TBS | Catalogue 2012/2013

OBO BETTERMANN

# Transient and lightning protection systems

THINK CONNECTED.

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**OBO TBS seminars: First-hand knowledge**
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# Minor cause, major effect: Damage caused by surge voltages

Our dependency on electrical and electronic equipment continues to increase, in both our professional or private lives. Data networks in companies or emergency facilities such as hospitals and fire stations are lifelines for an essential real time information exchange. Sensitive databases, e.g. in banks or media publishers, need reliable transmission paths.

It is not only lightning strikes that pose a latent threat to these systems. More and more frequently, today's electronic aids are damaged by surge voltages caused by remote lightning discharges or switching operations in large electrical systems. During thunderstorms too, high volumes of energy are instantaneously released. These voltage peaks can penetrate a building though all manner of conductive connections and cause enormous damage.

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**What are the consequences of damage caused by surge voltages in our daily lives?**
The most obvious one is the destruction of electrical equipment. In private households, these are specifically:

- TV/DVD players
- Telephone systems
- Computer systems, stereo systems
- Kitchen appliances
- Monitoring systems
- Fire alarm systems

The failure of such equipment certainly incurs great expense. What happens when the following suffer outage times / consequential damage:

- Computers (loss of data)
- Heating/water heating systems
- Lift, garage door and roller shutter drives
- Triggering or destruction of fire / burglar alarm systems (costs through a false alarm)?

A vital topic perhaps, particularly in office buildings, because:

- Can work continue in your company without a central computer / server?
- Was all the important data backed up in time?

**Growing sums of damage**
Current statistics and estimates of insurance companies show: Damage levels caused by surges – excluding consequential or outage costs – long since reached drastic levels due to the growing dependency on electronic "aids". It's no surprise, then, that property insurers are checking more and more claims and stipulating the use of devices to protect against surges. Information on protection measures is contained, e.g. in Directive VDS 2010.

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# Creation of lightning discharges

*Creation of lightning discharges: 1 = approx. 6,000 m, approx. −30 °C, 2 = approx. 15,000 m, approx. −70 °C*

**Discharge types**
Some 90% of all lightning discharges between a cloud and the ground are negative cloud-earth strikes. The lightning begins in a negatively charged area of the cloud and spreads to the positively charged surface of the earth. Additional discharges are divided into:

- Negative earth-cloud strikes
- Positive cloud-earth strikes
- Positive earth-cloud strikes.

The most common discharges actually occur within a cloud or between different clouds.

**Creation of lightning discharges**
When warm, damp air masses rise, the air humidity condenses and ice crystals are formed at great heights. Storm fronts can occur when the clouds expand to heights of up to 15,000 m. The strong upwind of up to 100 kilometres per hour causes the light ice crystals to enter the higher area and the sleet particles enter the lower area. Knocks and friction cause electrical discharge.

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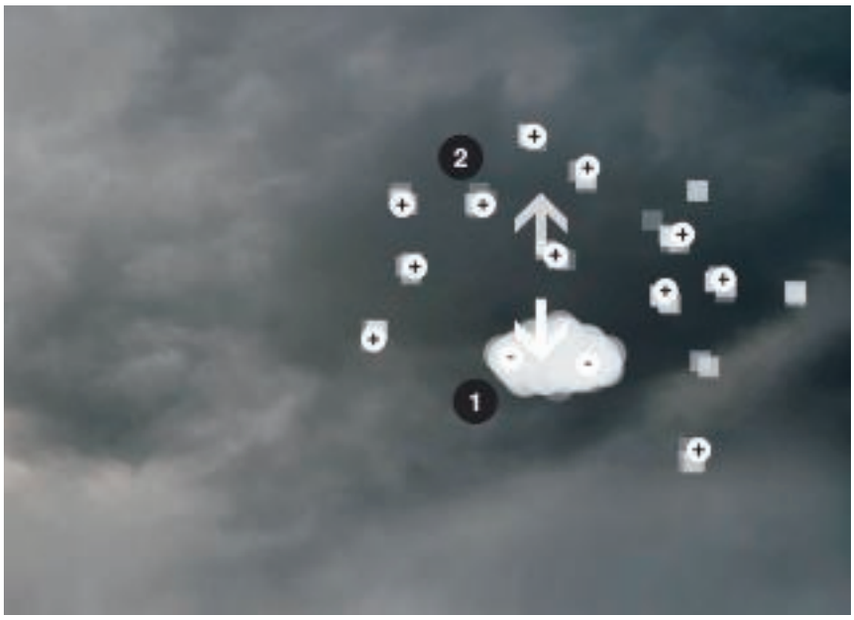
**Negative and positive charges**
Studies have proved that the sleet falling down (area warmer than −15 °C) has a negative charge and the ice crystals being thrown upwards (area colder than −15 °C) has a positive charge. The light ice crystals are carried into the upper areas of the cloud by the upwind and the sleet falls to the central areas of the cloud. This divided the clouds into the three areas:

- Top: Positively charged zone
- Centre: Weakly negative charged zone
- Bottom: Weakly positive charged zone

This separation of charges forms a voltage in the cloud.




*Negative and positive charges: 1 = Sleet, 2 = Ice crystals*

**Load distribution**
Typical load distribution:

- Positive at the top, negative in the centre and weakly positive at the bottom.
- Positive charges can also be found in the area near the ground.
- The field strength required to trigger lightning is dependent on the insulating ability of the air and is between 0.5 and 10 kV/cm.

*Charge distribution: 1 = approx. 6,000 m, 2 = Electrical field*

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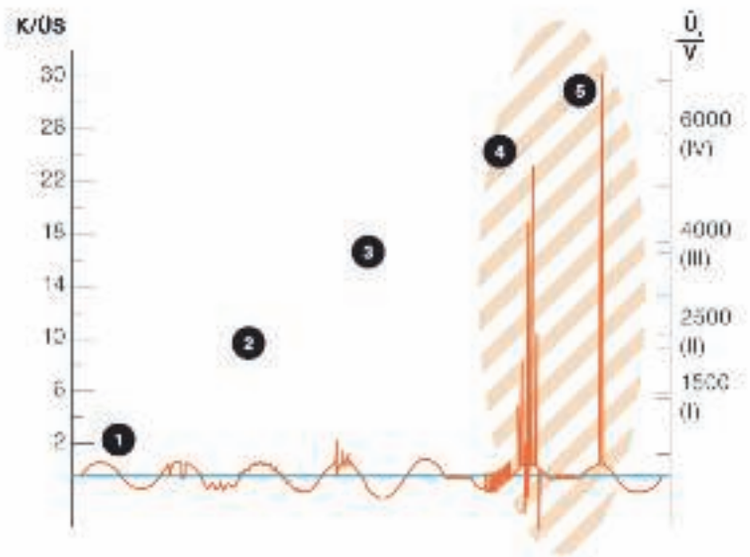
# What are transient surges?




*Transient surge voltages: 1 = Voltage drops/brief interruptions, 2 = Harmonic waves through slow and rapid voltage changes, 3 = Temporary voltage increases, 4 = Switching surges, 5 = Lightning surge voltages, hatched = application for surge protection devices*

**Transient surge voltages are brief voltage peaks lasting microseconds, which may be a multiple of the attached mains nominal voltage.**

### Direct strike

The largest voltage peaks in the low-voltage consumer network are caused by lightning discharges. The high energy content of lightning surges when a direct strike hits the external lightning protection system or a low-voltage open-wire line usually causes – without internal lightning and surge protection – total outage of the connected consumers and damage to the insulation.

### Induced voltage peaks and switching surge voltages

Yet induced voltage peaks in building installations and energy or data line supply cables can also reach many times the nominal operating voltage. Switching surges too, which in fact do not cause such high voltage peaks as lightning discharges but occur much more frequently, can result in immediate system failure. As a rule, switching surges amount to twice to three times the operating voltage, lightning surges on the other hand can sometimes reach 20 times the nominal voltage value and transport a high energy content.

### Delayed failures

Often, failures occur only after a time delay as the aging process of electronic components in the affected devices triggered by smaller transients causes insidious damage. A number of different protection measures are required. These depend on the exact cause and/or impact point of the lightning discharge.

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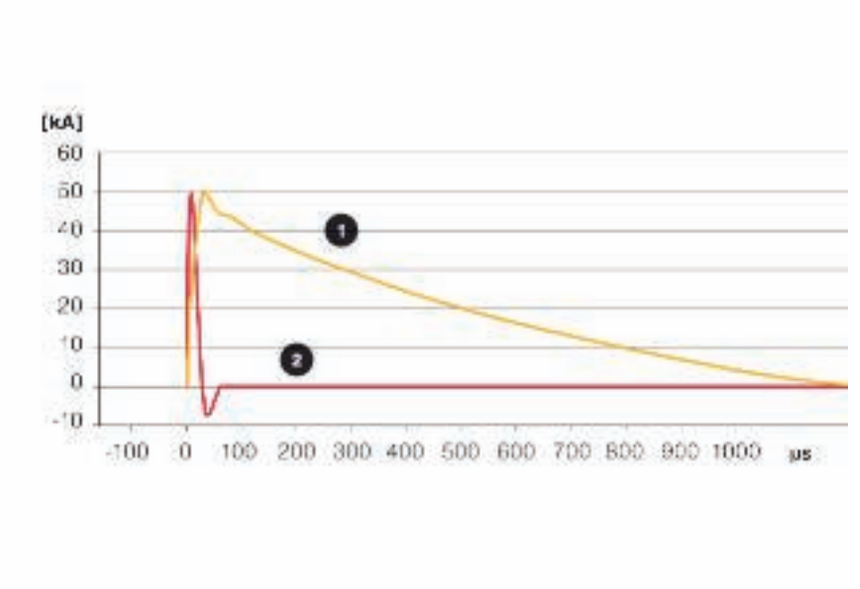
# What pulse forms are there?




*Pulse types and their characteristics: Yellow = pulse shape 1, direct lightning strike, 10/350 µs simulated lightning pulse, red = pulse shape 2, remote lightning strike or switching operation, 8/20 µs simulated lightning pulse (Surge)*

**Testing currents simulate potential increase**
High lightning currents can flow to the ground during a storm. If a building with external lightning protection receives a direct hit, a voltage drop occurs on the earthing resistor of the lightning protection equipotential bonding system, which represents a surge voltage against the distant environment. This rise in potential poses a threat to the electrical systems (e.g. voltage supply, telephone systems, cable TV, control cables, etc.) that are routed into the building. Suitable test currents for testing different lightning and surge protectors have been defined in national and international standards.

**Direct lightning strike: Pulse shape 1**
Lightning currents that can occur during a direct lightning strike can be imitated with the surge current of wave form 10/350 µs. The lightning test current imitates both the fast rise and the high energy content of natural lightning. Lightning current arrestor type 1 and external lightning protection components are tested using this current.

**Remote lightning strikes or switching operations: Pulse shape 2**
The surges created by remote lightning strikes and switching operations are imitated with test impulse 8/20 µs. The energy content of this impulse is significantly lower than the lighting test current of surge current wave 10/350 µs. Surge arrestor type 2 and type 3 are impacted with this test impulse.

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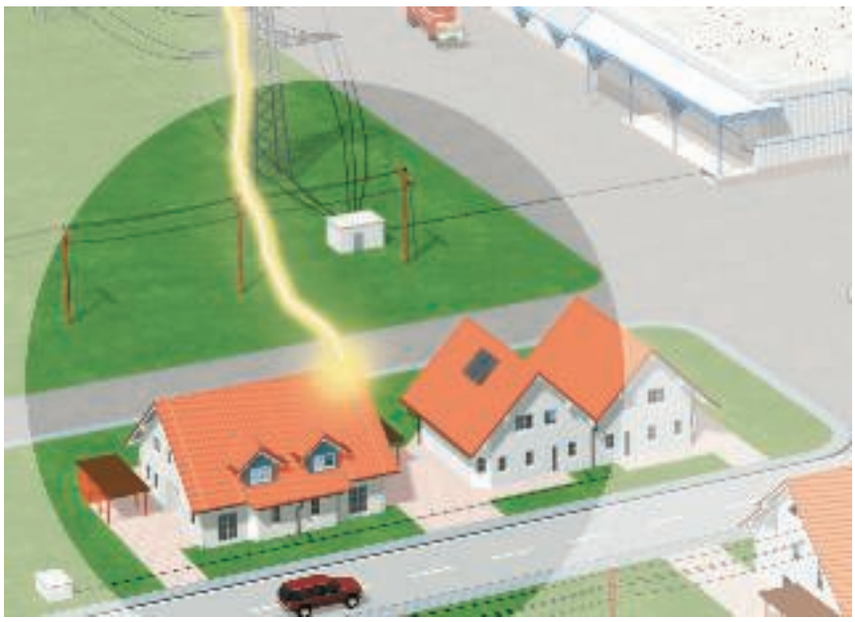
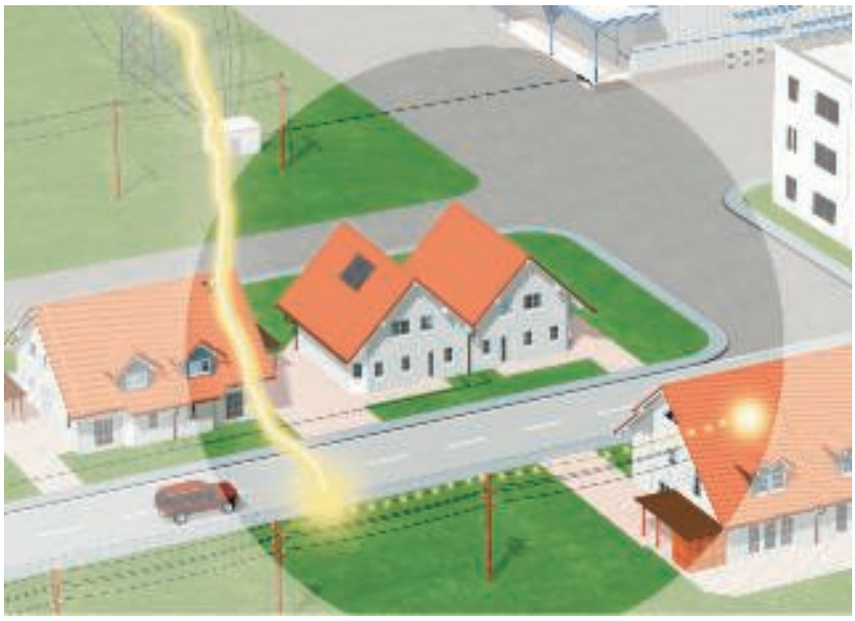
# Causes of lightning currents

**Direct lightning strike into a building**
If a lightning strike hits the external lightning protection system or earthed roof structures capable of carrying lightning current (e.g. roof aerial), then the lightning energy can be arrested to the ground in advance. However, a lightning protection system on its own is not enough: Due to its impedance, the building's entire earthing system is raised to a high potential. This potential increase causes the lightning current to spilt over the building's earthing system and also over the power supply systems and data cables to the adjacent earthing systems (adjacent building, low-voltage transformer).



**Risk:**
**Lightning impulse (10/350)**

**Direct lightning strike into a low-voltage open-wire line**
A direct lightning strike into a low-voltage open wire line or data cable can couple high partial lighting currents in an adjacent building. Electrical equipment in buildings at the end of the low-voltage open-wire line are at particular risk of damage caused by surges.



**Risk:**
**Lightning impulse (10/350)**

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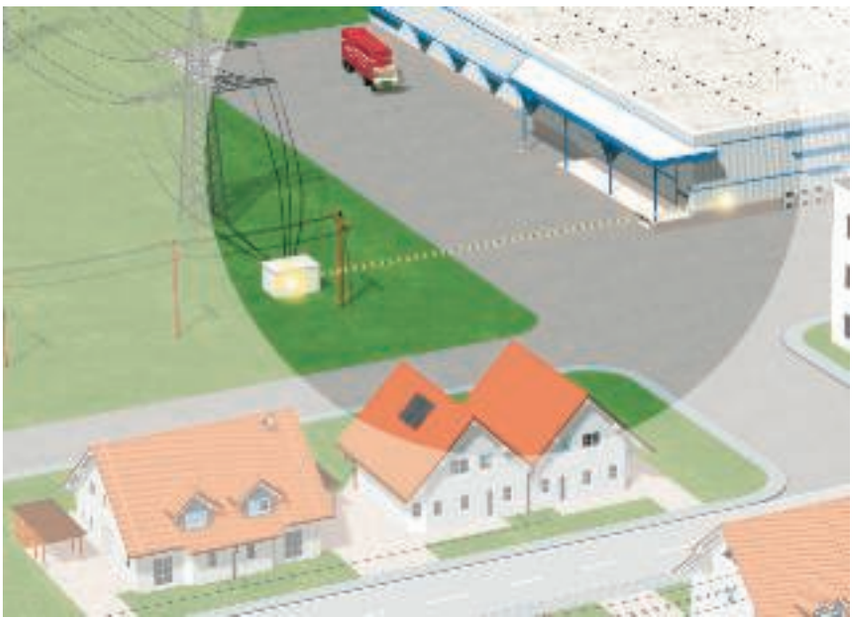
# Causes of surges

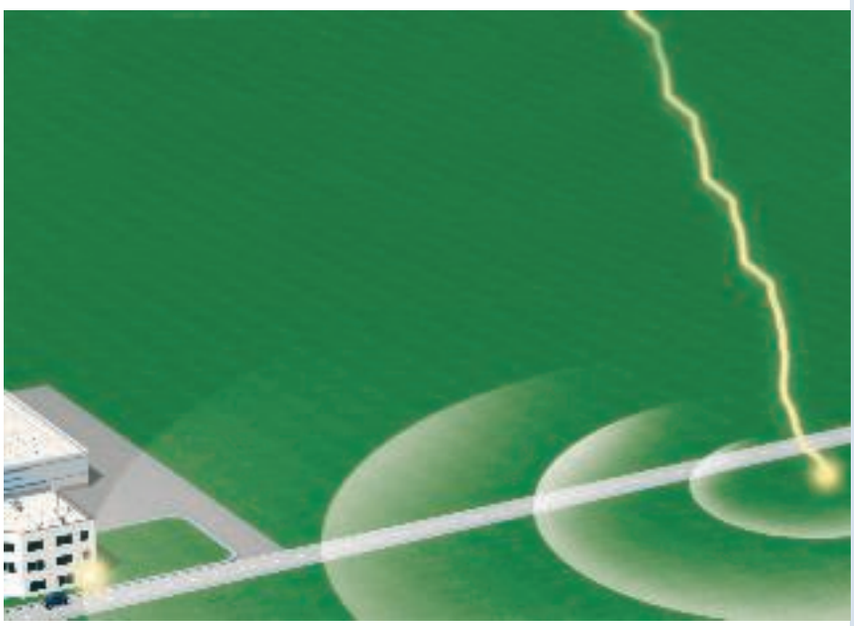
**Switching surges in the low-voltage system**
Switching surges are caused by switch-on and switch-off operations, by switching inductive and capacitive loads and by interrupting short-circuit currents. Particularly when production plants, lighting systems or transformers are switched off, electrical equipment located in close proximity can be damaged.

**Risk:**
**Surge impulse (8/20)**



**Coupling of surges through local or remote lightning strike**
Even if lightning protection and surge protection measures are already installed: A local lightning strike creates additional high magnetic fields, which in turn induce high voltage peaks in line systems. Inductive or galvanic coupling can cause damage within a radius of up to 2 km around the lightning impact point.

**Risk:**
**Surge impulse (8/20)**



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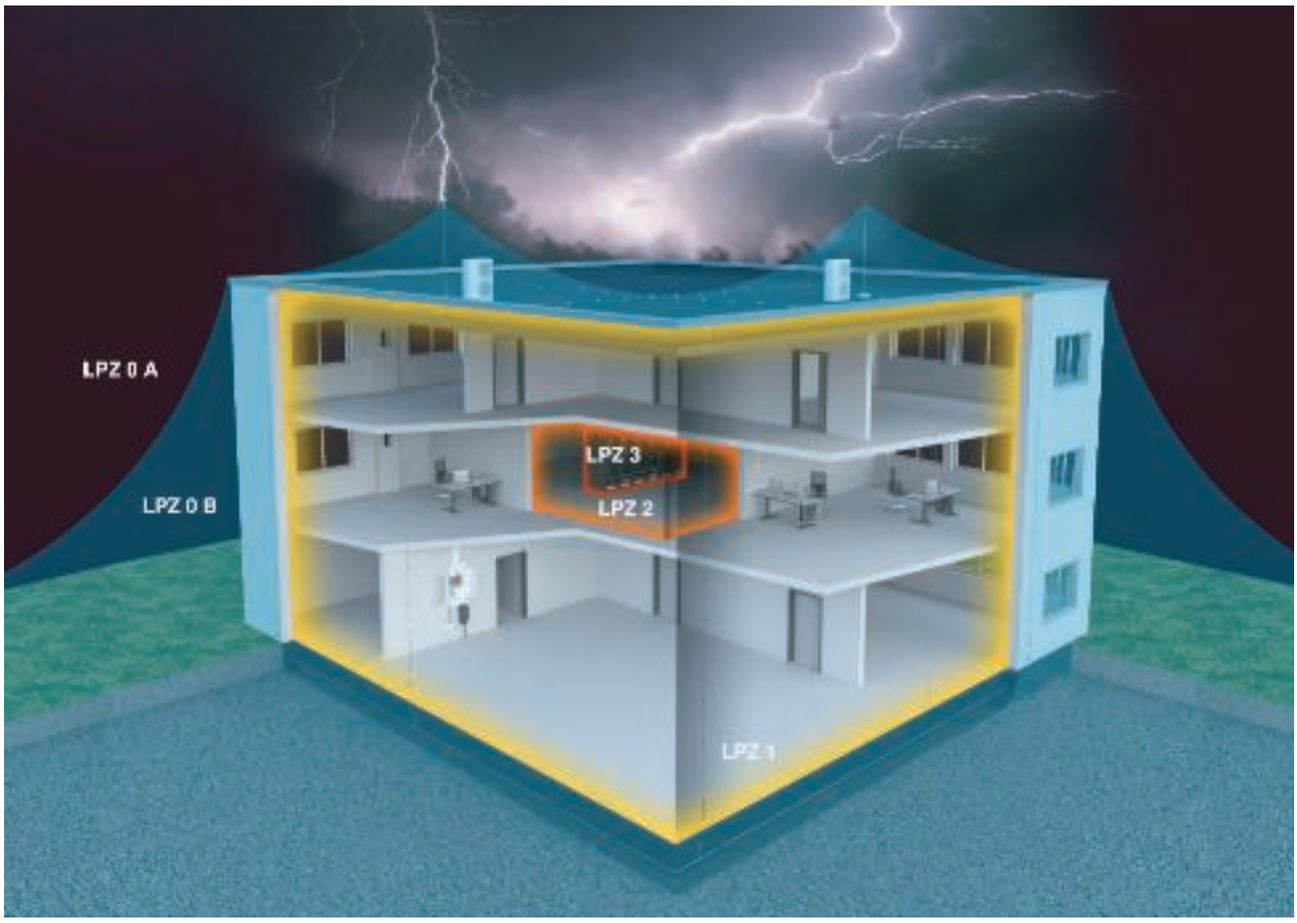
# Gradual surge reduction with lightning protection zones




**Lightning protection zone concept**
The lightning protection zone concept described in international standard IEC 62305-4 (DIN VDE 0185 Part 4) has proved to be practical and efficient. This concept is based on the principle of gradually reducing surges to a safe level before they reach the terminal device and cause damage. In order to achieve this situation, a building's entire energy network is split into lightning protection zones (LPZ = Lightning Protection Zone). Installed at each transition from one zone to another is a surge arrestor for equipotential bonding. These arrestors correspond to the requirement class in question.

**Lightning protection zone**

| | | |
|---|---|---|
| **LPZ 0 A** | | Unprotected zone outside the building. Direct lightning strike, no shielding against electromagnetic interference pulses LEMP (Lightning Electromagnetic Pulse) |
| **LPZ 0 B** | | Through the area protected by the external lightning protection system. No shielding against LEMP. |
| **LPZ 1** | | Zone inside the building. Low partial lightning energies possible. |
| **LPZ 2** | | Zone inside the building. Low surges possible. |
| **LPZ 3** | | Zone inside the building (can also be the metal housing of a consumer). No interference pulses through LEMP or surges present. |

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# Zone transitions and protective devices

**Benefits of the lightning protection zone concept**

- Minimisation of the couplings into other cable systems through arresting the energy-rich, dangerous lightning currents directly at the point the cables enter the building.
- Malfunction prevention with magnetic fields.
- Economic, well-plannable individual protection concept for new and old buildings and reconstructions.

**Type classes of the surge protection devices**

OBO surge protection devices are classified in accordance with DIN EN 61643-11 into three type classes – type 1, type 2 and type 3 (previously B, C and D). These standards contain building regulations, requirements and tests for surge arrestors used in AC networks with nominal voltages of up to 1,000 V and nominal frequencies of between 50 and 60 Hz.

**Correct selection of the arrestor**

This classification enables arrestors to be matched to different requirements with regard to location, protection level and current-carrying capacity. The table below provides an overview of the zone transitions. It also shows which OBO surge protection devices can be installed in the energy supply network and their respective function.

## Zone transitions

| Zone transition | Protection device and device type | Product example | Product figure |
|---|---|---|---|
| LPZ 0 B<br>to<br>LPZ 1 | Protection device for lightning protection equipotential bonding in accordance with DIN VDE 0185-3 for direct or close lightning strikes.<br>• Devices: type 1 (Class I, requirements class B), e.g. MC50-B<br>• Max. protection level according to standard: 4 kV<br>• Installation e.g. in the main distributor/at building entry | MCD<br>Item no.:<br>5096 87 9 | |
| LPZ 1<br>to<br>LPZ 2 | Protection device for surge protection to DIN VDE 0100-443 for surge voltages arriving through the supply network due to remote strikes or switching operations.<br>• Devices: type 2 (Class II, requirements class C), e.g. V20-C<br>• Max. protection level according to standard: 2.5 kV<br>• Installation e.g. in the power distributor, subdistributor | V20<br>Item no.:<br>5094 65 6 | |
| LPZ 2<br>to<br>LPZ 3 | Protection device, designed for surge protection of portable consumers at sockets and power supplies.<br>• Devices: type 3 (Class III, requirements class D), e.g. FineController FC-D<br>• Max. protection level according to standard: 1.5 kV<br>• Installation e.g. on the end consumer | FC-D<br>Item no.:<br>5092 80 0 | |

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# BET – testing centre for lightning protection, electrical engineering and support systems

*Lightning current test*

**BET with countless tasks**
If only lightning current, environmental and electrical testing was possible at BET up to now, the BET Test Centre is now a competent partner for testing of cable support systems. This combination has made it necessary to revise the meaning of the name. If BET previously stood for "Blitzschutz- und EMV-Technologiezentrum" (Lightning protection and EMC technology centre), since 2009 these letters have meant BET Test centre for lightning protection, electrical engineering and support systems.

**Test generator for lightning current tests**
The test generator planned in 1994 and completed in 1996 makes it possible to carry out lightning current tests at up to 200 kA. The generator was planned and constructed in cooperation with the Soest Technical College. Due to the intensive planning and scientific support in the construction of the test system, it has worked for 12 years without errors and meets current standardised test requirements.

**Testing tasks**
The main load of the testing generator is generated through the testing of products from the TBS product division. For this, developmental tests of new developments, modifications to existing OBO products and also comparison tests with competitive products are carried out. These include lightning protection components, surge protection devices and lightning arrestors. Tests for lightning protection components are carried out according to DIN EN 50164-1, for spark gaps according to DIN EN 50164-3 and for lightning and surge protection devices according to DIN EN 61643-11. This is only a small amount of the testing standards used for tests in the BET Test Centre.

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*Load test*

**Testing types for lightning and surge protection**

Both lightning current tests and surge voltage tests can be carried out at up to 20 kV. A hybrid generator is used for these tests, which was also developed as part of a cooperation with the Soest Technical College. EMC testing of cable support systems can also be carried out using this test generator. All kinds of cable routing and cable support systems of up to 8 m length can be tested without any difficulties. Tests for electrical conductivity according to DIN EN 61537 are also carried out.

**Simulation of real environmental conditions**

To carry out standardised tests on components intended for external use, they must be pretreated under real environmental conditions. This takes place in a salt spray trough and a sulphur dioxide testing chamber. Depending on the test, the test length and the concentration of the salt spray or sulphur dioxide in the testing chambers may vary. This means that it is possible to conduct tests according to IEC 60068-2-52, ISO 7253, ISO 9227 and EN ISO 6988.

**Testing cable support systems**

The well-known KTS testing system, newly installed in the BET Test Centre, allows the investigation of the load capacities of any cable support system manufactured by OBO. The basis for this is DIN EN 61537 and VDE 0639.

In the BET Test Centre, OBO Bettermann has a testing department in which products can be tested according to standards, even during the development phase.

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# Planning aids, surge protection energy technology

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# Standards, surge protection

**You must take various standards into account when erecting surge protection. You can find the most important specifications here.**

| Standard | Contents |
|---|---|
| **DIN VDE 0100-410 (IEC 60364-4-41)** | Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock |
| **DIN VDE 0100-540 (IEC 60364-5-54)** | Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors |
| **DIN VDE 0100-443 (IEC 60364-4-44)** | Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances – Clause 443: Protection against surge voltages of atmospheric origin or due to switching |
| **DIN VDE 0100-534 (IEC 60364-5-53)** | Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control – Clause 534: Devices for protection against surge voltages |
| **DIN EN 61643-11 (IEC 61643-1)** | Low-voltage surge protection devices – Part 11: Surge protection devices connected to low-voltage power systems – Requirements and tests |

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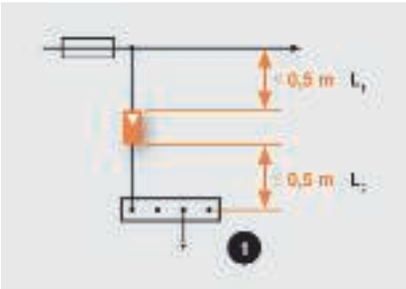
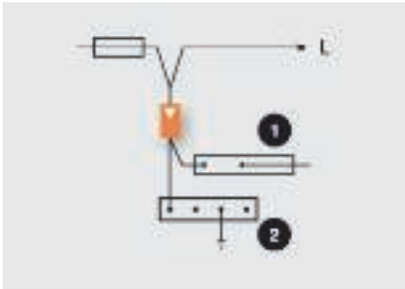
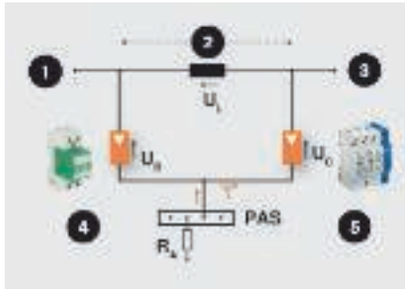



*Length of the feed line, 1 = Equipotential bonding rail or terminal or protective conductor rail*




*V wiring, 1 = Protective conductor rail, 2 = Main equipotential bonding rail or terminal*




*1= Power supply, 2 = Cable length, 3 = Consumer, 4 = Response voltage 2 kV, e.g. MC 50-B VDE 5 = Response voltage 1.4 kV, e.g. V20 C*

**Minimum cross-sections for lightning protection equipotential bonding**

The following minimum cross-sections must be observed for lightning protection equipotential bonding: for copper 16 mm², for aluminium 25 mm² and for iron 50 mm².

At the lightning protection zone, transition from LPZ0 to LPZ1, all metal installations must be integrated into the equipotential bonding system. Active lines must be earthed using suitable arrestors.

**Connection length, V-wiring**

The connection cable to the protector is crucial for achieving an optimum protection level. In accordance with IEC installation directives, the length of the branch line to the arrestor and the length of the line from the protection device to the equipotential bonding should in each case be less than 0.5 m. If the cables are longer than 0.5 m, then V-wiring must be chosen.

**Decoupling**

Lightning current and surge arrestors perform a number of functions. These arrestors must be used in coordination. This coordination is guaranteed by the existing line length or special lightning current arrestors (MCD series). For example, in the protection set, type 1 and type 2 arrestors (Classes B and C) can be used adjacent to each other.

**Example cable length > 5 m**

- No additional decoupling required

**Example cable length < 5 m**

- Use decoupling: MC 50-B VDE + LC 63 + V20-C
- Alternatively: MCD 50-B + V20-C, no additional decoupling required (e.g. protection set)

**Minimum dimensions of cables, protection class I to IV**

| Material | Cross-section of cables, which interconnect different equipotential bonding rails or which connect to the earthing system | Cross-section of cables, which connect the internal metallic installations with the equipotential bonding rail |
|---|---|---|
| Copper | 16 mm² | 6 mm² |
| Aluminium | 25 mm² | 10 mm² |
| Steel | 50 mm² | 16 mm² |



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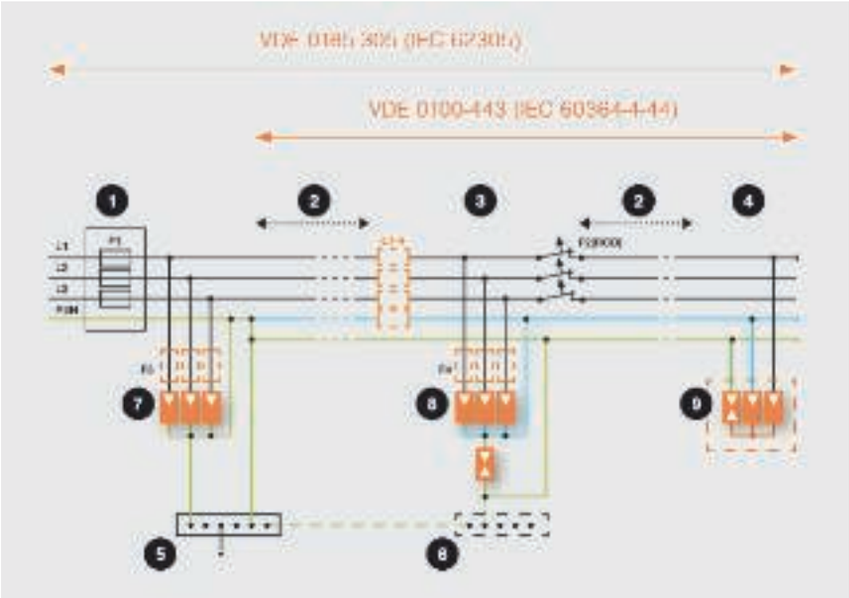
# 4-cable networks, TN-C network system




*1 = Main distributor, 2 = Cable length, 3 = Circuit distributor, e.g. subdistributor, 4 = Fine power protection, 5 = Main EBS, 6 = Local EBS, 7 = Type 1, 8 = type 2, 9 = type 3*

**In the TN-C-S network system, the electrical unit is supplied through the three external lines (L1, L2, L3) and the combined PEN line. Usage is described in DIN VDE 0100-534 (DIN EN 61643-11).**

**Lightning current arrestor Type 1**
Type 1 lightning current arrestors are used in the 3-pole circuit (e.g.: 3x MC 50-B). The connection is effected parallel to the external lines, which are connected to the PEN via the arrestor. Following consultation with the local energy provider and in accordance with the VDN Directive, use before the main meter device is also possible.

**Surge arrestor, type 2**
Surge arrestors of type 2 are usually used after the split in the PEN line. If the split is more than 0.5 m away, the network from here onwards is 5-line. The arrestors are used in the 3+1 circuit (e.g. V20-C 3+NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are connected to the neutral cable (N) via arrestors. The neutral cable (N) is connected to the protective earth via a collective spark gap. The arrestors must be used before a residual current protective device (RCD), as it would otherwise interpret the surge current as a residual current and interrupt the power circuit.

**Surge arrestor, type 3**
Surge arrestors of type 3 are used to protect against surges in the device power circuits. These transverse surges occur primarily between L and N. A Y circuit protects the L and N lines with varistor circuits and makes the connections to the PE line through a collective spark gap (e.g. KNS-D). This protection circuit between L and N prevents surge currents from transverse voltages being conducted towards PE, the RCD thus interprets no residual current. The relevant technical data is contained on the product pages.

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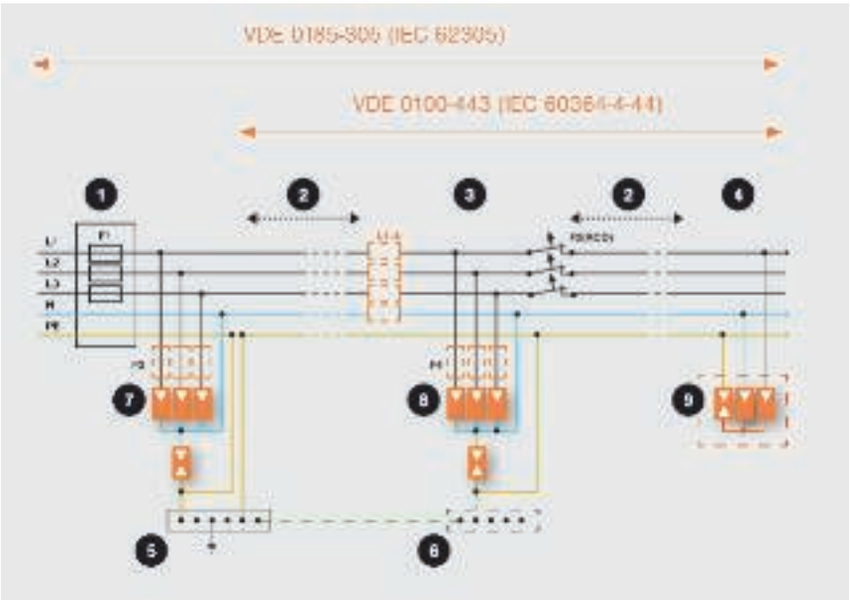
# 5-cable networks, TN-S and TT network system




*1 = Main distributor, 2 = Cable length, 3 = Circuit distributor, e.g. subdistributor, 4 = Fine power protection, 5 = Main EBS, 6 = Local EBS, 7 = Type 1, 8 = Type 2, 9 = Type 3*

**In the TN-S network system, the electrical unit is supplied through the three external lines (L1, L2, L3), the neutral cable (N) and the earth cable (PE). In the TT network, however, the electrical unit is supplied through the three external lines (L1, L2, L3), the neutral cable (N) and the earth cable (PE). Usage is described in DIN VDE 0100-534 (DIN EN 61643-11).**

**Lightning current arrestor type 1**
Type 1 lightning current arrestors are used in the 3+1 circuit (e.g. 3x MC 50-B and one MC 125-B NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are connected to the neutral cable (N) via arrestors. The neutral cable (N) is connected to the protective earth via a collective spark gap. Following consultation with the local energy provider and in accordance with the VDN Directive, use before the main meter device is also possible.

**Surge arrestor, type 2**
Surge arrestors of type 2 are used in the 3+1 circuit (e.g. V20-C 3+NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are connected to the neutral cable (N) via arrestors. The neutral cable (N) is connected to the protective earth via a collective spark gap. The arrestors must be used before a residual current protective device (RCD), as it would otherwise interpret the surge current as a residual current and interrupt the power circuit.

**Surge arrestor, type 3**
Surge arrestors of type 3 are used to protect against surges in the device power circuits. These transverse surges occur primarily between L and N. A Y circuit protects the L and N lines with varistor circuits and makes the connection to the PE line through a collective spark gap (e.g. KNS-D). This protection circuit between L and N prevents surge currents from transverse voltages being conducted towards PE, the RCD thus interprets no residual current. The relevant technical data is contained on the product pages.



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# Selection aid, energy technology
# AC combination arrestor and surge protection; type 1+2, type 2 and type 3

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**Installation location 2**
**Installation in the subdistributor**
**Medium protection / type 2**
**Only required if distance ≥ 10m**

| Description | Type | Item no. | Product figure |
|---|---|---|---|
| TN/TT<br>Type 2 + 3<br>2.5 SU | V10 Compact | **5093380**<br>Page: 200 | |
| | V10 Compact-AS,<br>with acoustic<br>remote signalling | **5093391**<br>Page: 200 | |
| TN/TT<br>Type 2<br>4 SU | V20-C 3+NPE | **5094656**<br>Page: 179 | |
| | V20-C 3+NPE+FS<br>with remote signalling | **5094765**<br>Page: 180 | |
| TN/TT<br>Type 2<br>4 SU | V20-C 3+NPE | **5094656**<br>Page: 179 | |
| | V20-C 3+NPE+FS<br>with remote signalling | **5094765**<br>Page: 180 | |
| TN/TT<br>Type 2<br>4 SU | VC20-C 3+NPE | **5094656**<br>Page: 179 | |
| | V20-C 3+NPE+FS<br>with remote signalling | **5094765**<br>Page: 180 | |

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# Test marks

| | |
|---|---|
| | Lightning current-tested |
| | Lightning current-tested, Class H (100 kA) |
| | ELEKTROTECHNICKÝ ZKUŠEBNÌ ÚSTAV, Czech Republic |
| | ATEX certificate for explosive areas |
| | Russia, GOST The State Committee for Standards |
| | KEMA-KEUR, Netherlands |
| | Indication of metric products |
| | MAGYAR ELEKTROTECHNIKAI ELLENŐRZŐ INTÉZET Budapest, Hungary |
| | Österreichischer Verband für Elektrotechnik, Austria |
| | Underwriters Laboratories Inc., USA |
| | Eidgenössisches Starkstrominspektorat, Switzerland |
| | Underwriters Laboratories Inc., USA |
| | Verband der Elektrotechnik, Elektronik, Informationstechnik e.V., Germany |
| | German Association of Electricians, tested safety |
| | 5-year warranty |
| | Halogen-free; without chlorine, fluorine and bromine |



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# Pictogram explanation

## Lightning protection classes

| | |
|---|---|
| Type 1 | Protection device to DIN EN 61643-11 or IEC 61643-11 |
| Type 1+2 | Combination protection device made of type 1 and type 2 |
| Type 2 | Protection device to DIN EN 61643-11 or IEC 61643-11 |
| Type 2+3 | Protection device to DIN EN 61643-11 or IEC 61643-11 |
| Type 3 | Protection device to DIN EN 61643-11 or IEC 61643-11 |

## Lightning protection zone

| | |
|---|---|
| LPZ 0→1 | Transition from LPZ 0 to LPZ 1 |
| LPZ 0→2 | Transition from LPZ 0 to LPZ 2 |
| LPZ 0→3 | Transition from LPZ 0 to LPZ 3 |
| LPZ 1→2 | Transition from LPZ 1 to LPZ 2 |
| LPZ 1→3 | Transition from LPZ 1 to LPZ 3 |
| LPZ 2→3 | Transition from LPZ 2 to LPZ 3 |

## Applications

| | |
|---|---|
| FS | Remote signalling |
| FS-SÜ | Remote signalling with fuse monitoring |
| AS | Acoustic signalling |
| ISDN | Integrated Service Digital Network, ISDN applications |
| DSL | Digital Subscriber Line, DSL applications |
| Analog TK | Analogue telecommunication |
| Cat 5 | Category 5 TwisterPair |
| Cat 6A | Channel Performance to American EIA/TIA standard |
| MSR | Measuring, controlling and regulating systems |
| TV | TV applications |
| SAT | SAT-TV applications |
| Mu | Multibase base |
| LifeControl | LifeControl |
| EX | Intrinsically safe protection device for areas with a risk of explosions |
| Class EA | Channel Performance to ISO / IEC 11801 |
| PoE | Power over Ethernet |
| 230/400 V System | 230/400 V system |
| M | Metric |

## Applications

| | |
|---|---|
| IP 65 | Degree of protection of enclosure IP 65 |

## Metals

| | |
|---|---|
| Alu | Aluminium |
| VA | Stainless steel, grade 304 |
| VA | Stainless steel, grade 316 |
| VA | Stainless steel, grade 316 L |
| VA | Stainless steel, grade 316 Ti |
| Cu | Copper |
| CuZn 37 | Brass |
| St | Steel |
| TG | Cast iron |
| Zn | Die-cast zinc |

## Plastics

| | |
|---|---|
| GFK | Fibre-glass-reinforced plastic |
| P | Petrolatum |
| PA | Polyamide |
| PC | Polycarbonate |
| PE | Polyethylene |
| PP | Polypropylene |
| PS | Polystyrene |

## Surfaces

| | |
|---|---|
| FS | Strip-galvanised |
| F | Hot-dip galvanised |
| G | Electro-galvanised |
| FT | Hot-dip galvanised |
| Cu | Copper-plated |
| N | Nickel-plated |
| ZD | Galvanised, Deltatone 500 |

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# Metallic materials

**Alu — Aluminium**

**VA (1.4301) — Stainless steel, grade 304**

**VA (1.4401) — Stainless steel, grade 316**

**VA (1.4404) — Stainless steel, grade 316 L**

**VA (1.4571) — Stainless steel, grade 316 Ti**

**Cu — Copper**

**CuZn — Brass**

**St — Steel**

**TG — Cast iron**
Electrogalvanised

**Zn — Die-cast zinc**



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# Plastic materials

## GFK — Fibre-glass-reinforced plastic
Temperature resistance:
-50 to 130 °C.
**Resistant to**
High chemical resistance
Corrosion resistance
UV light resistance

## PETR — Petrolatum

## PA — Polyamide
Temperature resistance:
permanently up to approx. 90 °C, briefly up to about 130 °C and to about minus 40 °C*.
Chem. resistance generally as for polyethylene.
**Resistant to**
Petrol, benzene, diesel oil, acetone, solvents for paints and lacquers, oils and greases.
**Unstable with**
Bleach, most acids, chlorine.
**Risk of tension cracking**
Low in air-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/PP — Polyamide/Polyethylene

## 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 tension cracking**
Relatively low.
Media which can cause tension cracking include benzene, aromatic hydrocarbons, methanol, butanol, acetone, turpentine.

## PE — Polyethylene
Temperature resistance:
hard types permanently up to about 90 °C, briefly up to about 105 °C, soft types permanently up to about 80 °C, briefly up to about 100 °C and to about minus 40 °C*.
**Resistant to**
Alkalis and inorganic acids.
**Conditionally resistant to**
Acetone, organic acids, petrol, benzene, diesel oil, most oils.
**Unstable with**
Chlorine, hydrocarbons, oxidising acids.
**Risk of tension cracking**
Relatively high.
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 — Polypropylene
Temperature resistance:
permanently up to approx. 90 °C, briefly up to about 110 °C and to about minus 30 °C*.
Chem. resistance generally as for polyethylene.
**Resistant to**
Alkalis and inorganic acids.
**Conditionally resistant to**
Acetone, organic acids, petrol, benzene, diesel oil, most oils.
**Unstable with**
Chlorine, hydrocarbons, oxidising acids.
**Risk of tension cracking**
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.
**Conditionally resistant to**
Oils and greases.
**Unstable with**
Butyric acid, concentrated nitric acid, concentrated acetic acid, acetone, ether, petrol and benzene, solvents for paints and lacquers, chlorine, diesel fuel.
**Risk of tension cracking**
Relatively high.
Stress cracks can be caused by, amongst other things, acetone, ether, petrol, cyclohexane, heptane, methanol, propanol and the softeners used in some PVC cable mixes.

*The minus values apply only for parts in the quiescent 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 supports of cable glands, ribbon clips.

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# Tested lightning protection components

## Tightening torques

M5 = 4 Nm

M6 = 6 Nm

M8 = 12 Nm

M10 = 20 Nm

Detailed data can be provided on request.



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# Brief glossary of overvoltage protection

### 100% response lightning impulse voltage
The 100% response lightning impulse voltage is the value of the lightning impulse voltage 1.2/50 µs, causing the arrestor to switch. With this testing voltage, the surge protection device must respond ten times to ten loads.

### Arrestor
Arrestors are resources, which primarily consist of voltage-dependent resistors and/or spark gaps. Both elements can be switched in series or in parallel or used individually.
Arrestors are used to protect other electrical resources and electrical systems against surge voltages.

### Arrestor measured voltage Vc
For arrestors without a spark gap, the measured voltage is the maximum permitted effective value of the mains voltage on the arrestor terminals. The measured voltage may constantly be applied to the arrestor without changing its operational characteristics.

### Back-up fuse before the arrestors
There must be a back-up fuse before the arrestors. If the upstream fuse is greater than the maximum approved back-up fuse of the arrestor elements (see technical data of the device), the arrestor must be protected selectively with the required value.

### Cut-off unit
The cut-off unit cuts the arrestor off from the mains or the earthing system if it is overloaded, thus preventing a fire risk and also signalling the switch-off of the protection device.

### Equipotential bonding
Electrical connection, which brings the bodies of electrical resources and other conductive parts to the same or almost the same potential.

### Equipotential bonding rail (PAS)
A terminal or rail, intended to connect the protective conductor, the equipotential bonding conductor and, if necessary, the conductor for function earthing with the earthing cable and the earthers.

### Error current protection unit (RCD)
Resource for protection against electric shocks and fire protection (e.g. FI protection switches).

### Lightning protection equipotential bonding system
The lightning protection equipotential bonding is a key measure in reducing the risk of fire and explosion on the room or building to be protected. The lightning protection equipotential bonding is achieved using equipotential bonding cables or arrestors, which connect the external lightning protection system, metallic parts of the building or room, the installation, the other conductive parts and the electrical energy and telecommunications systems.

### Lightning protection system (LPS)
A lightning protection system (LPS) is considered as the entire system used to protect a room or building against the impact of a lightning strike. This includes both internal and external lightning protection.

### Lightning protection zone (LPZ)
Lightning protection zones are those areas in which the electromagnetic environment of the lightning is to be defined and mastered. At the zone transitions, all cables and metallic parts must be integrated into the equipotential bonding system.

### Lightning surge current (Iimp)
A lightning surge current (lightning current carrying capacity per path) is a standardised surge current curve of the shape 10/350 µs. With its parameters
- Peak value
- Charge
- Specific energy

it represents the load from natural lightning currents. Type 1 lightning current arrestors (previously requirement class B) must be able to arrest such lightning currents without being destroyed.

### Line follow current quenching (If)
The follow current – also called network follow current – is the current which flows through the surge protection device after an arresting operation and is supplied by the network. The follow current is considerably different from the continuous operating current. The level of the network follow current is dependent on the feed line from the transformer to the arrestor.

### Nominal current (In)
The nominal current is the maximum permitted operating current which may be run continually through the appropriately labelled connection terminals.

### Nominal discharge surge current (In)
Peak value of the current flowing through the arrestor with the wave shape 8/20. It is used to classify the testing of surge arrestors of type 2 (formerly requirements Class C).

### Nominal frequency (fn)
The nominal frequency is that frequency for which a resource is measured, by which it is called and upon which other nominal parameters refer.

### Nominal voltage (Vn)
The rated voltage is the voltage value for which a resource is designed. In so doing it might be a direct voltage value or the effective value of a sine-form alternating voltage.

### Surge protection device (ÜSG)
A device intended for the limitation of transient surge voltages and arresting of surge voltages. It contains at least one non-linear construction element. In general speech, surge protection devices are also termed arrestors.

### Protection level (Up)
The protection level is the highest current voltage value on the terminals of the surge protection device before response.

### Residual voltage (Vres)
The peak voltage value, occurring via the terminals of the surge protection device during or immediately after the arresting surge current has flowed.

### Short-circuit resistance
The surge protection device must be able to conduct the short-circuit current, until it is either interrupted by the device itself or by an internal or external cut-off unit or by mains-side over-current protection (e.g. back-up fuse).

### Response time (ta)
The response time primarily characterises the response behaviour of the individual protection elements used in arrestors. Depending on the slope du/dt of the surge voltage or di/dt of the surge current, the response times may vary within specific limits.

### SPD
Surge protection device.

### Surge arrestor, type 1
Arrestors, which, due to their special structure, are able to arrest lighting currents or partial lightning currents during direct strikes.

### Surge arrestor, type 2
Arrestors, which are able to arrest surge voltages cause by remote or nearby strikes or switching actions.

### Surge arrestor, type 3
Arrestors, used for surge protection of individual consumers or consumer groups and are employed directly on sockets.

### Surge voltage
A surge voltage is a voltage occurring briefly between conductors or between a conductor and the earth, which exceeds the highest permissible operating voltage value by a long way, but does not have the operating frequency. It can be created by storms or by earthing or short-circuits.

### Temperature range
The operating temperature specifies within which temperature limits the perfect function of the surge protection device is guaranteed.

### Transient surge voltage (TOV)
Temporary surge voltages are short-term (i.e. temporary) surge voltages, which may occur due to errors within the medium and low-voltage network.

### Transmission frequency (fg)
The transmission frequency specifies up to which frequency the insertion damping of the employed resource is less than 3 dB.

### Volume resistance per path, series resistance
The volume resistance per path specifies the ohmic resistance increase of the conductor path per wire caused by the use of the surge protection device.



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# Conversion table, cable material

## Conversion table, cable material

| Designation | Item number | Weight approx. (kg/m) | Weight approx. (kg/100 m) | Length approx. (m/kg) |
|---|---|---|---|---|
| **Flat conductor St/FT, 20x2.5** | 5019340 | 0.41 | 41 | 2.44 |
| **Flat conductor St/FT, 25x3** | 5019342 | 0.60 | 59.7 | 1.68 |
| **Flat conductor St/FT, 30x3** | 5019344 | 0.71 | 70.65 | 1.42 |
| **Flat conductor St/FT, 30x3.5** | 5019345/5019347 | 0.84 | 84 | 1.19 |
| **Flat conductor St/FT, 30x4** | 5019350 | 0.97 | 97 | 1.03 |
| **Flat conductor St/FT, 40x4** | 5019355 | 1.28 | 128 | 0.78 |
| **Flat conductor St/FT, 40x5** | 5019360 | 1.62 | 162 | 0.62 |
| **Flat conductor copper, 20x2.5** | 5021804 | 0.45 | 44.5 | 2.25 |
| **Flat conductor VA, 30x3.5** | 5018501 (V2A)<br>5018706 (V4A)<br>5018730 (V4A) | 0.83 | 82.5 | 1.21 |
| **St/FT round cable, 8 mm** | 5021081 | 0.40 | 40 | 2.50 |
| **St/FT round cable, 10 mm** | 5021103 | 0.63 | 63 | 1.59 |
| **Aluminium round cable, 8 mm** | 5021286<br>5021294 | 0.14 | 13.5 | 7.41 |
| **Aluminium round cable, 10 mm** | 5021308 | 0.21 | 21 | 4.76 |
| **Copper round cable, 8 mm** | 5021480 | 0.45 | 45 | 2.22 |
| **Copper round cable, 10 mm** | 5021502 | 0.70 | 70 | 1.43 |
| **VA round cable, 8 mm** | 5021235 (V2A)<br>5021644 (V4A) | 0.40 | 40 | 2.50 |
| **VA round cable, 10 mm** | 5021227 (V2A)<br>5021239 (V2A)<br>5021642 (V4A)<br>5021647 (V4A) | 0.63 | 63 | 1.59 |
| **St/FT round cable with PVC jacket, 10 mm** | 5021162 | 0.67 | 67.2 | 1.49 |
| **Aluminium round cable with PVC jacket, 8 mm** | 5021332 | 0.20 | 20 | 5.00 |
| **Copper cable, 9 mm** | 5021650 | 0.45 | 44.5 | 2.25 |
| **Copper cable, 10.5 mm** | 5021654 | 0.59 | 58.6 | 1.71 |



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# Surge protection energy technology, arrestor, type 2+3


| | | | |
|---|---|---|---|
| | Surge arrestor | V10 Compact | 200 |
| | | V10, 280 V | 202 |
| | | V10, 320 V | 203 |
| | Accessories, upper parts and bases V10 | | 204 |
| | Protection packages | | 207 |


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# Surge arrestor V10 Compact

LPZ 1→3 | Type 2+3

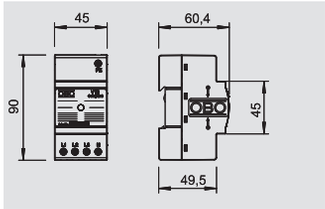
Surge arrestor, compact module, type 2+3
- For surge protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 60 kA (8/20) in total
- Incl. thermal and dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrestor for use in distributor housings
- Integrated 3+1 solution for TN and TT network systems of a 45 mm module width

Application: Industry, housing and device protection of rotary current systems.

## Surge arrestor Compact 150 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10 COMPACT 150** | 150 | 3 + NPE | | 1 | 15.800 | **5093 37 8** |

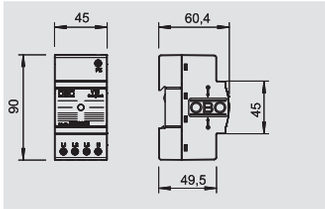
/pc.



## Surge arrestor Compact 280 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10 COMPACT 255** | 255 | 3 + NPE | | 1 | 15.800 | **5093 38 0** |

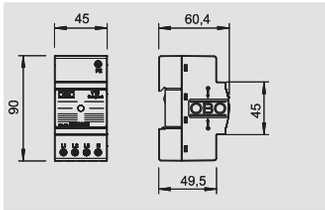
/pc.



## Surge arrestor Compact 385 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10 COMPACT 385** | 385 | 3 + NPE | | 1 | 16.800 | **5093 38 4** |

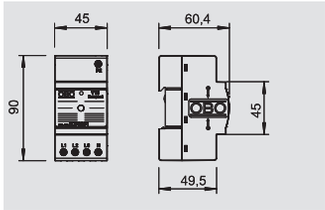
/pc.

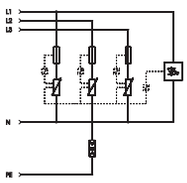
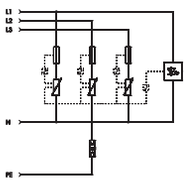
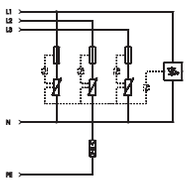
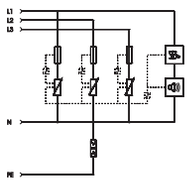


## Surge arrestor Compact with acoustic signalling

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10 COMPACT-AS** | 255 | 3 + NPE | | 1 | 15.800 | **5093 39 1** |

/pc.




| | | | V10 COMPACT 150 | V10 COMPACT 255 | V10 COMPACT 385 | V10 COMPACT-AS |
|---|---|---|---|---|---|---|
| | | |  |  |  |  |
| Nominal voltage | $U_N$ | V | 130 | 230 | 385 | 230 |
| SPD to EN 61643-11 | | | Type 2+3 | Type 2+3 | Type 2+3 | Type 2+3 |
| SPD to IEC 61643-11 | | | class II+III | class II+III | class II+III | class II+III |
| Lightning protection Zone LPZ | | | 1→3 | 1→3 | 1→3 | 1→3 |
| Nominal discharge current (8/20) | $I_n$ | kA | 10 | 10 | 10 | 10 |
| Total discharge current (8/20) | $I_{Total}$ | kA | 60 | 60 | 60 | 60 |
| Maximum discharge current | $I_{max}$ | kA | 20 | 20 | 20 | 20 |
| Voltage protection level | $U_p$ | kV | < 0,7 | < 1,1 | < 1,5 | < 1,1 |
| Response time | $t_A$ | ns | < 25 | < 25 | < 25 | < 25 |
| Maximum back-up fuse | | A | 63 | 63 | 63 | 63 |
| Temperature range | ϑ | °C | -40 - +80 | -40 - +80 | -40 - +80 | -40 - +80 |
| Division unit TE (17.5 mm) | | | 2.5 | 2.5 | 2.5 | 2.5 |
| Degree of protection of enclosure | | | IP20 | IP20 | IP20 | IP20 |
| Connection cross-section, rigid | | mm² | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 |
| Connection cross-section, multi-wire | | mm² | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 |
| Connection cross-section, flexible | | mm² | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 | 2,5 - 10 |
| **Item No.** | | | **5093 37 8** | **5093 38 0** | **5093 38 4** | **5093 39 1** |

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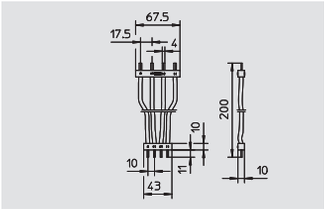
Always indicate the item number when ordering.

Surge arrestor, compact module, type 2+3
- For surge protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 60 kA (8/20) in total
- Incl. thermal and dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrestor for use in distributor housings
- Integrated 3+1 solution for TN and TT network systems of a 45 mm module width

Application: Industry, housing and device protection of rotary current systems.

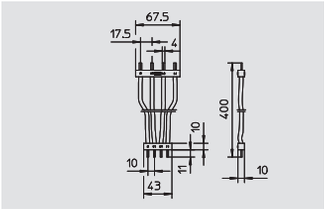
LPZ 1→3 | Type 2+3




## Connecting bridge for V10 Compact 200 mm

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **VB-V10 COMPACT-2** | 200 mm | | 1 | 5.300 | **5089 65 0** |

/pc.




## Connecting bridge for V10 Compact 400 mm

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **VB-V10 COMPACT-4** | 400 mm | | 1 | 8.900 | **5089 65 2** |

/pc.

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# Surge arrestor V10, 280 V

Type 2+3 | LPZ 1→3

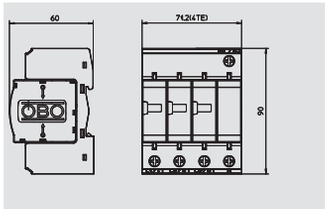
Surge arrestor, type 2+3
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 20 kA (8/20) per pin
- Arrestor, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrestor for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding and device protection in main and subdistributors

## Surge arrestor, 3-pole + NPE

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 3+NPE** | 280 | 3 + NPE | | 1 | 37.800 | **5094 92 0** |

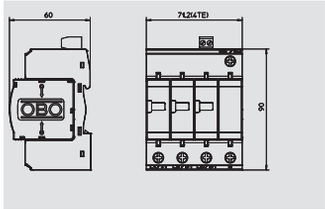
/pc.



## Surge arrestor, 3-pole + NPE with remote signalling

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 3+NPE+FS** | 280 | 3 + NPE | | 1 | 37.900 | **5094 93 1** |

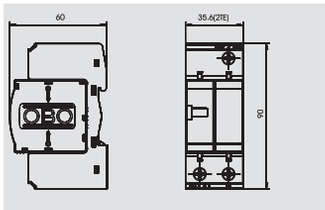
/pc.

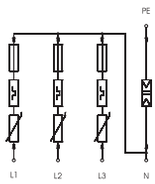
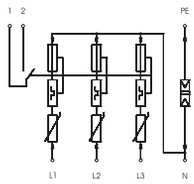
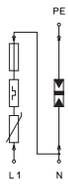


## Surge arrestor, 1-pole + NPE

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 1+NPE-280** | 280 | 1 + NPE | | 1 | 22.200 | **5093 41 8** |

/pc.




| | | | V10-C 3+NPE | V10-C 3+NPE+FS | V10-C 1+NPE-280 |
|---|---|---|---|---|---|
| | | |  |  |  |
| Nominal voltage | $U_N$ | V | 230 | 230 | 230 |
| SPD to EN 61643-11 | | | Type 2+3 | Type 2+3 | Type 2+3 |
| SPD to IEC 61643-11 | | | class II+III | class II+III | class II+III |
| Lightning protection Zone LPZ | | | 1→3 | 1→3 | 1→3 |
| Nominal discharge current (8/20) | $I_n$ | kA | 10 | 10 | 10 |
| Total discharge current (8/20) | $I_{Total}$ | kA | 40 | 40 | 40 |
| Maximum discharge current | $I_{max}$ | kA | 20 | 20 | 20 |
| Voltage protection level | $U_p$ | kV | < 1,1 | < 1,1 | < 1,1 |
| Response time | $t_A$ | ns | <25 | <25 | < 25 |
| Maximum back-up fuse | | A | 125 | 125 | 125 |
| Temperature range | ϑ | °C | -40 - +80 | -40 - +80 | -40 - +80 |
| Division unit TE (17.5 mm) | | | 4 | 4 | 2 |
| Degree of protection of enclosure | | | IP20 | IP20 | IP20 |
| Connection cross-section, rigid | | mm² | 2,5 - 35 | 2,5 - 35 | 2,5 - 35 |
| Connection cross-section, multi-wire | | mm² | 2,5 - 35 | 2,5 - 35 | 2,5 - 35 |
| Connection cross-section, flexible | | mm² | 2,5 - 25 | 2,5 - 25 | 2,5 - 35 |
| **Item No.** | | | **5094 92 0** | **5094 93 1** | **5093 41 8** |

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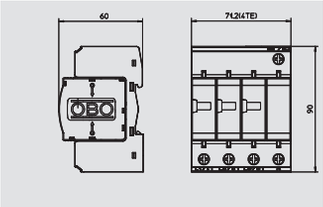
# Surge arrestor V10, 320 V

Type 2+3 | LPZ 1→3

Surge arrestor, type 2+3
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 20 kA (8/20) per pin
- Arrestor, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrestor for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding and device protection in main and subdistributors

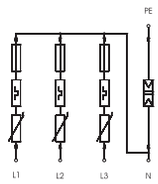



## Surge arrestor, 3-pole + NPE

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 3+NPE-320** | 320 | 3 + NPE | | 1 | 39.000 | **5094 92 4** |

/pc.

V10-C 3+NPE-320




| | | | |
|---|---|---|---|
| Nominal voltage | $U_N$ | V | 320 |
| SPD to EN 61643-11 | | | Type 2+3 |
| SPD to IEC 61643-11 | | | class II+III |
| Lightning protection Zone LPZ | | | 1→3 |
| Nominal discharge current (8/20) | $I_n$ | kA | 10 |
| Total discharge current (8/20) | $I_{Total}$ | kA | 40 |
| Maximum discharge current | $I_{max}$ | kA | 20 |
| Voltage protection level | $U_p$ | kV | < 1,2 |
| Response time | $t_A$ | ns | <25 |
| Maximum back-up fuse | | A | 125 |
| Temperature range | ϑ | °C | -40 - +80 |
| Division unit TE (17.5 mm) | | | 4 |
| Degree of protection of enclosure | | | IP20 |
| Connection cross-section, rigid | | mm² | 2,5 - 35 |
| Connection cross-section, multi-wire | | mm² | 2,5 - 35 |
| Connection cross-section, flexible | | mm² | 2,5 - 25 |
| **Item No.** | | | **5094 92 4** |

Always indicate the item number when ordering.



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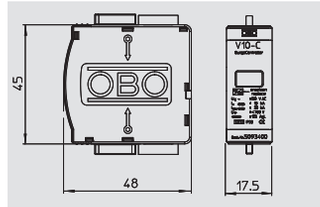
# Accessories, upper parts and bases V10

## Upper part, surge arrestor 150 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 0-150** | 150 | 1-pole | | 1 | 3.300 | **5093 40 0** |

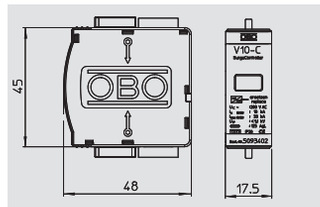
/pc.



## Upper part, surge arrestor 280 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 0-280** | 280 | 1-pole | | 1 | 3.360 | **5093 40 2** |

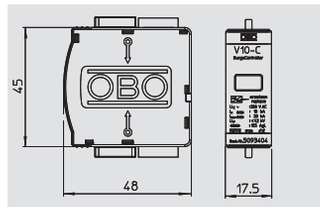
/pc.



## Upper part, surge arrestor 320 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 0-320** | 320 | 1-pole | | 1 | 3.510 | **5093 40 4** |

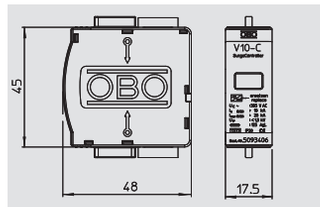
/pc.

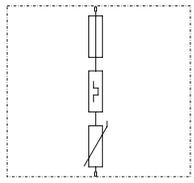
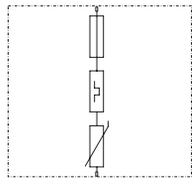
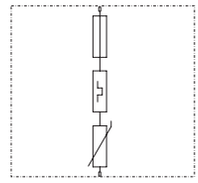
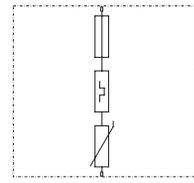


## Upper part, surge arrestor 385 V

| Type | Max. continuous operating voltage V | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **V10-C 0-385** | 385 | 1-pole | | 30 | 3.630 | **5093 40 6** |

/pc.




| | | | V10-C 0-150 | V10-C 0-280 | V10-C 0-320 | V10-C 0-385 |
|---|---|---|---|---|---|---|
| | | |  |  |  |  |
| Max. continuous operating voltage | $U_C$ | V | 150 | 280 | 320 | 385 |
| SPD to EN 61643-11 | | | Type 2+3 | Type 2+3 | Type 2+3 | Type 2+3 |
| SPD to IEC 61643-11 | | | class II+III | class II+III | class II+III | class II+III |
| Lightning protection Zone LPZ | | | 1→3 | 1→3 | 1→3 | 1→3 |
| Nominal discharge current (8/20) | $I_n$ | kA | 10 | 10 | 10 | 10 |
| Total discharge current (8/20) | $I_{Total}$ | kA | 10 | 10 | 10 | 10 |
| Maximum discharge current | $I_{max}$ | kA | 20 | 20 | 20 | 20 |
| Voltage protection level | $U_p$ | kV | < 0,7 | < 1,1 | < 1,2 | < 1,5 |
| Response time | $t_A$ | ns | < 25 | < 25 | < 25 | < 25 |
| Maximum back-up fuse | | A | 125 | 125 | 125 | 125 |
| Temperature range | ϑ | °C | -40 - +80 | -40 - +80 | -40 - +80 | -40 - +80 |
| Division unit TE (17.5 mm) | | | 1 | 1 | 1 | 1 |
| Degree of protection of enclosure | | | IP20 | IP20 | IP20 | IP20 |
| **Item No.** | | | **5093 40 0** | **5093 40 2** | **5093 40 4** | **5093 40 6** |

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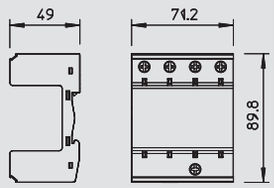
Always indicate the item number when ordering.

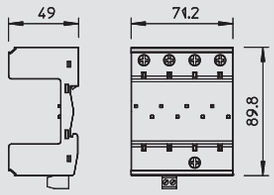



## Base, Multibase

| Type | Version | Dividing unit TE (17.5 mm) | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **MB 1** | 1-pole | 1 | | 1 | 6.200 | **5096 64 8** |
| **MB 2** | 2-pole | 2 | | 1 | 11.200 | **5096 65 3** |
| **MB 3** | 3-pole | 3 | | 1 | 16.000 | **5096 66 5** |
| **MB 4** | 4-pole | 4 | | 1 | 21.000 | **5096 68 0** |

/pc.

- Suitable for V25-B+C, V20-C and V10-C
- Pre-mounted and ready for connection
- For TN systems
- Multifunction terminals for easy circuit of series-mounted devices
- Upper parts can be rotated through 180 degrees

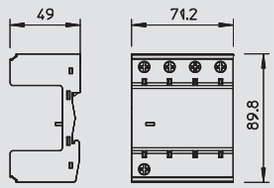



## Base, Multibase with remote signalling

| Type | Version | Dividing unit TE (17.5 mm) | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **MB 1+FS** | 1-pole | 1 | | 1 | 6.700 | **5096 64 9** |
| **MB 2+FS** | 2-pole | 2 | | 1 | 11.700 | **5096 65 4** |
| **MB 3+FS** | 3-pole | 3 | | 1 | 16.500 | **5096 66 7** |
| **MB 4+FS** | 4-pole | 4 | | 1 | 21.000 | **5096 68 2** |

/pc.

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Upper parts can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring

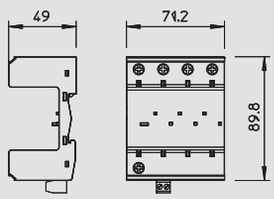



## Base, Multibase + NPE

| Type | Version | Dividing unit TE (17.5 mm) | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **MB 1+NPE** | 1 + NPE | 2 | | 1 | 11.500 | **5096 65 0** |
| **MB 2+NPE** | 2 + NPE | 3 | | 1 | 16.100 | **5096 65 5** |
| **MB 3+NPE** | 3 + NPE | 4 | | 1 | 20.000 | **5096 66 9** |

/pc.

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Upper parts can be rotated through 180 degrees
- For TN-S and TT network systems

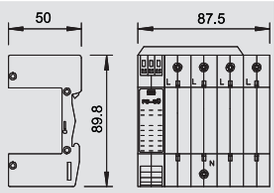



## Base, Multibase + NPE with remote signalling

| Type | Version | Dividing unit TE (17.5 mm) | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **MB 1+NPE+FS** | 1 + NPE | 2 | | 1 | 11.600 | **5096 65 1** |
| **MB 2+NPE+FS** | 2 + NPE | 3 | | 1 | 16.000 | **5096 65 7** |
| **MB 3+NPE+FS** | 3 + NPE | 4 | | 1 | 21.300 | **5096 67 1** |

/pc.

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Upper parts can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring
- 3+1 protection circuit for TN-S and TT network systems




## Base, Multibase with fuse monitoring

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **V20-C U-3 FS-SÜ** | 3-pole | | 1 | 26.000 | **5096 35 9** |
| **V20-C U-4 FS-SÜ** | 4-pole | | 1 | 33.000 | **5096 36 7** |

/pc.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrestor upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- Pre-mounted and ready for connection



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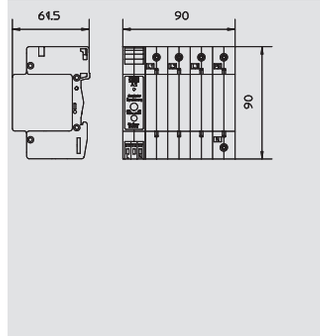
# Accessories, upper parts and bases V10

## Base, Multibase with acoustic signalling

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **V20-C U-2 AS** | 2-pole | | 1 | 23.000 | **5096 41 3** |
| **V20-C U-3 AS** | 3-pole | | 1 | 29.000 | **5096 42 1** |
| **V20-C U-4 AS** | 4-pole | | 1 | 35.000 | **5096 44 8** |
| **V20-C U-3+NPE-AS** | 3 + NPE | | 1 | 32.500 | **5096 37 2** |

/pc.

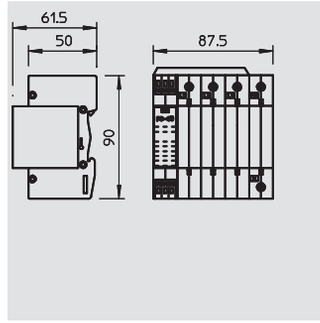



- Suitable for V 25-B+C, V 20-C and V 10-C
- With remote signaling, potential-free changeover contact, for function monitoring
- With acoustic signalling for function monitoring, signal tone can be shut down for 24 h
- Pre-mounted and ready for connection

## Base, Multibase + NPE with fuse monitoring

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **V20-C U-3+NPE** | 3-NPE with FS-SÜ | | 1 | 30.000 | **5096 37 0** |

/pc.

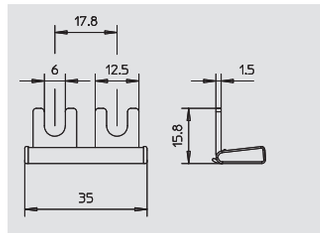



- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrestor upper part, remote signalling
- With remote signalling, potential-free changeover contact, for function monitoring
- For TN-S and TT network systems
- Pre-mounted and ready for connection

## Copper bridges with step width 17.6 mm

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **KB MB** | Step width 17.6 mm | | 10 | 0.900 | **5089 66 0** |

/pc.

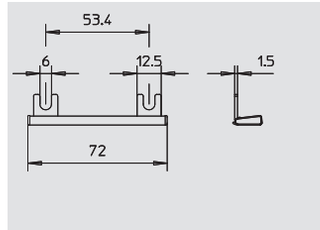



The KB... bridges allow parallel switching of bases and poles of the MultiBase bases.
The bridges are available in various widths.

## Copper bridges with step width 53.4 mm

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **KB MB** | Step width 53.4 mm | | 10 | 1.470 | **5089 66 2** |

/pc.

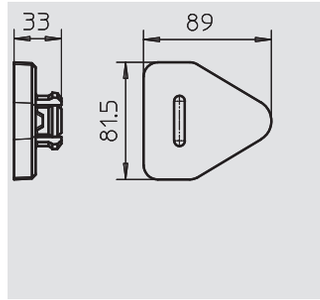



The bridges KB... permit parallel connection of bases and poles of the MultiBase bases.
The bridges are available in various widths.

## Shock Guard locking

| Type | Colour | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|---|
| **MB-SG** | Blue | Locking system for upper parts | | 100 | 0.060 | **5096 69 5** |

PA Polyamide /pc.

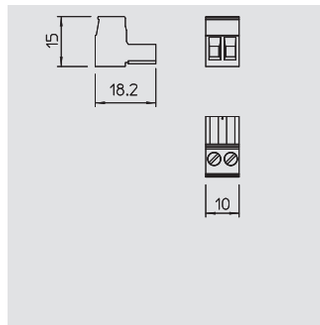



Shock Guard: Locking for connector technology on MultiBase bases
Locking system for the plug-in modules/covers
Vibration and shock-tested
Use in housing hole of the connection terminals
Upper parts can be removed without tools

## Remote signalling replacement connector for Multibase

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **MB-FS** | 2-pole | | 25 | 0.310 | **5096 69 3** |

/pc.




Replacement telephony connector, 2-pin version, for Multibase base

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OBO protection packages with surge arrestor

Type 3 | LPZ 2→3

- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Type 2 surge protection with arresting capacity to 40 kA (8/20) per pin
- Type 2 arrestor, connectable with dynamic cut-off unit and function display
- Type 3 (fine protection device) in TC, SAT or TV version

The appropriate adapters and data cables are included in the protection package.

Application: Equipotential bonding and device protection, VDE and GS tested.

## Protection package, telecommunications

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **P-TK** | 1 x V20-C/3+NPE<br>2 x FC-D<br>1 x FC-TAE-D | | 1 | 92.000 | **5086 01 9** |

/pc.

## Protection package, SAT applications

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **P-TK+SAT** | 1 x V20-C/3+NPE<br>1 x FC-D<br>1 x FC-TAE-D<br>1 x FC-SAT-D | | 1 | 98.000 | **5086 02 3** |

/pc.

## Protection package, TV

| Type | Version | | Pack. pcs | Weight kg/100 pcs. | Item No. |
|---|---|---|---|---|---|
| **P-TK+TV** | 1 x V20-C/3+NPE<br>1 x FC-D<br>1 x FC-TAE-D<br>1 x FC-TV-D | | 1 | 98.000 | **5086 02 7** |

/pc.

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| 541197 | **5229 55 3** | | 350 |
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| 544623 | **5230 21 7** | | 349 |
| 562953 | **5230 32 2** | | 349 |
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| 589284 | **5304 27 0** | | 357 |
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| 550305 | **5304 52 0** | | 363 |

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| 581775 | **5304 66 0** | | 358 |
| 541695 | **5304 97 0** | | 358 |
| 541707 | **5304 99 7** | | 322 |
| 541731 | **5311 03 9** | | 359 |
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| 541803 | **5312 13 2** | | 361 |
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| 570086 | **5312 31 8** | | 320 |
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| 523719 | **5315 55 7** | | 322 |
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| 541983 | **5315 70 0** | | 359 |
| 541989 | **5316 01 4** | | 366 |
| 541995 | **5316 15 4** | | 366 |
| 581835 | **5316 17 0** | | 366 |
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| 542007 | **5316 25 1** | | 366 |
| 542013 | **5316 30 8** | | 365 |
| 542019 | **5316 32 4** | | 366 |

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| 542043 | **5317 01 0** | | 363 |
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| 542097 | **5317 47 9** | | 365 |
| 585086 | **5317 48 1** | | 364 |
| 542103 | **5318 08 4** | | 363 |
| 542109 | **5318 14 9** | | 363 |
| 542127 | **5320 01 1** | | 368 |
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| 542151 | **5320 69 0** | | 369 |
| 542157 | **5320 70 4** | | 369 |
| 542163 | **5320 71 2** | | 369 |
| 542187 | **5325 30 7** | | 367 |
| 542193 | **5325 31 5** | | 367 |
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| 542247 | **5326 31 1** | | 368 |
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| 545367 | **5328 28 4** | | 359 |
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| 588557 | **5331 00 8** | | 369 |
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| 562905 | **5400 62 7** | | 315 |
| 590133 | **5401 77 1** | | 334 |
| 542781 | **5401 80 1** | | 334 |
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| 589839 | **5401 85 2** | | 334 |
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| 542817 | **5402 15 8** | | 335 |
| 542841 | **5402 80 8** | | 334 |
| 542847 | **5402 85 9** | | 334 |
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| 507008 | **5403 12 4** | | 334 |
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| 587156 | **5408 03 1** | | 391 |
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| 581377 | **5408 05 8** | | |

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| 544641 | **5412 63 3** | | 352 |
| 575235 | **5412 80 3** | | 353 |

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| 575229 | **5412 81 1** | | 353 |
| 542967 | **5416 56 6** | | 374 |
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| 562929 | **5420 01 6** | | 322 |
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| 543057 | **5430 15 1** | | 316 |
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| 500622 | **6117 46 7** | | 213 |
| 611767 | **6117 47 3** | | 213 |
| 500621 | **6117 47 5** | | 213 |
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| 604908 | **6404 00 6** | | 306 |
| 604920 | **6404 01 4** | | 306 |

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| 101 16-1500 | 1500/ GFK | 5613213 | 5408 10 8 | | 382 |
| 101 16-3000 | 3000/ GFK | 5613220 | 5408 10 9 | | 382 |
| 101 16-750 | 750/ GFK | 5613206 | 5408 10 7 | | 382 |
| 101 20-3000 | 3000/ GFK | 5690733 | 5408 10 5 | | 382 |
| 101 20-6000 | 6000/ GFK | 5636731 | 5408 14 8 | | 382 |
| 101 3B-4000 | 2000/ Al | 5674733 | 5402 86 4 | | 337 |
| 101 3B-4500 | 2500/ Al | 5674740 | 5402 86 6 | | 337 |
| 101 3B-5000 | 3000/ Al | 5674757 | 5402 86 8 | | 337 |
| 101 3B-5500 | 3500/ Al | 5674764 | 5402 87 0 | | 337 |
| 101 3B-6000 | 4000/ Al | 5674795 | 5402 87 2 | | 337 |
| 101 3B-6500 | 4500/ Al | 5674801 | 5402 87 4 | | 337 |
| 101 3B-7000 | 5000/ Al | 5674818 | 5402 87 6 | | 337 |
| 101 3B-7500 | 5500/ Al | 5674825 | 5402 87 8 | | 337 |
| 101 3B-8000 | 5500/ Al | 5674856 | 5402 88 0 | | 337 |
| 101 3-ES-16 | 750 | 5613329 | 5408 97 6 | | 382 |
| | | | | /100 pc. | |
| 101 A-1500 | 1500/ St / FT | 5427575 | 5400 15 5 | | 315 |
| 101 A-1500 | 1500/ St / FT | 5427575 | 5400 15 5 | | 332 |
| 101 A-1500 | 1500/ St / FT | 5427575 | 5400 15 5 | | 375 |
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| 101 A-16 | 1660/ Al | 5613268 | 5408 35 2 | | 383 |
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| 101 A-CU | 1500/ Cu | 5629054 | 5400 62 7 | | 315 |
| 101 A-CU | 1500/ Cu | 5629054 | 5400 62 7 | | 333 |
| 101 A-CU | 1500/ Cu | 5629054 | 5400 62 7 | | 375 |
| 101 A-L100 | 1000/ St / FT | 5428411 | 5402 80 8 | | 334 |
| 101 A-L150 | 1500/ St / FT | 5428473 | 5402 85 9 | | 334 |
| 101 ALU-1000 | 1000/ Al | 5901334 | 5401 77 1 | | 334 |
| 101 ALU-1500 | 1500/ Al | 5427810 | 5401 80 1 | | 334 |
| 101 ALU-2000 | 2000/ Al | 5427872 | 5401 83 6 | | 334 |
| 101 ALU-2500 | 2500/ Al | 5898399 | 5401 85 2 | | 334 |
| 101 ALU-3000 | 3000/ Al | 5902119 | 5401 87 9 | | 334 |
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| 101 A-M16 | 2060/ Al | 5674474 | 5408 35 0 | | 383 |
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| 101 B-16 M16 | M16 | 5897910 | 5402 95 6 | | 335 |
| 101 B-16 M16 | M16 | 5897910 | 5402 95 6 | | 383 |
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| 101 BB-16 | 1640 | 5613381 | 5408 98 8 | | 385 |
| 101 BP-16 | 17540 | 5613367 | 5408 98 4 | | 385 |
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| 101 F1000 | 1000/ St / FT | 5430094 | 5424 10 0 | | 335 |
| 101 F1500 | 1500/ St / FT | 5430216 | 5424 15 1 | | 316 |
| 101 F1500 | 1500/ St / FT | 5430216 | 5424 15 1 | | 375 |
| 101 F1500 | 1500/ St / FT | 5430216 | 5424 15 1 | | 335 |
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| 101 F-16 | 16121 | 5613428 | 5408 99 2 | | 385 |
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| 101 F2000 | 2000/ St / FT | 5430339 | 5424 20 8 | | 316 |
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| 101 FS-16 | 750 | 5613343 | 5408 98 0 | | 382 |
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| 101 G1000 | 1000/ St / FT | 5428053 | 5402 10 7 | | 335 |
| 101 G1500 | 1500/ St / FT | 5428176 | 5402 15 8 | | 335 |
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| 101 HV-16 | 1690 | 5613411 | 5408 99 0 | | 385 |
| 101 IAB | 18/ Al | 5673750 | 5408 73 3 | | 386 |
| 101 IAG | 20107/ Al | 5674290 | 5408 50 4 | | 384 |
| 101 IAG-16 | 16107/ Al | 5613282 | 5408 50 6 | | 384 |
| 101 IDK | 20125/ Al | 5895817 | 5408 24 5 | | 383 |
| 101 IDK-16 | 16125/ Al | 5613244 | 5408 24 7 | | 383 |
| 101 IES | 2060/ Al | 5674412 | 5408 39 3 | | 383 |
| 101 IES-16 | 1660/ Al | 5613275 | 5408 39 5 | | 383 |
| 101 IGL | 20127/ Al | 5674177 | 5408 62 8 | | 384 |
| 101 IGL-16 | 16127/ Al | 5613312 | 5408 63 0 | | 384 |
| 101 IK | 20100/ Al | 5895879 | 5408 29 6 | | 383 |
| 101 IK-16 | 16100/ Al | 5613251 | 5408 29 8 | | 383 |
| 101 ISP M10 | 110/ Al | 5674351 | 5408 45 8 | | 386 |
| 101 IT | 2065/ Al | 5681496 | 5408 15 6 | | 382 |
| 101 IT-16 | 1660/ Al | 5613237 | 5408 15 8 | | 382 |
| 101 IV | 2060/ Al | 5674238 | 5408 55 5 | | 384 |
| 101 IV-16 | 1660/ Al | 5613299 | 5408 55 7 | | 384 |
| 101 IW-M10 | 2060/ Al | 5673811 | 5408 68 7 | | 383 |
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| 101 J1000 | 1000/ Al | 5034810 | 5401 97 0 | | 332 |
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| 101 MA-16 | 1691 | 5613442 | 5408 99 6 | | 386 |
| 101 R-16 | 1681 | 5613435 | 5408 99 4 | | 385 |
| | | | | /100 pc. | |
| 101 RH-16 | Black/ PA | 5674924 | 5408 10 1 | | 384 |
| 101 ST | M16 | 5428534 | 5402 89 1 | | 335 |
| 101 ST | M16 | 5428534 | 5402 89 1 | | 383 |
| 101 VL1500 | 1500/ Al | 5105619 | 5401 98 0 | | 332 |
| 101 VL2000 | 2000/ Al | 5107774 | 5401 98 3 | | 332 |
| | | | | /100 pc. | |
| 101 VL2500 | 2500/ Al | 5108672 | 5401 98 6 | | 332 |
| 101 VL3000 | 3000/ Al | 5108733 | 5401 98 9 | | 332 |
| 101 VL3500 | 3500/ Al | 5045359 | 5401 99 3 | | 332 |
| 101 VL4000 | 4000/ Al | 5050803 | 5401 99 5 | | 332 |
| | | | | /pc. | |
| 101 VRS-16 | 750 | 5613350 | 5408 98 2 | | 382 |
| 101 VS-16 | 750 | 5613336 | 5408 97 8 | | 382 |
| 101 W-16 | 1660/ Al | 5613305 | 5408 68 9 | | 383 |
| 101 WG-16 | 16110 | 5613374 | 5408 98 6 | | 385 |
| | | | | /100 pc. | |
| 108 B DIN | / St / FT | 5429678 | 5416 56 6 | | 374 |
| 112 DIN-100 | 100/ St / F | 5428893 | 5410 09 6 | | 353 |
| 112 DIN-CU-100 | 100/ Cu | 5429074 | 5410 30 4 | | 353 |
| 113 8-10 | / Zn / Cu | 5446231 | 5230 21 7 | | 349 |
| 113 B-HD-16 | / Zn / Cu | 5752295 | 5412 81 1 | | 353 |
| 113 B-MS-HD 8-10 | / Zn / Cu | 5629474 | 5230 36 5 | | 349 |
| 113 BZ-FL | / Zn / G | 5739999 | 5230 44 6 | | 324 |
| 113 B-Z-HD | / Zn / VZ | 5629535 | 5230 32 2 | | 349 |
| 113 B-Z-HD | / Zn / VZ | 5752356 | 5412 80 3 | | 353 |
| 113 B-Z-HD-FL | / Zn / G | 5740056 | 5230 46 2 | | 324 |
| 113 Z-16 | / Zn / VZ | 5429616 | 5412 60 9 | | 352 |
| 113 Z-20 | / Zn / VZ | 5959601 | 5230 52 7 | | 353 |
| 113 Z-20 | / Zn / VZ | 5959601 | 5230 52 7 | | 386 |
| 113 Z8-10 | / Zn / G | 5412212 | 5229 96 0 | | 349 |
| 113 Z-K 8-10 | / Zn / G | 5840886 | 5229 96 1 | | 349 |
| 113 ZN-16 | / Zn / Cu | 5446415 | 5412 63 3 | | 352 |
| 120 A | / Zn / G | 5428657 | 5405 06 8 | | 332 |
| | | | | /pc. | |
| 128 F | / St / FT | 5428718 | 5405 76 9 | | 336 |
| | | | | /100 pc. | |
| 132 CU | / Cu | 5902171 | 5202 86 8 | | 340 |
| 132 GB-M8 | / St / FT | 5894124 | 5202 56 8 | | 341 |
| 132 K-CU | / Cu | 5902232 | 5202 59 0 | | 341 |
| 132 K-VA | / V2A | 5403036 | 5202 51 5 | | 340 |
| 132 N-DK | / St / FT | 5902294 | 5202 56 6 | | 341 |
| 132 U | / V2A | 5038269 | 5203 01 5 | | 340 |
| 132 U 35 | / V2A | 5784968 | 5203 01 8 | | 340 |
| 132 U-CU | / V2A / Cu | 5289746 | 5203 02 3 | | 340 |
| 132 VA | / V2A | 5403814 | 5202 83 3 | | 340 |
| 132 VA 35 | / V2A | 5784920 | 5202 83 6 | | 340 |
| 133 A | / PA | 5402138 | 5202 24 8 | | 344 |
| 133 NB | / PA | 5904335 | 5202 21 3 | | 344 |
| 156 16 | / St / FT | 5411079 | 5228 22 0 | | 353 |
| 156 8-10 | / St / FT | 5410836 | 5228 02 6 | | 351 |
| 156 FL | / St / FT | 5411192 | 5228 32 8 | | 351 |
| 156 K8-10 CU | / Cu | 5411017 | 5228 13 1 | | 351 |
| 156 K8-10 ST | / St / FT | 5410959 | 5228 12 3 | | 351 |
| 156 K8-10 VA | / V2A | 5851011 | 5228 13 4 | | 351 |
| 157 E-CU | 265/ Cu | 5902355 | 5215 80 3 | | 343 |
| 157 EK-CU | 265/ Cu | 5902478 | 5215 85 4 | | 343 |
| 157 EK-VA | 265/ V2A | 5902416 | 5215 83 8 | | 343 |
| 157 E-VA | 265/ V2A | 5407232 | 5215 50 1 | | 342 |
| 157 E-VA 35 | 265/ V2A | 5784975 | 5215 50 4 | | 342 |
| 157 F-CU 230 | / Cu | 5902539 | 5216 19 2 | | 341 |
| 157 F-CU 280 | / Cu | 5813019 | 5216 20 6 | | 341 |
| 157 F-CU 410 | / Cu | 5813132 | 5216 25 7 | | 341 |
| 157 FK-CU 230 | / Cu | 5902652 | 5216 18 4 | | 342 |
| 157 FK-CU 280 | / Cu | 5813071 | 5216 21 4 | | 342 |
| 157 FK-CU 410 | / Cu | 5813194 | 5216 26 5 | | 342 |
| 157 FK-VA 230 | / V2A | 5902591 | 5215 54 4 | | 341 |
| 157 FK-VA 280 | / V2A | 5812296 | 5215 58 7 | | 341 |
| 157 FK-VA 410 | / V2A | 5812418 | 5215 60 9 | | 341 |
| 157 F-VA 230 | / V2A | 5407294 | 5215 55 2 | | 341 |
| 157 F-VA 230 35 | / V2A | 5784982 | 5215 55 5 | | 341 |
| 157 F-VA 280 | / V2A | 5812234 | 5215 57 9 | | 341 |
| 157 F-VA 280 35 | / V2A | 5785019 | 5215 58 2 | | 341 |
| 157 F-VA 410 | / V2A | 5812357 | 5215 59 5 | | 341 |
| 157 F-VA 410 35 | / V2A | 5785026 | 5215 59 8 | | 341 |
| 157 FX-AL | / Al | 5531791 | 5215 87 5 | | 342 |
| 157 FX-CU | / Cu | 5531852 | 5215 87 9 | | 342 |
| 157 GB-M8 | 260/ V2A | 5894223 | 5202 56 9 | | 344 |
| 157 I-CU | / Cu | 5812593 | 5215 74 9 | | 342 |
| 157 IK-VA | / V2A | 5812531 | 5215 66 8 | | 342 |
| 157 I-VA | / V2A | 5407355 | 5215 62 5 | | 342 |
| 157 L-CU | 212/ Cu | 5812111 | 5215 47 1 | | 343 |
| 157 LK-CU | 212/ Cu | 5811930 | 5215 38 2 | | 343 |
| 157 LK-VA | 212/ V2A | 5811879 | 5215 37 4 | | 343 |

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|---|---|---|---|---|---|
| | | | | /100 pc. | |
| 157 L-VA | 212/ V2A | 5407171 | 5215 43 9 | | 343 |
| 157 NB-VA | 260/ V2A | 5903673 | 5215 27 7 | | 343 |
| 157 ND-VA | 260/ V2A | 5903796 | 5215 30 7 | | 344 |
| 159 K-VA | / V2A | 5813255 | 5216 81 8 | | 344 |
| 159 VA-V | / V2A | 5407959 | 5217 07 5 | | 344 |
| 163 100 CU | 100/ Cu | 5409939 | 5223 60 1 | | 350 |
| 163 100 FT | 100/ St / FT | 5409519 | 5223 10 5 | | 350 |
| 163 150 FT | 150/ St / FT | 5409632 | 5223 15 6 | | 350 |
| 163 200 FT | 200/ St / FT | 5409755 | 5223 20 2 | | 350 |
| 163 70 FT | 70/ St / FT | 5409458 | 5223 07 5 | | 350 |
| 165 B 100 | / St / FT | 5408970 | 5218 82 9 | | 346 |
| 165 B 60 | / St / FT | 5408918 | 5218 81 0 | | 346 |
| 165 KR | / PE | 5409038 | 5218 86 1 | | 345 |
| 165 KRB SO | | 5952213 | 5218 97 7 | | 346 |
| 165 MBG HFL | Black/ PP | 5623052 | 5218 88 5 | | 345 |
| | | | | /pc. | |
| 165 MBG UH | Black/ PP | 5674580 | 5218 88 2 | | 345 |
| 165 MBG UH | Black/ PP | 5674580 | 5218 88 2 | | 390 |
| | | | | /100 pc. | |
| 165 MBG-10 | / PA/PE | 5408734 | 5218 67 5 | | 345 |
| 165 MBG-10 200 | / PE | 5814634 | 5218 75 6 | | 345 |
| 165 MBG-8 | / PA/PE | 5408857 | 5218 69 1 | | 345 |
| 165 MBG-8 200 | / PE | 5904519 | 5218 74 8 | | 345 |
| 165 NBK 55 | 55/ PA | 5904274 | 5218 31 4 | | 346 |
| 165 OBG-8 | / PE | 5408796 | 5218 68 3 | | 345 |
| 165 R-8-10 | / PE | 5625889 | 5218 99 7 | | 346 |
| 166 LS 70 | 70/ St / FT | 5410416 | 5226 57 0 | | 350 |
| 168 8-10 M6 | M6/ Zn / G | 5411499 | 5229 16 2 | | 349 |
| 168 DIN 30 | 56/ Zn / G | 5411734 | 5229 48 0 | | 350 |
| 168 DIN-K-M8 | M8/ Zn / G | 5412151 | 5229 83 9 | | 349 |
| 168 DIN-K-M8 | M8/ Zn / Cu | 5411611 | 5229 38 3 | | 350 |
| 168 FL30-M6 | 56/ Zn / VZ | 5411673 | 5229 46 4 | | 350 |
| 168 FL40-M8 | 66/ TG / FT | 5411970 | 5229 55 3 | | 350 |
| 168 ZN-M6 | M6/ Zn / Cu | 5411550 | 5229 36 7 | | 350 |
| 172 AR | / Al | 5409090 | 5218 92 6 | | 369 |
| 176 A 100 | 100/ TG / F | 5410652 | 5227 10 0 | | 351 |
| 176 A 150 | 150/ TG / F | 5410713 | 5227 15 1 | | 351 |
| 176 A 65 | 65/ TG / F | 5410539 | 5227 07 0 | | 351 |
| 176 A 80 | 80/ TG / F | 5410591 | 5227 08 9 | | 351 |
| 177 20 CU | / PA | 5904991 | 5207 74 6 | | 348 |
| 177 20 KL | / PA | 5009726 | 5207 45 1 | | 348 |
| 177 20 M8 | / PA | 5404897 | 5207 44 4 | | 348 |
| 177 20 VA B-HD | / V2A | 5915836 | 5207 90 1 | | 347 |
| | | | | /100 pc. | |
| 177 20 VA M6 | / V2A | 5404774 | 5207 33 9 | | 347 |
| 177 20 VA M8 | / V2A | 5404835 | 5207 34 7 | | 347 |
| 177 20 VA-VK M6 | / V2A / Cu | 5904878 | 5207 80 0 | | 347 |
| 177 20 VA-VK M8 | / V2A / Cu | 5904939 | 5207 81 9 | | 347 |
| 177 30 CU | / PA | 5905059 | 5207 75 4 | | 348 |
| 177 30 M8 | / PA | 5404958 | 5207 46 0 | | 348 |
| 177 35 VA M6 | / V2A | 5735762 | 5207 34 2 | | 347 |
| 177 55 CU | / PA | 5905110 | 5207 76 2 | | 348 |
| 177 55 M8 | / PA | 5405016 | 5207 48 7 | | 348 |
| 177 B-HD20 | / PA | 5336433 | 5207 85 1 | | 348 |
| 177 B-HD30 | / PA | 5334811 | 5207 87 8 | | 348 |
| 177 U | Light grey/ PP | 5069546 | 5207 37 1 | | 347 |
| 194 | Grey M8/ PA | 5404651 | 5207 25 8 | | 348 |
| 194 K | Grey M8/ PA | 5110392 | 5207 26 6 | | 348 |
| | | | | /kg | |
| 198 60 | 2160 | 5399674 | 5101 06 9 | | 377 |
| | | | | /100 pc. | |
| 199 DIN | M8/ St / FS | 5405252 | 5208 01 7 | | 351 |
| 200 V4A-1500 | 1500/ V4A | 5751571 | 5420 50 4 | | 315 |
| 200 V4A-1500 | 1500/ V4A | 5751571 | 5420 50 4 | | 333 |
| 200 V4A-1500 | 1500/ V4A | 5751571 | 5420 50 4 | | 375 |
| 200 V4A-2000 | 2000/ V4A | 5331575 | 5420 53 9 | | 315 |
| 200 V4A-2000 | 2000/ V4A | 5331575 | 5420 53 9 | | 333 |
| 200 V4A-2000 | 2000/ V4A | 5331575 | 5420 53 9 | | 375 |
| 204 KL-1500 | / St | 5430575 | 5430 15 1 | | 316 |
| 204 KL-1500 | / St | 5430575 | 5430 15 1 | | 375 |
| | | | | /pc. | |
| 204 KS-2000 | 2000/ St / F | 5901457 | 5430 01 1 | | 316 |

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| | | | | /pc. | |
| 204 KS-2000 | 2000/ St / F | 5901457 | 5430 01 1 | | 375 |
| 204 KS-2500 | 2500/ St / F | 5901570 | 5430 06 2 | | 316 |
| 204 KS-2500 | 2500/ St / F | 5901570 | 5430 06 2 | | 375 |
| 205 B-M10 VA | M10/ V4A | 5900498 | 5420 00 8 | | 322 |
| 205 B-M12 VA | M12/ V4A | 5629290 | 5420 01 6 | | 322 |
| 213 1000 DIN | 1000/ St / FT | 5373575 | 5003 00 8 | | 316 |
| 213 1000 M | 1000/ St / FT | 5373995 | 5003 25 3 | | 316 |
| 213 1500 DIN | 1500/ St / FT | 5373636 | 5003 01 6 | | 316 |
| 213 1500 F | 1500/ St / FT | 5374718 | 5003 77 6 | | 317 |
| 213 1500 M | 1500/ St / FT | 5374053 | 5003 26 1 | | 316 |
| 213 2000 DIN | 2000/ St / FT | 5373698 | 5003 02 4 | | 316 |
| 213 2000 F | 2000/ St / FT | 5374770 | 5003 78 4 | | 317 |
| 213 2000 M | 2000/ St / FT | 5374114 | 5003 28 8 | | 316 |
| 213 2500 DIN | 2500/ St / FT | 5373759 | 5003 03 2 | | 316 |
| 213 2500 M | 2500/ St / FT | 5374176 | 5003 29 6 | | 316 |
| 213 3000 DIN | 3000/ St / FT | 5373810 | 5003 04 0 | | 316 |
| 213 3000 M | 3000/ St / FT | 5374237 | 5003 31 8 | | 316 |
| 219 20 BP CU | 1500/ St / Cu | 5371717 | 5000 50 5 | | 313 |
| 219 20 BP FT | 1500/ St / FT | 5371892 | 5000 94 7 | | 312 |
| 219 20 BP V4A | 1000/ V4A | 5740650 | 5000 85 8 | | 312 |
| 219 20 BP V4A | 1500/ V4A | 5371830 | 5000 86 6 | | 312 |
| 219 20 OMEX FT | 1500/ St / FT | 5371298 | 5000 01 7 | | 313 |
| 219 20 OMEX FT | 2000/ St / FT | 5371472 | 5000 20 3 | | 313 |
| 219 20 ST FT | 1000/ St / FT | 5018049 | 5000 74 2 | | 312 |
| 219 20 ST FT | 1500/ St / FT | 5814450 | 5000 75 0 | | 312 |
| 219 25 BP FT | 1500/ St / FT | 5371953 | 5000 95 5 | | 312 |
| 219 25 OMEX FT | 1500/ St / FT | 5371359 | 5000 02 5 | | 313 |
| 219 25 ST FT | 1500/ St / FT | 5111047 | 5000 76 9 | | 312 |
| | | | | /100 pc. | |
| 223 DIN MS | / Zn / Cu | 5423676 | 5335 25 6 | | 372 |
| 223 DIN ZN | / Zn / G | 5423614 | 5335 20 5 | | 372 |
| 223 O DIN MS | / Zn / Cu | 5890119 | 5335 16 7 | | 372 |
| 223 O DIN ZN | / Zn / G | 5890058 | 5335 14 0 | | 372 |
| 226 8-10 | / St / FT | 5424215 | 5336 00 7 | | 372 |
| 226 CU | / Cu | 5424277 | 5336 02 3 | | 373 |
| 226 VA | / V2A | 5424338 | 5336 05 8 | | 372 |
| 226 ZV CU | / V2A | 5424451 | 5336 09 0 | | 373 |
| 226 ZV VA | / Cu | 5424390 | 5336 07 4 | | 373 |
| 233 8 | / St / FT | 5424635 | 5336 30 9 | | 373 |
| 233 A VA | / V2A | 5424871 | 5336 45 7 | | 373 |
| 233 A ZV | / Cu | 5424932 | 5336 50 3 | | 374 |
| 233 VA | / V2A | 5424758 | 5336 34 1 | | 373 |
| 233 ZV | / V2A | 5424819 | 5336 37 6 | | 373 |
| 237 N CU | / Cu | 5453673 | 5328 28 4 | | 359 |
| 237 N FT | / St / F | 5453611 | 5328 20 9 | | 359 |
| 239 | / Zn / G | 5423195 | 5329 07 8 | | 359 |
| 244 | / Zn / G | 5417316 | 5311 03 9 | | 359 |
| 245 8-10 CU | / Cu | 5417439 | 5311 15 2 | | 360 |
| 245 8-10 FT | / St / FT | 5417378 | 5311 10 1 | | 359 |
| 247 8-10 CU | / Cu | 5417552 | 5311 26 8 | | 360 |
| 247 8-10 FT | / St / FT | 5417491 | 5311 20 9 | | 360 |
| 249 6-10 CU | 40/ Cu | 5816591 | 5311 41 7 | | 356 |
| 249 6-10 ST | 40/ St / FT | 5816584 | 5311 41 0 | | 355 |
| 249 8-10 ALU | 44/ Al | 5417736 | 5311 51 9 | | 355 |
| 249 8-10 ALU-OT | 44/ Al | 5466192 | 5311 58 5 | | 305 |
| 249 8-10 ALU-OT | 44/ Al | 5466192 | 5311 58 5 | | 352 |
| 249 8-10 ALU-OT | 44/ Al | 5466192 | 5311 58 5 | | 367 |
| 249 8-10 CU | 40/ Cu | 5417798 | 5311 52 7 | | 355 |
| 249 8-10 CU-OT | 40/ Cu | 5835394 | 5311 53 0 | | 301 |
| 249 8-10 CU-OT | 40/ Cu | 5835394 | 5311 53 0 | | 305 |
| 249 8-10 CU-OT | 40/ Cu | 5835394 | 5311 53 0 | | 352 |
| 249 8-10 CU-OT | 40/ Cu | 5835394 | 5311 53 0 | | 367 |
| 249 8-10 ST | 40/ St / FT | 5417675 | 5311 50 0 | | 355 |
| 249 8-10 ST-OT | 40/ St / FT | 5737063 | 5311 50 3 | | 305 |
| 249 8-10 ST-OT | 40/ St / FT | 5737063 | 5311 50 3 | | 352 |
| 249 8-10 ST-OT | 40/ St / FT | 5737063 | 5311 50 3 | | 367 |
| 249 8-10 VA | 40/ V2A | 5417910 | 5311 55 1 | | 355 |
| 249 8-10 VA-OT | 40/ V2A | 5835349 | 5311 55 4 | | 301 |
| 249 8-10 VA-OT | 40/ V2A | 5835349 | 5311 55 4 | | 305 |
| 249 8-10 VA-OT | 40/ V2A | 5835349 | 5311 55 4 | | 352 |
| 249 8-10 VA-OT | 40/ V2A | 5835349 | 5311 55 4 | | 367 |
| 249 8-10 ZV | 44/ Cu | 5417859 | 5311 53 5 | | 355 |

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|---|---|---|---|---|---|
| 249 8-10X16 VA | / V2A | 5925446 | 5311 59 0 | | 356 |
| | | | | /100 pc. | |
| 249 B ALU | 44/ Al | 5452058 | 5311 71 3 | | 355 |
| 249 B ST | 40/ FT | 5451990 | 5311 70 5 | | 355 |
| 249 VA-OT | / V2A | 5693789 | 5311 57 3 | | 306 |
| 249 VA-OT | / V2A | 5693789 | 5311 57 3 | | 353 |
| 249 VA-OT | / V2A | 5693789 | 5311 57 3 | | 368 |
| 250 | / St / FT | 5418696 | 5312 90 6 | | 321 |
| 250 | / St / FT | 5418696 | 5312 90 6 | | 360 |
| 250 A-BO | 25/ St / F | 5806530 | 5313 06 6 | | 321 |
| 250 A-FT | 40/ St / FT | 5740537 | 5313 01 5 | | 321 |
| 250 AS-FT | 20/ St / FT | 5543015 | 5313 03 1 | | 321 |
| 250 A-VA | 40/ V2A | 5740476 | 5313 02 3 | | 321 |
| 250 V4A | / V4A | 5700876 | 5312 92 5 | | 321 |
| 250 V4A | / V4A | 5700876 | 5312 92 5 | | 360 |
| 250 VA | / V2A | 5418757 | 5312 92 2 | | 321 |
| 250 VA | / V2A | 5418757 | 5312 92 2 | | 360 |
| 251 8-10 | / St / FT | 5417972 | 5312 03 5 | | 361 |
| 251 CU | / Cu | 5418030 | 5312 13 2 | | 361 |
| 252 8-10 CU | / Cu | 5418214 | 5312 41 8 | | 320 |
| 252 8-10 CU | / Cu | 5418214 | 5312 41 8 | | 362 |
| 252 8-10 FT | / St / FT | 5418092 | 5312 31 0 | | 320 |
| 252 8-10 FT | / St / FT | 5418092 | 5312 31 0 | | 361 |
| 252 8-10 V4A | / V4A | 5700869 | 5312 31 8 | | 320 |
| 252 8-10 V4A | / V4A | 5700869 | 5312 31 8 | | 362 |
| 252 8-10X16 CU | / Cu | 5418276 | 5312 44 2 | | 320 |
| 252 8-10X16 CU | / Cu | 5418276 | 5312 44 2 | | 362 |
| 252 8-10X16 FT | / St / FT | 5418153 | 5312 34 5 | | 320 |
| 252 8-10X16 FT | / St / FT | 5418153 | 5312 34 5 | | 362 |
| 252 8-10x16 V4A | / V4A | 5893103 | 5312 34 6 | | 320 |
| 252 8-10x16 V4A | / V4A | 5893103 | 5312 34 6 | | 362 |
| | | | | /100 pc. | |
| 252 8-10XFL30 FT | / St / F | 5418399 | 5312 65 5 | | 321 |
| 252 8-10XFL30 FT | / St / F | 5418399 | 5312 65 5 | | 360 |
| 252 8-10xFL30V4A | / V4A | 5893141 | 5312 65 6 | | 321 |
| 252 8-10xFL30V4A | / V4A | 5893141 | 5312 65 6 | | 360 |
| | | | | /100 pc. | |
| 253 10X16 | / St / F | 5418573 | 5312 80 9 | | 320 |
| 253 10X16 | / St / F | 5418573 | 5312 80 9 | | 362 |
| 253 8X8 | / St / F | 5418337 | 5312 60 4 | | 319 |
| 253 8X8 | / St / F | 5418337 | 5312 60 4 | | 361 |
| 254 DIN 8-10 CU | / Cu | 5419112 | 5314 13 5 | | 361 |
| 254 DIN 8-10 FT | / St / FT | 5418993 | 5314 03 8 | | 361 |
| 255 30 | 52/ St / FT | 5419174 | 5314 51 8 | | 319 |
| 255 A-FL30 FT | 60/ St / FT | 5419235 | 5314 53 4 | | 319 |
| 256 A-DIN 30 FT | 60/ St / FT | 5419471 | 5314 65 8 | | 319 |
| 256 A-DIN 30 V4A | 60/ V4A | 5893080 | 5314 65 9 | | 319 |
| | | | | /100 pc. | |
| 256 A-DIN 30 VA | 60/ V2A | 5925873 | 5314 72 0 | | 319 |
| 256 A-DIN 40 FT | 80/ St / FT | 5419532 | 5314 66 6 | | 319 |
| 256 DIN 30 FT | 60/ St / FT | 5419297 | 5314 61 5 | | 319 |
| 256 DIN 30 V4A | 60/ V4A | 5893097 | 5314 61 6 | | 319 |
| | | | | /100 pc. | |
| 256 DIN 40 FT | 80/ St / FT | 5419358 | 5314 62 3 | | 319 |
| 259 8-10 | / TG / FT | 5419716 | 5315 50 6 | | 358 |
| 259 A FT | / St / FT | 5740414 | 5315 51 4 | | 322 |
| 259 A FT 8-OT | / St / FT | 5737070 | 5315 51 7 | | 368 |
| 259 A ST | / St | 5237198 | 5315 55 7 | | 322 |
| 259 A VA | / V2A | 5740353 | 5315 52 2 | | 322 |
| 260 8 | / Zn / G | 5419839 | 5315 70 0 | | 359 |
| 260 8-10 MS | / CuZn / Cu | 5419778 | 5315 65 4 | | 359 |
| 262 | / St / FT | 5419891 | 5316 01 4 | | 366 |
| 262 A-DIN CU | / Cu | 5420071 | 5316 25 1 | | 366 |
| 262 A-DIN FT | / St / FT | 5420019 | 5316 21 9 | | 366 |
| 262 CU | / Cu | 5419952 | 5316 15 4 | | 366 |
| 262 ZM | / St / FT | 5818359 | 5316 17 0 | | 366 |
| 264 | / St / F | 5420316 | 5316 51 0 | | 367 |

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| | | | | /100 pc. | |
| 264 CU | / Cu | 5420378 | 5316 55 3 | | 367 |
| 267 | / St / FT | 5420132 | 5316 30 8 | | 365 |
| 267 VA | / V2A | 5420194 | 5316 32 4 | | 366 |
| 269 8-10 | / Zn / G | 5420439 | 5317 01 0 | | 363 |
| 269 MS | / Zn / Cu | 5420491 | 5317 05 3 | | 363 |
| 270 8-10 CU | / Cu | 5420675 | 5317 25 8 | | 364 |
| 270 8-10 FT | / St / FT | 5420552 | 5317 20 7 | | 363 |
| 270 8-10 VA | / V2A | 5893158 | 5317 20 8 | | 363 |
| | | | | /100 pc. | |
| 271 8-10 | / St / FT | 5420798 | 5317 40 1 | | 364 |
| 271 8-10 VA | / V2A | 5850861 | 5317 48 1 | | 364 |
| 271 CU | / Cu | 5420910 | 5317 45 2 | | 364 |
| 272 14 | / TG / FT | 5421092 | 5318 14 9 | | 363 |
| 272 8 | / TG / FT | 5421030 | 5318 08 4 | | 363 |
| 273 8-10 | / St / FT | 5420613 | 5317 22 3 | | 364 |
| 273 CU | / Cu | 5420736 | 5317 27 4 | | 364 |
| 274 8-10 | / St / FT | 5420859 | 5317 42 8 | | 365 |
| 274 CU | / Cu | 5420972 | 5317 47 9 | | 365 |
| 280 8-10 | / Zn / G | 5421276 | 5320 01 1 | | 368 |
| 280 VK | / Zn | 5421337 | 5320 05 4 | | 368 |
| 287 | / Al | 5421573 | 5320 70 4 | | 369 |
| 287 CU | / Cu | 5421511 | 5320 69 0 | | 369 |
| 288 DIN | / Al | 5421634 | 5320 71 2 | | 369 |
| 292 DIN | / TG / F | 5424994 | 5340 01 2 | | 374 |
| 301 CU-100 | / Cu | 5426370 | 5350 70 0 | | 370 |
| 301 CU-110 | / Cu | 5426431 | 5350 71 9 | | 370 |
| 301 CU-120 | / Cu | 5426493 | 5350 72 7 | | 370 |
| 301 CU-80 | / Cu | 5426257 | 5350 68 9 | | 370 |
| 301 CU-90 | / Cu | 5426318 | 5350 69 7 | | 370 |
| 301 DIN-100 | / St / FS | 5425717 | 5350 10 7 | | 370 |
| 301 DIN-110 | / St / FS | 5425779 | 5350 11 5 | | 370 |
| 301 DIN-120 | / St / FS | 5425830 | 5350 12 3 | | 370 |
| 301 DIN-80 | / St / FS | 5425595 | 5350 08 5 | | 370 |
| 301 DIN-90 | / St / FS | 5425656 | 5350 09 3 | | 370 |
| 301 S-100 | / St / FS | 5426974 | 5351 05 7 | | 370 |
| 301 S-120 | / St / FS | 5427032 | 5351 07 3 | | 370 |
| 301 S-AL-100 | / Al | 5890652 | 5351 35 9 | | 370 |
| 301 S-AL-120 | / Al | 5890713 | 5351 37 5 | | 370 |
| 301 S-CU-100 | / Cu | 5427216 | 5351 45 6 | | 371 |
| 301 S-CU-120 | / Cu | 5427278 | 5351 47 2 | | 371 |
| 301 S-VA-100 | / V2A | 5427094 | 5351 25 1 | | 371 |
| 301 S-VA-120 | / V2A | 5427155 | 5351 28 6 | | 371 |
| 301 V | / St / FS | 5426790 | 5350 86 7 | | 369 |
| 301 V-CU | / Cu | 5426851 | 5350 88 3 | | 370 |
| 301 V-VA | / V2A | 5426912 | 5350 90 5 | | 370 |
| 303 DIN-1 | / St / FT | 5399971 | 5102 11 1 | | 371 |
| 303 DIN-1 1/2 | / St / FT | 5400097 | 5102 15 4 | | 371 |
| 303 DIN-1 1/4 | / St / FT | 5400035 | 5102 13 8 | | 371 |
| 303 DIN-1/2 | / St / FT | 5399858 | 5102 07 3 | | 371 |
| 303 DIN-2 | / St / FT | 5400158 | 5102 19 7 | | 371 |
| 303 DIN-2 1/2 | / St / FT | 5400219 | 5102 21 9 | | 371 |
| 303 DIN-3 | / St / FT | 5400271 | 5102 23 5 | | 371 |
| 303 DIN-3 1/2 | / St / FT | 5400332 | 5102 25 1 | | 371 |
| 303 DIN-3/4 | / St / FT | 5399919 | 5102 08 1 | | 371 |
| 303 DIN-3/8 | / St / FT | 5399797 | 5102 05 7 | | 371 |
| 303 DIN-4 | / St / FT | 5400394 | 5102 27 8 | | 371 |
| 311 N-ALU 16 | / Al | 5631392 | 3049 34 5 | | 326 |
| 311 N-ALU 16 | / Al | 5631392 | 3049 34 5 | | 374 |
| 311 N-ALU 8-10 | | 5631576 | 3049 25 6 | | 326 |
| 311 N-ALU 8-10 | | 5631576 | 3049 25 6 | | 374 |
| 311 N-CU 16 | / Cu | 5631514 | 3049 30 2 | | 326 |
| 311 N-CU 16 | / Cu | 5631514 | 3049 30 2 | | 374 |
| 311 N-CU 8-10 | / Cu | 5631699 | 3049 20 5 | | 326 |
| 311 N-CU 8-10 | / Cu | 5631699 | 3049 20 5 | | 374 |
| 311 N-VA 16 | / V2A | 5631453 | 3049 32 9 | | 326 |
| 311 N-VA 16 | / V2A | 5631453 | 3049 32 9 | | 374 |
| 311 N-VA 8-10 | / V2A | 5631637 | 3049 22 1 | | 326 |
| 311 N-VA 8-10 | / V2A | 5631637 | 3049 22 1 | | 374 |
| 319 10 | / TG / F | 5421931 | 5325 31 5 | | 367 |

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| | | | | /100 pc. | |
| 319 8 | / TG / F | 5421870 | 5325 30 7 | | 367 |
| 324 S-CU | / Cu | 5422532 | 5326 33 8 | | 368 |
| 324 S-FT | / St / FT | 5422419 | 5326 30 3 | | 368 |
| 324 S-VA | / V2A | 5422471 | 5326 31 1 | | 368 |
| 330 K | / PA | 5401599 | 5201 10 1 | | 336 |
| | | | | /pc. | |
| 356 100 | 100 10 | 5230595 | 2360 10 1 | | 326 |
| 356 100 | 100 10 | 5230595 | 2360 10 1 | | 377 |
| 356 50 | 50 10 | 5230533 | 2360 05 5 | | 326 |
| 356 50 | 50 10 | 5230533 | 2360 05 5 | | 377 |
| 364 | 297/ St / FT | 5244219 | 3051 01 3 | | 378 |
| | | | | /100 pc. | |
| 366 35 | 35/ St / FT | 5388876 | 5059 35 6 | | 326 |
| 366 50 | 50/ St / FT | 5389057 | 5059 49 6 | | 326 |
| 370 H | 55/ St / FT | 5382690 | 5025 20 6 | | 325 |
| 470 4-16 | / CuZn / N | 5389231 | 5064 01 5 | | 306 |
| | | | | /pc. | |
| 480 180 | | 5412571 | 5240 03 4 | | 288 |
| 480 250 | | 5412755 | 5240 07 7 | | 288 |
| 480 350 | | 5412694 | 5240 06 9 | | 288 |
| 481 | | 5412816 | 5240 08 5 | | 288 |
| 482 | | 5412632 | 5240 05 0 | | 289 |
| 484 M12 | 13/ St / F | 5412991 | 5240 22 0 | | 288 |
| 484 M16 | 17/ St / F | 5413059 | 5240 23 9 | | 288 |
| 484 M20 | 21/ St / F | 5413110 | 5240 24 7 | | 288 |
| 484 M24 | 25/ St / F | 5413172 | 5240 25 5 | | 288 |
| 485 M10 | 11/ St / F | 5413233 | 5240 30 1 | | 288 |
| 485 M12 | 13/ St / F | 5413295 | 5240 32 8 | | 288 |
| 485 M16 | 17/ St / F | 5413356 | 5240 33 6 | | 288 |
| 485 M20 | 21/ St / F | 5413417 | 5240 34 4 | | 288 |
| | | | | /100 pc. | |
| 555 7.6x380 SWUV | 7.6 x 380 102/ PA | 5896920 | 2332 78 4 | | 393 |
| 708 30 HG | 52/ St / G | 5383659 | 5030 23 4 | | |
| 708 30 SP | 52/ St / G | 5383413 | 5030 02 1 | | 325 |
| 708 40 HG | 52/ St / G | 5383710 | 5030 24 2 | | |
| 710 30 | 52/ St / G | 5383055 | 5028 03 5 | | 325 |
| 710 40 | 62/ St / G | 5383116 | 5028 04 3 | | 325 |
| 733 16 VA | 14-16 6,5 x 10/ V2A | 5116714 | 1362 01 1 | | 352 |
| 733 21 VA | 19-21 6,5 x 10/ V2A | 5116837 | 1362 04 6 | | 354 |
| 831 30 | 54/ St / FT | 5383833 | 5032 03 2 | | 324 |
| 831 30 M6 | 54/ St / FT | 5383956 | 5032 23 7 | | 324 |
| 831 40 | 65/ St / FT | 5383895 | 5032 04 0 | | 324 |
| 831 40 M6 | 65/ St / FT | 5384014 | 5032 24 5 | | 324 |
| 832 30 | 55/ St / FT | 5384137 | 5032 53 9 | | 324 |
| 832 40 | 65/ St / FT | 5384199 | 5032 54 7 | | 324 |
| 833 35 | 60/ St / FT | 5384434 | 5033 03 9 | | 324 |
| 835 | / St / FT | 5433750 | 5033 20 9 | | 324 |
| 853 200 | 200/ Cu | 5885573 | 5331 00 8 | | 369 |
| 853 300 | 300/ Cu | 5423379 | 5331 01 3 | | 369 |
| 853 400 | 400/ Cu | 5885580 | 5331 01 7 | | 369 |
| 856 | / Cu | 5423430 | 5331 50 1 | | 369 |
| 910 N 10x50 GRW | 1050/ PA | 5229155 | 2349 10 8 | | 378 |
| 910 N 12x60 GRW | 1260/ PA | 5229216 | 2349 12 4 | | 378 |
| 910 N 5x25 GRW | 525/ PA | 5228851 | 2349 04 3 | | 378 |
| 910 N 6x30 GRW | 630/ PA | 5228912 | 2349 05 1 | | 378 |

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| | | | | /100 pc. | |
| 910 N 6x60 GRW | 660/ PA | 5228974 | 2349 07 8 | | 378 |
| 910 N 8x40 GRW | 840/ PA | 5229032 | 2349 08 6 | | 378 |
| 925 1 | 70 31,7-33,7 / St / G | 5385455 | 5040 11 6 | | 304 |
| 925 1 1/2 | 88 46,3-48,3 / St / G | 5385578 | 5040 15 9 | | 304 |
| 925 1 1/4 | 81 40,4-42,4 / St / G | 5385516 | 5040 13 2 | | 304 |
| 925 1/2 | 56 19,3-21,3 / St / G | 5385332 | 5040 07 8 | | 304 |
| 925 1/4 | 48 11,5-13,5 / St / G | 5385219 | 5040 03 5 | | 304 |
| 925 3/4 | 62 24,9-26,9 / St / G | 5385394 | 5040 09 4 | | 304 |
| 925 3/8 | 52 15,2-17,2 / St / G | 5385271 | 5040 05 1 | | 304 |
| 927 0 | / CuZn / N | 5388517 | 5057 50 7 | | 303 |
| 927 1 | / V2A | 5388579 | 5057 51 5 | | 303 |
| 927 2 | / V2A | 5388630 | 5057 52 3 | | 303 |
| 927 2 6-K | / V2A | 5699651 | 5057 59 9 | | 392 |
| 927 4 | / V2A | 5388692 | 5057 55 8 | | 303 |
| | | | | /100 m | |
| 927 BAND-VA | 23 0,3/ V2A | 5805458 | 5057 92 2 | | 303 |
| | | | | /100 pc. | |
| 927 SCH-K-VA | / V2A | 5805519 | 5057 93 0 | | 303 |
| 928 | 240/ CuZn / N | 5385936 | 5040 50 7 | | 304 |
| 937 50 | 100/ St / FT | 5385998 | 5043 01 8 | | 306 |
| 939 | 150/ St / G | 5386056 | 5043 10 7 | | 306 |
| 942 11 | 44 8-11 / Cu / N | 5384557 | 5038 01 4 | | 304 |
| 942 15 | 50 13-15 / Cu / N | 5384618 | 5038 03 0 | | 304 |
| 942 18 | 52 16-18 / Cu / N | 5384670 | 5038 05 7 | | 304 |
| 942 22 | 55 19-22 / Cu / N | 5384731 | 5038 07 3 | | 304 |
| 942 28 | 63 24-28 / Cu / N | 5384793 | 5038 08 1 | | 304 |
| 942 35 | 71 30-35 / Cu / N | 5384854 | 5038 11 1 | | 304 |
| 942 43 | 81 39-43 / Cu / N | 5384915 | 5038 13 8 | | 304 |
| 942 49 | 86 44-49 / Cu / N | 5384977 | 5038 15 4 | | 304 |
| 950 Z 1 | 66 31,5-34,5 / Zn / G | 5386353 | 5050 11 1 | | 304 |
| 950 Z 1 1/2 | 84 46,5-49,5 / Zn / G | 5386476 | 5050 15 4 | | 304 |
| 950 Z 1 1/4 | 78 40,5-43,5 / Zn / G | 5386414 | 5050 13 8 | | 304 |
| 950 Z 1 3/4 | 88 51-54 / Zn / G | 5386537 | 5050 17 0 | | 304 |
| 950 Z 1/2 | 54 20-22,5 / Zn / G | 5386230 | 5050 07 3 | | 304 |
| 950 Z 1/4 | 45 12-14 / Zn / G | 5386117 | 5050 03 0 | | 304 |
| 950 Z 2 | 96 58,5-61,5 / Zn / G | 5386599 | 5050 19 7 | | 304 |
| 950 Z 3/4 | 61 25-28 / Zn / G | 5386292 | 5050 08 1 | | 304 |
| 950 Z 3/8 | 50 15,5-17,5 / Zn / G | 5386179 | 5050 05 7 | | 304 |
| 951 | 120/ V2A | 5386650 | 5051 50 9 | | 305 |
| 952 Z 1 | 77 30,5-33,5 / St / FT | 5386957 | 5052 11 4 | | 305 |
| 952 Z 1 1/2 | 94 45,5-48,5 / St / FT | 5387077 | 5052 15 7 | | 305 |
| 952 Z 1 1/4 | 87 39,5-42,5 / St / FT | 5387015 | 5052 13 0 | | 305 |
| 952 Z 1/2 | 65 18,5-21,5 / St / FT | 5386834 | 5052 07 6 | | 305 |
| 952 Z 2 | 105 57-60 / St / FT | 5387190 | 5052 18 1 | | 305 |
| 952 Z 3/4 | 71 24-27 / St / FT | 5386896 | 5052 09 2 | | 305 |
| 985 M6 25 | 25 4,3/ St / G | 5250395 | 3133 02 8 | | 378 |
| 985 M6 35 | 35 4,3/ St / G | 5250456 | 3133 03 6 | | 378 |
| 985 M8 35 | 35 10/ St / G | 5250579 | 3133 23 0 | | 378 |
| | | | | /pc. | |
| 1801 AH | Grey/ PS | 5378617 | 5015 70 7 | | 297 |
| 1801 KL1 | 212/ CuZn | 5378730 | 5015 72 3 | | 297 |
| 1801 KL2 | 430/ CuZn | 5378976 | 5015 80 4 | | 297 |
| 1801 KL3 | 645/ CuZn | 5379034 | 5015 81 2 | | 297 |
| 1801 RK25 | / St / G | 5378853 | 5015 75 8 | | 296 |
| 1801 RK30 | / St / G | 5378792 | 5015 73 1 | | 296 |
| 1801 RK40 | / St / G | 5455837 | 5015 77 4 | | 297 |
| 1801 RK95 | / St / G | 5378914 | 5015 76 6 | | 296 |
| 1801 SCH | Grey/ PS | 5378679 | 5015 71 5 | | 297 |
| 1801 VDE | Grey/ CuZn | 5378556 | 5015 65 0 | | 296 |
| 1802 10 CU | 40/ Cu | 5002260 | 5015 84 2 | | 301 |
| 1802 10 VA | 40/ V2A | 5002284 | 5015 86 6 | | 301 |
| 1802 12 CU | 40/ Cu | 5699354 | 5015 84 4 | | 301 |
| 1802 14 CU | 40/ Cu | 5699361 | 5015 84 7 | | 301 |
| 1802 20 CU | 40/ Cu | 5699408 | 5015 84 9 | | 301 |
| 1802 5 CU | 40/ Cu | 5002253 | 5015 83 0 | | 301 |
| 1802 5 VA | 40/ V2A | 5002277 | 5015 85 4 | | 301 |
| 1802 6 CU | 40/ Cu | 5699330 | 5015 83 2 | | 301 |
| 1802 8 CU | 40/ Cu | 5699347 | 5015 83 6 | | 301 |
| 1802 AH 10 | / V2A | 5033677 | 5015 88 4 | | 301 |
| 1802 AH 5 | / V2A | 5033615 | 5015 88 0 | | 301 |
| 1802 KL | / V2A | 5033738 | 5015 89 0 | | 301 |
| 1804 | / CuZn | 5378495 | 5015 55 3 | | 299 |
| 1804 AP | / PE | 5477839 | 5015 55 7 | | |

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| | | | | /pc. | |
| 1804 UP | / CuZn | 5378433 | 5015 54 5 | | |
| 1805 2 FT | 200110/ St / FT | 5379096 | 5016 02 9 | | 302 |
| 1805 2 FT | 200110/ St / FT | 5379096 | 5016 02 9 | | 323 |
| 1805 2 VA | 200110/ V4A | 5922216 | 5016 09 6 | | 323 |
| 1805 2 VA | 200110/ V4A | 5922216 | 5016 09 6 | | 302 |
| 1805 4 FT | 302212/ St / FT | 5379157 | 5016 03 7 | | 302 |
| 1805 4 FT | 302212/ St / FT | 5379157 | 5016 03 7 | | 323 |
| 1805 4 VA | 302212/ V4A | 5800354 | 5016 11 8 | | 323 |
| 1805 4 VA | 302212/ V4A | 5800354 | 5016 11 8 | | 302 |
| 1805 6 FT | 404314/ St / FT | 5379218 | 5016 04 5 | | 302 |
| 1805 6 FT | 404314/ St / FT | 5379218 | 5016 04 5 | | 323 |
| 1805 6 VA | 404314/ V4A | 5922278 | 5016 12 6 | | 323 |
| 1805 6 VA | 404314/ V4A | 5922278 | 5016 12 6 | | 302 |
| 1807 | / Al | 5379270 | 5016 14 2 | | 323 |
| 1808 | / CuZn | 5378075 | 5015 01 4 | | 299 |
| 1809 | Grey/ CuZn | 5378259 | 5015 07 3 | | 297 |
| 1809 30 AH | Grey/ PS | 5800118 | 5015 20 0 | | 298 |
| 1809 A | Black/ V2A | 5959427 | 5015 11 1 | | 300 |
| 1809 BG | Grey/ CuZn | 5378372 | 5015 50 2 | | 298 |
| 1809 M | Grey/ CuZn | 5378310 | 5015 08 1 | | 298 |
| 1809 UP | / CuZn | 5378198 | 5015 06 5 | | |
| 1810 | / St / F | 5378136 | 5015 05 7 | | 298 |
| 1811 | 250/ St / FT | 5377894 | 5014 01 8 | | 323 |
| 1811 L | 400/ St / FT | 5377955 | 5014 02 6 | | 323 |
| 1813 DIN | / St / FT | 5378013 | 5014 21 2 | | 323 |
| 1813 KL | / St / FT | 5901938 | 5014 42 5 | | 322 |
| 1814 FT | / St / FT | 5105015 | 5014 46 8 | | 322 |
| 1814 ST | / St | 5105077 | 5014 47 6 | | 322 |
| 1816 F-1000X1000 | / St / FT | 5376996 | 5009 23 5 | | 317 |
| 1816 F-500X1000 | / St / FT | 5376934 | 5009 22 7 | | 317 |
| 1816 F-500X500 | / St / FT | 5376873 | 5009 21 9 | | 317 |
| | | | | /100 pc. | |
| 1818 | / St / FT | 5377719 | 5012 01 5 | | 322 |
| | | | | /pc. | |
| 1819 20 | / TG / FT | 5242710 | 3041 20 4 | | 313 |
| 1819 20BP | / TG / FT | 5242772 | 3041 21 2 | | 313 |
| 1819 25 | / TG / FT | 5242833 | 3041 25 5 | | 313 |
| 1819 25BP | / TG / FT | 5242956 | 3041 95 6 | | 313 |
| 1820 20 | / St | 5243137 | 3042 20 0 | | 314 |
| 1820 25 | / St | 5243199 | 3042 25 1 | | 314 |
| | | | | /100 pc. | |
| 2056N SAS 12 VA | 8-12 / V2A | 5432432 | 1167 01 4 | | 306 |
| 2056N SAS 16 VA | 12-16 / V2A | 5432494 | 1167 02 2 | | 306 |
| 2056N SAS 22 VA | 16-22 / V2A | 5432555 | 1167 03 0 | | 306 |
| 2056N SAS 28 VA | 22-28 / V2A | 5432616 | 1167 04 9 | | 306 |
| 2056N SAS 8 VA | 4-8 / V2A | 5432371 | 1167 00 6 | | 306 |
| | | | | /100 m | |
| 2066 2M F | 25 x 12/ St / F | 5046516 | 1117 02 5 | | 306 |
| 2066 2M FS | 25 x 12/ St / FS | 5046578 | 1117 03 3 | | 306 |
| | | | | /pc. | |
| 2500 20 | / St | 5243311 | 3043 20 7 | | 314 |
| 2500 25 | / St | 5243373 | 3043 25 8 | | 314 |
| 2510 20 | / St | 5717492 | 3043 31 2 | | 314 |
| 2520 20 | / St | 5243793 | 3043 70 3 | | 314 |
| 2520 25 | / St | 5243854 | 3043 75 4 | | 314 |
| 2530 20 | / St | 5243557 | 3043 40 1 | | 314 |
| 2530 25 | / St | 5243618 | 3043 45 2 | | 314 |
| 2531 20 | / St | 5642312 | 3043 90 8 | | 314 |
| 2535 20 | / St | 5453796 | 3043 91 6 | | 315 |
| 2535 25 | / St | 5453970 | 3044 91 2 | | 315 |
| 2536 20 | / St | 5643036 | 3044 90 4 | | 315 |
| 2536 25 | / St | 5642978 | 3044 83 1 | | 315 |

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| 2710 20 | 84/ St / FT | 5372370 | 5001 21 8 | | 318 |
| 2710 25 | 89/ St / FT | 5372431 | 5001 22 6 | | 318 |
| 2730 20 FT | 84/ St / FT | 5372554 | 5001 40 4 | | 318 |
| 2730 20 VA | 84/ V2A | 5635475 | 5001 36 6 | | 318 |
| 2730 25 FT | 89/ St / FT | 5372615 | 5001 41 2 | | 318 |
| 2745 20 MS | / CuZn / Cu | 5372851 | 5001 56 0 | | 318 |
| 2745 20 MS | / CuZn / Cu | 5372851 | 5001 56 0 | | 374 |
| 2760 20 FT | 101/ St / FT | 5372912 | 5001 64 1 | | 318 |
| 2760 20 V4A | 101/ V4A | 5862697 | 5001 63 3 | | 318 |
| 2760 20 VA | 101/ V2A | 5635239 | 5001 61 7 | | 318 |
| 2760 25 FT | 110/ St / FT | 5372974 | 5001 66 8 | | 318 |
| 2760 25 V4A | 110/ V4A | 5901259 | 5001 67 2 | | 318 |
| | | | | /pc. | |
| 2760 B-20 FT | 101/ St / FT | 5754879 | 5001 74 9 | | 318 |
| 2760 B-20 VA | 101/ V2A | 5752653 | 5001 62 5 | | 318 |
| | | | | /100 pc. | |
| 5000 | / St / F | 5415695 | 5304 00 8 | | 356 |
| 5001 DIN-FT | / St / FT | 5415879 | 5304 10 5 | | 356 |
| 5001 DIN-FT+VA | / St / FT | 5858034 | 5304 10 7 | | 356 |
| 5001 N-CU | / Cu | 5817574 | 5304 17 2 | | 357 |
| 5001 N-FT | / St / FT | 5817512 | 5304 16 4 | | 357 |
| 5001 N-VA | / V2A | 5892809 | 5304 17 6 | | 357 |
| | | | | /100 pc. | |
| 5001 ZN-CU | / Zn / Cu | 5415930 | 5304 11 3 | | 356 |
| 5002 DIN-FT | / St / FT | 5416050 | 5304 20 2 | | 356 |
| 5002 N-VA | / V2A | 5892847 | 5304 27 0 | | 357 |
| | | | | /100 pc. | |
| 5003 | / TG / FT | 5416234 | 5304 31 8 | | 357 |
| 5004 DIN-FT 12 | / TG / FT | 5416357 | 5304 40 7 | | 362 |
| 5004 DIN-FT 20 | / TG / FT | 5416418 | 5304 50 4 | | 362 |
| 5005 DIN-FT | / St / F | 5416470 | 5304 60 1 | | 358 |
| 5005 N-FT | / St / FT | 5817758 | 5304 66 0 | | 358 |
| 5009 | / St / F | 5416951 | 5304 97 0 | | 358 |
| 5010 20 FT | / St / FT | 5503057 | 5304 52 0 | | 363 |
| 5011 | / St / FT | 5417071 | 5304 99 7 | | 322 |
| 5011 | / St / FT | 5417071 | 5304 99 7 | | 358 |
| 5011 VA M10 | / V4A | 5629115 | 5334 93 4 | | 323 |
| 5011 VA M10 | / V4A | 5629115 | 5334 93 4 | | 358 |
| 5011 VA M12 | / V4A | 5959663 | 5334 94 2 | | 323 |
| 5011 VA M12 | / V4A | 5959663 | 5334 94 2 | | 358 |
| | | | | /100 m | |
| 5052 DIN 20X2.5 | 20 x 2,5/ St / FT | 5680468 | 5019 34 0 | | 310 |
| 5052 DIN 20X2.5 | 20 x 2,5/ St / FT | 5680468 | 5019 34 0 | | 330 |
| 5052 DIN 25X3 | 25 x 3/ St / FT | 5694007 | 5019 34 2 | | 310 |
| 5052 DIN 25X3 | 25 x 3/ St / FT | 5694007 | 5019 34 2 | | 330 |
| 5052 DIN 30X3 | 30 x 3/ St / FT | 5694014 | 5019 34 4 | | 310 |
| 5052 DIN 30X3 | 30 x 3/ St / FT | 5694014 | 5019 34 4 | | 330 |
| 5052 DIN 30X3.5 | 30 x 3,5/ St / FT | 5680475 | 5019 34 5 | | 310 |
| 5052 DIN 30X3.5 | 30 x 3,5/ St / FT | 5680475 | 5019 34 5 | | 330 |
| 5052 DIN 30X3.5 | 30 x 3,5/ St / FT | 5680482 | 5019 34 7 | | 310 |
| 5052 DIN 30X3.5 | 30 x 3,5/ St / FT | 5680482 | 5019 34 7 | | 330 |
| 5052 DIN 30X4 | 30 x 4/ St / FT | 5680499 | 5019 35 0 | | 310 |
| 5052 DIN 30X4 | 30 x 4/ St / FT | 5680499 | 5019 35 0 | | 330 |
| 5052 DIN 40X4 | 40 x 4/ St / FT | 5680505 | 5019 35 5 | | 310 |
| 5052 DIN 40X4 | 40 x 4/ St / FT | 5680505 | 5019 35 5 | | 330 |
| 5052 DIN 40X5 | 40 x 5/ St / FT | 5680512 | 5019 36 0 | | 310 |
| 5052 DIN 40X5 | 40 x 5/ St / FT | 5680512 | 5019 36 0 | | 330 |
| 5052 V2A 30X3.5 | 30 x 3,5/ V2A | 5800415 | 5018 50 1 | | 310 |
| 5052 V2A 30X3.5 | 30 x 3,5/ V2A | 5800415 | 5018 50 1 | | 330 |
| 5052 V4A 30X3.5 | 30 x 3,5/ V4A | 5800477 | 5018 70 6 | | 310 |
| 5052 V4A 30X3.5 | 30 x 3,5/ V4A | 5800477 | 5018 70 6 | | 330 |
| 5052 V4A 30X3.5 | 30 x 3,5/ V4A | 5022015 | 5018 73 0 | | 310 |
| 5052 V4A 30X3.5 | 30 x 3,5/ V4A | 5022015 | 5018 73 0 | | 330 |
| | | | | /pc. | |
| 5700 A DIN | | 5400936 | 5106 02 8 | | 376 |
| 5700 DIN | | 5400875 | 5106 00 1 | | 376 |
| 5800 VA | / V2A | 5900436 | 5106 14 1 | | 376 |
| 5800 VZ | / St / FS | 5900375 | 5106 13 3 | | 376 |

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| 5900 | / St | 5244813 | 3059 00 6 | | 378 |
| ASP-V11EI 4 | | 5917717 | 5083 08 7 | | 257 |
| ASP-V24T 4 | | 5917595 | 5083 06 0 | | 257 |
| | | | | /100 pc. | |
| B 33020 | 22 8 / CuZn | 6049080 | 6404 00 6 | | 306 |
| B 33021 | 26 10 / CuZn | 6049202 | 6404 01 4 | | 306 |
| | | | | /pc. | |
| C 25-B+C 0 | | 5919391 | 5095 60 3 | | 164 |
| C 25-B+C 0 | | 5919391 | 5095 60 3 | | 195 |
| C 25-B+C 1 | | 5542957 | 5095 60 6 | | 156 |
| C 25-B+C 1 | | 5542957 | 5095 60 6 | | 179 |
| C 25-B+C 1 | | 5542957 | 5095 60 6 | | 195 |
| CNS 3-D-D | EN Black | 5952817 | 5092 70 1 | | 211 |
| CNS-D-D | EN Light grey | 5314837 | 5092 60 4 | | 211 |
| DLS-BS | | 5685333 | 5082 38 2 | | 251 |
| DS-7 16 M/W | | 5030881 | 5093 17 1 | | 247 |
| DS-BNC M/M | | 5391098 | 5093 26 0 | | 246 |
| DS-BNC M/W | | 5391036 | 5093 25 2 | | 245 |
| DS-BNC W/W | | 5390978 | 5093 23 6 | | 245 |
| DS-F M/W | | 5022732 | 5093 27 5 | | 247 |
| DS-F W/W | | 5022619 | 5093 27 2 | | 247 |
| DS-N M/W | | 5805991 | 5093 99 6 | | 246 |
| DS-N W/W | | 5962243 | 5093 98 8 | | 246 |
| DS-SMA W/W | | 5867050 | 5093 27 7 | | 247 |
| DS-TNC M/W | | 5087250 | 5093 27 0 | | 246 |
| FC-D | EN Pure white | 5035053 | 5092 80 0 | | 210 |
| FC-ISDN-D | EN Pure white | 5047223 | 5092 81 2 | | 211 |
| FC-RJ-D | EN Pure white | 5047254 | 5092 82 8 | | 211 |
| FC-SAT-D | EN Pure white | 5035176 | 5092 81 6 | | 210 |
| FC-TAE-D | EN Pure white | 5035237 | 5092 82 4 | | 210 |
| FC-TV-D | EN Pure white | 5035114 | 5092 80 8 | | 210 |
| FDB-2 24-M | 32 22 | 5683339 | 5098 38 0 | | 282 |
| FDB-2 24-N | 32 22 | 5683384 | 5098 39 0 | | 282 |
| FDB-3 24-M | 32 22 | 5683346 | 5098 38 2 | | 282 |
| FDB-3 24-N | 32 22 | 5683391 | 5098 39 2 | | 282 |
| | | | | /100 pc. | |
| F-FIX-10 | | 5070054 | 5403 10 3 | | 333 |
| F-FIX-10B | | 5070061 | 5403 11 0 | | 333 |
| | | | | /pc. | |
| F-FIX-132 | 110 / V2A | 5613572 | 5403 33 0 | | 336 |
| F-Fix-132-300 | 300 / V2A | 5813903 | 5403 33 3 | | 336 |
| | | | | /100 pc. | |
| F-FIX-16 | | 5548713 | 5403 20 0 | | 333 |
| F-FIX-16B | | 5110637 | 5403 20 5 | | 333 |
| F-FIX-B10 | / PP | 5070085 | 5403 12 4 | | 334 |
| F-FIX-B10 | / PP | 5070085 | 5403 12 4 | | 385 |
| F-FIX-B16 | / PP | 5548959 | 5403 23 5 | | 333 |
| F-FIX-B16 | / PP | 5548959 | 5403 23 5 | | 384 |
| F-FIX-B16 3B | 25 / PP | 5926320 | 5403 23 8 | | 338 |
| F-FIX-B16 3B | 25 / PP | 5926320 | 5403 23 8 | | 392 |
| | | | | /pc. | |
| F-FIX-BASIS | / PP | 5034933 | 5403 32 4 | | 332 |
| F-FIX-JUNIOR | 1000 / Al | 5034872 | 5403 30 8 | | 332 |
| | | | | /100 pc. | |
| F-FIX-KL | / V2A | 5548775 | 5403 21 9 | | 334 |
| F-FIX-S10 | | 5070078 | 5403 11 7 | | 334 |
| F-FIX-S10 | | 5070078 | 5403 11 7 | | 384 |
| F-FIX-S16 | | 5548898 | 5403 22 7 | | 333 |
| F-FIX-S16 | | 5548898 | 5403 22 7 | | 338 |
| F-FIX-S16 | | 5548898 | 5403 22 7 | | 384 |
| F-FIX-S16 | | 5548898 | 5403 22 7 | | 392 |

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| FL 20-CU | 20 x 2,5 / Cu | 5382331 | 5021 80 4 | | 310 |
| FL 20-CU | 20 x 2,5 / Cu | 5382331 | 5021 80 4 | | 330 |
| | | | | /pc. | |
| FLD 110 | | 5578413 | 5098 64 6 | | 270 |
| FLD 12 | | 5578376 | 5098 60 3 | | 269 |
| FLD 2-110 | | 5578512 | 5098 85 9 | | 272 |
| FLD 2-12 | | 5578444 | 5098 80 8 | | 271 |
| FLD 2-24 | | 5578451 | 5098 81 6 | | 271 |
| FLD 24 | | 5578383 | 5098 61 1 | | 269 |
| FLD 2-48 | | 5578468 | 5098 82 4 | | 271 |
| FLD 2-5 | | 5578529 | 5098 86 7 | | 271 |
| FLD 48 | | 5578390 | 5098 63 0 | | 269 |
| FLD 5 | | 5578369 | 5098 60 0 | | 269 |
| FLD 60 | | 5578406 | 5098 63 8 | | 270 |
| FRD 110 | | 5578338 | 5098 55 7 | | 267 |
| FRD 12 | | 5578291 | 5098 50 6 | | 266 |
| FRD 2-24 | | 5578420 | 5098 72 7 | | 268 |
| FRD 24 | | 5578307 | 5098 51 4 | | 266 |
| FRD 24 HF | | 5578352 | 5098 57 5 | | 265 |
| FRD 2-5 | | 5578437 | 5098 79 4 | | 268 |
| FRD 48 | | 5578314 | 5098 52 2 | | 266 |
| FRD 5 | | 5578284 | 5098 49 2 | | 266 |
| FRD 5 HF | | 5578345 | 5098 57 1 | | 265 |
| FS-V20 | | 5397458 | 5099 80 3 | | 289 |
| ISAV1000R | / GFK | 5004608 | 5408 84 9 | | 386 |
| ISAV1000W | / GFK | 5009733 | 5408 85 2 | | 386 |
| | | | | /100 m | |
| isCon 750 LGR | Light grey | 5888123 | 5407 99 5 | | 388 |
| isCon 750 LGR | Light grey | 5888154 | 5407 99 7 | | 388 |
| isCon 750 SW | Black | 5674573 | 5408 00 2 | | 388 |
| isCon 750 SW | Black | 5674627 | 5408 00 4 | | 388 |
| isCon 750 SW | Black | 5854265 | 5408 00 6 | | 388 |
| | | | | /pc. | |
| isCon AP1-16 VA | / V2A | 5674696 | 5408 02 6 | | 392 |
| isCon AP2-16 VA | / V2A | 5674702 | 5408 02 8 | | 392 |
| isCon connect | / V2A | 5674689 | 5408 02 2 | | 388 |
| isCon cut | | 5674641 | 5408 01 1 | | 388 |
| isCon DH | 23-26 / GFK | 5674863 | 5408 04 3 | | 390 |
| | | | | /100 pc. | |
| isCon EPPA 004 | 140 200 / Z-PP-P | 5813781 | 5408 06 0 | | |
| | | | | /pc. | |
| isCon H 26 VA | / V2A | 5872696 | 5408 06 4 | | 389 |
| isCon H VA | / V2A | 5699668 | 5408 05 6 | | 389 |
| isCon H280 26 PA | Light grey / PA | 5872757 | 5408 07 2 | | 390 |
| isCon H280 26 VA | / V2A | 5872764 | 5408 07 4 | | 390 |
| isCon H280 PA | Black / PA | 5674887 | 5408 04 9 | | 390 |
| isCon H280 VA | / V2A | 5674870 | 5408 04 7 | | 390 |
| isCon HS 26 PA | Light grey / PA | 5872702 | 5408 06 6 | | 389 |
| isCon HS 26 VA | / V2A | 5872740 | 5408 06 8 | | 389 |
| isCon HS PA | Black / PA | 5674917 | 5408 05 4 | | 389 |
| isCon HS VA | / V2A | 5674726 | 5408 05 2 | | 389 |
| isCon HWS | / PS | 5813774 | 5408 05 8 | | |
| isCon IN connect | M16 / V2A | 5864172 | 5408 02 4 | | 391 |
| isCon IN PAE | 49,9 / Al | 5871569 | 5408 03 1 | | 391 |
| isCon PAE | / V2A | 5674719 | 5408 03 6 | | 388 |
| isCon stripper | 23-26 | 5674634 | 5408 00 9 | | 388 |
| isFang 3B-100 | 1000 / V2A | 5670148 | 5408 96 8 | | 337 |
| isFang 3B-100 | 1000 / V2A | 5670148 | 5408 96 8 | | 391 |
| isFang 3B-100 AL | 1000 / Al | 5802433 | 5408 96 6 | | 337 |
| isFang 3B-100 AL | 1000 / Al | 5802433 | 5408 96 6 | | 391 |
| isFang 3B-100-A | 1026 / V2A | 5859550 | 5408 93 0 | | 337 |
| isFang 3B-100-A | 1026 / V2A | 5859550 | 5408 93 0 | | 391 |
| isFang 3B-150 | 1500 / V2A | 5674931 | 5408 96 9 | | 337 |
| isFang 3B-150 | 1500 / V2A | 5674931 | 5408 96 9 | | 391 |
| isFang 3B-150 AL | 1500 / Al | 5802440 | 5408 96 7 | | 337 |
| isFang 3B-150 AL | 1500 / Al | 5802440 | 5408 96 7 | | 391 |
| isFang 3B-150-A | 1500 / V2A | 5859567 | 5408 93 2 | | 337 |
| isFang 3B-150-A | 1500 / V2A | 5859567 | 5408 93 2 | | 391 |
| isFang 3B-G1 | 270 / V2A | 5674948 | 5408 97 1 | | 338 |
| isFang 3B-G1 | 270 / V2A | 5674948 | 5408 97 1 | | 392 |
| isFang 3B-G2 | 340 / V2A | 5674979 | 5408 97 2 | | 338 |
| isFang 3B-G2 | 340 / V2A | 5674979 | 5408 97 2 | | 392 |
| isFang 3B-G3 | 430 / V2A | 5674986 | 5408 97 3 | | 338 |
| isFang 3B-G3 | 430 / V2A | 5674986 | 5408 97 3 | | 392 |
| isFang 4000 | 1240 / GFK | 5670056 | 5408 94 2 | | 337 |
| isFang 4000 | 1240 / GFK | 5670056 | 5408 94 2 | | 391 |

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| isFang 6000 | 3340/ GFK | 5670063 | 5408 94 6 | | 337 |
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| isFang 6000 AL | 3340/ GFK | 5785347 | 5408 94 7 | | 337 |
| isFang 6000 AL | 3340/ GFK | 5785347 | 5408 94 7 | | 391 |
| isFang IN 4000 | 1325/ GFK | 5871613 | 5408 93 4 | | 338 |
| isFang IN 4000 | 1325/ GFK | 5871613 | 5408 93 4 | | 393 |
| isFang IN 6000 | 3325/ GFK | 5871620 | 5408 93 6 | | 338 |
| isFang IN 6000 | 3325/ GFK | 5871620 | 5408 93 6 | | 393 |
| isFang IN-A 4000 | 1325/ GFK | 5871668 | 5408 93 8 | | 337 |
| isFang IN-A 4000 | 1325/ GFK | 5871668 | 5408 93 8 | | 390 |
| isFang IN-A 6000 | 3325/ GFK | 5871675 | 5408 94 0 | | 337 |
| isFang IN-A 6000 | 3325/ GFK | 5871675 | 5408 94 0 | | 390 |
| isFang TR100 | 40/ V2A | 5670100 | 5408 95 6 | | 339 |
| isFang TR100 | 40/ V2A | 5670100 | 5408 95 6 | | 393 |
| isFang TR100 100 | 100/ V2A | 5849360 | 5408 95 5 | | 339 |
| isFang TR100 100 | 100/ V2A | 5849360 | 5408 95 5 | | 394 |
| isFang TR100 200 | 200/ V2A | 5849391 | 5408 95 7 | | 339 |
| isFang TR100 200 | 200/ V2A | 5849391 | 5408 95 7 | | 394 |
| isFang TR100 300 | 300/ V2A | 5849407 | 5408 95 9 | | 339 |
| isFang TR100 300 | 300/ V2A | 5849407 | 5408 95 9 | | 394 |
| isFang TS40-50 | 40/ V2A | 5670117 | 5408 95 8 | | 339 |
| isFang TS40-50 | 40/ V2A | 5670117 | 5408 95 8 | | 394 |
| isFang TS50-60 | 30/ V2A | 5670124 | 5408 96 0 | | |
| isFang TS50-60 | 30/ V2A | 5670124 | 5408 96 0 | | 339 |
| isFang TS50x50 | 30/ V2A | 5670131 | 5408 96 4 | | |
| isFang TS50x50 | 30/ V2A | 5670131 | 5408 96 4 | | 339 |
| isFang TW200 | 300/ V2A | 5670094 | 5408 95 4 | | 338 |
| isFang TW200 | 300/ V2A | 5670094 | 5408 95 4 | | 393 |
| isFang TW30 | 30/ V2A | 5670087 | 5408 95 2 | | 338 |
| isFang TW30 | 30/ V2A | 5670087 | 5408 95 2 | | 393 |
| isFang TW80 | 80/ V2A | 5670070 | 5408 95 0 | | 338 |
| isFang TW80 | 80/ V2A | 5670070 | 5408 95 0 | | 393 |
| ISO-A-1030 | 1080/ Al | 5770497 | 5408 82 0 | | 387 |
| ISO-A-500 | 500/ Al | 5542773 | 5408 80 6 | | 387 |
| ISO-A-800 | 800/ Al | 5542834 | 5408 81 4 | | 387 |
| ISOLAB | D/GB | 5921738 | 5096 81 2 | | 292 |
| KB MB | | 5709350 | 5089 66 0 | | 206 |
| KB MB | | 5709367 | 5089 66 2 | | 206 |
| KOAX B-E2 MF-C | | 5684916 | 5082 41 2 | | 250 |
| KOAX B-E2 MF-F | | 5684855 | 5082 42 0 | | 250 |
| KoaxB-E2 FF-F | | 5685074 | 5082 42 2 | | 251 |
| LC 63 | | 5509899 | 5096 97 0 | | 143 |
| LE ERDER FT | 1000/ St / FT | 5018001 | 5000 29 7 | | 312 |
| LE ERDER FT | 1500/ St / FT | 5617358 | 5000 30 0 | | 312 |
| LE ERDER V4A | 1500/ V4A | 5708834 | 5000 33 5 | | 312 |
| LE HAMMER-AC | / St | 5111641 | 3043 61 8 | | 315 |
| LE HAMMER-B | / St | 5087137 | 3043 61 4 | | 315 |
| LE HAMMER-B-II | / St | 5421627 | 3043 62 8 | | 315 |
| LE HAMMER-H | / St | 5087076 | 3043 61 0 | | 315 |
| LE HAMMER-SDS-M | / St | 5111160 | 3043 60 2 | | 315 |
| LE HAMMER-W | / St | 5617419 | 3043 60 6 | | 315 |
| LE KOPF | / St / FT | 5617297 | 3042 30 8 | | 313 |
| LE SPITZE | / St / FT | 5617235 | 3041 40 9 | | 313 |
| LFC | | 5425182 | 5096 78 6 | | 292 |
| LSA-A-LEI | Grey | 5525134 | 5084 00 8 | | 241 |
| LSA-BF-180 | | 5525370 | 5084 02 4 | | 242 |
| LSA-BF-24 | | 5525431 | 5084 02 8 | | 242 |
| LSA-B-MAG | | 5525318 | 5084 02 0 | | 241 |
| LSA-E | | 5525493 | 5084 03 2 | | 242 |
| LSA-E-LEI | Red | 5525257 | 5084 01 6 | | 241 |
| LSA-G | Light grey/ PA | 5110750 | 5084 04 8 | | 243 |
| LSA-M | / St | 5525554 | 5084 03 6 | | 242 |
| LSA-T-LEI | White | 5525196 | 5084 01 2 | | 241 |
| LSA-TOOL | | 5525615 | 5084 04 0 | | 243 |
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| MB 1+NPE | | 5415770 | 5096 65 0 | | 205 |
| MB 1+NPE+FS | | 5415787 | 5096 65 1 | | 165 |
| MB 1+NPE+FS | | 5415787 | 5096 65 1 | | 196 |
| MB 1+NPE+FS | | 5415787 | 5096 65 1 | | 205 |
| MB 2 | | 5415794 | 5096 65 3 | | 165 |
| MB 2 | | 5415794 | 5096 65 3 | | 196 |
| MB 2 | | 5415794 | 5096 65 3 | | 205 |
| MB 2+FS | | 5415800 | 5096 65 4 | | 165 |
| MB 2+FS | | 5415800 | 5096 65 4 | | 196 |
| MB 2+FS | | 5415800 | 5096 65 4 | | 205 |
| MB 2+NPE | | 5067481 | 5096 65 5 | | 165 |
| MB 2+NPE | | 5067481 | 5096 65 5 | | 196 |
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| MB 2+NPE+FS | | 5067498 | 5096 65 7 | | 165 |
| MB 2+NPE+FS | | 5067498 | 5096 65 7 | | 196 |
| MB 2+NPE+FS | | 5067498 | 5096 65 7 | | 205 |
| MB 3 | | 5067504 | 5096 66 5 | | 165 |
| MB 3 | | 5067504 | 5096 66 5 | | 196 |
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| MB 3+FS | | 5067535 | 5096 66 7 | | 165 |
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| MB 3+NPE | | 5067542 | 5096 66 9 | | 165 |
| MB 3+NPE | | 5067542 | 5096 66 9 | | 196 |
| MB 3+NPE | | 5067542 | 5096 66 9 | | 205 |
| MB 3+NPE+FS | | 5067559 | 5096 67 1 | | 165 |
| MB 3+NPE+FS | | 5067559 | 5096 67 1 | | 196 |
| MB 3+NPE+FS | | 5067559 | 5096 67 1 | | 205 |
| MB 4 | | 5067566 | 5096 68 0 | | 165 |
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| MB-FS | | 5813484 | 5096 69 3 | | 164 |
| MB-FS | | 5813484 | 5096 69 3 | | 197 |
| MB-SG | Blue/ PA | 5616375 | 5096 69 5 | | |
| MB-SG | Blue/ PA | 5616375 | 5096 69 5 | | 164 |
| MB-SG | Blue/ PA | 5616375 | 5096 69 5 | | 206 |
| MC 125-B NPE | | 5966449 | 5096 86 3 | | 140 |
| MC 50-B 0 VDE | | 5480730 | 5096 82 0 | | 142 |
| MC 50-B 0-OS | | 5051428 | 5096 82 5 | | 142 |
| MC 50-B 3 | | 5077046 | 5096 87 6 | | 141 |
| MC 50-B 3+1 | | 5077084 | 5096 87 8 | | 140 |
| MC 50-B U VDE | | 5480792 | 5096 83 9 | | 143 |
| MC 50-B VDE | | 5966388 | 5096 84 7 | | 141 |
| MC 50-B-OS | | 5051411 | 5096 85 1 | | 141 |
| MC V3 | / Cu | 5531135 | 5096 88 4 | | 143 |
| MC V4 | / Cu | 5531197 | 5096 88 6 | | 143 |
| MCD 125-B NPE | | 5541394 | 5096 86 5 | | 136 |
| MCD 50-B | | 5541158 | 5096 84 9 | | 137 |
| MCD 50-B 0 | | 5544517 | 5096 82 2 | | 142 |
| MCD 50-B 0-OS | | 5051473 | 5096 82 7 | | 142 |
| MCD 50-B 3 | | 5077077 | 5096 87 7 | | 137 |
| MCD 50-B 3+1 | | 5077091 | 5096 87 9 | | 136 |
| MCD 50-B 3+1-OS | | 5288299 | 5096 83 6 | | 136 |
| MCD 50-B 3+1-VG | | 5362036 | 5096 87 5 | | 138 |
| MCD 50-B 3-OS | | 5288282 | 5096 83 5 | | 137 |
| MCD 50-B 3-VG | | 5362029 | 5096 87 4 | | 139 |
| MCD 50-B-OS | | 5051466 | 5096 85 2 | | 137 |
| MDP-2 D-12-T-10 | | 5787372 | 5098 41 5 | | 278 |
| MDP-2 D-24-T | | 5406860 | 5098 42 2 | | 275 |
| MDP-2 D-24-T-10 | | 5787389 | 5098 42 5 | | 279 |

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| MDP-3 D-24-T | | 5406877 | 5098 42 7 | | 275 |
| MDP-3 D-48-T | | 5406907 | 5098 44 6 | | 276 |
| MDP-3 D-5-T | | 5406846 | 5098 40 7 | | 274 |
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| MDP-4 D-24-EX | | 5848523 | 5098 43 2 | | 284 |
| MDP-4 D-24-T | | 5406884 | 5098 43 1 | | 275 |
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| MDP-4 D-48-EX | | 5848530 | 5098 45 2 | | 284 |
| MDP-4 D-48-T | | 5406914 | 5098 45 0 | | 276 |
| MDP-4 D-5-EX | | 5848516 | 5098 41 2 | | 284 |
| MDP-4 D-5-T | | 5406853 | 5098 41 1 | | 274 |
| MDP-4 D-5-T-10 | | 5625124 | 5098 41 3 | | 277 |
| | | | | /VPE | |
| MK-B | | 5461111 | 5091 32 2 | | 293 |
| MK-B | | 5461111 | 5091 32 2 | | 376 |
| | | | | /100 pc. | |
| M-Quick M25 SW | Jet black 20-25 / PA | 5505396 | 2153 78 7 | | 390 |
| M-Quick M32 LGR | Light grey 25-32 / PA | 5741671 | 2153 73 4 | | 390 |
| | | | | /pc. | |
| ND-CAT6A/EA | | 5614364 | 5081 80 0 | | 250 |
| | | | | /VPE | |
| PCS | | 5461296 | 5091 43 8 | | 293 |
| PCS | | 5461296 | 5091 43 8 | | 376 |
| | | | | /pc. | |
| PCS-CS-D | EN | 5461654 | 5091 68 3 | | 293 |
| PCS-CS-D | EN | 5461654 | 5091 68 3 | | 377 |
| PCS-CS-GB | GB | 5896111 | 5091 69 1 | | 293 |
| PCS-CS-GB | GB | 5896111 | 5091 69 1 | | 377 |
| | | | | /VPE | |
| PCS-H | | 5461470 | 5091 52 7 | | 293 |
| PCS-H | | 5461470 | 5091 52 7 | | 377 |
| | | | | /pc. | |
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| PS3-B+C TNC | | 5405528 | 5089 75 4 | | 168 |
| PS3-B+C TNC+FS | | 5405535 | 5089 75 6 | | 168 |
| PS3-B+C-320 | | 5806813 | 5089 75 5 | | 168 |
| PS3-B+C-320+FS | | 5816614 | 5089 75 7 | | 168 |
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| PS3-VA TNC+FS | | 5405580 | 5089 77 5 | | 170 |
| PS4-B+C TNS+FS | | 5405559 | 5089 76 3 | | 167 |
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| PS4-VA TT+TNS | | 5405573 | 5089 77 0 | | 169 |
| P-TK | | 5017387 | 5086 01 9 | | 207 |
| P-TK+SAT | | 5017448 | 5086 02 3 | | 207 |
| P-TK+TV | | 5017509 | 5086 02 7 | | 207 |
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| RD 10 | / St / FT | 5381617 | 5021 10 3 | | 310 |
| RD 10 | / St / FT | 5381617 | 5021 10 3 | | 330 |
| RD 10-ALU | / Al | 5381976 | 5021 30 8 | | 311 |
| RD 10-ALU | / Al | 5381976 | 5021 30 8 | | 331 |
| RD 10-CU | / Cu | 5382096 | 5021 50 2 | | 311 |
| RD 10-CU | / Cu | 5382096 | 5021 50 2 | | 331 |
| RD 10-PVC | Black 10 / St / FT | 5381730 | 5021 16 2 | | 310 |
| RD 10-PVC | Black 10 / St / FT | 5381730 | 5021 16 2 | | 330 |
| RD 10-V2A | / V2A | 5801375 | 5021 22 7 | | 311 |
| RD 10-V2A | / V2A | 5801375 | 5021 22 7 | | 331 |
| RD 10-V2A | / V2A | 5680567 | 5021 23 9 | | 311 |
| RD 10-V2A | / V2A | 5680567 | 5021 23 9 | | 331 |
| RD 10-V4A | / V4A | 5902058 | 5021 64 2 | | 311 |
| RD 10-V4A | / V4A | 5902058 | 5021 64 2 | | 331 |
| RD 10-V4A | / V4A | 5680581 | 5021 64 7 | | 311 |
| RD 10-V4A | / V4A | 5680581 | 5021 64 7 | | 331 |
| RD 8-ALU | / Al | 5381914 | 5021 28 6 | | 311 |
| RD 8-ALU | / Al | 5381914 | 5021 28 6 | | 331 |
| RD 8-ALU-T | / Al | 5901273 | 5021 29 4 | | 311 |
| RD 8-ALU-T | / Al | 5901273 | 5021 29 4 | | 331 |
| RD 8-CU | / Cu | 5382034 | 5021 48 0 | | 311 |
| RD 8-CU | / Cu | 5382034 | 5021 48 0 | | 331 |
| RD 8-FT | / St / FT | 5381556 | 5021 08 1 | | 310 |

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|---|---|---|---|---|---|
| | | | | /100 m | |
| RD 8-FT | / St / FT | 5381556 | 5021 08 1 | | 330 |
| RD 8-PVC | Cream 8 / Al | 5067474 | 5021 33 2 | | 311 |
| RD 8-PVC | Cream 8 / Al | 5067474 | 5021 33 2 | | 331 |
| RD 8-V2A | / V2A | 5680529 | 5021 23 5 | | 311 |
| RD 8-V2A | / V2A | 5680529 | 5021 23 5 | | 331 |
| RD 8-V4A | / V4A | 5680574 | 5021 64 4 | | 311 |
| RD 8-V4A | / V4A | 5680574 | 5021 64 4 | | 331 |
| | | | | /pc. | |
| RJ11-TELE 4-C | | 5680536 | 5081 92 0 | | 237 |
| RJ11-TELE 4-C | | 5680536 | 5081 92 0 | | 238 |
| RJ11-TELE 4-F | | 5680413 | 5081 93 9 | | 238 |
| RJ45 S-ATM 8-F | | 5462439 | 5081 79 3 | | 250 |
| RJ45 S-E100 4-B | | 5239956 | 5081 72 6 | | 252 |
| RJ45 S-E100 4-C | | 5239895 | 5081 73 4 | | 252 |
| RJ45 S-E100 4-F | | 5239833 | 5081 74 2 | | 252 |
| RJ45-ISDN 4-C-G | | 5889458 | 5081 54 8 | | 239 |
| RJ45S-V24T 4-F | | 5502630 | 5081 64 5 | | 253 |
| RJ45S-V24T 8-F | | 5502692 | 5081 64 7 | | 253 |
| RJ45-TELE 4-C | | 5791119 | 5081 96 3 | | 238 |
| RJ45-TELE 4-F | | 5791058 | 5081 97 1 | | 238 |
| | | | | /100 pc. | |
| RK-FIX | / St / FT | 5433682 | 5316 45 0 | | 365 |
| RK-FIX CU | / V2A / Cu | 5433736 | 5316 46 8 | | 365 |
| RK-FIX VA | / V2A | 5433729 | 5316 45 9 | | 365 |
| | | | | /100 m | |
| S 11-CU | 10,5 / Cu | 5836209 | 5021 65 4 | | |
| S 11-CU | 10,5 / Cu | 5836209 | 5021 65 4 | | |
| S 9-CU | 9 / Cu | 5382218 | 5021 65 0 | | |
| S 9-CU | 9 / Cu | 5382218 | 5021 65 0 | | |
| | | | | /pc. | |
| SC-TELE 4-C-G | | 5834793 | 5081 68 8 | | 237 |
| SD09-V11 9 | | 5916277 | 5080 06 1 | | 256 |
| SD09-V24 9 | | 5915973 | 5080 05 3 | | 255 |
| SD15-V24 15 | | 5916031 | 5080 15 0 | | 255 |
| SD25-V11 25 | | 5916390 | 5080 28 2 | | 256 |
| SD25-V24 25 | | 5916215 | 5080 27 4 | | 255 |
| SD-Fix | / V2A | 5670735 | 5403 33 5 | | 335 |
| | | | | /100 pc. | |
| SQ M6 | Light grey M6 / PC | 5016069 | 2146 50 9 | | 389 |
| SQ PP | 630 / PA | 5016182 | 2351 70 6 | | 389 |
| SQ-20 SW | Jet black 23 / PP | 5655367 | 2146 16 4 | | 389 |
| SQ-25 LGR | Light grey 26 / PA | 5595717 | 2146 20 7 | | 389 |
| | | | | /pc. | |
| S-UHF M/W | | 5390732 | 5093 02 3 | | 245 |
| S-UHF W/W | | 5390671 | 5093 01 5 | | 245 |
| TKS-B | | 5578277 | 5097 97 6 | | 265 |
| | | | | /100 pc. | |
| TrayFix | | 5738428 | 5403 10 0 | | 334 |
| TrayFix | | 5738428 | 5403 10 0 | | 377 |
| | | | | /pc. | |
| TV 4+1 | | 5022978 | 5083 40 0 | | 248 |
| ÜSM-A | | 5080886 | 5092 45 1 | | 212 |
| ÜSM-A-150 | | 5475804 | 5092 46 6 | | 212 |
| ÜSM-A-2 | | 5247098 | 5092 46 0 | | 212 |
| ÜSM-A-4 | | 5613596 | 5092 47 2 | | 212 |
| ÜSM-A-TW | | 5613589 | 5092 47 0 | | 212 |
| ÜSS 45-A-ALU | Aluminium painted | 5006220 | 6117 46 7 | | 213 |

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|---|---|---|---|---|---|
| | | | | /pc. | |
| ÜSS 45-A-RW | Pure white | 6117611 | 6117 46 5 | | 213 |
| ÜSS 45-O-ALU | Aluminium painted | 5006213 | 6117 47 5 | | 213 |
| ÜSS 45-O-RW | Pure white | 6117673 | 6117 47 3 | | 213 |
| V 20-C 3+NPE+FS | | 5616382 | 5094 76 4 | | 177 |
| V 50-B+C 0-150 | 200 | 5681939 | 5094 40 0 | | 151 |
| V10 COMPACT 150 | | 5246268 | 5093 37 8 | | 200 |
| V10 COMPACT 255 | | 5076551 | 5093 38 0 | | 200 |
| V10 COMPACT 385 | | 5126041 | 5093 38 4 | | 200 |
| V10 COMPACT-AS | | 5299448 | 5093 39 1 | | 200 |
| V10-C 0-150 | | 5158103 | 5093 40 0 | | 204 |
| V10-C 0-280 | | 5012825 | 5093 40 2 | | 204 |
| V10-C 0-320 | | 5012832 | 5093 40 4 | | 204 |
| V10-C 0-385 | | 5004660 | 5093 40 6 | | 204 |
| V10-C 1+NPE-280 | | 5382799 | 5093 41 8 | | 202 |
| V10-C 3+NPE | | 5363903 | 5094 92 0 | | 202 |
| V10-C 3+NPE+FS | | 5363941 | 5094 93 1 | | 202 |
| V10-C 3+NPE-320 | | 5363934 | 5094 92 4 | | 203 |
| V20-C 0-150 | 200 | 5519133 | 5096 70 7 | | 193 |
| V20-C 0-280 | 350 | 5396918 | 5099 60 9 | | 193 |
| V20-C 0-300PV | 300 | 5708902 | 5099 61 1 | | 231 |
| V20-C 0-320-SP | 420 | 5570318 | 5099 84 8 | | 193 |
| V20-C 0-335 | 420 | 5481270 | 5099 85 0 | | 194 |
| V20-C 0-385 | 505 | 5396857 | 5099 59 5 | | 194 |
| V20-C 0-440 | 585 | 5942498 | 5099 70 6 | | 194 |
| V20-C 0-500PV | 500 | 5708933 | 5099 70 8 | | 231 |
| V20-C 0-550 | 745 | 5396970 | 5099 61 7 | | 194 |
| V20-C 0-75 | 100 | 5396734 | 5099 57 9 | | 193 |
| V20-C 1+FS-280 | | 5406679 | 5094 72 7 | | 182 |
| V20-C 1+NPE+FS | | 5382911 | 5094 76 0 | | 180 |
| V20-C 1+NPE-150 | | 5382966 | 5094 63 9 | | 176 |
| V20-C 1+NPE-280 | | 5382973 | 5094 65 0 | | 179 |
| V20-C 1+NPE-385 | | 5382980 | 5094 66 6 | | 185 |
| V20-C 1-150 | | 5406617 | 5094 67 7 | | 178 |
| V20-C 1-280 | | 5406594 | 5094 61 8 | | 181 |
| V20-C 1-385 | | 5406655 | 5094 70 3 | | 186 |
| V20-C 1-550 | | 5406662 | 5094 71 3 | | 188 |
| V20-C 2+AS-280 | | 5393672 | 5096 37 5 | | 183 |
| V20-C 2+FS-280 | | 5374923 | 5094 63 2 | | 182 |
| V20-C 2+FS-550 | | 5374985 | 5094 63 6 | | 189 |
| V20-C 2+NPE+FS | | 5240235 | 5094 76 2 | | 180 |
| V20-C 2+NPE-150 | | 5240044 | 5094 64 1 | | 176 |
| V20-C 2+NPE-280 | | 5240068 | 5094 65 3 | | 179 |
| V20-C 2+NPEFS15 | | 5240228 | 5094 75 0 | | 177 |
| V20-C 2-150 | | 5382881 | 5094 67 9 | | 178 |
| V20-C 2-280 | | 5382867 | 5094 62 1 | | 181 |
| V20-C 2-385 | | 5382898 | 5094 70 4 | | 186 |
| V20-C 2-550 | | 5382904 | 5094 71 4 | | 188 |
| V20-C 2-PH-1000 | 1000 | 5478669 | 5094 61 7 | | 223 |
| V20-C 2PH-600 | 600 | 5708889 | 5094 61 3 | | 222 |
| V20-C 2PHFS-1000 | 1000 | 5709114 | 5094 61 5 | | 223 |
| V20-C 2PHFS-600 | 600 | 5709077 | 5094 57 2 | | 222 |
| V20-C 3+AS-280 | | 5393733 | 5096 38 3 | | 183 |
| V20-C 3+FS-280 | | 5240198 | 5094 73 1 | | 182 |
| V20-C 3+FS-385 | | 5240280 | 5094 78 0 | | 187 |
| V20-C 3+FS-550 | | 5240334 | 5094 79 2 | | 189 |
| V20-C 3+FS-SÜ | | 5393191 | 5096 25 1 | | 184 |
| V20-C 3+NPE+AS | | 5617471 | 5096 39 7 | | 180 |
| V20-C 3+NPE+FS | | 5240242 | 5094 76 5 | | 180 |
| V20-C 3+NPE-150 | | 5240051 | 5094 64 4 | | 176 |
| V20-C 3+NPE-280 | | 5240099 | 5094 65 6 | | 179 |
| V20-C 3+NPE-385 | | 5240112 | 5094 66 8 | | 185 |
| V20-C 3+NPE400 | | 5871255 | 5094 90 0 | | 191 |
| V20-C 3+NPEFS38 | | 5240303 | 5094 78 8 | | 185 |
| V20-C 3-150 | | 5240129 | 5094 68 0 | | 178 |
| V20-C 3-280 | | 5240020 | 5094 62 4 | | 181 |
| V20-C 3-385 | | 5240150 | 5094 70 5 | | 186 |
| V20-C 3-550 | | 5240174 | 5094 71 5 | | 188 |
| V20-C 3-PH-1000 | 1000 | 5478621 | 5094 60 8 | | 223 |
| V20-C 3PH-600 | 600 | 5708872 | 5094 60 5 | | 222 |
| V20-C 3PHFS-1000 | 1000 | 5648482 | 5094 57 4 | | 223 |
| V20-C 3PHFS-600 | 600 | 5709084 | 5094 57 6 | | 222 |
| V20-C 4+AS-280 | | 5393795 | 5096 39 1 | | 183 |
| V20-C 4+FS-280 | | 5240204 | 5094 73 4 | | 182 |
| V20-C 4+FS-550 | | 5240341 | 5094 79 5 | | 189 |
| V20-C 4+FS-SÜ | | 5393252 | 5096 27 8 | | 184 |
| V20-C 4-280 | | 5240037 | 5094 62 7 | | 181 |
| V20-C 4-385 | | 5240167 | 5094 70 8 | | 186 |
| V20-C 4-550 | | 5240181 | 5094 71 8 | | 188 |
| V20-C U-2 AS | | 5393856 | 5096 41 3 | | 166 |
| V20-C U-2 AS | | 5393856 | 5096 41 3 | | 197 |

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| | | | | /pc. | |
| V20-C U-2 AS | | 5393856 | 5096 41 3 | | 206 |
| V20-C U-2 PH | | 5464457 | 5096 63 7 | | 232 |
| V20-C U-2 PH+FS | | 5464464 | 5096 63 9 | | 232 |
| V20-C U-3 AS | | 5393917 | 5096 42 1 | | 166 |
| V20-C U-3 AS | | 5393917 | 5096 42 1 | | 197 |
| V20-C U-3 AS | | 5393917 | 5096 42 1 | | 206 |
| V20-C U-3 FS-SÜ | | 5393559 | 5096 35 9 | | 165 |
| V20-C U-3 FS-SÜ | | 5393559 | 5096 35 9 | | 196 |
| V20-C U-3 FS-SÜ | | 5393559 | 5096 35 9 | | 205 |
| V20-C U-3+NPE | | 5063407 | 5096 37 0 | | 166 |
| V20-C U-3+NPE | | 5063407 | 5096 37 0 | | 197 |
| V20-C U-3+NPE | | 5063407 | 5096 37 0 | | 206 |
| V20-C U-3+NPE-AS | | 5247104 | 5096 37 2 | | 166 |
| V20-C U-3+NPE-AS | | 5247104 | 5096 37 2 | | 197 |
| V20-C U-3+NPE-AS | | 5247104 | 5096 37 2 | | 206 |
| V20-C U-3PH-Y | | 5299455 | 5096 64 7 | | 232 |
| V20-C U-3PH-Y-FS | | 5648499 | 5096 64 6 | | 232 |
| V20-C U-4 AS | | 5393979 | 5096 44 8 | | 166 |
| V20-C U-4 AS | | 5393979 | 5096 44 8 | | 197 |
| V20-C U-4 AS | | 5393979 | 5096 44 8 | | 206 |
| V20-C U-4 FS-SÜ | | 5393610 | 5096 36 7 | | 165 |
| V20-C U-4 FS-SÜ | | 5393610 | 5096 36 7 | | 196 |
| V20-C U-4 FS-SÜ | | 5393610 | 5096 36 7 | | 205 |
| V20-C3+NPE400+FS | | 5871262 | 5094 90 2 | | 191 |
| V20-VA 0 | | 5807612 | 5099 61 3 | | 195 |
| V20-VA 1-385 | | 5406716 | 5099 47 5 | | 192 |
| V25-B+C 0-150 | 200 | 5965664 | 5097 08 8 | | 163 |
| V25-B+C 0-280 | 350 | 5394099 | 5097 05 3 | | 163 |
| V25-B+C 0-320 | 420 | 5711551 | 5097 29 0 | | 163 |
| V25-B+C 0-385 | 505 | 5766636 | 5097 06 1 | | 163 |
| V25-B+C 0-450PV | 450 | 5708896 | 5097 06 5 | | 231 |
| V25-B+C 1+NPE | | 5382850 | 5094 45 7 | | 156 |
| V25-B+C 1+NPE+FS | | 5374886 | 5094 44 4 | | 157 |
| V25-B+C 1-150 | | 5457473 | 5094 40 1 | | 155 |
| V25-B+C 1-280 | | 5406556 | 5094 41 8 | | 158 |
| V25-B+C 1-385 | | 5406563 | 5094 43 1 | | 162 |
| V25-B+C 1NPE150 | | 5382843 | 5094 44 8 | | 154 |
| V25-B+C 2+NPE | | 5239826 | 5094 46 0 | | 156 |
| V25-B+C 2-150 | | 5382812 | 5094 40 3 | | 155 |
| V25-B+C 2-280 | | 5382829 | 5094 42 1 | | 158 |
| V25-B+C 2-385 | | 5382836 | 5094 43 4 | | 162 |
| V25-B+C 2-PH900 | 900 | 5478690 | 5097 45 7 | | 221 |
| V25-B+C 2PHFS900 | 900 | 5709138 | 5097 45 8 | | 221 |
| V25-B+C 3+AS | | 5945314 | 5097 18 5 | | 159 |
| V25-B+C 3+NPE | | 5239864 | 5094 46 3 | | 156 |
| V25-B+C 3+NPE+AS | | 5617532 | 5097 43 2 | | 157 |
| V25-B+C 3+NPE-FS | | 5239949 | 5094 51 0 | | 157 |
| V25-B+C 3-280 | | 5239734 | 5094 42 3 | | 158 |
| V25-B+C 3-385 | | 5239758 | 5094 43 7 | | 162 |
| V25-B+C 3-FS280 | | 5239925 | 5094 49 0 | | 159 |
| V25-B+C 3NPE150 | | 5239819 | 5094 45 4 | | 154 |
| V25-B+C 3NPE385 | | 5239888 | 5094 47 8 | | 161 |
| V25-B+C 3NPEAS38 | | 5542056 | 5097 11 1 | | 161 |
| V25-B+C 3NPEFS38 | | 5239994 | 5094 52 6 | | 161 |
| V25-B+C 3-PH900 | 900 | 5478683 | 5097 44 7 | | 221 |
| V25-B+C 3PHFS900 | 900 | 5709121 | 5097 44 8 | | 221 |
| V25-B+C 4+AS280 | | 5394211 | 5097 19 3 | | 159 |
| V25-B+C 4+FS-SÜ | | 5394396 | 5097 35 5 | | 160 |
| V25-B+C 4-280 | | 5239741 | 5094 42 6 | | 158 |
| V25-B+C 4-385 | | 5239765 | 5094 44 0 | | 162 |
| V25-B+C 4-FS280 | | 5239932 | 5094 49 3 | | 159 |
| V25-B+C 4-FS-G | | 5240013 | 5094 55 2 | | 160 |
| V50-B+C 0-280 | 350 | 5361954 | 5093 72 4 | | 151 |
| V50-B+C 0-300PV | 300 | 5708841 | 5093 72 6 | | 231 |
| V50-B+C 1+NPE | | 5688426 | 5093 65 3 | | 148 |
| V50-B+C 1+NPE+FS | | 5688433 | 5093 66 1 | | 149 |
| V50-B+C 2+NPE | | 5836797 | 5093 65 5 | | 148 |
| V50-B+C 2-PH600 | 600 | 5478553 | 5093 62 8 | | 220 |
| V50-B+C 2PHFS600 | 600 | 5709060 | 5093 62 9 | | 220 |
| V50-B+C 3+FS280 | | 5361916 | 5093 64 3 | | 150 |
| V50-B+C 3+NPE | | 5425120 | 5093 65 4 | | 148 |
| V50-B+C 3+NPE+FS | | 5425137 | 5093 66 2 | | 149 |
| V50-B+C 3-280 | | 5361893 | 5093 62 7 | | 150 |
| V50-B+C 3-PH600 | 600 | 5478546 | 5093 62 3 | | 220 |
| V50-B+C 3PHFS600 | 600 | 5709022 | 5093 62 5 | | 220 |
| V50-B+C 4 | | 5361909 | 5093 63 1 | | 150 |
| V50-B+C 4+FS | | 5361923 | 5093 64 7 | | 150 |
| VB-MDP 10-MD | / Cu | 5410461 | 5098 47 0 | | 280 |
| VB-MULTIBASE250 | | 5237358 | 5089 65 5 | | 164 |
| VB-V10 COMPACT-2 | | 5237341 | 5089 65 0 | | 201 |
| VB-V10 COMPACT-4 | | 5299400 | 5089 65 2 | | 201 |

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| VF110-AC DC | 150 | 5578154 | 5097 63 1 | | 215 |
| VF110-AC DC | 150 | 5578154 | 5097 63 1 | | 260 |
| VF110-AC DC-FS | 200150 | 5578192 | 5097 84 6 | | 216 |
| VF110-AC DC-FS | 200150 | 5578192 | 5097 84 6 | | 262 |
| VF12-AC DC | 13,5 | 5578116 | 5097 45 3 | | 214 |
| VF12-AC DC | 13,5 | 5578116 | 5097 45 3 | | 259 |
| VF12-AC/DC-FS | 1813,5 | 5736561 | 5097 45 4 | | 261 |
| VF2-110-AC/DCFS | 150200 | 5578253 | 5097 93 5 | | 217 |
| VF2-110-AC/DCFS | 150200 | 5578253 | 5097 93 5 | | 263 |
| VF2-230-AC/DC-FS | 255350 | 5578260 | 5097 93 9 | | 217 |
| VF2-230-AC/DC-FS | 255350 | 5578260 | 5097 93 9 | | 263 |
| VF2-24-AC/DC-FS | 3446 | 5578246 | 5097 93 1 | | 217 |
| VF2-24-AC/DC-FS | 3446 | 5578246 | 5097 93 1 | | 263 |
| VF230-AC/DC | 255 | 5578161 | 5097 65 0 | | 215 |
| VF230-AC/DC | 255 | 5578161 | 5097 65 0 | | 260 |
| VF230-AC-FS | 255 | 5578215 | 5097 85 8 | | 216 |
| VF230-AC-FS | 255 | 5578215 | 5097 85 8 | | 262 |
| VF24-AC/DC | 34 | 5578123 | 5097 60 7 | | 214 |
| VF24-AC/DC | 34 | 5578123 | 5097 60 7 | | 259 |
| VF24-AC/DC-FS | 4634 | 5578185 | 5097 82 0 | | 216 |
| VF24-AC/DC-FS | 4634 | 5578185 | 5097 82 0 | | 261 |
| VF48-AC/DC | 60 | 5578130 | 5097 61 5 | | 214 |
| VF48-AC/DC | 60 | 5578130 | 5097 61 5 | | 259 |
| VF48-AC/DC-FS | 8060 | 5812258 | 5097 82 2 | | 261 |
| VF60-AC/DC | 80 | 5578147 | 5097 62 3 | | 214 |
| VF60-AC/DC | 80 | 5578147 | 5097 62 3 | | 259 |
| VF60-AC/DC-FS | 11080 | 5812265 | 5097 82 4 | | 262 |
| VF-FS | | 5813521 | 5098 47 5 | | 280 |
| VG 3-B TNC | | 5531074 | 5089 21 2 | | 139 |
| VG 4-B TNS+TT | | 5531012 | 5089 20 0 | | 138 |
| VG LM | / PA | 5047155 | 5088 87 9 | | 164 |
| VG-BC DC-MSFS600 | 600 | 5835646 | 5088 69 5 | | 227 |
| VG-BC DC-MSFS900 | 900 | 5835653 | 5088 69 6 | | 227 |
| VG-BC DCPH900-21 | 900 | 5872641 | 5088 62 5 | | 224 |
| VG-BC DCPH900-31 | 900 | 5872658 | 5088 62 9 | | 224 |
| VG-BC DCPH-MS600 | 600 | 5613725 | 5088 69 3 | | 226 |
| VG-BC DCPH-MS900 | 900 | 5613718 | 5088 69 2 | | 226 |
| VG-BC DCPH-Y600 | 600 | 5709008 | 5088 67 6 | | 229 |
| VG-BC DCPH-Y900 | 900 | 5709015 | 5088 67 8 | | 229 |
| VG-C DCPH1000-21 | 1000 | 5829461 | 5088 64 6 | | 224 |
| VG-C DCPH1000-31 | 1000 | 5829478 | 5088 64 8 | | 224 |
| VG-C DC-PH1000-4 | 1000 | 5704010 | 5088 70 3 | | 228 |
| VG-C DCPH1000-4K | 1000 | 5780700 | 5088 65 0 | | 226 |
| VG-C DCPH1000-4S | 1000 | 5780717 | 5088 65 1 | | 225 |
| VG-C DCPH1000-6S | 1000 | 5780724 | 5088 65 2 | | 225 |
| VG-C DC-PH-21 | 1000 | 5890805 | 5088 60 5 | | 230 |
| VG-C DC-PH-31 | 1000 | 5890812 | 5088 60 9 | | 230 |
| VG-C DC-PH-MS | 1000 | 5371090 | 5088 69 4 | | 230 |
| VG-C DCPH-MS1000 | 1000 | 5613701 | 5088 69 1 | | 226 |
| VG-C DC-PH-Y | 1000 | 5473206 | 5088 69 9 | | 230 |
| VG-C DCPH-Y1000 | 1000 | 5708964 | 5088 67 2 | | 229 |
| VG-C DCPH-Y600 | 600 | 5708957 | 5088 67 0 | | 229 |
| ZSF | | 5518419 | 2362 97 0 | | 377 |

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# Terms and conditions of sale and delivery of OBO BETTERMANN GmbH & Co. KG, OBO BETTERMANN Projekt und Systemtechnik GmbH and OBO Befestigungselemente GmbH, Menden.

1. All our supplies and services shall be governed exclusively by the following terms and conditions, including our additional terms and conditions for cable tray business transactions. Any terms and conditions of business and purchasing of the customer shall be valid only if we have acknowledged them in writing. Our quotations are without engagement; they are mere invitations to submit contract offers. Any and all transactions and agreements, including those entered into by our employees and agents shall only be binding upon our written confirmation or invoicing. The foregoing provision shall also apply to any modifications of the agreed formal requirements.

2. The documents and data pertaining to the quotation, such as illustrations, brochures, drawings, dimensions, loading capacity values and weight details are approximate only, unless they are expressly stipulated to be binding.

Samples are non-binding samples for inspection. Any purchase according to sample will be subject to customary deviations and deviations resulting from normal production processes. The properties of the sample shall be no guaranteed quality of the purchase object unless expressly stated otherwise in the confirmation of order. Samples must be returned to us at the latest within four weeks in perfect condition. If they are not returned within this period in proper condition, we shall be entitled to charge the purchase price for the sample in accordance with our current price list. All information on our products, in particular the illustrations, drawings, weight, dimension and performance data included in our quotations and printed matter shall be regarded as approximate average values and shall not represent any quality guarantee.

With regard to products made according to customer drawings, samples and other instructions of the customer, we will not provide any warranty nor assume any liability for the due and proper functioning of the product or for any other defects if and to the extent they are based upon the customer's specifications. The customer shall indemnify us from any third party claims, including claims for product liability as may be asserted against us for damages resulting from the products unless we have caused such damages by intent or gross negligence. The customer shall warrant that the manufacture and supply of products made in accordance with his instructions will not infringe any proprietary rights of third parties. Should any proprietary rights be asserted against us, we shall be entitled, without any legal review of the third party claims, to withdraw from the contract after hearing the customer, unless the third party withdraws the claims asserted against us under its proprietary rights within eight days by written declaration. The customer shall compensate us for any damage sustained as a result of the assertion of proprietary rights. In case of withdrawal, the work we have carried out so far shall be remunerated. Further rights under the statutory provisions shall not be affected thereby.

Any moulds, tools and design data produced by us for the execution of the order shall be our exclusive property. Unless expressly agreed otherwise, the customer shall not have any claims thereto, even if he has contributed to the costs of producing any such moulds, tools and design data.

3. The packing, shipping route and means of transportation shall be left to our discretion in the absence of any other agreements. They shall be charged at their cost price. We will take back undamaged cases, when being returned carriage paid, at 2/3 of the amount invoiced. The one-way or pool pallets used for transport shall be either exchanged upon taking delivery or returned. The smallest packing units stocked and listed may not be broken up for rationalisation reasons. In case of orders for different quantities, the nearest packing unit will be supplied.

We reserve the right to deviate from the agreed delivery quantity, in particular in the case of custom-made products, to a customary extent or in conformity with national or international standards. In case of a demand for adhering to a precise quantity, an express reference is necessary and subject to confirmation.

Master and call orders shall oblige the customer to accept the total quantity on which the master/call order is based. Where no particular call orders are specified in the contract, the total quantity of the master call order must be called within twelve months. If the customer fails to adhere to call deadlines, we shall be entitled to deliver and charge the total quantity in full after four weeks from written notice with reference to the consequences of any failure to call. Our rights arising from any default of the customer shall not be affected thereby.

4. Unless otherwise agreed, our prices are quoted ex works and do not include packing and insurance. The value added tax at the rate applicable on the date of dispatch will be added to our prices. The purchaser shall ensure the correctness of his VAT identification number, which he must notify to us immediately without being asked. He shall undertake to inform both us and the competent domestic tax authority without delay of any change in his name, address and VAT identification number.

Delivery shall be franco domicile within Germany, i.e. carriage and packing prepaid, if the net order value is in excess of € 1,200. For small orders below € 100 (net excluding value added tax), we shall invoice a lower quantity surcharge of € 10 (net) per order. Upon transfer of our supplies and services to a carrier or forwarding agent, at the latest upon their leaving our warehouse or supply plant, the risk shall pass to the recipient, even in case of deliveries free place of destination.

5. Delivery periods and delivery deadlines shall be approximate only unless we have expressly stated in writing that they are binding. Delivery periods shall commence upon receipt of our confirmation of order, but not before clarification of all execution details, ex place of delivery. The customer shall only be entitled to withdraw from the contract after having granted a reasonable extension of time. We reserve the right to make partial deliveries. Claims for damages and reimbursement of expenses - for any reason whatsoever - shall be subject to the provisions set out in article 10.

In the event of any circumstances that are beyond our control within the scope of normal operating risks and obstruct or make impracticable any delivery, we shall be entitled to suspend delivery by the duration of such obstruction plus a reasonable start-up period or to withdraw from the contract for the part not yet fulfilled. The purchaser can demand a statement from us as to whether we wish to deliver within a reasonable period or withdraw. If we fail to make such a statement, the purchaser may withdraw. Our notice to the purchaser shall be deemed to be sufficient evidence that we have been prevented from delivering.

Delivery time is extended in case of such events as labour disputes, strikes and lockouts, orders from the authorities, difficulties with the procurement of materials, spoiled work or post-processing, shutdowns and staff shortage as well as shortage of means of transport, and general occurrence of unforeseen events beyond our scope of influence, by the length of duration of these events.

6. Payments shall be made upon receipt of invoice less a 3% cash discount for payment within 10 days or net after 30 days from date of invoice. Erection work and all paid labour work must be paid within 10 days without deduction of any cash discount. In case of non-cash payments, the date of the credit note will be deemed to be the date of receipt of payment. Payments received shall always be credited first against costs, then against interest and then against the earliest liability. Cheques and bills of exchange shall only be accepted as means of payment.

Any payment by bill of exchange shall be subject to a prior separate and written agreement, whereby all bill costs shall be borne by the customer and no discount can be granted. The customer shall have no right to refuse performance and no right of retention - for any legal reason whatsoever - unless we have acknowledged his claim beforehand in writing or his claim has the force of law.

The customer shall only be entitled to set off claims which have the force of law, are undisputed or acknowledged by us in writing.

7. We shall retain title to the goods supplied by us until all our claims arising from our business transactions with the customer have been satisfied - current account clause - and all bills of exchange or cheques submitted for payment by the customer have been honoured.

Any treatment or processing of goods subject to our retention of title (reserved goods) shall be carried out for us as the manufacturer in accordance with § 950 BGB (German Civil Code) without any obligation on our part. If our reserved goods are to be regarded as the main item or the main item is owned by the customer, full title to the new item shall pass to us when it is created. In other cases, we shall acquire a co-ownership interest in the new item in the proportion of the sales value of our reserved goods to the other goods used for the new item at the time of processing, intermingling, joining or mixing. The customer shall take custody of our ownership or co-ownership interest free of charge; it shall be treated as reserved goods.

Before transfer of title, our goods shall be neither pledged nor assigned as collateral without our prior consent. In addition, any third party rights or pledges shall be notified to us immediately and we shall be given all details and provided all documents necessary for intervention; otherwise the customer must bear our loss. In the latter case, our total claims against the customer shall also be immediately payable.

The customer shall be entitled to sell or to use our reserved goods in the ordinary course of business subject to the condition that the relevant claims are transferred in accordance with article 8 below. This right shall lapse upon the customer's failure to promptly meet his payment obligations towards us or in the event of any cheque or bill protests or his suspension of payments. In such cases, we shall be entitled to take back the goods provisionally at the customer's expense and to sell them at our duly exercised discretion after a corresponding reminder has been sent to the customer. We will then pass the due amount to the customer's credit.

8. If our goods are sold before payment of our claim, the customer shall be obliged to retain our title against his purchaser until the goods have been paid for in full by the purchaser. The claim arising against the purchaser from such resale as well as any other ancillary rights or security interests of the customer resulting from the sale and any claims for compensation in case of damage to or destruction of our reserved property, including the relevant insurance sum shall hereby be assigned to us. We hereby accept this assignment. Where our co-ownership interest is sold, the relevant claims shall be assigned in the amount corresponding to the value of our interest.

The customer shall, at our request, inform us of his purchasers, notify them of the assignment made and provide us with any and all documents required to assert our rights.

As long as the customer meets his contractual obligations without delay, he shall be authorised to collect the claims assigned. He shall keep the amounts collected on our behalf separately and remit them to us immediately as soon and as far as our claims become due. The authorisation shall lapse in case of any cheque or bill protest of the customer or his definite suspension of payments. The customer shall bear the costs incurred for any action taken against third parties and shall advance them upon request.

If the security provided to us by the retention of title and the anticipatory assignment should exceed the claims to be secured by more than 20%, we shall, at the customer's request, release paid supplies of our choice. Upon payment of all our claims by the customer, assigned claims shall pass to the customer.

9. Any complaints for obvious defects regarding the quantity or quality of our supplies and services that are identifiable upon careful inspection shall without delay, but at the latest within the period of limitation of eight days from arrival of the goods at the address of the customer or the person appointed by him, be notified in writing to us, not to our representatives. Slight deviations in dimensions and designs within the scope of defined technical tolerances shall not give rise to any right of complaint. Any rejected goods may only be returned to us with our prior written authorisation.

In case of justified complaints within the prescribed period, we shall, at our option, take remedial action by way of subsequent performance, by rectifying the defect, supplying non-defective goods or providing a credit note for the lower value calculated.

We shall be entitled to refuse subsequent performance in accordance with the statutory provisions. If we refuse subsequent performance, if any subsequent performance remains unsuccessful or if the customer cannot be reasonably expected to accept any subsequent performance, the latter shall be entitled to withdraw from the contract in compliance with the provisions of the following sentences. The customer shall only be entitled to withdraw from the contract - where a withdrawal is not excluded by law - upon the unsuccessful expiry of a reasonable period for subsequent performance set by him, unless this period was not required under the statutory provisions (§§ 281 para. 2, 323 para. 2, 440, 441 para. 1 BGB (German Civil Code)).

In case of his withdrawal, the customer shall be liable for any deterioration, destruction or loss of use resulting from any negligence or intent on his part. Any claims for damages or reimbursement of expenses of the customer shall be subject to the provisions set out in article 10.

In the case of any fraudulent concealment of a defect or in the case of any provision of a quality guarantee for the goods sold at the time of the passing of risk within the meaning of § 444 BGB (German Civil Code) (seller's declaration that the object sold has a specific property at the time of the passing of risk and that the seller, regardless of any fault on his part, intends to be answerable for any and all consequences resulting from its absence), the customer's rights shall be exclusively governed by the statutory provisions.

We shall - in addition to the statutory grounds for refusal - also be entitled to refuse subsequent performance if and as long as the customer fails to send us, at our request, the rejected goods or a sample thereof; the customer shall have no right of withdrawal for any such refusal. We may further refuse any subsequent performance if the goods concerned have been altered or modified without our consent unless the customer can prove that the defect was not caused by such alteration or modification.

The limitation period for any claims arising from defects shall be one year; in the case of goods which have been used in accordance with their intended purpose for a building and have caused its defectiveness, the limitation period shall be two years. The provisions of §§ 478, 479 BGB (German Civil Code) on recourse in the chain of suppliers shall not be affected thereby.

10. In the case of a pre-contractual, contractual or non-contractual breach of duty, including unsatisfactory delivery, tortious conduct and producer's liability, we shall only be liable for compensatory damages and reimbursement of expenses - subject to further contractual or statutory liability requirements - in the case of intent, gross negligence or slightly negligent breach of a material contractual duty (contractual duty the infringement of which jeopardises the fulfilment of the object of the contract). However - except in the case of intent - our liability shall be limited to the typical contractual damage that was foreseeable at the time the contract was entered into.

The purchaser shall not be permitted to make a claim for expenses incurred in vain.

Except for any breach of material duties, our liability for slight negligence shall be excluded, but in any case be limited to the amount of the purchase price.

Any claim asserted by the customer or a third party for payment of a contractual penalty shall be excluded.

With regard to damages caused by delay, we shall only be liable for slight negligence up to the amount of 5% of the purchase price agreed with us.

The exclusions and limitations of liability set forth above shall not apply in the event that a guarantee is given with respect to the quality of the object sold within the meaning of § 444 BGB (German Civil Code) if a defect is fraudulently concealed or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act.

Any and all claims for damages against us, for any legal reason whatsoever, shall become statute-barred at the latest after one year from delivery of the goods to the customer, in the case of tortious liability from the time of knowledge, or grossly negligent ignorance, of the circumstances giving rise to the claim and the person liable to pay damages. This provision shall not apply in the case of liability for intent and in the event that a guarantee is given for the quality of the object sold, in the case of fraudulent concealment of a defect or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act. Any shorter limitation periods shall take precedence.

11. We shall be entitled to process and store any customer data obtained with regard to or in connection with the business relationship in accordance with the German Federal Data Protection Act, irrespective of whether such data is provided by the purchaser himself or by any third parties.

12. Place of performance for delivery and payment is Menden/Sauerland. The court of competent jurisdiction for any and all disputes, including disputes with regard to bills of exchange and cheques, is the Local Court (Amtsgericht) of Menden or, at our option, the District Court (Landgericht) of Arnsberg, irrespective of the value of the object in dispute. We shall, however, also be entitled to take legal proceedings against the customer at the place of his registered office.

German law shall be exclusively applicable. The application of international purchase laws is hereby excluded.

Should, for any reason whatsoever, individual provisions of our terms and conditions of sale and delivery be invalid, the validity and binding nature of the other provisions shall not be affected thereby. The customer agrees, that the invalid provision shall be replaced by a valid provision that comes as close as possible to the economic meaning of the invalid provision.

13. The prices of products made of brass and copper are subject to certain fluctuations that are based on the relevant DEL listings. The prices of our brass articles are based on a DEL listing of € 150 for Ms 58, those of our copper products on a DEL value for electrolyte copper of € 200.

In case of any increase or reduction in these prices by more than € 15, a five per cent surcharge or deduction shall be made for each 15 points. The calculation of any such surcharges or deductions shall be based on the DEL listing of the date of our receipt of the order.

Valid from January 2010



02_TBS_Masterkatalog_Länder_2012 / en / 10/04/2012 (LLExport_01433) / 11/04/2012

# Terms and conditions of sale and delivery of OBO BETTERMANN GmbH & Co. KG, OBO BETTERMANN Projekt und Systemtechnik GmbH and OBO Befestigungselemente GmbH, Menden.

1. All our supplies and services shall be governed exclusively by the following terms and conditions, including our additional terms and conditions for cable tray business transactions. Any terms and conditions of business and purchasing of the customer shall be valid only if we have acknowledged them in writing. Our quotations are without engagement; they are mere invitations to submit contract offers. Any and all transactions and agreements, including those entered into by our employees and agents shall only be binding upon our written confirmation or invoicing. The foregoing provision shall also apply to any modifications of the agreed formal requirements.

2. The documents and data pertaining to the quotation, such as illustrations, brochures, drawings, dimensions, loading capacity values and weight details are approximate only, unless they are expressly stipulated to be binding.

Samples are non-binding samples for inspection. Any purchase according to sample will be subject to customary deviations and deviations resulting from normal production processes. The properties of the sample shall be no guaranteed quality of the purchase object unless expressly stated otherwise in the confirmation of order. Samples must be returned to us at the latest within four weeks in perfect condition. If they are not returned within this period in proper condition, we shall be entitled to charge the purchase price for the sample in accordance with our current price list. All information on our products, in particular the illustrations, drawings, weight, dimension and performance data included in our quotations and printed matter shall be regarded as approximate average values and shall not represent any quality guarantee.

With regard to products made according to customer drawings, samples and other instructions of the customer, we will not provide any warranty nor assume any liability for the due and proper functioning of the product or for any other defects if and to the extent they are based upon the customer's specifications. The customer shall indemnify us from any third party claims, including claims for product liability as may be asserted against us for damages resulting from the products unless we have caused such damages by intent or gross negligence. The customer shall warrant that the manufacture and supply of products made in accordance with his instructions will not infringe any proprietary rights of third parties. Should any proprietary rights be asserted against us, we shall be entitled, without any legal review of the third party claims, to withdraw from the contract after hearing the customer, unless the third party withdraws the claims asserted against us under its proprietary rights within eight days by written declaration. The customer shall compensate us for any damage sustained as a result of the assertion of proprietary rights. In case of withdrawal, the work we have carried out so far shall be remunerated. Further rights under the statutory provisions shall not be affected thereby.

Any moulds, tools and design data produced by us for the execution of the order shall be our exclusive property. Unless expressly agreed otherwise, the customer shall not have any claims thereto, even if he has contributed to the costs of producing any such moulds, tools and design data.

3. The packing, shipping route and means of transportation shall be left to our discretion in the absence of any other agreements. They shall be charged at their cost price. We will take back undamaged cases, when being returned carriage paid, at 2/3 of the amount invoiced. The one-way or pool pallets used for transport shall be either exchanged upon taking delivery or returned. The smallest packing units stocked and listed may not be broken up for rationalisation reasons. In case of orders for different quantities, the nearest packing unit will be supplied.

We reserve the right to deviate from the agreed delivery quantity, in particular in the case of custom-made products, to a customary extent or in conformity with national or international standards. In case of a demand for adhering to a precise quantity, an express reference is necessary and subject to confirmation.

Master and call orders shall oblige the customer to accept the total quantity on which the master/call order is based. Where no particular call orders are specified in the contract, the total quantity of the master call order must be called within twelve months. If the customer fails to adhere to call deadlines, we shall be entitled to deliver and charge the total quantity in full after four weeks from written notice with reference to the consequences of any failure to call. Our rights arising from any default of the customer shall not be affected thereby.

4. Unless otherwise agreed, our prices are quoted ex works and do not include packing and insurance. The value added tax at the rate applicable on the date of dispatch will be added to our prices. The purchaser shall ensure the correctness of his VAT identification number, which he must notify to us immediately without being asked. He shall undertake to inform both us and the competent domestic tax authority without delay of any change in his name, address and VAT identification number.

Delivery shall be franco domicile within Germany, i.e. carriage and packing prepaid, if the net order value is in excess of € 1,200. For small orders below € 100 (net excluding value added tax), we shall invoice a lower quantity surcharge of € 10 (net) per order. Upon transfer of our supplies and services to a carrier or forwarding agent, at the latest upon their leaving our warehouse or supply plant, the risk shall pass to the recipient, even in case of deliveries free place of destination.

5. Delivery periods and delivery deadlines shall be approximate only unless we have expressly stated in writing that they are binding. Delivery periods shall commence upon receipt of our confirmation of order, but not before clarification of all execution details, ex place of delivery. The customer shall only be entitled to withdraw from the contract after having granted a reasonable extension of time. We reserve the right to make partial deliveries. Claims for damages and reimbursement of expenses - for any reason whatsoever - shall be subject to the provisions set out in article 10.

In the event of any circumstances that are beyond our control within the scope of normal operating risks and obstruct or make impracticable any delivery, we shall be entitled to suspend delivery by the duration of such obstruction plus a reasonable start-up period or to withdraw from the contract for the part not yet fulfilled. The purchaser can demand a statement from us as to whether we wish to deliver within a reasonable period or withdraw. If we fail to make such a statement, the purchaser may withdraw. Our notice to the purchaser shall be deemed to be sufficient evidence that we have been prevented from delivering.

Delivery time is extended in case of such events as labour disputes, strikes and lockouts, orders from the authorities, difficulties with the procurement of materials, spoiled work or post-processing, shutdowns and staff shortage as well as shortage of means of transport, and general occurrence of unforeseen events beyond our scope of influence, by the length of duration of these events.

6. Payments shall be made upon receipt of invoice less a 3% cash discount for payment within 10 days or net after 30 days from date of invoice. Erection work and all paid labour work must be paid within 10 days without deduction of any cash discount. In case of non-cash payments, the date of the credit note will be deemed to be the date of receipt of payment. Payments received shall always be credited first against costs, then against interest and then against the earliest liability. Cheques and bills of exchange shall only be accepted as means of payment.

Any payment by bill of exchange shall be subject to a prior separate and written agreement, whereby all bill costs shall be borne by the customer and no discount can be granted. The customer shall have no right to refuse performance and no right of retention - for any legal reason whatsoever - unless we have acknowledged his claim beforehand in writing or his claim has the force of law.

The customer shall only be entitled to set off claims which have the force of law, are undisputed or acknowledged by us in writing.

7. We shall retain title to the goods supplied by us until all our claims arising from our business transactions with the customer have been satisfied - current account clause - and all bills of exchange or cheques submitted for payment by the customer have been honoured.

Any treatment or processing of goods subject to our retention of title (reserved goods) shall be carried out for us as the manufacturer in accordance with § 950 BGB (German Civil Code) without any obligation on our part. If our reserved goods are to be regarded as the main item or the main item is owned by the customer, full title to the new item shall pass to us when it is created. In other cases, we shall acquire a co-ownership interest in the new item in the proportion of the sales value of our reserved goods to the other goods used for the new item at the time of processing, intermingling, joining or mixing. The customer shall take custody of our ownership or co-ownership interest free of charge; it shall be treated as reserved goods.

Before transfer of title, our goods shall be neither pledged nor assigned as collateral without our prior consent. In addition, any third party rights or pledges shall be notified to us immediately and we shall be given all details and provided all documents necessary for intervention; otherwise the customer must bear our loss. In the latter case, our total claims against the customer shall also be immediately payable.

The customer shall be entitled to sell or to use our reserved goods in the ordinary course of business subject to the condition that the relevant claims are transferred in accordance with article 8 below. This right shall lapse upon the customer's failure to promptly meet his payment obligations towards us or in the event of any cheque or bill protests or his suspension of payments. In such cases, we shall be entitled to take back the goods provisionally at the customer's expense and to sell them at our duly exercised discretion after a corresponding reminder has been sent to the customer. We will then pass the due amount to the customer's credit.

8. If our goods are sold before payment of our claim, the customer shall be obliged to retain our title against his purchaser until the goods have been paid for in full by the purchaser. The claim arising against the purchaser from such resale as well as any other ancillary rights or security interests of the customer resulting from the sale and any claims for compensation in case of damage to or destruction of our reserved property, including the relevant insurance sum shall hereby be assigned to us. We hereby accept this assignment. Where our co-ownership interest is sold, the relevant claims shall be assigned in the amount corresponding to the value of our interest.

The customer shall, at our request, inform us of his purchasers, notify them of the assignment made and provide us with any and all documents required to assert our rights.

As long as the customer meets his contractual obligations without delay, he shall be authorised to collect the claims assigned. He shall keep the amounts collected on our behalf separately and remit them to us immediately as soon and as far as our claims become due. The authorisation shall lapse in case of any cheque or bill protest of the customer or his definite suspension of payments. The customer shall bear the costs incurred for any action taken against third parties and shall advance them upon request.

If the security provided to us by the retention of title and the anticipatory assignment should exceed the claims to be secured by more than 20%, we shall, at the customer's request, release paid supplies of our choice. Upon payment of all our claims by the customer, assigned claims shall pass to the customer.

9. Any complaints for obvious defects regarding the quantity or quality of our supplies and services that are identifiable upon careful inspection shall without delay, but at the latest within the period of limitation of eight days from arrival of the goods at the address of the customer or the person appointed by him, be notified in writing to us, not to our representatives. Slight deviations in dimensions and designs within the scope of defined technical tolerances shall not give rise to any right of complaint. Any rejected goods may only be returned to us with our prior written authorisation.

In case of justified complaints within the prescribed period, we shall, at our option, take remedial action by way of subsequent performance, by rectifying the defect, supplying non-defective goods or providing a credit note for the lower value calculated.

We shall be entitled to refuse subsequent performance in accordance with the statutory provisions. If we refuse subsequent performance, if any subsequent performance remains unsuccessful or if the customer cannot be reasonably expected to accept any subsequent performance, the latter shall be entitled to withdraw from the contract in compliance with the provisions of the following sentences. The customer shall only be entitled to withdraw from the contract - where a withdrawal is not excluded by law - upon the unsuccessful expiry of a reasonable period for subsequent performance set by him, unless this period was not required under the statutory provisions (§§ 281 para. 2, 323 para. 2, 440, 441 para. 1 BGB (German Civil Code)).

In case of his withdrawal, the customer shall be liable for any deterioration, destruction or loss of use resulting from any negligence or intent on his part. Any claims for damages or reimbursement of expenses of the customer shall be subject to the provisions set out in article 10.

In the case of any fraudulent concealment of a defect or in the case of any provision of a quality guarantee for the goods sold at the time of the passing of risk within the meaning of § 444 BGB (German Civil Code) (seller's declaration that the object sold has a specific property at the time of the passing of risk and that the seller, regardless of any fault on his part, intends to be answerable for any and all consequences resulting from its absence), the customer's rights shall be exclusively governed by the statutory provisions.

We shall - in addition to the statutory grounds for refusal - also be entitled to refuse subsequent performance if and as long as the customer fails to send us, at our request, the rejected goods or a sample thereof; the customer shall have no right of withdrawal for any such refusal. We may further refuse any subsequent performance if the goods concerned have been altered or modified without our consent unless the customer can prove that the defect was not caused by such alteration or modification.

The limitation period for any claims arising from defects shall be one year; in the case of goods which have been used in accordance with their intended purpose for a building and have caused its defectiveness, the limitation period shall be two years. The provisions of §§ 478, 479 BGB (German Civil Code) on recourse in the chain of suppliers shall not be affected thereby.

10. In the case of a pre-contractual, contractual or non-contractual breach of duty, including unsatisfactory delivery, tortious conduct and producer's liability, we shall only be liable for compensatory damages and reimbursement of expenses - subject to further contractual or statutory liability requirements - in the case of intent, gross negligence or slightly negligent breach of a material contractual duty (contractual duty the infringement of which jeopardises the fulfilment of the object of the contract). However - except in the case of intent - our liability shall be limited to the typical contractual damage that was foreseeable at the time the contract was entered into.

The purchaser shall not be permitted to make a claim for expenses incurred in vain.

Except for any breach of material duties, our liability for slight negligence shall be excluded, but in any case be limited to the amount of the purchase price.

Any claim asserted by the customer or a third party for payment of a contractual penalty shall be excluded.

With regard to damages caused by delay, we shall only be liable for slight negligence up to the amount of 5% of the purchase price agreed with us.

The exclusions and limitations of liability set forth above shall not apply in the event that a guarantee is given with respect to the quality of the object sold within the meaning of § 444 BGB (German Civil Code) if a defect is fraudulently concealed or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act.

Any and all claims for damages against us, for any legal reason whatsoever, shall become statute-barred at the latest after one year from delivery of the goods to the customer, in the case of tortious liability from the time of knowledge, or grossly negligent ignorance, of the circumstances giving rise to the claim and the person liable to pay damages. This provision shall not apply in the case of liability for intent and in the event that a guarantee is given for the quality of the object sold, in the case of fraudulent concealment of a defect or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act. Any shorter limitation periods shall take precedence.

11. We shall be entitled to process and store any customer data obtained with regard to or in connection with the business relationship in accordance with the German Federal Data Protection Act, irrespective of whether such data is provided by the purchaser himself or by any third parties.

12. Place of performance for delivery and payment is Menden/Sauerland. The court of competent jurisdiction for any and all disputes, including disputes with regard to bills of exchange and cheques, is the Local Court (Amtsgericht) of Menden or, at our option, the District Court (Landgericht) of Arnsberg, irrespective of the value of the object in dispute. We shall, however, also be entitled to take legal proceedings against the customer at the place of his registered office.

German law shall be exclusively applicable. The application of international purchase laws is hereby excluded.

Should, for any reason whatsoever, individual provisions of our terms and conditions of sale and delivery be invalid, the validity and binding nature of the other provisions shall not be affected thereby. The customer agrees, that the invalid provision shall be replaced by a valid provision that comes as close as possible to the economic meaning of the invalid provision.

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In case of any increase or reduction in these prices by more than € 15, a five per cent surcharge or deduction shall be made for each 15 points. The calculation of any such surcharges or deductions shall be based on the DEL listing of the date of our receipt of the order.

Valid from January 2010

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**QR-Code**
With the QR Code you have direct access to our products on the Internet.

You can find further information on the QR Code at www.obo-bettermann.com.

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