PROTOLON(FL) (N)TSFLCGEWOEU

Medium voltage flat reeling cable

Application

Flexible medium voltage reeling cable for high mechanical stresses (e.g. dynamic tensile loads, multiple changes of direction within one plane, running over rollers). Mainly for mobile equipment, e.g. fast-moving container cranes, cranes, large mobile equipment and excavators.

Global data

Brand	PROTOLON(FL)
Type designation	(N)TSFLCGEWOEU
Standard	Based on DIN VDE 0250-813

Design features

Conductor	Electrolytic copper tinned, finely stranded, class F (refer also to DIN VDE 0295)
Insulation	PROTOLON Special compound based on high-quality EPR (at least 3GI3); improved mechanical and electrical characteristics
Electrical field control	Inner semiconductive layer of EPR, outer semiconductive layer of modified EPR, removable in warm condition
Core identification	Natural coloured insulation with black semiconductive layer
Core arrangement	Parallel core arrangement; earth conductor splitted and concentrically distributed around each core
Sheath system	PROTOFIRM Special compound based on CR, quality at least 5GM5, red colour
Marking	PROTOLON (FL) (N)TSFLCGEWOEU (number of cores)x(cross-section) (rated voltage) (year of manufacture) (serial number)

Electrical parameters

Rated voltage	3.6/6 kV	6/10 kV	8.7/15 kV
Max. permissible operating voltage AC	4.2/7.2 kV	6.9/12 kV	10.4/18 kV
Max. permissible operating voltage DC	5.4/10.8 kV	9/18 kV	13.5/27 kV
AC test voltage	11 kV	17 kV	24 kV
Data transmission	A special cable design with fibre-optics can be found in the product range PROTOLON (FL)-LWL		
Current Carrying Capacity description	According to DIN VDE 0298, Part 4 Higher values are permissible in specific cases (please consult the manufacturer).		

Chemical parameters

Resistance to oil	Acc. to DIN EN 60811-404 and DIN VDE 0473-811-404, paragraph 10
Weather resistance	Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture
Water resistance	According to HD 2216

Thermal parameters

Max. permissible temperature at conductor	90 °C
Max. short circuit temperature of the conductor	250 °C
Ambient temperature for fixed installation	min -50 °C ; max +80 °C
Ambient temperature in fully flexible operation	min -35 °C ; max +80 °C

Mechanical parameters

Max. tensile load on the conductor	15 N/mm²
Torsional stress	Not allowed
Min. bending radius	Acc. to DIN VDE 0298, Part 3. (Recommendation: applied cable diameter D = 1.5 x height of the flat cable)
Min. distance with S-type directional changes	20 x D (cable diameter)
Travel speed	- Gantry (reeling operation): up to 120 m/min
Additional tests	Reversed bending test, reeling test

Rated voltage 3.6/6 kV

Number of cores x cross section	Part number	MLFB Number	Conductor diameter max. mm	Min. Height (for flat cable) mm	Max. Height (for flat cable) mm	Min. Width (for flat cable) mm	Max. Width (for flat cable) mm	Bending radius free moving min. mm	Weight (ca.) kg/km	Permissible tensile force max. N	Conductor resistance at 20°C max. Ω/km	Current carrying capacity, reeled in 1 layer (3) A	Short Circuit Current (conductor) kA
3x25+3x25/3E		5DK3...	6.9	24.2	27.2	46.3	68.3	408	2730	1125	0.8	105	3.58
3x35+3x25/3E		5DK3...	8.3	24.7	27.7	65.8	69.8	416	3120	1575	0.57	130	5.01
3x50+3x25/3E	20090795	5DK3471	9.8	27.8	30	71.1	75.1	450	3860	2250	0.39	162	7.15
3x70+3x35/3E		5DK3...	11.4	28.9	31.9	76.8	80.8	479	4730	3150	0.28	200	10.01
3x95+3x50/3E	20008330	5DK3030	13.3	29.2	30.9	75.5	79.5	464	5280	4275	0.21	241	13.59
3x120+3x70/3E	20141934	5DK3454	15.1	35.4	37.4	92.3	97.3	561	7400	5400	0.16	282	17.16

(3) Nominal current carrying capacity for rubber cables reeled in 1 layer, at 30°C ambient temperature (see also technical appendixes).

Rated voltage 6/10 kV

Number of cores x cross section	Part number	MLFB Number	Conductor diameter max. mm	Min. Height (for flat cable) mm	Max. Height (for flat cable) mm	Min. Width (for flat cable) mm	Max. Width (for flat cable) mm	Bending radius free moving min. mm	Weight (ca.) kg/km	Permissible tensile force max. N	Conductor resistance at 20°C max. Ω/km	Current carrying capacity, reeled in 1 layer (3) A	Short Circuit Current (conductor) kA
3x25+3x25/3E	20135391	5DK4505	6.9	25	27.5	66.7	69.7	413	2860	1125	0.8	105	3.58
3x35+3x25/3E	20008722	5DK4508	8.3	25.5	28.5	68.2	72.2	428	3260	1575	0.57	130	5.01
4x35+4x25/4E	20154113	5DK4514	8.3	25.5	28.5	86.7	91.7	428	4110	2100	0.57	130	5.01
3x50+3x25/3E	20014334	5DK4509	9.8	28.1	31.1	74.6	78.6	467	4030	2250	0.39	162	7.15
3x70+3x35/3E	20040832	5DK4512	11.4	29.7	32.7	79.2	83.2	491	4850	3150	0.28	200	10.01
4x70+4x35/4E	20048375	5DK4513	11.4	29.5	32.5	100.9	105.9	488	6240	4200	0.28	200	10.01
3x95+3x50/3E		5DK4...	13.3	31.7	34.7	84.7	89.7	521	5920	4275	0.21	241	13.59
3x120+3x70/3E		5DK4...	15.1	35.1	38.1	92.9	97.9	572	7420	5400	0.16	282	17.16

(3) Nominal current carrying capacity for rubber cables reeled in 1 layer, at 30°C ambient temperature (see also technical appendixes).

Rated voltage 8.7/15 kV

Number of cores x cross section	Part number	MLFB Number	Conductor diameter max. mm	Min. Height (for flat cable) mm	Max. Height (for flat cable) mm	Min. Width (for flat cable) mm	Max. Width (for flat cable) mm	Bending radius free moving min. mm	Weight (ca.) kg/km	Permissible tensile force max. N	Conductor resistance at 20°C max. Ω/km	Current carrying capacity, reeled in 1 layer (3) A	Short Circuit Current (conductor) kA
3x25+3x25/3E	20168238	5DK5...	6.9	27.7	30.7	73.3	77.3	461	3390	1125	0.8	111	3.58
3x35+3x25/3E		5DK5...	8.3	28.7	31.7	76.2	80.2	476	3820	1575	0.57	138	5.01
3x50+3x25/E		5DK5...	9.8	30.2	33.2	80.7	84.7	498	4440	2250	0.39	172	7.15
3x70+3x35/3E		5DK5...	11.4	33.3	36.3	87.5	92.5	545	5610	3150	0.28	212	10.01
3x95+3x50/3E		5DK5...	13.3	35.3	38.3	93.5	98.5	575	6700	4275	0.21	255	13.59
3x120+3x70/3E		5DK5...	15.1	37.3	40.3	99.5	104.5	605	8000	5400	0.16	297	17.16

(3) Nominal current carrying capacity for rubber cables reeled in 1 layer, at 30°C ambient temperature (see also technical appendixes).