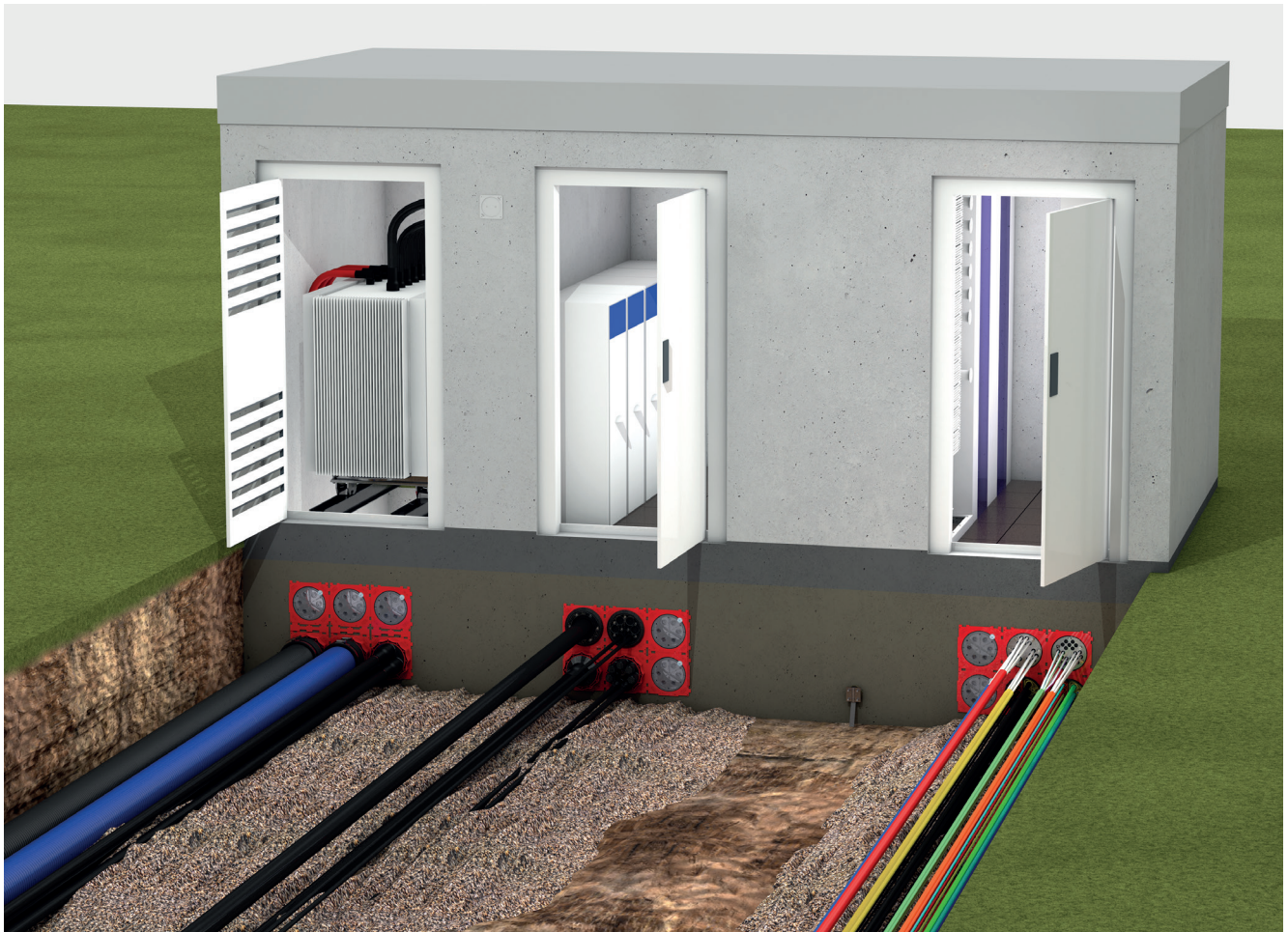


Always. Reliable. Tight.



CABLE ENTRIES, EARTHINGS AND PASSIVE NETWORK COMPONENTS

MULTI-TALENTED NETWORK STATION – THE TECHNICAL BUILDING FOR ELECTRICITY AND BROADBAND NETWORKS

CABLE ENTRIES AND EARTHINGS

YOUR BENEFITS



No moisture in the station

A sealed cable entry prevents water and moisture from entering the station building. This protects the technical equipment from corrosion while at the same time increasing operational safety.



No rodents or reptiles

A seal also serves a further protective function: unlike open breakthroughs, no rodents or reptiles are able to get inside the station. Damage caused by rodents, especially short circuits and power failures, can thus be avoided.



No oil leakage into groundwater/soil

According to the Water Resources Act (WHG), water-polluting substances such as transformer oil may not enter the ground or groundwater during the construction or operation of a plant. A cable entry retains the transformer oil escaping in the event of an accident, thereby contributing significantly to compliance with the requirements of the German Water Resources Act (WHG).

Transformer stations are an elementary component of the power supply network and power distribution.

In order to ensure trouble-free operation and high supply reliability in the long term, the transformer station with its sensitive technology requires protection from hazards. Cable entries are a key factor here.

In Germany, transformer stations have to comply with the following requirements, among others:

- DIN VDE 0101 (systems over 1,000 V)

For factory-built stations:

- DIN 62271-202 (high-voltage switchgear and switching systems part 202:
factory-built stations for high voltage/low voltage)

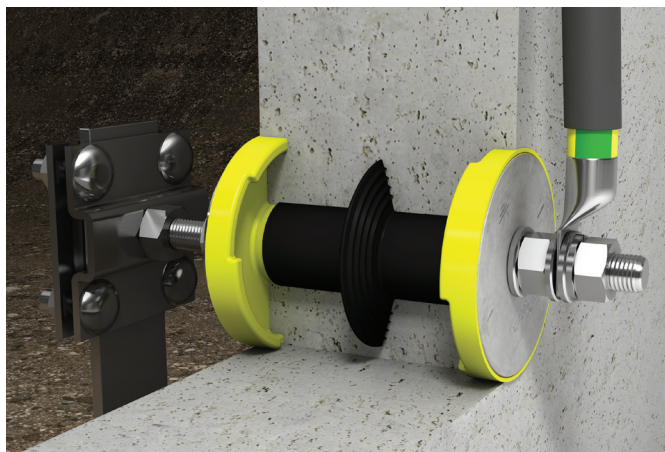
HAUFF-TECHNIK

Hauff-Technik is one of Europe's leading manufacturers of cable, pipe and house entries.

For over 60 years we have specialised in sealing cables in stations.

Our innovations protect buildings of almost all kinds from gas, penetrating water, dirt and vermin.

In the field of energy supply, Hauff-Technik sets the benchmark in such areas as cable entries for transformer stations.



Earthing entry HEA-IS-M12: on one side connection of a flat steel via cross-clamp Z-KG-M12 and on the other side connection of an earthing conductor via the connection bolt Z-B-M12.

PRESCRIBED PROTECTIVE EARTHINGS

The earthing includes all measures required to connect an electrical part to the earth.

It is an essential component in transformer stations, switching systems, substations, etc. A distinction is drawn here between protective, functional, operational and lightning earthing:



Multi-talented network station – the technical building for electricity and broadband networks

GROUNDING AND GLASS FIBRE

- **Protective earthing** provides a safe connection to the ground to protect people (and animals) from dangerously high touch voltages if a fault occurs. The VDE 0100-540 standard describes the requirements for equipotential bonding in detail. The relevant specifications for foundation earth electrodes are contained in DIN 18014.
- **Functional earthing** is used to safely operate the electrical equipment of the station. Functional earthing is used to safely discharge residual currents.
- In switching systems, **operational earthing** is mainly used

to ensure trouble-free operation of the system.

The standard DIN EN 50522 (VDE 0101-2):2011-11 provides precise specifications for system protection against short circuits above 1 kV (max. temperature and no damage to the connection and the concrete structure).

- **Lightning protection earthing** is used to safely discharge lightning currents into the ground in order to protect people, animals and buildings. DIN EN 62305-3 (VDE 0185-305-3):2011-10 regulated.

OUR SOLUTIONS

With the earthing entries and earthing fixed points by Hauff-Technik, earthing conductors can be run in secure, leakproof fashion through the station walls or connected to the reinforcement. Via the connection thread (M12 or M16) round or flat steels/ring earth electrodes can be connected with connection bolts, cable shoes or flaps or with cross clamps.

The insulated earthing entry HEA-IS-M12/X by Hauff-Technik is particularly suitable for station construction and also serves as an optional measuring isolation point for the earthing system. The function of the ring earth electrode outside the station can be checked separately via the insulated earthing entry.

When carrying out the internal earthing to the external earthing system, country-specific features must be taken into account. Our wide product range offers tested solutions for a wide variety of applications. Please contact us regarding your application.



ZWEICOM-HAUFF

ZweiCom was founded in 2005 and has become the preferred specialist for fibre-to-the-home components thanks to its innovative strength and intelligent, high-quality solutions. These include products that are crucial in terms of the quality and performance of a fibre optic network: optical main distributors, multifunctional housings, splice sleeves and junction boxes.

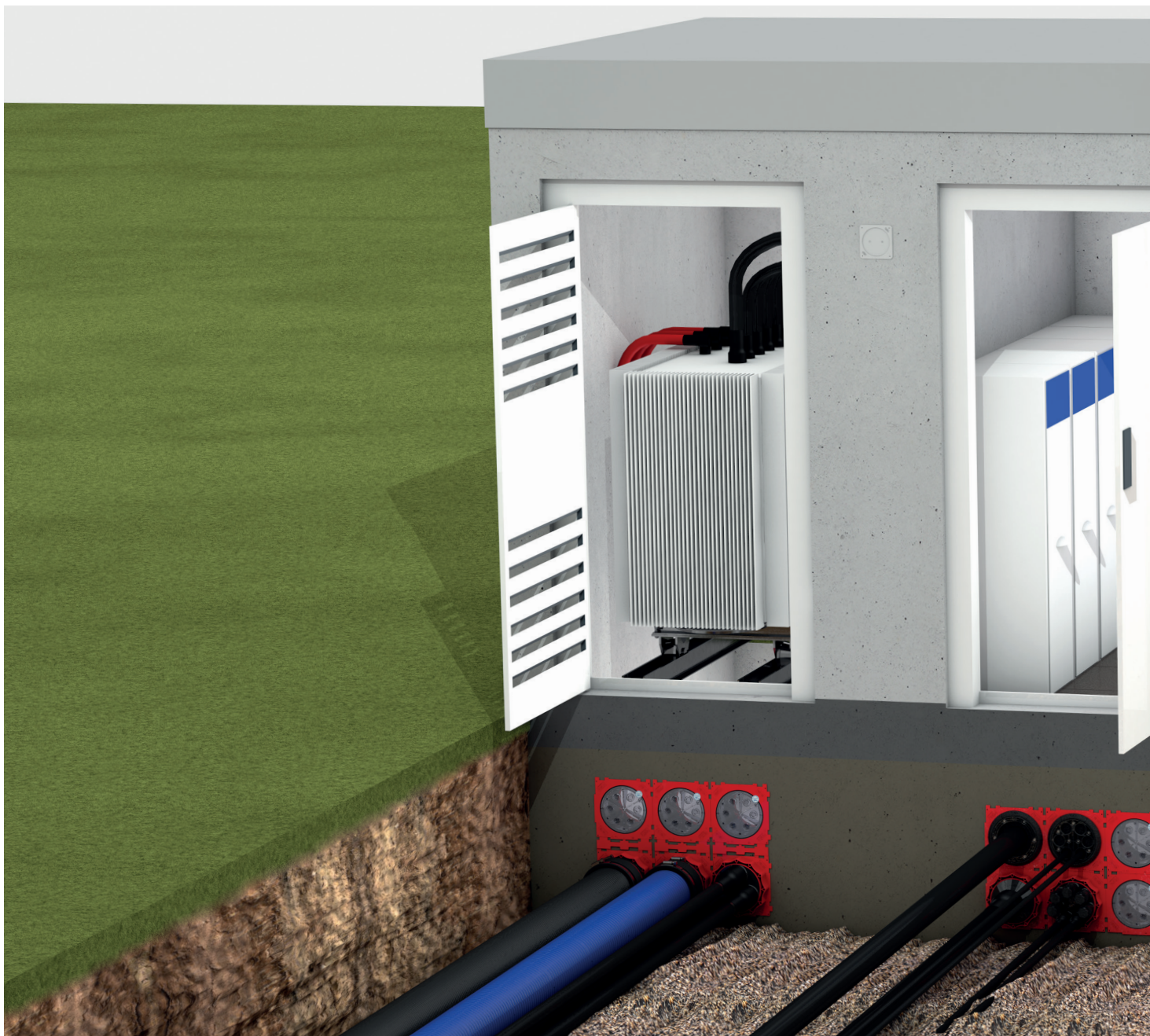
With the foundation of the new joint venture company ZweiCom-Hauff, innovative strength and a high level of consultation expertise has been brought together above and beyond each company's respective product portfolio. Joint customers thus receive clear added value and benefit from comprehensive overall solutions.

The focus of ZweiCom-Hauff is primarily on the industrial prefabrication of components for fibre optic installation. From the POP station to the wall outlet box, ZweiCom-Hauff offers the complete portfolio of network components. This results in faster installation times in the field as well as increasing the quality of your network. At the customer's request, ZweiCom-Hauff products can be delivered to the installation site ready for connection.

- Top-quality, high-performance components for fibre optic networks.
- Complete, pre-assembled solutions to save time and money.
- Fast write-off due to trouble-free use – even over many years.
- Individual consultation and fast logistics services.

Application example

NETWORK STATIONS



Connection example: Connection of a rigid or flexible cable duct (Hateflex 14150) via an HSI 150 system cover with sleeve. Sealing of the medium voltage cables with a HSI 150-D3/58. Connection of a ring earth electrode to the insulated earthing entry HEA-IS-M12.

With the advancement of broadband expansion and e-mobility, new station concepts are becoming increasingly important. Accessible stations are becoming more and more important. As a multi-talent, the classic network station can be used in a variety of ways. As broadband becomes more widespread and electrification spreads with more and more e-charging stations, new station concepts will have to be developed in the future. The trend is increasingly towards technology buildings with multiple uses.

Different applications can be integrated within a technology building. In addition to the classic accommodation of trans-

formers, switching systems and inverters, fibre-optic distribution cabinets and components for management of electrical charging stations will increasingly be incorporated in stations in future.

The new components of a network station are integrated control and regulation technology for the management of e-charging stations and distributors for fibre optic installation.

The network station manages to accommodate all components within a building in relatively little space. The individual functional areas are spatially separated from each other, ensur-



Various solutions for sealing control and signal cables as well as low-voltage cables (HSI 150-D7/33 or HSI 150-DG-6/10-36). Use of HSI Segmento or special standard press seals for sealing microtubes.

ing smooth operation of the station. The station of the future offers the advantages of compact design while still meeting the need for maximum functionality and flexibility. Walk-in stations offer the advantage that the operation and maintenance of the systems inside the building can be carried out regardless of the weather. In addition, spatial separation allows separate access to and maintenance of the individual functional areas.

The HSI 150 cable entry sets the standard here with the single wall insert HSI 150-K and the double wall insert HSI 150-K2. From a wall thickness of 100 mm, the HSI 150-K2 double seal insert enables pressure-tight cable duct connection and sealing

at the same time.

Due to the empty conduit connection of a smooth or corrugated cable duct and the flexible cable entry system KES-M150, subsequent groundwork directly in front of the building is no longer necessary when replacing cables or laying new cables, thereby also preventing potential cable damage. Heat shrink technology, split system covers and Segmento are available for cable sealing, for example.

Cable entries HSI 150

WALL INSERTS

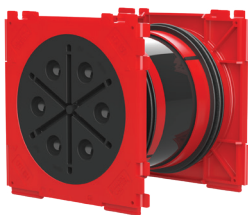
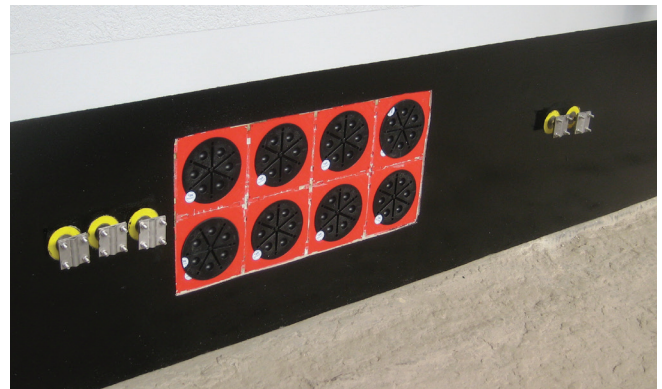
The cable entry HSI 150 is concreted into the prefabricated concrete during the construction of the station building. The square connection frame allows packages of any size to be formed. Tightness to the concrete is achieved by means of 3-ribbed seals made of thermoplastic elastomer (TPE). A quality seal guaranteeing tightness of the closing cover when intact is located under the protective film.

Various system covers or system seals are available for sealing to the cable or cable duct which are connected via the integrated bayonet system. All cable entries are supplied in a pressurized state and closed with closing covers.



Single wall insert HSI 150-K/X with one-sided connection option on the outside of the building

The single wall inserts are preferentially used in non-walk-in stations for cable sealing. The minimum wall thickness is 70 mm. In addition to the pressure-tight closing cover, single wall inserts are also equipped with a safety cover that is not removed until just before the cable is laid. This double security ensures additional protection from water ingress if the cover is opened accidentally.



Double wall insert HSI 150-K2/X with connection options on both sides for cable ducts and cables

Double wall inserts are preferentially used in walk-in stations. The minimum wall thickness is 100 mm. They are equipped ex works with pressure-tight closing covers with bayonet system on both sides. Double wall inserts offer the option of connecting cable ducts and sealing them in addition to the cable, for example.



Cable entries HSI 150

WALL INSERTS AND PLASTIC FLANGE



Single wall insert HSI 150-GSM with plug-in socket.

The single wall insert with plug-in socket is an extremely economical and technologically sophisticated solution for the pressure-tight connection of smooth cable ducts.

(Ø 110, 125 or 160 mm).

With the factory pre-assembled closing cover, the HSI 150-GSM is sealed pressure-tight, even after connection of the cable duct. On the inside of the building, the cable should preferably be sealed with split system seals after the cable has been laid.



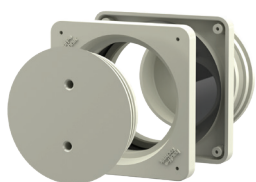
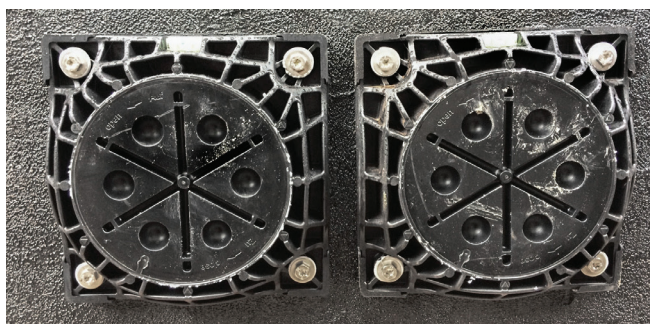
Plastic flange HSI 150-DFK

for subsequent mounting on sheet steel, sheet metal housings or concreted walls

Tightness to the wall is achieved by a 6 mm thick overlapping surface seal made of EPDM. The fastening elements are made of high-quality stainless steel including sealing washer.

An integrated spirit level simplifies horizontal alignment.

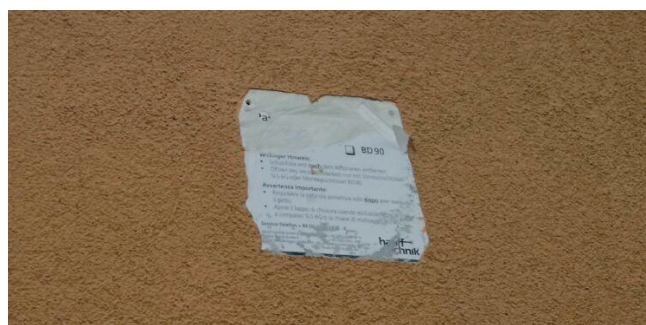
All system lids and system seals of the HSI 150 range can be installed.



BD 90 or BD 68 site power supply for temporary power supply

With the site power supply entry, cables can be fed into the substation above ground on a temporary basis. The doors of the station can be closed.

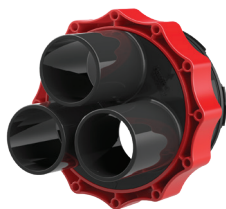
When not being used, the site power supply is closed by means of screw caps on both sides. On the inside of the station, the optionally available site power supply cover provides additional protection from vandalism and rodents.



Cable entries HSI 150

SYSTEM COVER

System covers or system seals are inserted into the single and double wall inserts that have already been embedded in concrete or subsequently mounted plastic or aluminium flanges.



System cover HSI 150, shrink-fit method

The system covers with bayonet system are installed in the wall inserts before the cables are laid. System covers HSI 150-D1/80, HSI 150-D3/58 and HSI 150-D7/33 are available for cable sealing, depending on requirements.

Hot or cold shrink sleeves are included.

Unused sockets are sealed using VS sealing plugs.



Split system cover HSI 150-DG

The HSI 150-DG system cover is installed after the cable has been laid. This means that the entire cable entry space is available for laying cables.

An adapter ring, which is also split, ensures optimum sealing fit. Thanks to the patented super segmented ring technology with precisely labelled application areas, the seal insert can be adapted on site according to the cables being laid.

Four variants are available for applications ranging from 10 – 112 mm.



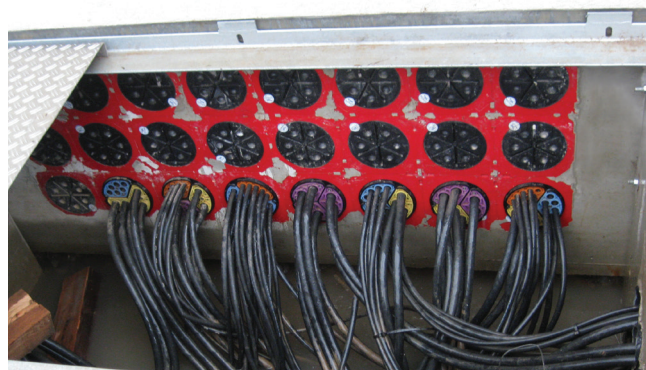
Cable entries HSI 150

SYSTEM COVER



SEGMENTO for sealing control and communication cables

With the sealing material Technogel used by Segmento, cables can be sealed in particularly low-impact fashion. There are four segments in the application range 5 – 31 mm which can be mounted in any combination in the system cover HSI 150-S3. Retrofitting is very straightforward. All segments are supplied with blind plugs.



HRD 150 press seal for microtubes / empty conduits

The special HRD press seals allow different bracings of microtubes or empty conduits to be run into the building and sealed. Predefined standard seals are available for applications ranging from 10 – 50 mm, adapted to the grouping of microtubes/empty conduits. These are preferentially used in the wall insert HSI 150 in combination with split adapter ring HSI 150-ARG.



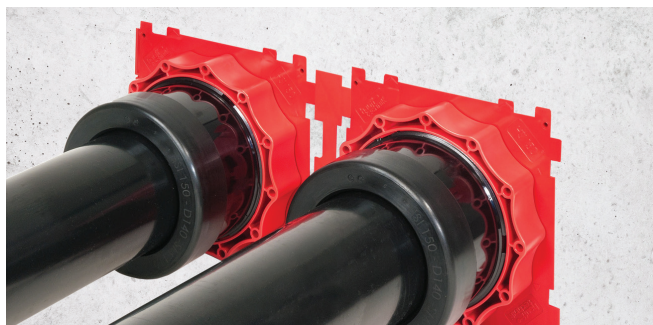
SYSTEM COVERS AND CABLE ENTRY SYSTEMS



HSI 150-D-GSM for connecting smooth cable ducts with plug-in socket

The system cover allows smooth cable ducts to be connected with an exterior diameter of 110, 125 or 160 mm.

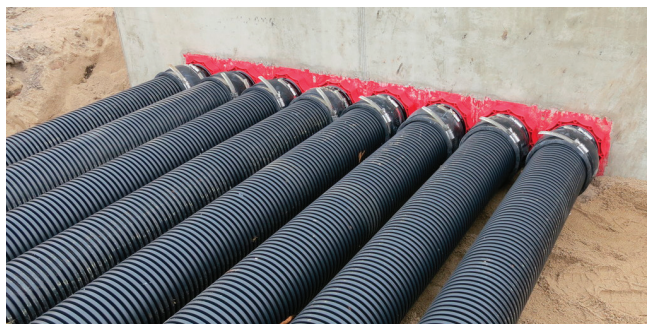
Simple and quick installation using plug-in technology.



HSI 150-M for connecting smooth or corrugated cable ducts

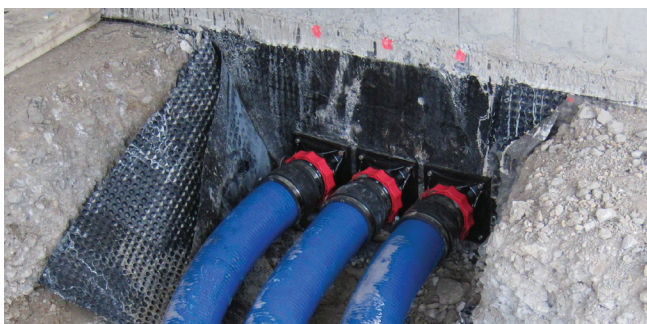
The system cover allows smooth or corrugated cable ducts to be connected with an exterior diameter of 110, 125 or 160 mm.

The pipe connection is made via an elastic and stable rubber sleeve, which is fitted with stainless steel straps against the system cover and the cable duct.

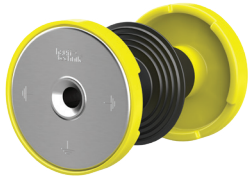


Cable entry system KE5-M 150

The flexible and robust 14150 spiral hose is connected gastight and watertight (2.5 bar) by means of a system cover with sleeve method. A number of different sealing variants are available with shrink-fit and sleeve method.



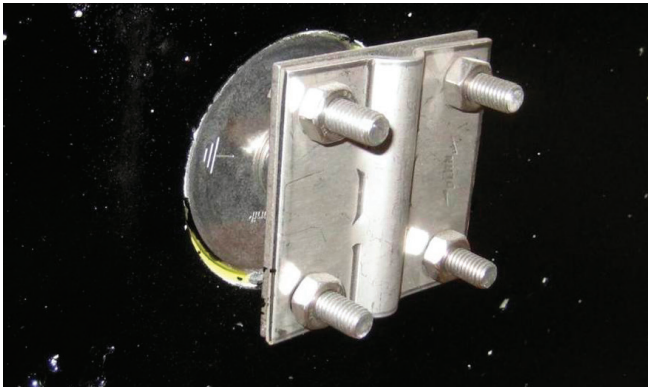
Earthing HEA EARTHINGS



Insulated earthing entry HEA-IS-M12

The insulated earthing entry by Hauff-Technik is particularly suitable for station construction. and, among other things, also serves as an optional measuring isolation point for the earthing system.

The function of the ring earth electrode outside the station can be checked separately via the insulated earthing entries. Round or flat steels or cable shoes can be connected via cross-clamps or connection bolts. Successful short-circuit test according to DIN EN 50522 (VDE 0101-2):2011-11



Earthing fixed point HEA-A-M12 for welding to core iron on the station building

The earthing fixed point for station construction can be used for equipotential bonding and earthing the transformer station. With the conductor core made of corrosion-resistant stainless steel V2A (AISI 304L), the connection point of the station earthing can be installed inside or outside. Due to the black-and-white transition and the practical connection groove, the core iron can be welded on without changing the material. Suitable for distances between formwork and core iron of 50 or 70 mm.

Successful short-circuit test according to DIN EN 50522 (VDE 0101-2):2011-11.



2LINE ODF ST



2Line ODF ST – optical distribution rack

The optical distribution racks 2Line ODF ST and ODF HD consist of a solid welded structure and offer a wide range of mounting and installation options without additional accessories. Due to its modular construction, our system offers maximum flexibility in terms of cable entry and cable stabilization and can also be fitted with various splice and patch modules.

Exemplary patch cable management is ensured with up to 2,600 patch cables when fully fitted, including excellent accessibility and feed-in via combs to suit bending radii. Available ex works, the distribution system saves cost and space, halving on-site assembly costs.

Capacity of up to 2,016 fibres.



2LINE ODF ST				
Article	Dimensions (mm) H x B x D	Capacity max.	Article code	Article number
Welded sheet metal construction, galvanised and powder-coated RAL 7035	2200 x 900 x 300	42HE/2016	2Line ODF 220 HD	20031
	2200 x 900 x 300	33HE/1584	2Line ODF 180 HD	20032

Basic cabinets

2LINE ODF 220 HD

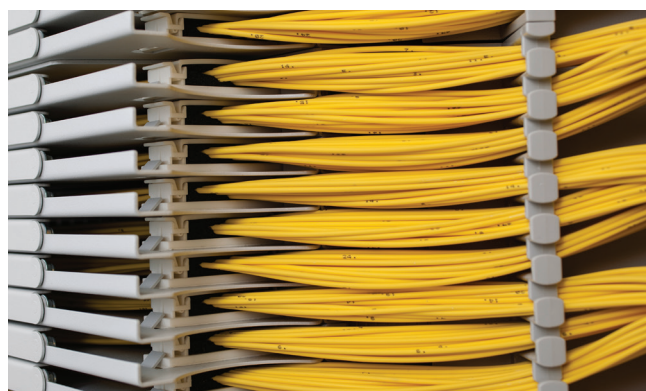
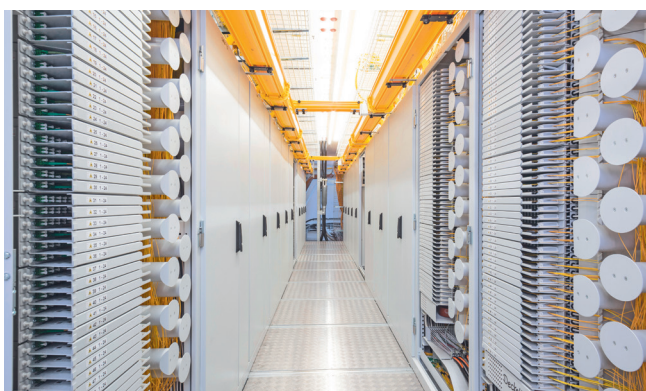


ODF HD – optical distribution rack

The optical distribution racks 2Line ODF ST and ODF HD consist of a solid welded structure and offer a wide range of mounting and installation options without additional accessories. Due to its modular construction, our system offers maximum flexibility in terms of cable entry and cable stabilization and can also be fitted with various splice and patch modules.

Exemplary patch cable management is ensured with up to 2,600 patch cables when fully fitted, including excellent accessibility and feed-in via combs to suit bending radii. Available ex works, the distribution system saves cost and space, halving on-site assembly costs.

Capacity of up to 2,592 fibres.



2LINE ODF 220 HD


Article	Dimensions (mm) H x B x D	Capacity max.	Article code	Article number
Welded sheet metal construction, galvanised and powder-coated RAL 7035	2200 x 900 x 300	42U / 2592Ports	2Line ODF 220 HD	20000
	1800 x 900 x 300	33HE / 2160Ports	2Line ODF 180 HD	20001

SELECTING THE CORRECT CABLE SEAL

Seal variant	Article code	Article number	Application range	Split, subsequent installation	Cable types					Transformer oil resistant
					Medium voltage, single-core	Medium voltage, multi-core	Low voltage, single-core	Low voltage, multi-core (energy cable)	Control lines communication	
Split system cover 	HSI 150-DG 1/70-112	2102200030	1x70-112	✓		+				✓
	HSI 150-DG 1/36-70	2102200020	1x36-70	✓		+		+		✓
	HSI 150-DG 3/24-54	2102200000	3x24-54	✓	+		+	+	+	✓
	HSI 150-DG 6/10-36	2102200010	6x10-36	✓			+		+	✓
System cover warm shrink-fit method 	HSI 150-D1/80	2101100010	1x25-78			+		+		✓
	HSI 150-D3/58	2101100049	3x22-56		+		+	+	+	✓
	HSI 150-D7/33	2101100059	7x12-31				+		+	✓


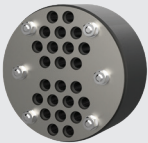
+ particularly well suited

ACCESSORIES

Article	Article code	Article number	Figure
To close empty plugs			
Sealing plug for system cover HSI 150-D7/33 (available as single unit or packing unit = 10x)	VS 32/34	2140403234	
Sealing plug for system cover HSI 150-D3/58 (available as single unit or packing unit = 10x)	VS 58/60	2140405860	

System cover for cables and press seals



SELECTING THE CORRECT CABLE SEAL

Seal variant	Article code	Article number	Application range	Split, subsequent installation	Cable types					Transformer oil resistant	Microtubes/empty conduits
					Medium voltage, single-core	Medium voltage, multi-core	Low voltage, single-core	Low voltage, multi-core (energy cable)	Control lines communication		
System cover Segmento 	SEG 2/31	2300130000	2x20-31						+		+
	SEG 3/26	2300140000	3x20-26						+		+
	SEG 6/21	2300150000	6x15-21						+		+
	SEG 8/15	2300160000	8x5-15						+		+
Press seal for microtubes/empty conduits  z.B. HRD 150-2-24/10	HRD 150-2-24/10*	2703270012	2x 12/10								+
	HRD 150-2-15/14*	2703270013	3x 5/14								+
	HRD 150-2-21/14*	2703270014	3x 7/14								+
	HRD 150-2-14/16*	2703270011	2x 7/16								+
	HRD 150-2-12/20*	2703270010	3x 4/20								+
	HRD 150-2-4/50*	2703270009	4x 1/50								+

+ particularly well suited

* without blind plugs. Additional variants on request.

ACCESSORIES

Article	Article code	Article number	Figure
Adapter ring for insertion in the HSI 150 wall insert	Adapter ring HSI 150-ARG - 150-SG	2700107008	
Blind plug for unused openings	Blind plug 10	0903580050	
	Blind plug 14	0903580054	
	Blind plug 16	0903580051	
	Blind plug 20	0903580052	
	Blind plug 50	0903580053	

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