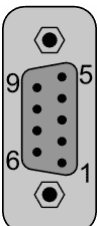


CS31 System Bus (PM55x, PM56x)

Connection

The AC500 CPUs PM554 and PM564 can be used as a CS31 bus master, They cannot be used as a CS31 bus slave. The connection is performed via the serial interface COM1 used as a CS31 system bus. The following figure shows the connection of the bus signals RxD/TxD-P (pin 3 on COM1) and RxD/TxD-N (pin 8 on COM1).

	1	FE	Functional earth
	2	SGND	0 V power supply, internally connected to M terminal
	3	RxD/TxD-P	Receive/Transmit positive
	4	Reserved	Reserved, not connected
	5	SGND	0 V power supply, internally connected to M terminal
	6	+3.3 V	3.3 V power supply
	7	Reserved	Reserved, not connected
	8	RxD/TxD-N	Receive/Transmit negative
	9	Reserved	Reserved, not connected
	Shield	Cable shield	Functional earth

Wiring

Bus line	
Construction	2 cores, twisted, with common shield
Conductor cross section	$\geq 0.22 \text{ mm}^2$ (24 AWG)
- recommendation	0.5 mm^2 corresponds to $\varnothing 0.8 \text{ mm}$
Twisting rate	> 10 per meter (symmetrically twisted)
Core insulation	Polyethylene (PE)
Resistance per core	< $100 \text{ } \Omega/\text{km}$
Characteristic impedance	ca. $120 \text{ } \Omega$ ($100 \dots 150 \text{ } \Omega$)
Capacitance between the cores	< 55 nF/km (if higher, the max. bus length must be reduced)
Terminating resistors	$120 \text{ } \Omega \text{ } \frac{1}{4} \text{ W}$ at both line ends
Remarks	Shielded cables with PVC core insulation and a core diameter of 0.8 mm can be used up to a length of ca. 50 m . In this case, the bus terminating resistor is ca. $100 \text{ } \Omega$.

Bus Topology

A CS31 system bus always contains only one bus master (CPU or Communication Module) which controls all actions on the bus. Up to 31 slaves can be connected to the bus, e. g. remote modules or slave-configured CPUs. Besides the wiring instructions shown below, the wiring and earthing instructions provided with the descriptions of the modules are valid additionally.

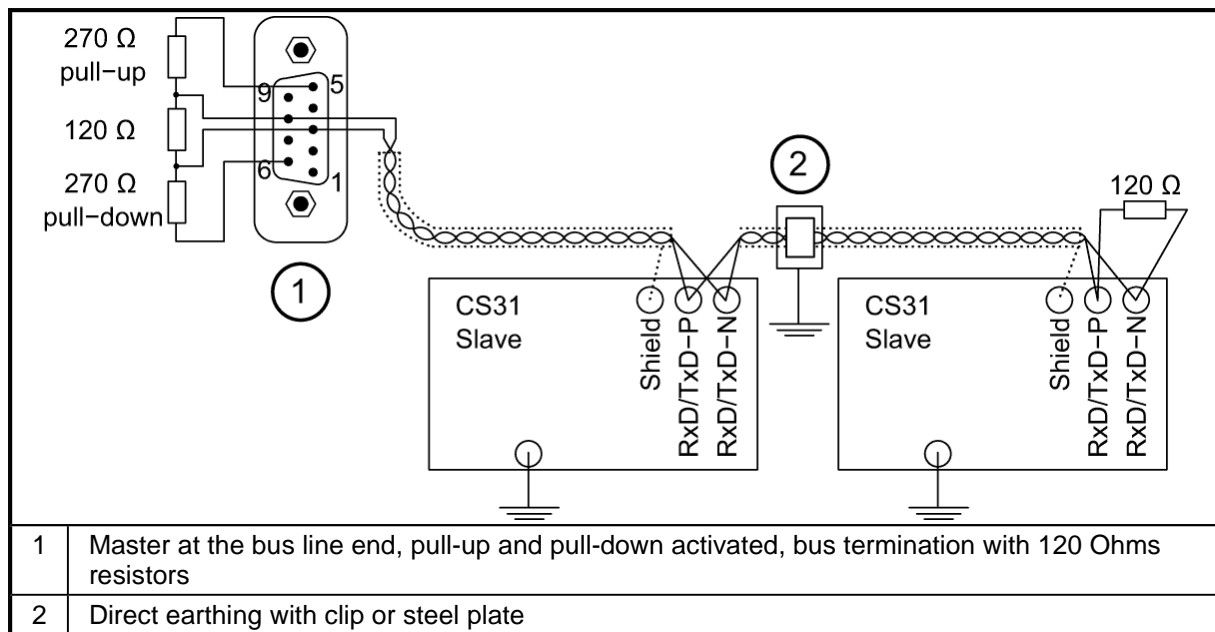


Figure: Bus topology for a CS31 system bus at COM1 (Master is at the end of the bus line)

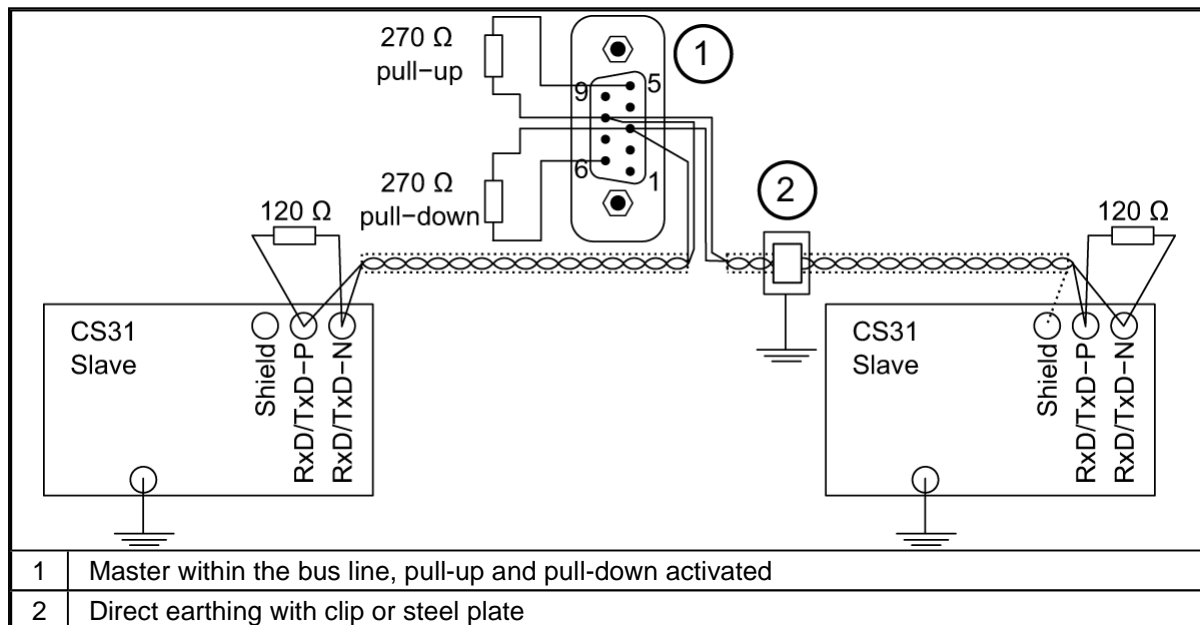
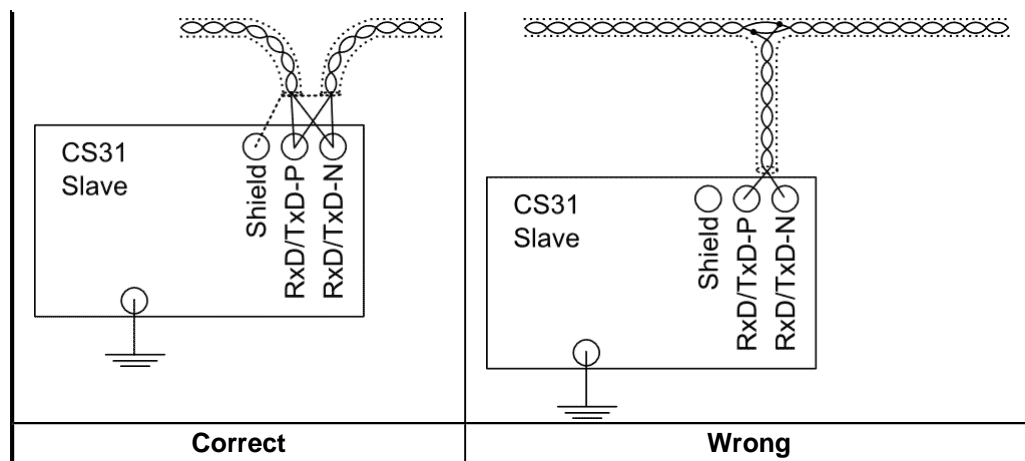


Figure: Bus topology for a CS31 system bus at COM1 (Master is within the bus line)

**Risk of malfunctions!**

Spur lines are not allowed within the CS31 bus.
 Loop the bus line from module to module (see figures below).



Earthing

In order to avoid disturbance, the cable shields must be earthed directly.

Case A

Multiple switch-gear cabinets: If it can be guaranteed that no potential differences can occur between the switch-gear cabinets by means of current-carrying metal connections (earthing bars, steel constructions etc.), the direct earthing is chosen.

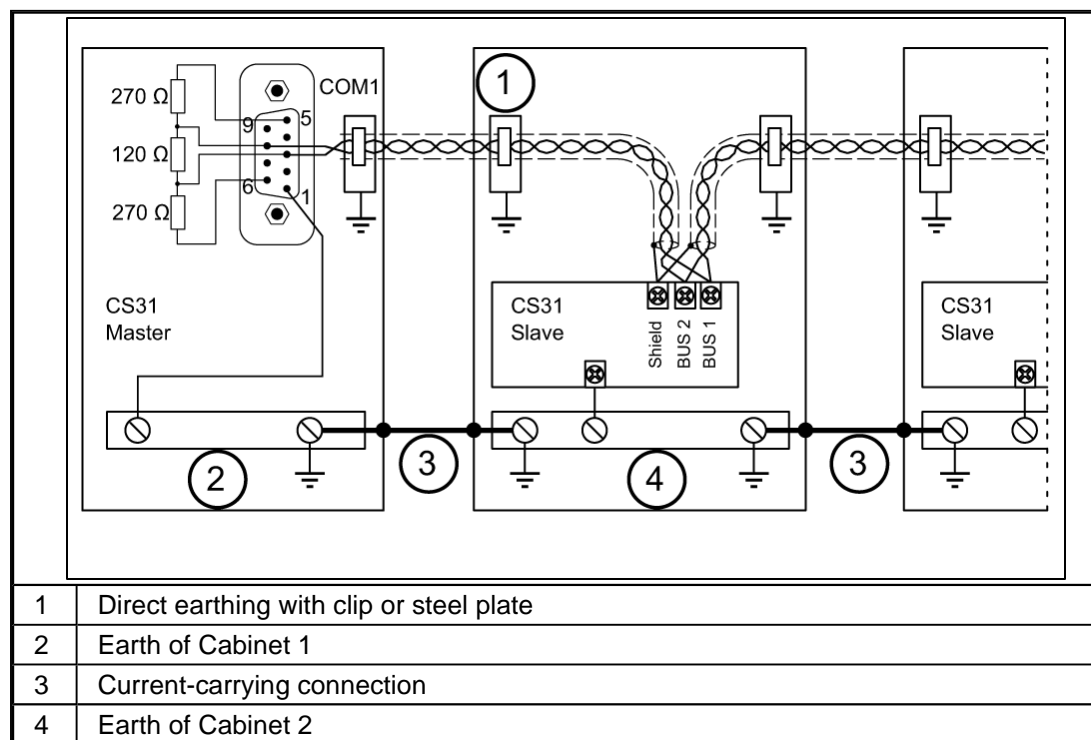


Figure: Direct earthing

Case B

Multiple switch-gear cabinets: If potential differences can occur between the switch-gear cabinets, the capacitive earthing method is chosen in order to avoid circulating currents on the cable shields.

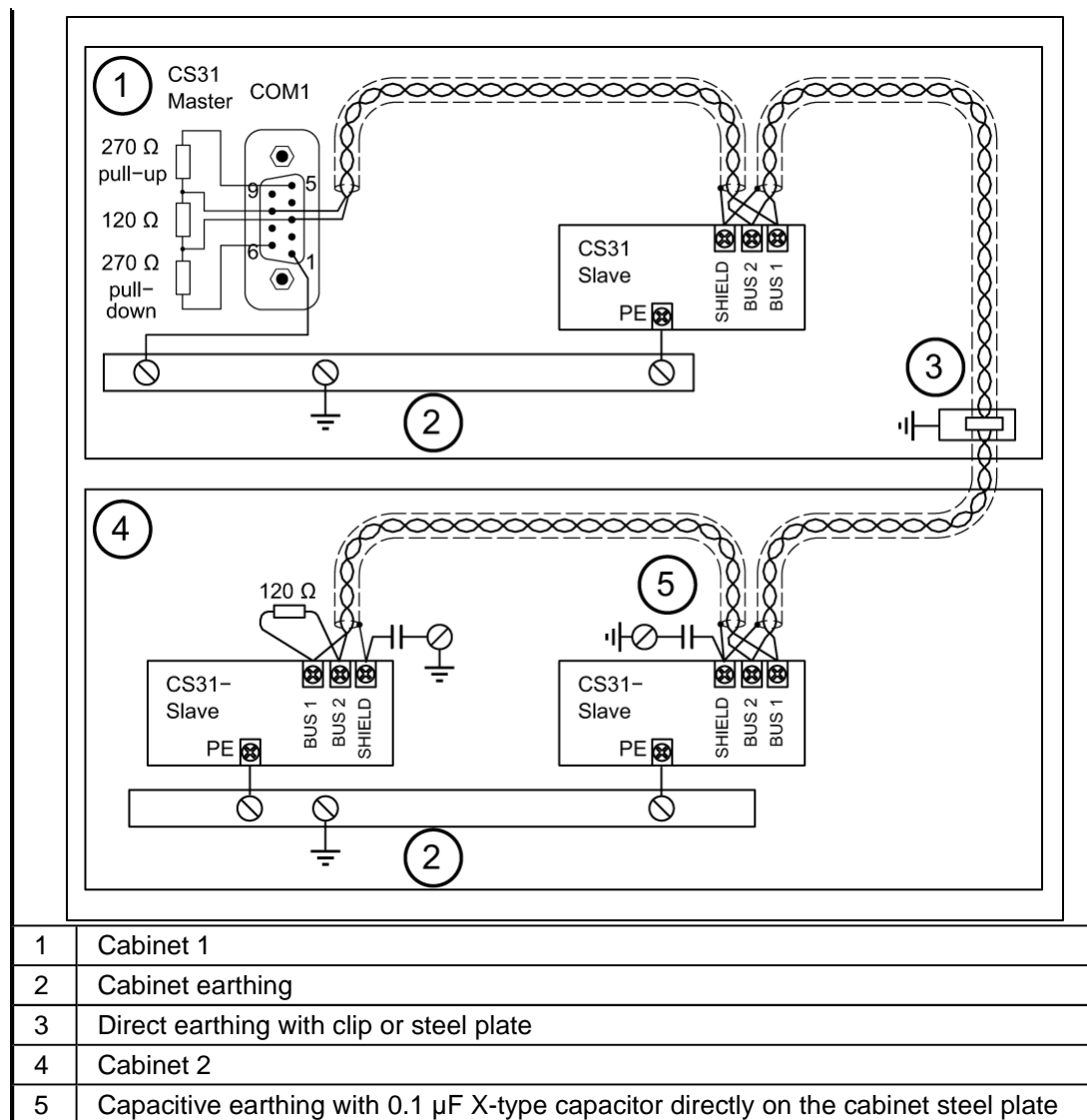


Figure: Earthing concept with several switch-gear cabinets: direct earthing of cable shields when cables enter the first switch-gear cabinet (containing the master), and capacitive earthing at the modules

Everywhere is valid: The total length of the earthing connections between the shield of the Terminal Base and the earthing bar must be as short as possible (max. 25 cm). The conductor cross section must be at least 2.5 mm².

VDE 0160 requires, that the shield must be earthed directly at least once per system.