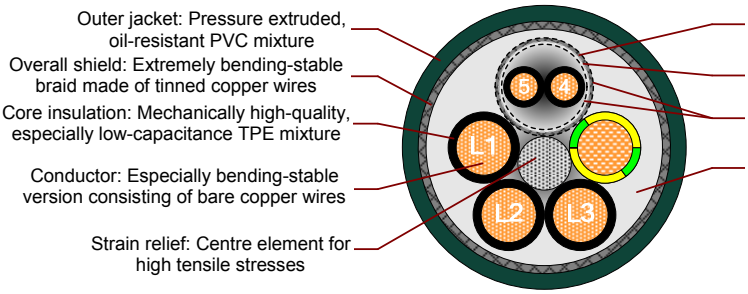
chainflex® cable works. CF21.UL

PVC - e-chain® - servo cable for high load requirements (class 5.2.2): shielded, oil-resistant as well as flame-retardant.



Example drawing
(For a detail overview see construction table)

Core design:

Conductor:
≤ 2,5 mm²: Fine-wire strand in especially bending-stable version consisting of bare copper wires (following DIN EN 60228).
≥ 4 mm²: Conductor strand in especially bending-stable version made of bare copper wires (following DIN EN 60228).

Core insulation: Mechanically high-quality, especially low-capacitance TPE mixture.

Core identification:
Energy cores: 3 Black cores with white printing & one core greenyellow
1st Core: U/L1/C/L+ 2nd Core: V/L2 3rd Core: W/L3/D/L-
1 signal pair:
1st signal pair: Black cores with white numerals 4 & 5
2 signal pairs:
1st signal pair: Black cores with white numerals 5 & 6
2nd signal pair: Black cores with white numerals 7 & 8

Shield design:

Material: Extremely bending-stable braid made of tinned copper wires.

Shield coverage: **Linear:** approx. 70 % **Optical**: approx. 90 %

Jacket design:

Inner jacket: PVC mixture adapted to suit the requirements in e-chains®.

Outer jacket: Low-adhesion mixture on the basis of PVC (following DIN VDE 0281-5), abrasion- and bending-stable, adapted to suit the requirements in e-chains®.
- oil-resistant (following DIN EN 50363-4-1)
- flame-retardant (following IEC 60332-1-2, CEI 20-35, VW-1 & FT-1)
- silicon-free (following PV 3.10.7 - status 1992)
- lead-free (following 2011/65/EU (RoHS-II))
- clean room ISO class 2 (following DIN ISO 14644-1 tested by IPA)
- UV-resistance: Medium

Colour outer jacket: Moos green (similar to RAL 6005)

Cable marking (White):
„00000 m“* igus chainflex CF21.-.-.-.-.UL① ---② 600/1000V E310776
cRUus AWM Style 2570 VW-1 AWM I/II A/B 80°C 1000V FT-1 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 for details).
Ex.: CF21.15.15.02.01.UL: ⇒ … igus chainflex CF21.15.15.02.01.UL (4G1,5+(2x1,5)C)C 600/1000V …

Date	Author
23 Jul. 2014	D. Borsberg

CF21.UL

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General mechanical values:
(for individual details see technical table)

Guaranteed lifetime for this series according to the "chainflex® guarantee club" conditions (see chainflex® catalogue and www.igus.eu/chainflex-guarantee)				
Double strokes*		**5 million**	**7,5 million**	**10 million**
Temperature (from/to) [°C]	**Travel distance (TD)**	Min. bending radius for e-chain® use [Factor multiplied by outer diameter (d)] (Ex.: CF21.15.15.02.01.UL at 20°C: 7,5 x 13,0 mm ➔ Min. bending radius 97,5 mm)		
+5✦ / +15	≤ 100 m	10,0	11,0	12,0
+15 / +60		7,5	8,5	9,5
+60 / +70		10,0	11,0	12,0

**: Minimum guarantee lifetime of the cable under the specified conditions. ✦: -5 °C at ≤ 50.000 strokes (following DIN EN 60811)*
The installation of the cable is recommended within the middle temperature range.

Temperature range	**-20 °C ←**	**+5 °C ←**	**+15 °C ←→ +60 °C**	**→ +70 °C**
Min. bending radius for fixed installation	10,0 x d	7,5 x d	5,0 x d	7,5 x d
Torsion (at 1 m cable length)	---	±0 °	±30 °	±0 °

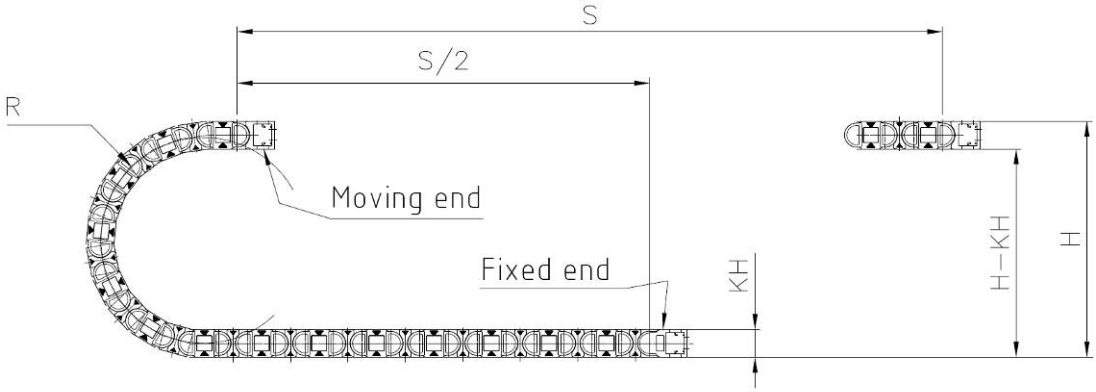
General electrical values:
(for individual details see technical table)

Nominal voltage: 600 / 1000 V (following DIN VDE 0250)
Test voltage: 4 kV (following VDE 0281-2)
Certifications: cULus: (E310776: Style 10492 & 2570, 1000 V / 80 °C)
Guidelines: CE, NFPA (following 79-2012 chapter 12.9), EAC & TR (CTP)

Dynamic values:
Max. speed in e-chain® use:** **Unsupported:** v = 10 m / s **Gliding (up to 100 m):** v = 5 m / s
Max. acceleration in e-chain® use:** a = 80 m / s²

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

Typical lab test setup for this cable group:
Test bending radius R: approx. 75 - 250 mm
Test travel S: approx. 1 - 15 m
Test period: min. 2 - 4 million double strokes
Test speed: approx. 0,5 - 2 m / s
Test acceleration: approx. 0,5 - 1,5 m / s²



e-chain® - servo cable for high load requirements:
- for areas of application of low oil influence
- for unsupported travel distances and up to 100 m in gliding applications
- CE, RoHS-II, cULus, NFPA, EAC & TR (CTP)

Typical application areas:
Preferably indoor applications, but also outdoor ones at temperatures > 5 °C.
Storage and retrieval units for high-bay warehouses, machining units / packaging machines, quick handling, indoor cranes.

+++ chainflex® cable works +++

igus® chainflex® CF21.UL

Image exemplary

chainflex® cable works.

CF21.UL

PVC - e-chain® - servo cable for high load requirements (class 5.2.2): shielded, oil-resistant as well as flame-retardant.

Technical tables:

Mechanical values:

① Part no.	② Number of cores & nominal cross section [mm²]***	External diameter (d)**** [max. mm]	Copper index [kg / km]	Weight [kg / km]
1 signal pair				
CF21.07.05.02.01.UL	(4G0,75+(2x0,5)C)C	11,5	95	185
CF21.15.15.02.01.UL	(4G1,5+(2x1,5)C)C	13,0	144	280
CF21.25.15.02.01.UL	(4G2,5+(2x1,5)C)C	14,0	197	312
CF21.40.10.02.01.UL	(4G4,0+(2x1,0)C)C	15,5	243	390
CF21.40.15.02.01.UL	(4G4,0+(2x1,5)C)C	16,0	256	412
CF21.60.10.02.01.UL	(4G6,0+(2x1,0)C)C	18,0	334	547
CF21.60.15.02.01.UL	(4G6,0+(2x1,5)C)C	18,5	357	605
CF21.100.15.02.01.UL	(4G10,0+(2x1,5)C)C	22,5	540	925
CF21.160.15.02.01.UL	(4G16,0+(2x1,5)C)C	24,5	716	1165
CF21.250.15.02.01.UL	(4G25,0+(2x1,5)C)C	29,5	1056	1466
CF21.350.15.02.01.UL	(4G35,0+(2x1,5)C)C	33,0	1557	2090
2 signal pairs				
CF21.07.03.02.02.UL	(4G0,75+2x(2x0,34)C)C	12,5	113	217
CF21.10.07.02.02.UL	(4G1,0+2x(2x0,75)C)C	13,5	146	277
CF21.15.07.02.02.UL	(4G1,5+2x(2x0,75)C)C	14,5	175	324
CF21.25.15.02.02.UL	(4G2,5+2x(2x1,5)C)C	17,0	265	450
CF21.40.15.02.02.UL	(4G4,0+2x(2x1,5)C)C	18,5	313	527
CF21.60.15.02.02.UL	(4G6,0+2x(2x1,5)C)C	21,0	409	712
CF21.100.15.02.02.UL	(4G10,0+2x(2x1,5)C)C	24,0	594	1025
CF21.160.15.02.02.UL	(4G16,0+2x(2x1,5)C)C	27,0	790	1270
CF21.250.15.02.02.UL	(4G25,0+2x(2x1,5)C)C	31,0	1140	1910
CF21.350.15.02.02.UL	(4G35,0+2x(2x1,5)C)C	34,0	1597	2175

*** *G ⇒ Cable contains a greenyellow core.*
**** *External diameters are maximum values and may tend toward lower tolerance limits.*

Electrical values (resistance & max. load):

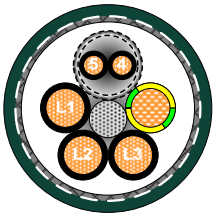
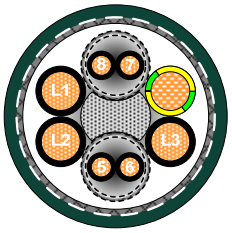
Nominal cross section [mm²]	Conductor resistance [approx. Ω / km] at 20 °C	Max. current rating [A] at 30 °C♦
(following)	DIN EN 50289-1-2	DIN VDE 0298-4
0,34	57	7
0,5	39	10
0,75	26	14
1,5	13,3	21
2,5	7,98	30
4,0	4,95	41
6,0	3,3	53
10,0	1,91	74
16,0	1,21	99
25,0	0,78	131
35,0	0,554	162

♦ *The max. current rating depends on factors such as the individual environmental conditions and the type of installation.*

CF21.UL

PVC - e-chain® - servo cable for high load requirements (class 5.2.2): shielded, oil-resistant as well as flame-retardant.

Construction table:

Part no. / No. of cores	Cable construction	Part no. / No. of cores	Cable construction
CF21.XX.XX.02.01.UL		CF21.XX.XX.02.02.UL	
4+2		4+2x2	

Head of Business Unit chainflex® cables
RR
igus® checked

Head of R+D chainflex® cables
MG
igus® checked