

## 12 Hybrid cables

### INFORMATION



This chapter shows the technical data of the hybrid cables available at SEW-EURODRIVE.

For assignment of hybrid cables to the products, refer to the respective chapters.

### 12.1 Description

The following figure shows examples of hybrid cables from SEW-EURODRIVE:



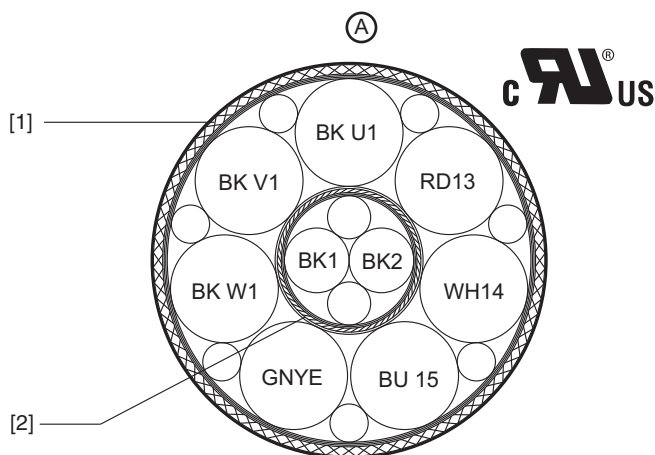
1507296907

Hybrid cables from SEW-EURODRIVE...

- Connect MOVIPRO® to AC motors
- Connect MOVIFIT® to AC motors or MOVIMOT®
- Connect field distributors to AC motors or MOVIMOT®
- Connect MOVIMOT® or MOVI-SWITCH® 2S units mounted in close to the motor to AC motors (in combination with option P2.A)
- Combine the energy transfer, control voltage and communication in one cable jacket
- Ensure optimum EMC shielding and cable impedances
- Are supplied as pre-fabricated cables with plug connectors.

## 12.2 Hybrid cable type „A“

### 12.2.1 Mechanical design



839041931

[1] Overall shield

[2] Shield

#### Cable type

**A**

8179530

- Supply cores: 7 x 1.5 mm<sup>2</sup>
- Control core pair: 2 x 0.75 mm<sup>2</sup>
- Conductor insulation: TPE-E (Polyester)
- Conductor: Bare E-Cu litz wire, extra fine wires with individual wire 0.1 mm
- Shield: E-Cu wire, tinned
- Overall diameter: Max. 15.9 mm
- Color of outer cable jacket: Black
- Outer cable jacket insulation: TPE-U (Polyurethane)

### 12.2.2 Electrical properties

- Conductor resistance for 1.5 mm<sup>2</sup> (at 20 °C): max. 13 Ω/km
- Conductor resistance for 0.75 mm<sup>2</sup> (at 20 °C): max. 26 Ω/km
- Operating voltage for 1.5 mm<sup>2</sup> conductor: Max. 600 V according to CRIUS
- Operating voltage for 0.75 mm<sup>2</sup> conductor: Max. 600 V according to CRIUS
- Insulation resistance at 20 °C: min. 20 MΩ x km

21914796/EN – 09/2015

### 12.2.3 Mechanical properties

- Suitable for cable carriers
  - Bending cycles > 2.5 million
  - Travel speed ≤ 3 m/s
- Bending radius    in the cable carrier:    10 x diameter  
                              for fixed routing:        5 x diameter
- Torsional strength (e.g. rotary table applications)
  - Torsion ±180° for a cable length of > 1 m
  - Torsional cycles > 100.000



### INFORMATION



You will have to check the mechanical marginal conditions if you encounter reversed bending and high torsional load for a length of < 3 m. Please contact SEW-EURODRIVE in such cases.

12

### 12.2.4 Thermal properties

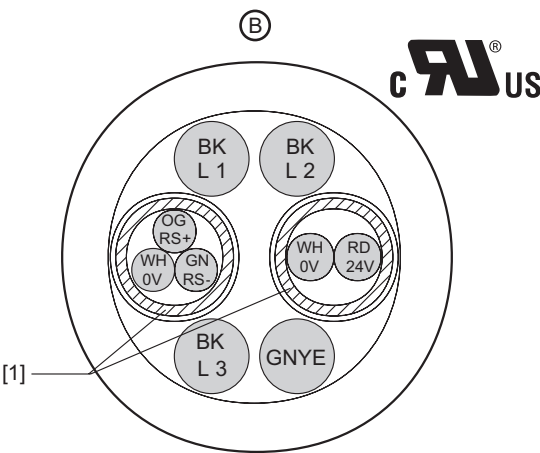
- Processing and operation: -30 °C – +90 °C (load capacity according to DIN VDE 0298-4)  
-30 – +80 °C according to  US
- Transport and storage: -40 °C – +90 °C (load capacity according to DIN VDE 0298-4)  
-30 – +80 °C according to  US
- Flame retardant according to UL1581 Vertical Wiring Flame Test (VW-1)
- Flame retardant according to CSA C22.2 Vertical Flame Test (FT-1)

### 12.2.5 Chemical properties

- Oil-resistant according to DIN VDE 0472 part 803 method B
- General fuel resistance (such as diesel, gasoline) according to DIN ISO 6722 parts 1 and 2
- General resistance to acids, alkalis, cleaning agents
- General resistance against dusts (e.g. bauxite, magnesite)
- Insulation and cable jacket material is halogen free according to DIN VDE 0472 part 815
- Within the specified temperature range, free from substances interfering with wetting agents (silicone-free)

12.3 Hybrid cable type "B" and "B/2,5"





12.3.1 Mechanical design



1031705739

Cable type	B	B/2.5
	8145172	13284363
• Supply cores:	4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>
• Control core pair:	2 x 0.75 mm <sup>2</sup>	2 x 0.75 mm <sup>2</sup>
• Control core group:	3 x 0.75 mm <sup>2</sup>	3 x 0.75 mm <sup>2</sup>
• Conductor insulation:	TPE-E (Polyester)	TPE-E (Polyester)
• Conductor:	Bare E-Cu litz wire, extra fine wires with individual wire 0.1 mm	
• Shield:	E-Cu wire, tinned	E-Cu wire, tinned
• Overall diameter:	13.2 – 13.8 mm	14.4 – 15.2 mm
• Color of outer cable jacket:	Black	Black
• Outer cable jacket insulation:	TPE-U (Polyurethane)	TPE-U (Polyurethane)

12.3.2 Electrical properties

Cable type	B	B/2,5
• Conductor resistance for 1.5/2.5 mm <sup>2</sup> (at 20° C):	Max. 13 Ω/km	Max. 8 Ω/km
• Conductor resistance for 0.75 mm <sup>2</sup> (at 20° C):	Max. 26 Ω/km	Max. 26 Ω/km
• Operating voltage for 1.5/2.5 mm <sup>2</sup> conductor:	Max. 600 V according to 	Max. 600 V according to 
• Operating voltage for 0.75 mm <sup>2</sup> conductor:	Max. 600 V according to 	Max. 600 V according to 
• Insulation resistance at 20° C:	Min. 20 MΩ x km	Min. 20 MΩ x km

21914796/EN – 09/2015

### 12.3.3 Mechanical properties

- Suitable for cable carriers
  - Bending cycles > 2.5 million
  - Travel speed ≤ 3 m/s
- Bending radius
  - in the cable carrier: 10 x diameter
  - for fixed installation: 5 x diameter
- Torsional strength (e.g. rotary table applications)
  - Torsion ± 180° for a cable length of > 1 m
  - Torsional cycles > 100 000



## INFORMATION



You will have to check the mechanical marginal conditions if you encounter reversed bending and high torsional load for a length of < 3 m. Please contact SEW-EURODRIVE in such cases.

12

### 12.3.4 Thermal properties

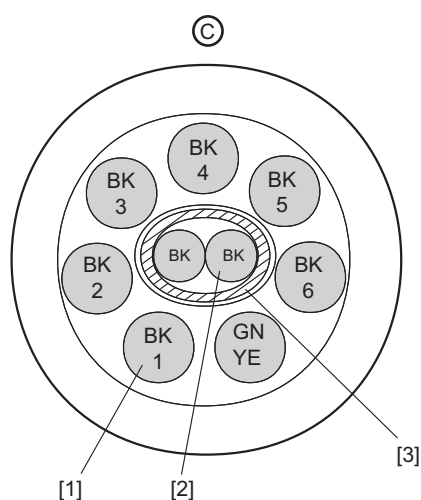
- Processing and operation: -30 to +90 °C (current-carrying capacity according to DIN VDE 0298-4)
  - 30 to +80 °C according to  US
- Transport and storage: -40 to +90 °C (current-carrying capacity according to DIN VDE 0298-4)
  - 30 to +80 °C according to  US
- Flame-retardant according to UL1581 Vertical Wiring Flame Test (VW-1)
- Flame-retardant according to CSA C22.2 Vertical Flame Test (FT-1)

### 12.3.5 Chemical properties

Cable type	B	B/2,5
• Oil resistant:	In accordance with VDE 0472 part 803, method B	In accordance with VDE 0282 part 10 HD 22.10 S1
• General fuel resistance (such as diesel, gasoline) according to DIN ISO 6722 parts 1 and 2		
• General resistance to acids, alkalis, cleaning agents		
• General resistance against dusts (e.g. bauxite, magnesite)		
• Insulation and cable jacket material is halogen free in accordance with VDE 0472 part 815		
• Within the specified temperature range, free from paint-wetting impairment substances (silicone free)		

### 12.4 Hybrid cable type "C"

#### 12.4.1 Mechanical design



1484841483

- [1] Cores 2.5 mm<sup>2</sup>
- [2] Cores 0.75 mm<sup>2</sup>
- [3] Shield

#### Cable type

**C**

0152072

- Supply cores: 7 x 2.5 mm<sup>2</sup>
- Control cores: 2 x 0.75 mm<sup>2</sup>
- Insulation: PVC
- Conductor: Fine wires to VDE0295 class 5, copper strand conductor
- Shield: Aluminum-laminated foil and tin-plated Cu wires
- Overall diameter: approx. 15.2 mm
- Color of outer cable jacket: Gray

#### 12.4.2 Electrical properties

- Conductor resistance for 2.5 mm<sup>2</sup>: 8.5 Ω/km
- Conductor resistance for 0.75 mm<sup>2</sup>: 26 Ω/km
- Operating voltage for 2.5 mm<sup>2</sup> cores: 600 V/1000 V
- Operating voltage for 0.75 mm<sup>2</sup> cores: AC 48 V
- Insulation resistance: 20 MΩ x km

#### 12.4.3 Mechanical properties

- Bending radius      In the cable carrier: 20 x diameter  
For fixed routing: 6 x diameter

12

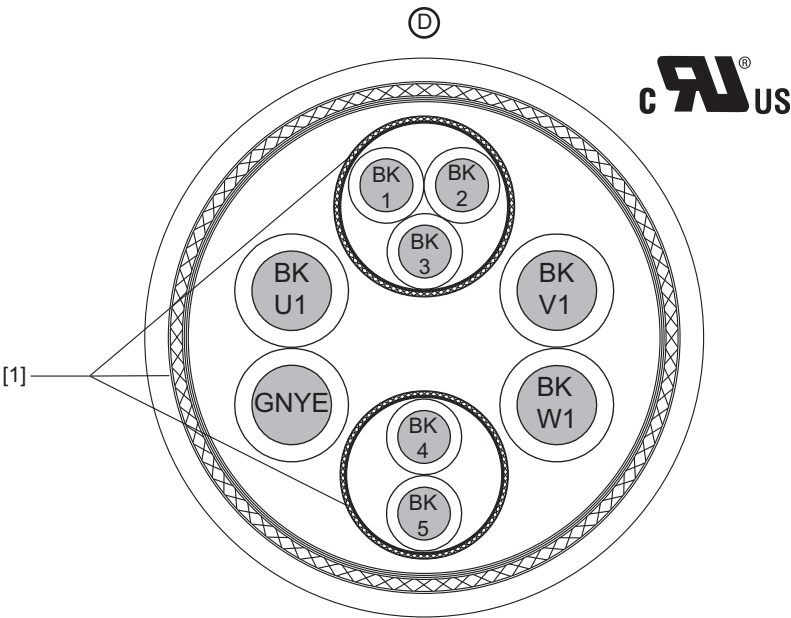
#### 12.4.4 Thermal properties

- Processing and operation:  
Flexible routing: -5 °C – +70 °C (current-carrying capacity to DIN VDE 0298-4)  
Fixed installation: -30 °C – +80 °C (current-carrying capacity to DIN VDE 0298-4)
- Transport and storage: -30 °C – +80 °C (current-carrying capacity to DIN VDE 0298-4)

12.5 Hybrid cable type "D"

12.5.1 Mechanical design

The following figure shows the mechanical structure of the cable:



5436771083

[1] Shield

Cable type	D/1.5 18110886	D/2.5 11747013	D/4.0 18119573	D/6.0 11747021	D/10.0 11747048
Supply cores	4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>	4 x 4.0 mm <sup>2</sup>	4 x 6.0 mm <sup>2</sup>	4 x 10.0 mm <sup>2</sup>
Control core pair	2 x 0.75 mm <sup>2</sup>	2 x 0.75 mm <sup>2</sup>	2 x 0.75 mm <sup>2</sup>	2 x 0.75 mm <sup>2</sup>	2 x 0.75 mm <sup>2</sup>
Brake control	3 x 1.0 mm <sup>2</sup>	3 x 1.0 mm <sup>2</sup>	3 x 1.5 mm <sup>2</sup>	3 x 1.5 mm <sup>2</sup>	3 x 1.5 mm <sup>2</sup>
Conductor insulation	PP (polypropylene)				
Conductor	Bare E-Cu litz wire, extra fine wires with individual wire 0.15 mm				
Shield	E-Cu wire, tinned				
Overall diameter	13.9 mm	17.2 mm	19.0 mm	21.5 mm	25.3 mm
Color of outer cable jacket	Orange				
Outer cable jacket insulation	TPE-U (Polyurethane)				

21914796/EN – 09/2015



### 12.5.2 Properties

All cable types have the following properties:

- Maximum 600 V operating voltage for all cores
- Approved according to European and American standards
- Suitable for cable carriers
  - Bending cycles > 5 million
  - Travel speed  $\leq 3 \text{ ms}^{-1}$
  - Min. bending radius: 10 x cable diameter
- Minimum bending radius for fixed installation: 5 x cable diameter
- Resistance against oil according to VDE 0250 part 407
- General resistance to acids, alkalis, cleaning agents
- General resistance against dusts (e.g. bauxite, magnesite)
- Insulation and sheath material halogen-free
- Within the specified temperature range, free from substances interfering with wetting agents (silicone-free)
- Flame retardant according to VDE 0472 part 804 (method B IEC 60 332-1)
- Temperature range for processing and operation:

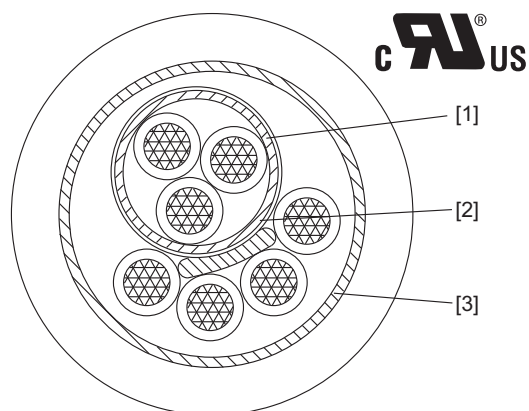
Fixed installation	Cable carrier installation
-40 °C – +90 °C (current-carrying capacity to DIN VDE 0298-4)	-5 °C – +90 °C (current-carrying capacity to DIN VDE 0298-4)
-30 °C – +80 °C according to UL758	-5 °C – +80 °C according to UL758

- Temperature range for transportation and storage:
  - -40 °C – +90 °C (current-carrying capacity to DIN VDE 0298-4)
  - -30 °C – +80 °C according to UL758

### 12.6 Hybrid cable type "E"

#### 12.6.1 Mechanical design

The following figure shows the mechanical structure of the cable:



5436773643

- [1] Shielded "three-conductor" cable
- [2] EMC shielding, "three-conductor" cable
- [3] Plaiting for complete EMC shielding

Cable type	E/1.5 01768948	E/2.5 01768956	E/4.0 00150509	E/6.0 00150630
Supply cores	4 x 1.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>	4 x 4.0 mm <sup>2</sup>	4 x 6.0 mm <sup>2</sup>
Brake control	3 x 1.0 mm <sup>2</sup>	3 x 1.0 mm <sup>2</sup>	3 x 1.0 mm <sup>2</sup>	3 x 1.5 mm <sup>2</sup>
Conductor insulation	TPM			
Conductor	Blank CU litz wire			
Shield	Made of tinned Cu wire			
Overall diameter	15.0 mm	16.3 mm	15.3 mm	17.4 mm
Color of outer cable jacket	Orange			
Outer cable jacket insulation	PUR (polyurethane)			

### 12.6.2 Properties

All cable types have the following properties:

- Maximum 600 V operating voltage for all cores
- Approved according to European and American standards
- Suitable for cable carriers
  - Bending cycles > 5 million
  - Travel speed  $\leq 3 \text{ ms}^{-1}$
  - Min. bending radius: 10 x cable diameter
- Minimum bending radius for fixed installation: 5 x cable diameter
- Resistance against oil according to VDE 0250 part 407
- General resistance to acids, alkalis, cleaning agents
- General resistance against dusts (e.g. bauxite, magnesite)
- Insulation and sheath material halogen-free
- Within the specified temperature range, free from substances interfering with wetting agents (silicone-free)
- Flame retardant according to VDE 0472 part 804 (method B IEC 60 332-1)
- Temperature range for processing and operation:
  - $-50 \text{ }^{\circ}\text{C} - +80 \text{ }^{\circ}\text{C}$
  - $-20 \text{ }^{\circ}\text{C} - +60 \text{ }^{\circ}\text{C}$
- Temperature range for transportation and storage:
  - $-40 \text{ }^{\circ}\text{C} - +90 \text{ }^{\circ}\text{C}$  (current-carrying capacity to DIN VDE 0298-4)
  - $-30 \text{ }^{\circ}\text{C} - +80 \text{ }^{\circ}\text{C}$  according to UL758