

Cable type

PANZERFLEX-L 0.6/1 kV

(N)SHTÖU-J / -0 rubber cables suitable for reeling & festoon system

Main application

Flexible power cables for use on connecting movable parts of machine tools and any material handling equipment (i.e. Stacker/reclaimer, ship to shore crane, container crane festoon, grabtype ship unloading, gantry festoons, timber crane festoons, etc.).

Suitable for any energy supply on cable reels and festoon systems associated to high mechanical stresses, frequent bending/torsional operation and fast movement with strong acceleration.

Construction

| | |
|--------------------------|---|
| Conductor: | Tinned copper conductor, flexible cl.5 IEC 60228 Specially designed for mobile application |
| Insulation: | HEPR compound better than 3GI3 New specially developed crushproof compound with improved electrical and mechanical characteristics |
| Cores identification: | Colours according to according to DIN VDE 0293 part 308 / HD 308 S2 Standard colours: - 1 core: black - 3+3 cores: brown, black, grey + 3 green/yellow - 4 cores: green/yellow, brown, black, grey - 5 cores: green/yellow, blue, brown, black, grey |
| Laying-up: | Short lay length for better flexibility ≤7,5 times the laying-up cores diameter |
| Separation (if any): | Tape(s) |
| Inner sheath: | Polychloroprene rubber based compound Better than GM1b |
| Antitwisting protection: | Synthetic yarns Firmly bonded between inner and outer sheath |
| Outer sheath: | Black polychloroprene rubber compound UV resistant oil and chemical resistant better than 5GM2 |
| Marking: | PALAZZO - PANZERFLEX-L 0,6/1 kV <i>nc</i> x cross section |

Parameters

| | | |
|------------|--|---|
| Electrical | Rated voltage | U ₀ /U= 0,6/1 kV |
| | Maximum permissible operating voltage in AC systems | U _m = 1,2 kV |
| | AC test voltage over 5 minutes | 3,5 kV |
| | Current Carrying Capacity | According to DIN VDE 0298 part 4 |
| Thermal | Fully flexible operation | - 25 °C |
| | Fixed installation | - 40 °C |
| | Maximum permissible operating temperature of the conductor | 90 °C |
| | Short-circuit temperature of the conductor | 250 °C |
| Mechanical | Tensile load | Up to 20 N/mm ² |
| | Minimum bending radii | According to DIN VDE 0298 part 3 |
| | Reeling operation | No restriction. Consult the manufacturer if speed exceeds 180 m/min |
| | Festoon systems | Up to 240 m/min |
| Chemical | Resistance to oil | According to VDE / IEC standard |
| | Weather resistance | Unrestricted use outdoor and indoor, UV resistant, moisture resistant. |

If the environment reaches - 40 °C, Palazzo can provide a special version of this cable (differentiated from the standard one by the "-K" add to the code name), which is constructed with a special rubber compound that can face this condition.

For temperature down to - 40°C we suggest to use the Panzerflex®-K. To allow this cable operating at - 40°C we use an outer-sheath compound that is less resistant to abrasion and tear so please contact our sales department for more information regarding application.

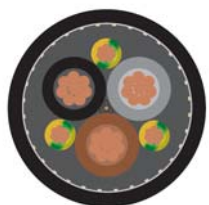


Table 1: PANZERFLEX-L 0.6/1 kV (N)SHTÖU-J /-O power cables

| N. of cores and nominal section (n-mm ²) | Main conductor | | Splitted protec. earth cond. nom. diam. mm | Overall diameter | | Net weight approx. kg/km | Maximum permissible tensile force N | Laid straight A | Current carrying capacity at 30 °C * | | | | Short circuit current 80 ° to 200 °C kA |
|--|------------------------------|---------------|--|------------------|---------|--------------------------|-------------------------------------|-----------------|--------------------------------------|---------------------|-----------|-----------|---|
| | D.C. resist. at 20 °C Ohm/km | nom. diam. mm | | min. mm | max. mm | | | | Suspended in free air A | Spiral or 1 layer A | 2 layer A | 3 layer A | |
| 1x16 | 1,24 | 5,4 | | 10,6 | 12,7 | 265 | 320 | 141 | 148 | - | - | - | 2,0 |
| 1x25 | 0,795 | 6,6 | | 12,2 | 14,3 | 370 | 500 | 187 | 196 | - | - | - | 3,2 |
| 1x35 | 0,565 | 8,0 | | 13,9 | 15,9 | 505 | 700 | 231 | 243 | - | - | - | 4,5 |
| 1x50 | 0,393 | 9,3 | | 15,6 | 17,7 | 650 | 1000 | 288 | 302 | - | - | - | 6,4 |
| 1x70 | 0,277 | 11,2 | | 17,6 | 19,7 | 875 | 1400 | 357 | 375 | - | - | - | 9,0 |
| 1x95 | 0,210 | 13,0 | | 20,0 | 22,1 | 1120 | 1900 | 430 | 452 | - | - | - | 12,2 |
| 1x120 | 0,164 | 15,0 | | 22,2 | 24,3 | 1440 | 2400 | 503 | 528 | - | - | - | 15,4 |
| 1x150 | 0,132 | 16,9 | | 24,9 | 27,0 | 1730 | 3000 | 577 | 606 | - | - | - | 19,2 |
| 1x185 | 0,108 | 18,3 | | 26,7 | 28,8 | 2070 | 3700 | 658 | 691 | - | - | - | 23,7 |
| 1x240 | 0,0817 | 20,5 | | 29,0 | 32,2 | 2660 | 4800 | 771 | 810 | - | - | - | 30,7 |
| 3x4 | 5,09 | 2,4 | | 14,9 | 17,0 | 395 | 240 | 41 | 43 | 33 | 25 | 20 | 0,51 |
| 3x6 | 3,39 | 3,1 | | 17,2 | 19,3 | 525 | 360 | 53 | 56 | 42 | 32 | 26 | 0,77 |
| 3x10 | 1,95 | 4,2 | | 20,3 | 22,4 | 765 | 600 | 74 | 78 | 59 | 45 | 36 | 1,3 |
| 3x16 | 1,24 | 5,4 | | 23,6 | 25,7 | 1080 | 960 | 99 | 104 | 79 | 60 | 49 | 2,0 |
| 3x25 | 0,795 | 6,6 | | 27,0 | 29,1 | 1470 | 1500 | 131 | 138 | 105 | 80 | 64 | 3,2 |
| 3x35 | 0,565 | 8,0 | | 30,4 | 33,6 | 2030 | 2100 | 162 | 170 | 130 | 99 | 79 | 4,5 |
| 3x50 | 0,393 | 9,3 | | 35,4 | 38,6 | 2680 | 3000 | 202 | 212 | 162 | 123 | 99 | 6,4 |
| 3x70 | 0,277 | 11,2 | | 39,6 | 42,8 | 3530 | 4200 | 250 | 263 | 200 | 153 | 123 | 9,0 |
| 3x95 | 0,210 | 13,0 | | 43,8 | 47,0 | 4400 | 5700 | 301 | 316 | 241 | 184 | 147 | 12,2 |
| 3x120 | 0,164 | 15,0 | | 49,0 | 53,5 | 5730 | 7200 | 352 | 370 | 282 | 215 | 172 | 15,4 |
| 3x150 | 0,132 | 16,9 | | 55,5 | 60,0 | 7040 | 9000 | 404 | 424 | 323 | 246 | 198 | 19,2 |
| 3x185 | 0,108 | 18,3 | | 59,5 | 64,0 | 8320 | 11100 | 461 | 484 | 369 | 281 | 226 | 23,7 |
| 3x240 | 0,0817 | 20,5 | | 67,5 | 72,0 | 10850 | 14400 | 540 | 567 | 432 | 329 | 265 | 30,7 |
| 4x4 | 5,09 | 2,4 | | 16,0 | 18,1 | 460 | 320 | 41 | 43 | 33 | 25 | 20 | 0,51 |
| 4x6 | 3,39 | 3,1 | | 18,4 | 20,5 | 615 | 480 | 53 | 56 | 42 | 32 | 26 | 0,77 |
| 4x10 | 1,95 | 4,2 | | 21,9 | 24,0 | 920 | 800 | 74 | 78 | 59 | 45 | 36 | 1,3 |
| 4x16 | 1,24 | 5,4 | | 25,5 | 27,6 | 1310 | 1280 | 99 | 104 | 79 | 60 | 49 | 2,0 |
| 4x25 | 0,795 | 6,6 | | 29,6 | 32,8 | 1860 | 2000 | 131 | 138 | 105 | 80 | 64 | 3,2 |
| 4x35 | 0,565 | 8,0 | | 33,2 | 36,4 | 2490 | 2800 | 162 | 170 | 130 | 99 | 79 | 4,5 |
| 4x50 | 0,393 | 9,3 | | 38,4 | 41,6 | 3300 | 4000 | 202 | 212 | 162 | 123 | 99 | 6,4 |
| 4x70 | 0,277 | 11,2 | | 43,6 | 46,8 | 4420 | 5600 | 250 | 263 | 200 | 153 | 123 | 9,0 |
| 4x95 | 0,210 | 13,0 | | 48,5 | 53,0 | 5610 | 7600 | 301 | 316 | 241 | 184 | 147 | 12,2 |
| 4x120 | 0,164 | 15,0 | | 55,5 | 60,0 | 7360 | 9600 | 352 | 370 | 282 | 215 | 172 | 15,4 |
| 4x150 | 0,132 | 16,9 | | 61,0 | 65,5 | 8770 | 12000 | 404 | 424 | 323 | 246 | 198 | 19,2 |
| 4x185 | 0,108 | 18,3 | | 67,5 | 72,0 | 10730 | 14800 | 461 | 484 | 369 | 281 | 226 | 23,7 |
| 4x240 | 0,0817 | 20,5 | | 74,0 | 78,5 | 13560 | 19200 | 540 | 567 | 432 | 329 | 265 | 30,7 |
| 5x4 | 5,09 | 2,4 | | 18,0 | 20,1 | 575 | 400 | 41 | 43 | 33 | 25 | 20 | 0,51 |
| 5x6 | 3,39 | 3,1 | | 19,8 | 21,9 | 725 | 600 | 53 | 56 | 42 | 32 | 26 | 0,77 |
| 5x10 | 1,95 | 4,2 | | 24,5 | 26,6 | 1140 | 1000 | 74 | 78 | 59 | 45 | 36 | 1,3 |
| 5x16 | 1,24 | 5,4 | | 27,6 | 29,7 | 1550 | 1600 | 99 | 104 | 79 | 60 | 49 | 2,0 |
| 5x25 | 0,795 | 6,6 | | 32,2 | 35,4 | 2170 | 2500 | 131 | 138 | 105 | 80 | 64 | 3,2 |
| 5x35 | 0,565 | 8,0 | | 37,0 | 40,2 | 3080 | 3500 | 162 | 170 | 130 | 99 | 79 | 4,5 |
| 5x50 | 0,393 | 9,3 | | 42,2 | 45,4 | 4010 | 5000 | 202 | 212 | 162 | 123 | 99 | 6,4 |
| 5x70 | 0,277 | 11,2 | | 48,0 | 52,5 | 5480 | 7000 | 250 | 263 | 200 | 153 | 123 | 9,0 |
| 5x95 | 0,210 | 13,0 | | 54,5 | 59,0 | 7010 | 9500 | 301 | 316 | 241 | 184 | 147 | 12,2 |
| 3x50+3x25/3 | 0,393 | 9,3 | 4,0 | 34,2 | 37,4 | 2730 | 3000 | 202 | 212 | 162 | 123 | 99 | 6,4 |
| 3x70+3x35/3 | 0,277 | 11,2 | 4,9 | 39,6 | 42,8 | 3740 | 4200 | 250 | 263 | 200 | 153 | 123 | 9,0 |
| 3x95+3x50/3 | 0,210 | 13,0 | 5,4 | 43,8 | 47,0 | 4690 | 5700 | 301 | 316 | 241 | 184 | 147 | 12,2 |
| 3x120+3x70/3 | 0,164 | 15,0 | 6,6 | 49,5 | 54,0 | 6220 | 7200 | 352 | 370 | 282 | 215 | 172 | 15,4 |
| 3x150+3x70/3 | 0,132 | 16,9 | 6,6 | 55,5 | 60,0 | 7480 | 9000 | 404 | 424 | 323 | 246 | 198 | 19,2 |
| 3x185+3x95/3 | 0,108 | 18,3 | 8,0 | 59,5 | 64,0 | 9020 | 11100 | 461 | 484 | 369 | 281 | 226 | 23,7 |
| 3x240+3x120/3 | 0,0817 | 20,5 | 9,3 | 67,5 | 72,0 | 11760 | 14400 | 540 | 567 | 432 | 329 | 265 | 30,7 |
| 4x10+4x2.5 | 1,95 | 4,2 | | 23,2 | 25,3 | 1060 | 80 | 74 | 78 | 59 | 45 | 36 | 1,3 |
| 4x16+4x2.5 | 1,24 | 5,4 | | 25,5 | 27,6 | 1360 | 1280 | 99 | 104 | 79 | 60 | 4 | 2,0 |
| 4x25+4x2.5 | 0,795 | 6,6 | | 29,6 | 32,8 | 1910 | 2000 | 131 | 138 | 105 | 80 | 64 | 3,2 |
| 4x35+4x2.5 | 0,565 | 8,0 | | 32,8 | 36,0 | 2530 | 2800 | 162 | 170 | 130 | 99 | 79 | 4,5 |
| 4x50+4x4 | 0,393 | 9,3 | | 38,0 | 41,2 | 3370 | 4000 | 202 | 212 | 162 | 123 | 99 | 6,4 |

*Tabulated values are valid up to three loaded conductors with or without earth

Control cables in line with **VDE 0250 part. 814**

Cable type

PANZERFLEX-L 0,6/1 kV
(N)SHTÖU-JZ / -OZ rubber cables suitable for reeling & festoon system

Main application

Flexible control cables for use on connecting movable parts of machine tools and any material handling equipment (i.e. Stacker/reclaimer, ship to shore crane, container crane, festoon, grabtype ship unloading, gantry festoons, timber crane festoons, etc.).

Suitable for signaling supply on cable reels and festoon systems associated to high mechanical stresses, frequent bending/torsional operation and fast movement with strong acceleration.

Construction

| | |
|---------------------------------|---|
| Conductor: | Tinned copper conductor, flexible cl. 5 IEC 60228 Specially designed for mobile application |
| Insulation: | HEPR compound better than 3GI3 New specially developed crushproof compound with improved electrical and mechanical characteristics |
| Cores identification: | Black with printed numbers with or without 1 green/yellow Standard: with green/yellow core in the outer layer |
| Laying-up: | Short lay length for better flexibility ≤7,5 times the laying-up cores diameter in maximum 3 layers |
| Separation (if any): | Tape(s) |
| Inner sheath: | Polychloroprene rubber based compound Better than GM1b |
| Antitwisting protection: | Synthetic yarns Firmly bonded between inner and outer sheath |
| Outer sheath: | Black polychloroprene rubber compound UV resistant, oil and chemical resistant better than 5GM2 |
| Marking: | PALAZZO - PANZERFLEX-L 0,6/1 kV <i>nc x cross section</i> |

Parameters

| | | |
|-------------------|--|---|
| Electrical | Rated voltage | U ₀ /U = 0,6/1 kV |
| | Maximum permissible operating voltage in AC systems | U _m = 1,2 kV |
| | AC test voltage over 5 minutes | 3,5 kV |
| | Current Carrying Capacity | According to DIN VDE 0298 part 4 |
| Thermal | Fully flexible operation | - 25 °C |
| | Fixed installation | - 40 °C |
| | Maximum permissible operating temperature of the conductor | 90 °C |
| | Short-circuit temperature of the conductor | 250 °C |
| Mechanical | Tensile load | Up to 15 N/mm ² |
| | Minimum bending radii | According to DIN VDE 0298 part 3 |
| | Reeling operation | No restriction. |
| | | Consult the manufacturer if speed exceeds 180 m/min |
| | Festoon systems | Up to 240 m/min |
| Chemical | Resistance to oil | According to VDE / IEC standard |
| | Weather resistance | Unrestricted use outdoor and indoor, UV resistant, moisture resistant. |

If the environment reaches - 40 °C, Palazzo can provide a special version of this cable (differentiated from the standard one by the "-K" add to the code name), which is constructed with a special rubber compound that can face this condition.

For temperature down to - 40 °C we suggest to use the Panzerflex-K. To allow this cable operating at - 40 °C we use an outer-sheath compound that is less resistant to abrasion and tear so please contact our sales department for more information regarding application.



Control cables in line with **VDE 0250 part. 814**

Table 1: PANZERFLEX-L 0,6/1 kV (N)SHTÖU-JZ /-OZ control cables

| N. of cores and nominal section (n·mm ²) | Conductor | | Overall diameter | | Net weight approx. kg/km | Maximum permissible tensile force N | Current carrying capacity at 30 °C* | | | | | Short circuit current 80 ° to 200 °C kA·1 sec. |
|--|------------------------------|---------------|------------------|---------|--------------------------|-------------------------------------|-------------------------------------|-------------------------|---------------------|------------|------------|--|
| | D.C. resist. at 20 °C Ohm/km | nom. diam. mm | min. mm | max. mm | | | Laid straight A | Suspended in free air A | Spiral or 1 layer A | 2 layers A | 3 layers A | |
| 3x1,5 | 13,7 | 1,5 | 12,4 | 14,5 | 255 | 68 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 4x1,5 | 13,7 | 1,5 | 13,1 | 15,2 | 285 | 90 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 5x1,5 | 13,7 | 1,5 | 14,0 | 16,0 | 320 | 113 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 7x1,5 | 13,7 | 1,5 | 15,8 | 17,9 | 415 | 158 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 12x1,5 | 13,7 | 1,5 | 19,1 | 21,2 | 585 | 270 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 18x1,5 | 13,7 | 1,5 | 21,6 | 23,7 | 765 | 405 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 24x1,5 | 13,7 | 1,5 | 25,6 | 27,6 | 1.040 | 540 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 30x1,5 | 13,7 | 1,5 | 26,6 | 28,7 | 1.140 | 675 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 36x1,5 | 13,7 | 1,5 | 28,6 | 31,8 | 1.370 | 810 | 23 | 24 | 18 | 14 | 11 | 0,19 |
| 3x2,5 | 8,21 | 2,0 | 13,4 | 15,5 | 310 | 113 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 4x2,5 | 8,21 | 2,0 | 14,3 | 16,3 | 355 | 150 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 5x2,5 | 8,21 | 2,0 | 15,2 | 17,3 | 410 | 188 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 7x2,5 | 8,21 | 2,0 | 18,1 | 20,2 | 570 | 263 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 12x2,5 | 8,21 | 2,0 | 21,1 | 23,2 | 760 | 450 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 18x2,5 | 8,21 | 2,0 | 24,7 | 26,8 | 1.070 | 675 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 24x2,5 | 8,21 | 2,0 | 28,6 | 31,8 | 1.450 | 900 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 30x2,5 | 8,21 | 2,0 | 30,0 | 33,0 | 1.600 | 1.125 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 36x2,5 | 8,21 | 2,0 | 31,8 | 35,0 | 1.850 | 1.350 | 30 | 32 | 24 | 18 | 15 | 0,32 |
| 7x4 | 5,09 | 2,4 | 20,6 | 22,6 | 760 | 420 | 41 | 43 | 33 | 25 | 20 | 0,51 |
| 12x4 | 5,09 | 2,4 | 25,0 | 27,0 | 1.085 | 720 | 41 | 43 | 33 | 25 | 20 | 0,51 |
| 18x4 | 5,09 | 2,4 | 28,4 | 30,4 | 1.460 | 1.080 | 41 | 43 | 33 | 25 | 20 | 0,51 |

* Tabulated values are valid up to three loaded conductors with or without earth.

Derating factor shall be used for multicore cables depending on loaded conductors. See page 57.

The Tensile Load on control cables is calculated considering the limit of 15N/mm² instead of the standard 20N/mm².

This is due to the construction of these multi-core cables. For higher Tensile Load please consider to use our VS type as it is provided of a central Kevlar® strainer that allows much higher tensile load.