor box must sit entirely on the concrete floor. Hollow spaces under the box significantly limit the load capacity**
- ✓ **The underfloor box must have a non-positive connection to the screed. Do not place any separating strips between the underfloor box and screed**
- ✓ **Work floor coverings exactly up to the opening of the mounting lid, e.g. GRAF9 Ø 305 +1 mm**
- ✓ **Firmly glue the floor coverings to the surface of the underfloor box and in the lid of the cassettes over the entire surface**







Floor sockets and floor boxes



UDHOME floor sockets and floor boxes

192



GES R2 floor sockets

198

System description



The family of UDHOME complete units can position power, data and multimedia connections exactly where they are required. Floor sockets and floor boxes of the UDHOME family are mounted directly on the raw floor and connected with flexible installation pipes – it couldn't be simpler.

Overview of the UDHOME series



The UDHOME4 and UDHOME9 floor boxes are the ideal solution for a wide equipment range and dry-cleaned floor coverings. The floor boxes offer a lot of space for the installation of power, data and multimedia connections and are available in discreet stainless steel and in stylish brass.

The UDHOME2 floor sockets, with their dimensions of 125 x 125 mm, combine an elegant appearance and functionality. The product family offers solutions for dry and wet-care floors. Stainless steel or aluminium are used as materials.

1

UDHOME 2 floor socket

UDHOME2 are available in three versions: With stainless steel cover, with floor covering recess and with tube body. With its protection rating of IP65, the floor socket with tube body is suitable for use in wet-cleaned cavity and screed floors.

2

The UDHOME4 floor box

The UDHOME4 can fit neatly into high-quality interior architecture. All you can see is a slender metal edge and the cord outlet. The floor box is available in stainless steel or brass versions.

3

The UDHOME9 floor box

The UDHOME9 is the largest floor box of the UDHOME family and is available in stainless steel and brass versions. It combines unobtrusive design with a wide range of use options.

Device installation

The UDHOME family can be equipped flexibly with power, data and multimedia technology. Our extremely comprehensive Modul 45® programme is available for this. However, you can also use standard devices from other manufacturers.

Maximum flexibility

For maximum flexibility, the floor sockets and floor boxes can, depending on requirements, be equipped with the comprehensive Modul 45® series from OBO Bettermann, or with standard devices. Both sockets and data and multimedia technology of the Modul 45® series are simply snapped in, without tools, making work quicker and thus cheaper.

The system can be used for a wide range of applications, thanks to the standardised installation dimensions of 45 x 45 mm and the large range of variants (e.g. HDMI, USB and audio connections).

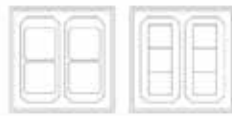




Floor socket

UDHOME2

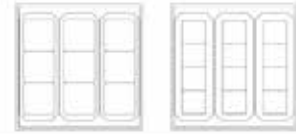
2 Modul 45® devices
2 data technology modules



Bottom box

UDHOME4

4 support ring devices
6 Modul 45® devices



Bottom box

UDHOME9

9 support ring devices
12 Modul 45® devices



Pre-equipped with
2 Modul 45® sockets



Option 1: Installation of up to 6 devices when equipped with 2 universal supports (type UT3 45 3)



Option 1: Installation of up to 12 devices when equipped with 3 universal supports (type UT4 45 4)



Mounting support for data technology for the optional installation of 2 additional data technology modules



Option 2: Installation of up to 4 devices when equipped with 2 support ring device supports



Option 2: Installation of up to 9 devices when equipped with 3 support ring device supports

Floor structure



Thanks to their compact design, UDHOME floor sockets and floor boxes require considerably less space in the floor than other electrical installation systems.



Tested quality

In addition, OBO tests its ducts, trunking and under-floor sockets in its own BET Test Centre. Thus, special solutions can be tested for their load capacity within a very short time.

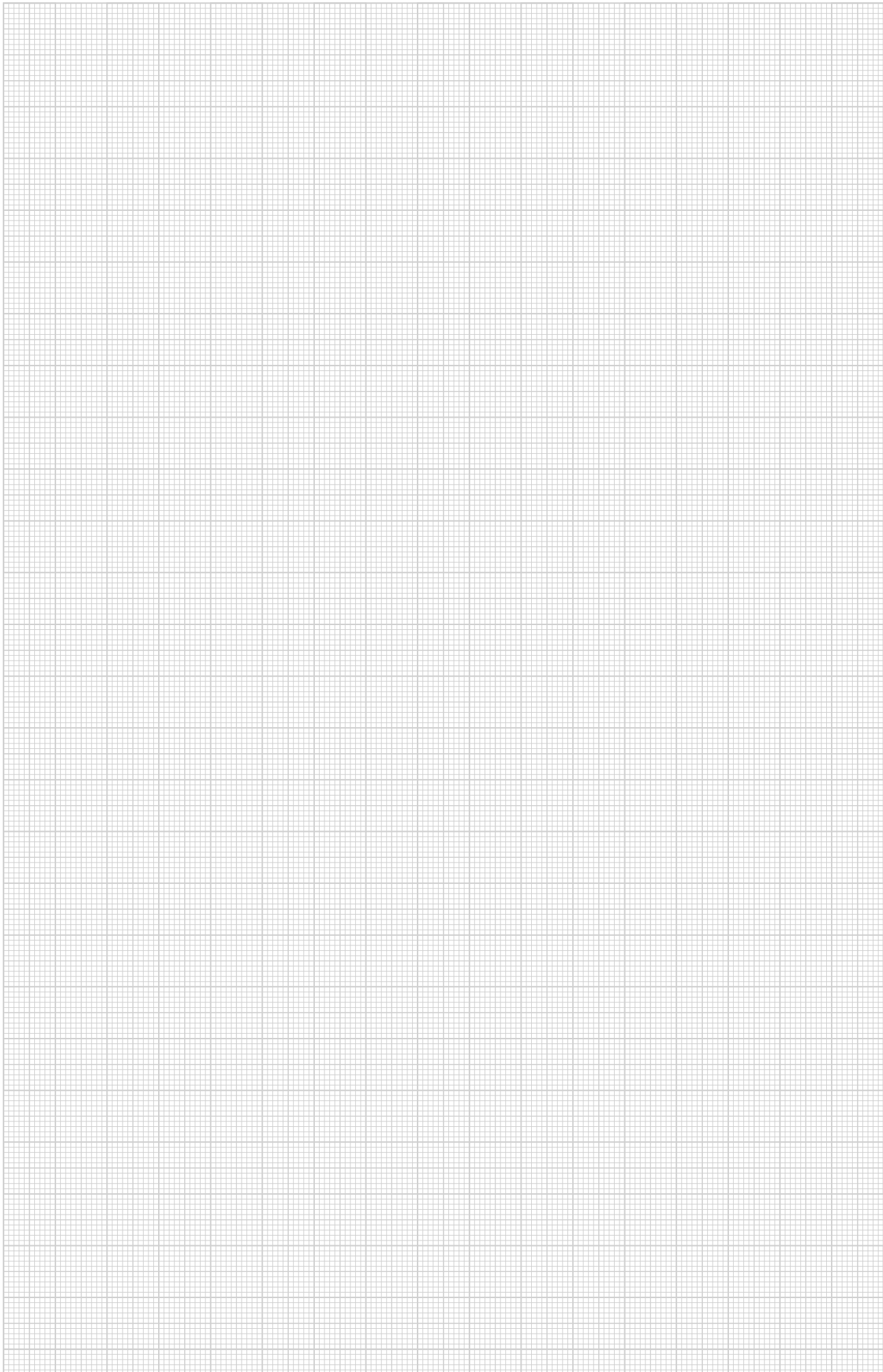
Height-adjustment supports

With the easily accessible height-adjustable supports, it is possible to adjust the covers of the floor sockets and floor boxes to the top edge of the floor coverings without any difficulty. The optional height extension means that adjustment is easy, even with higher floor structures.



Simple infeed

The feeding in of cables is not complex. They are simply run in standard empty tubes in the screed up to the UDHOME.



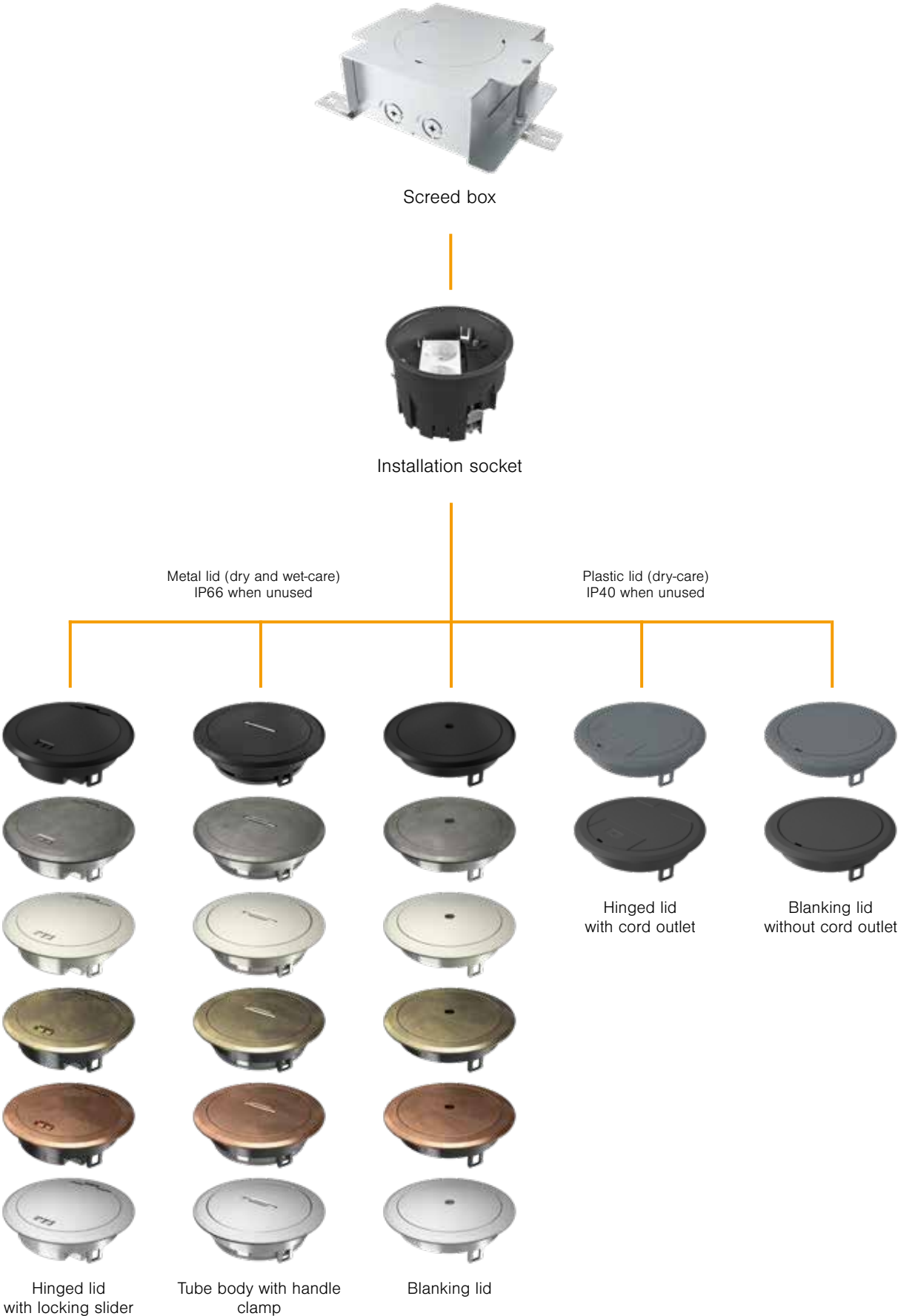
System description



The round floor sockets of the GES R2 series supply data and power exactly where they are required. Their handling is simple: The connection lines are inserted in the compact installation space and that space is closed off with a lid. Depending on the lid version, the floor sock-

ets are suitable for dry or wet-care floors. The variants for wet-care floors are protected with IP66 when closed.

System overview



Installation socket for Modul 45®

The installation socket for GES R2 service outlets accepts Modul 45® devices. After the routing of the electrical installation, the installation socket is inserted in the screed socket.



1

Separation of different current types

The large installation socket offers separated installation spaces for heavy current connections and data or multimedia connections.

2

Functional

The installation socket possesses break-out cable entries and an integrated strain relief.

3

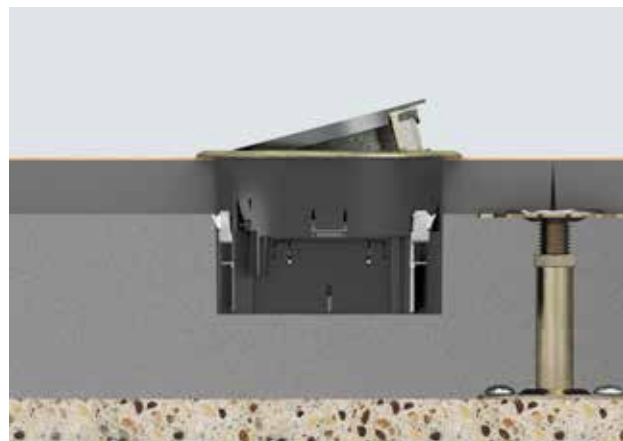
Solid hold

The fastening bracket is used to fasten the installation socket in raised and cavity floors or in the screed box.



Varied installation options

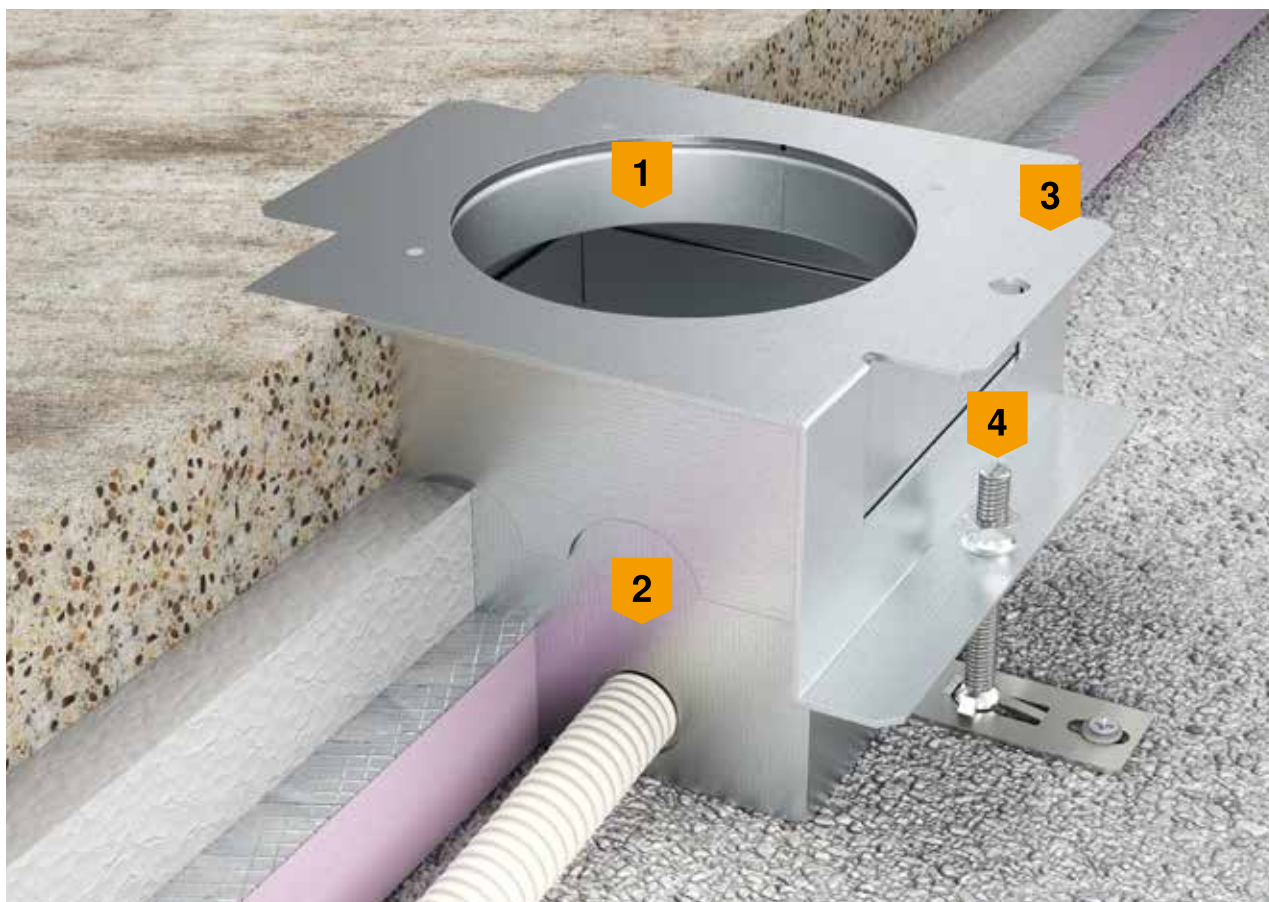
The pre-equipped installation socket, which contains a double socket of the Modul 45® series, is suitable for standard applications. The variant for two single Modul 45® devices offers a great amount of installation flexibility. The installation space is separated here. This allows simultaneous installation of sockets, data and multimedia connections, such as HDMI or VGA.



GES R2 in system floor

The installation socket can be installed simply in the system base. A drill hole of 122 mm is sufficient. It is mounted in the raised floor plate using three fastening brackets.

Mounting in screed



1

Installation in the screed socket

The GES R2 floor sockets are installed in the screed in the compact screed socket. The screed box possesses a stable pressure acceptance plate, the frame of which serves as the screed drip edge. The mounting protection lid of the screed box is knocked out after the screed work has been completed. This makes the installation opening for the service outlet accessible.

2

Connection

Cables are routed via flexible installation pipes in the insulation layer of the screed construction. The screed box possesses four break-out pipe insertions.

3

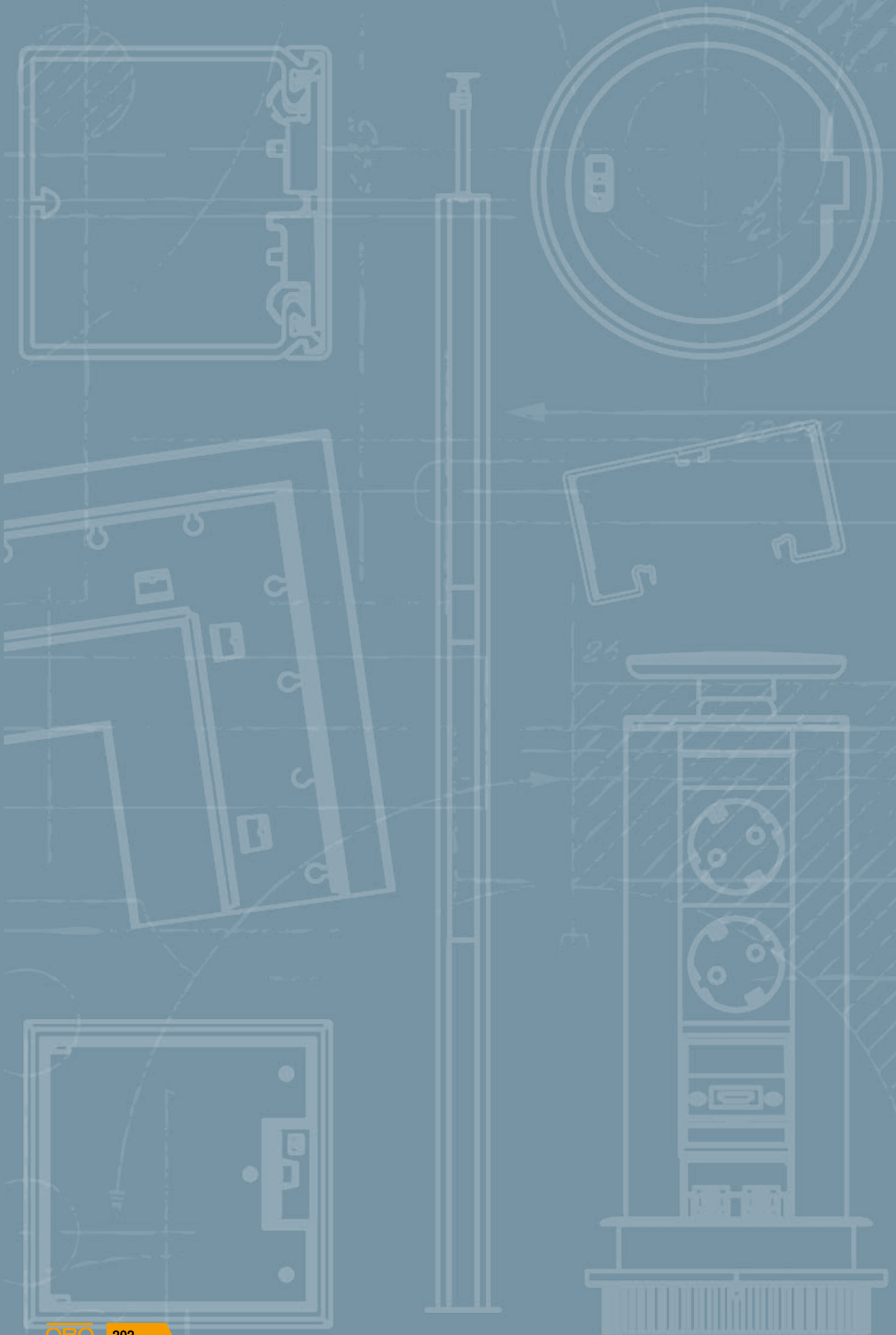
Screed-flush drip edge

The drip edge of the screed box ensures sufficient stability and load dissipation in the area. The installation socket and the service outlet are installed after the floor covering work has been carried out.

4

Height adjustment

Using a simple 3-point height adjustment, the screed box can be adjusted exactly to the top edge of the screed. The height-adjustment range is 85 to 130 mm.



Installation housings and supports



Universal supports

204



UVS energy distributors

214



Module support MT45V

215

System description



The universal support is designed for the installation of Modul 45[®] devices and standard accessories with 50 mm central plate. It offers countless combination options for sockets, data and multimedia technology.

Installation principle

The type of cover plate determines which accessories can be inserted in the universal support and which device distribution is possible. When specifying the device equipment, the different sizes and combination options of the cover plates in the universal support must be taken into account.

Universal support UT3

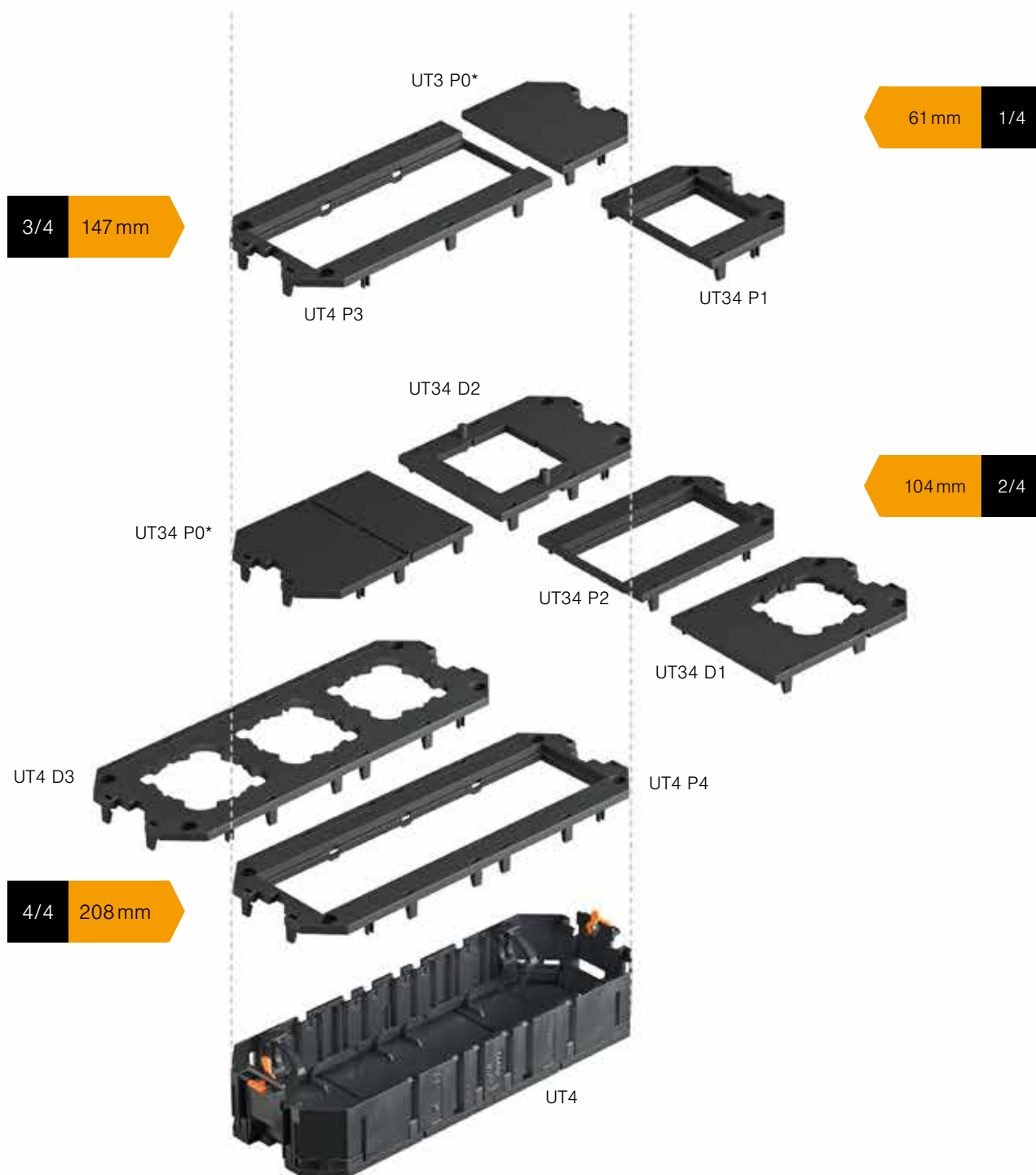
1. Combination with two cover plates 1/2 division (2x 82.5 mm)
2. Combination of cover plates with 1/3 and 2/3 division (61 mm + 104 mm)
3. Cover plate with 3/3 division (165 mm)



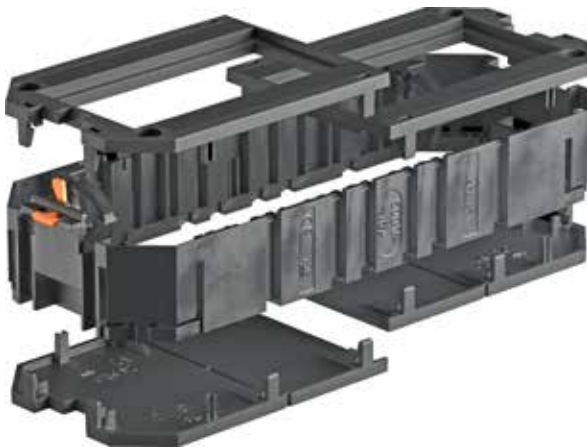
Installation principle

Universal support UT4

1. Combination of cover plates with 1/4 and 3/4 division (61 mm + 147 mm)
2. Combination with two cover plates 2/4 division (2x 104 mm)
3. Cover plate with 4/4 division (208 mm)



* Can be shortened



Universal support UT3 and UT4 for the installation of Modul 45® devices and standard accessories with 50 mm central plate. Power, data and multimedia connections can be combined as required and positioned at various heights in the locking ladder.



Cover plates for flexible device equipment

With the universal support, device equipment is determined by the selection of the cover plates. The universal support has space for up to four Modul 45® devices. Combinations of Modul 45® devices and standard accessories are also possible. The cover plates have practical labelling panels for clear labelling of sockets.



Support frame with innovative turn buckle

The universal support is fastened in the locking ladder of a cassette or a service outlet with a turn buckle. The turn buckle simplifies and accelerates mounting: The universal support is installed and safely locked with just a few actions.



Removable floor plate

The floor plate can be removed, either partially or completely. The benefit: When installing data and multimedia technology, the cables can simply be run downwards out of the universal support.

Combination options and installation

The compact Modul 45® devices can be combined at will in the universal support, allowing maximum equipment of a device installation unit. Combinations of sockets, data and multimedia technology and standard accessories with a 50 mm central plate are possible.

Maximum equipment of Modul 45® devices per device installation unit

Nominal size	Universal support	Modul 45 devices
2	1x UT3	3
4 and R4	2x UT3	6
6	3x UT3	9
7	2x UT3 + 1x UT4	10
9 and R9	3x UT4	12



Toolless mounting

Modul 45® devices are simply snapped into the cover plate and connected. The connection cables are fixed according to the standard using the supplied strain reliefs.

Finally, the cover plates are placed on the universal support and engaged.



Two circuits with partition

The installation of two circuits in a universal support is made easy through the use of the matching partition.

The partition can be positioned according to the device equipment in the universal support. The partition can be ordered separately.



Installing data technology

When installing data and multimedia technology, more space is required for the cable connection and the supply cable. In this case, the floor plate can be removed, either partially or completely, on the universal support.

To install individual devices, such as the data technology support, additional mounting bridges must be mounted in the cover plate. The mounting bridges can be ordered separately.



Combining power and data technology

The universal support means that device combinations of sockets and data technology are easy. In the universal support, the installation area for sockets can be closed off with a separating retainer to offer touch protection.

The floor plate in the data and multimedia technology installation area can be removed to create sufficient space for cable routing. When sockets are combined, mounting bridges should be inserted between the devices.



Inserting a universal support

To create the largest possible amount of free space for the device connectors, the universal support is inserted in the lowest possible locking ladder track.

After this, the turn buckle is first pushed towards the locking ladder, then swivelled to the side and engaged. The universal support is then securely fastened in the device installation unit.

Floor structure height and free space for device use

The minimum floor structure height for the installation of device installation units is primarily dependent on the connector types and sizes used. The required free space is calculated from the dimension between the underside of the lid and the top edge of the universal support.

The universal support can be installed at various heights in the locking ladder of the device installation units. The appropriate free space can be created for this.



If the universal socket has been mounted in the top usable level of the locking ladder, then free space of at least 24 mm is available. This distance is sufficient for the angular connector dimensions, but not, however, for power connectors, straight connectors and USB charging devices. The connector structure heights must be determined for the calculation of the necessary free space.

Installation of multimedia technology

The free space for the installation of data and multimedia technology cannot be clearly determined on account of the many different connector types, sizes and shapes. It must be determined after the connection solution and the connectors have been specified.

Determination of the required free space

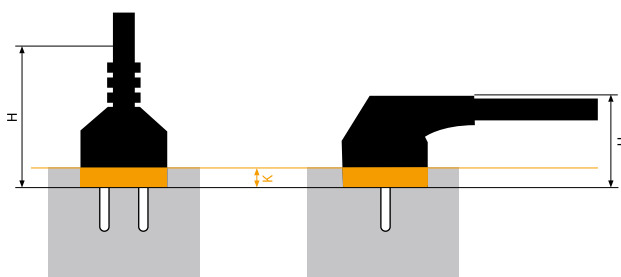
The dimensions of the connectors used must be known for the determination of the free space. The minimum free space for use can be calculated using the appropriate corrective measures for the connector types.

Calculation

Connector height (H) + corrective dimension (K) = minimum free space for use

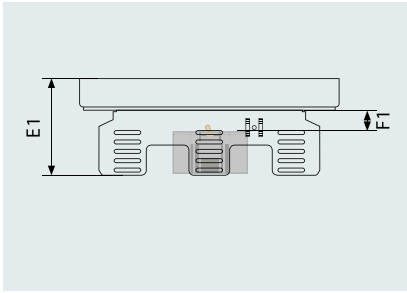
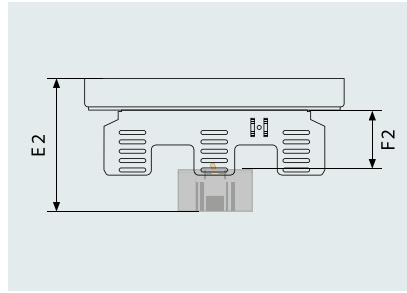
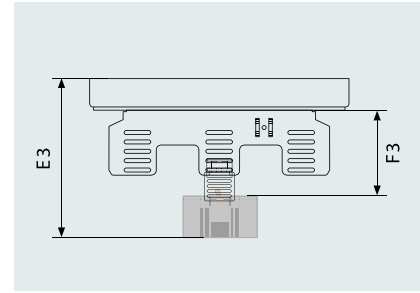
Example

Protective contact angle connector (H) 35 mm – corrective dimension (K) 12.5 mm = 22.5 mm free space when connector is used



Socket types	Correction dimension (K)
Protective contact	-12.5 mm
With earthing pin	-9.5 mm
British Standard	+5.5 mm
South Africa	+5.5 mm
India	+5.5 mm
China	+5.5 mm
Italy	+5.5 mm
Denmark	-8.5 mm
Switzerland	-8.5 mm

Locking ladder positions


R1 First locking ladder position

R2 Lowest locking ladder position

R3 Lowest locking ladder position with locking ladder extension

The first usable locking ladder position is the basis for the minimum floor structure height during device installation. In this position, socket use with angular connectors is possible when the device installation unit is closed.

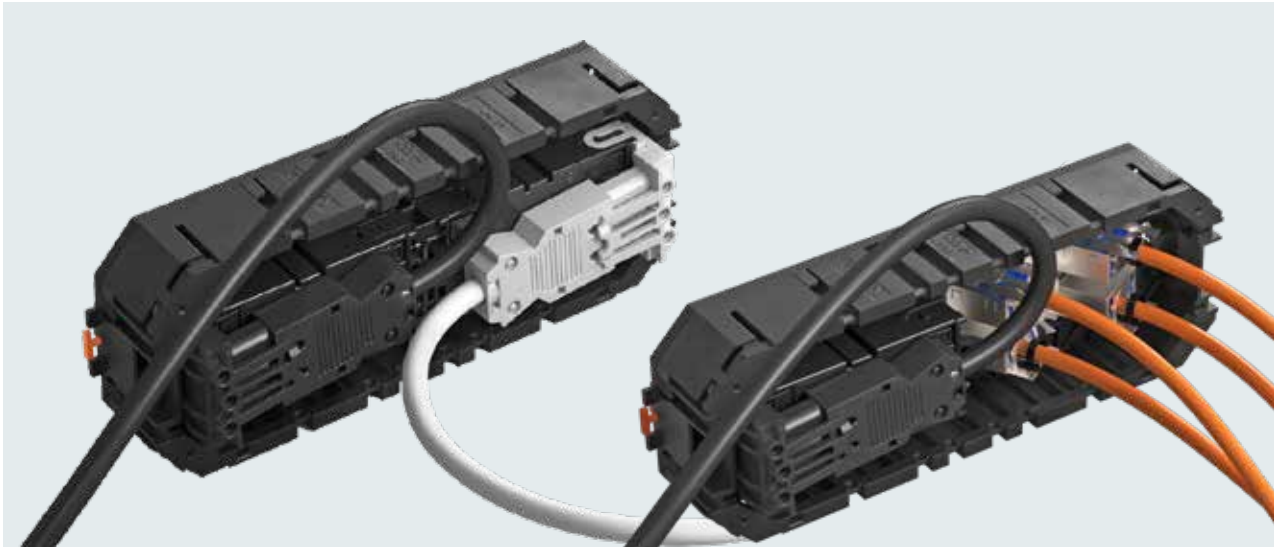
The lowest locking ladder position relates to the maximum possible lowering of the universal support, without additional components such as the locking ladder extension.

If the locking ladder extension is used, the lowering range of the universal support increases by 26 mm. This makes four additional locking ladder positions available.

	Floor covering thickness mm	Number of locking ladder positions	r1 Min. installation depth (E1) mm	r1 Free space (F1) mm	R2 Min. installation depth (E2) mm	R2 Free space (F2) mm	R3 Min. installation depth (E3) mm	R3 Free space (F3) mm
GES2, GES4, GESR4, GESR9SR	5	5	73	24	93	44	119	70
GES4-2, GES6-2, GES9-3B, GES9-3S	5 10	6 5*	73 78*	26 26*	98 98	51 46	124 124	77 72
GES6, GESR9	5	6	73	24	98	49	124	75
GESR7, GESR9/10, GESRA9, GESRA7	5 10	5 5	78 78	24 24	98 98	44 44	124 124	70 70
GES4M, GES6M, GES9M	5 10	4 4	78 78	24 24	103 103	49 49	129 129	75 75
GESR9-2	5 10	6 6	76 76	29 24	101 101	54 49	127 127	80 75
GRAF9	-	6	80	29	106	54	132	80
Height-adjustable, cassettes RKN2..., RKS2..., RKFN2...	20 25	5 5	97 102	25 25	129 134	61 61	155 160	87 87
Height-adjustable cassettes RKR2..., RKS2..., RKFR2...	20 25	5 5	101 101	30 25	131 131	65 60	157 157	91 86
Height-adjustable, decouplable cassettes RKN2..., RKS2..., RKFN2...	20 25	5 5	90 95	25 25	125 130	61 61	151 156	87 87
Height-adjustable, decouplable cassettes RKR2..., RKS2..., RKFR2...	20 25	5 5	95 95	30 25	130 130	65 60	156 156	91 86

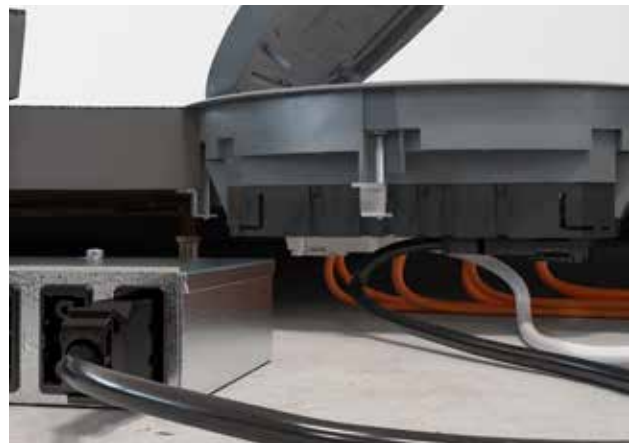
* Use is possible from the second locking ladder.

Ready-for-connection universal support connect UTC



The ready-for-connection connect UTC universal supports are equipped with connectable connection adapters. The cables are connected directly to the underfloor distributors via connection cables.

Combinations of up to two circuits are possible for each connection unit – also with surge protection.



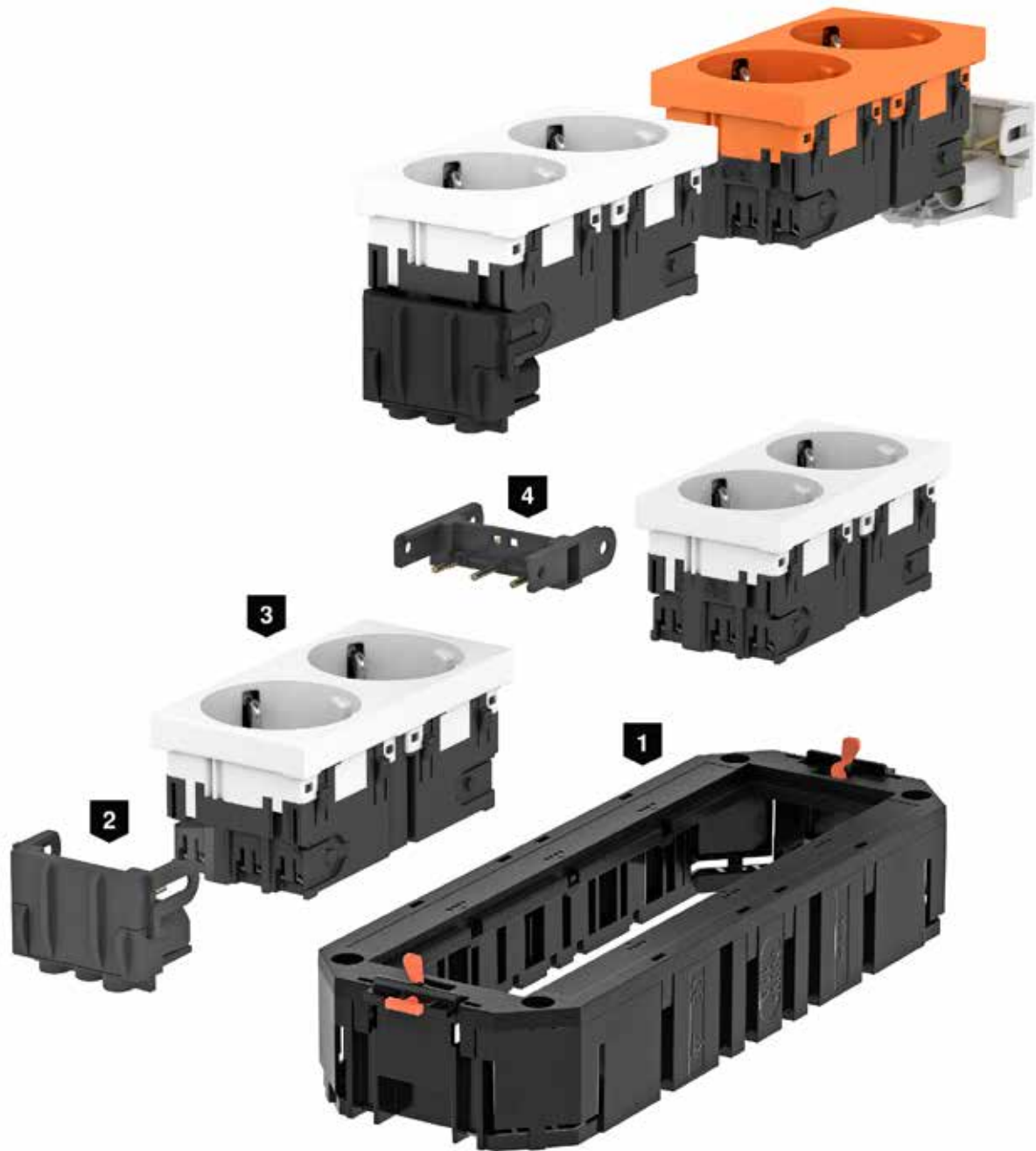
The plug connections on the Modul 45connect® sockets are located below the connection unit. This allows plug connections outside the floor box. The connected universal support is installed in the floor box by lowering it in the locking ladder. Fastening in the floor box is carried out using the turn buckles in the locking ladder.



Energy distributors are used in raised floors with removable floor plates. They are mounted at central points under the floor surfaces and supply the installed floor boxes in a star shape.



Modular structure



- 1** Universal support
- 2** Modul 45connect® connector part adapter
- 3** Protective contact socket
- 4** Modul 45connect® connector

UVS energy distributors



Energy distributors are used in raised floors with removable floor plates. They are mounted at central points under the floor surfaces and supply the installed floor boxes in a star shape.



Cable routing in cavity floors

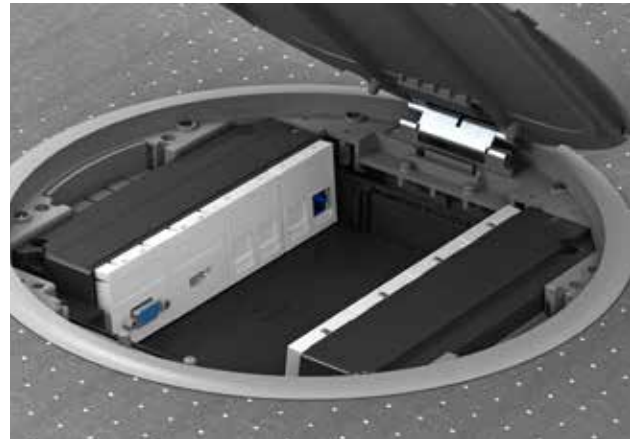
Beneath the screed plate, supply points for the installed floor boxes are set using energy distributors.



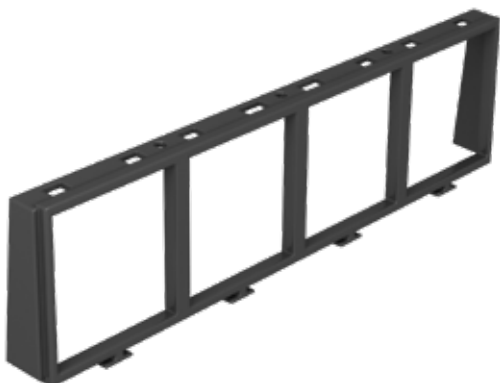
Module support for vertical installation of Modul 45® devices

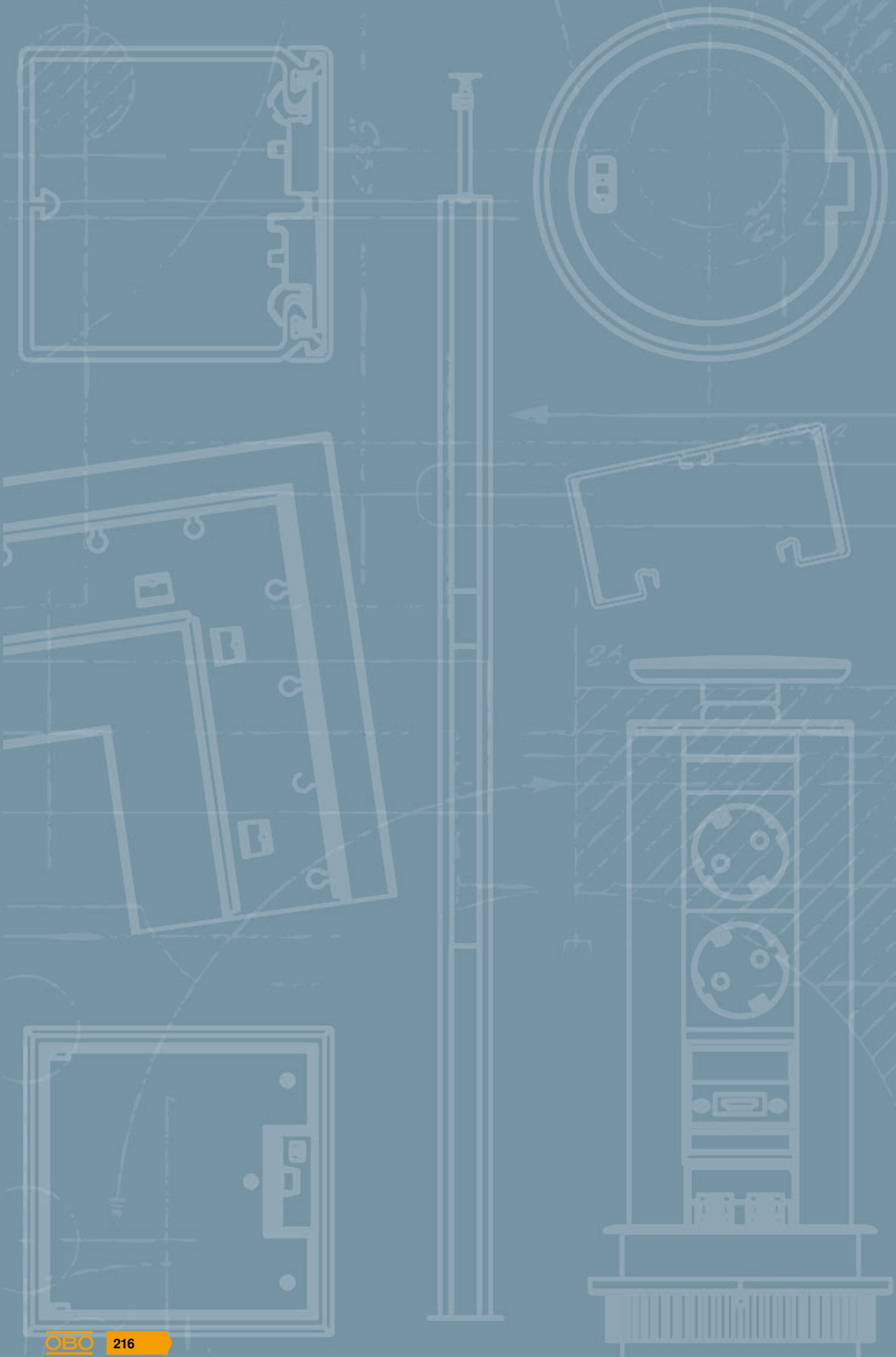


The module support MT45V is designed for the vertical installation of Modul 45® devices and can be used in service outlets and cassettes of nominal size 9 and R9. The module support offers space for a maximum of eight Modul 45® devices and can be equipped flexibly with sockets, data and multimedia technology. The necessary installation depth (floor structure height) is dependent on the device installation unit used and, for a GES9 service outlet, is at least 73 mm.



Connection cables with large connectors (e.g. XLR, DVI) can be installed with the module support, even at low floor structure heights.





Tabletop sockets



DB Deskbox

218



DBV Deskbox

222



DBK Deskbox

224



System description



Deskboxes by OBO offer direct access to power, data and multimedia connections for any workplace – be it in offices or meeting or conference rooms. Three different Deskbox solutions in high-quality materials and elegant designs are available for individual requirements:

Freely positionable Deskbox DB

High-quality aluminium, slim design and variable installation options. The Deskbox DB can be freely positioned in the workstation and offers direct access to all connection solutions.

Mounting aid



Preparation of fastening clamps

The appropriate fastening clamps are placed on the tabletop and screwed down.



Dismantling of the design panel

The first step for the cable connection of the data technology components is the removal of the design cover.



Dismantling of the housing cover

Open the housing cover located under the design cover.



Data technology connection

Simply connect the data technology couplings using standard universal cables.



Mounting of the housing cover

When the connection work has been completed, the housing cover is reattached and screwed down tight.



Preparation of Deskbox fastening

The fastening elements of the fastening clamps are inserted into the housing profile from the side. A Flexkanal holder can also be mounted as an option.



Fixing of the Deskbox fastening

The aligned fastening elements are fixed using a screw.



Mounting of the Deskbox on the fastening clamp

Simply insert the pre-mounted Deskbox into the fastening clamps from above.



Mounting of the design panel

When the mounting work has been completed, reattach and engage the design panel.



Flexkanal fastening on Deskbox

The supply lines can be bundled using a Flexkanal and can be fastened on the pre-mounted Flexkanal holder.



Deskbox mounting with fastening clamp

The Deskbox with fastening clamps is ready-mounted and ready for use.



Preparation for fastening stand mounting

Drill holes (Ø 16 mm) in the tabletop are required to mount the fastening stands.



Mounting of the fastening stands

The fastening stands are inserted into the mounting drill hole and screwed tight.
Note: Can be used in tabletops of up to 50 mm thickness.



Mounting of the Deskbox on the fastening stand

Push the Deskbox onto the fastening stands from the side. The design panel must be removed in advance.



Deskbox mounting with fastening stand

The Deskbox with fastening stands is ready-mounted and ready for use.



Preparation for fastening set, table mounting

Drill holes (Ø 10 mm) in the tabletop are required to mount the fastening sets.



Pre-mounting of the fastening set, table mounting

The fastening elements are inserted into the mounting drill hole.
Note: The supplied fastening screws (M4 x 40 mm) can be used for tabletops of up to a maximum thickness of 32 mm.



Deskbox mounting on the fastening set, table mounting

The Deskbox can be slid onto the fastening elements from the side. The design panel must be removed in advance.



Finished mounting of the fastening set, table mounting

When the Deskbox is positioned, the fastening elements can be screwed tight.



Deskbox mounting with fastening set, table mounting

The Deskbox is ready-mounted and ready for use directly on the tabletop.



Mounting of the fastening set, under-table mounting

The fastening elements are connected to the tabletop using the wood screws contained in the scope of delivery.



Deskbox mounting on the fastening set, under-table mounting

The Deskbox can be slid onto the fastening elements from the side. The design panel must be removed in advance.



Mounting of the Deskbox with fastening set, under-table mounting

The Deskbox is ready-mounted and ready for use under the tabletop.



Cable connection, energy technology

The energy technology of the Deskbox is always equipped ready for connection and tested according to VDE directives. There is no need to remove the device cover on the energy side.



System description



Deskboxes by OBO offer direct access to power, data and multimedia connections for any workplace – be it in offices or meeting or conference rooms. Three different Deskbox solutions in high-quality materials and elegant designs are available for individual requirements:

Lowerable Deskbox DBV

Power and data simply vanish into the recess. If necessary, the Deskbox DBV can simply be pulled out – the plug connections are then easy to reach.

Mounting aid



Preparation for Deskbox mounting

A mounting opening of \varnothing 102 mm is required for installation. A suitable circular band saw is available as an accessory for the installation of the Deskbox.

Note: Can be used in tabletops of up to 50 mm thickness.



Inserting the Deskbox

Insert the Deskbox without fastening ring into the mounting opening.



Fastening the Deskbox

Place the fastening ring on the Deskbox from below and screw it down.



Fixing the Deskbox

The Deskbox is fixed using wood screws to ensure secure mounting.



Completion of Deskbox mounting

The Deskbox is mounted and, when closed, is almost flush with the tabletop.



Application information for Deskbox DBV

The use of angular connectors means that the Deskbox DBV can be lowered without any trouble. Straight connectors can only be used when the Deskbox is extended.



Cable outlet of the Deskbox DBV

When the Deskbox is lowered, the cable is run out through the integrated folding function of the cover.



System description



Deskboxes by OBO offer direct access to power, data and multimedia connections for any workplace – be it in offices or meeting or conference rooms. Three different Deskbox solutions in high-quality materials and elegant designs are available for individual requirements:

Foldable Deskbox DBK

At workplaces or conference tables – the range of applications of the foldable Deskbox DBK is huge. No matter whether for laptops, projectors or PCs: Connection is as easy as you'd expect. Open the lid, put the plug in, then close the lid. The integrated brush bar allows tidy running out of the cables.

Mounting aid



Preparation for Deskbox mounting

A rectangular mounting opening is required for Deskbox installation. The appropriate installation dimensions can be found in the mounting instructions.



Inserting the Deskbox

Insert the Deskbox into the mounting opening from the top.



Preparing Deskbox fastening

The fastening hole strips located on the Deskbox are bent over the fixing rail contained in the scope of delivery.



Fastening the Deskbox

The Deskbox is fastened to the tabletop with four wood screws. Ensure the screws are always screwed in directly next to the fixing rails.



Data technology connection

Simply connect the data technology couplings using standard universal cables. There is no need to screw on the Deskbox.



Completion of Deskbox mounting

The Deskbox is mounted and, when closed, is almost flush with the tabletop.



Application information for Deskbox DBK

The Deskbox DBK can also easily be closed using the connectors.



Cable outlet of the Deskbox DBK

When the Deskbox is closed, the cable outlet is through an integrated brush bar.



Setting the cover resistance

The resistance or movement of the cover is adjusted using two adjusting screws on the lower side of the Deskbox.

Configure an individual Deskbox in 5 steps

Configure a Deskbox according to your requirements. For quantities over 5 units per version, we can produce a tested, ready-for-connection Deskbox according to your specifications.

1

Select Deskbox design



DB Deskbox

2

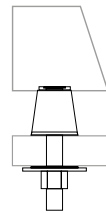
Select housing colour

Standard design
 Silver anodised

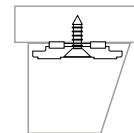
On request
 Powder-coated

3

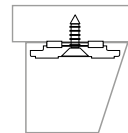
Fastening



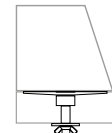
Stainless steel fastening stand



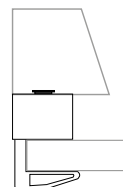
Free erection without fastening



Fastening set for under-table mounting



Fastening set for table mounting



Fastening clamp



DBV Deskbox



DBK Deskbox

Standard body version

- Silver anodised

Cover

- Painted silver
- Solid stainless steel

Standard design

- Stainless steel, brushed

Body version on request

- Black anodised
- Old brass anodised

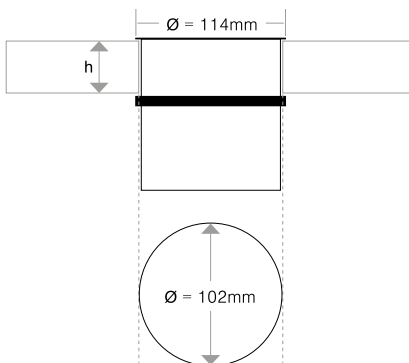
Cover

- Painted black RAL 9005
- Painted as old brass
- Painted white RAL 9010

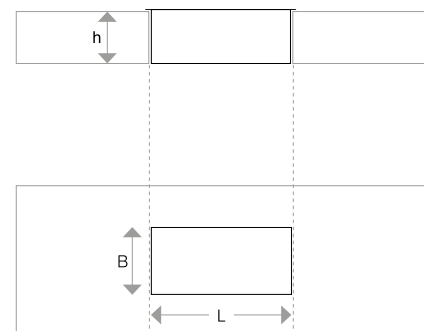
On request

- Painted black RAL 9005
- Painted white RAL 9010

**Installation opening in the tabletop
(plate thickness max. 50 mm)**



**Installation opening in the tabletop
(plate thickness max. 50 mm)**



4

Select the energy technology equipment

Checklist

Select connection type

- Specify socket type and quantity
- Specify power circuits and additional function

Select connection type

- Protective contact connector
- Wieland GST18 connector
- Wago Winsta connector
- Without connector, with wire end sleeves
- Country-specific connector (on request)

Select cable lengths

- 3 m cable with connector (standard)
- 5 m cable with connector
- Special lengths (on request)



Protective contact

Protective contact

Denmark

Denmark, IT



Earthing pin

Earthing pin

Switzerland 10 A

USA/Canada

5

Select the data/multimedia technology equipment

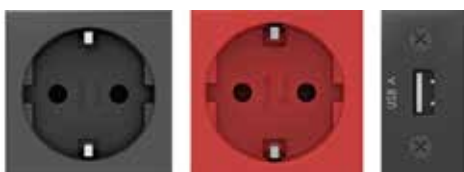
Checklist

Select connection type

- Specify connection type and quantity

Select connection type

- Short cable with socket
- 3 m cable with connector
- 5 m cable with connector (on request)



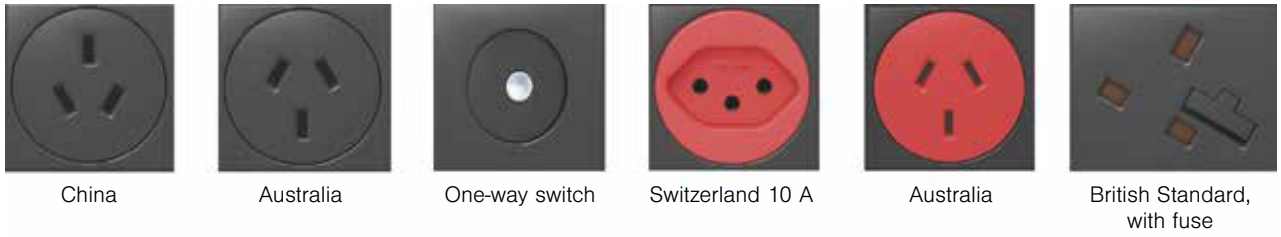
Protective contact

Protective contact

USB charging device



RJ45 coupling Cat. 6



China

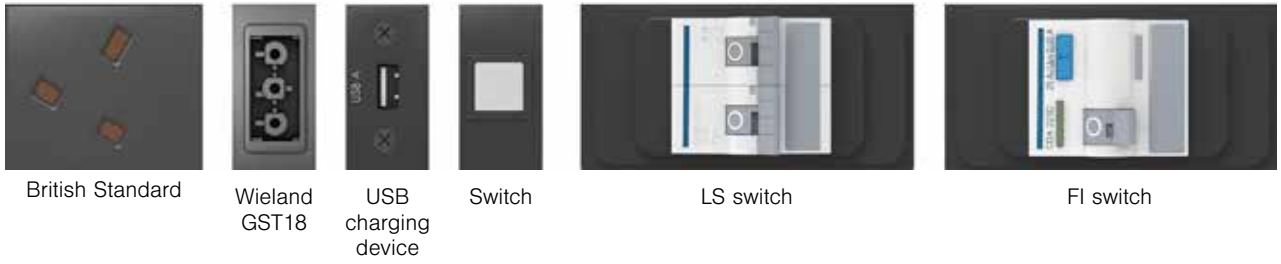
Australia

One-way switch

Switzerland 10 A

Australia

British Standard, with fuse



British Standard

Wieland GST18

USB charging device

Switch

LS switch

FI switch



DVI

VGA

VGA + cinch 3.5 mm

Cinch 3.5 mm

USB 2.0/3.0

HDMI



RJ45 coupling Cat. 6

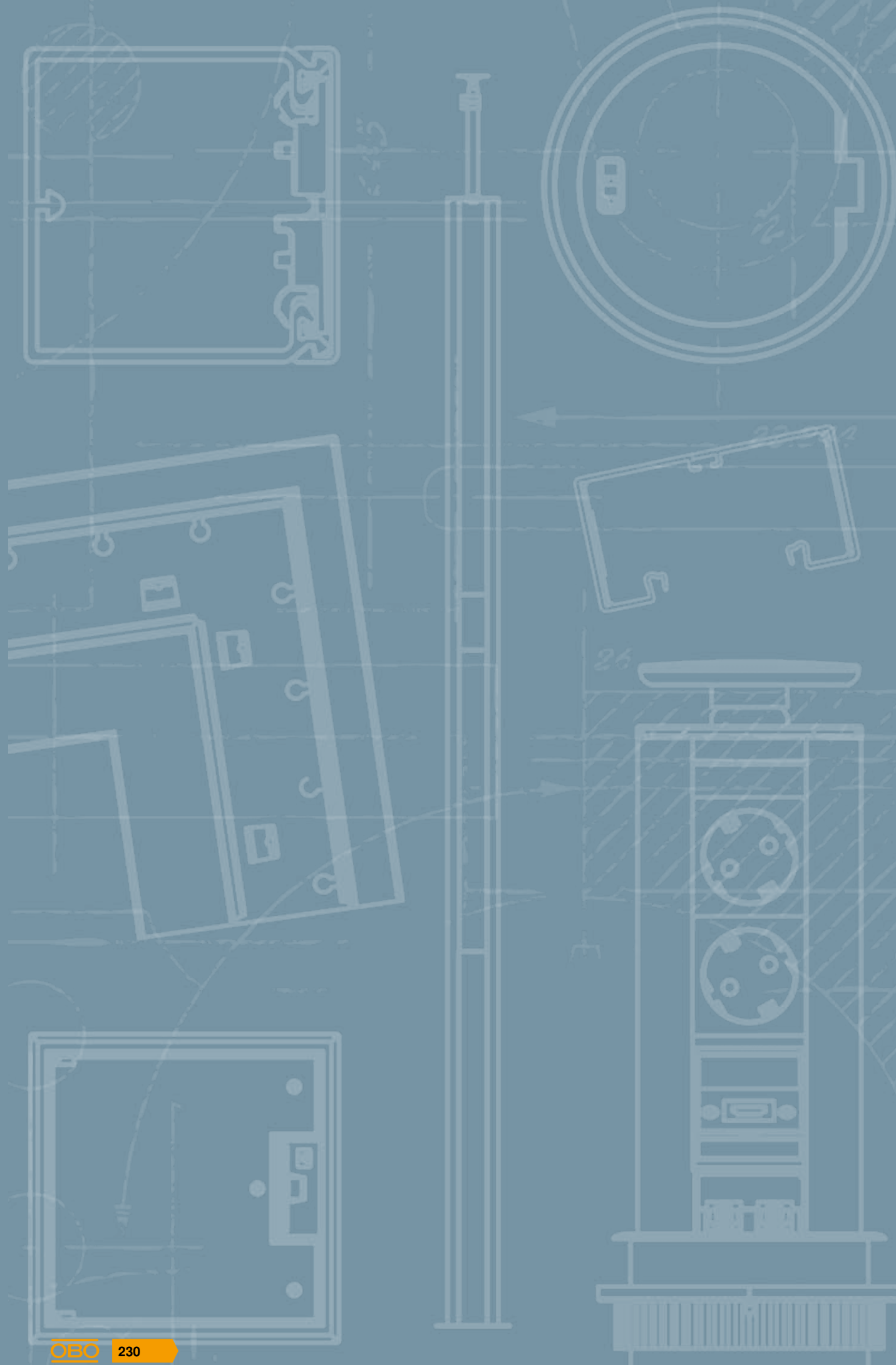
RJ45 coupling Cat. 6A

RJ45 socket Cat. 6

RJ45 socket Cat. 6A

RJ45 socket Cat. 7





Sockets, switches, data and multimedia technology



Modul 45® devices

232



Modul 45connect®

238



MTU mounting support

246



System description



With their dimensions of 45 x 45 mm, the Modul 45® devices from OBO Bettermann are compact and space-saving. For this reason, the sockets, data and multimedia technology connections are ideal for use in underfloor systems, device installation trunking and service poles. The Modul 45® system makes optimum use of limited installation space.

The advantages of Modul 45® at a glance:

- Space savings thanks to compact design
- Modular structure
- Quick and easy planning
- Easy mounting
- High efficiency due to time and cost savings
- Wide range of application options
- Easy exchangeability

One system – many solutions

The Modul 45® devices from OBO Bettermann offer the right solution for every application – no matter whether you're dealing with sockets, data or multimedia technology.

- Multiple sockets for economic device installation
- Sockets for international applications
- Data technology supports for data modules of different manufacturers
- Multimedia connection solutions for data, video and audio transmission

Modul 45® protective contact and earthing pin sockets



Modul 45® country-specific sockets



Modul 45® switching and protective devices



Modul 45® data technology



Modul 45® multimedia technology



Sockets, switches, data and multimedia technology

One system – all kinds of applications



Modul 45® in Rapid 45 device installation trunking



Modul 45® in the Modal net cavity wall installations



Modul 45® in Rapid 80 device installation trunking



Modul 45® in suspended power supply units



Modul 45® in underfloor service outlets and cassettes



Modul 45® in industrial service poles



Modul 45® in underfloor floor sockets and floor boxes

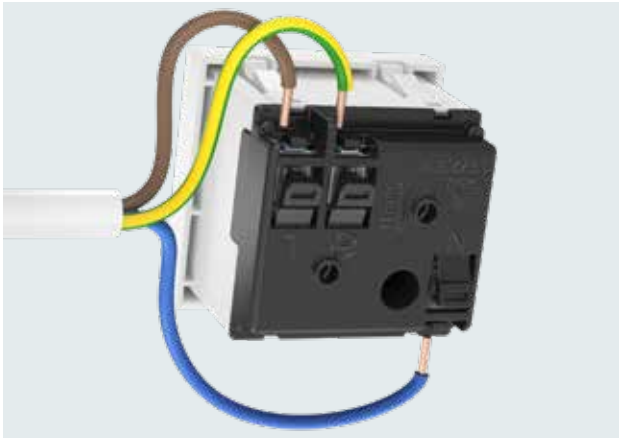


Modul 45® in service poles



Modul 45® in the Modal net surface-mounted housing

Modul 45® sockets



Connection of Modul 45® sockets

The screwless terminals correspond to IEC 60884-1 and are suitable for the connection of rigid cables of 1.5 to 2.5 mm². Each screwless terminal can accept two conductors.



Multiple sockets

The multiple sockets, double and triple, are particularly economic and time-saving during installation. In a standard installation, the wiring of the individual sockets takes a lot of time. This time is not required at all when installing the multiple sockets.



The integrated screwless terminals and the tried-and-trusted locking fastening allow toolless mounting. The wide range of country-specific sockets offers the right solution for any system environment.

Modul 45® data and multimedia technology

Today, we cannot picture offices without a data network. Flexible cabling solutions and data connection modules are used with increasing frequency. OBO can offer various data connection modules, both with and without shielding: Cat. 5e, Cat. 6 and Cat. 6a. The data connection modules are simply snapped into the Modul 45 data technology support.

With the multimedia connection solutions, computer, video and audio connections can be installed in the different OBO system environments. No matter whether in the GES service outlet, in cassettes or in System 55 – with the Modul 45 support plate, mounting is easy and quick.



Modul 45® data technology support

A large selection of different data technology supports is available for the installation of the connection modules. In so doing, data technology supports of other manufacturers can be installed.



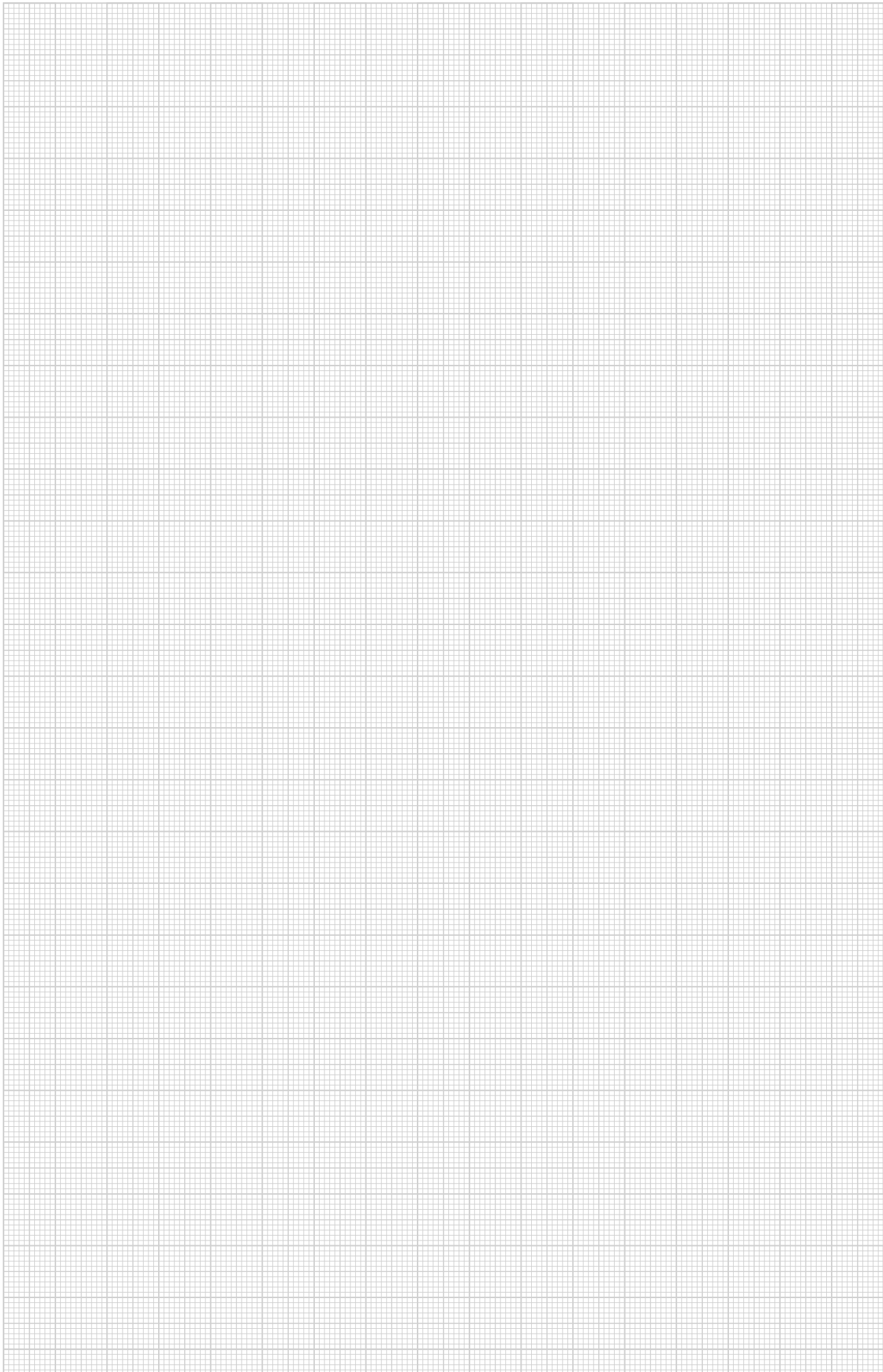
Practical connection solutions

We have the right connection solution for every connection type: Whether you are routing pre-terminated cables or conventional installation cables.

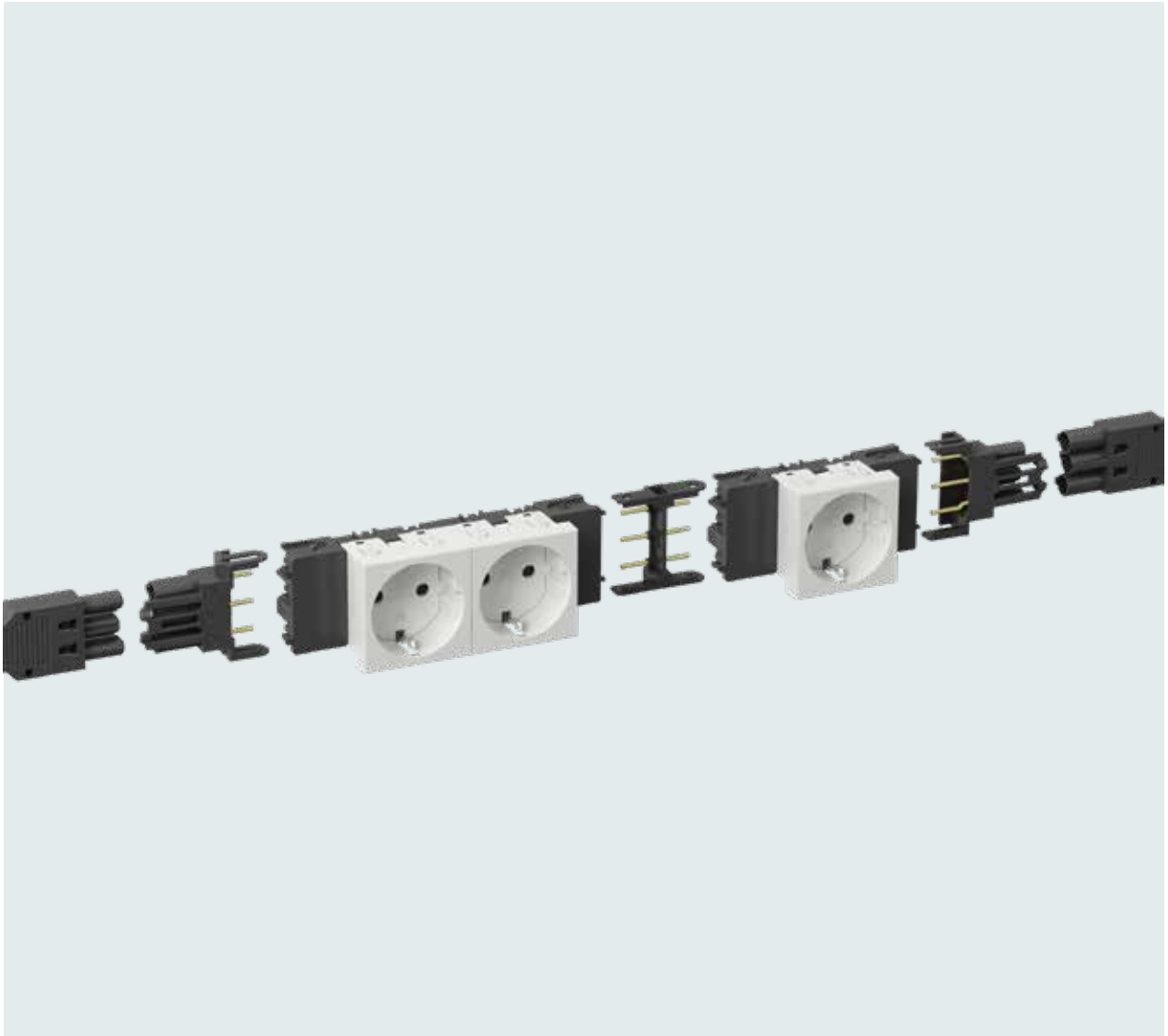
- Solder connection or screw connection for conventional cable connections
- Connection cable or 1:1 coupling to connect pre-terminated cables

Integrated dust protection

Integrated dust protection flaps cover the data connection modules when unused. They protect them against dust and other outside influences. During use of the data socket, the dust protection flaps are pushed upwards. After the connection cables have been removed, the dust protection flaps close again automatically.



System description



As continuously connectable installation technology, Modul 45connect® for device installation trunking and service poles offers the highest level of flexibility, security and cost efficiency.

From energy distribution through to device connection in the trunking, the system offers all the required installation components.

Modul 45connect® sockets + installation accessories

Modul 45connect® advantages

- Fast installation without the need for tools
- Direct mounting in the trunking – without additional components
- Safe installation through encoded connection technology

Sockets 0° for Rapid 45



Sockets 0° for Rapid 80



33° sockets for service poles



Device installation material for Rapid 80 and service poles



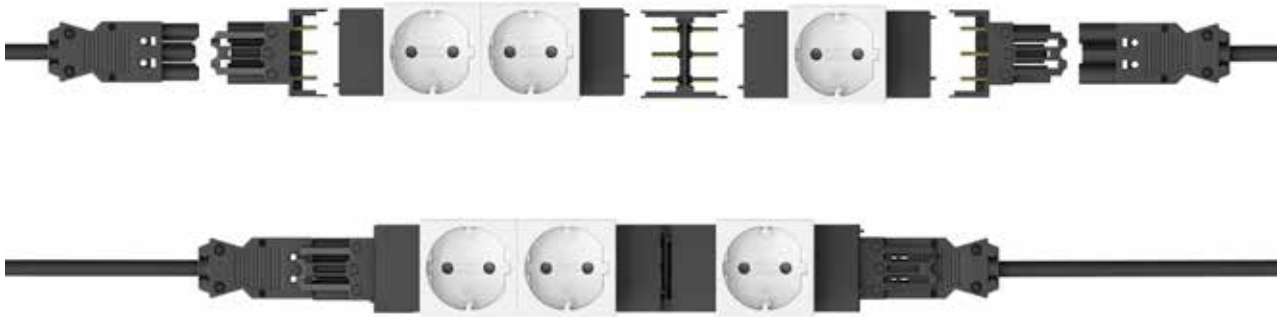
Connection adapters



Installation accessories and connection cables



Modul 45connect® in Rapid 45 trunking



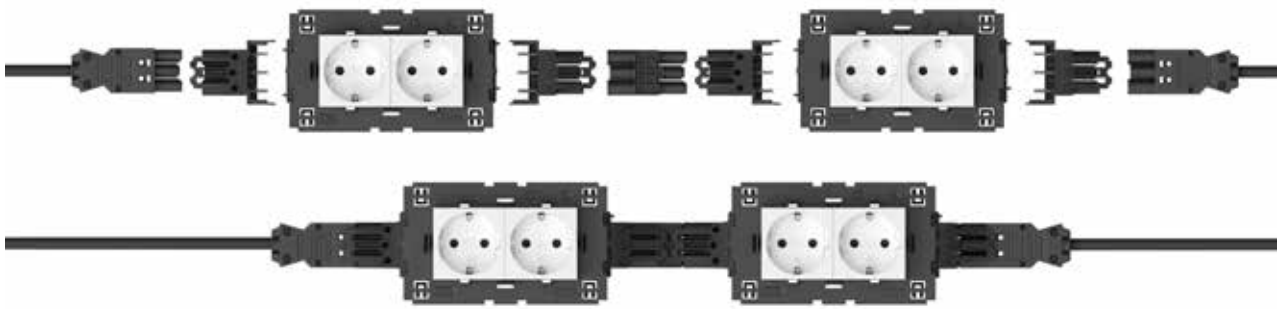
Device installation in Rapid 45 device installation trunking

Rapid 45 trunking is marked by a slender design. It is ideal for direct installation of the Modul 45® range for sockets, data and multimedia installations.

Sockets 0° – Connect 45

Modul 45connect® 0° sockets are inserted in Rapid 45 trunking with a front-side connection. This allows the tool-less installation of connected sockets in the trunking profile. Connection adapters with integrated strain relief are specially available for use in Rapid 45.

Modul 45connect® in Rapid 80 trunking



Device installation in Rapid 80 device installation trunking

Rapid 80 trunking offers large trunking openings for device installation and sufficient space for large cable volumes.

The Modul 45® product range for sockets, data and multimedia installation is installed in Rapid 80 trunking using accessory mounting boxes.

Sockets 0° – Connect 80

In Rapid 80, Connect 80 sockets are offered as a unit with an installation frame. The 0° Connect sockets are installed with connection adapters with integrated strain relief.

This allows continuous, plug-in installation technology – there is no need for the conventional connection of sockets.

Modul 45connect® in service poles

Service poles offer direct access to the installation technology at the workstation. Service poles with 45 and 80 mm installation openings are offered.

Sockets 33° – Connect 45

Modul 45connect® 33° sockets are inserted in service poles with a front-side connection. These 33° Connect sockets can be arranged without gaps using connection adapters. Connection adapters with integrated strain relief are available specially for use in service poles.



Energy distribution via consolidation point



Energy distribution via consolidation point

Consolidation points are positioned centrally in the false ceiling and allow the supply of multiple service poles from the ceiling.

This solution allows the distribution of power, data and multimedia.

Consolidation points offer a high level of flexibility and combination options for power, data and multimedia connections.

The electrical supply is possible via both the Modul 45® sockets and the plug connector systems. In the housing, cover hoods can be used to separate the different sockets and to separate the power and data technology.

Data and multimedia technology can be installed in the housing conventionally or with pre-terminated data cables.

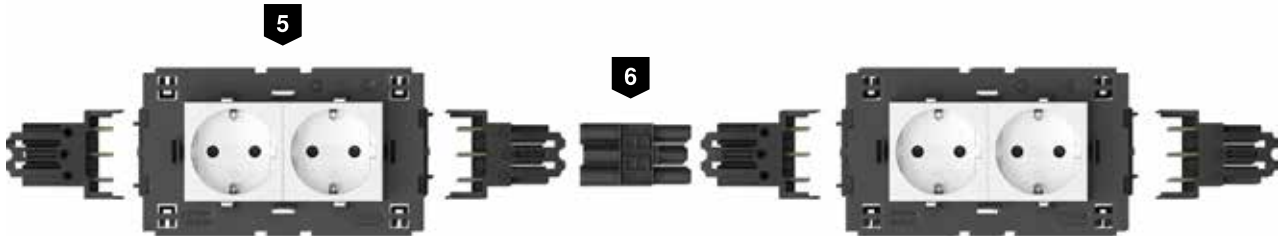


System components

Rapid 45



Rapid 80



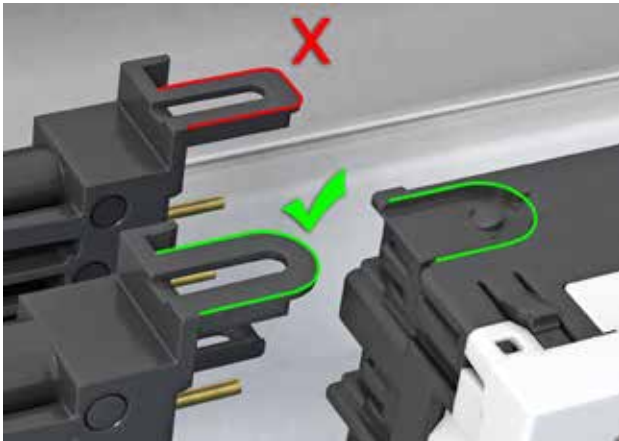
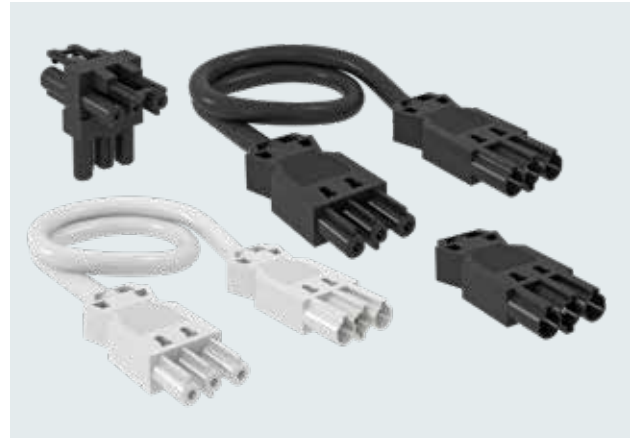
Service poles



- 1** Connector adapter GST18
- 2** 0° socket for Rapid 45
- 3** Connection adapter sockets
- 4** Socket section adapter GST18
- 5** 0° socket for Rapid 80
- 6** Connection adapter GST18
- 7** Socket 33° for service pole

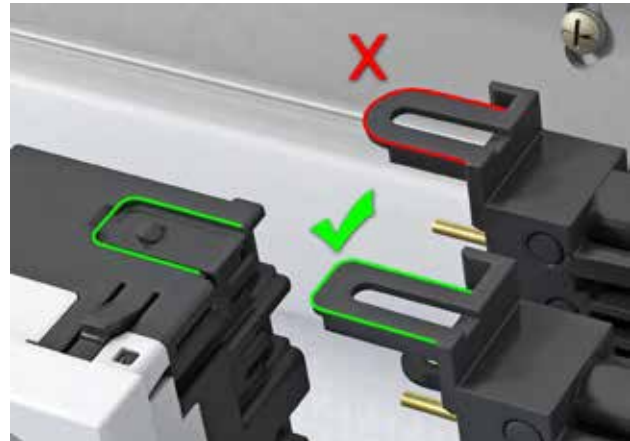
Plug connections

All the plug connections are equipped with the GST18i connector systems and strain relief. Black and white connectors and cable colours are suitable for labelling the different circuits. Connection cables with cross-sections of 1.5 mm² or 2.5 mm² and a wide range of plug connectors offer the right solution for every requirement.



Plug connection side coding

Before mounting the connector section adapter, check that the coding matches with the socket. Each socket has a plug connection side.



Socket connection side coding

Before mounting the socket section adapter, check that the coding matches with the socket. Each socket has a socket connection side.



Cost-aware

The efficient installation time and simple installation mean that Modul 45connect® sockets are a particularly economic solution.



Connection adapter GST18

The connection adapter VB-G GST18 allows the arrangement of sockets in the Rapid 80 trunking system and in ISS service poles.



MTU mounting support



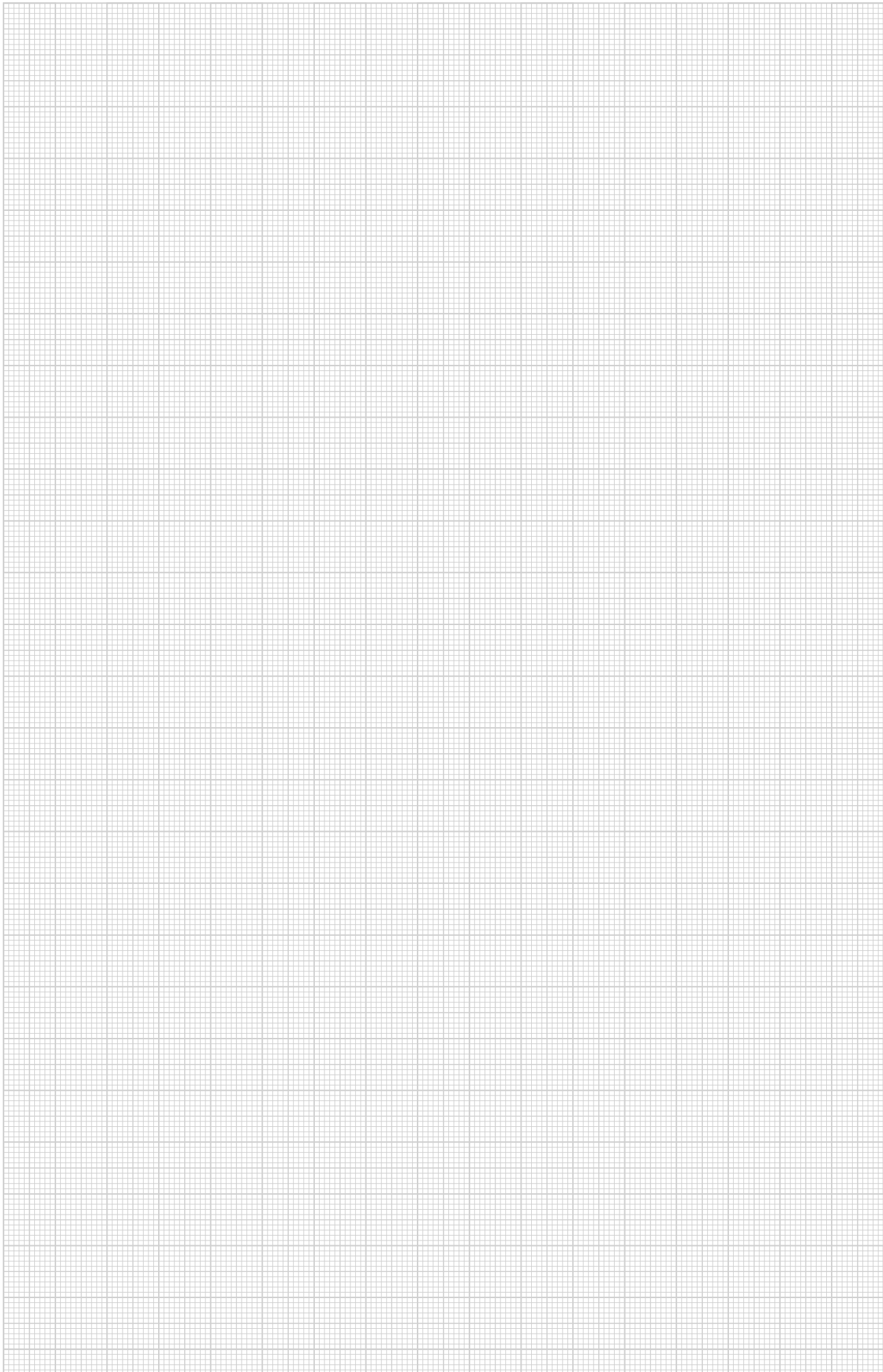
The MTU mounting support is designed to accommodate data and multimedia technology. Data connection modules of different sizes and fastening types, as well as multimedia components, can be installed more easily in the mounting support using the matching type MTM support plates. The required installation depth (floor structure height) is dependent on the installation components and is at least 80 mm.



A large choice of support plates is available to accept the different data and multimedia connection solutions.



The fastening slider on the mounting support ensures quick, secure installation of the mounting supports in the locking ladder of the device installation units.



OBO Bettermann Holding GmbH & Co. KG

P.O. Box 1120
58694 Menden
GERMANY

Customer Service

Tel.: +49 (0)23 73 89 - 17 00
Fax: +49 (0)23 73 89 - 12 38
export@obo.de

www.obo-bettermann.com

Building Connections

