



PROTOLON (SMK)
(N)TSCGEWOEU
Medium Voltage Reeling Cable

ENERGY



Technical Data

	Type	PROTOLON (SMK)						
	Type designation	(N)TSCGEWOEU						
	Approvals/ standards	DIN VDE 0250, Part 813, MSHA P-189-4; GOST R						
	Application	Flexible H.V. flexible reeling cable, also suitable for festoon systems, for high to extreme mechanical stresses, e.g. high travel speeds, dynamic tensile loads, multiple changes of direction into different planes, churning on running over rollers and torsional stresses. Mainly for mobile equipment, e.g. fast-moving container cranes, cranes, large mobile equipment and excavators. Also for application to which DIN VDE 0168 and 0118 apply: Open-cast and underground mining.						
Electrical parameters	Rated voltage (U ₀ /U)	1,8/3	3,6/6	6/10	8,7/15	12/20	14/25	18/30
	Maximum permissible operating voltage in AC systems (U ₀ /U)	2,1/3,6	4,2/7,2	6,9/12	10,4/18	13,9/24	17,3/30	20,8/36
	Maximum permissible operating voltage in DC systems (U ₀ /U)	2,7/5,4	5,4/10,8	9/18	13,5/27	18/36	22,5/45	27/54
	AC test voltage	6,0	11,0	17,0	24,0	29,0	36,0	43,0
		according to DIN VDE 0250, Part 813						
	Current-carrying capacity	According to DIN VDE 0298, Part 4 Higher values are permissible in specific cases. Please consult the manufacturer.						
	Bus compatibility	A special cable design with fibre-optics can be found in the product range PROTOLON (SMK) LWL						
EMC	This design exhibits an extremely low interference level as a result of use of a symmetrical three-core design with very narrow manufacturing tolerances.							
Thermal parameters	Ambient temperature							
	- Fully flexible operation	-35°C to +80°C						
	- Fixed installation	-50°C to +80°C						
	Maximum permissible operating temperature of the conductor	90°C						
Short-circuit temperature of the conductor	250°C							

Technical Data

Mechanical parameters	dynamical tensile load at acceleration processes	up to 30 N/mm ² (acc. to DIN VDE 0298 part 3: 15 N/mm ²)
	max. permanent tensile load	up to 20 N/mm ²
	Torsional stresses	+/- 25°/m
	Minimum bending radii	According to DIN VDE 0298, Part 3
	Minimum distance with S-type directional changes	20xD (cable diameter)
	Travel speed - Gantry (reeling operation)	No restriction. For speeds beyond 240 m/min it is recommended to consult the cable manufacturer
	Additional tests	Reversed bending test, torsional stress test
Chemical parameters	Resistance to oil	DIN VDE 0473, Part 811-2-1 Para. 10
	Weather resistance	Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture
	Water compatibility	According to HD 2216



Design features

Type	PROTOLON (SMK)
Conductor and earth conductor (refer also to DIN VDE 0295)	Electrolytic copper tinned, very finely stranded, class FS
Insulation (refer also to DIN VDE 0207, Part 20)	PROTOLON HS High grade special compound based on high-quality EPR (at least 3GI3); improved mechanical and electrical characteristics
Field control	For designs from 3 to 30 kV: inner semiconductive layer of EPR, outer semiconductive layer of modified NBR, capable of being stripped when cold and thus extremely easy to prepare (Easy Strip design)
Core identification	From 3.6/6 kV: natural coloured insulation with black semiconductive layer
Core arrangement	Laid-up with length of lay $7 \times D$ (core diameter), three-core diameter, earth conductor split into 3 parts
Sheath system	<ul style="list-style-type: none"> - PROTOFIRM Sandwich: double layer inner sheath Special compound based on EPR, quality at least 5GM3, also served as water barrier, color: red - Anti-torsion braid: reinforced braid made of polyester threads, in a vulcanized bond between the sheaths. Resulting in high strength of the sheath system. - PROTOFIRM Sandwich: double layer outer sheath A sheath system with a unique combination of flexibility and robustness has been achieved through the use of a new sandwich structure. Abrasion and tear-proof high grade rubber compounds based on PCP, quality at least 5GM5 colour: bright red/red
Marking	PROTOLON (SMK) (N)TSCGEW0EU (number of cores)x(cross-section) (rated voltage) (year of manufacture) (serial number)

Selection and ordering data

Number of cores and nominal cross-section	Order No.	Power-/Earth conductor diameter (guidance value) [mm]	Overall diameter of cable Min. value (guidance value) [mm]	Overall diameter of cable Max. value (guidance value) [mm]	Approx. net weight for 1000 m [kg/km]	Maximum permissible tensile force (dyn. value) [N]
0,6/1 kV (N)TSW0EU=(N)SHT0EU						
3x70+3x35/3	5DH3 123	12,0/5,0	39,7	42,7	3920	6300
3x95+3x50/3	5DH3 124	14,0/6,0	44,3	47,3	5020	8550
3x120+3x70/3	5DH3 125	15,8/7,2	51,0	55,0	6630	10800
3x150+3x70/3	5DH3 126	17,5/7,2	53,9	57,9	7690	13500
3x185+3x95/3	5DH3 127	19,7/8,1	58,9	62,9	9310	16650
3x240+3x120/3	5DH3 128	22,5/9,3	67,4	71,4	12200	21600
1,8/3 kV (N)TSCGEW0EU						
3x25+3x25/3	5DK2 101	7,1/4,2	40,4	43,4	2680	1500 (2250)
3x35+3x25/3	5DK2 102	8,3/4,2	43,0	46,0	3150	2100 (3150)
3x50+3x25/3	5DK2 103	9,9/4,2	46,4	49,4	3840	3000 (4500)
3x70+3x35/3	5DK2 104	11,8/5,0	45,9	48,9	4240	4200 (6300)
3x95+3x50/3	5DK2 105	13,8/5,9	58,5	62,5	6490	5700 (8550)
3x120+3x70/3	5DK2 106	15,4/7,0	63,8	67,8	8010	7200 (10800)
3x150+3x70/3	5DK2 107	17,2/7,0	67,7	71,7	9240	9000 (13500)
3x185+3x95/3	5DK2 108	19,0/8,0	71,6	75,6	10750	11100 (16650)
3x240+3x120/3	5DK2 110	21,8/9,0	79,4	83,4	13640	14400 (21600)
3x300+3x150/3	5DK2 111	24,4/10,0	84,7	89,7	16230	18000 (27000)
3,6/6 kV (N)TSCGEW0EU						
3x25+3x25/3	5DK3 101	7,1/4,2	36,1	39,1	2190	1500 (2250)
3x35+3x25/3	5DK3 102	8,3/4,2	39,6	42,6	2710	2100 (3150)
3x50+3x25/3	5DK3 103	9,9/4,2	42,4	45,4	3360	3000 (4500)
3x70+3x35/3	5DK3 104	11,8/5,0	46,4	49,4	4290	4200 (6300)
3x95+3x50/3	5DK3 105	13,8/5,9	51,4	55,5	5520	5700 (8550)
3x120+3x70/3	5DK3 106	15,4/7,0	55,0	59,0	6680	7200 (10800)
3x150+3x70/3	5DK3 107	17,2/7,0	58,8	62,8	7830	9000 (13500)
3x185+3x95/3	5DK3 108	19,0/8,0	65,1	69,1	9480	11100 (16650)
3x240+3x120/3	5DK3 110	21,8/9,0	72,5	76,5	12120	14400 (21600)
3x300+3x150/3	5DK3 111	24,4/10,0	78,2	82,2	14580	18000 (27000)
6/10 kV (N)TSCGEW0EU						
3x25+3x25/3	5DK4 061	7,1/4,2	37,8	40,8	2410	1500 (2250)
3x35+3x25/3	5DK4 062	8,3/4,2	40,9	43,9	2880	2100 (3150)
3x35+3x35/3	5DK4 072	8,3/5,0	40,9	43,9	2880	2100
3x50+3x25/3	5DK4 063	9,9/4,2	43,7	46,7	3480	3000 (4500)
3x70+3x50/3	5DK4 074	11,8/5,9	47,7	50,7	4570	4200 (6300)
3x95+3x50/3	5DK4 065	13,8/5,9	52,8	56,8	5710	5700 (8550)
3x120+3x70/3	5DK4 066	15,4/7,0	56,2	60,2	6830	7200 (10800)
3x150+3x70/3	5DK4 067	17,2/7,0	61,5	65,5	8180	9000 (13500)
3x185+3x95/3	5DK4 068	19,0/8,0	65,3	69,3	9660	11100 (16650)
3x240+3x120/3	5DK4070	21,8/9,0	73,8	77,8	12310	14400 (21600)
3x300+3x150/3	5DK4 071	24,4/10,0	79,5	83,5	14780	18000 (27000)

Selection and ordering data

Number of cores and nominal cross-section	Order No.	Power-/Earth conductor diameter (guidance value)	Overall diameter of cable Min. value (guidance value)	Overall diameter of cable Max. value (guidance value)	Approx. net weight for 1000 m	Maximum permissible tensile force (dyn. value)
		[mm]	[mm]	[mm]		
8,7/15 kV (N)TSCGEWOEU						
3x25+3x25/3	5DK5 061	7,1/4,2	41,1	44,1	2670	1500 (2250)
3x35+3x25/3	5DK5 062	8,3/4,2	43,7	46,7	3130	2100 (3150)
3x50+3x25/3	5DK5 063	9,9/4,2	47,1	50,1	3810	3000 (4500)
3x70+3x35/3	5DK5 064	11,8/5,0	52,0	56,0	4960	4200 (6300)
3x95+3x50/3	5DK5 065	13,8/5,9	57,2	61,2	6070	5700 (8550)
3x120+3x70/3	5DK5 066	15,4/7,0	62,1	66,1	7480	7200 (10800)
3x150+3x70/3	5DK5 067	17,2/7,0	65,9	69,9	8630	9000 (13500)
3x185+3x95/3	5DK5 068	19,0/8,0	69,8	73,8	10140	11100 (16650)
3x240+3x120/3	5DK5 070	21,8/9,0	77,3	81,3	12860	14400 (21600)
3x300+3x150/3	5DK5 071	24,4/10,0	84,2	89,2	15730	18000 (27000)
12/20 kV (N)TSCGEWOEU						
3x25+3x25/3	5DK5 521	7,1/4,2	44,1	47,1	2940	1500 (2250)
3x35+3x25/3	5DK5 522	8,3/4,2	46,6	49,6	3420	2100 (3150)
3x50+3x25/3	5DK5 523	9,9/4,2	51,8	55,8	4300	3000 (4500)
3x70+3x35/3	5DK5 524	11,8/5,0	55,9	59,9	5300	4200 (6300)
3x95+3x50/3	5DK5 525	13,8/5,9	59,2	63,2	6500	5700 (8550)
3x120+3x70/3	5DK5 526	15,4/7,0	65,1	69,1	7870	7200 (10800)
3x150+3x70/3	5DK5 527	17,2/7,0	69,0	73,0	9060	9000 (13500)
3x185+3x95/3	5DK5 528	19,0/8,0	74,3	78,3	10850	11100 (16650)
3x240+3x120/3	5DK5 530	21,8/9,0	80,3	84,3	13340	14400 (21600)
3x300+3x150/3	5DK5 532	24,4/10,0	87,2	92,2	16250	18000 (27000)
14/25 kV (N)TSCGEWOEU						
3x25+3x25/3	5DK6 101	7,1/4,2	49,6	53,6	3490	1500 (2250)
3x35+3x25/3	5DK6 102	8,3/4,2	52,2	56,2	3990	2100 (3150)
3x50+3x25/3	5DK6 103	9,9/4,2	55,7	59,7	4740	3000 (4500)
3x70+3x35/3	5DK6 104	11,8/5,0	61,2	65,2	5990	4200 (6300)
3x95+3x50/3	5DK6 105	13,8/5,9	65,5	69,5	7170	5700 (8550)
3x120+3x70/3	5DK6 106	15,4/7,0	69,0	73,0	8410	7200 (10800)
3x150+3x70/3	5DK6 107	17,2/7,0	74,3	78,3	9890	9000 (13500)
3x185+3x95/3	5DK6 108	19,0/8,0	78,2	82,2	11460	11100 (16650)
3x240+3x120/3	5DK6 111	21,8/9,0	85,5	90,5	14380	14400 (21600)
3x300+3x150/3	5DK6 112	24,4/10,0	91,1	96,1	16970	18000 (27000)
18/30 kV (N)TSCGEWOEU						
3x25+3x25/3	5DK6 561	7,1/4,2	53,1	57,1	3860	1500 (2250)
3x35+3x25/3	5DK6 562	8,3/4,2	55,7	59,7	4390	2100 (3150)
3x50+3x25/3	5DK6 563	9,9/4,2	59,1	63,1	5140	3000 (4500)
3x70+3x35/3	5DK6 564	11,8/5,0	64,7	68,7	6440	4200 (6300)
3x95+3x50/3	5DK6 565	13,8/5,9	69,0	73,0	7660	5700 (8550)
3x120+3x70/3	5DK6 566	15,4/7,0	73,8	77,8	9160	7200 (10800)
3x150+3x70/3	5DK6 567	17,2/7,0	77,7	81,7	10420	9000 (13500)
3x185+3x95/3	5DK6 568	19,0/8,0	81,6	85,6	12020	11100 (16650)
3x240+3x120/3	5DK6 570	21,8/9,0	89,0	94,0	15010	14400 (21600)
3x300+3x150/3	5DK6 571	24,4/10,0	95,6	100,6	17900	18000 (27000)

Special designs upon request!