

Project information

Date	2022-07-31
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Load

Voltage	230 V, 3 Phase AC
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Load	25 A
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Max. volt drop	4 %
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Cable distance	300 m
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Cable type

Cable type	Multi-core 4C+E
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Phase 1 core	70 mm ²
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Phase 2 core	70 mm ²
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Phase 3 core	70 mm ²
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Neutral core	70 mm ²
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Earth core	35 mm ²
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Conductors	Aluminium
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Insulation	PVC V-90 Standard 75°
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Live and neutral rating

Rated current	170 A, Table 13
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Derated current	$170 \times 1.072 = 182 \text{ A}$
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Calculated operating temperature	11°C
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Maximum operating temperature	75°C
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Voltage drop

Voltage drop	2.8%, 6.4 V
Voltage at load	223.6 V
Max distance	430 m for 4%
Option: Conductor temperature	Calculated
Option: Load power factor	Worst case

Live and neutral impedance

Resistance	0.488 Ohm/km, Table 35, Col. 7, 45°C
Reactance	0.077 Ohm/km
Impedance	0.494 Ohm/km

Earth impedance

Resistance	1.06 Ohm/km, Table 35, Col. 9, 75°C
Reactance	0.0826 Ohm/km
Impedance	1.0632 Ohm/km

Installation

Cable installation  Buried direct

Number of circuits	1
Cable depth	1.0 m
Soil temperature	10°C
Soil resistivity	1.2°C.m/W

Derating

Circuits	1
Soil temperature	1.14
Soil resistivity	1
Cable depth	0.94
Total derating	1.07

Protection

Protection device	MCB
Rating	25 A
Curve	C
Magnetic trip setting	188 A, Fixed
Earth fault current at load	227 A

Live and neutral fault rating

Fault energy rating	26,543,104 A ² s
Initial operating temperature	75°C, worst case.
Maximum fault temperature	160°C
Fault constant	73.6

Earth fault rating

Fault energy rating	6,635,776 A ² s
Initial operating temperature	75°C, worst case.
Maximum fault temperature	160°C
Fault constant	73.6

Earth loop impedance

Check loop impedance	Yes
Source earth fault impedance method	Estimate
Source earth fault impedance	0.1168 Ohm
Live cable impedance	0.1482 Ohm
Earth cable impedance	0.319 Ohm
Total earth fault loop impedance	0.584 Ohm
Max allowable total fault loop impedance	0.71 Ohm
Installed distance	300 m
Max allowable distance	364 m
Earth fault current at load	227 A
Minimum fault current required at load	188 A

Cable checks

Current rating for live and neutral conductors.	Good
Voltage drop less than 4%.	Good
Minimum earth size recommended by IEC 60364-5-54.	Good
MCB rating.	Good
Fault loop impedance.	Good
Short circuit rating for live and neutral conductors.	Good
Short circuit rating for earth conductor.	Good

All cables

Phase Size mm ²	Earth Size mm ²	Derated Rating A	Volt Drop %	MCB Rating A	Max Loop m	Active Fault rating A ² s	Earth Fault rating A ² s
16	16	75	11.9	25	128	1,386,742	1,386,742
25	16	97	7.5	25	155	3,385,600	1,386,742
35	16	117	5.4	25	172	6,635,776	1,386,742

Cable Sizing Report

AS/NZS 3008:2017

	50	25	138	4	25	260	13,542,400	3,385,600
X	70	35	170	2.8	25	364	26,543,104	6,635,776
	95	50	204	2	25	493	48,888,064	13,542,400
	120	70	233	1.6	25	677	78,004,224	26,543,104

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