

| Dobór zabezpieczeń i kabli | | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------|-----------|-------------|-----------------------|-----------------------|---------------------------|-------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------|-------------------------|--------------------------------|-----------|--------------|
| Załącznik 1 | | | | | | | | | | | | | | | | | | |
| Nr. No | Opis Description | P [kW] | cosφ [-] | U _n [V] | I _b [A] | I _{n,min} [A] | Zab Fuse | I _n [A] | k ₂ [-] | I _z [A] | I _z [A] | k _p [-] | I _{dd} [A] | Przewód Wire | S [mm ²] | γ [10 ⁻⁶ /(Ω*m)] | L [km] | x' [Ω/km] |
| 1 | Obwód 1 - oświetlenie | 1,55 | 0,98 | 400 | 2,3 | 2,6 | gG D01 | 6 | 1,90 | 7,86 | 111,0 | 1,00 | 111,0 | YAKXS | 4x 25 | 33 | 0,294 | 0,08 |
| 2 | Obwód 2 - oświetlenie | 0,38 | 0,98 | 400 | 0,6 | 0,6 | gG D01 | 6 | 1,90 | 7,86 | 111,0 | 1,00 | 111,0 | YAKXS | 4x 25 | 33 | 0,169 | 0,08 |
| 3 | Obwód 3 - oświetlenie | 0,12 | 0,98 | 400 | 0,2 | 0,2 | gG D01 | 6 | 1,90 | 7,86 | 111,0 | 1,00 | 111,0 | YAKXS | 4x 25 | 33 | 0,264 | 0,08 |

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Załącznik 2 - obliczenia obwodu oświetleniowego

| Struktura sieci | | | Stan | Moc opraw [W] | Odcinek kabla | | L [m] | $\Delta U_{\%}$ [%] | Moc odcinka [W] | Przewód Wire [-] | S [mm ²] | y [10 ⁶ /(Ω*m)] | x' [Ω/km] |
|-----------------|-----------|-------------|-------|------------------|---------------|-------------|----------|------------------------|--------------------|------------------------|-------------------------|-------------------------------|--------------|
| 1 | 2 | 3 | | | od | do | | | | | | | |
| ZK | | | | 0 | | | | | 1548 | | | | |
| | | | | | ZK | SO | 5 | | | YAKXS | 4x 35 | 33 | 0,08 |
| SO | | | proj. | 0 | | | | 0,00 | 1548 | | | | |
| | | | | | SO | St. 1/1 | 40 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 1/1 | | | proj. | 75 | | | | 0,05 | 1548 | | | | |
| | | | | | St. 1/1 | St. 2/1 | 41 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 2/1 | | | proj. | 75 | | | | 0,10 | 1548 | | | | |
| | | | | | St. 2/1 | St. 3/1 | 36 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 3/1 | | | proj. | 75 | | | | 0,14 | 1548 | | | | |
| | | | | | St. 3/1 | St. 4/1 | 26 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 4/1 | | | proj. | 75 | | | | 0,17 | 1548 | | | | |
| | | | | | St. 4/1 | St. 4.1/1 | 15 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.1/1 | | proj. | 39 | | | | 0,18 | 378 | | | | |
| | | | | | St. 4.1/1 | St. 4.2/1 | 30 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.2/1 | | proj. | 39 | | | | 0,19 | 339 | | | | |
| | | | | | St. 4.2/1 | St. 4.2.1/1 | 18 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 4.2.1/1 | proj. | 75 | | | | 0,19 | 300 | | | | |
| | | | | | St. 4.2.1/1 | St. 4.2.2/1 | 33 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 4.2.2/1 | proj. | 75 | | | | 0,20 | 225 | | | | |
| | | | | | St. 4.2.2/1 | St. 4.2.3/1 | 22 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 4.2.3/1 | proj. | 75 | | | | 0,20 | 150 | | | | |
| | | | | | St. 4.2.3/1 | St. 4.2.4/1 | 23 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 4.2.4/1 | proj. | 75 | | | | 0,20 | 75 | | | | |
| | | | | | St. 4.2/1 | St. 4.3/1 | 31 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.3/1 | | proj. | 39 | | | | 0,19 | 156 | | | | |
| | | | | | St. 4.3/1 | St. 4.4/1 | 36 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.4/1 | | proj. | 39 | | | | 0,19 | 156 | | | | |
| | | | | | St. 4.4/1 | St. 4.4.1/1 | 15 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 4.4.1/1 | proj. | 39 | | | | 0,19 | 39 | | | | |
| | | | | | St. 4.4/1 | St. 4.5/1 | 33 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.5/1 | | proj. | 39 | | | | 0,20 | 78 | | | | |
| | | | | | St. 4.5/1 | St. 4.6/1 | 13 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 4.6/1 | | proj. | 39 | | | | 0,20 | 39 | | | | |
| | | | | | St. 4/1 | St. 5/1 | 24 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 5/1 | | | proj. | 75 | | | | 0,19 | 900 | | | | |
| | | | | | St. 5/1 | St. 5.1/1 | 27 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 5.1/1 | | proj. | 75 | | | | 0,20 | 225 | | | | |
| | | | | | St. 5.1/1 | St. 5.2/1 | 15 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 5.2/1 | | proj. | 75 | | | | 0,20 | 150 | | | | |
| | | | | | St. 5.2/1 | St. 5.2.1/1 | 21 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | | St. 5.2.1/1 | proj. | 75 | | | | 0,20 | 75 | | | | |
| | | | | | St. 5.2/1 | St. 5.3/1 | 18 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 5.3/1 | | proj. | 75 | | | | 0,20 | 150 | | | | |
| | | | | | St. 5.3/1 | St. 5.4/1 | 36 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 5.4/1 | | proj. | 75 | | | | 0,20 | 75 | | | | |
| | | | | | St. 5/1 | St. 6/1 | 12 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 6/1 | | | proj. | 75 | | | | 0,19 | 450 | | | | |
| | | | | | St. 6/1 | St. 7/1 | 35 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 7/1 | | | proj. | 75 | | | | 0,21 | 375 | | | | |
| | | | | | St. 7/1 | St. 8/1 | 30 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 8/1 | | | proj. | 75 | | | | 0,21 | 300 | | | | |
| | | | | | St. 8/1 | St. 9/1 | 35 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 9/1 | | | proj. | 75 | | | | 0,22 | 225 | | | | |
| | | | | | St. 9/1 | St. 9.1/1 | 15 | | | YAKXS | 4x 25 | 33 | 0,08 |
| | St. 9.1/1 | | proj. | 75 | | | | 0,22 | 150 | | | | |
| | | | | | St. 9/1 | St. 10/1 | 14 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 10/1 | | | proj. | 75 | | | | 0,22 | 75 | | | | |

Załącznik 3 - obliczenia obwodu oświetleniowego

| Struktura sieci | | | Stan | Moc opraw [W] | Odcinek kabla | | L [m] | $\Delta U_{\%}$ [%] | Moc odcinka [W] | Przewód Wire [-] | S [mm ²] | γ [10 ⁶ / (Ω*m)] | x' [Ω/km] |
|-----------------|---|---|-------|------------------|---------------|---------|----------|------------------------|--------------------|------------------------|-------------------------|---------------------------------------|----------------|
| 1 | 2 | 3 | | | od | do | | | | | | | |
| ZK | | | | 0 | | | | | 375 | | | | |
| | | | | | ZK | SO | 5 | | | YAKXS | 4x 35 | 33 | 0,08 |
| SO | | | proj. | 0 | | | | 0,00 | 375 | | | | |
| | | | | | SO | St. 1/2 | 6 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 1/2 | | | proj. | 75 | | | | 0,00 | 375 | | | | |
| | | | | | St. 1/2 | St. 2/2 | 40 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 2/2 | | | proj. | 75 | | | | 0,01 | 300 | | | | |
| | | | | | St. 2/2 | St. 3/2 | 34 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 3/2 | | | proj. | 75 | | | | 0,02 | 225 | | | | |
| | | | | | St. 3/2 | St. 4/2 | 67 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 4/2 | | | proj. | 75 | | | | 0,03 | 150 | | | | |
| | | | | | St. 4/2 | St. 5/2 | 22 | | | YAKXS | 4x 25 | 33 | 0,08 |
| St. 5/2 | | | proj. | 75 | | | | 0,03 | 75 | | | | |

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Załącznik 4 - obliczenia obwodu oświetleniowego

| Załącznik 4 - Obliczenia obwodu oświetleniowego | | | | | | | | | | | | | | | U1 | |
|---|---|---|-------|------------------|---------------|---------|----------|------------------------|--------------------|------------------------|-------------------------|---|------------------------------|--|----|--|
| Struktura sieci | | | Stan | Moc opraw [W] | Odcinek kabla | | L [m] | $\Delta U_{\%}$ [%] | Moc odcinka [W] | Przewód Wire [-] | S [mm ²] | γ [10 ⁶ /($\Omega \cdot m$)] | α' [Ω/km] | | | |
| 1 | 2 | 3 | | | od | do | | | | | | | | | | |
| ZK | | | | 0 | | | | | 117 | | | | | | | |
| | | | | | ZK | SO | 5 | | | YAKXS | 4x 35 | 33 | 0,08 | | | |
| SO | | | proj. | 0 | | | | 0,00 | 117 | | | | | | | |
| | | | | | SO | St. 1/2 | 209 | | | YAKXS | 4x 25 | 33 | 0,08 | | | |
| St. 1/2 | | | proj. | 39 | | | | 0,02 | 117 | | | | | | | |
| | | | | | St. 1/2 | St. 2/2 | 23 | | | YAKXS | 4x 25 | 33 | 0,08 | | | |
| St. 2/2 | | | proj. | 39 | | | | 0,02 | 78 | | | | | | | |
| | | | | | St. 2/2 | St. 3/2 | 32 | | | YAKXS | 4x 25 | 33 | 0,08 | | | |
| St. 3/2 | | | proj. | 39 | | | | 0,02 | 39 | | | | | | | |

| Załącznik 5 | | | Spodziewany najmniejszy prąd zwarcia (impedancją pętli zwarcia) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|--|----------------|---|--------------------|---------------------------|----------------|-----------------|-----------------|-----------------|--------------------|---------------------------|----------------|--------------------|-----------------|-----------------|--------------------|---------------------------|----------------|-----------------|-----------------|-----------------|--------|--|--------------------|----------------|------|------|-------|-----|------|------|--|------|--|------|--|-------------|----------------|---|----------------|----------------|---|
| Obwód | Transformator 0,4 kV Transformor 0,4 kV | | Linia 1 Transformator -> ZK | | | | | | | | | | Linia 2 ZK > SO | | | | | | | | | | Linia 3 SO -> Najdalszy słup obwodu | | | | | | | | | | Suma | | Prąd | | Zab Fuse | I _n | t | k ₁ | I _b | Ochrona skuteczna I'' _{min} ≥ I _b |
| | S | R _T | X _T | S ₁ | V ₁ | L ₁ | X' ₁ | R ₁₁ | X ₁₁ | S ₂ | V ₂ | L ₂ | X' ₂ | R ₁₂ | X ₁₂ | S ₃ | V ₃ | L ₃ | X' ₃ | R ₁₃ | X ₁₃ | R | X | I'' _{min} | I _b | | | | | | | | | | | | | | | | | |
| | [MVA] | [Ω] | [Ω] | [mm ²] | [10 ⁶ /(Ω*ml)] | [km] | [Ω/km] | [Ω] | [Ω] | [mm ²] | [10 ⁶ /(Ω*ml)] | [km] | [Ω/km] | [Ω] | [Ω] | [mm ²] | [10 ⁶ /(Ω*ml)] | [km] | [Ω/km] | [Ω] | [Ω] | [Ω] | [Ω] | [Ω] | [Ω] | [kA] | [kA] | [s] | [s] | [kA] | [kA] | | | | | | | | | | | |
| 1 | 250 | 0,0092 | 0,0304 | 120 | 33 | 0,25 | 0,08 | 0,1263 | 0,0400 | 35 | 33 | 0,005 | 0,08 | 0,0087 | 0,0008 | 25 | 33 | 0,294 | 0,08 | 0,7127 | 0,0470 | 0,8568 | 0,1182 | 0,21 | 4,2 | 5,0 | 4,2 | 0,025 | TAK | | | | | | | | | | | | | |
| 2 | 250 | 0,0092 | 0,0304 | 120 | 33 | 0,25 | 0,08 | 0,1263 | 0,0400 | 35 | 33 | 0,005 | 0,08 | 0,0087 | 0,0008 | 25 | 33 | 0,169 | 0,08 | 0,4097 | 0,0270 | 0,5538 | 0,0982 | 0,33 | 4,2 | 5,0 | 4,2 | 0,025 | TAK | | | | | | | | | | | | | |
| 3 | 250 | 0,0092 | 0,0304 | 120 | 33 | 0,25 | 0,08 | 0,1263 | 0,0400 | 35 | 33 | 0,005 | 0,08 | 0,0087 | 0,0008 | 25 | 33 | 0,264 | 0,08 | 0,6400 | 0,0422 | 0,7841 | 0,1134 | 0,23 | 4,2 | 5,0 | 4,2 | 0,025 | TAK | | | | | | | | | | | | | |

| Załącznik 6 | | | | | | | | | | | | | | | | | | | |
|--|----------------------|----------------|----------------|--------------------|---------------------------|--------------------------------|-----------------|-----------------|-----------------|--------------------|---------------------------|----------------|-----------------|-----------------|-----------------|--------|--------|--------------------------------|--|
| Spodziewany największy prąd zwarciaowy | | | | | | | | | | | | | | | | | | | |
| Miejsce zwarcia | Transformator 0,4 kV | | | | | Linia 1 Transformator -> ZK | | | | | Linia 2 ZK-> SO | | | | | Suma | | Prąd $I''_{k, max}$ [kA] | |
| | S | R _T | X _T | S ₁ | Y ₁ | L ₁ | X' ₁ | R _{L1} | X _{L1} | S ₂ | Y ₂ | L ₂ | X' ₂ | R _{L2} | X _{L2} | R | X | | |
| | [kVA] | [Ω] | [Ω] | [mm ²] | [10 ⁶ /(Ω*km)] | | [Ω/km] | [Ω] | [Ω] | [mm ²] | [10 ⁶ /(Ω*km)] | [km] | [Ω/km] | [Ω] | [Ω] | [Ω] | [Ω] | | |
| SO | 250 | 0,0092 | 0,0304 | 35 | 33 | 0,5 | 0,08 | 0,8658 | 0,0800 | 35 | 33 | 0,005 | 0,08 | 0,0087 | 0,0008 | 0,8837 | 0,1112 | 0,26 | |