Medium Voltage Cable Drop Calculator

Calculate voltage drop, receiving-end voltage, maximum route length at an entered limit, and I-squared-R loss on a medium or high voltage cable run from resistance, reactance, and power factor.

Generated November 24, 2026

https://www.elecatrix.com/wire-raceway-ampacity/medium-voltage-cable-drop-calculator/

Inputs

Input	Value	Unit
System voltage	11	kV
Phase	Three-phase	
Load current	100	A
One-way route length	300	m
Cable resistance	0.443	ohm/km
Cable reactance	0.08	ohm/km
Load power factor	0.9	
Voltage-drop limit	5	%
Conductor size	35	mm2

Results

Result	Value	Unit
Voltage drop	**22.529**	V
Voltage drop	**0.2048**	%
Receiving-end voltage	**10977.471**	V
Limit comparison	**Within the entered voltage-drop limit**	
Maximum one-way route at the limit	**7323.8872**	m
Conductor length used	**300**	m
Impedance used	**0.4336**	ohm/km
Cable loss	**3987**	W

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Cable loss	**0.2325**	%
System voltage	**11000**	V
Phase multiplier	**1.7321**	x

Calculation details

Detail	Value	Unit
Cable basis	Reactance is included, so the result follows the R cos(phi) + X sin(phi) projection. Entered conductor size is a label for the record only; every number here comes from the resistance and reactance you entered.	
Calculation basis	Three-phase uses sqrt(3) and the one-way route per phase; single-phase uses 2 and twice the one-way length. Voltage drop equals that product times (R cos(phi) + X sin(phi)) per km, multiplied by the route and divided by 1000.	
Review boundary	Arithmetic for voltage drop and I-squared-R loss only. Short-circuit withstand, thermal rating and dielectric losses, screen or earthing arrangement, installation method, and the edition adopted by the local authority remain outside this calculation.	

Formulas

```
Z_proj = Rcosphi + Xsinphi
```

```
V_drop = k x I x L_used x fracZ_proj1000
```

```
V_far = V_system - V_drop
```

```
Drop percent = fracV_dropV_system x 100%
```

```
P_loss = n x I^2 x R x fracL_used1000
```

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Warnings and limitations

This is a voltage-drop and loss estimate for one cable run. It does not size an MV or HV feeder and does not verify short-circuit withstand, thermal rating, or earthing arrangements.

Sample Report