Instructions on Protecting Cables

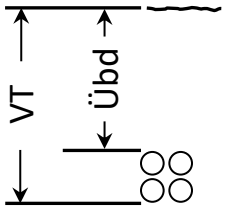
Instructions on protecting buried telecommunications cables belonging to Telekom Deutschland GmbH when work is being carried out by third parties

Produced and issued by Telekom Deutschland GmbH

Telecommunications cables as part of Telekom Deutschland GmbH's telecommunications network include all under- or above-ground telecommunications cable installations, including any related control and cross-connection points, masts and supports, cable shafts and cable duct pipelines, and other technical installations required for the purpose of providing public telecommunications services (Article 3 (64) TKG [German Telecommunications Act]).Underground telecommunications cables can easily be damaged when work is being carried out either on or under the ground in their vicinity. If they are damaged, the important telecommunications service provided by Telekom Deutschland GmbH for the public will be severely affected. Damage to telecommunications cables is punishable under Article 317 of the StGB. (German Criminal Code), including if it is the result of negligence. Furthermore, the person responsible for causing the damage will have to compensate Telekom Deutschland GmbH, accordingly. It is therefore in the interest of everyone who carries out such work to exercise extreme care, and, in particular, to comply strictly with the following rules, in order to prevent the occurrence of any damage.

1. There is always the danger that telecommunications cables belonging to Telekom Deutschland GmbH will be damaged when any type of work is being carried out on or under the ground. This applies in particular to digging, paving and surfacing work, boring, excavating, the erecting of masts and poles, pile-driving, drilling, and spiking.

2. Telecommunications cables belonging to Telekom Deutschland GmbH are not just found on or along public traf-fic routes; they also run through private property (such as, for example, fields, meadows, woods, private proper-ties). Telecommunications cables are normally installed on a trench bottom (installation depth) at 40 cm to 100 cm. With new cabling techniques such as trenching or other cabling processes (see page 7), telecommunications lines are also laid at depths starting at 7 cm.



However, positions in depth for telecommunications cables may vary due to crossings with other systems, subsequent changes to the surface cover as part of roadworks/streetworks and the like, or other reasons. Cables may run through conduits; they may be covered with a protective layer of clay or building stones or something similar; they may be marked with route warning tape made of plastic or by electronic markers; or they may be laid loosely in the ground. Conduits, covering, and route warning tape made of plastic do not, however, protect telecommunications cables against mechanical damage. They are merely intended to draw the attention of anyone carrying out excavation work that there are telecommunications cables nearby. (That is to say, they simply serve as a warning.)

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If telecommunications cables[1] belonging to Telekom Deutschland GmbH are damaged, the life of anyone coming into contact with them may be put at risk.

If, however, telecommunications cables belonging to Telekom Deutschland GmbH have an insulating outer cover and are undamaged, they pose no risk along their route.

Ground electrodes and unearthed cables (cables with a metallic outer cover) can be particularly dangerous during thunderstorms. Under DIN VDE (Association of German Electrical Engineers) 0105 Part 100, section 6.1.3 *Weather Conditions*, work on such installations must be suspended during a thunderstorm.

Optical fiber cables are marked with a  symbol on their outer cover. Anyone looking into the optical fiber may suffer damage to the eyes.

Whenever telecommunications cables are damaged, the following rule must be followed:
All workers must leave the danger area where the cable is damaged, and Telekom Deutschland GmbH must be informed without delay by the fastest possible means, so that the damage can be eliminated.

3. Before work of the type mentioned in paragraph 1 is started on or under the ground, therefore, steps must be taken to establish whether there are any telecommunications cables belonging to Telekom Deutschland GmbH in the vicinity that could be damaged by the work being carried out at the site. If there are, their position must be confirmed. This can be done either by going to https://trassenauskunftkabel.telekom.de on the Internet, or by checking with the branch office (phone: 0800/3301000) that is responsible for the cable network concerned.

The design of the telecommunications cables is partially free from metal and provided with electronic markers. These markers (frequencies of the passive oscillating circuits according to 3M industrial standard 101.4 kHz) are also shown in the layout plan as  and can be safely localized with appropriate commercial detectors.

4. If there are telecommunications cables belonging to Telekom Deutschland GmbH, and the planning documents are obviously incorrect or incomplete, illegible or misleading, or if the plan excerpt does not contain any information at all, neither a plan background nor visible routes, in the area of the worksite, the responsible branch office must be informed in writing well in advance that the work is going to be carried out. In urgent cases, the information must be passed by telephone. If necessary, a representative can then be sent to the site so that further details about the position of the cables or installations can be provided.

5. If telecommunications cables belonging to Telekom Deutschland GmbH are unintentionally exposed and/or damaged, the branch office concerned must be informed without delay by the fastest possible means.
If a direct contact is not known, damage can also be reported via the “Trassen Defender” app (available in the Google Playstore and Apple Store), online at https://trassenauskunftkabel.telekom.de „Kabelschaden melden“, or under 0800/3301000
Exposed telecommunications cables must be made safe, and they must be protected from damage and theft. The excavation work being carried out at a site where there are exposed cables must be suspended until a representative of Deutsche Telekom arrives.

[1] The following types of cable are used:
- Telephone cables
- Telephone cables with remote power feed
- Cables (power cables) that supply remote equipment with power

6. When work is being carried out in the vicinity of buried telecommunications cables, pointed or sharp tools (such as drills, pickaxes, spades, and crowbars) must only be used if steps are taken to ensure that they can only penetrate the ground to a depth of no more than ten centimeters above the telecommunications cable in question. Blunt implements, such as shovels, must be used for any further work. They must be used with care, and they must be kept as close to the horizontal as possible. Pointed implements (such as spikes and stakes) must only be driven into the ground above telecommunications cables if they have a permanent fixed plate or crossbar to prevent a too deep penetration and thus safely exclude a damage of the telecommunications cables. The position may vary, and groups of cable conduits may be wider than expected. For this reason, the same rules must be applied fifty centimeters to the right and left of the telecommunications cables. When mechanical building equipment is being used in the vicinity of telecommunications cables, care must be taken to ensure that it is kept at a safe distance from the telecommunications cables so that they cannot be damaged. Special care must be taken if the position or the depth is not known. If necessary, a cross-section must be carefully cut out so that the route of the telecommunications cables can be determined.

7. In trenches where cables have been exposed, the earth must first of all be replaced to no more than the height of the cable support, and it must then be firmly tamped down. When this is being done, care must be taken to ensure that the cable support is smooth and free of stones. The cables must then be covered with ten centimeters of loose earth that is free of stones, and this must also be tamped down. The tamping must be done very carefully, and wooden tampers must be used to begin with. If the earth that has been excavated is not suitable for filling in the trench, sand must be used instead. Cables can be easily damaged if stony ground immediately above them is tamped down.

8. When water ducts around which telecommunications cables are laid are being cleaned, the equipment must be used with care so as to ensure that the telecommunications cables are not damaged.

9. Any person or firm carrying out excavation work must take all necessary care. In particular, temporary staff drafted in to help with the work must be fully instructed and briefed in order to avert the risk of damage to telecommunications cables that is always present during excavation work. Only in this way will they be able to avoid having to pay compensation for damage.

10. The fact that a representative of Telekom Deutschland GmbH is present at the excavation site will not affect the responsibility of those carrying out the excavation for any damage they have caused to telecommunications cables belonging to Telekom Deutschland GmbH. The representative of Telekom Deutschland GmbH will have no authority to issue instructions to the employees of the firm carrying out the excavation work.

11. Please note that subsequent building work may change the depth at which the telecommunications cables are laid. Large deviations in the position of the cables must be expected in the area of connecting sleeves, duct interruptions and cable groups. Special attention has to be paid to the area of cable entries from multi-function casing, cable branching devices and other distribution units.

12. Deviations in the location of measurements outlined in the plan extract may occur. Measurements provided in as-completed plans relate to the time of installation. Persons performing building work must take into account any changes to reference points or building lines made in the interim.

Symbols and abbreviations used in the Telekom Deutschland GmbH ground plans

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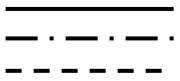
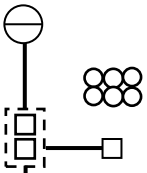


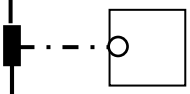
Cable pipeline routes with minimum one pipe
Cable routes; all cables buried
Overhead lines



Operational building

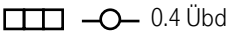
Group of cable conduits made of 2*3 cable ducts (external diameter of the cable ducts 110 mm)
Cable shaft with 2 manholes
Cable shaft with 1 manhole

Cable duct made of purpose-made cable duct tiles, with 2 air vents



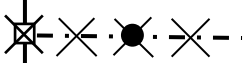
Junction box with buried cable to the APL line termination point in the building

Cross-section of the telecommunications installation along a route:
In this case: 2 buried cables and 4 plastic conduits (external diameter 40 mm) and a 7x12 SNRV



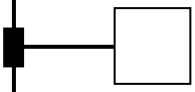
In this case: 3 purpose-made concrete tiles and 1 double steel half pipe with a depth of cover (Übd) of 0.4 m

Breakpoint in the conduit



Part of a disused cable shaft remaining in the ground, with buried cable not in operation and disused junction

Breakpoint in the conduit bridged with half conduits or screw-clamp fittings



Junction box / underfloor container with empty cable duct leading to the house

Cable shaft, closed / cable shaft, closed and electrically protected

Cable fanouts / glass fiber power distributor s/ feeding points 230VAC

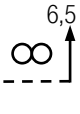
End of conduit, start of buried cabling

T-joint with buried cable to the telephone cabin, booth, hood, pillar, tele-station

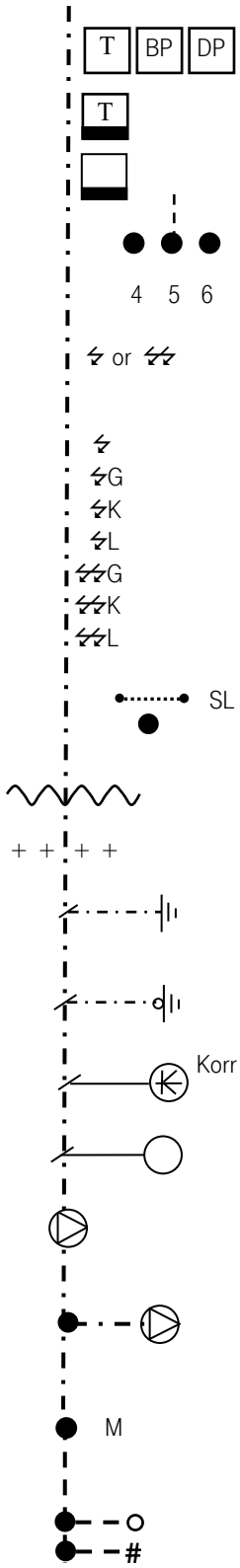
Telekom cable laid straight in the ground; covered
- with building tiles or cover plates, (may also have a double cover)

- with cable cover

- two cables with yellow route warning tape



Two cable conduits made of plastic, steel, galvanized steel, or concrete;
6.5 m in length from the broken line in the direction of the arrow



Cable tag (made of plastic) or marking stone (made of concrete)

Cable tag with electronic marker

Electronic marker without cable marker (buried)

A broken line marking the axis used as a reference for all measurements showing the distance to
the group of cables (cables no. 4 to 6).

Warning of danger from remote feed if the limit given in VDE 800, Part 3 is exceeded, and local feed with 230 V(AC)/400V(DC)
Hazard due to
operating voltage
Short-term influence by thunderstorms
Short-term influence from electr. Energy systems < 3 seconds
Long-term influence from electrical energy systems ≥3 seconds
Operating voltage, and short-term influence by thunderstorms
Operating voltage and short-term influence from electr. Energy systems < 3 seconds
Operating voltage, long-term influence and possibly short-term influence

Screen conductor over buried cable

- Non-Telekom power cable / non-Telekom telephone cable (+text)

- Pipeline for liquids or gases (gas, water, oil, or district heating)

Ground electrode made of copper rope / galvanized steel wire used as surface ground electrode

Surface ground electrode with terminating deep ground electrode (ground rod)

Device to protect against corrosion / potential measuring or balance point in terminal distributor pillar

Buried cable measuring point

Trough sleeve connected by branch cable with intermediate regenerator in direct proximity to a sleeve / an amplifier housing

Sleeve with a trough sleeve connected by branch cable with intermediate regenerator in a distance of >2m to a sleeve

Pole, start of the overhead line

Terminal point of the line network copper
Glass fibre terminal point (GF TP)

Buried cables or outer pipes laid in this section of route were laid before 1946 or the date the cabling was laid is unknown.

Instructions for reading the planning documents

Telecommunications cables are shown as unifilar representation in the layout plan. The actual scope of the system is specified in the cross section plan.

Planning information must be obtained in an appropriate scale. All details contained within this planning information (dimensions, route cross-sections, etc.) must be clearly recognisable and legible.

Only measurements outlined in plans (not drawings!) provide an indication of the location of depicted telecommunications cables (please note: drawings are **not** to scale). Lining-up on groups of cable ducts refers to the middle of the cable shaft covering. All measurements are in meters.

Places where power cables and pipelines intersect or join have only been shown if they were found during work on the telecommunications cables, or if they become known later in some other way.

Surface characteristics and their abbreviations can be found in DIN 18 702 “Symbols for survey sketches, large-scale maps, and plans”.

If no information on the type of installation and the laying depth or depth of cover is stored on the route sections, the instructions shall apply in accordance with paragraph 2.
If the information deviates from paragraph 2, the route sections shall have a marking consisting of 1 to 3 indications:

- Type of installation
- Installation depth or depth of cover
- Hazard due to tension or influence

Example: VP 0.8 ϟ

Cable ploughed in with laying plough
Installation depth: 0.8m
Hazard due to operating voltage

Example: TR4 Übd 0.3

Pipe/SNRV installed by trenching
Depth of cover: 0.3 m

Example: TR4 0.4 Übd 0.1

Pipe/SNRV installed by trenching
Installation depth: 0.4 m
Depth of cover: 0.1 m

The marking of the installation type and the installation depth on the routes will be successively changed from a manual to an automated display. Therefore, two different representations can be found in the plan information:
In the column "abbr." is the new automated representation and in the column "old abbreviation" the previous one. See page 7.

Marking of the type of installation

abbr.	type of installation	old abbreviation
MT	Trench / underground cable route with shallow depth Route with unknown location	
TR1	Tube/SNRV installed by trenching; installation depth 7-12 cm	
TR2	Pipe/SNRV installed by trenching (saw process); installation depth 20-30 cm	
TR3	Pipe/SNRV installed by trenching (milling process); installation depth 20-30 cm	
TR4	Pipe/SNRV installed by trenching; installation depth 30-50 cm	
VP	Cable buried with pipe-and-cable-laying plough	
VP	Pipe buried with pipe-and-cable-laying plough	
BV	Pipe installed by soil displacement	
SCH	Shooting route	
SB	Pipe installed using directional boring	
BS	Drilling route	
BR	Pipe guided to or in a bridge	BR
TN	Cables in a walk-in tunnel	TN
DÜ	Pipe in a culvert	DÜ
MVAK	Cable which is laid in a sewer	MVAK
MVFK	Cable which is laid in a fresh water channel	MVFK
PRIV	Pipe laid by the customer	PRIV