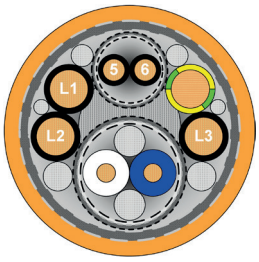
Data sheet
chainflex® CF220.UL.H

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)

CF220.UL.H100.07.04-
CF280.UL.H102.40.04



Guarantee igus chainflex 36 month guarantee

igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

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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.
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 2570 VW-1 AWM I/II A/B 80°C 1000V FT-1 EAC/CTP

CE RoHS-II conform www.igus.de +++ chainflex cable works +++

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

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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.

Guaranteed service life according to guarantee conditions

Double strokes	5 million	7.5 million	10 million
Temperature, from/to [°C]	R min. [factor x d]	R min. [factor x d]	R min. [factor 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.

Electrical information

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

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Example image

Properties and approvals

Resistance to weathering	Medium
Oil resistance	Oil-resistant (following DIN EN 50363-4-1), Class 2
Flame retardant	According to IEC 60332-1-2, FT1, VW-1
Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL verified	Certificate No. B129699: „igus 36-month 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
EAC	Certificate No. RU C-DE.ME77.B.02324 (TR ZU)
CTP	Certificate No. C-DE.PB49.B.00420 (Fire protection)
REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
Cleanroom	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.H100.07.04	10989	2570	1000	80
CF220.UL.H101.10.04	10989	2570	1000	80
CF220.UL.H101.15.04	10989	2570	1000	80
CF220.UL.H102.25.04	10989	2570	1000	80
CF220.UL.H102.40.04	10989	2570	1000	80

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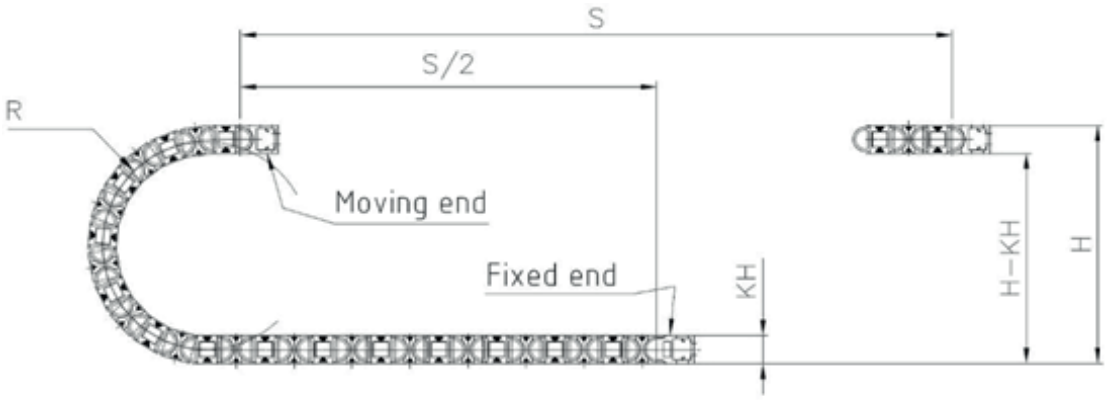
Example image

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

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF220.UL.H100.07.04	(4G0.75+(2x0.34)C+(2xAWG22)C)C	12.0	110	214
CF220.UL.H101.10.04	(4G1.0+(2x0.75)C+(2xAWG22)C)C	12.0	133	202
CF220.UL.H101.15.04	(4G1.5+(2x0.75)C+(2xAWG22)C)C	13.0	156	230
CF220.UL.H102.25.04	(4G2.5+(2x1.0)C+(2xAWG22)C)C	14.5	203	348
CF220.UL.H102.40.04	(4G4.0+(2x1.0)C+(2xAWG22)C)C	16.5	281	434

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
1.0	19.5	15
1.5	13.3	19
2.5	8.0	27
4.0	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.

Capacities

	Control cores		Power cores	
	Core/Core	Core/Shield	Core/Core	Core/Shield
Part No.	Capacity [approx. pF / m]	Capacity [approx. pF / m]	Capacity [approx. pF / m]	Capacity [approx. pF / m]
Sick (Hiperface DSL)				
CF220.UL.H100.07.04	75	130	60	105
CF220.UL.H101.10.04	100	175	95	155
CF220.UL.H101.15.04	100	175	80	140
CF220.UL.H102.25.04	120	210	105	185

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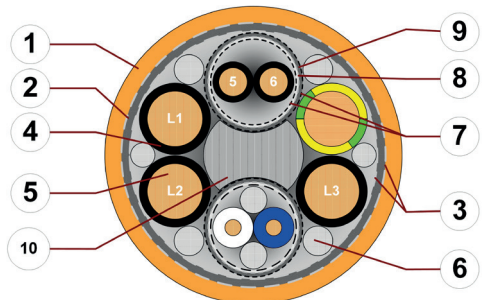

Example image
For detailed overview please see design table

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

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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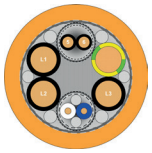
CF220.UL.H100.07.04-CF220.UL.H102.40.04

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	
CF220.UL.H102.40.04	4G4.0	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	
	(2x1.0)C	2 black cores with white numbers 5 & 6	
	(2xAWG22)C	one core each in white and blue	