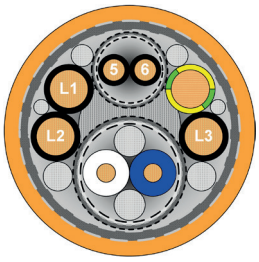
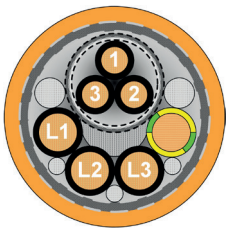
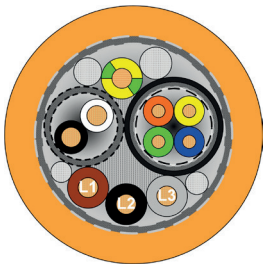
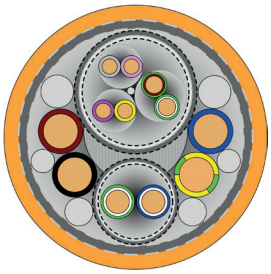
Data sheet
chainflex® CF220.UL.H

Hybrid servo cable (Class 4.2.2.1) ● For medium duty applications ● PVC outer jacket ● Shielded ● Oil-resistant ● Flame retardant

Example image

Sick (Hiperface DSL)	SEW-EURODRIVE	Siemens (SINAMICS S210)
CF220.UL.H100.07.04- CF220.UL.H102.25.04	CF220.UL.H203.15.04	CF220.UL.H300.03.04- CF220.UL.H304.15.04
		

B&R
CF220.UL.H501.15.04


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Example image

Cable structure

Conductor	Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality, especially low-capacitance XLPE mixture. **CF220.UL.H3xx:** Mechanically high-quality, especially low-capacitance TPE mixture.
Core structure	Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.
Core identification	According to Servo-Hybrid specification.
Element shield	Bending-resistant braiding made of tinned copper wires.
Intermediate layer	Foil taping over the outer layer.
Overall shield	Bending-resistant braiding made of tinned copper wires. Coverage approx. 55 % linear, approx. 80 % optical
Outer jacket	Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1). **Colour:** Pastel orange (similar to RAL 2003) **Printing:** black

„00000 m“* igus chainflex CF220.UL.-.-.-.-① ---② 600/1000V E310776

cЯUus AWM Style ③ VW-1 AWM I/II A/B 80°C ④ FT1 CE

RoHS-II conform www.igus.eu +++ chainflex cable works +++

*** Length printing:** Not calibrated. Only intended as an orientation aid.
① / ② Cable identification according to Part No. (see technical table).
③ / ④ Printing of the UL Style / Voltage (see related chapter).
Example: ... chainflex **CF220.UL.H101.10.04 (4G1.0+(2x0.75)C+(2xAWG22)C)C 600/1000V** ...

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igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

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Example image

Dynamic information

Bend radius	e-chain® linear	min. 10 x d
	flexible	min. 8 x d
	fixed	min. 5 x d
Temperature	e-chain® linear	+5 °C up to +70 °C
	flexible	-5 °C up to +70 °C (following DIN EN 60811-504)
	fixed	-15 °C up to +70 °C (following DIN EN 50305)
v max.	unsupported	10 m/s
	gliding	2 m/s
a max.		50 m/s²
Travel distance		Unsupported travels and up to 10 m for gliding applications, Class 2

These values are based on specific applications or tests. They do not represent the limit of what is technically feasible.

Garantierte Lebensdauer gemäß Garantie-Bedingungen

Double strokes	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [x d]	R min. [x d]	R min. [x d]
+5/+15	12,5	13,5	14,5
+15/+60	10	11	12
+60/+70	12,5	13,5	14,5

Minimum guaranteed service life of the cable under the specified conditions.
The installation of the cable is recommended within the middle temperature range.

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Hybrid servo cable (Class 4.2.2.1) ● For medium duty applications ● PVC outer jacket ● Shielded ● Oil-resistant ● Flame retardant

Example image

Eigenschaften und Zulassungen

UV resistance	medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
PFAS-free	Use of PFAS-free materials according to the content of the REACH directive and its rules for the production and processing of chemical substances
UL verified	Certificate No. V293560: „igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
UL/CSA AWM	See table UL/CSA AWM for details
NFPA	Following NFPA 79-2018, chapter 12.9
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Bleifrei	Following 2011/65/EC (RoHS-II/RoHS-III)
Reinraum	According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Properties and approvals

UL/CSA AWM Details

Part No.	UL style core insulation	UL style outer jacket	UL Voltage Rating [V]	UL Temperature Rating [°C]
CF220.UL.H10x.xx.xx	3646 11807 (AWG22)	2570	1000	80
CF220.UL.H203.15.04	3646	2570	1000	80
CF220.UL.H300.03.04 **CF220.UL.H301.07.04**	10467 11602 (AWG26)	2464	300	80
CF220.UL.H304.15.04	10492 11807 (AWG26)	2570	1000	80
CF220.UL.H501.15.04	3646 10867 (0.14/0.25/0.75 mm²)	2570	1000	80

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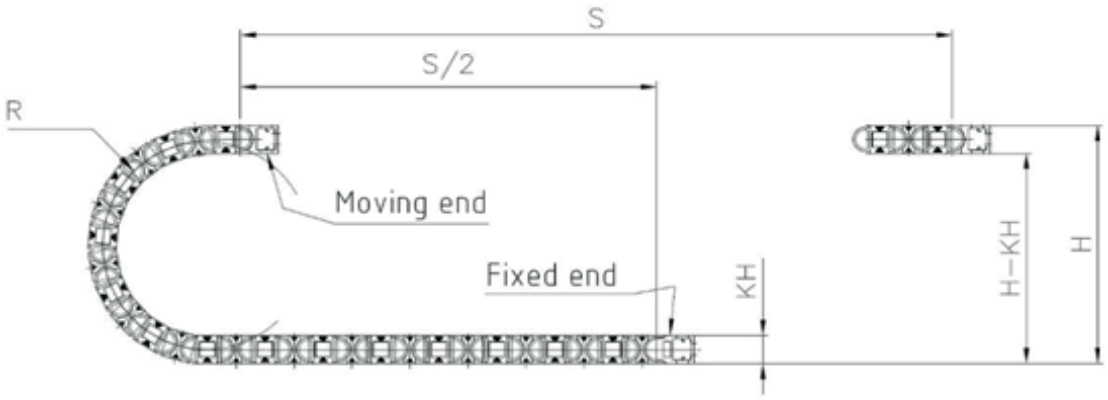
Example image

Typical lab test setup for this cable series

Test bend radius R	appro. 125 - 175 mm
Test travel S/S_2	approx. 1 - 15 m
Test duration	minimum 2 - 4 million double strokes
Test speed	approx. 0.5 - 2 m / s
Test acceleration	approx. 0.5 - 1.5 m / s^2



Typical application areas

- For medium duty applications, Class 4
- Unsupported travel distances and up to 10 m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

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Example image

Technical tables:

Mechanical information

Art.-Nr.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
Sick (Hiperface DSL)				
CF220.UL.H100.07.04	(4G0.75+(2x0.34)C+(2xAWG22)C)C	11.5	106	166
CF220.UL.H101.10.04	(4G1.0+(2x0.75)C+(2xAWG22)C)C	12.0	129	200
CF220.UL.H101.15.04	(4G1.5+(2x0.75)C+(2xAWG22)C)C	13.0	151	226
CF220.UL.H102.25.04	(4G2.5+(2x1.0)C+(2xAWG22)C)C	14.5	199	289
SEW-EURODRIVE				
CF220.UL.H203.15.04	(4G1.5+(3x1.0)C)C	11.5	133	201
SINAMICS S210				
CF220.UL.H300.03.04 [7)]	(4Gx0.34+(2x0.34)C+(4xAWG26)C)C	10.0	78	128
CF220.UL.H301.07.04 [7)]	(4Gx0.75+(2x0.5)C+(4xAWG26)C)C	11.0	99	149
CF220.UL.H304.15.04	(4G1.5+(2x1.5)C+(4xAWG26)C)C	13.0	159	234
Heidenhain				
CF220.UL.H501.15.04	(4G1.5+(2x0.75)C+(2x2x0.14+2x0.25)C)C	13.5	150	240

[7)] Nominal voltage 300/500 V (following DIN VDE 0298-3), 300 V (following UL)

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core **x =** without earth core

Electrical information

Conductor nominal cross section	Maximum conductor resistance at 20 °C (following DIN EN 50289-1-2) [Ω/km]	Maximum current rating at 30 °C (following DIN VDE 0298-4) [A]
0.34 (AWG22)	59.0	7
0.75	26.0	13
1	19.5	15
1.5	13.3	19
2.5	8.0	27
4	4.95	34

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

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chainflex® CF220.UL.H

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Example image

Capacities

Part No.	Control cores Core/Core Capacity [approx. pF / m]	Control cores Core/Shield Capacity [approx. pF / m]	Power cores Core/Core Capacity [approx. pF / m]	Power cores Core/Shield Capacity [approx. pF / m]
Sick (Hiperface DSL)				
CF220.UL.H100.07.04	60	105	75	130
CF220.UL.H101.10.04	95	155	100	175
CF220.UL.H101.15.04	80	140	100	175
CF220.UL.H102.25.04	105	185	120	210
SEW-EURODRIVE				
CF220.UL.H203.15.04	80	140	100	175
Siemens (SINAMICS S210)				
CF220.UL.H300.03.04	60	105	85	155
CF220.UL.H301.07.04	70	130	85	155
CF220.UL.H304.15.04	90	155	135	245
B&R				
CF220.UL.H501.15.04	85	150	105	185

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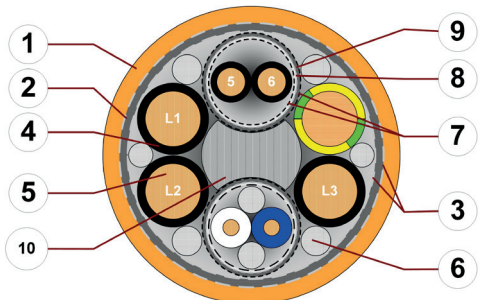
Example image

Sick (Hiperface DSL)

CF220.UL.H100.07.04-CF220.UL.H102.25.04



Example image
For detailed overview please see design table

1. Outer jacket: Pressure extruded PVC mixture
2. Overall shield: Extremely bending-stable braid made of tinned copper wires
3. Banding: Plastic fleece
4. Core insulation: Mechanically high-quality, especially low-capacitance XLPE mixture
5. Conductor: Especially bending-resistant version consisting of bare copper wires
6. Filling: Plastic yarns
7. Element banding: Plastic foil
8. Shield foil: Aluminium-coated polyester foil
9. Element shield: Bending-resistant braiding made of tinned copper wires
10. Strain relief: Tensile stress-resistant centre element

Electrical information

Bus element	Hiperface DSL
Characteristic wave impedance (following DIN EN 50289-1-11)	110 ± 10 Ω (10 MHz)
Operating capacity	45 pF/m

U	**Nominal voltage**	600/1000 V (following DIN VDE 0298-3) 1000 (following UL)
	Testing voltage	4000 V (following DIN EN 50395)

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Example image

Sick (Hiperface DSL)

CF220.UL.H100.07.04-CF220.UL.H102.25.04

Design table

Part No.	Core group	Colour code	Core design
CF220.UL.H100.07.04	4G0.75	3 black cores with white printing: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x0.34)C	2 black cores with white numbers 5 & 6	
	(2xAWG22)C)C	one core each in white and blue	
CF220.UL.H101.10.04	4G1.0	3 black cores with white printing: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x0.75)C	2 black cores with white numbers 5 & 6	
	(2xAWG22)C)C	one core each in white and blue	
CF220.UL.H101.15.04	4G1.5	3 black cores with white printing: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x0.75)C	2 black cores with white numbers 5 & 6	
	(2xAWG22)C)C	one core each in white and blue	
CF220.UL.H102.25.04	4G2.5	3 black cores with white printing: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x1.0)C	2 black cores with white numbers 5 & 6	
	(2xAWG22)C)C	one core each in white and blue	

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chainflex® CF220.UL.H

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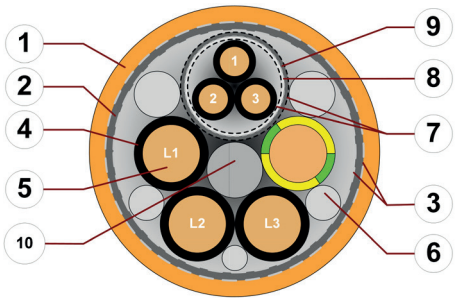
Example image

SEW-EURODRIVE

CF220.UL.H203.15.04



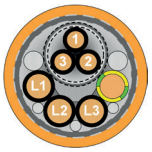
Example image
For detailed overview please see design table

1. Outer jacket: Pressure extruded PVC mixture
2. Overall shield: Extremely bending-stable braid made of tinned copper wires
3. Banding: Plastic fleece
4. Core insulation: Mechanically high-quality, especially low-capacitance XLPE mixture
5. Conductor: Especially bending-resistant version consisting of bare copper wires
6. Filling: Plastic yarns
7. Element banding: Plastic foil
8. Shield foil: Aluminium-coated polyester foil
9. Element shield: Bending-resistant braiding made of tinned copper wires
10. Strain relief: Tensile stress-resistant centre element

Electrical information

Coaxial element	SEW-EURODRIVE MOVILINK® DDI
Characteristic wave impedance (following DIN EN 50289-1-11)	50 ± 5 Ω (200 MHz)
Operating capacity	100 pF/m (800 kHz)
Nominal voltage	600/1000 V (following DIN VDE 0298-3) 1000 V (following UL)
Testing voltage	4000 V (following DIN EN 50395)

Design table

Part No.	Core group	Colour code	Core design
CF220.UL.H203.15.04 (SEW-EURODRIVE Kabeltyp E/1,5)	4G1.5	3 black cores with white printing: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(3x1.0)C)C	3 black cores with white numbers 1 - 3	

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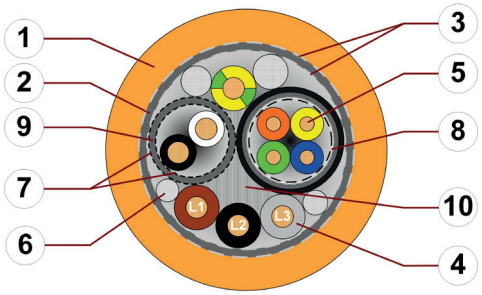
Siemens (SINAMICS S210)

CF220.UL.H300.03.04-CF220.UL.H304.15.04



Example image
For detailed overview please see design table

1. Outer jacket: Pressure extruded PVC mixture
2. Overall shield: Extremely bending-stable braid made of tinned copper wires
3. Banding: Plastic fleece
4. Core insulation: Mechanically high-quality, especially low-capacitance TPE mixture
5. Conductor: Especially bending-resistant version consisting of bare copper wires
6. Filling: Plastic yarns
7. Element banding: Plastic foil
8. Shield foil: Aluminium-coated polyester foil
9. Element shield: Bending-resistant braiding made of tinned copper wires
10. Strain relief: Tensile stress-resistant centre element

Electrical information

Bus element	SINAMICS S210
Characteristic wave impedance (following DIN EN 50289-1-11)	100 ± 15 Ω (1-10 MHz)
Operating capacity	50 pF/m
Nominal voltage	300/500 V (following DIN VDE 0298-3) 300 V (following UL) **CF220.UL.H304.15.04:** 1000 V (following UL)
Testing voltage	2000 V (following DIN EN 50395)

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Example image

Siemens (SINAMICS S210)

CF220.UL.H300.03.04-CF220.UL.H304.15.04

Design table

Part No.	Core group	Colour code	Core design
CF220.UL.H300.03.04	4G0.34	one core each in grey, black and brown: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x0.34)C	one core each in black and white	
	(4xAWG26)C	one core each in yellow, blue, green and orange	
CF220.UL.H301.07.04	4G0.75	one core each in grey, black and brown: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x0.5)C	one core each in black and white	
	(4xAWG26)C	one core each in yellow, blue, green and orange	
CF220.UL.H304.15.04	4G1.5	one core each in grey, black and brown: **1. Core:** U/L1/C/L+ **2. Core:** V/L2 **3. Core:** W/L3/D/L- followed by one green-yellow core	
	(2x1.5)C	one core each in black and white	
	(4xAWG26)C	one core each in yellow, blue, green and orange	

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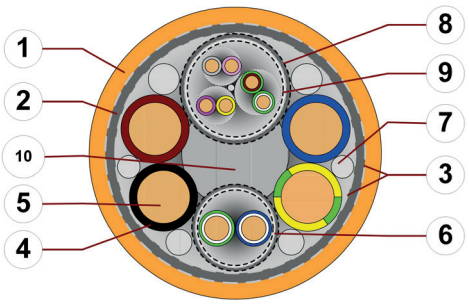
Example image

B&R

CF220.UL.H501.15.04



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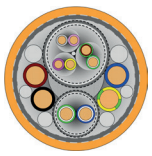
6. Filling: Plastic yarns
7. Element banding: Plastic foil
8. Shield foil: Aluminium-coated polyester foil
9. Element shield: Bending-resistant braiding made of tinned copper wires
10. Strain relief: Tensile stress-resistant centre element

Electrical information

Nominal voltage	600/1000 V (following DIN VDE 0298-3) 1000 V (following UL)
Testing voltage	4000 V (following DIN EN 50395)

Design table

Part No.	Core group	Colour code	Core design
CF220.UL.H501.15.04	4G1.5	one core each in black, brown, blue, followed by one green-yellow core	
	(2x0.75)C	one core each in white-blue and white-green	
	2x2x0.14	2 pairs in pink/grey and yellow/violet	
	2x0.25	one core each in brown-green and white-green	