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### АПвЭгПнг-60 1x240 ТУ У 31.3-00214534-060:2011

Power cables with aluminium cunductor, flame-retardant, with XLPE, longitudinal screen sealing and polymer compound outer sheath

For the cable of this mark correspond the foreign-made analogues:

XnUHAKXS (PL)

Technical cable requirements correspond to IEC 60840

Cables are used for laying:

- in premises, tunnels, ducts, mines, dry soil and outdoor under shelter
- · single laying

It is possible to manufacture cables with extruded semiconductor layer along outer sheath.

Order entry example:

АПвЭгПнг-П-60 1х240/95 ТУ У 31.3-00214534-060:2011

An extruded semiconductor layer along outer sheath ensures the correct testing of cable line with sections of underground laying in polymer pipes.

It is possible to manufacture cables with an integrated fiber-optic module.

Order entry example:

АПвЭгПнг-60 1х240/95 (ОМ) ТУ У 31.3-00214534-060:2011

In conjunction with the DTS system, the integrated fiber-optic module can act as a distributed cable line temperature sensor.

It is possible to manufacture cable with sealed conductor.

Order entry example:

АПвЭгПнг-60 1х240/95 (г) ТУ У 31.3-00214534-060:2011

Fire safety code in accordance with ДСТУ 4809:2007: ПБ121122000

Products of this mark meet the requirements:

- · single wire cable flame retardance
- bunched cable flame retardance category A
- toxicity class Tk1 of the combustion products of nonmetallic elements (toxicity index from 13 up to 40 g/m3)
- class  $\Delta T \kappa 1$  on smoke-forming ability by smouldering of non-metallic elements (coefficient of smoke formation from 50 to 500 m<sup>2</sup>/kg)
- class ДПк2 on smoke-forming ability by combustion (minimum luminous flux more than 60 %)
- corrosive class  $K\kappa 2$  of combustion products of non-metallic elements (the number of halogen hydrides less than 150 mg/g, pH more than 4.3, specific conductivity less than 10  $\mu$ S/mm)







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Power cables with aluminium cunductor, flame-retardant, with XLPE, longitudinal screen sealing and polymer compound outer sheath

### **TECHNICAL SPECIFICATIONS**

| Maximum voltage kV 72.5 Conductor rated area mm² 240 Minimum screen cross-section mm² 35 Partial discharge factor for rated voltage, not more than pC 6 Permissible short circuit current across the screen of kA 5.1 Minimum cross-section kA 5.1 Maximum permissible short-circuit current in core kA 22.7 Permissible continious current rating by aerial laying *  in trefoil formation with double-side screen earthing A 464  in trefoil formation with single-side screen earthing or A 477 cross screen earthing  plane with double-side screen earthing or cross screen A 565  earthing  Permissible continious current rating by burial *  in trefoil formation with double-side screen earthing or cross screen A 565  earthing  Permissible continious current rating by burial *  in trefoil formation with double-side screen earthing A 387  in trefoil formation with double-side screen earthing or A 399  cross screen earthing  plane with double-side screen earthing A 379  plane with double-side screen earthing A 416  earthing  Maximum permissible conductor temperature  Continious  'C +90  in emergency operation  c C +130  in emergency operation  c C +250  Operating temperature range  C -60+50  Minimum bending radius by laying  mm 880  Rated outer diameter of the cable (for reference) **  mh 55  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery  on the drums ***  # 25VJ-60: 499 · 3.0  # 26VJ-100: 1404 · 7.8  | Rated voltage  | kV    | 60                     |
|--|--|-------|------------------------|
| Minimum screen cross-section Partial discharge factor for rated voltage, not more than Pc 6 Permissible short circuit current across the screen of minimum cross-section  Maximum permissible short-circuit current in core kA 22.7  Permissible continious current rating by aerial laying *  - in trefoil formation with double-side screen earthing A 464  - in trefoil formation with single-side screen earthing or cross screen earthing - plane with double-side screen earthing or cross screen earthing Permissible continious current rating by burial *  - in trefoil formation with double-side screen earthing or cross screen - arthing Permissible continious current rating by burial *  - in trefoil formation with double-side screen earthing or cross screen earthing  Permissible continious current rating by burial *  - in trefoil formation with single-side screen earthing or A 399  - cross screen earthing - plane with double-side screen earthing or A 399  - cross screen earthing - plane with double-side screen earthing or cross screen earthing  - plane with single-side screen earthing or cross screen - A 416  - Maximum permissible conductor temperature  - Continious - C +90  - in emergency operation - C +130  - at short circuit - C -60 +50  Minimum bending radius by laying - mm 880  Rated outer diameter of the cable (for reference) ** - mm 55  Cable weight (approximate) - kg/km 4230  Rated factory cable length and gross weight of the delivery - wn the drums *** - # 25VД-90: 1028 · 5.9   | Maximum voltage  | kV    | 72.5                   |
| Partial discharge factor for rated voltage, not more than Permissible short circuit current across the screen of minimum cross-section Maximum permissible short-circuit current in core RA 22.7  Permissible continious current rating by aerial laying *  in trefoil formation with double-side screen earthing A 464  in trefoil formation with single-side screen earthing or cross screen earthing  plane with double-side screen earthing or cross screen A 565  earthing Permissible continious current rating by burial *  in trefoil formation with double-side screen earthing or cross screen A 565  earthing Permissible continious current rating by burial *  in trefoil formation with double-side screen earthing or cross screen earthing  in trefoil formation with single-side screen earthing or cross screen earthing  plane with double-side screen earthing or cross screen earthing  plane with double-side screen earthing or cross screen earthing  A 379  plane with single-side screen earthing or cross screen A 416  earthing  Maximum permissible conductor temperature  Continious  "C +90  in emergency operation "C +130  at short circuit "C +250  Operating temperature range "C -60 +50  Minimum bending radius by laying  Rated outer diameter of the cable (for reference) **  mm 55  Cable weight (approximate)  kg/km 4230  Rated factory cable length and gross weight of the delivery on the drums ***  # 25VД-90: 1028 • 5.9   | Conductor rated area   | mm²   | 240                    |
| Permissible short circuit current across the screen of minimum cross-section  Maximum permissible short-circuit current in core  Permissible continious current rating by aerial laying *  · in trefoil formation with double-side screen earthing · plane with double-side screen earthing · plane with single-side screen earthing or cross screen earthing Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing or cross screen earthing Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing or cross screen earthing or cross screen earthing or cross screen earthing or cross screen earthing  Permissible continious current rating by burial *  · in trefoil formation with single-side screen earthing or A 387  · in trefoil formation with single-side screen earthing or cross screen earthing  · plane with double-side screen earthing or cross screen earthing  · plane with single-side screen earthing or cross screen earthing  Maximum permissible conductor temperature  · Continious  · C +90  · in emergency operation  · C +250  Operating temperature range  · C -60 +50  Minimum bending radius by laying  Mated outer diameter of the cable (for reference) **  mm 55  Cable weight (approximate)  kg/km 4230  Rated factory cable length and gross weight of the delivery on the drums ***  # 25VJL-90: 1028 · 5.9   | Minimum screen cross-section   | mm²   | 35                     |
| minimum cross-section  Maximum permissible short-circuit current in core  Permissible continious current rating by aerial laying *  · in trefoil formation with double-side screen earthing or cross screen earthing  · plane with double-side screen earthing or cross screen earthing  · plane with single-side screen earthing or cross screen earthing  Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing  Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing or cross screen earthing  · in trefoil formation with single-side screen earthing or A 399  cross screen earthing  · plane with double-side screen earthing or A 379  · plane with single-side screen earthing or cross screen  earthing  Maximum permissible conductor temperature  · Continious  · in emergency operation  · C +90  · in emergency operation  · C +130  · at short circuit  · C +250  Operating temperature range  · C -60 +50  Minimum bending radius by laying  Rated outer diameter of the cable (for reference) **  mm 55  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery  on the drums ***  # 25VД-90: 1028 · 5.9   | Partial discharge factor for rated voltage, not more than                    | рС    | 6                      |
| Maximum permissible short-circuit current in core  Permissible continious current rating by aerial laying *  in trefoil formation with double-side screen earthing or cross screen earthing  plane with double-side screen earthing or cross screen earthing or plane with single-side screen earthing or cross screen earthing  plane with single-side screen earthing or cross screen A 565  earthing  Permissible continious current rating by burial *  in trefoil formation with double-side screen earthing or A 387  in trefoil formation with single-side screen earthing or A 399  cross screen earthing  plane with double-side screen earthing or A 399  cross screen earthing  plane with double-side screen earthing or cross screen A 416  earthing  Maximum permissible conductor temperature  Continious  c C +90  in emergency operation  at short circuit  C +250  Operating temperature range  A 230  Rated outer diameter of the cable (for reference) **  mm 55  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery  on the drums ***  # 259Д-90: 1028 · 5.9   | Permissible short circuit current across the screen of                       | kA    | 5.1                    |
| Permissible continious current rating by aerial laying *     · in trefoil formation with double-side screen earthing   | minimum cross-section  |       |                        |
| • in trefoil formation with double-side screen earthing       A       464         • in trefoil formation with single-side screen earthing or cross screen earthing       A       477         cross screen earthing       A       511         • plane with double-side screen earthing or cross screen earthing       A       565         earthing       Permissible continious current rating by burial *       • in trefoil formation with double-side screen earthing or in trefoil formation with single-side screen earthing or cross screen earthing       A       387         • in trefoil formation with single-side screen earthing or cross screen earthing       A       399         cross screen earthing       A       379         • plane with double-side screen earthing or cross screen earthing       A       416         earthing       A       416         Maximum permissible conductor temperature       • C       +90         • in emergency operation       ° C       +90         • in emergency operation       ° C       +250         Operating temperature range       ° C       -60 +50         Minimum bending radius by laying       mm       880         Rated outer diameter of the cable (for reference) **       mm       55         Cable weight (approximate)       kg/km       4230         Rated fa   | Maximum permissible short-circuit current in core                            | kA    | 22.7                   |
| • in trefoil formation with single-side screen earthing or cross screen earthing       A       477         • plane with double-side screen earthing       A       511         • plane with single-side screen earthing or cross screen       A       565         earthing       Bermissible continious current rating by burial *       • in trefoil formation with double-side screen earthing       A       387         • in trefoil formation with single-side screen earthing or cross screen earthing       A       399         • cross screen earthing       A       379         • plane with double-side screen earthing or cross screen       A       416         earthing       A       416         Maximum permissible conductor temperature       ° C       +90         • in emergency operation       ° C       +90         • in emergency operation       ° C       +250         Operating temperature range       ° C       -60 +50         Minimum bending radius by laying       mm       880         Rated outer diameter of the cable (for reference) **       mm       55         Cable weight (approximate)       kg/km       4230         Rated factory cable length and gross weight of the delivery on the drums ***       # 259Д-90: 1028 * 5.9  | Permissible continious current rating by aerial laying *                     |       |                        |
| ross screen earthing plane with double-side screen earthing or cross screen plane with single-side screen earthing or cross screen permissible continious current rating by burial * in trefoil formation with double-side screen earthing in trefoil formation with single-side screen earthing or cross screen earthing in trefoil formation with single-side screen earthing or cross screen earthing plane with double-side screen earthing plane with double-side screen earthing or cross screen plane with single-side screen earthing or cross screen earthing or cross screen plane with single-side screen earthing or cross | <ul> <li>in trefoil formation with double-side screen earthing</li> </ul>    | Α     | 464                    |
| <ul> <li>plane with double-side screen earthing</li> <li>plane with single-side screen earthing or cross screen</li> <li>earthing</li> <li>Permissible continious current rating by burial *</li> <li>in trefoil formation with double-side screen earthing</li> <li>in trefoil formation with single-side screen earthing or</li> <li>in trefoil formation with single-side screen earthing or</li> <li>plane with double-side screen earthing</li> <li>plane with single-side screen earthing or cross screen</li> <li>plane with single-side screen earthing or cross screen</li> <li>plane with single-side screen earthing or cross screen</li> <li>carthing</li> <li>Maximum permissible conductor temperature</li> <li>Continious</li> <li>°C</li> <li>+90</li> <li>in emergency operation</li> <li>°C</li> <li>+130</li> <li>at short circuit</li> <li>°C</li> <li>+250</li> <li>Operating temperature range</li> <li>°C</li> <li>-60 +50</li> <li>Minimum bending radius by laying</li> <li>mm</li> <li>880</li> <li>Rated outer diameter of the cable (for reference) **</li> <li>mm</li> <li>55</li> <li>Cable weight (approximate)</li> <li>kg/km</li> <li>4230</li> <li>Rated factory cable length and gross weight of the delivery on the drums ***</li> <li># 22УД-60: 499 · 3.0</li> <li>on the drums ***</li> <li># 25УД-90: 1028 · 5.9</li> </ul>  | <ul> <li>in trefoil formation with single-side screen earthing or</li> </ul> | Α     | 477                    |
| <ul> <li>plane with single-side screen earthing or cross screen earthing</li> <li>Permissible continious current rating by burial *</li> <li>in trefoil formation with double-side screen earthing</li> <li>in trefoil formation with single-side screen earthing or cross screen earthing</li> <li>plane with double-side screen earthing</li> <li>plane with single-side screen earthing or cross screen</li> <li>plane with single-side screen earthing or cross screen</li> <li>plane with single-side screen earthing or cross screen</li> <li>continious</li> <li>C +90</li> <li>in emergency operation</li> <li>c +130</li> <li>at short circuit</li> <li>C +250</li> <li>Operating temperature range</li> <li>C -60 +50</li> <li>Minimum bending radius by laying</li> <li>mm 880</li> <li>Rated outer diameter of the cable (for reference) **</li> <li>mm 55</li> <li>Cable weight (approximate)</li> <li>kg/km 4230</li> <li>Rated factory cable length and gross weight of the delivery on the drums ***</li> <li># 25yД-90: 1028 • 5.9</li> </ul>   | cross screen earthing  |       |                        |
| earthing  Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing or cross screen earthing  · in trefoil formation with single-side screen earthing or A 399  cross screen earthing  · plane with double-side screen earthing A 416  earthing  Maximum permissible conductor temperature  · Continious ° C +90  · in emergency operation ° C +130  · at short circuit ° C +250  Operating temperature range ° C -60 +50  Minimum bending radius by laying mm 880  Rated outer diameter of the cable (for reference) ** mm 55  Cable weight (approximate) kg/km 4230  Rated factory cable length and gross weight of the delivery on the drums *** # 25УД-90: 1028 · 5.9   | <ul> <li>plane with double-side screen earthing</li> </ul>                   | Α     | 511                    |
| Permissible continious current rating by burial *  · in trefoil formation with double-side screen earthing  · in trefoil formation with single-side screen earthing or cross screen earthing  · plane with double-side screen earthing  · plane with single-side screen earthing or cross screen  earthing  Maximum permissible conductor temperature  · Continious  · in emergency operation  · in emergency operation  · at short circuit  Operating temperature range  Minimum bending radius by laying  Rated outer diameter of the cable (for reference) **  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery on the drums ***  # 259Д-90: 1028 · 5.9  | <ul> <li>plane with single-side screen earthing or cross screen</li> </ul>   | Α     | 565                    |
| <ul> <li>in trefoil formation with double-side screen earthing</li> <li>in trefoil formation with single-side screen earthing or cross screen earthing</li> <li>plane with double-side screen earthing</li> <li>plane with single-side screen earthing or cross screen</li> <li>carthing</li> <li>Maximum permissible conductor temperature</li> <li>Continious</li> <li>C +90</li> <li>in emergency operation</li> <li>C +130</li> <li>at short circuit</li> <li>C +250</li> <li>Operating temperature range</li> <li>C -60 +50</li> <li>Minimum bending radius by laying</li> <li>mm 880</li> <li>Rated outer diameter of the cable (for reference) **</li> <li>mm 55</li> <li>Cable weight (approximate)</li> <li>kg/km 4230</li> <li>Rated factory cable length and gross weight of the delivery on the drums ***</li> <li># 22УД-60: 499 • 3.0</li> <li>on the drums ***</li> <li># 25УД-90: 1028 • 5.9</li> </ul>  | earthing   |       |                        |
| ・ in trefoil formation with single-side screen earthing or cross screen earthing ・ plane with double-side screen earthing ・ plane with single-side screen earthing or cross screen   | Permissible continious current rating by burial *                            |       |                        |
| cross screen earthing  • plane with double-side screen earthing or cross screen  • plane with single-side screen earthing or cross screen  earthing  Maximum permissible conductor temperature  • Continious  • C +90  • in emergency operation  • C +130  • at short circuit  • C +250  Operating temperature range  Minimum bending radius by laying  Rated outer diameter of the cable (for reference) **  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery on the drums ***  # 25УД-90: 1028 • 5.9  |  | Α     |                        |
| • plane with double-side screen earthing • plane with single-side screen earthing or cross screen earthing  Maximum permissible conductor temperature • Continious • in emergency operation • at short circuit  Operating temperature range Minimum bending radius by laying Rated outer diameter of the cable (for reference) **  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery on the drums ***  A 379  416  416  416  416  C +90  • C +90  • C +130  • C +250  Operating temperature range • C -60 +50  mm 880  Rated outer diameter of the cable (for reference) **  mm 55  Cable weight (approximate)  kg/km 4230  Rated factory cable length and gross weight of the delivery on the drums ***  # 22УД-60: 499 • 3.0  # 25УД-90: 1028 • 5.9  | <ul> <li>in trefoil formation with single-side screen earthing or</li> </ul> | Α     | 399                    |
| · plane with single-side screen earthing or cross screen earthing  Maximum permissible conductor temperature · Continious · in emergency operation · at short circuit  Operating temperature range Minimum bending radius by laying Rated outer diameter of the cable (for reference) **  Cable weight (approximate)  Rated factory cable length and gross weight of the delivery on the drums ***  A 416  416  416  416  416  416  416  416   |  |       |                        |
| earthingMaximum permissible conductor temperature• Continious° C+90• in emergency operation° C+130• at short circuit° C+250Operating temperature range° C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0  | <ul> <li>plane with double-side screen earthing</li> </ul>                   | Α     | 379                    |
| Maximum permissible conductor temperature°C+90• Continious°C+90• in emergency operation°C+130• at short circuit°C+250Operating temperature range°C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the deliverym, t# 22УД-60: 499 • 3.0on the drums ****# 25УД-90: 1028 • 5.9   | <ul> <li>plane with single-side screen earthing or cross screen</li> </ul>   | Α     | 416                    |
| · Continious° C+90• in emergency operation° C+130• at short circuit° C+250Operating temperature range° C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0   |  |       |                        |
| • in emergency operation° C+130• at short circuit° C+250Operating temperature range° C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0   | Maximum permissible conductor temperature                                    |       |                        |
| • at short circuit° C+250Operating temperature range° C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery on the drums ***m, t# 22УД-60: 499 • 3.0   | Continious   |       |                        |
| Operating temperature range°C-60 +50Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0  | in emergency operation   |       |                        |
| Minimum bending radius by layingmm880Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0# 25УД-90: 1028 • 5.9   | at short circuit   |       |                        |
| Rated outer diameter of the cable (for reference) **mm55Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0# 25УД-90: 1028 • 5.9  | · · · · · · · · · · · · · · · · · · ·  | °C    |                        |
| Cable weight (approximate)kg/km4230Rated factory cable length and gross weight of the delivery<br>on the drums ***m, t# 22УД-60: 499 • 3.0# 25УД-90: 1028 • 5.9  |  | mm    | 880                    |
| Rated factory cable length and gross weight of the delivery m, t # 22УД-60: 499 • 3.0 on the drums *** # 25УД-90: 1028 • 5.9   | Rated outer diameter of the cable (for reference) **                         | mm    | 55                     |
| on the drums *** # 25УД-90: 1028 • 5.9   |  | kg/km | 4230                   |
| •  | ,                                      | m, t  | • •                    |
| # 26УД-100: 1404 • 7.8   | on the drums ***   |       | • •                    |
|  |  |       | # 26УД-100: 1404 • 7.8 |

#### Notes:

When ordering it is neccesary to agree the factory length of the product with the manufacturer

<sup>\*</sup> Long permissible current loads are calculated for the following conditions: conductor temperature 90 °C, air temperature 30 °C, soil temperature 20 °C, load factor 1.0, thermal resistivity of soil 1.0 °K•m/W, laying depth in the ground 1.5 m, while laying in flat formation the distance between cables in clear is equal to the cable diameter, while laying in trefoil formation cables are laid side by side

<sup>\*\*</sup> The external diameter may differ from the rated up to  $\pm$  10 %

<sup>\*\*\*</sup> Отклонение фактической массы брутто от указанного значения может составлять ± 7 %



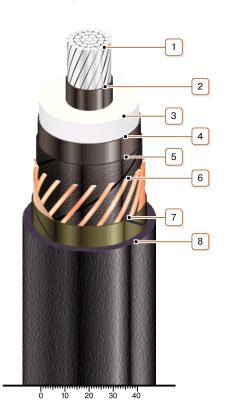




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Power cables with aluminium cunductor, flame-retardant, with XLPE, longitudinal screen sealing and polymer compound outer sheath



### **CONSTRUCTION**

1. Aluminium multiwire compacted conductor

Note: It is possible to manufacture cable with sealed conductor.

- 2. Inner extruded semiconducting layer
- 3. XLPE insulation
- 4. Outer extruded semiconducting layer
- 5. Lapping layer of semiconductive swellable tape
- 6. Copper screen

Note: It is possible to manufacture a cable with a fiber optic module built into the screen, including as a DTS system sensor

- 7. Lapping layer of glass tape
- 8. Flame-retardant polymer compound outer sheath

Note: It is possible to manufacture cable with extruded semiconductor layer along outer sheath