According to the new IEC/EN standards
IEC 60364-4-44
IEC 60364-5-53
surge protection has been mandatory since 2016.

Surge protection selection aid

OBO BETTERMANN

The underestimated risk

Damage from surge voltages
Those who consider damage from surge voltages to be caused only by direct lightning strikes with spectacular destruction forget that lightning strikes at distances of up to two kilometres can also cause devastating damage to electronic devices and systems. And even everyday switching operations in the power network, e.g. through major systems, can trigger dangerous surge voltages in the power network.

Causes of damage

Direct lightning strike
Direct lightning strikes hit buildings with maximum destructive energy. Around 80% of lightning strikes involve between 30,000 and 100,000 A and can generate surge voltages of several 100,000 V.

100.000 A

80% of lightning strikes involve between 30,000 and 100,000 A.

Remote lightning strike
It is not only direct lightning strikes into a building that are dangerous, but also the more frequent strikes into the surrounding area of buildings. Here, brief voltage increases of millionths of seconds can occur.

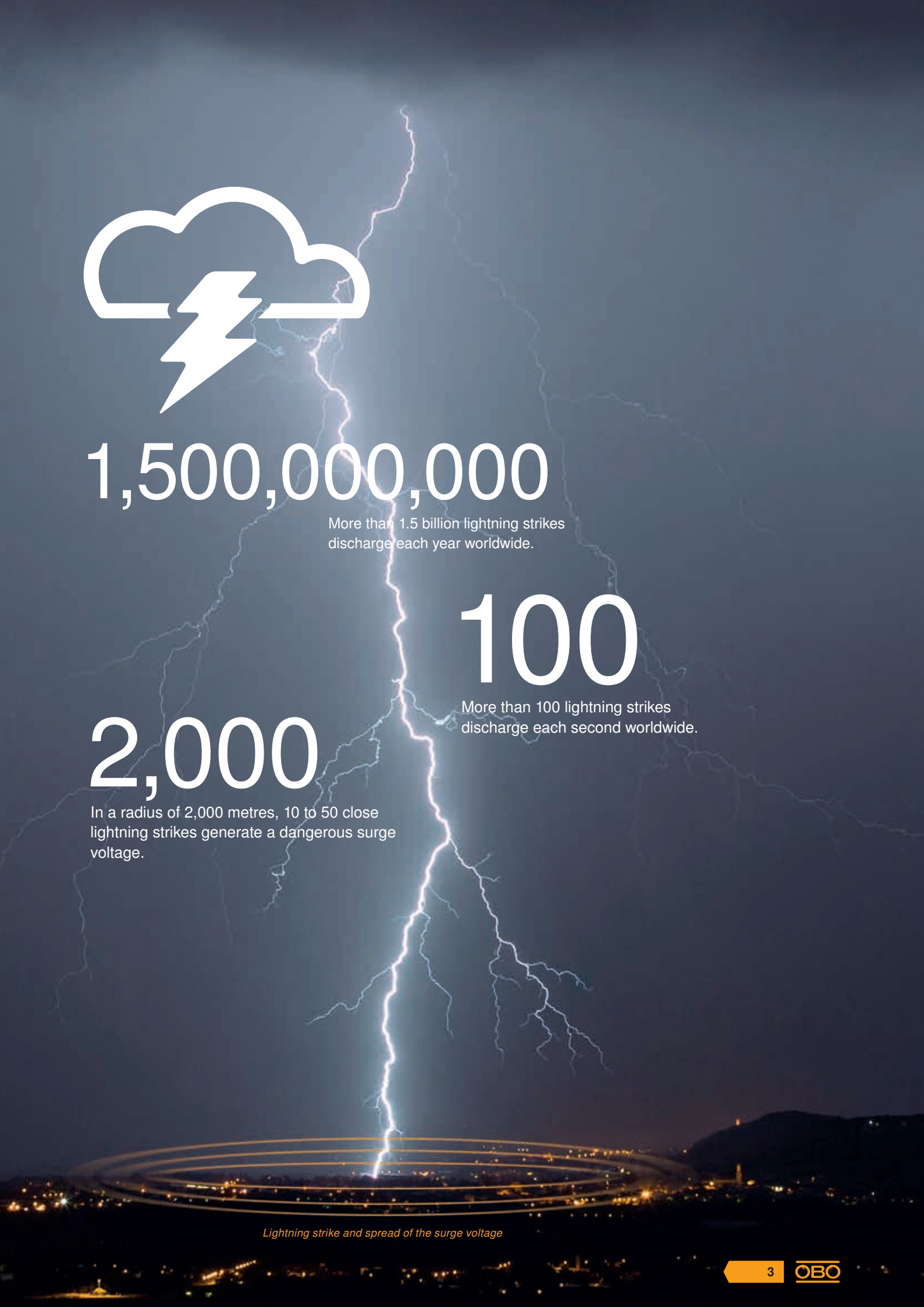
450.000

More than 450,000 incidents of damage are reported to insurance companies each year.

Switching operations
Switching operations such as switch-on and switch-off operations, the switching of inductive and capacitive loads and the interruption of short-circuit currents generate high surge voltages. Particularly when production plants, lighting systems or transformers are switched off, electrical equipment located in close proximity can be damaged.

31%

31% of all electronic damage is caused by direct or indirect lightning strikes.



1,500,000,000

More than 1.5 billion lightning strikes discharge each year worldwide.

100

More than 100 lightning strikes discharge each second worldwide.

2,000

In a radius of 2,000 metres, 10 to 50 close lightning strikes generate a dangerous surge voltage.

Lightning strike and spread of the surge voltage

Worth protecting

> 10,000 €

Damage to the building control system, heating and air-conditioning technology.

> 50,000 €

Subsequent damage: Failure of the entire building control system, heating system, lighting system, security systems and risk of fire.

... beyond price

Injury to people or irreparable data loss.

Surge protection required

Modern electrical installation creates ever greater requirements for comfort and communication. The increasing number of devices also increases the risk of surge voltage damage on all devices, operated via the power, telephone or data network.

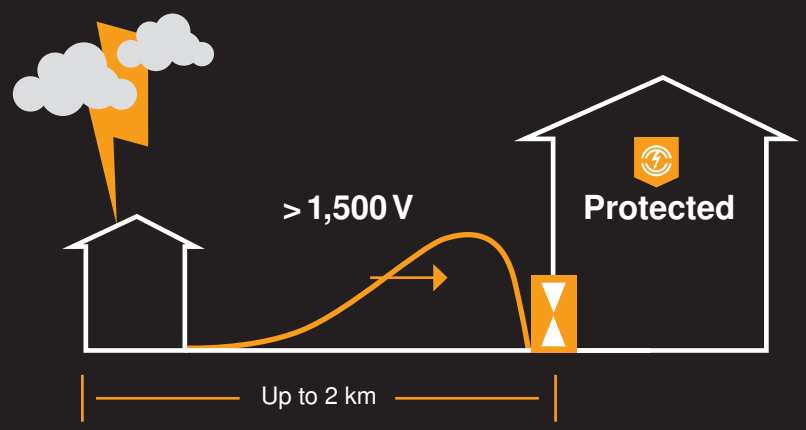
Dangerous surge voltages also occur in pure supply via earth cables, as these cables cannot provide any significant reduction in potential differences. The installation of surge protection devices can guarantee a voltage limitation according to the insulation coordination. This avoids dangerous spark formation through short-circuits and, of course, the resulting fires.

OBO lightning and surge protection systems: Our comprehensive product range can offer you all-round protection.

1500 V

Dangerous voltages over 1,500 V

Devices such as TV systems, PCs or heating and building control systems can survive brief surge voltages of up to 1,500 V. Lightning impacts or switching operations can, however, quickly exceed this voltage value by a multiple of times. OBO surge protection devices limit the voltage to considerably below 1,500 V.



Conclusion:
Surge protection secures the function and comfort of the system.

Surge protection - obligatory

From 2016, surge protection in all new buildings and in electrical installations will be mandatory for electrical installations conforming with the standard.

The new standards HD 60364-4-443 and IEC 60364-4-44 describe the decision criteria as to when and how surge protection measures are required in systems and buildings.

The new HD 60364-4-443 and IEC 60364-4-44

The erection of surge voltage protection devices will now be obligatory for a standard electrical installation, if the influences of the surge voltages have an influence on:

1. **Human lives, e.g. systems for safety purposes, medical areas.**
2. **Public buildings and cultural facilities, e.g. failure of public services, telecommunications centres, museums.**
3. **Commercial or industrial activities, e.g. hotels, banks, industrial companies, shops, agricultural operations.**
4. **Groups of people, e.g. large housing blocks, offices, schools, churches.**

Resources in surge voltage category I + II are, for example, computers, heating systems, building systems or sensitive kitchen appliances.

REMARK:
By influences on Individual people, e.g. in housing and small offices, ***surge protection is recommend.*** *But, if the total economic value of the electronic installation to be protected is more than 5 times the economic value of the SPD located at the origin of the installation, the using of* ***SPD protection is necessary.***

In accordance with these criteria, surge protection must be installed in all new buildings/distributors to ensure a standardised electrical installation.

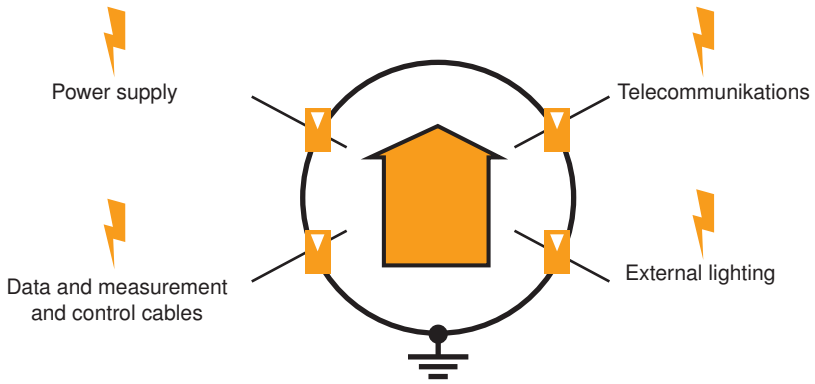
„Surge protection has been obligatory since 2016. The new standard finally matches the increased requirements in the field of electrics and electronics.“

Installation location
To arrest surge voltages before the electronic installation, surge voltage protection devices at the building entry must be used as a part of the equipotential bonding. The surge voltage devices should be installed as close to the source of interference as possible as protection against switching surge voltages.

In the case of buildings with an external lightning protection system or in the case of supply via an exposed cable, a type 1 surge arrester must also be used.

Protection area
OBO surge protection devices limit the voltage at the installation location and also in feed lines between the main distributor and subdistributors of up to 10 m to a harmless 1500 V. For cables longer than 10 m, inductive couplings can generate voltage peaks of a multiple of 1500 V. These mean that additional surge protection devices are necessary on the electrical device to be protected.

Protection circuit
Feed lines from outside can couple in dangerous surge voltages. For this reason, it is necessary to protect all cables being run in from outside with surge protection devices. This creates a protection circuit with just one potential.



The new standard makes it obligatory
The planner, the tradespeople and the owner and operator of a building are responsible for the correct planning and installation.

Good to know: The new standard means that planners and the electrical installation engineers have a duty to inform the owner/operator. Failure to do so or undocumented information can lead to claims for regress by clients.

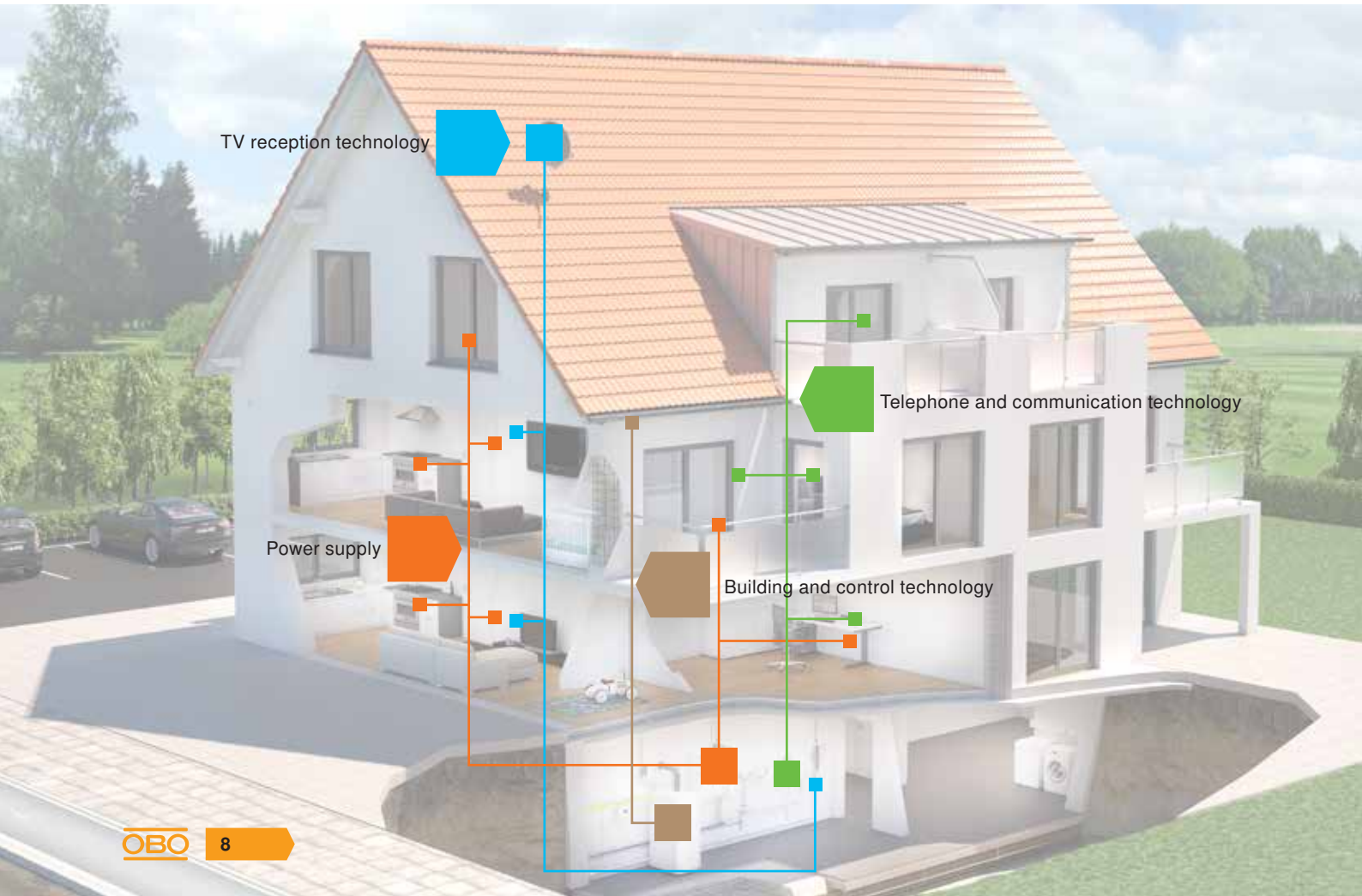
Overview of application examples

Which surge protection applications are the right ones? The OBO selection aid gives you an overview of the most common surge protection applications. We can show you examples on different building types from the fields of power supply, control and regulation technology, telephone and communication technology and antenna technology.

Please note that, for complete protection of the appropriate building, additional protection measures and an equipotential bonding system are required.

Lightning protection guide

- Examples on the correct application of the present standard for the planning and erection of lightning protection systems IEC/EN 62305.
- Information and selection aids for surge protection in low voltage systems and in data and information technology systems.



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Application examples: Power supply

Application	Page
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Application examples: Building and control technology

Application	Page
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Application examples: Telephone and communication technology

Application	Page
Telephone	10, 16, 18, 20
Telephone system	22, 24, 26
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Door/gate intercom system	12, 14, 20, 22

Application examples: TV reception technology

Application	Page
SAT system	10, 14, 16, 18
Cable TV	12, 20

Single-occupancy dwelling without external lightning protection

In this building type, we will show you the following application examples*:

- **Power supply**
  Supply, terminals
- **Telephone and communication technology**
  TV reception technology, telephone
- **Building and control technologies**
  Heating, roller shutters

* Please note that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, closed-circuit television systems (CCTV), roller shutter control and intercom systems.**

Power supply

Supply

		Protection of	Installation point	Product	Item no.
1 2		Power supply Supply	Main + sub distributor, spacing > 10 m	**V20-3+NPE**	5095 25 3
Alternatively					
1 2		Power supply Supply	Sub-distributor, spacing > 10 m	**V10 Compact AS**	5093 39 1

Terminal protection

		Protection of	Installation point	Product	Item no.
3		PC, Power supply	On the PC	**ÜSM-A**	5092 45 1

TV reception technology

SAT system

		Protection of	Installation point	Product	Item no.
4		Power supply TV + TV coaxial	On the TV	**ÜSM-A**	5092 45 1
5		SAT protection	On the Multi-switch (roof)	**TV4+1**	5083 40 0
6		SAT protection Power supply	On the Multi-switch (roof)	**ÜSM-A**	5092 45 1

Telephone and communication technology

Telephone

		Protection of	Installation point	Product	Item no.
7		Telephone supply	Before the splitter, cellar	**TD-2D-V**	5081 69 8
8		Telephone system	Before the device	**ÜSM-A**	5092 45 1
8		Telephone system	Before the device	**RJ11-TELE 4-F**	5081 97 7

Building and control technology

Heating

		Protection of	Installation point	Product	Item no.
9		Heating: Power supply	Cellar, in small distributor	**VF230 AC/DC**	5097 65 0
10		Heating: Measuring sensor	Cellar, in small distributor	**TKS-B**	5097 97 6

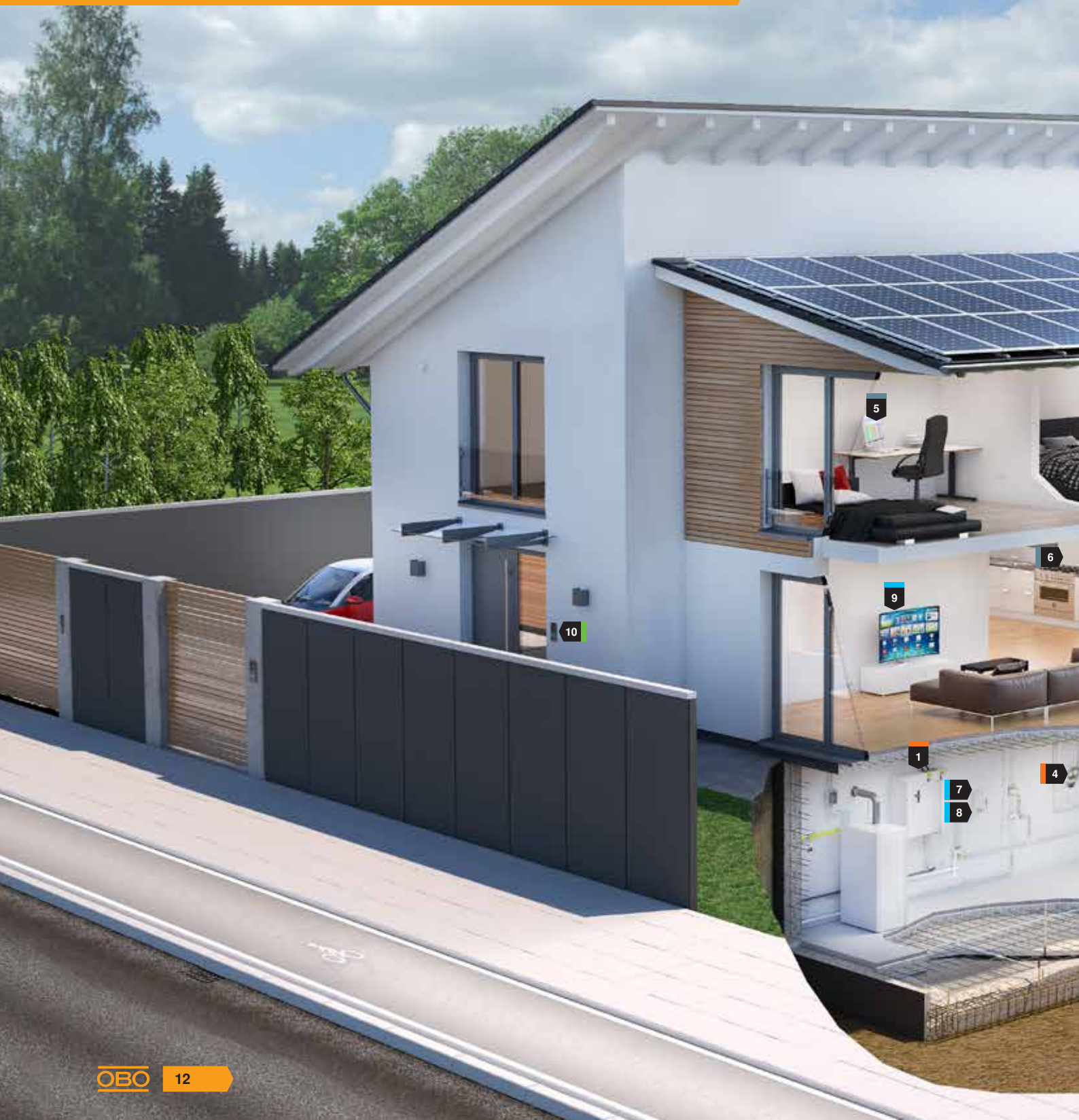
Roller shutters

		Protection of	Installation point	Product	Item no.
11		Roller shutter controller	on the roller shutter	**ÜSM-10-230I2P+PE**	5092 42 6
12		Roller shutter controller	On the controller	**VF230 AC/DC**	5097 65 0

Smart Home with photovoltaics and without external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, power inverter, terminals
- **Telephone and communication technology**
  TV reception technology, intercom systems
- **Building and control technology**
  KNX building control



* Please not that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **cable TV, closed-circuit television systems (CCTV), roller shutter control and telephone and communication systems.**

Power supply

Supply

	Protection of	Installation point	Product	Item no.
1 2	Power supply Supply	Main + subdistributor, spacing > 10 m	**V20-3+NPE**	5095 25 3
Alternatively				
1 2	Power supply Supply	Sub-distributor, spacing > 10 m	**V10 Compact AS**	5093 39 1

Photovoltaics

	Protection of	Installation point	Product	Item no.
3	On the power converter	Directly on the power inverter	**V20-3+NPE**	5095 25 3
4	PV DC side, per tracker, up to 1,000 V	Directly on the power inverter	**V20-C 3-PH-1000**	5094 60 8

Terminal protection

	Protection of	Installation point	Product	Item no.
5	PC Power supply	On the PC	**ÜSM-A**	5092 45 1
6	Additional sensitive devices	On the device	**ÜSM-A-2**	5092 46 0

TV reception technology

Cable TV

	Protection of	Installation point	Product	Item no.
7	BK protection (cable TV)	In the cellar, supply, in front of the amplifier	**DS-F m/w**	5093 27 5
8	BK protection (cable TV) Power supply	In the cellar, supply, in front of the amplifier	**ÜSM-A**	5092 45 1
9	TV device	On the TV	**ÜSM-A**	5092 45 1

Telephone and communication technology

Intercom system

	Protection of	Installation point	Product	Item no.
10	Control of an external intercom system Power supply	On the intercom system and in the building	**ÜSM-A**	5092 45 1

Building and control technology

KNX

	Protection of	Installation point	Product	Item no.
11	KNX building controller 24 V data cable	Directly on the DIN rail, on the control device	**FRD24**	5098 51 4
12	KNX control unit, permanently integrated	In the connection socket	**ÜSM-A**	5092 45 1

Smart Home with photovoltaics with external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, power inverter, terminals
- **Telephone and communication technology**
  TV reception technology, Intercom systems
- **Building and control technology**
  KNX building control, external gate control

* Please not that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **closed-circuit television systems (CCTV), roller shutter control and telephone and communication systems.**

Power supply

Supply

		Protection of	Installation point	Product	Item no.
1		Power supply Supply	Main distributor	**V50-3+NPE-280**	5093 52 6
2		Power supply Supply	Sub-distributor, spacing > 10 m	**V10 Compact AS**	5093 39 1

Photovoltaics

		Protection of	Installation point	Product	Item no.
3		On the power converter	Directly on the power inverter	**V20-3+NPE**	5095 25 3
4		PV DC side, per tracker, up to 1000 V	Directly on the power inverter	**V20-C 3-PH-1000**	5094 60 8

Terminal protection

		Protection of	Installation point	Product	Item no.
5		PC Power supply	On the PC	**ÜSM-A**	5092 45 1
6		Additional sensitive devices	On the device	**ÜSM-A-2**	5092 46 0

TV reception technology

SAT system

		Protection of	Installation point	Product	Item no.
7		TV device	On the device	**FC-SAT-D**	5092 81 6
8		SAT protection	On the Multi-switch (roof)	**TV4+1**	5083 40 0
9		SAT protection Power supply	On the Multi-switch (roof)	**ÜSM-A**	5092 45 1

Telephone and communication technology

Intercom system

		Protection of	Installation point	Product	Item no.
10		Control of an external intercom system, Power supply	On the intercom system + in the building	**V50-1+NPE-280**	5093 52 2
11		Control of an external intercom system, data cable	On the intercom system + in the building	**TKS-B**	5097 97 6

Building and control technology

KNX

		Protection of	Installation point	Product	Item no.
12		KNX building controller 24 V data cable	Directly on the DIN rail, on the control device	**FRD24**	5098 51 4
13		KNX control unit, permanently integrated	In the connection socket	**ÜSM-A**	5092 45 1

External gate control

		Protection of	Installation point	Product	Item no.
14		Controller external gate, power supply	On the gate + in the building	**V50-1+NPE-280**	5093 52 2
15		Controller external gate, data cable	On the gate + in the building	**TKS-B**	5097 97 6

Private building with exposed cable connection, with or without external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, Terminals
- **Telephone and communication technology**
  Telephone, TV reception technology
- **Building and control technology**
  Heating

* Please not that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, closed-circuit television systems (CCTV) and roller shutter control.**

Power supply

Supply

	Protection of	Installation point	Product	Item no.
1	Power supply Supply	Main distributor	**V50-3+NPE-280**	5093 52 6
2	Power supply Supply	Sub-distributor, spacing > 10 m	**V10 Compact AS**	5093 39 1
Alternatively				
2	Power supply Supply	Sub-distributor, spacing > 10 m	**V20-3+NPE-280**	5095 25 3

Terminal protection

	Protection of	Installation point	Product	Item no.
3	PC Power supply	On the PC	**ÜSM-A**	5092 45 1
4	Additional sensitive devices	On the device	**ÜSM-A**	5092 45 1

Telephone and communication technology

Telephone

	Protection of	Installation point	Product	Item no.
5	Telephone supply	Before the splitter, cellar	**TD-2D-V**	5081 69 8
6	Telephone system	Before the device	**ÜSM-A**	5092 45 1
6	Telephone system	Before the device	**RJ11-TELE 4-F**	5081 97 7

TV reception technology

SAT system

	Protection of	Installation point	Product	Item no.
7	Power supply TV + TV coaxial	On the TV	**ÜSM-A**	5092 45 1
8	SAT protection	On the Multi-switch (roof)	**TV4+1**	5083 40 0
9	SAT protection Power supply	On the Multi-switch (roof)	**ÜSM-A**	5092 45 1

Building and control technology

Heating

	Protection of	Installation point	Product	Item no.
10	Heating/heat pump: power supply	Cellar, in small distributor	**VF230 AC/DC**	5097 65 0
11	Heating: measuring sensor	Cellar, in small distributor	**TKS-B**	5097 97 6

Multi-person dwelling without external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, Terminals
- **Telephone and communication technology**
  Telephone, TV reception technology
- **Building and control technology**
  Heating

* Please not that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, closed-circuit television systems (CCTV), roller shutter control and intercom systems.**

Power supply

Supply

	Protection of	Installation point	Product	Item no.
1 2	Power supply Supply	Main + sub-distributor, spacing > 10 m	**V20-3+NPE-280**	5095 25 3
Alternatively				
1 2	Power supply Supply	Main + sub-distributor, spacing > 10 m	**V10 Compact AS**	5093 39 1

Terminal protection

	Protection of	Installation point	Product	Item no.
3	PC Power supply	On the PC	**ÜSM-A**	5092 45 1
4	Additional sensitive devices	On the device	**ÜSM-A**	5092 45 1

Telephone and communication technology

Telephone

	Protection of	Installation point	Product	Item no.
5	Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-G**	5084 04 8
6	Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-B-MAG**	5084 02 0
7	Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-A-LEI**	5084 00 8

TV reception technology

SAT system

	Protection of	Installation point	Product	Item no.
8	Power supply TV & TV Koaxial	On the TV	**ÜSM-A**	5092 45 1
9	SAT protection	On the Multi-switch (roof)	**TV4+1**	5083 40 0
10	SAT protection Power supply	On the Multi-switch (roof)	**ÜSM-A**	5092 45 1

Building and control technology

Heating

	Protection of	Installation point	Product	Item no.
11	Heating/heat pump: power supply	Cellar, in small distributor	**VF230 AC/DC**	5097 65 0
12	Heating: measuring sensor	Cellar, in small distributor	**TKS-B**	5097 97 6

Multi-person dwelling with external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, terminals
- **Telephone and communication technology**
  Telephone, intercom system, TV reception technology
- **Building and control technology**
  Heating

* Please not that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **cable TV, closed-circuit television systems (CCTV) and roller shutter control.**

Power supply

Supply

		Protection of	Installation point	Product	Item no.
1		Power supply Supply	Main distributor, Pre-meter area	**MCF100-3+NPE+FS**	5096 98 7
2		Power supply Supply	In all sub-distri-butors Spacing>10m	**V20-3+NPE-280**	5095 25 3
Alternatively					
2		Power supply Supply	In all sub-distri-butors Spacing>10m	**V10 Compact AS**	5093 39 1

Terminal protection

		Protection of	Installation point	Product	Item no.
3		PC Power supply	On the PC	**ÜSM-A**	5092 45 1
4		TV device	On the TV	**ÜSM-A**	5092 45 1

Telephone and communication technology

Telephone

		Protection of	Installation point	Product	Item no.
5		Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-G**	5084 04 8
6		Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-B-MAG**	5084 02 0
7		Telephone supply for 10 two-cores	Main supply in the cellar	**LSA-A-LEI**	5084 00 8

Intercom system

		Protection of	Installation point	Product	Item no.
8		Control of an external intercom system, power supply	On the intercom system	**TKS-B**	5097 97 6
9		Control of an external intercom system, data cable	On the intercom system	**ÜSM-A**	5092 45 1

TV reception technology

Cable TV

		Protection of	Installation point	Product	Item no.
10		BK protection (cable TV)	In the cellar, supply, in front of the amplifier	**DS-F m/w**	5093 27 5
11		BK protection (cable TV) Power supply	In the cellar, supply, in front of the amplifier	**ÜSM-A**	5092 45 1

Building and control technology

Heating

		Protection of	Installation point	Product	Item no.
12		Heating/Wärme-pumpe: Power supply	Cellar, in small distributor	**VF230 AC/DC**	5097 65 0
13		Heating: measu-ring sensor	Cellar, in small distributor	**TKS-B**	5097 97 6

Power supply

Supply

		Protection of	Installation point	Product	Item no.
1		Supply	NS-Distrutibu-tion	**V20-3+NPE-280-FS**	5095 33 3
2		Sub-distributor, spacing > 10 m			

Charging station e-mobility

		Protection of	Installation point	Product	Item no.
3		Supply	Charging station	**V20-3+NPE-280-FS**	5095 33 3

Telephone and communication technology

Server

		Protection of	Installation point	Product	Item no.
4		Server Power supply	On the server	**ÜSM-A**	5092 45 1
5		Server, data cable	On the server	**Net Defender**	5081 80 0
6		Patch panel, data cable	On each data cable coming from other rooms	**Net Defender**	5081 80 0

PC

		Protection of	Installation point	Product	Item no.
7		PC Power supply	On the PC, in the cable duct	**ÜSM-A-2**	5092 46 0
8		PC Data cable	On the PC	**Net Defender**	5081 80 0

Office building without external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, terminals
- **Telephone and communication technology**
  Server, PC, telephone system, intercom system
- **Building and control technology**
  KNX building control, time recording, closed-circuit television systems (CCTV)

* Please note that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, SAT TV, heating control and roller shutter control.**

Telephone and communication technology

Telephone system

		Protection of	Installation point	Product	Item no.
9		Telephone system Power supply	At the telephone system	**ÜSM-A**	5092 45 1
10		Telephone supply for 10 two-cores	Telecommunication supply into all buildings, in front of telephone system, as well as supply of all two-cores that leave the building	**LSA-G**	5084 04 8
11		Telephone supply for 10 two-cores		**LSA-B-MAG**	5084 02 0

Intercom system

		Protection of	Installation point	Product	Item no.
12		Control of an external intercom system, power supply	On the intercom system	**TKS-B**	5097 97 6
13		Control of an external intercom system, data cable	On the intercom system	**ÜSM-A**	5092 45 1

		Protection of	Installation point	Product	Item no.
14		Control of an external intercom system, power supply	In the building	**TKS-B**	5097 97 6
15		Control of an external intercom system, data cable	In the building	**ÜSM-A**	5092 45 1

KNX

	Protection of	Installation point	Product	Item no.
16	KNX building control 230 V	Directly on the DIN rail, on the control device	**VF230 AC/DC**	5097 65 0
17	KNX building controller 24 V data cable, for 2 two-cores	Directly on the DIN rail, on the control device	**MDP-4 D-24-T**	5098 43 1
18	KNX control unit, permanently integrated	In the connecti-on socket	**ÜSM-A**	5092 45 1

Time recording

	Protection of	Installation point	Product	Item no.
19	Time recording , Power supply	On the time recording device + on the patch panel	**ÜSM-A**	5092 45 1
20	Time recording, data cable Cat 5	On the time recording device + on the patch panel	**Net Defender**	5081 80 0

Closed-circuit television systems (CCTV)

	Protection of	Installation point	Product	Item no.
21	CCTV	On the CCTV de-vice as well as at reception device (PoE-ready)	**Net Defender**	5081 80 2
Alternatively				
21	CCTV 230V RJ45 Cat 6	On the CCTV device as well as at reception device	**PND-2in1-C-FS**	5081 06 4
21	CCTV 230V Koax-BNC RS485 (4)	On the CCTV device as well as at reception device	**PND-3in1-C-FS**	5081 06 6

Supply

	Protection of	Installation point	Product	Item no.
1	Supply	Main distributor, Pre-meter area	**MCF100-3+NPE+FS**	5096 98 7
2	Supply	Main distribu-tor, after meter, active current	**V20-3+NPE-280-FS**	5095 33 3
3	Supply	Sub-distributor, spacing >10m	**V20-3+NPE-280-FS**	5095 33 3
4	Power supplied from the outside (lights etc.) 3 phases	Directly at entry to building (in the insulated enclosure)	**V50-3+NPE-280**	5093 52 6
5	Outdoor lighting with LED	Directly in the light connection box	**ÜSM-20-230I1P+PE**	5092 43 1

Photovoltaics

	Protection of	Installation point	Product	Item no.
6	PV DC side, per tracker, up to 1,000 V	At entry to buil-ding and in the connection box. Note: Modules are installed in the protection area.	**V20-C PH1000**	5094 60 8
7	PV DC side, per tracker, up to 1,000 V	On the power converter	**V20-C PH1000**	5094 60 8
8	PV AC side	On the power converter	**V20-3+NPE-280-FS**	5095 33 3

Office/commercial building with external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, photovoltaics, terminals
- **Telephone and communication technology**
  Server, PC, telephone
- **Building and control technology**
  FAC, closed-circuit television systems (CCTV), air conditioning

* Please note that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, FAC, closed-circuit television systems (CCTV), air conditioning, heating control and roller shutter control.**

Telephone and communication technology

Server

		Protection of	Installation point	Product	Item no.
9		Server Power supply	On the server	**CNS-3-D**	5092 70 1
10		Server Data cable	On the server	**Net Defender**	5081 80 0
11		Patch panel Data cable	On each data cable coming from other rooms	**Net Defender**	5081 80 0

PC

		Protection of	Installation point	Product	Item no.
12		PC Power supply	On the PC, in the cable duct	**ÜSM-A-2**	5092 46 0
13		PC Data cable	On the PC	**Net Defender**	5081 80 0

Telephone system

		Protection of	Installation point	Product	Item no.
14		Telephone supply for 10 two-cores	Telecommunication supply into all buildings, in front of telephone system, as well as supply of all two-cores that leave the building	**LSA-G**	5084 04 8
15				**LSA-B-MAG**	5084 02 0
16				**LSA-A-LEI**	5084 00 8
17		Telephone system Power supply	At the telephone system	**ÜSM-A**	5092 80 0

FAC (fire alarm control centre)

	Protection of	Installation point	Product	Item no.
18	FAC 230 V	In FAC on DIN rail	**VF230 AC/DC**	5097 65 0
19	FAC TC-Connec-tions	In FAC on DIN rail	**TD-2/D-HS**	5081 69 4
20	FAC TC-Signal-line	In FAC on DIN rail, for each alarm circuit	**TKS-B**	5097 97 6

Closed-circuit television systems (CCTV)

	Protection of	Installation point	Product	Item no.
21	CCTV	On the CCTV de-vice as well as at reception device (PoE-ready)	**Net Defender**	5081 80 2
22	Reception device	At reception device	FC-D	5092 80 0

Alternatively

21 22	CCTV 230V RJ45 Cat 6	On the CCTV device as well as at reception device	**PND-2in1-C-FS**	5081 06 4
21 22	CCTV 230V Koax-BNC RS485 (4)	On the CCTV device as well as at reception device	**PND-3in1-C-FS**	5081 06 6

Air-conditioning system

	Protection of	Installation point	Product	Item no.
23	Power supply	In the distribution box	**VF230 AC/DC**	5097 65 0
24	Measuring sensor	In the distribution box	**TKS-B**	5097 97 6

Supply

	Protection of	Installation point	Product	Item no.
1	Supply	Main distributor, Pre-meter area	**MCF100-3+NPE+FS**	5096 98 7
2	Supply	Main distributor, after meter, active current	**V20-3+NPE-280-FS**	5095 33 3
3	Supply	Sub-distributor, spacing >10m	**V20-3+NPE-280-FS**	5095 33 3
4	Power supplied from the outside (lights etc.) 3 phases	Directly at entry to building (in the insulated enclosure)	**V50-3+NPE-280**	5093 52 6
5	Outdoor lighting with LED	Directly in the light connection box	**ÜSM-20-230I1P+PE**	5092 43 1

Photovoltaics

	Protection of	Installation point	Product	Item no.
6	PV DC side, per tracker, up to 1,000 V	At entry to building and in the connection box. Note: Modules are installed in the protection area.	**V20-C PH1000**	5094 60 8
7	PV DC side, per tracker, up to 1,000 V	On the power converter	**V20-C PH1000**	5094 60 8
8	PV AC side	On the power converter	**V20-3+NPE-280-FS**	5095 33 3

Industrial hall with external lightning protection

In this building type we show you the following application examples*:

- **Power supply**
  Supply, terminals
- **Telephone and communication technology**
  Server, telephone
- **Building and control technology**
  KNX building control, PLC, machine controllers, FAC, gate control

* Please note that the examples shown on this page are only an excerpt of the necessary protection measures for this building. Please refer to the application overview on page 9 for additional surge protection solutions for **broadband cable connection, SAT TV, CCTV, air-conditioning control, roller shutter control and PV**.

Telephone and communication technology

Server

	Protection of	Installation point	Product	Item no.
9	Server Power supply	On the server	**CNS-3-D**	5092 70 1
10	Server, Data cable	On the server	**Net Defender**	5081 80 0
11	Data cable Cat 5/6/7	Directly on the DIN rail, on the control device	**Net Defender**	5081 80 0
12	PLC control Data cable, for 2 two-cores	Directly on the DIN rail, on the control device	**MDP-4 D-24-T**	5098 43 1

Telephone system

	Protection of	Installation point	Product	Item no.
13	Telephone supply for 10 two-cores	Telecommunication supply into all buildings, in front of telephone system, as well as supply of all two-cores that leave the building	**LSA-G**	5084 04 8
14			**LSA-B-MAG**	5084 02 0
15			**LSA-A-LEI**	5084 00 8
16	Telephone system Power supply	At the telephone system	**ÜSM-A**	5092 45 1

PC

	Protection of	Installation point	Product	Item no.
17	PC Power supply	On the PC, in the cable duct	**ÜSM-A-2**	5092 46 0
18	PC Data cable	On the PC	**Net Defender**	5081 80 0

Building and control technology

KNX

	Protection of	Installation point	Product	Item no.
19	KNX control unit, permanently integrated	In the connection socket	**ÜSM-A**	5092 45 1

PLC

	Protection of	Installation point	Product	Item no.
20	PLC control 230 V	Directly on the DIN rail, on the control device	**VF230 AC/DC**	5097 65 0
21	PLC control Data cable, for 2 two-cores	Directly on the DIN rail, on the control device	**MDP-4 D-24-T**	5098 43 1

Machine controllers

		Protection of	Installation point	Product	Item no.
22		Machine controllers	Up to 160 A	**V20-3+NPE-280-FS**	5095 33 3
23		Machine controllers	Up to 63 A	**V10 Compact FS**	5093 38 2

FAC (fire alarm control centre)

		Protection of	Installation point	Product	Item no.
24		FAC 230 V	In the FAC on the hat rail	**VF230 AC/DC**	5097 65 0
25		FAC TC-Connec-tions	In the FAC on the hat rail	**TD-2/D-HS**	5081 69 4
26		FAC TC signalling line	In the FAC on the hat rail for each alarm circuit	**TKS-B**	5097 97 6

Gate control

		Protection of	Installation point	Product	Item no.
27		Controller external gate Power supply	Power supply for gate and in the building	**ÜSM-20-230I1P+PE**	5092 43 1
28		Controller external gate Data cable	On the gate and in the building	**TKS-B**	5097 97 6

Heating

		Protection of	Installation point	Product	Item no.
29		Heating/heat pump: power supply	Cellar, in small distributor	**VF230 AC/DC**	5097 65 0
30		Heating: measu-ring sensor	Cellar, in small distributor	**TKS-B**	5097 97 6

Air-conditioning system

		Protection of	Installation point	Product	Item no.
31		Power supply	In the distribution box	**VF230 AC/DC**	5097 65 0
32		Measuring sensor	In the distribution box	**TKS-B**	5097 97 6

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Building Connections

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