Prysmian Group

Rolling Stock Cables

Supplement to Prysmian Group General Catalogue (CEE Region)

PRYSMIAN

Draka

Rolling Stock Cables

Supplement to Prysmian Group General Catalogue (CEE Region)

Prysmian Group

Linking the Future

As the worldwide leader in the cable industry, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as a primary driver in the development of communities.

With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology.
Through two renowned commercial brands - Prysmian and Draka - based in almost 50 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

In our energy business, we design, produce, distribute and install cables and systems for the transmission and distribution of power at low, medium, high and extra-high voltage.

In telecoms, the Group is a leading manufacturer of all types of copper and fibre cables, systems and accessories - covering voice, video and data transmission.

Drawing on over 130 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do, meeting and exceeding the precise needs of our customers across all continents, at the same time shaping the evolution of our industry.

What links global expertise to the wheels of industry?

High-performing cable solutions to keep the wheels of industry turning

On every continent, in applications that range from commercial vessels to passengers ships and mega-yachts, workboats, tugs, icebreakers, specialized vessels (e.g. pipelaying ships) and military vessels, Prysmian's specialist cable solutions sit at the heart of significant international projects; supporting the work of major customers, with high-performing, durable and safe technology.

As the world leader in cabling, we draw on global expertise and local presence to work in close proximity with our customers, delivering products and service platforms built on easy contact, bespoke solutions and effective supply chain, meeting their specialised requirements, to help them drive the wheels of industry and achieve sustainable growth and profitability.

Rolling Stock Cables

Introduction

In the last few years, the development of rolling stock technology has been largely driven by the implementation of high speed train networks.

This development covers rolling stock for underground, mass transit lines and tramlines as well as diesel and regional trains.

The increasing need to reduce both volume and weight has lead to the development of miniaturised cables, as well as high temperature cables with enhanced performance.

This leads to highly stressed materials being used in the harsh environment of rolling stock.

Prysmian Group provides a full range of products from Medium Voltage to Instrumentation cables, and from High Temperature to Thin Wall designs.

The materials used have been specially developed to improve mechanical and thermal properties, fire performance and extended life using advanced technologies, such as electron beam irradiation, silan, steam and salt bath cross linking - whatever is best matching to the application.

Application

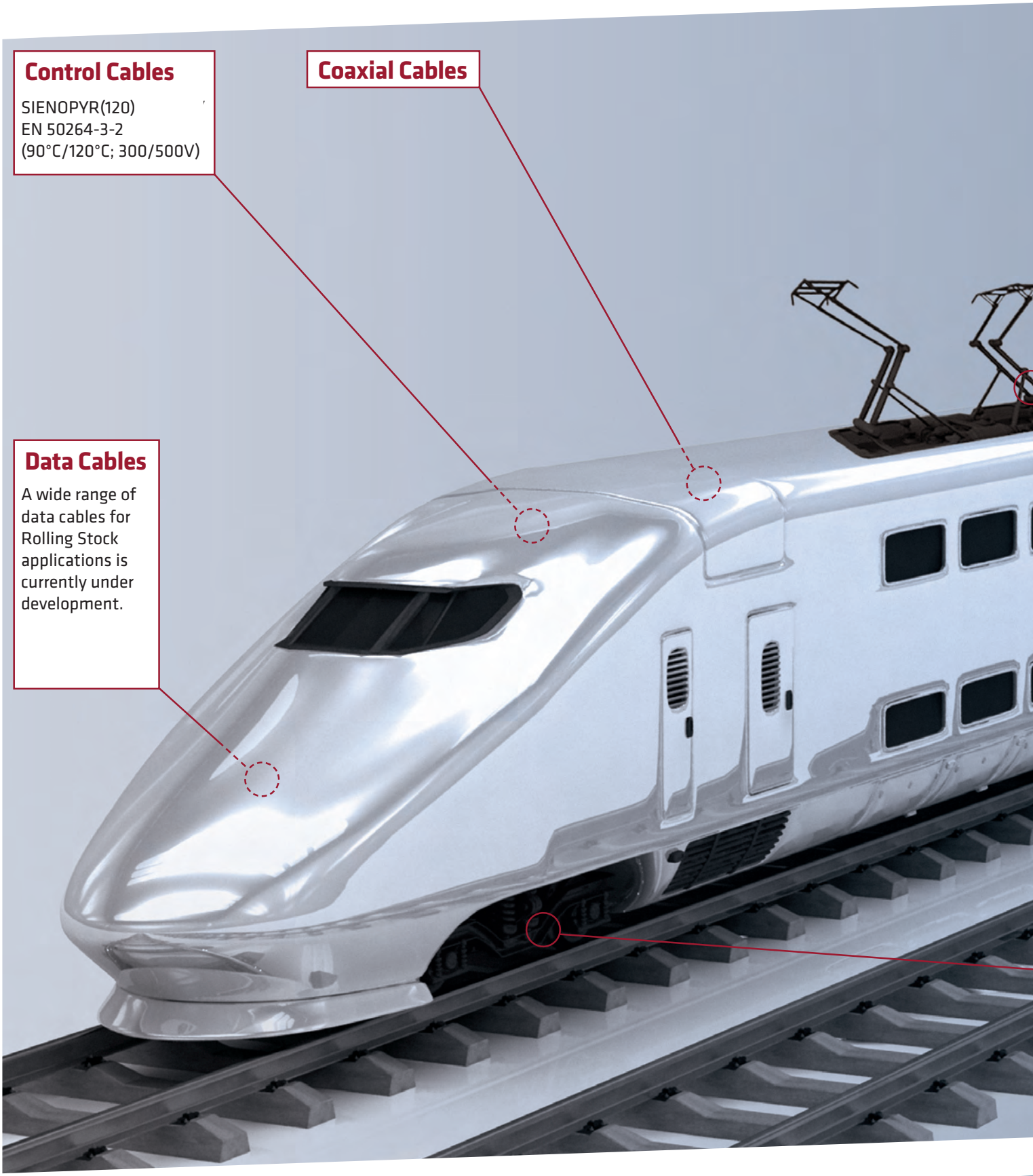
The railway industry is continuously evolving in terms of new market requirements: increasingly demanding customer expectations, fierce competition and rapid technological changes are the main drivers of the entire Rolling Stock supply chain.

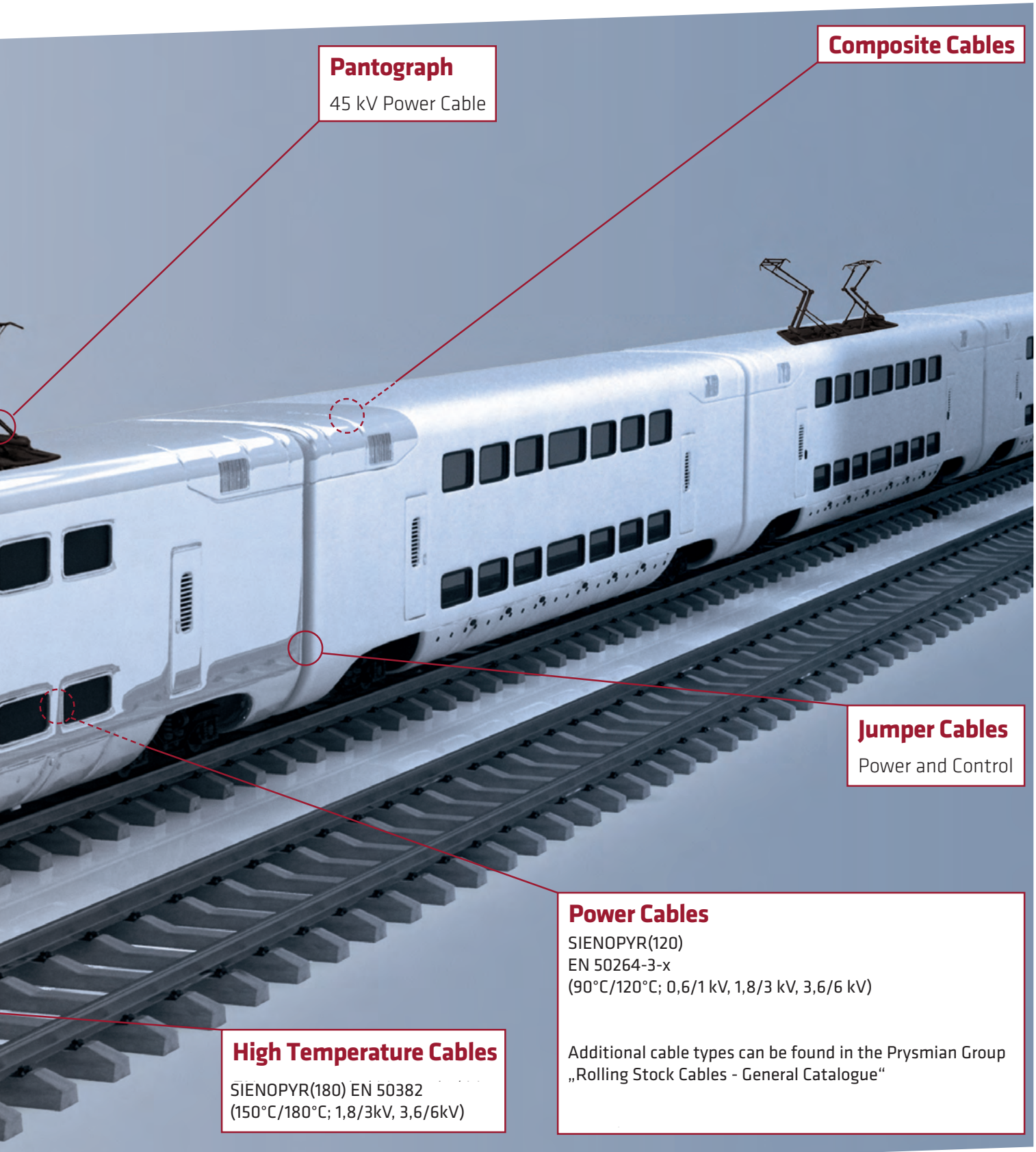
With the goal of maximizing passengers' comfort, operational efficiency, safety and speed, the train manufacturing industry is looking for new solutions in terms of both product and system development. The ever-growing challenge for train manufacturers is to meet all of the above-mentioned market needs.

Enhanced data and power transmission and advanced technology requirements, translate into an increased amount of cabling on the train. This has an impact on all types of rolling stock vehicles and carriages, especially on those for tramlines, underground and mass transit lines but also on diesel and regional trains.

To meet these requirements Prysmian Group, as the world leader in the energy and telecom cables and systems industry, is called to promote and drive product development and innovation, by minimizing the size and weight of cables and reducing the wall thickness of its insulation and outer sheath, yet maintaining or even enhancing performances.

Rolling Stock Cables




Pantograph
45 kV Power Cable
Composite Cables
Jumper Cables
Power and Control
Power Cables
SIENOPYR(120)
EN 50264-3-x
(90°C/120°C; 0,6/1 kV, 1,8/3 kV, 3,6/6 kV)
Additional cable types can be found in the Prysmian Group „Rolling Stock Cables - General Catalogue“
High Temperature Cables
SIENOPYR(180) EN 50382
(150°C/180°C; 1,8/3kV, 3,6/6kV)

Rolling Stock Cables

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Medium Wall Single Core Cables for Pantograph Connection

Rolling Stock Data Cables

Technical Annex

Rolling Stock Cables

MEDIUM WALL SINGLE CORE CABLES BASED ON EN50264

SIENOPYR(120) (N)HX4GAF (EN) 50264-3-1 600V MT

Power Cables 0.6/1kV

Application

Halogen-free single core cables, unsheathed,for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intented for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered.
Typical uses are lighting circuits powered by accumulators, equipment control and monitoring circuits, auxiliary and electric heating circuits.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	(N)HX4GAF (EN)50264-3-1 600V MT
Standard	Based on DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 109

Electrical parameters

Rated voltage	0.6/1 kV (600/1000V)
Max. permissible operating voltage AC	0.7/1.2 kV
Max. permissible operating voltage DC	0.9/1.8 kV
AC Test Voltage	3.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
0.5	5DB7 001	0.9	2.2	2.6	9.5	14	0.07
0.75	5DB7 002	1.1	2.4	2.8	12	16	0.11
1	5DB7 003	1.3	2.5	2.9	14	20	0.14
1.5	5DB7 004	1.5	2.8	3.2	19	25	0.21
2.5	5DB7 005	1.9	3.4	3.9	30	33	0.36
4	5DB7 006	2.4	3.8	4.3	44	46	0.57
6	5DB7 007	2.9	4.4	4.9	62	60	0.86
10	5DB7 008	3.9	5.4	6.1	100	85	1.43
16	5DB7 009	5.4	6.8	7.5	152	110	2.29
25	5DB7 010	6.3	8.2	8.9	240	150	3.58
35	5DB7 011	7.4	9.3	10.1	322	190	5.01
50	5DB7 012	8.9	11	12.2	463	240	7.15
70	5DB7 013	10.6	12.9	14.1	648	300	10
95	5DB7 014	12.1	14.3	15.8	839	360	13.6
120	5DB7 015	14.2	16.6	18.1	1095	425	17.2
150	5DB7 016	15.8	18.6	20.1	1341	490	21.5
185	5DB7 017	17.4	20.6	22.1	1641	560	26.5
240	5DB7 018	20.2	23.6	25.3	2161	675	34.3
300	5DB7 019	22.9	26.3	28.5	2691	775	42.9
400	5DB7 020	26.2	30.2	32.4	3550	950	57.2

Colours: codes to be added to part number: -1 BK black, -2 GNYE green/yellow, -3 BU blue, -4 GY gray, -5 WH white, -6 YE yellow, -7 RD red
Others available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) (N)HXSGAFHXOE EN50264-3-1 1800V FM

Power Cables 1.8/3kV

Application

Halogen-free single core cables, sheathed, for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	(N)HXSGAFHXOE EN50264-3-1 1800V FM
Standard	DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	1.8/3 kV
Max. permissible operating voltage AC	2.1/3.6 kV
Max. permissible operating voltage DC	2.7/5.4 kV
AC Test Voltage	6.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1.5	5DB7 501	1.5	5.5	6.4	48	25	0.21
2.5	5DB7 502	2	6	6.9	61	33	0.36
4	5DB7 503	2.4	6.4	7.3	78	46	0.57
6	5DB7 504	2.9	6.9	7.8	99	60	0.86
10	5DB7 505	3.9	8.3	9.2	150	85	1.43
16	5DB7 506	5.6	10.3	11.5	227	110	2.29
25	5DB7 507	6.7	12.4	13.6	342	150	3.58
35	5DB7 508	7.9	13.6	14.8	442	190	5.01
50	5DB7 509	9.4	15	16.5	587	240	7.15
70	5DB7 510	10.9	16.5	18	774	300	10
95	5DB7 511	12.6	19	20.5	1039	360	13.6
120	5DB7 512	14.3	20.7	22.2	1273	425	17.2
150	5DB7 513	16.2	23	24.5	1573	490	21.5
185	5DB7 514	17.6	24.5	26.9	1909	560	26.5
240	5DB7 515	20.8	27.7	30.1	2421	675	34.3
300	5DB7 516	23.1	30	32.4	2959	775	42.9
400	5DB7 517	26.8	34.1	37.7	3917	950	57.2

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) (N)HXSGAFCHXOE (EN)50264-3-1 1800V FM S

Screened Power Cables 1.8/3kV

Application

Halogen-free single core cables, screened and sheathed, for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage or frequency converter drives.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	(N)HXSGAFCHXOE (EN)50264-3-1 1800V FM S
Standard	Based on DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107
Screen	Braid of tinned copper wires
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	1.8/3 kV
Max. permissible operating voltage AC	2.1/3.6 kV
Max. permissible operating voltage DC	2.7/5.4 kV
AC Test Voltage	6.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1.5	5DB7 551	1.5	4.9	6.2	7.4	70	25	0.21
2.5	5DB7 552	2	5.4	6.7	7.9	84	33	0.36
4	5DB7 553	2.4	5.8	7.1	8.3	102	46	0.57
6	5DB7 554	2.9	6.3	7.6	8.8	128	60	0.86
10	5DB7 555	3.9	7.7	9	10.2	184	85	1.43
16	5DB7 556	5.6	10	11.2	12.7	288	110	2.29
25	5DB7 557	6.7	11.7	13.3	14.8	409	150	3.58
35	5DB7 558	7.9	12.9	14.5	16	514	190	5.01
50	5DB7 559	9.4	14.4	15.9	17.7	665	240	7.15
70	5DB7 560	10.9	16.1	17.6	19.4	868	300	10
95	5DB7 561	12.6	18.6	20.1	21.9	1169	360	13.6
120	5DB7 562	14.3	20.5	22	23.8	1409	425	17.2
150	5DB7 563	16.2	22.4	24.3	26.1	1716	490	21.5
185	5DB7 564	17.6	24.2	25.8	28.5	2062	560	26.5
240	5DB7 565	20.8	27.4	29	31.7	2585	675	34.3
300	5DB7 566	23.1	29.7	31.3	34	3134	775	42.9
400	5DB7 567	26.8	34	35.6	39.5	4105	950	57.2

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) (N)HXSGAFHXOE EN50264-3-1 3600V FM

Power Cables 3.6/6kV

Application

Halogen-free single core cables, sheathed, for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	(N)HXSGAFHXOE EN50264-3-1 3600V FM
Standard	DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	3.6/6 kV
Max. permissible operating voltage AC	4.2/7.2 kV
Max. permissible operating voltage DC	5.4/10.8 kV
AC Test Voltage	11 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2.5	5DB7 602	2	8.6	9.5	105	33	0.36
4	5DB7 603	2.4	9	9.9	125	46	0.57
6	5DB7 604	2.9	9.5	10.4	149	60	0.86
10	5DB7 605	3.9	10.4	11.6	198	85	1.43
16	5DB7 606	5.6	12.5	13.7	285	110	2.29
25	5DB7 607	6.7	14.6	15.8	411	150	3.58
35	5DB7 608	7.9	15.7	17.2	517	190	5.01
50	5DB7 609	9.4	17.2	18.7	669	240	7.15
70	5DB7 610	10.9	18.7	20.2	863	300	10
95	5DB7 611	12.6	20.4	21.9	1103	360	13.6
120	5DB7 612	14.3	22.5	24	1363	425	17.2
150	5DB7 613	16.2	24.4	25.9	1649	490	21.5
185	5DB7 614	17.6	26.1	28.5	2003	560	26.5
240	5DB7 615	20.8	30.1	32.5	2582	675	34.3
300	5DB7 616	23.1	32.4	34.8	3133	775	42.9
400	5DB7 617	26.8	35.7	39.3	4047	950	57.2

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) (N)HXSGAFCHXOE (EN)50264-3-1 3600V FM S

Screened Power Cables 3.6/6kV

Application

Halogen-free single core cables, screened and sheathed, for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage or frequency converter drives.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	(N)HXSGAFCHXOE (EN)50264-3-1 3600V FM S
Standard	Based on DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107
Screen	Braid of tinned copper wires
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	3.6/6 kV
Max. permissible operating voltage AC	4.2/7.2 kV
Max. permissible operating voltage DC	5.4/10.8 kV
AC Test Voltage	11 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2.5	5DB7 652	2	8.2	9.5	10.7	131	33	0.36
4	5DB7 653	2.4	8.6	9.8	11.3	151	46	0.57
6	5DB7 654	2.9	9.1	10.3	11.8	181	60	0.86
10	5DB7 655	3.9	10.1	11.3	12.8	235	85	1.43
16	5DB7 656	5.6	12.2	13.4	14.9	350	110	2.29
25	5DB7 657	6.7	13.9	15.4	17.2	482	150	3.58
35	5DB7 658	7.9	15.1	16.6	18.4	593	190	5.01
50	5DB7 659	9.4	16.6	18.1	19.9	751	240	7.15
70	5DB7 660	10.9	18.3	19.8	21.6	962	300	10
95	5DB7 661	12.6	20	21.5	23.3	1239	360	13.6
120	5DB7 662	14.3	21.9	23.8	25.6	1507	425	17.2
150	5DB7 663	16.2	23.8	25.4	28.1	1799	490	21.5
185	5DB7 664	17.6	25.8	27.4	30.1	2164	560	26.5
240	5DB7 665	20.8	29.4	31.4	34.1	2756	675	34.3
300	5DB7 666	23.1	31.7	33.7	36.4	3317	775	42.9
400	5DB7 667	26.8	35.6	37.2	41.1	4244	950	57.2

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

Rolling Stock Cables

MEDIUM WALL MULTI CORE CABLES BASED ON EN50264

SIENOPYR(120) HXSLHXOE EN50264-3-2 300V FM

Control Cables 300/500V

Application

Halogen-free multicore control cables for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors.
Typical uses are internal safe circuits, control and monitoring circuits.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	HXSLHXOE EN50264-3-2 300V FM
Standard	DIN EN 50264-3-2

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107; color: natural bright with printed black numbers
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	300/500V
Max. permissible operating voltage AC	0.318/0.55 kV
Max. permissible operating voltage DC	0.413/0.825 kV
AC Test Voltage	2 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2x0,75	5DB7101	1.1	5.9	6.7	50	14	0.11
3x0,75	5DB7102	1.1	6.3	7.1	60	14	0.11
4x0,75	5DB7103	1.1	6.8	7.6	75	12	0.11
5x0,75	5DB7104	1.1	7.4	8.4	90	10	0.11
6x0,75	5DB7105	1.1	8.1	9.1	110	10	0.11
7x0,75	5DB7106	1.1	8.8	9.8	120	9	0.11
9x0,75	5DB7108	1.1	10.8	11.8	150	8	0.11
12x0,75	5DB7109	1.1	10.8	12.2	200	7	0.11
19x0,75	5DB7112	1.1	13.3	14.7	300	6	0.11
24x0,75	5DB7114	1.1	15.1	17.1	370	6	0.11
32x0,75	5DB7117	1.1	16.7	18.7	490	5	0.11
37x0,75	5DB7119	1.1	18.5	20.5	580	5	0.11
40x0,75	5DB7120	1.1	19.2	21.2	620	5	0.11
2x1	5DB7125	1.2	6.1	6.9	55	17	0.14
3x1	5DB7123	1.2	6.5	7.3	70	17	0.14
4x1	5DB7126	1.2	7.1	7.9	90	14	0.14
5x1	5DB7124	1.2	7.7	8.7	110	12	0.14
6x1	5DB7127	1.2	8.5	9.5	125	11	0.14
7x1	5DB7128	1.2	9.2	10.2	140	11	0.14
9x1	5DB7129	1.2	11.3	12.3	180	10	0.14
12x1	5DB7130	1.2	11.3	12.7	240	9	0.14
19x1	5DB7131	1.2	14	15.4	350	7	0.14
24x1	5DB7132	1.2	15.8	17.8	440	7	0.14
32x1	5DB7133	1.2	17.5	19.5	580	6	0.14
37x1	5DB7134	1.2	19.3	21.3	680	6	0.14
40x1	5DB7135	1.2	20.1	22.1	730	6	0.14
2x1,5	5DB7140	1.5	6.8	7.6	70	21	0.21
3x1,5	5DB7141	1.5	7.2	8	90	21	0.21
4x1,5	5DB7142	1.5	7.9	8.7	115	18	0.21
7x1,5	5DB7145	1.5	10.3	11.3	190	14	0.21
9x1,5	5DB7146	1.5	12.6	13.6	240	12	0.21
12x1,5	5DB7147	1.5	12.6	14	310	11	0.21
19x1,5	5DB7149	1.5	15.7	17.1	470	9	0.21
24x1,5	5DB7148	1.5	17.8	19.8	580	9	0.21
32x1,5	5DB7150	1.5	19.7	21.7	780	8	0.21
37x1,5	5DB7152	1.5	21.7	23.7	910	7	0.21
2x2,5	5DB7160	1.9	7.6	8.4	90	28	0.36
3x2,5	5DB7161	1.9	8.1	8.9	125	28	0.36
4x2,5	5DB7162	1.9	8.9	9.7	160	23	0.36
7x2,5	5DB7165	1.9	11.6	12.6	270	18	0.36
9x2,5	5DB7166	1.9	14.3	15.3	340	16	0.36
12x2,5	5DB7167	1.9	14.2	15.6	450	14	0.36
19x2,5	5DB7168	1.9	17.8	19.2	680	12	0.36
24x2,5	5DB7169	1.9	20.2	22.2	850	11	0.36

Code to be added to part number for cables
with green-yellow core (G): -1; without green-yellow core (X): -2; Other constructions available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) HXSLCHXOE EN50264-3-2 300V FM S

Screened Control Cables 300/500V

Application

Halogen-free, screened multicore control cables for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors.
Typical uses are internal safe circuits, control and monitoring circuits.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	HXSLCHXOE EN50264-3-2 300V FM S
Standard	DIN EN 50264-3-2

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant, cross-linked elastomeric special compound, requirements based on type EI 107; color: natural bright with printed black numbers
Screen	Braid of tinned copper wires
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	300/500V
Max. permissible operating voltage AC	0.318/0.55 kV
Max. permissible operating voltage DC	0.413/0.825 kV
AC Test Voltage	2 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2x0,75	5DB7201	1.1	5.7	6.9	7.7	75	14	0.11
3x0,75	5DB7202	1.1	6.1	7.3	8.1	90	14	0.11
4x0,75	5DB7203	1.1	6.6	7.8	8.6	110	12	0.11
5x0,75	5DB7204	1.1	7.3	8.4	9.4	125	10	0.11
6x0,75	5DB7205	1.1	8	9.1	10.1	150	10	0.11
7x0,75	5DB7206	1.1	8.9	10.4	11.4	180	9	0.11
9x0,75	5DB7208	1.1	10.9	12.4	13.4	230	8	0.11
12x0,75	5DB7209	1.1	10.7	12	13.4	260	7	0.11
19x0,75	5DB7212	1.1	13.2	14.9	16.3	390	6	0.11
24x0,75	5DB7214	1.1	15.5	16.9	18.9	490	6	0.11
32x0,75	5DB7217	1.1	16.7	18.1	20.1	600	5	0.11
37x0,75	5DB7219	1.1	18.1	19.9	21.9	700	5	0.11
40x0,75	5DB7220	1.1	18.8	20.6	22.6	750	5	0.11
2x1	5DB7225	1.2	5.9	7.1	7.9	85	17	0.14
3x1	5DB7223	1.2	6.3	7.5	8.3	100	17	0.14
4x1	5DB7226	1.2	6.9	8.1	8.9	120	14	0.14
5x1	5DB7224	1.2	7.6	8.7	9.7	140	12	0.14
6x1	5DB7227	1.2	8.4	9.5	10.5	170	11	0.14
7x1	5DB7228	1.2	9.3	10.8	11.8	210	11	0.14
9x1	5DB7229	1.2	11.4	12.9	13.9	260	10	0.14
12x1	5DB7230	1.2	11.2	12.5	13.9	300	9	0.14
19x1	5DB7231	1.2	14.1	15.8	17.2	460	7	0.14
24x1	5DB7232	1.2	16.2	17.6	19.6	560	7	0.14
32x1	5DB7233	1.2	17.5	18.9	20.9	700	6	0.14
37x1	5DB7234	1.2	18.9	20.7	22.7	810	6	0.14
40x1	5DB7235	1.2	19.7	21.5	23.5	870	6	0.14
2x1,5	5DB7240	1.5	6.6	7.8	8.6	100	21	0.21
3x1,5	5DB7241	1.5	7	8.2	9	125	21	0.21
4x1,5	5DB7242	1.5	7.7	8.9	9.7	150	18	0.21
7x1,5	5DB7245	1.5	10.4	11.9	12.9	260	14	0.21
9x1,5	5DB7246	1.5	12.7	14.2	15.2	320	12	0.21
12x1,5	5DB7247	1.5	12.5	13.8	15.2	380	11	0.21
19x1,5	5DB7249	1.5	15.6	17.3	18.7	580	9	0.21
24x1,5	5DB7248	1.5	18.2	19.6	21.6	720	9	0.21
32x1,5	5DB7250	1.5	19.7	21.1	23.1	910	8	0.21
37x1,5	5DB7252	1.5	21.3	23.1	25.1	1050	7	0.21
2x2,5	5DB7260	1.9	7.4	8.6	9.4	130	28	0.36
3x2,5	5DB7261	1.9	7.9	9.1	9.9	170	28	0.36
4x2,5	5DB7262	1.9	8.7	9.9	10.7	200	23	0.36
7x2,5	5DB7265	1.9	11.7	13.2	14.2	350	18	0.36
9x2,5	5DB7266	1.9	14.4	15.9	16.9	440	16	0.36
12x2,5	5DB7267	1.9	14.1	15.4	16.8	530	14	0.36
19x2,5	5DB7268	1.9	17.7	19.4	20.8	800	12	0.36
24x2,5	5DB7269	1.9	20.6	22	24	1010	11	0.36

Code to be added to part number for cables
with green-yellow core (G): -1; without green-yellow core (X): -2; Other constructions available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) HXELHXOE EN50264-3-2 600V FM

Power and Control Cables 0.6/1kV

Application

Halogen-free multicore power cables for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors.
Typical uses are lighting circuits, auxiliary and electric heating circuits, control and monitoring circuits.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	HXELHXOE EN50264-3-2 600V FM
Standard	DIN EN 50264-3-2

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat-resistant, cross-linked special elastomeric compound; requirements based on type EI 107; color: natural bright with printed black numbers
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	0.6/1 kV (600/1000V)
Max. permissible operating voltage AC	0.7/1.2 kV
Max. permissible operating voltage DC	0.9/1.8 kV
AC Test Voltage	3.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2x1,5	5DB7311	1.55	7	8	76.4	21	0.21
2x2,5	5DB7312	1.9	8.3	9.3	101.3	28	0.36
3x1,5	5DB7321	1.55	7.4	8.4	102	21	0.21
3x2,5	5DB7322	1.95	8.8	9.8	149	28	0.36
3x4	5DB7323	2.4	9.7	11.3	208	37	0.57
3x6	5DB7324	2.9	10.7	12.3	271	49	0.86
3x10	5DB7325	3.9	13.2	14.8	430	68	1.43
4x1,5	5DB7335	1.55	8.3	9.3	138	17	0.21
4x2,5	5DB7336	1.9	9.6	11.2	184	23	0.36
4x4	5DB7337	2.4	10.6	12.2	255	31	0.57
4x6	5DB7338	2.9	12.1	13.7	350	41	0.86
4x10	5DB7339	3.9	14.4	16.4	546	57	1.43
4x16	5DB7340	5.4	18.2	20.2	825	76	2.29
5x1,5	5DB7351	1.55	8.9	9.9	154	16	0.21
5x2,5	5DB7352	1.9	10.5	12.1	228	21	0.36
5x4	5DB7353	2.4	12.2	13.8	325	28	0.57
5x6	5DB7354	2.9	13.5	15.1	430	37	0.86
6x1,5	5DB7361	1.55	9.7	11.3	189	14	0.21
6x2,5	5DB7362	1.9	12	13.6	285	19	0.36
7x1,5	5DB7371	1.55	10.6	12.2	224	14	0.21
7x2,5	5DB7372	1.9	13.1	14.7	336	18	0.36

Code to be added to part number for cables
with green-yellow core (G):-1; without green-yellow core (X):-2; Other constructions available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(120) HXELCHXOE EN50264-3-2 600V FM S

Screened Power and Control Cables 0.6/1kV

Application

Halogen-free, screened multicore power cables for railway rolling stock, having special fire performance, increased heat resistance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors.
Typical uses are lighting circuits, auxiliary and electric heating circuits, control and monitoring circuits.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(120)
Type designation	HXELCHXOE EN50264-3-2 600V FM S
Standard	DIN EN 50264-3-2

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat-resistant, cross-linked special elastomeric compound; requirements based on type EI 107; color: natural bright with printed black numbers
Screen	Braid of tinned copper wires
Outer sheath	Heat resistant, cross-linked elastomeric special compound, requirements based on type EM 104; color: black

Electrical parameters

Rated voltage	0.6/1 kV (600/1000V)
Max. permissible operating voltage AC	0.7/1.2 kV
Max. permissible operating voltage DC	0.9/1.8 kV
AC Test Voltage	3.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	120 °C
Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2x10	5DB7415	3.9	12.2	13.8	15.4	436	68	1.43
2x16	5DB7416	5.4	15	16.7	18.7	567	90	2.29
3x1,5	5DB7421	1.6	7.7	8.7	9.7	130	21	0.21
3x2,5	5DB7422	2	8.5	9.6	11.2	186	28	0.36
3x4	5DB7423	2.4	9.4	10.6	12.2	225	37	0.57
4x1,5	5DB7435	1.6	8	9.2	10.2	151	17	0.21
4x2,5	5DB7436	2	9.4	10.5	12.1	214	23	0.36
4x4	5DB7437	2.4	10.4	11.4	13	276	31	0.57
4x6	5DB7438	2.9	11.6	13	14.6	374	41	0.86
4x10	5DB7439	3.9	14.4	15.7	17.7	587	57	1.43
5x1,5	5DB7451	1.6	8.8	10	11.6	192	16	0.21
5x2,5	5DB7452	2	10.4	12	13.6	271	21	0.36
5x4	5DB7453	2.4	11.9	13.4	15	384	28	0.57
5x6	5DB7454	2.9	13.3	14.6	16.6	494	37	0.86
7x1,5	5DB7471	1.6	10.5	12.1	13.7	272	14	0.21
7x2,5	5DB7472	2	12.7	14.2	15.8	393	18	0.36
7x4	5DB7473	2.4	14.1	15.4	17.4	519	24	0.57
12x1,5	5DB7475	1.6	13.2	14.6	16.6	399	11	0.21
12x2,5	5DB7476	2	15.7	17.4	19.4	561	15	0.36

Code to be added to part number for cables
with green-yellow core (G):-1; without green-yellow core (X):-2; Other constructions available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

Rolling Stock Cables

MEDIUM WALL SINGLE CORE HIGH TEMPERATURE CABLES BASED ON EN50382

SIENOPYR(180) (N)HXSGAFHXOE EN50382 1800V OM 150°C

High Temperature Power Cables 1.8/3kV

Application

Halogen-free single core high temperature cables, sheathed, for railway rolling stock, having special fire performance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(180)
Type designation	(N)HXSGAFHXOE EN50382 1800V OM 150°C
Standard	Based on DIN EN 50382, dimensions acc. to DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant SIR special compound; requirements based on type EI 112
Outer sheath	Halogen-free, heat resistant SIR special compound, requirements based on type EM 107; color: black

Electrical parameters

Rated voltage	1.8/3 kV
Max. permissible operating voltage AC	2.1/3.6 kV
Max. permissible operating voltage DC	2.7/5.4 kV
AC Test Voltage	6.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	180 °C
Recommended operation temp. >100.000 h	150 °C
Max. short circuit temperature of the conductor	350 °C (max. 5 s)
Ambient temperature for fix installation min.	-50 °C
Ambient temp. in fully flex. operation min.	-50 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1.5	5DB7 701	1.5	5.5	6.4	43	37	0.219
2.5	5DB7 702	2	6	6.9	55	48	0.365
4	5DB7 703	2.4	6.4	7.3	71	67	0.584
6	5DB7 704	2.9	6.9	7.8	91	88	0.876
10	5DB7 705	3.9	8.3	9.2	139	123	1.46
16	5DB7 706	5.6	9.9	11.1	204	161	2.336
25	5DB7 707	6.7	12	13.2	312	219	3.65
35	5DB7 708	7.9	13.2	14.4	408	273	5.11
50	5DB7 709	9.4	14.6	16.1	548	344	7.3
70	5DB7 710	10.9	16.1	17.6	731	434	10.22
95	5DB7 711	12.6	18.6	20.1	985	517	13.87
120	5DB7 712	14.3	20.3	21.8	1214	608	17.52
150	5DB7 713	16.2	22.6	24.1	1504	702	21.9
185	5DB7 714	17.6	24.4	25.9	1831	798	27.01
240	5DB7 715	20.8	27.3	29.7	2332	958	35.04
300	5DB7 716	23.1	29.6	32	2862	1108	43.8
400	5DB7 717	26.8	34.1	36.5	3797	1310	58.4

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 150 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(180) (N)HXSGAFCHXOE EN50382 1800V OM 150°C S

Screened High Temperature Power Cables 1.8/3kV

Application

Halogen-free, screened single core high temperature cables, sheathed, for railway rolling stock, having special fire performance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage or frequency converter drives.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(180)
Type designation	(N)HXSGAFCHXOE EN50382 1800V OM 150°C S
Standard	Based on DIN EN 50382, dimensions acc. to DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant SIR special compound; requirements based on type EI 112
Screen	Braid of tinned copper wires
Outer sheath	Halogen-free, heat resistant SIR special compound, requirements based on type EM 107; color: black

Electrical parameters

Rated voltage	1.8/3 kV
Max. permissible operating voltage AC	2.1/3.6 kV
Max. permissible operating voltage DC	2.7/5.4 kV
AC Test Voltage	6.5 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	180 °C
Recommended operation temp. >100.000 h	150 °C
Max. short circuit temperature of the conductor	350 °C (max. 5 s)
Ambient temperature for fix installation min.	-50 °C
Ambient temp. in fully flex. operation min.	-50 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1.5	5DB7 721	1.5	4.9	6.2	7.4	64	37	0.219
2.5	5DB7 722	2	5.4	6.7	7.9	77	48	0.365
4	5DB7 723	2.4	5.8	7.1	8.3	94	67	0.584
6	5DB7 724	2.9	6.3	7.6	8.8	120	88	0.876
10	5DB7 725	3.9	7.7	9	10.2	173	123	1.46
16	5DB7 726	5.6	9.6	10.8	12.3	264	161	2.336
25	5DB7 727	6.7	11.3	12.9	14.4	378	219	3.65
35	5DB7 728	7.9	12.5	14	15.8	479	273	5.11
50	5DB7 729	9.4	14	15.5	17.3	625	344	7.3
70	5DB7 730	10.9	15.7	17.2	19	823	434	10.22
95	5DB7 731	12.6	18.2	19.7	21.5	1113	517	13.87
120	5DB7 732	14.3	20.1	21.6	23.4	1348	608	17.52
150	5DB7 733	16.2	22	23.9	25.7	1645	702	21.9
185	5DB7 734	17.6	23.8	25.4	28.1	1983	798	27.01
240	5DB7 735	20.8	27	28.6	31.3	2494	958	35.04
300	5DB7 736	23.1	29.3	30.9	33.6	3035	1108	43.8
400	5DB7 737	26.8	33.6	35.2	39.1	3982	1310	58.4

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 150 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(180) (N)HXSGAFHXOE EN50382 3600V OM 150°C

High Temperature Power Cables 3.6/6kV

Application

Halogen-free single core high temperature cables, sheathed, for railway rolling stock, having special fire performance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(180)
Type designation	(N)HXSGAFHXOE EN50382 3600V OM 150°C
Standard	Based on DIN EN 50382, dimensions acc. to DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant SIR special compound; requirements based on type EI 112
Outer sheath	Halogen-free, heat resistant SIR special compound, requirements based on type EM 107; color: black

Electrical parameters

Rated voltage	3.6/6 kV
Max. permissible operating voltage AC	4.2/7.2 kV
Max. permissible operating voltage DC	5.4/10.8 kV
AC Test Voltage	11 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	180 °C
Recommended operation temp. >100.000 h	150 °C
Max. short circuit temperature of the conductor	350 °C (max. 5 s)
Ambient temperature for fix installation min.	-50 °C
Ambient temp. in fully flex. operation min.	-50 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2.5	5DB7 742	2	8.6	9.5	100	48	0.365
4	5DB7 743	2.4	9	9.9	120	67	0.584
6	5DB7 744	2.9	9.5	10.4	140	88	0.876
10	5DB7 745	3.9	10.4	11.6	190	123	1.46
16	5DB7 746	5.6	12.1	13.3	260	161	2.336
25	5DB7 747	6.7	14.2	15.4	380	219	3.65
35	5DB7 748	7.9	15.3	16.8	480	273	5.11
50	5DB7 749	9.4	16.8	18.3	630	344	7.3
70	5DB7 750	10.9	18.3	19.8	820	434	10.22
95	5DB7 751	12.6	20	21.5	1100	517	13.87
120	5DB7 752	14.3	22.1	23.6	1350	608	17.52
150	5DB7 753	16.2	24	25.5	1650	702	21.9
185	5DB7 754	17.6	25.7	28.1	2000	798	27.01
240	5DB7 755	20.8	29.7	32.1	2600	958	35.04
300	5DB7 756	23.1	32	34.4	3200	1108	43.8
400	5DB7 757	26.8	35.3	38.9	4100	1310	58.4

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 150 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

SIENOPYR(180) (N)HXSGAFCHXOE EN50382 3600V OM 150°C S

Screened High Temperature Power Cables 3.6/6kV

Application

Halogen-free, screened single core high temperature cables, sheathed, for railway rolling stock, having special fire performance and reduced dimensions – Medium Wall
These cables are intended for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered, they may be used both in- and outdoors, e.g. flexible between car floor and bogies.
Typical uses are auxiliary circuits at line voltage, traction circuits, electric heating fed at line voltage or frequency converter drives.
In other respects, DIN EN 50355 applies; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having the hazard level HL1, 2, 3 acc. to DIN EN 45545-1:2013

Global data

Brand	SIENOPYR(180)
Type designation	(N)HXSGAFCHXOE EN50382 3600V OM 150°C S
Standard	Based on DIN EN 50382, dimensions acc. to DIN EN 50264-3-1

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN EN 60228
Insulation	Halogen-free, heat resistant SIR special compound; requirements based on type EI 112
Screen	Braid of tinned copper wires
Outer sheath	Halogen-free, heat resistant SIR special compound, requirements based on type EM 107; color: black

Electrical parameters

Rated voltage	3.6/6 kV
Max. permissible operating voltage AC	4.2/7.2 kV
Max. permissible operating voltage DC	5.4/10.8 kV
AC Test Voltage	11 kV (5 Min.)

Thermal parameters

Maximal operating temperature (20 000 h)	180 °C
Recommended operation temp. >100.000 h	150 °C
Max. short circuit temperature of the conductor	350 °C (max. 5 s)
Ambient temperature for fix installation min.	-50 °C
Ambient temp. in fully flex. operation min.	-50 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
2.5	5DB7 762	2	8.2	9.4	10.9	120	48	0.37
4	5DB7 763	2.4	8.6	9.8	11.3	140	67	0.58
6	5DB7 764	2.9	9.1	10.3	11.8	170	88	0.88
10	5DB7 765	3.9	10.1	11.3	12.8	220	123	1.46
16	5DB7 766	5.6	11.8	13	14.5	330	161	2.34
25	5DB7 767	6.7	13.5	15	16.8	450	219	3.65
35	5DB7 768	7.9	14.7	16.2	18	560	273	5.11
50	5DB7 769	9.4	16.2	17.7	19.5	710	344	7.3
70	5DB7 770	10.9	17.9	19.4	21.2	920	434	10.22
95	5DB7 771	12.6	19.6	21.1	22.9	1200	517	13.87
120	5DB7 772	14.3	21.5	23.4	25.2	1450	608	17.52
150	5DB7 773	16.2	23.4	25	27.7	1750	702	21.9
185	5DB7 774	17.6	25.4	27	29.7	2100	798	27.01
240	5DB7 775	20.8	29	31	33.7	2700	958	35.04
300	5DB7 776	23.1	31.3	33.3	36	3300	1108	43.8
400	5DB7 777	26.8	35.2	36.8	40.7	4300	1310	58.4

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 150 °C operation temperature, 45 °C ambient temperature, free in air
Short Circuit Current for 1s

Rolling Stock Cables

MEDIUM WALL SINGLE CORE CABLES FOR PANTOGRAPH CONNECTION

TENAX-TRAIN-Plus (N)TMCWOEU 26/45kV

Pantograph Cables 26/45kV

Application

As a general rule, single-core cables are used in short lengths, e.g. for connection of switchgear cubicles and for connection of mobile transformer substations to the overhead line.
Also usable for connection of pantographs in locomotives and trains.
Suitable for occational movement during operation.
When laying and during operation care should be taken to protect them against excessive mechanical stresses.
In other respects, DIN VDE 0298-3 applies as well as DIN EN 50355; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having hazard level HL1, 2, 3 acc. to DIN EN 45545-1(2013).
Expected lifetime of the cable at an average utilisation is approximately 25 years.

Global data

Brand	TENAX-TRAIN-Plus
Type designation	(N)TMCWOEU
Standard	based on IEC60840
Standard	Based on DIN VDE 0250-813

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN VDE 0295 / IEC 60228
Insulation	Halogen-free, cross-linked special compound, basic material HEPR, requirements based on type EI110 (EN50264-1) / HEPR (IEC 60840); colour: light-pink
Electrical field control	Inner and outer layer of semi-conductive rubber compound; colour: black. Core screen cold strippable "Easy Strip"
Screen	Stranded layer of tinned copper wires bedded between two separating layers
Outer sheath	Halogen-free, cross-linked special compound, basic material EVA, requirements based on type EM104; colour: black or red (others possible)

Electrical parameters

Rated voltage	26/45 kV
Max. permissible operating voltage AC	31/54 kV
Max. permissible operating voltage DC	40.5/81 kV
AC Test Voltage	87 kV (5 Min.)
impuls voltage strength	250 kV
max. partial discharge intensity	≤ 5 pC @ 52 kV
Suitability for railway networks	Voltage pulses IEC 61287-1 Short time overvoltages DIN EN 50124-2 Long time overvoltages DIN EN 50163

Thermal parameters

Max. permissible temperature at conductor	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1x50/16	5DK9751	9.3	30.5	36	38	1900	309	7.15
1x70/16	5DK9752	11.5	31.8	38	40	2400	379	10
1x95/16	5DK9753	12.6	33.5	40.5	42.5	2700	457	13.6
1x95/25	5DK9754	12.6	33.7	40.7	42.7	2700	457	13.6
1x120/16	5DK9755	14.6	36	43	45	3000	531	17.2
1x120/25	5DK9756	14.6	36.2	43.2	45.2	3000	531	17.2
1x150/25	5DK9757	16	36.7	44.5	46.5	3700	613	21.5
1x185/25	5DK9758	18	38.9	46.5	48.5	4200	699	26.6
1x240/25	5DK9759	20.6	41.5	49	51	4500	823	34.3
1x300/35	5DK9760	23.1	44.8	52	54	5400	945	42.9
1x400/35	5DK9761	26.5	48.5	55	57	6400	1145	57.2
1x500/35	5DK9762	29.3	50.2	59	62	7400	1288	71.5
1x630/35	5DK9763	33.9	54.8	64	68	9200	1432	90.1

Remarks, colours: codes to be added to part number: -0 BK black, -1 RD red; others available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 30 °C ambient temperature, free in air
Short Circuit Current for 1s

TENAX-TRAIN-Plus Jumper (N)TMCWOEU 26/45kV

Pantograph Cables 26/45kV

Application

As a general rule, single-core cables are used in short lengths, e.g. for connection of switchgear cubicles and for connection of mobile transformer substations to the overhead line.
Also usable for connection of pantographs in locomotives and trains.
Suitable for coach interconnections.
When laying and during operation care should be taken to protect them against excessive mechanical stresses.
In other respects, DIN VDE 0298-3 applies as well as DIN EN 50355; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles having hazard level HL1, 2, 3 acc. to DIN EN 45545-1(2013).
Expected lifetime of the cable at an average utilisation is approximately 25 years.

Global data

Brand	TENAX-TRAIN-Plus Jumper
Type designation	(N)TMCWOEU
Standard	Based on DIN VDE 0250-813
Standard	based on IEC60840

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN VDE 0295 / IEC 60228
Insulation	Halogen-free, cross-linked special compound, basic material HEPR, requirements based on type EI110 (EN50264-1) / HEPR (IEC 60840); colour: light-pink
Electrical field control	Inner and outer layer of semi-conductive rubber compound; colour: black. Core screen cold strippable "Easy Strip"
Screen	Braid of tinned copper wires bedded between two separating layers
Outer sheath	Halogen-free, cross-linked special compound, basic material EVA, requirements based on type EM104; colour: black or red (others possible)

Electrical parameters

Rated voltage	26/45 kV
Max. permissible operating voltage AC	31/54 kV
Max. permissible operating voltage DC	40.5/81 kV
AC Test Voltage	87 kV (5 Min.)
impuls voltage strength	250 kV
max. partial discharge intensity	≤ 5 pC @ 52 kV
Suitability for railway networks	Voltage pulses IEC 61287-1 Short time overvoltages DIN EN 50124-2 Long time overvoltages DIN EN 50163

Thermal parameters

Max. permissible temperature at conductor	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-40 °C
Ambient temp. in fully flex. operation min.	-40 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1x50/16	5DK9751	9.3	30.5	36	38	1900	309	7.15
1x70/16	5DK9752	11.5	31.8	38	40	2400	379	10
1x95/16	5DK9753	12.6	33.5	40.5	42.5	2700	457	13.6
1x95/25	5DK9754	12.6	33.7	40.7	42.7	2700	457	13.6
1x120/16	5DK9755	14.6	36	43	45	3000	531	17.2
1x120/25	5DK9756	14.6	36.2	43.2	45.2	3000	531	17.2
1x150/25	5DK9757	16	36.7	44.5	46.5	3700	613	21.5
1x185/25	5DK9758	18	38.9	46.5	48.5	4200	699	26.6
1x240/25	5DK9759	20.6	41.5	49	51	4500	823	34.3
1x300/35	5DK9760	23.1	44.8	52	54	5400	945	42.9
1x400/35	5DK9761	26.5	48.5	55	57	6400	1145	57.2
1x500/35	5DK9762	29.3	50.2	59	62	7400	1288	71.5
1x630/35	5DK9763	33.9	54.8	64	68	9200	1432	90.1

Remarks, colours: codes to be added to part number: -0 BK black, -1 RD red; others available upon request
(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 30 °C ambient temperature, free in air
Short Circuit Current for 1s

PROTOLON(HMK) (N)TMCGCHXOEUK 26/45kV

Pantograph Cables 26/45kV

Application

As a general rule, single-core cables are used in short lengths, e.g. for connection of switchgear cubicles and for connection of mobile transformer substations to the overhead line.
Also usable for connection of pantographs in locomotives and trains.
Suitable for occational movement during operation.
When laying and during operation care should be taken to protect them against excessive mechanical stresses.
In other respects, DIN VDE 0298-3 applies as well as DIN EN 50355; attention should be paid to the rules for installation of cabling (DIN EN 50343).
Usable on railway vehicles where GOST certification is needed, tests according EN 45545-2 are conducted internally only.
Expected lifetime of the cable at an average utilisation is approximately 25 years.

Global data

Brand	PROTOLON(HMK)
Type designation	(N)TMCGCHXOEUK
Standard	Based on DIN VDE 0250-813

Design features

Conductor	Copper, tinned, finely stranded class 5 according to DIN VDE 0295 / IEC 60228
Insulation	Halogen-free, cross-linked special compound, basic material HEPR; colour: light-pink
Electrical field control	Inner and outer layer of semi-conductive rubber compound; colour: black Core screen cold strippable
Screen	Stranded layer of tinned copper wires bedded between two separating layers
Outer sheath	Halogen-free, cross-linked special polyolefin compound; colour: black

Electrical parameters

Rated voltage	26/45 kV
Max. permissible operating voltage AC	31/54 kV
Max. permissible operating voltage DC	40.5/81 kV
AC Test Voltage	65 kV (5 Min.)
impuls voltage strength	250 kV
max. partial discharge intensity	≤ 5 pC @ 52 kV
Suitability for railway networks	Voltage pulses IEC 61287-1 Short time overvoltages DIN EN 50124-2 Long time overvoltages DIN EN 50163

Thermal parameters

Recommended operation temp. >100.000 h	90 °C
Max. short circuit temperature of the conductor	250 °C (max. 5 s)
Ambient temperature for fix installation min.	-55 °C
Ambient temp. in fully flex. operation min.	-55 °C

Size	MLFB Number	conduc-tor diameter nom. mm	Diameter over screen (nom.) mm	Outer diameter min. mm	Outer diameter max. mm	Net weight approx. kg/km	Current carrying capacity (1) A	Short Circuit Current (conduc-tor) kA
1x50/16	5DK9731	9	30.2	36.1	38.5	1900	309	7.15
1x70/16	5DK9732	10.8	31.6	38.9	41.3	2400	379	10
1x95/16	5DK9733	12.6	33.4	40.7	43.1	2700	457	13.6
1x95/25	5DK9734	12.6	33.6	40.9	43.3	2700	457	13.6
1x120/16	5DK9735	14.2	35	42.3	44.7	3000	531	17.2
1x120/25	5DK9736	14.2	35.2	42.5	44.9	3000	531	17.2
1x150/25	5DK9737	15.8	36.8	44.1	46.5	3700	613	21.5
1x185/25	5DK9738	17.4	38.4	45.7	48.1	4200	699	26.6
1x240/25	5DK9739	20.4	41.4	49.7	52.1	4500	823	34.3
1x300/35	5DK9740	22.9	44.5	52.3	55.3	5400	945	42.9
1x400/35	5DK9741	26.2	47.8	55.6	58.6	6400	1145	57.2
1x500/35	5DK9742	29.3	50.2	59.4	62.4	7400	1288	71.5
1x630/35	5DK9743	33.9	54.8	64.4	68.4	9200	1432	90.1

(1) The values in the table are valid for one cable in permanent operation with DC or AC with 50 up to 60 Hz at 90 °C operation temperature, 30 °C ambient temperature, free in air
Short Circuit Current for 1s

Rolling Stock Cables

DATA CABLES

Rolling Stock Cables

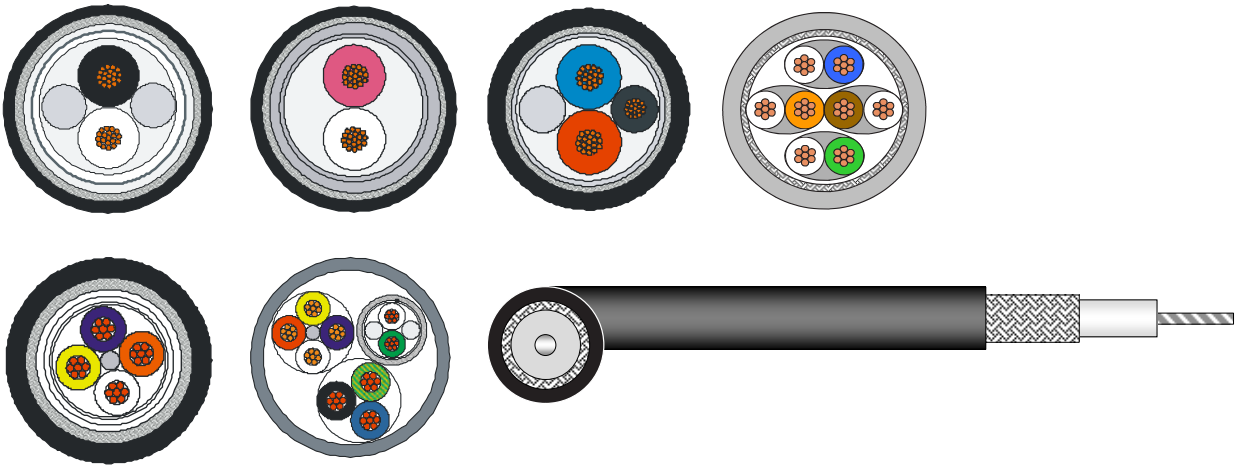
Rolling Stock Data Cables

A wide range of data cables for Rolling Stock applications is currently under development:

- Cat5e, Cat6, Cat7 100Ω cables
- Bus cables 120Ω, such as WTB and MVB
- Special Bus cable designs (e.g. 105Ω)
- Coaxial cables
- Combinations of different elements

Basic Specification:

- Data transmission values according to relevant standards
- Outer sheath classified as EM103 (J) or EM104 (M)
    - Temperature range -25 up to 90°C or -40 up to 90°C
    - Ozone resistant
    - UV resistant
    - Oil and fuel resistant
    - Acid & alkaline resistant
    - Resistant against a wide range of cleaning agents
- Fire protection according to EN 45545-2:2013, R15/16, HL1, 2, 3
    - Single cable burn test
    - Bunched cables burn test
    - Smoke density
    - Halogen free
    - Toxicity



Rolling Stock Cables

Technical Annex

General

The following information are not complete, they have to be seen as a supplement to the information given in the „Rolling Stock Cables - General Catalogue“ of Prysmian Group for the cables types handled in this catalogue.

Electrical Parameters

Permissible short-circuit current

The 1s values given in the tables refer to a start temperature of 90°C, respectively 150°C for SIENOPYR(180) cables. For other conductor temperatures the following values can be used to calculate I_{thz} for 1s:

start / end temperature:	90/250°C	120/250°C	150/350°C	180/350°C
short-circuit current density:	143 A/mm²	126 A/mm²	146 A/mm²	132 A/mm²

Permissible short-circuit current I_{thz} for different break times t_k up to 5s are calculated using the formula:

$$I_{thz} = I_{thr} \times \sqrt{1s/t_k}$$

Permissible short-circuit current of screens with nominal cross sections

nom. cross section of screen	16	25	35
I_{thz} in kA	3,3	5	7

(1s, 60°C -> 350°C; acc. to DIN VDE 0276)

Current carrying capacity

The values given in the tables of the datasheets are only valid for the given conditions. They can be converted for different conditions (ambient temperature, conductor temperature, laying conditions) with the help of the correction factors attached at the end of this catalogue.

Mechanical Parameters

Permissible pulling force

The permissible pulling force can be calculated by multiplication of the permissible tension with the total nominal cross section of the cables cores.

Max. permissible tension

during operation	15 N/mm²
short term during installation	50 N/mm²

Of course the common rules of cable installation need to be respected to avoid any damages of the cables.

Minimum permissible bending radii

(D = outer diameter of cable)

Application	Outer diameter			Screened	Type
	D ≤ 8	8 < D ≤ 12	D > 12		
fixed installation	3D	3D	4D	5D	single and multicore cables 300/500V and 0.6/1kV
one careful bend at the end of installation	2D	2D	3D	5D	
free movement	3D	4D	5D	10D	
limited movement	3D	4D	5D	8D	
fixed installation	4D	4D	5D	6D	singlecore cables 1.8/3kV and 3.6/6kV
one careful bend at the end of installation	3D	3D	4D	6D	
free movement	10D	10D	10D	10D	
limited movement	8D	8D	8D	8D	
fixed installation	-	-	-	6D	Pantograph 26/45kV
one careful bend at the end of installation	-	-	-	5D	
free movement	-	-	-	10D	

Chemical Stability

Mineral oil (IRM902) and fuel (IRM903) resistance	DIN EN 60811-404
Acid and alkaline resistance	DIN EN 60811-404
Ozone resistance	DIN EN 50305
UV-resistance	ISO 4892-2

Reaction to fire

All cables are tested acc. to EN45545-2:

Flame propagation, single cable	DIN EN 60332-1-2
Flame propagation, bunched cables (depending on diameter)	DIN EN 60332-3-24 DIN EN 60332-3-25 DIN EN 50305, clause 9.1.2
Smoke emission	DIN EN 61034-2
Toxicity	DIN EN 50305, clause 9.2

Conversions for different ambient or conductor temperatures

SIENOPYR(120)																					
max. conductor temperature / °C	ambient temperature / °C																				
	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
90	1,25	1,20	1,15	1,11	1,05	1,00	0,94	0,88	0,82	0,75	0,67	0,58	0,47	0,33	0,00	-	-	-	-	-	-
120	1,36	1,33	1,29	1,26	1,22	1,18	1,14	1,10	1,06	1,01	0,96	0,91	0,86	0,81	0,75	0,68	0,61	0,53	0,43	0,30	0,00

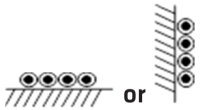
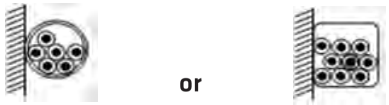
SIENOPYR(180)																	
max. conductor temperature / °C	ambient temperature / °C																
	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
150	1,11	1,09	1,07	1,05	1,02	1,00	0,98	0,95	0,93	0,90	0,87	0,85	0,82	0,79	0,76	0,72	0,69
180	1,28	1,26	1,24	1,22	1,20	1,18	1,16	1,14	1,11	1,09	1,07	1,04	1,02	0,99	0,96	0,94	0,91

SIENOPYR(180)								
max. conductor temperature / °C	ambient temperature / °C							
	105	110	115	120	125	130	135	140
150	0,65	0,62	0,58	0,53	0,49	0,44	0,38	0,31
180	0,88	0,85	0,82	0,79	0,75	0,72	0,68	0,64

Pantograph Cables																	
max. conductor temperature / °C	ambient temperature / °C																
	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
90	1,15	1,12	1,08	1,04	1,00	0,96	0,91	0,87	0,82	0,76	0,71	0,65	0,58	0,50	0,41	0,29	0,00

Conversions for different installation conditions

Installation	free in air or on perforated cable trays																									
Number of simultaneously loaded cables																										
	1	2	3	4	6	8	10	16	20	4	6	8	10	16	20	4	6	8	10	16	20	4	6	8	10	16	20
Conversion factor	1,00	0,87	0,81	0,78	0,75	0,74	0,73	0,72	0,71	0,71	0,62	0,57	0,53	0,47	0,45	0,67	0,59	0,54	0,50	0,45	0,43	0,71	0,58	0,52	0,48	0,41	0,38

Installation	on a surface				under a surface (ceiling)									in a tube, channel or housing												
Number of simultaneously loaded cables																										
	1	2	3	4	1	2	3	4	5	6	7	8	≥9	1	2	3	4	5	6	7	8	9	10	12	14	16	20
Conversion factor	0,95	0,81	0,75	0,71	0,90	0,77	0,68	0,65	0,63	0,61	0,60	0,59	0,58	0,76	0,61	0,53	0,49	0,46	0,43	0,41	0,40	0,38	0,36	0,34	0,33	0,31	0,29

NOTES

Prysmian Kabel und Systeme GmbH
Alt Moabit 91D
10559 Berlin
Germany
T +49 (0) 30 3675 0
F +49 (0) 30 3675 40
www.prysmiangroup.com

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Prysmian Kabel und Systeme GmbH
Alt Moabit 91D
10559 Berlin, Germany
E-Mail: kontakt@prysmiangroup.com

www.prysmiangroup.com
www.prysmiangroup.de

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