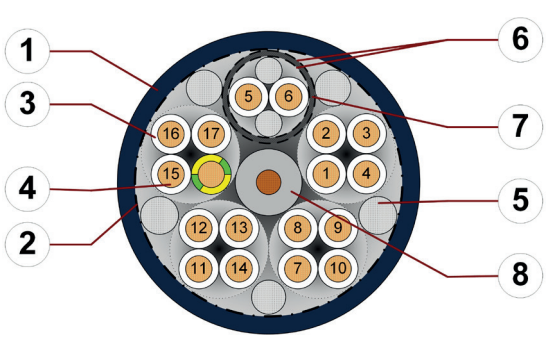
Data sheet
chainflex® CFROBOT9

Hybrid cable (Class 6.1.3.3) ● For torsion applications ● PUR outer jacket ● Unshielded/ shielded ● Oil-resistant and coolant-resistant ● Flame retardant ● PVC and halogen-free ● Notch-resistant ● Hydrolysis and microbe-resistant



1. Outer jacket: Pressure extruded PUR mixture
2. Overall banding: Plastic fleece over a plastic tape
3. Core insulation: Mechanically high-quality TPE mixture
4. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires
5. Filling: Plastic yarns
6. Element banding: Plastic fleece
7. Element shield: Extremely torsion-resistant wrapping made of tinned copper wires
8. Strain relief: Tensile stress-resistant and torsion-resistant centre element

Example image
For detailed overview please see design table

Example image

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	▶ Product range table
Element shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85 % optical
Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2) **Colour:** Steel-blue (similar to RAL 5011) **Printing:** white

„00000 m“ igus chainflex CFROBOT9.---① -----② E310776 cЯUus**

AWM Style 20317 VW-1 AWM I/II A/B 80°C 300V FT1 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 **CFROBOT9.004 16G1.0+(2x1.0)C E310776**

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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Example image

Dynamic information

Bend radius	e-chain® twisted	min. 10 x d
	flexible	min. 8 x d
	fixed	min. 5 x d
Temperature	e-chain® twisted	-25 °C up to +80 °C
	flexible	-40 °C up to +80 °C (following DIN EN 60811-504)
	fixed	-50 °C up to +80 °C (following DIN EN 50305)
v max.	twisted	180 °/s
a max.	twisted	60 °/s²
Travel distance	Robots and 3D movements, Class 1	

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

Cycles	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±150	±90	±30
-15/+70	±180	±120	±60
+70/+80	±150	±90	±30

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	300/500 V (following DIN VDE 0298-3) 300 V (following UL)
Testing voltage	2000 V (following DIN EN 50395)

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Example image

Properties and approvals

UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
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)
Halogen-free	Following DIN EN 60754
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.00300/19 (TR ZU)
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 1. The outer jacket material of this series complies with CF77. UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1
CE	Following 2014/35/EU

Properties and approvals

UL/CSA AWM Details

Conductor nominal cross section	UL style core insulation	UL style outer jacket	UL Voltage Rating	UL Temperature Rating
mm²			[V]	[°C]
0.25	10493	20317	300	80
1.0	10493	20317	300	80

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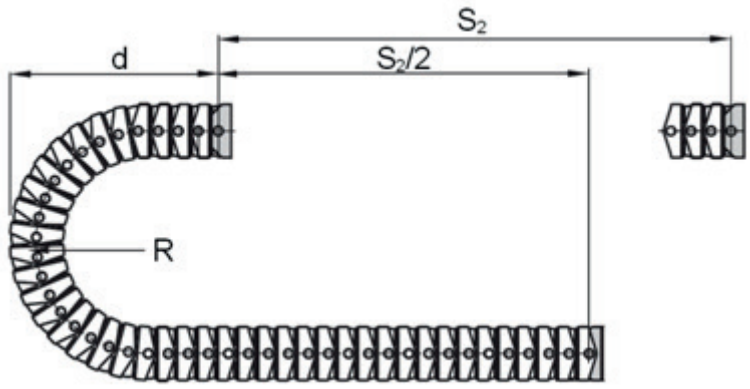
Example image

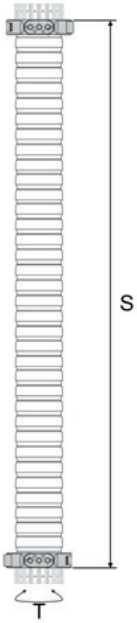
Typical lab test setup for this cable series

Test bend radius R	approx. 100 - 200 mm
Test travel S/S_2	approx. 1 - 12 m
Test duration	minimum 1.5 - 3 million double strokes
Test speed	approx. 0.5 m/s
Test acceleration	approx. 1.5 m/s²



Typical lab test setup (torsion) for this cable series

Torsion range T	±180°/m
Length 3D e-chains®	1 m
Test duration (torsion)	minimum 3 - 5 million cycles
Test speed (torsion)	approx. 80 - 120 °/s
Test acceleration (torsion)	approx. 40°/s²



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Example image

Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

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]
CFROBOT9.001	5G1.0+(2x1.0)C	10.0	82	136
CFROBOT9.004 [11)]	16G1.0+(2x1.0)C	15.5	194	307
CFROBOT9.006 [11)]	24G1.0+(2x1.0)C	19.0	280	453
CFROBOT9.007	(15x(2x0.25)C+(4x0.25)C)C	18.5	229	369
CFROBOT9.010	(4x(2x0.25)C)C	10.5	63	116

[11)] Phase-out model

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

Technical tables:

Electrical information

Conductor nominal cross section [mm²]	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]
0.25	81.0	5
1	20.0	17

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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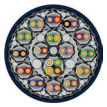
Example image

Design table

Part No.	Core group	Colour code	Core design
CFROBOT9.001	5G1.0	white with black numbers 1-4, one green-yellow core	
	(2x1.0)C	white with black numbers 5-6	
CFROBOT9.004	16G1.0	white with black numbers 1-4, 7-17, one green-yellow core	
	(2x1.0)C	white with black numbers 5-6	
CFROBOT9.005	23G1.0	white with black numbers 1-4, 7-24, one green-yellow core	
	(2x1.0)C	white with black numbers 5-6	
CFROBOT9.006	24G1.0	white with black numbers 1-4, 7-25, one green-yellow core	
	(2x1.0)C	white with black numbers 5-6	
CFROBOT9.007	15x(2x0.25)C	Colour code according to DIN 47100.	
	(4x0.25)C	white/green/brown/yellow(CAN-Bus)	
CFROBOT9.010	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red	

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