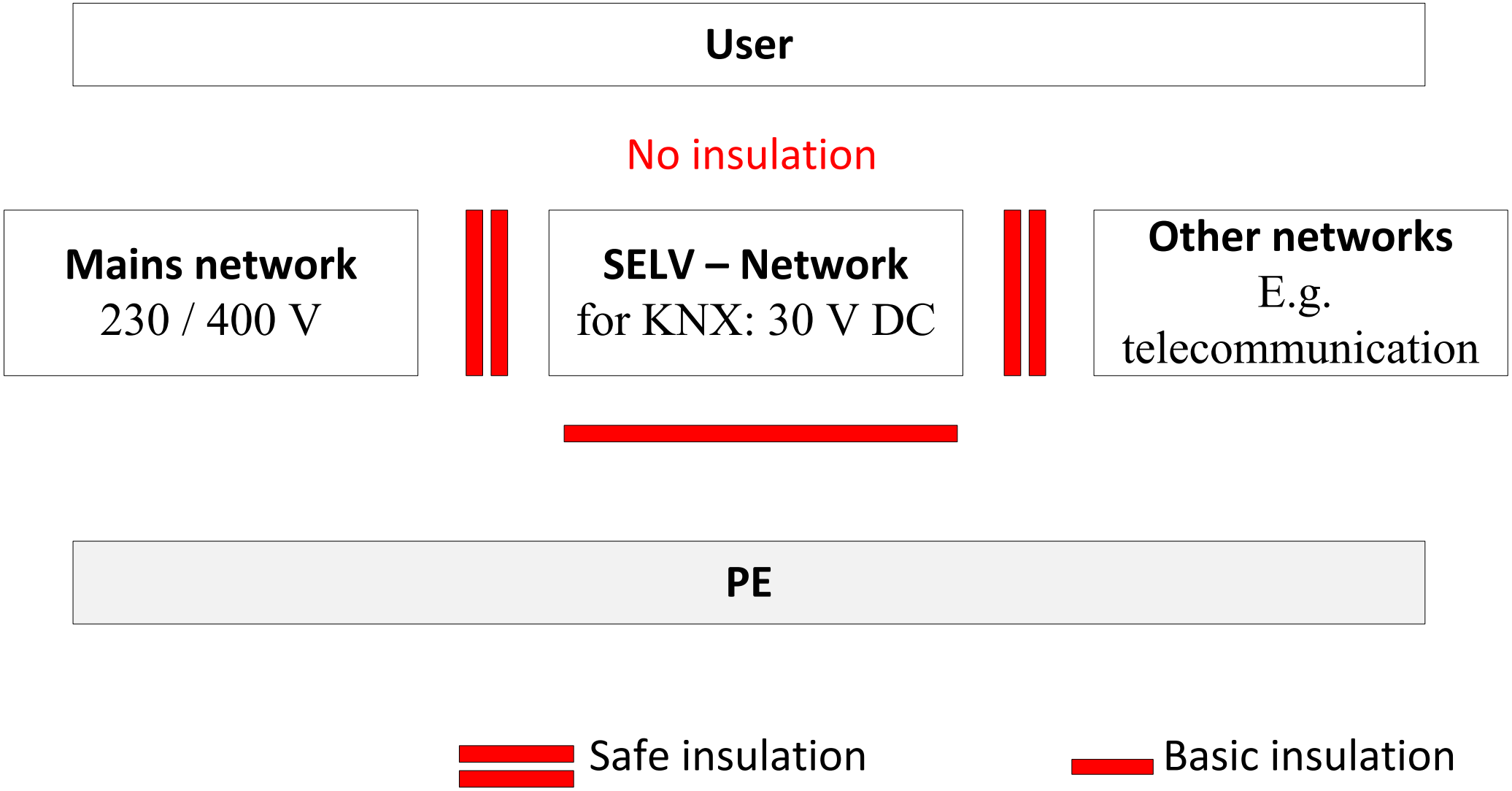
SELV
(Safety Extra Low Voltage)

- Safety transformer
- Voltage range less than/ identical to 120 V DC or 50 V
- Safe insulation to e.g. 230 / 400 V AC
- SELV may not be earthed!

Relevant voltage	Mains type	Creepage Distance / Clearance	Test voltage
230 / 400 V ~	TN / TT	5,5 / 5,5 mm	4,0 kV ~
400 V ~	IT	8,0 / 8,0 mm	6,0 kV ~
24 V ~	-	1,25 / 0,8 mm	0,6 kV ~
Ground	-	1,5 / 1,0 mm	1,0 kV ~

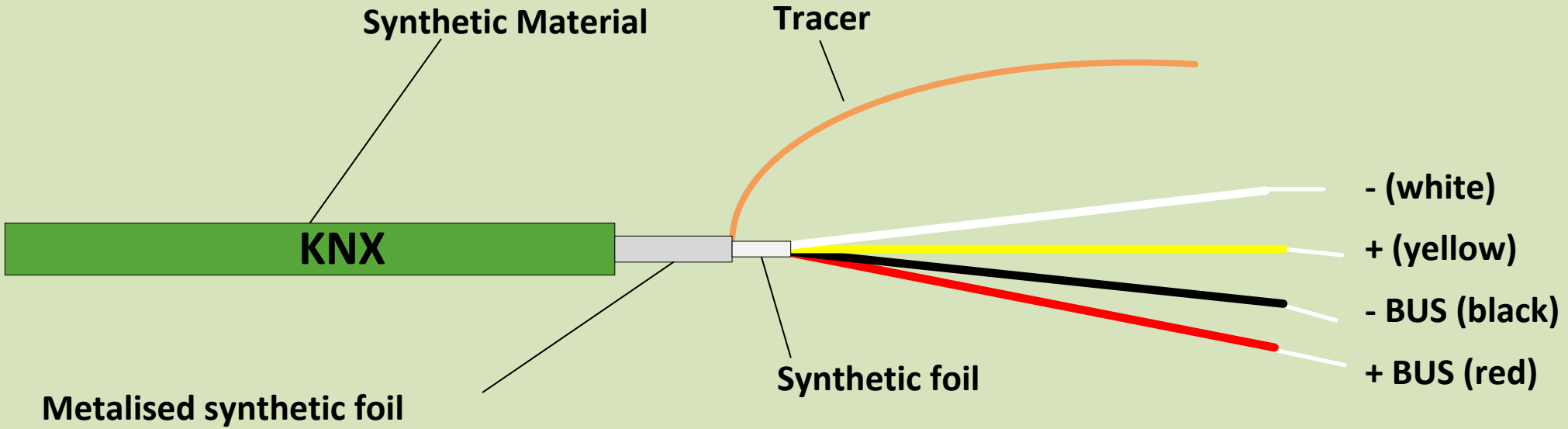

User
No insulation
Mains network
230 / 400 V
SELV – Network
for KNX: 30 V DC
Other networks
E.g.
telecommunication
PE
Safe insulation
Basic insulation

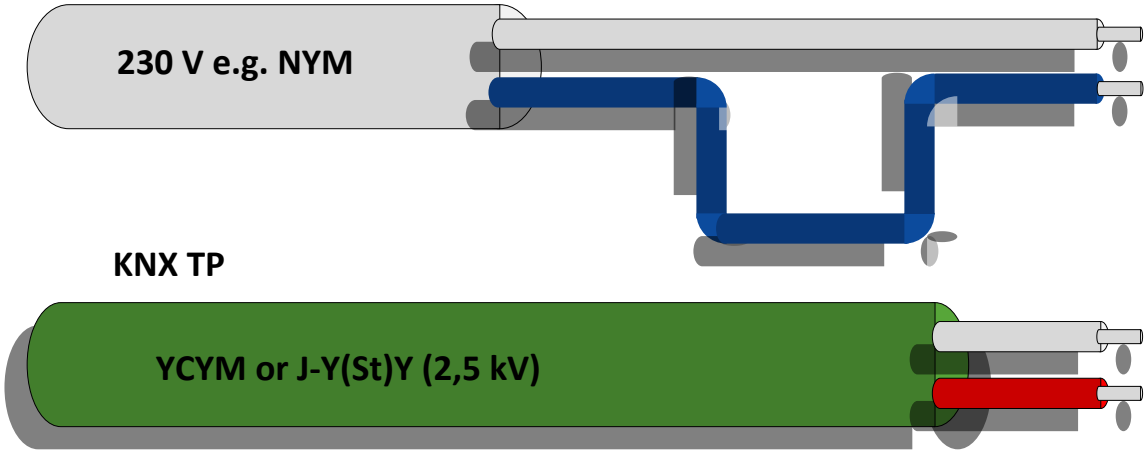
YCYM 2×2×0,8

- Fixed installation: dry, humid and wet rooms; wall-mounted, flush-mounted, in conduits; - Outdoor: If protected against direct sun radiation;
- Test voltage: 4 kV according to EN 50090

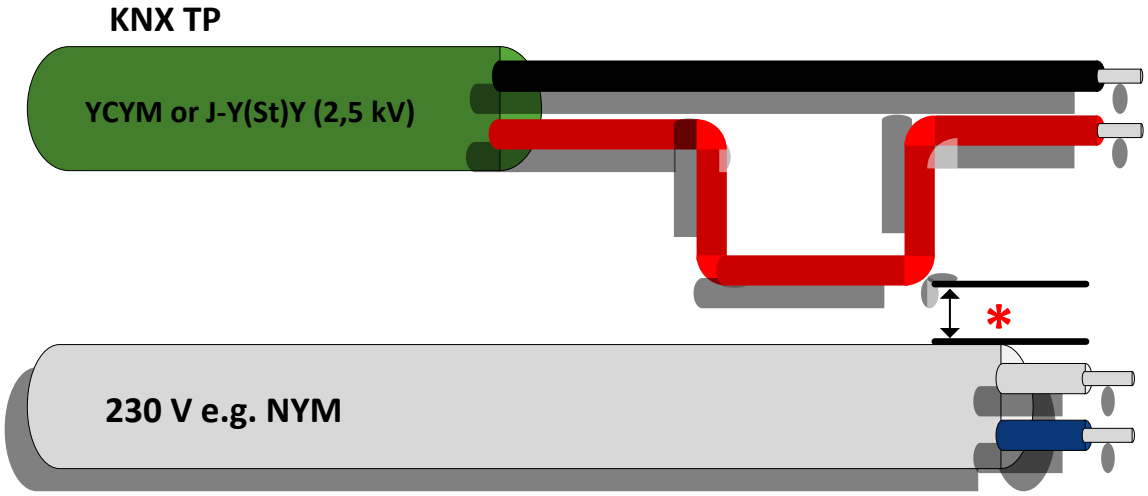
J-Y (St) Y 2×2×0,8

- Fixed installation: dry and humid industrial sites; wall-mounted, flush-mounted, in conduits; - Outdoor: F lush-mounted and conduits
- Test voltage: 2,5 kV according to EN 50090

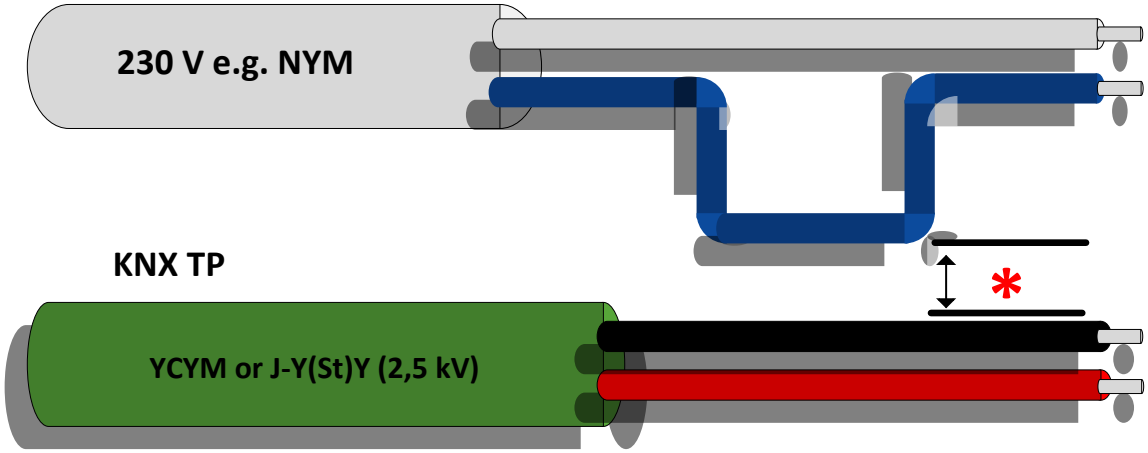




Overall insulated single core 230 V adjacent to the sheath of the bus cable



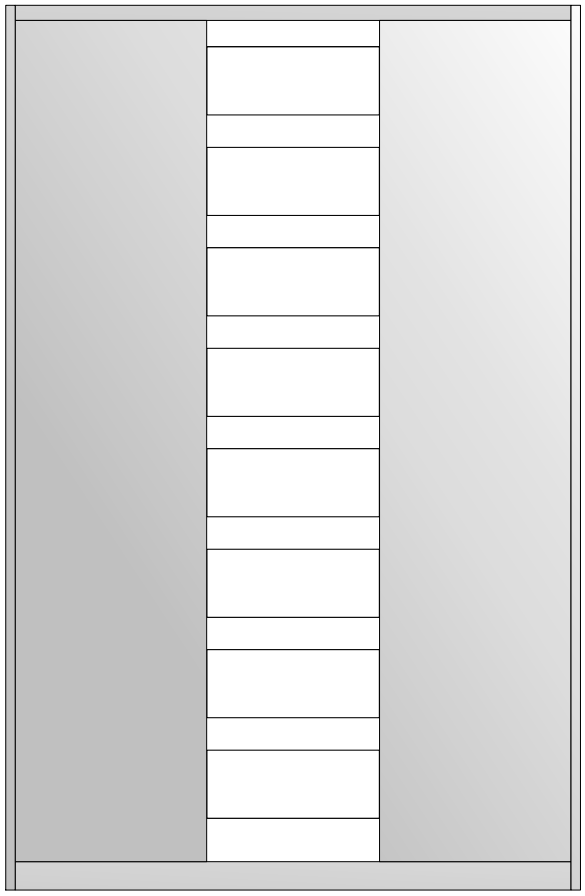
Overall insulated single core of the bus adjacent to the sheathed mains cable



Exposure of two single cores

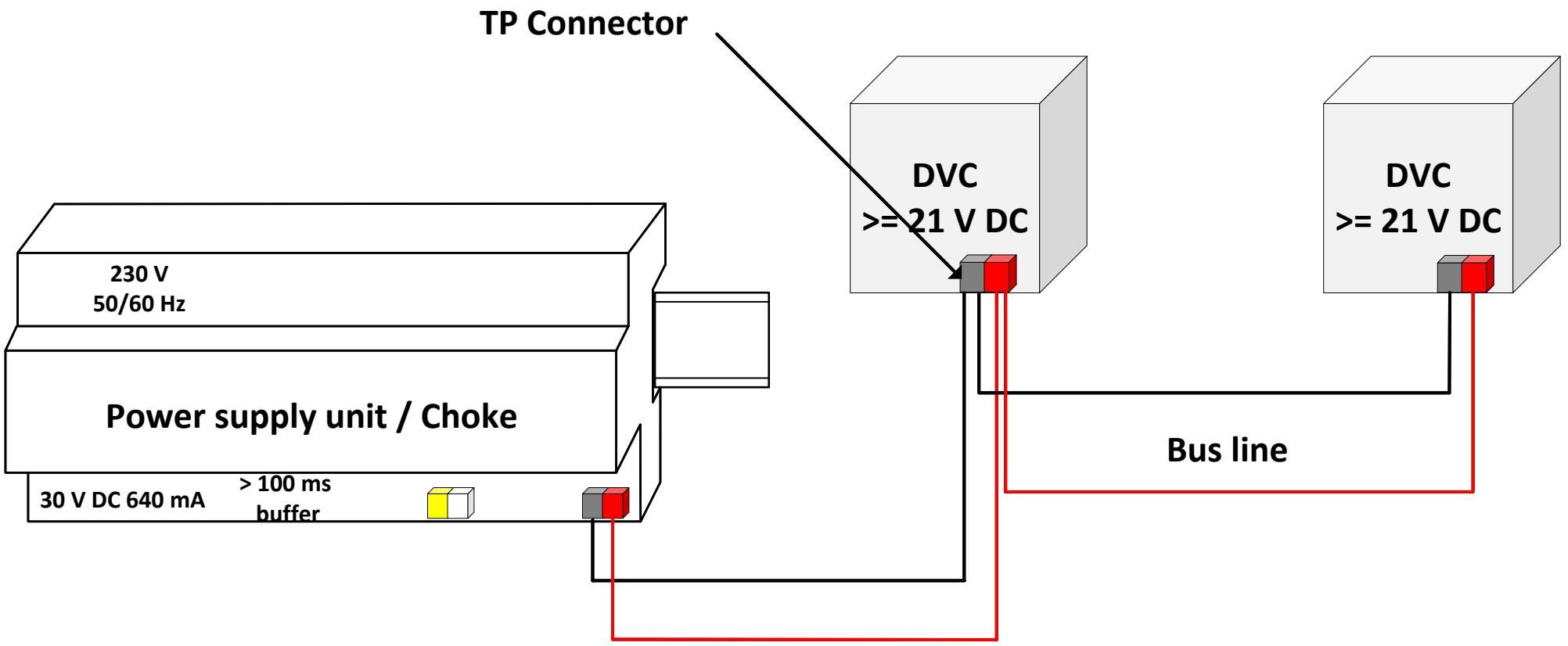
* >= 4 mm separation or identical insulation

Standardised power distribution boards

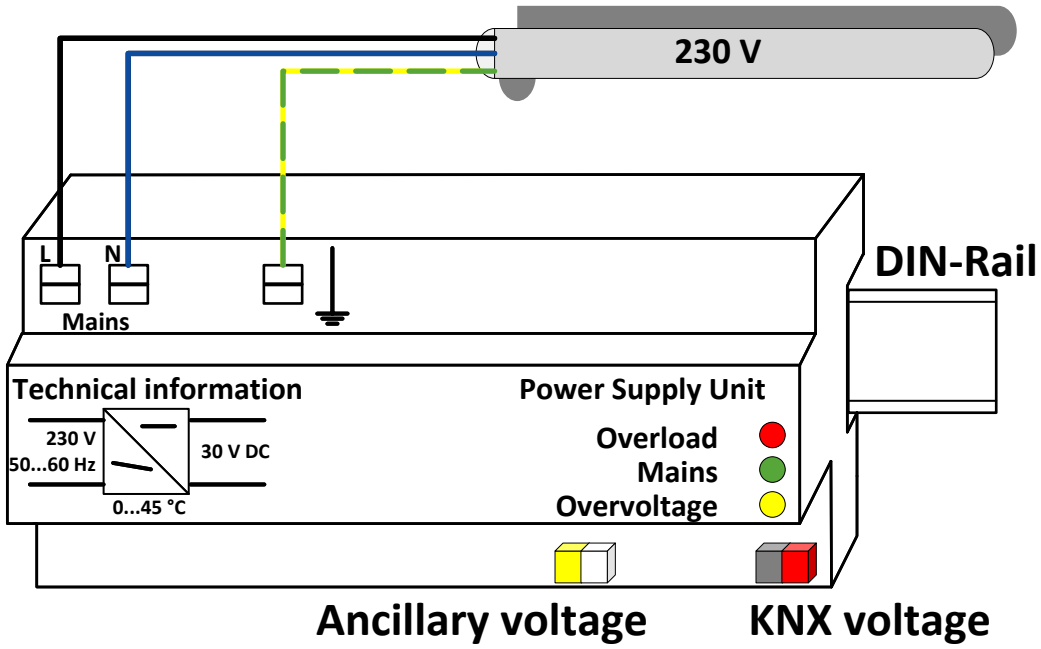


Requirements

- Use of standardised distribution boards
- Install bus cables with sheath up to the terminal
- Do not install bus devices above mains devices with significant power losses
- Cover unused section of data rail

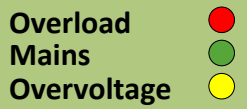

TP Connector
DVC
>= 21 V DC
DVC
>= 21 V DC
230 V
50/60 Hz
Power supply unit / Choke
30 V DC 640 mA
> 100 ms
buffer
Bus line

Example of a power supply unit

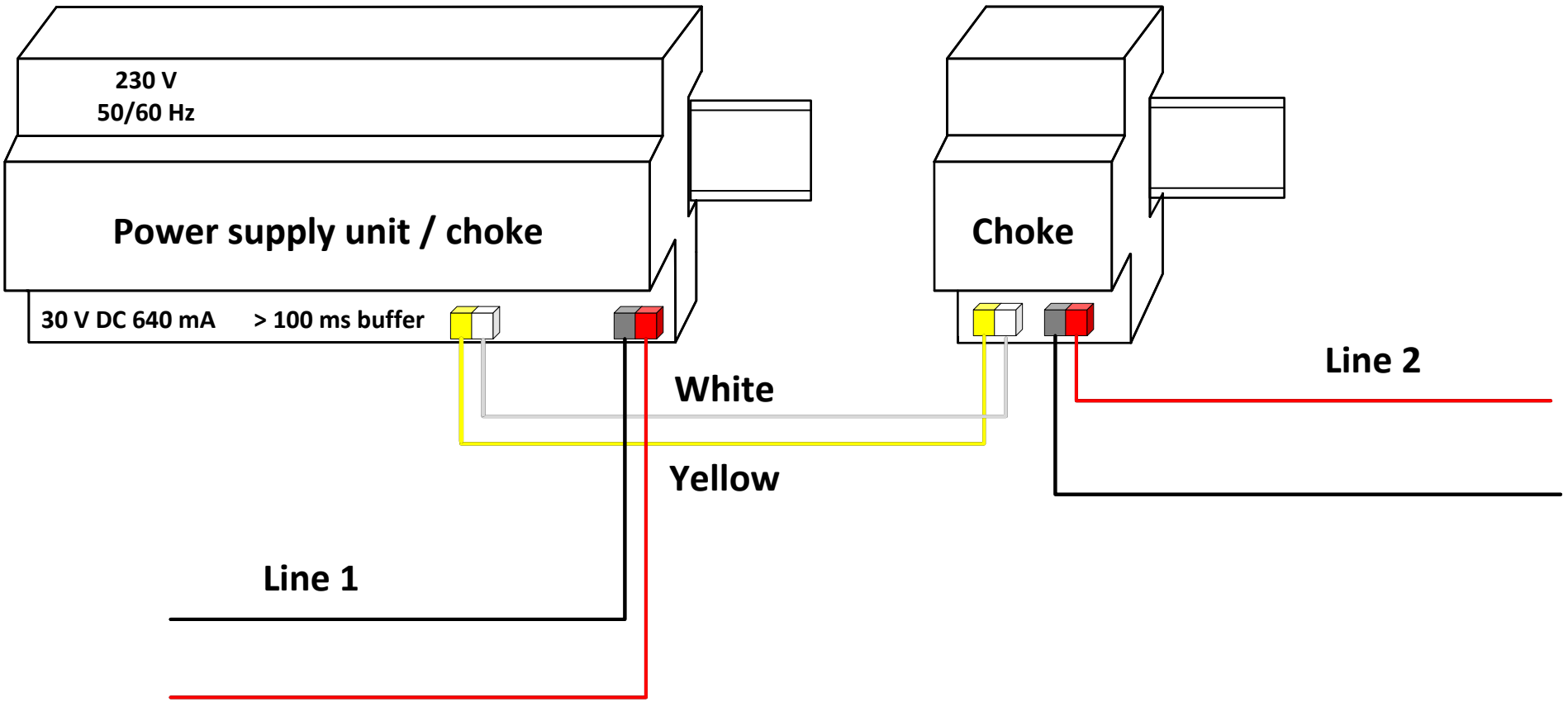


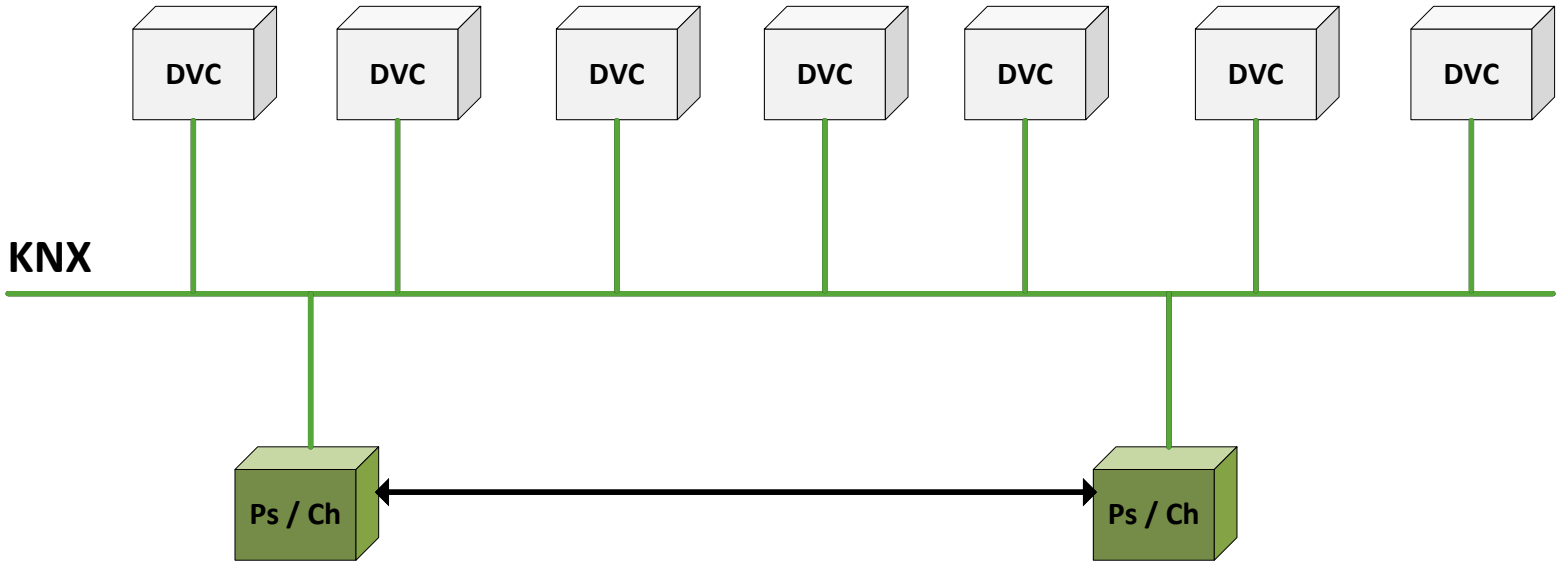
Features

- Earth connection prevents static charging
- 100 ms buffer time bridges brief interruptions of the mains
- Optional LEDs for displaying



- Additional output for supplying other line (needs extra choke !)

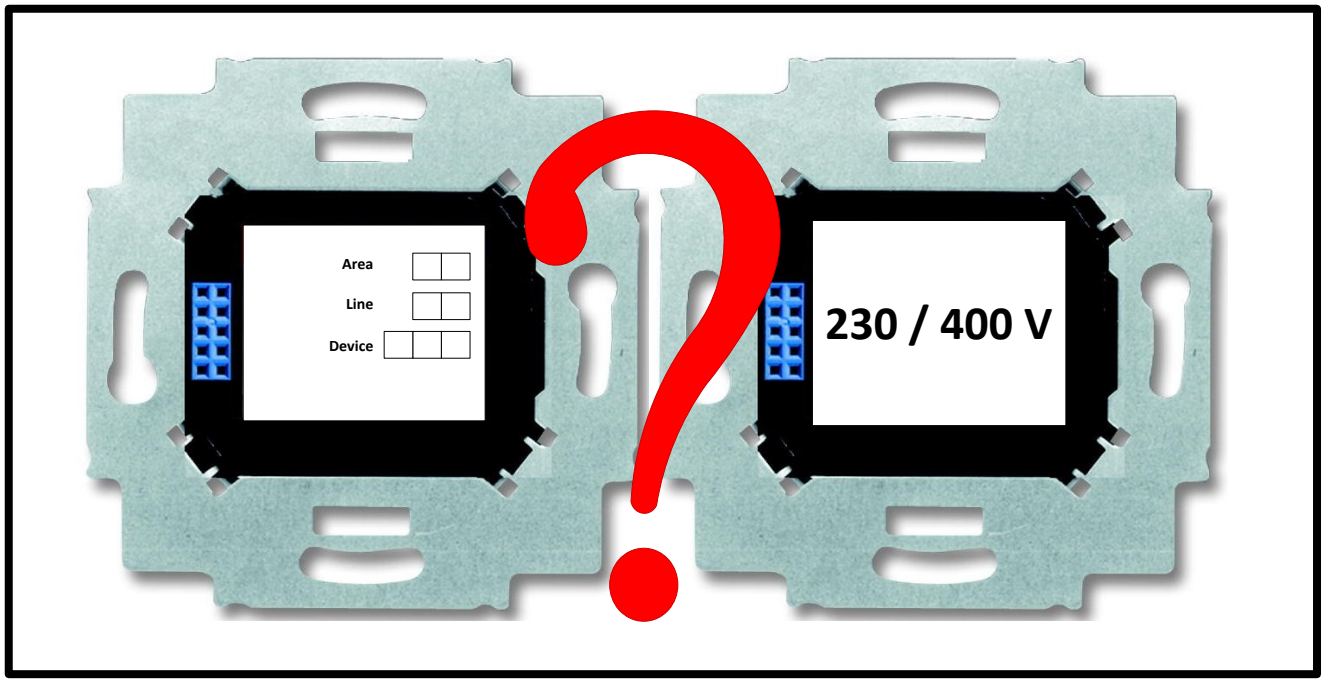

230 V
50/60 Hz
Power supply unit / choke
30 V DC 640 mA
> 100 ms buffer
Choke
White
Yellow
Line 2
Line 1

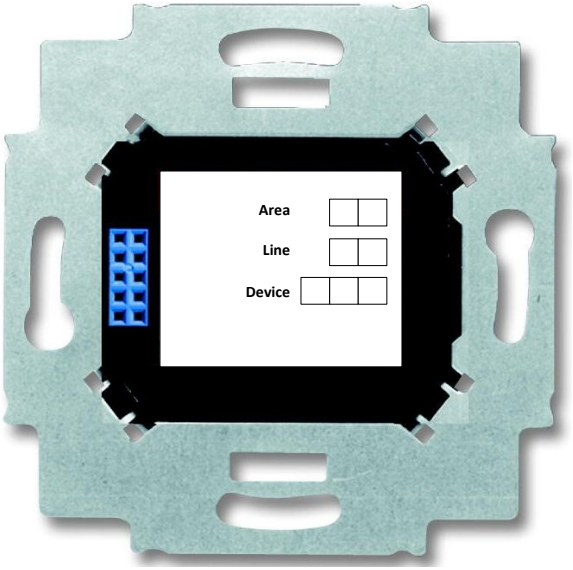


Minimum distance between power supplies as specified by the manufacturer

Mains and bus wires should be installed either in:

- **Separate installation / wall junction boxes or;**
- **Common installation boxes with a partition, guaranteeing the required clearance / creepage distances**





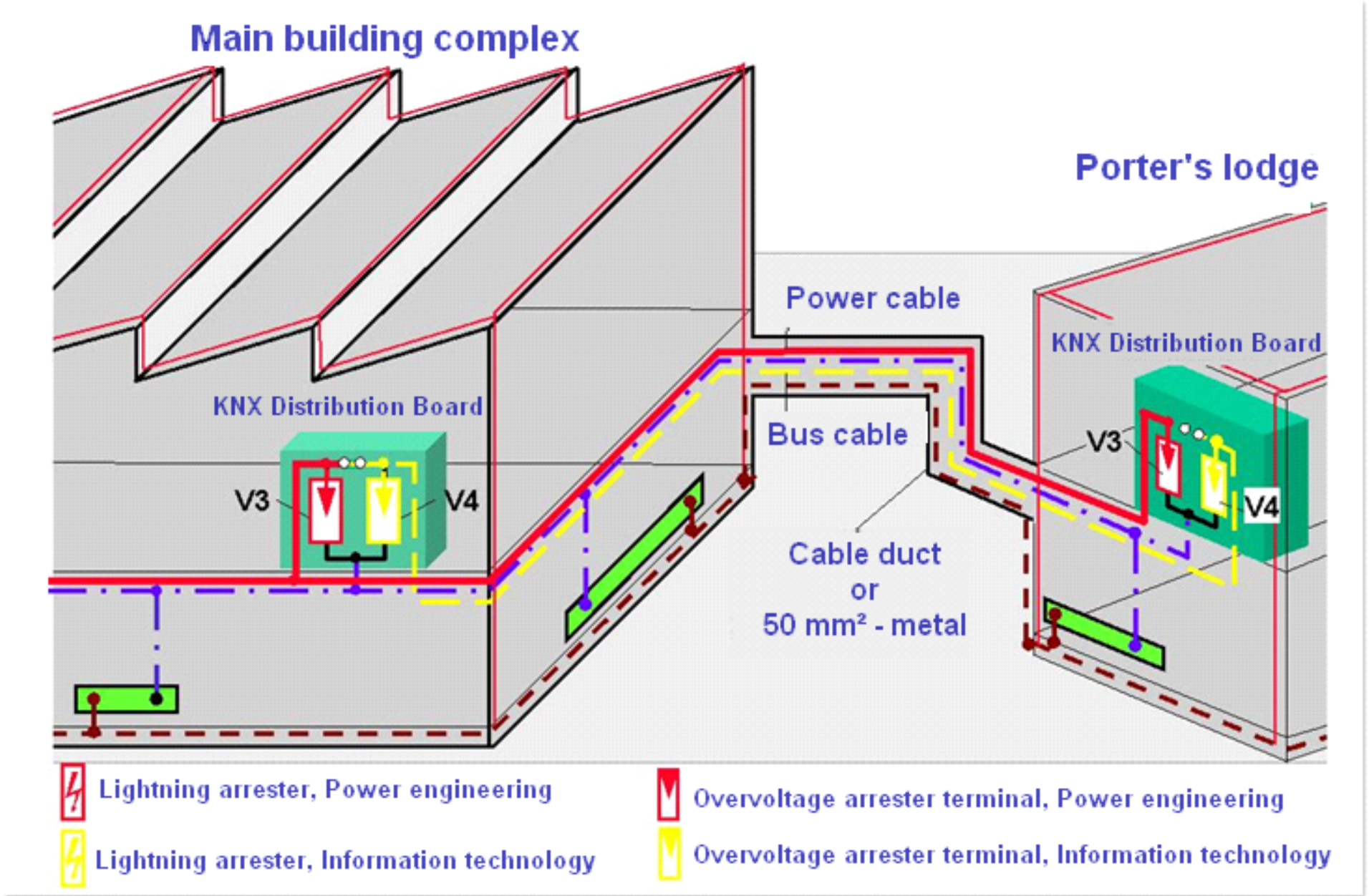
- **Use of wall boxes for screw mounting**

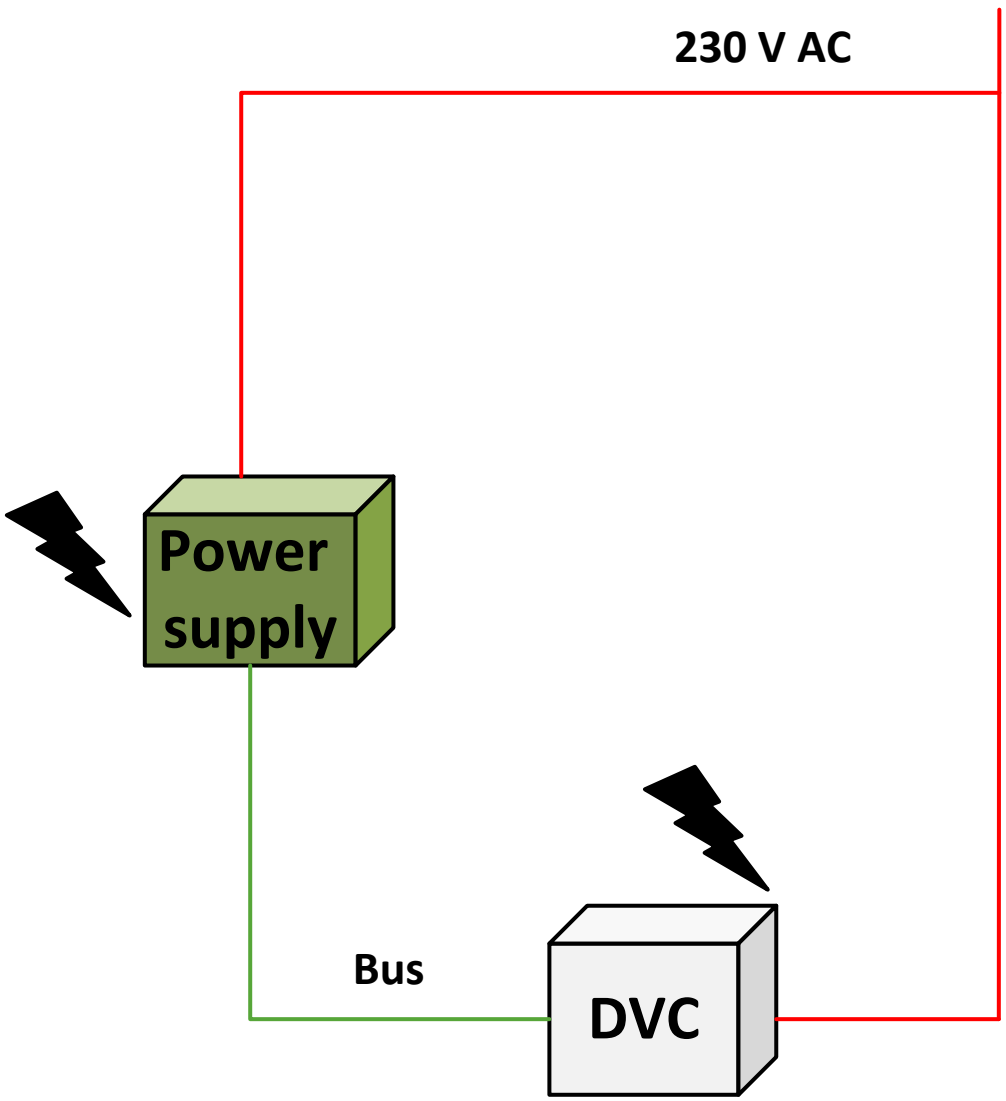
- **Permitted use of flush-mounted devices in combination with mains devices depends on the environmental conditions and the design of the bus devices (e.g. pollution degree, overvoltage category).**

Bus connector

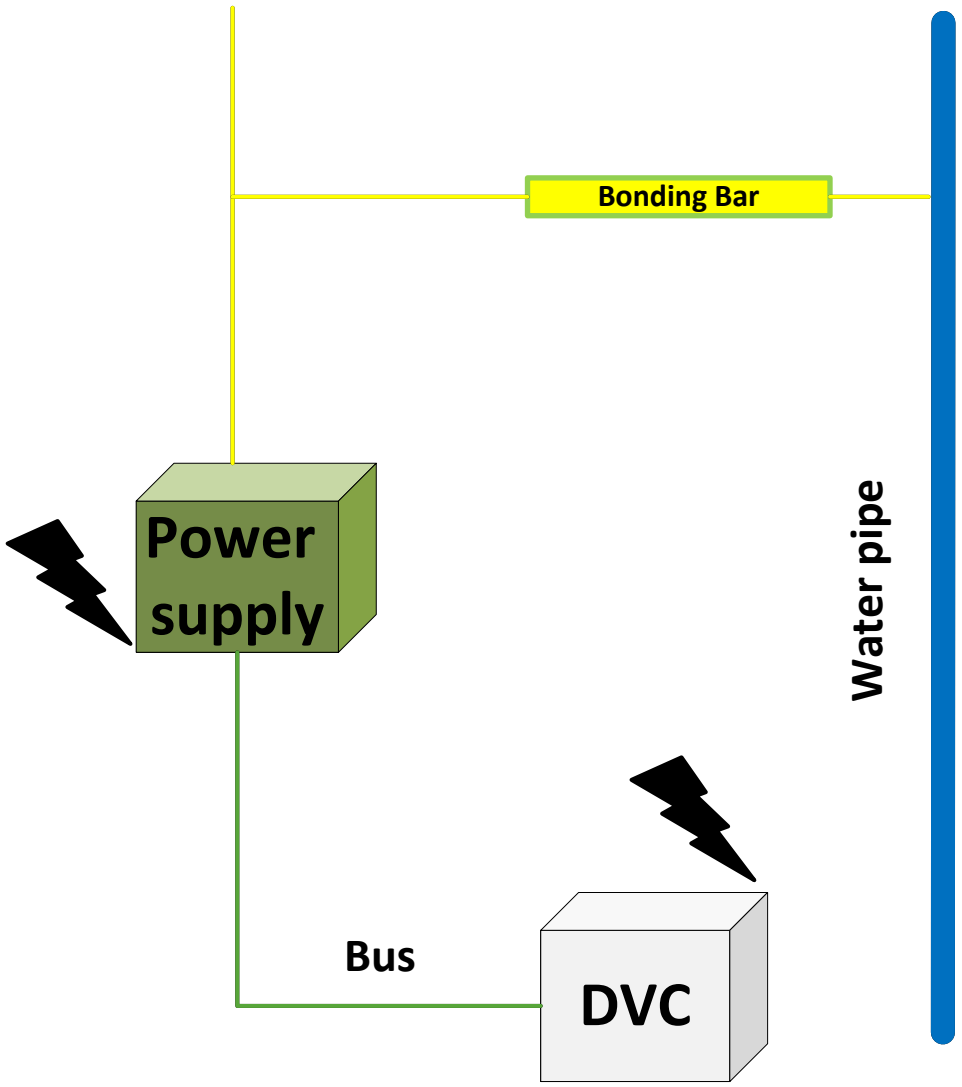
Usage

- Joints, extensions or connections are realised by means of bus connectors
- Bus cable shall only end either at the device itself or at this terminal
- Removal of bus devices without interrupting the bus
- Mechanical protection against reverse polarity

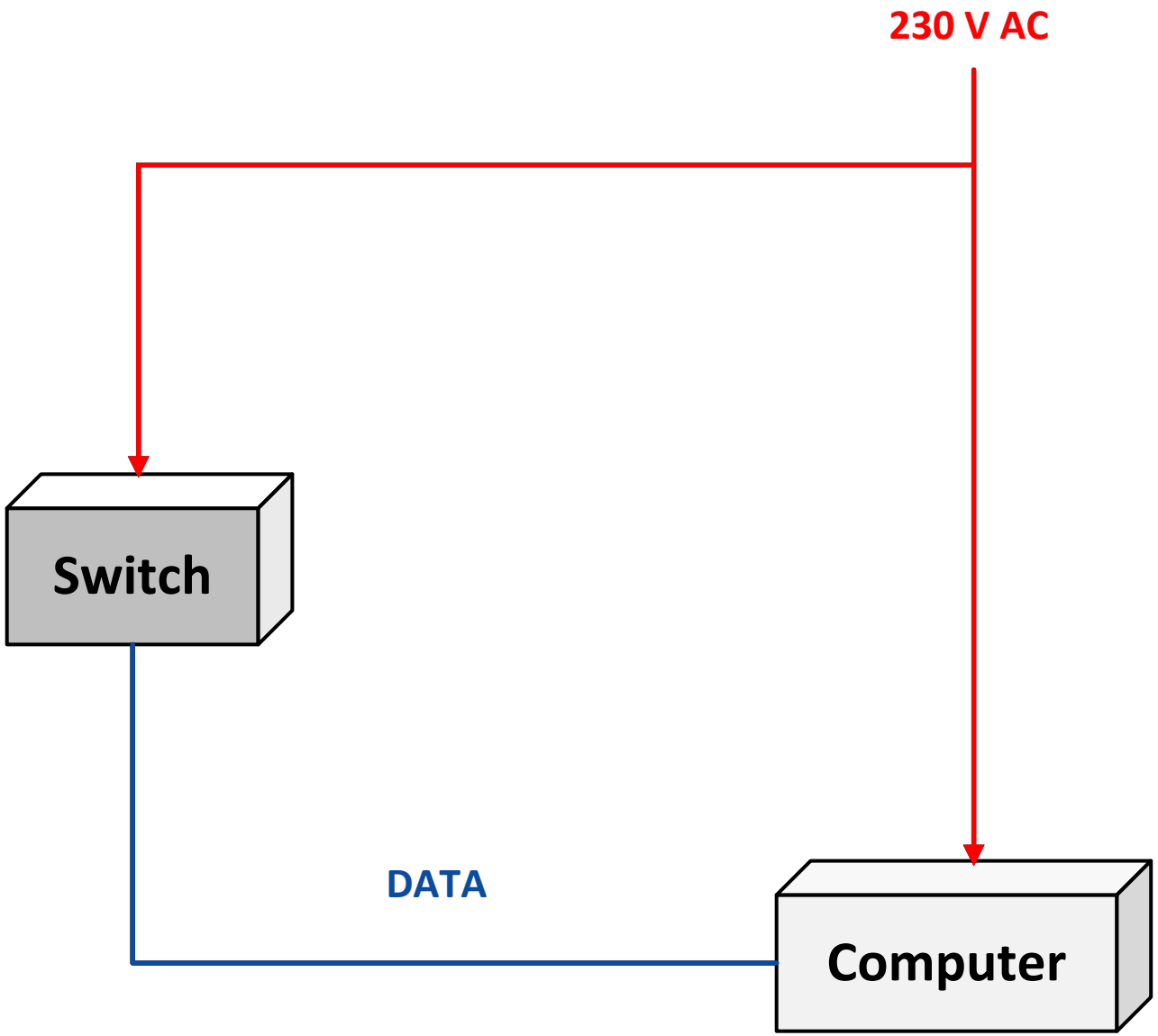

Main building complex
Porter's lodge
Power cable
KNX Distribution Board
KNX Distribution Board
Bus cable
V3
V4
V3
V4
Cable duct
or
50 mm² - metal
Lightning arrester, Power engineering
Overvoltage arrester terminal, Power engineering
Lightning arrester, Information technology
Overvoltage arrester terminal, Information technology

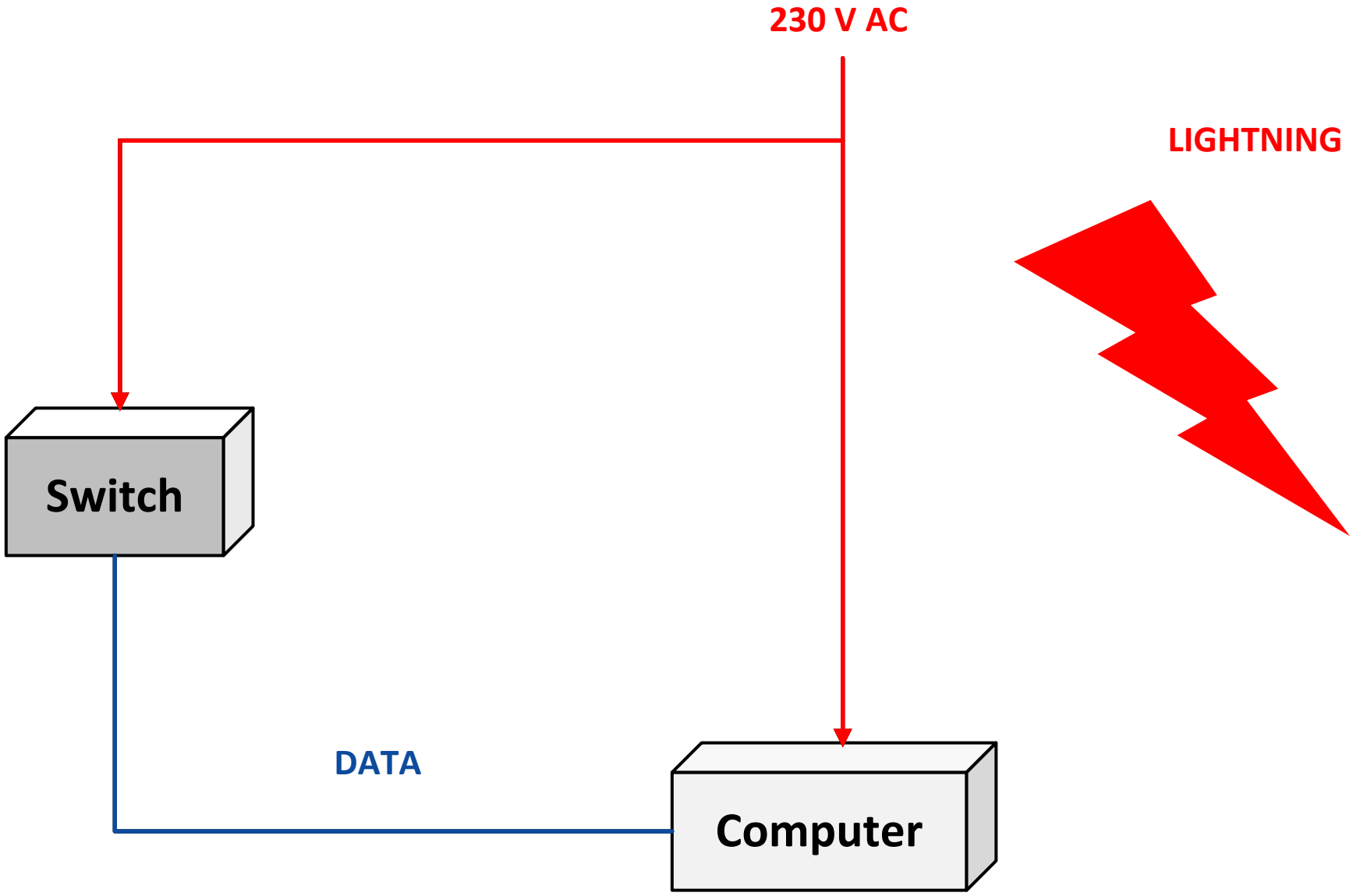


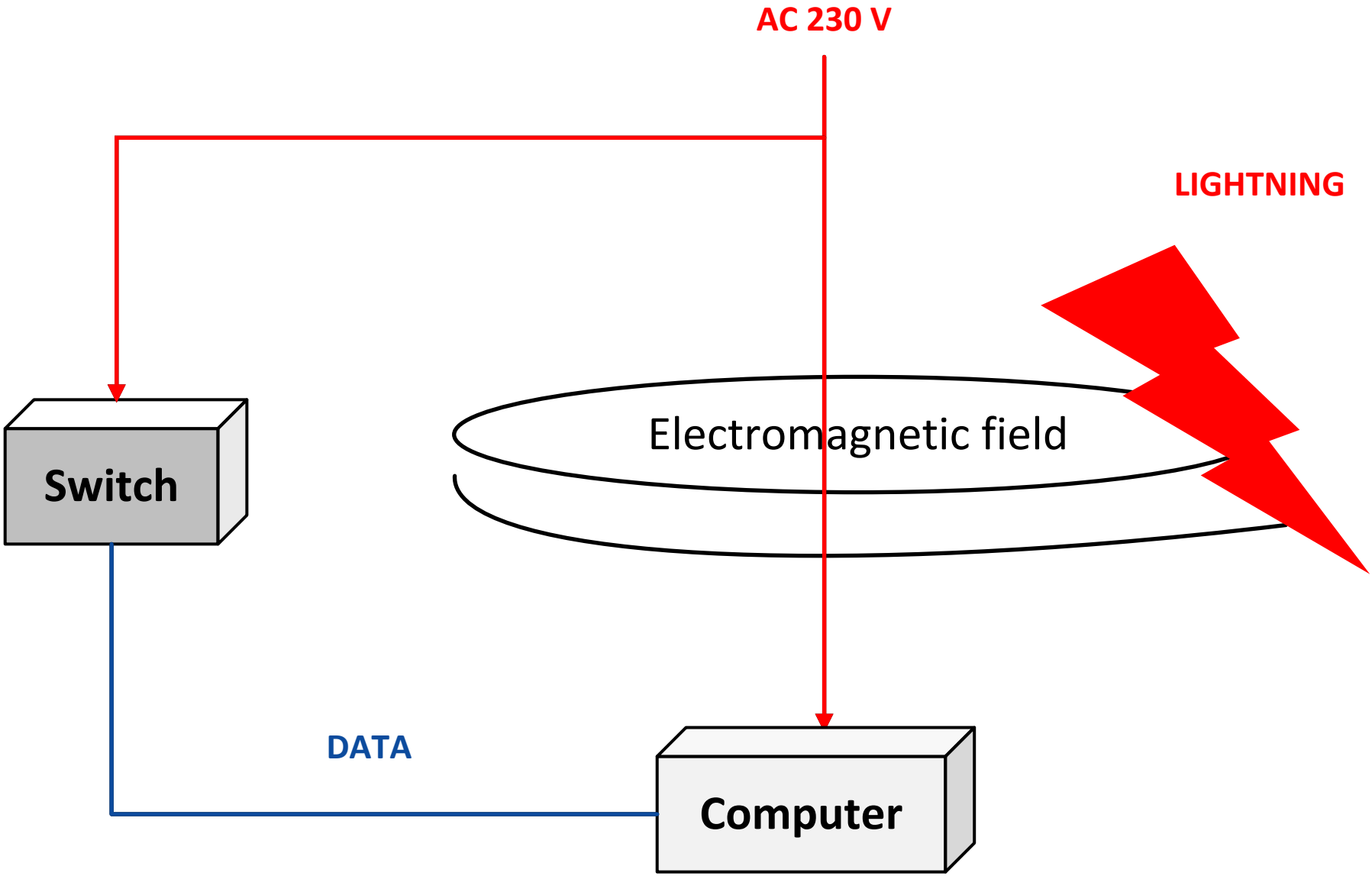
Loop between bus – 230 V AC
Consisting of DVC and power supply

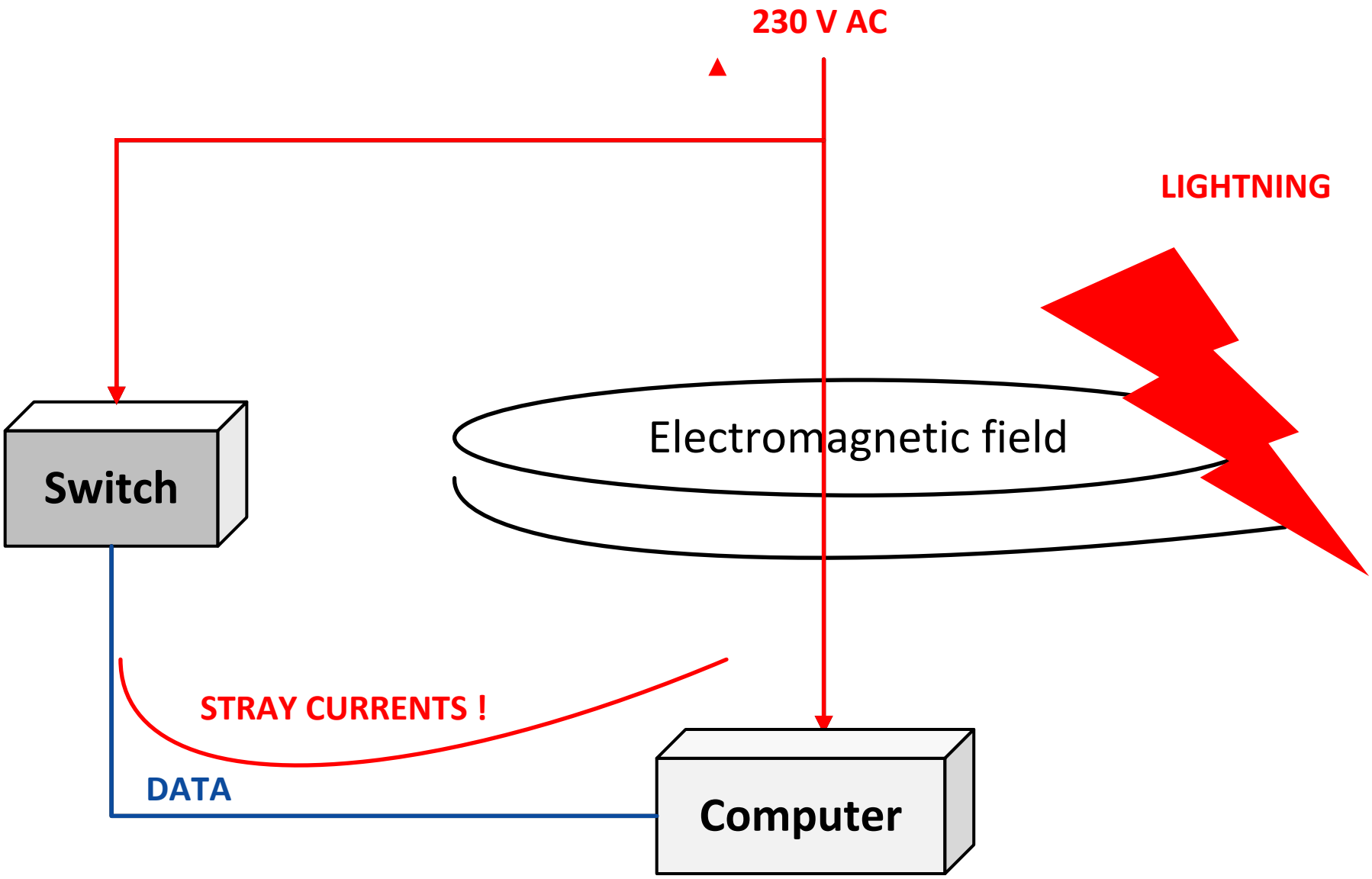


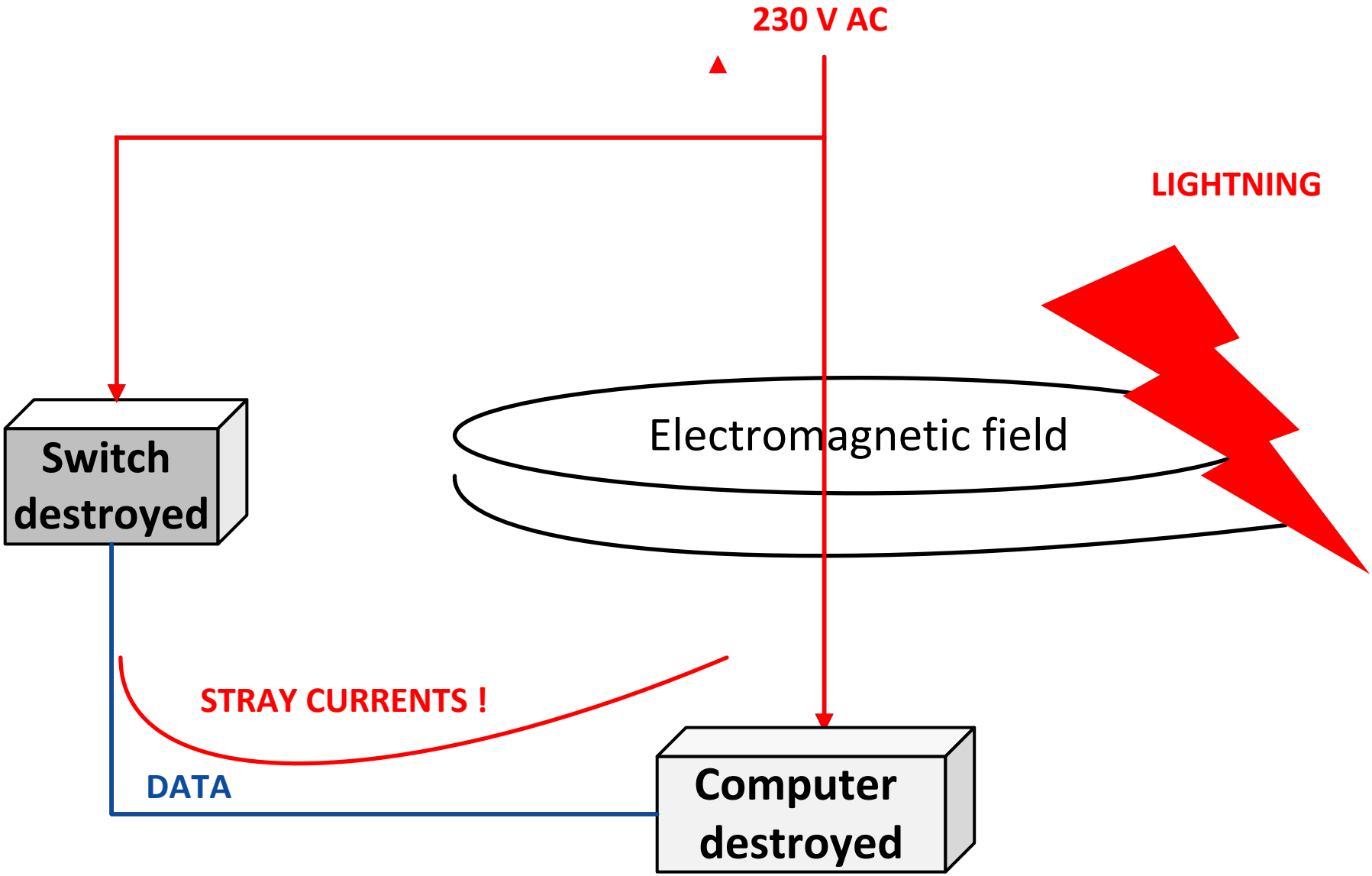
Loop between bus – water supply system consisting of DVC, power supply and bonding bar

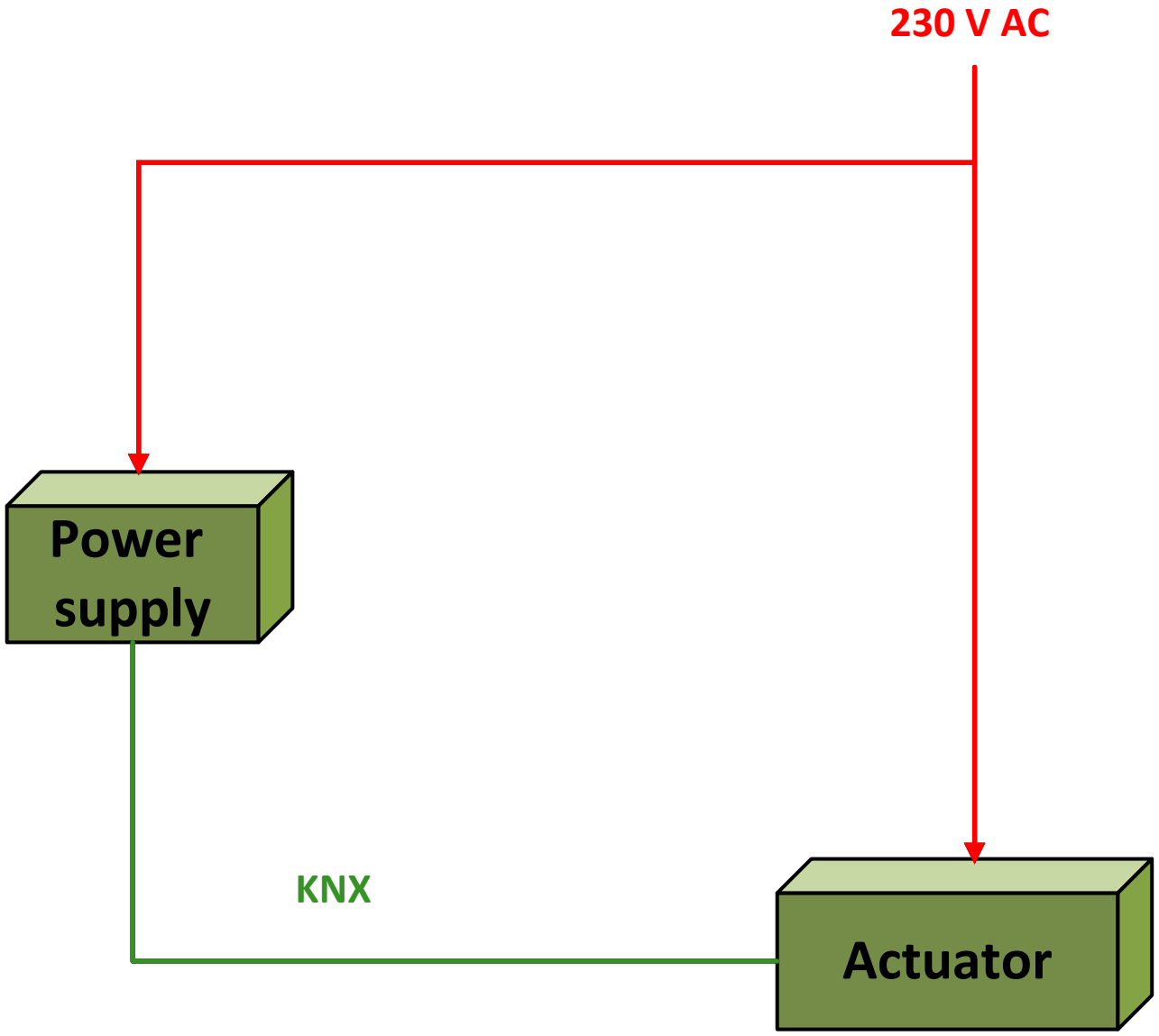

230 V AC
Switch
DATA
Computer

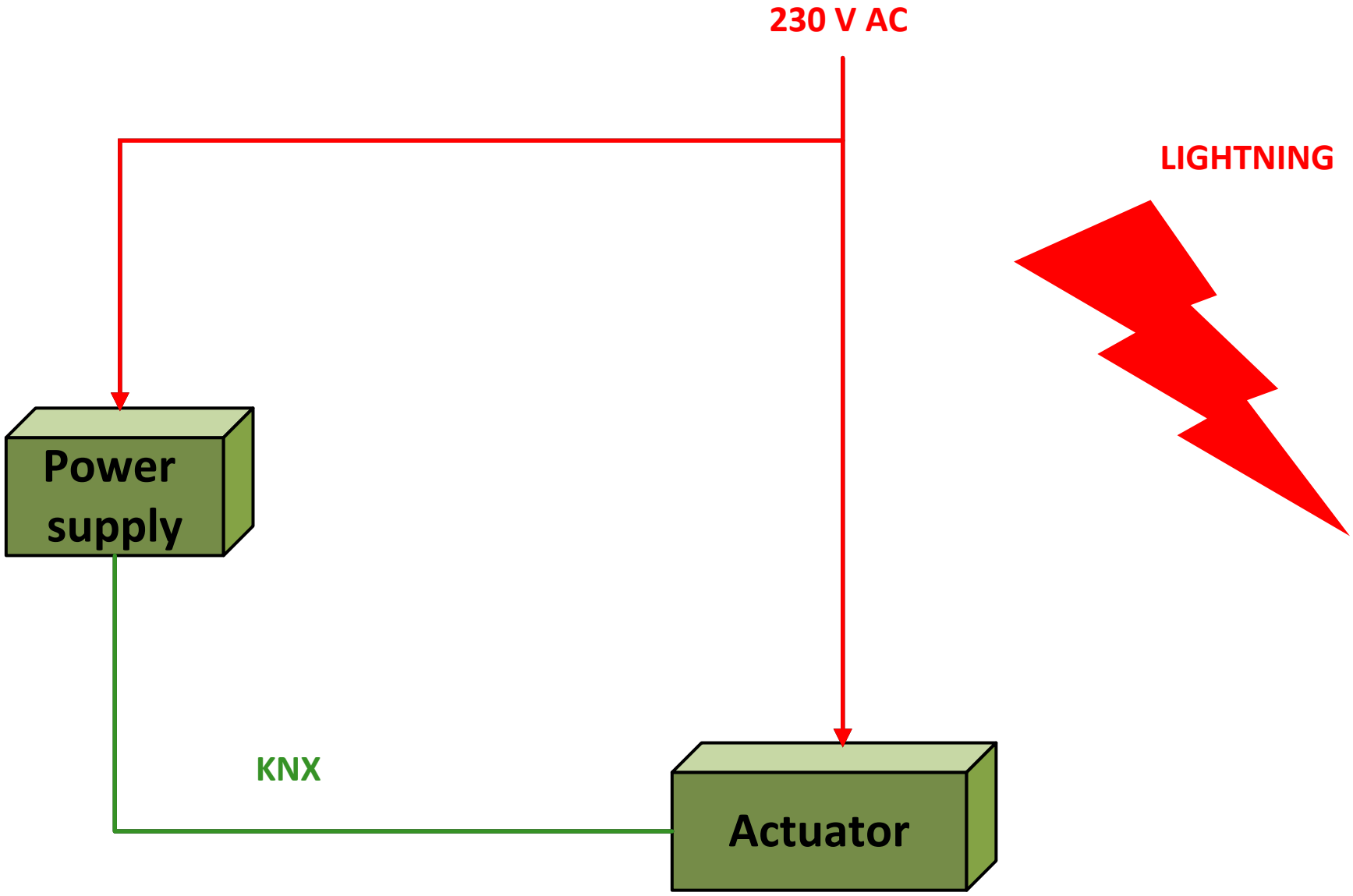

230 V AC
LIGHTNING
Switch
DATA
Computer

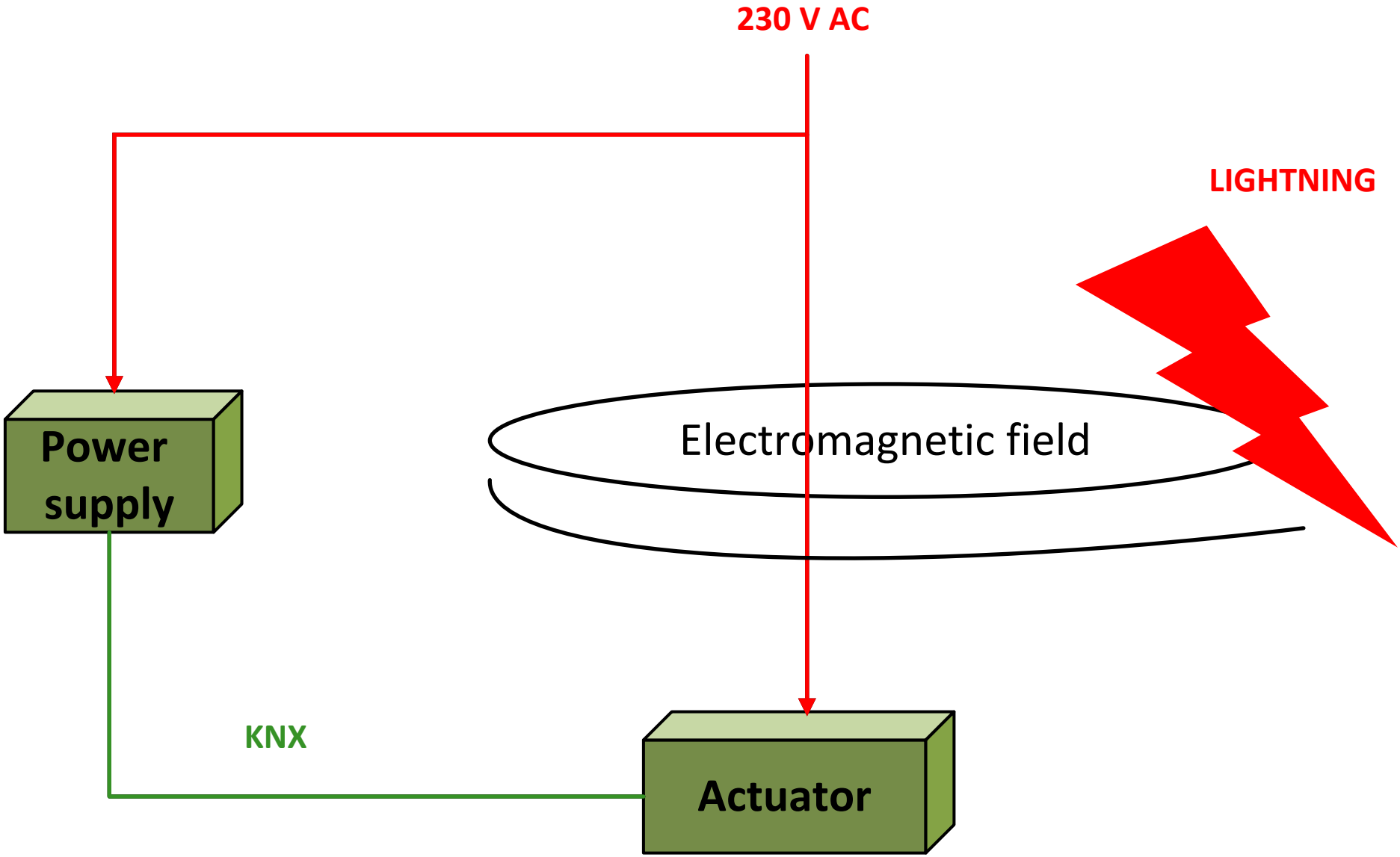

AC 230 V
LIGHTNING
Electromagnetic field
Switch
DATA
Computer

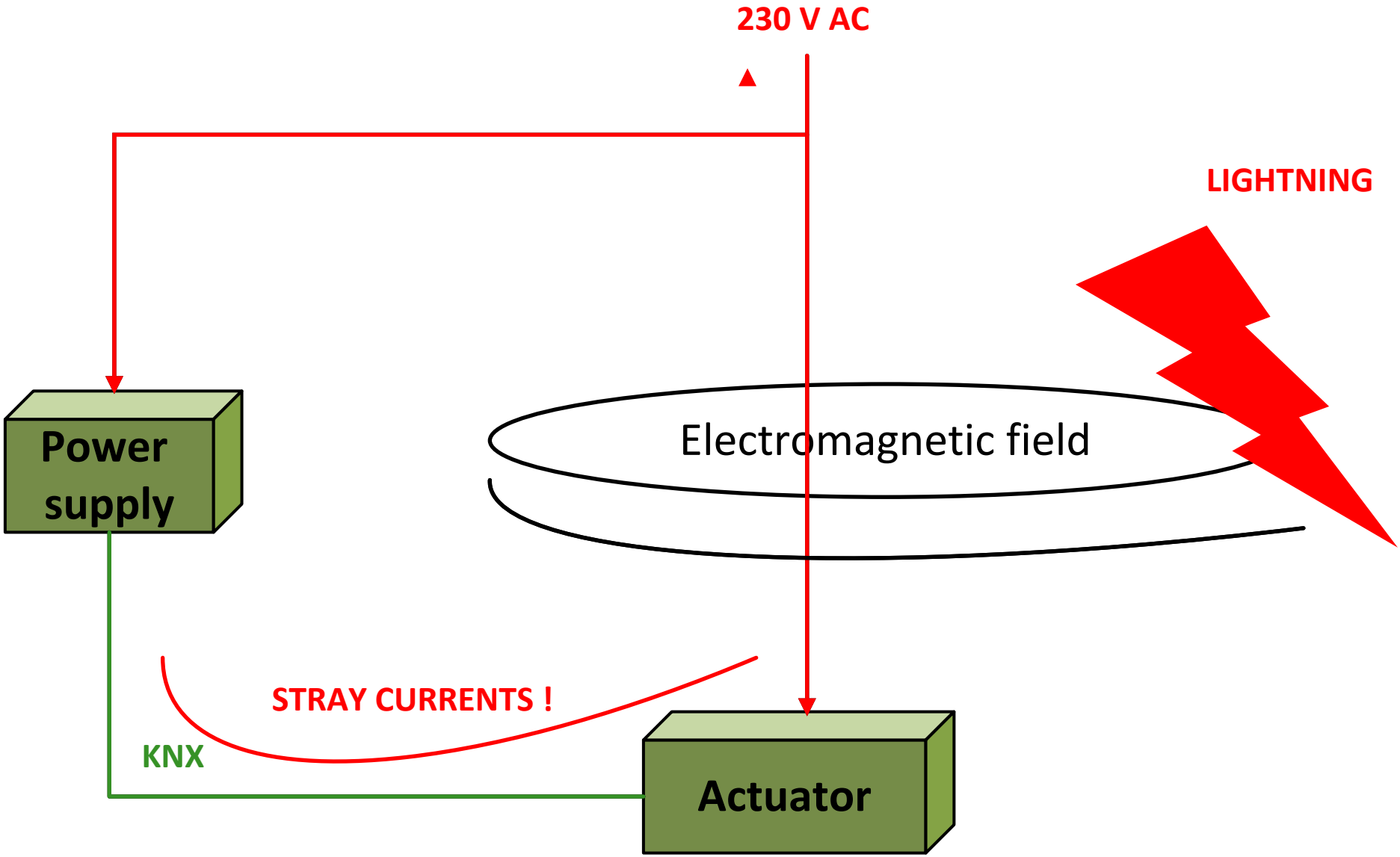

230 V AC
LIGHTNING
Electromagnetic field
Switch
STRAY CURRENTS !
DATA
Computer

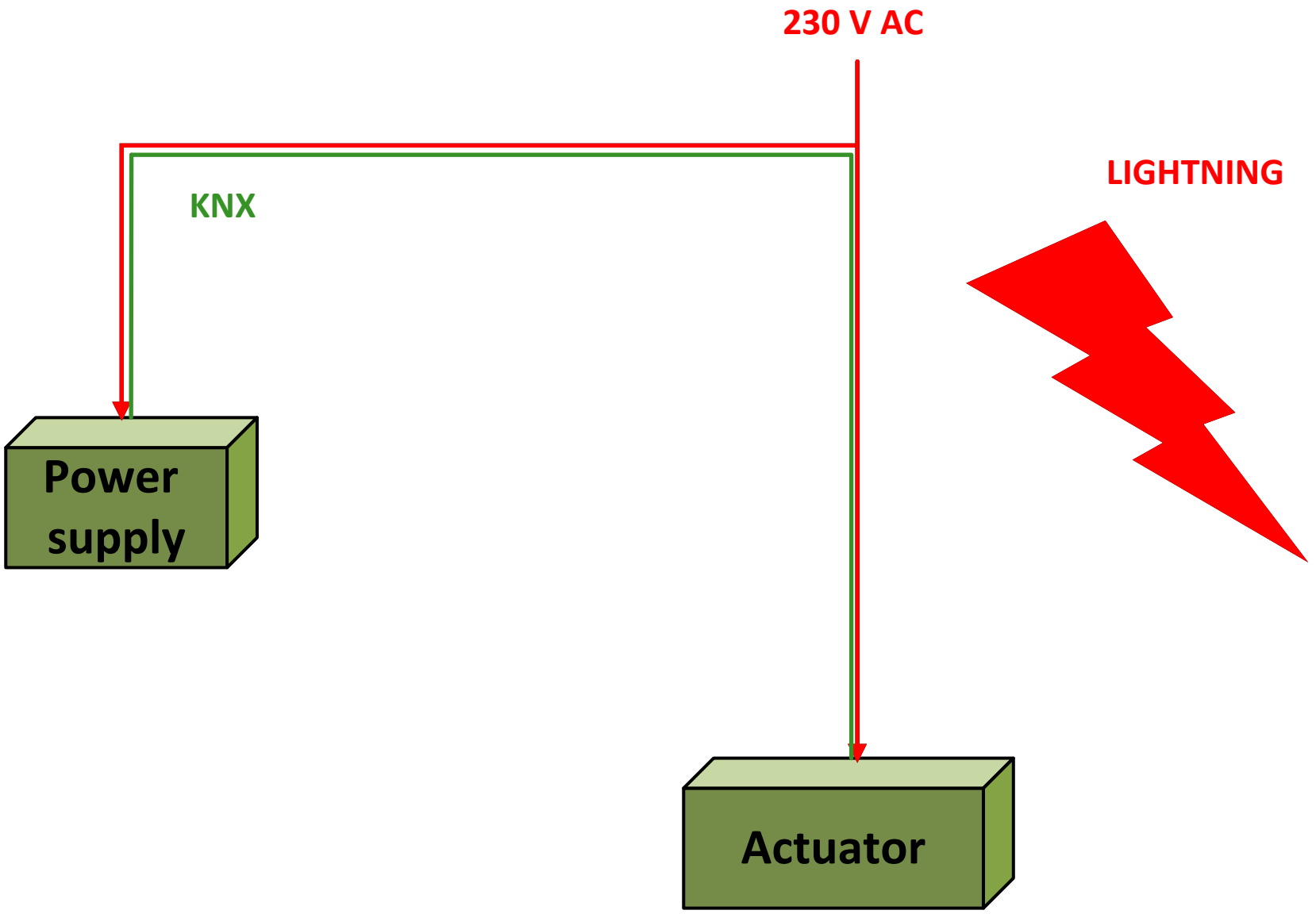

230 V AC
LIGHTNING
Electromagnetic field
Switch destroyed
STRAY CURRENTS !
DATA
Computer destroyed


230 V AC
Power supply
KNX
Actuator

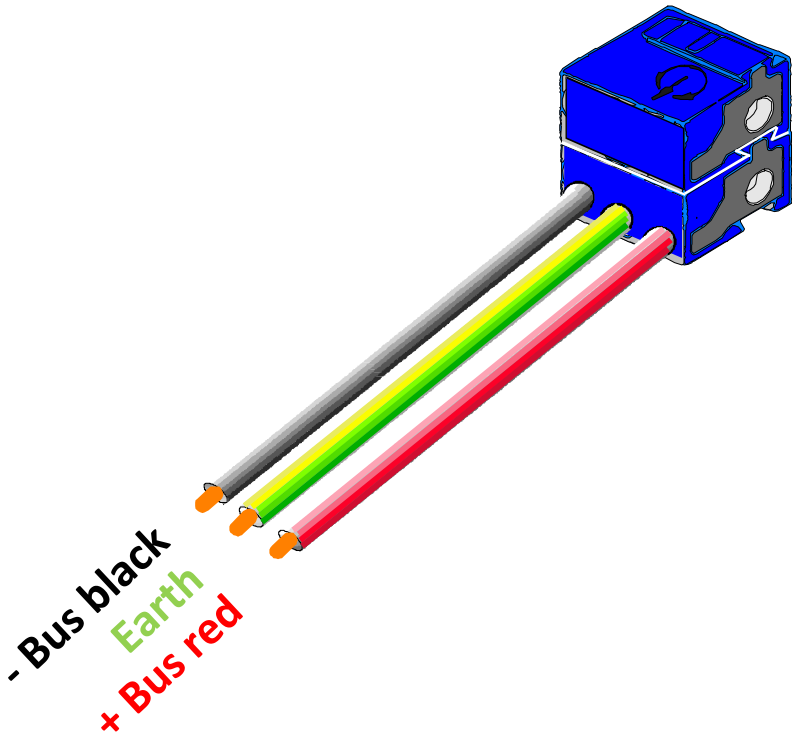

230 V AC
LIGHTNING
Power supply
KNX
Actuator


230 V AC
LIGHTNING
Power supply
Electromagnetic field
KNX
Actuator


230 V AC
LIGHTNING
Power supply
Electromagnetic field
STRAY CURRENTS !
KNX
Actuator


230 V AC
KNX
LIGHTNING
Power supply
Actuator

Bus overvoltage arrester



Recommended usage

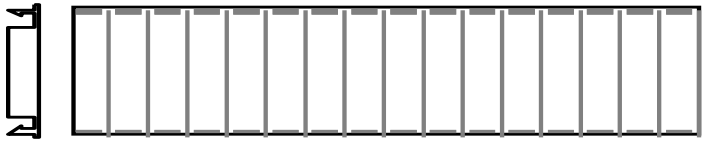
- To bus devices with 230 V mains connection
- To line and area couplers on both lines
- To bus devices installed in conductive walls or in the vicinity of water pipes, gas pipes etc.
- To bus cable ends
- At the edge of buildings

Checking an installation

1. Check whether permitted cable lengths have been observed
2. Run a visual check of the marking of the bus cable ends
3. Check installation for inadmissible cable connections
4. Measure the insulation resistance of the bus cables
5. Check polarity of all bus devices
6. Measure voltage at each bus cable end (minimum 21 V)
7. Record your test results

Data rails, data rail covers in certain installations

KNX Data rail 243 mm



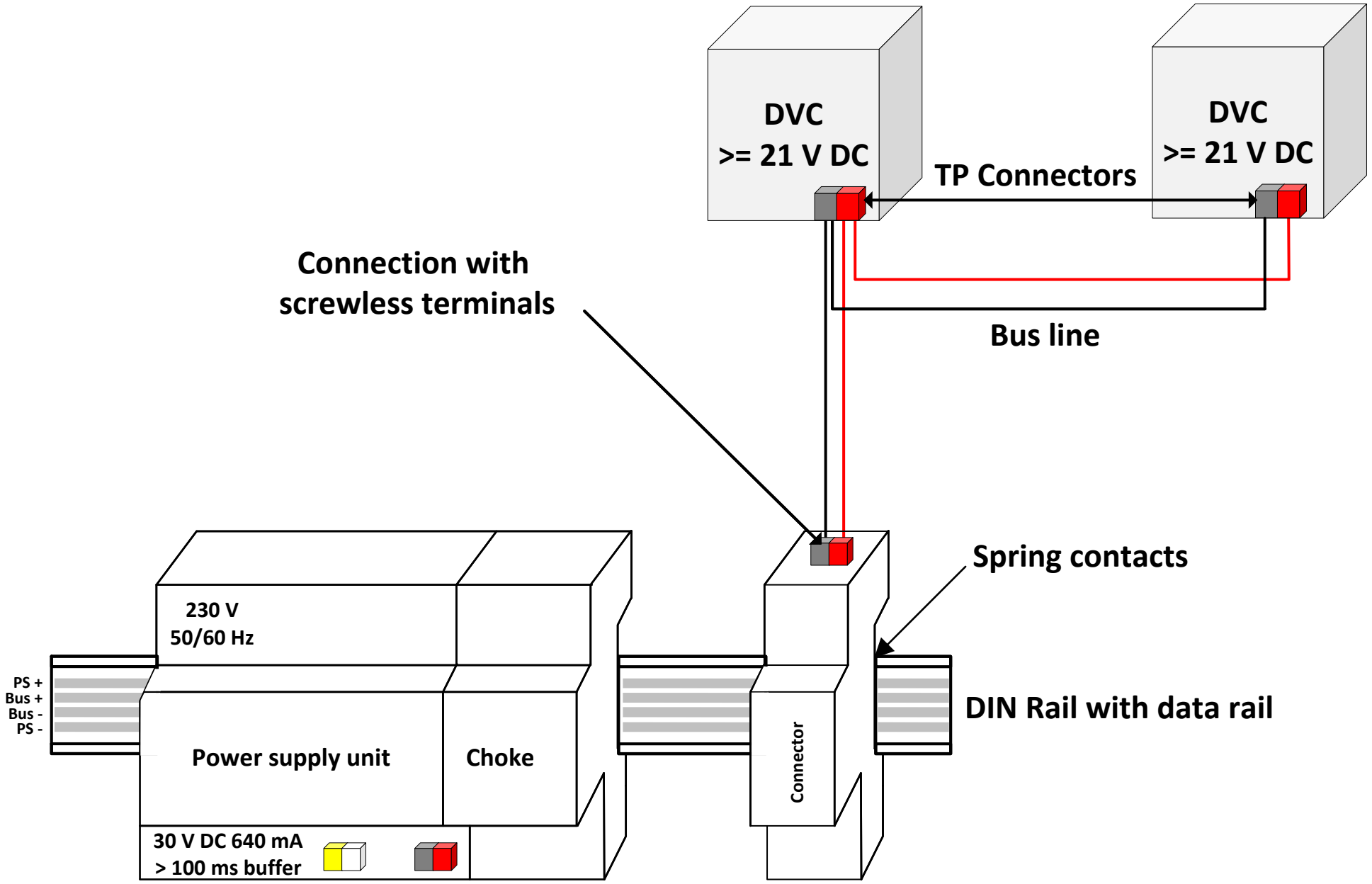
Data rail cover

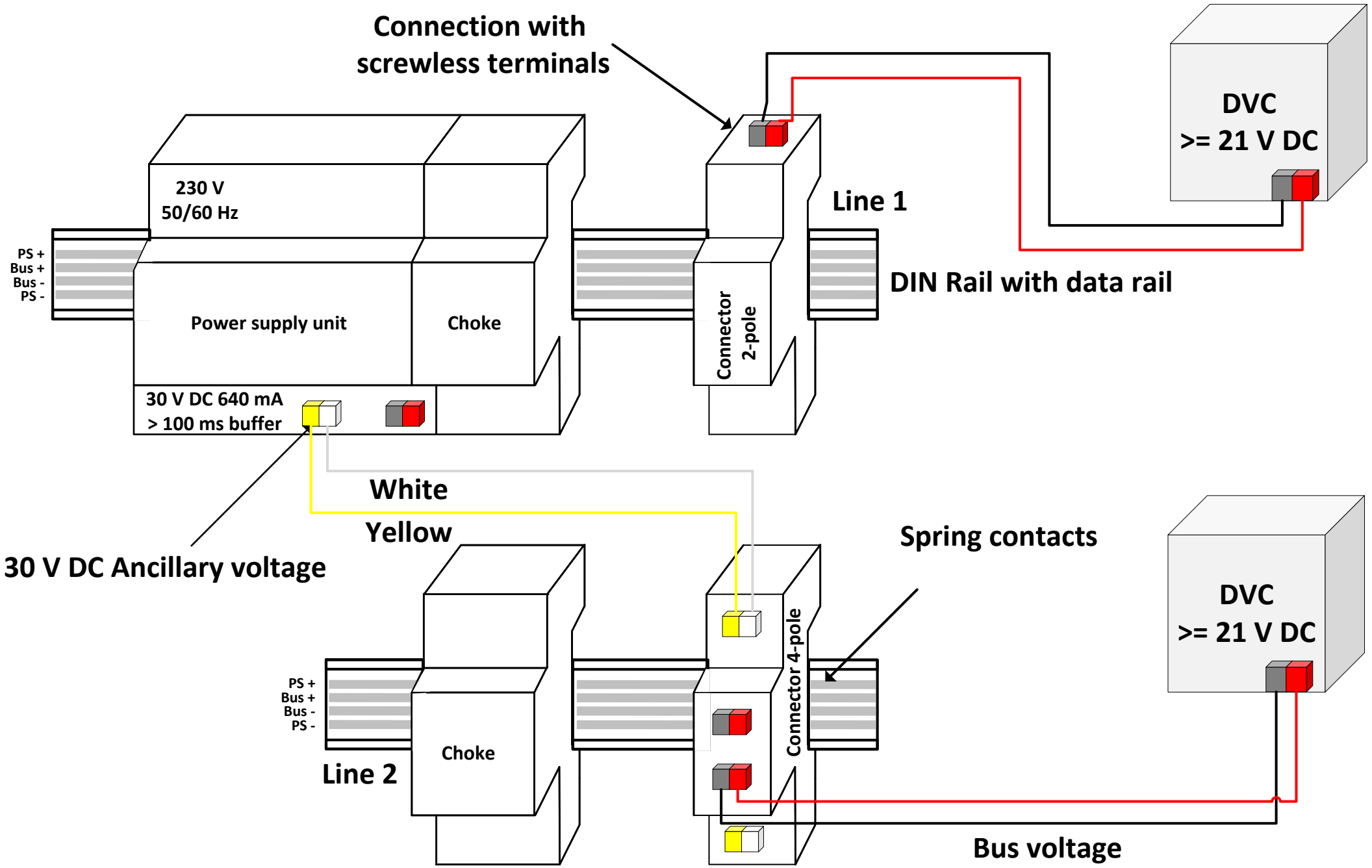
Self adhesive data rail for 35 mm DIN rail

The data rail is offered in various standardized lengths:

Make sure that:

- **Keep the data rail clean**
- **Do not cut the data rail**
- **Do not solder the data rail**
- **Cover unused sections**


DVC
>= 21 V DC
TP Connectors
DVC
>= 21 V DC
Connection with
screwless terminals
Bus line
Spring contacts
230 V
50/60 Hz
PS +
Bus +
Bus -
PS -
Power supply unit
Choke
Connector
DIN Rail with data rail
30 V DC 640 mA
> 100 ms buffer


Connection with
screwless terminals
DVC
>= 21 V DC
230 V
50/60 Hz
Line 1
PS +
Bus +
Bus -
PS -
Power supply unit
Choke
Connector
2-pole
DIN Rail with data rail
30 V DC 640 mA
> 100 ms buffer
White
Yellow
30 V DC Ancillary voltage
Spring contacts
DVC
>= 21 V DC
PS +
Bus +
Bus -
PS -
Choke
Connector 4-pole
Line 2
Bus voltage