

Twistable cables



chainflex [®] cable	Jacket	Shield	Bend radius e-chain [®] [factor x d]	Temperature e-chain [®] from/to [°C]	Approvals and standards	Oil-resistant	Torsion-resistant	v max. [°/s] twisted	a max. [°/s ²] twisted	Page
Twistable cables										
Information about twistable cables										
Control cables										
CF77.UL.D	PUR		6.8	-25/+80	                 	✓	✓	180	60	376
CFROBOT2	PUR	✓	10	-25/+80	                 	✓	✓	180	60	380
Data cable										
CFROBOT3	PUR	✓	10	-25/+80	                 	✓	✓	180	60	382
Measuring system cable										
CFROBOT4	PUR	✓	10	-25/+80	                 	✓	✓	180	60	384
Fibre Optic Cable										
CFROBOT5	TPE		10	-35/+80	                 	✓	✓	180	60	388
Motor cables										
CFROBOT6	PUR		10	-25/+80	                 	✓	✓	180	60	390
CFROBOT7	PUR	✓	10	-25/+80	                 	✓	✓	180	60	392
Spindle cable/Single core										
CFROBOT	TPE	✓	10	-35/+90	                 	✓	✓	180	60	396
Bus cables										
CFROBOT8	PUR	✓	10	-25/+70	                 	✓	✓	180	60	398
CFROBOT8.PLUS	PUR	✓	10	-25/+70	                 	✓	✓	360	60	402
Hybrid cable										
CFROBOT9	PUR	✓	10	-25/+80	                 	✓	✓			406

36-month chainflex[®] guarantee
Guaranteed service life for predictable reliability
► Selection table page 374

With the help of the chainflex[®] service life calculator, you can quickly and easily calculate the expected service life of chainflex[®] cables specifically for your application:



www.igus.eu/chainflexlife



UL-verified chainflex[®] guarantee ... www.igus.eu/ul-verified

Ever more complex sequences of movements in industrial applications demand twistable or multi-axis flexible cables with a long service life, similar to the classic chainflex® cables for use in linear e-chain systems®.

Stranding, structure, shields and jacket materials must compensate both for major changes in bending load and changes in diameter due to torsional movements. To achieve this, different “soft” structural elements e.g. rayon fibres, PTFE elements or filling elements that absorb torsion forces are used in chainflex® CFROBOT cables.

Special demands are made on the braided shielding in torsion cables. Torsion-optimised shield structures are chosen that allow compensatory movements thanks to special PTFE gliding films.

With twistable bus cables in particular, the transmission characteristics such as attenuation, cable capacitance and signal quality must remain within very tight tolerance ranges over the whole service life. This is achieved through the use of particularly torsion optimised insulating materials and mechanical attenuation elements with matching capacitance values.

The highly abrasion-resistant, halogen-free and flame-resistant PUR jacket material in motor, hybrid/control cables and bus cables protects the torsion-optimised stranded elements from possible damage.

The highly abrasion-resistant, halogen-free TPE jacket achieves the special requirements of the twistable FOC and individual as well as the single core cables.

Unlike cables for linear e-chain systems®, the mechanical stress on these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined by design or during use by means of measurement. For this reason, and unlike the situation with linear e-chain® applications, a clear “yes/no” statement cannot be made about the use of a particular cable in torsion applications.

To enable evaluation to take place, based on sensible and comparable test results, the igus® “torsion test standard” was developed.

According to this standard, all chainflex® CFROBOT cables of a triflex® energy chain are twisted with a fixed point distance of one metre and a torsion of +/- 180° at least 3 million times.

In addition, a test is carried out on a test bench with a chain length of approx. 2,500mm with 270° torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur on an industrial robot.



All the non-shielded, gusset-filled extruded standard chainflex® control cables of the series CF130.UL, CF5, CF9 and CF9.UL correspond to the above igus® standard and have been approved for use in torsion applications.

The following twistable CFROBOT cable types are currently available:

- Control cable (shielded and unshielded)
- Data and measuring system cables
- Fibre optic cables
- Motor and servo cables
- Bus cables
- Hybrid cables

We can also offer you chainflex® CFROBOT cables pre-harnessed with the connectors of your choice as a readycable®, or as a ready-to-install readychain® system.



Test data ► Page 49

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chainflex[®] guarantee

Guaranteed service life ⁽¹⁾

chainflex [®] cables		Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Minimum bend radius [factor x d]	Minimum bend radius [factor x d]	Minimum bend radius [factor x d]	Page
Twistable cables					5 million cycles *	7.5 million cycles *	10 million cycles *	
Control cables								
	CF77.UL.D	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	376
	CFROBOT2	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	380
Data cable								
	CFROBOT3	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	382
Measuring system cable								
	CFROBOT4	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	384
Fibre Optic Cable								
	CFROBOT5	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	388
Motor cables								
	CFROBOT6	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	390
	CFROBOT7	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	392
Spindle cable/Single core								
	CFROBOT	-35 / -25 -15 / +80 +80 / +90	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	396
Bus cables								
	CFROBOT8	-25 / -15 -15 / +60 +60 / +70	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	398
	CFROBOT8.PLUS	-25 / -15 -15 / +60 +60 / +70	360	60	±330 ±360 ±330	±240 ±270 ±240	±150 ±180 ±150	402
Hybrid cable								
	CFROBOT9	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	406

Control cable | PUR | chainflex® CF77.UL.D

36 10 million
Cycles guaranteed

6.8 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 6.8 x d
		fixed	minimum 4 x d
	Temperature	flexible twisted	-25°C up to +80°C
		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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3 (except for 5-core types ≥ 4.0mm² ► Product range table)	

Cable structure

	Conductor	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core structure	Number of cores < 12: Cores wound in a layer with short pitch length. Number of cores ≥ 12: Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure.	
	Core identification	Cores < 0.5mm²: Colour code in accordance with DIN 47100. Cores ≥ 0.5mm²: Black cores with white numbers, one green-yellow core. CF77.UL.02.03.INI: brown, blue, black CF77.UL.03.04.INI: brown, blue, black, white CF77.UL.03.05.INI: brown, blue, black, white, green-yellow	
	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: Window-grey (similar to RAL 7040) Variants ► Product range table	

Electrical information

	Nominal voltage	300/500V (following DIN VDE 0298-3) Number of cores < 12: Cores < 0.5mm²: 300V (following UL) Cores ≥ 0.5mm²: 1000V (following UL) Number of cores ≥ 12: 1000V (following UL)	
	Testing voltage	2000V (following DIN EN 50395)	

Properties and approvals

	UV resistance	Medium	
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Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Class 5.1.3.3

	Oil resistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Offshore	MUD-resistant following NEK 606 - status 2009
	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)
	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 data sheet for details ► www.igus.eu/CF77.UL.D
	NFPA	Following NFPA 79-2018, chapter 12.9
	DNV	Type Approval Certificate TAE00003X1
	EAC	Certificate No. RU C-DE.ME77.B.00300/19
	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, material/cable tested by IPA according to DIN EN ISO standard 14644-1
	DESINA	According to VDW, DESINA standardisation
	CE	Following 2014/35/EU
	UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

Typical application areas

- For heavy-duty applications, Class 5
- 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 with average sun radiation
- Robots, handling, spindle drives

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chainflex cable
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service life
calculator based
on 2 billion test
cycles per year

UL

UL

UL

nec

NFPA

CUPA

DNV

EAC

REACH

RoHS

clean-room

DESINA

CE

UKCA

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up to 36 months guarantee

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calculator based
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cycles per year

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UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Control cable | PUR | chainflex® CF77.UL.D

Class 5.1.3.3

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			



Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.02.03.INI ¹²⁾	3x0.25	5.0	9	29
CF77.UL.02.04.D	4x0.25	5.5	11	35
CF77.UL.02.05.D	5x0.25	6.0	13	39
CF77.UL.02.07.D	7x0.25	6.5	18	51
CF77.UL.02.12.D	12x0.25	9.0	32	78
CF77.UL.02.18.D	18x0.25	10.5	47	127
CF77.UL.02.25.D	25x0.25	11.5	63	155
CF77.UL.03.04.INI ¹²⁾	4x0.34	6.0	14	37
CF77.UL.03.05.INI ¹²⁾	5x0.34	6.0	18	36
CF77.UL.03.05.INI.D	5x0.34	6.0	18	36
CF77.UL.05.04.D	4G0.5	6.0	21	46
CF77.UL.05.05.D	5G0.5	6.5	26	53
CF77.UL.05.07.D	7G0.5	7.5	39	78
CF77.UL.05.12.D	12G0.5	10.0	63	130
CF77.UL.05.18.D	18G0.5	12.0	94	184
CF77.UL.05.25.D	25G0.5	14.0	129	243
CF77.UL.05.30.D	30G0.5	15.0	155	315
CF77.UL.07.03.D	3G0.75	6.5	23	52
CF77.UL.07.04.D	4G0.75	7.0	31	59
CF77.UL.07.05.D	5G0.75	7.5	38	71
CF77.UL.07.07.D	7G0.75	8.5	54	100
CF77.UL.07.12.D	12G0.75	12.0	91	180
CF77.UL.07.18.D	18G0.75	13.5	134	239
CF77.UL.07.20.D	20G0.75	14.5	149	269
CF77.UL.07.25.D	25G0.75	16.0	186	336
CF77.UL.07.36.D	36G0.75	19.0	279	506
CF77.UL.07.42.D	42G0.75	21.0	341	580
CF77.UL.10.02.D	2x1.0	6.5	21	51
CF77.UL.10.03.D	3G1.0	6.5	31	58
CF77.UL.10.04.D	4G1.0	7.0	41	73
CF77.UL.10.05.D	5G1.0	8.0	50	90
CF77.UL.10.07.D	7G1.0	9.0	71	120
CF77.UL.10.12.D	12G1.0	12.5	120	220
CF77.UL.10.18.D	18G1.0	15.0	179	314
CF77.UL.10.25.D	25G1.0	17.5	248	431
CF77.UL.10.42.D	42G1.0	22.5	433	699

¹²⁾ Colour outer jacket: Colza yellow (similar to RAL 1021)

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

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.15.03.D	3G1.5	7.0	46	71
CF77.UL.15.04.D	4G1.5	7.5	61	88
CF77.UL.15.05.D	5G1.5	8.0	75	105
CF77.UL.15.07.D ¹⁷⁾	7G1.5	9.5	105	152
CF77.UL.15.12.D	12G1.5	13.0	179	297
CF77.UL.15.18.D	18G1.5	17.0	268	405
CF77.UL.15.25.D	25G1.5	19.5	297	564
CF77.UL.15.36.D	36G1.5	23.5	551	848
CF77.UL.25.03.D	3G2.5	8.5	75	132
CF77.UL.25.04.D	4G2.5	9.5	95	167
CF77.UL.25.05.D	5G2.5	10.0	124	196
CF77.UL.25.07.D ¹⁷⁾	7G2.5	12.0	174	270
CF77.UL.25.12.D	12G2.5	17.0	297	479

¹⁷⁾ When using the cables with "7G1.5mm²" and "5G2.5mm²" minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

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



Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this on page 24/25 and online: www.igus.eu/cfcase



Order example: CF77.UL.02.04.D - to your desired length (0.5m steps)
CF77.UL.D chainflex® series .02 Code nominal cross section .04 Number of cores

Order online ► www.igus.eu/CF77.UL.D

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

EPLAN download, configurators ► www.igus.eu/CF77.UL.D

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Control cable | PUR | chainflex® CFROBOT2

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +80°C
		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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

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	Black cores with white numbers, one green-yellow core.	
	Overall 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)	

Electrical information

	Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
	Testing voltage	2,000V (following DIN EN 50395)

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, 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)
	Halogen-free	Following DIN EN 60754

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Class 6.1.3.3



Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
See data sheet for details ► www.igus.eu/CFROBOT2

Following NFPA 79-2018, chapter 12.9

Certificate No. RU C-DE.ME77.B.00300/19

In accordance with regulation (EC) No. 1907/2006 (REACH)

Following 2011/65/EC (RoHS-II/RoHS-III)

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
Following 2014/35/EU

In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT2.07.04.C	(4G0.75)C	8.0	43	78
CFROBOT2.07.05.C	(5G0.75)C	8.5	51	90
CFROBOT2.07.07.C	(7G0.75)C	10.0	71	120
CFROBOT2.07.12.C	(12G0.75)C	14.0	122	214
CFROBOT2.07.18.C	(18G0.75)C	16.5	185	301

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



Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this on page 24/25 and online: www.igus.eu/cfcase



UL-verified chainflex® guarantee ... www.igus.eu/ul-verified



Example image

Data cable | PUR | chainflex® CFROBOT3

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +80°C
		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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

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 structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.	
	Core identification	Colour code in accordance with DIN 47100.	
	Overall 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)	

Electrical information

	Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)
	Testing voltage	2,000V (following DIN EN 50395)

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, 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)

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Class 6.1.3.3



Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
See data sheet for details ► www.igus.eu/CFROBOT3

Following NFPA 79-2018, chapter 12.9

Certificate No. RU C-DE.ME77.B.00300/19

In accordance with regulation (EC) No. 1907/2006 (REACH)

Following 2011/65/EC (RoHS-II/RoHS-III)

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
Following 2014/35/EU

In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT3.02.03.02	(3x(2x0.25))C	9.0	33	84
CFROBOT3.02.04.02	(4x(2x0.25))C	10.5	38	103
CFROBOT3.02.06.02	(6x(2x0.25))C	11.5	52	127
CFROBOT3.02.08.02	(8x(2x0.25))C	13.5	66	170
CFROBOT3.05.05.02	(5x(2x0.5))C	12.5	80	170

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



Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this on page 24/25 and online: www.igus.eu/cfcase



Example image



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UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

Measuring system cable | PUR | chainflex® CFROBOT4

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +80°C
		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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of tinned copper wires (following DIN EN 60228).	
	Core insulation	Mechanically high-quality TPE mixture.	
	Core identification	According to measuring system specification. ► Product range table	
	Element shield	Extremely torsion-resistant tinned wound copper shield.	
	Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 80% 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) Variants ► Product range table	

Electrical information

	Nominal voltage	50V 30V (following UL)
	Testing voltage	500V

EPLAN download, configurators ► www.igus.eu/CFROBOT4

36-month guarantee ... more than 1,350 cable types from stock ... no cutting charges



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Class 6.1.3.3

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, 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)
	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 data sheet for details ► www.igus.eu/CFROBOT4
	NFPA	Following NFPA 79-2018, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.00295/19
	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 Following 2014/35/EU
	CE	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			



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



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



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Example image



Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part No.	Core group	Colour code
CFROBOT4.001	(3x(2x0.14)C+(4x0.14)+(2x0.5))C	10.5	62	115	CFROBOT4.001	3x(2x0.14)C 4x0.14 2x0.5	green/yellow, black/brown, red/orange grey/blue/white-yellow/white-black brown-red/brown-blue
CFROBOT4.006	(3x(2x0.14C+(4x0.14)+(4x0.22)+(2x0.5))C	11.5	74	135	CFROBOT4.006	3x(2x0.14)C (4x0.14) (4x0.22) (2x0.5)	green/yellow, black/brown, red/orange grey/blue/white-yellow/white-black yellow-brown/grey-brown/green-black/green-red brown-red/brown-blue
CFROBOT4.009	(4x(2x0.25)+(2x0.5))C	9.0	48	90	CFROBOT4.009	4x(2x0.25) 2x0.5	brown/green, blue/violet, grey/pink, red/black white, brown
CFROBOT4.015	(4x(2x0.14)+4x0.5)C	9.0	49	91	CFROBOT4.015	4x(2x0.14) 4x0.5	brown/green, yellow/violet, grey/pink, red/black blue, white, brown-green, white-green
CFROBOT4.028 ¹³⁾	(2x(2x0.20)+(2x0.38))C	7.5	44	72	CFROBOT4.028 ¹³⁾	2x(2x0.20) (2x0.38)	green/yellow, pink/blue red/black

¹³⁾ Colour outer jacket: Yellow-green (RAL 6018)

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



Cables available in the chainflex® CASE

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Order example: **CFROBOT4.009** – to your desired length (0.5m steps)
CFROBOT4 chainflex® series **.009** Code measuring system type



Order online ► www.igus.eu/CFROBOT4



Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

EPLAN download, configurators ► www.igus.eu/CFROBOT4

386 36-month guarantee ... more than 1,350 cable types from stock ... no cutting charges



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UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

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



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



Fibre Optic Cable | TPE | chainflex® CFLG.G

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- TPE outer jacket
- Oil and bio-oil-resistant
- UV-resistant
- Low-temperature-flexible
- Hydrolysis and microbe-resistant
- PVC and halogen-free

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +80°C
		fixed	-55°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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

	Conductor	50/125µm, 62.5/125µm bending-resistant solid glass fibre optic cores, with aramid strain relief elements.	
	Core structure	FOC cores wound with high-tensile aramid dampers around a glass-fibre reinforced plastic central element.	
	Core identification	► Product range table	
	Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)	

Properties and approvals

	UV resistance	High	
	Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4	
	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"	
	REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)	
	Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)	

EPLAN download, configurators ► www.igus.eu/CFROBOT5

36-month guarantee ... more than 1,350 cable types from stock ... no cutting charges



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Class 6.1.4.3



Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 Following 2014/35/EU

In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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, also with bio-oils, Class 4
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling

Part No.	Number of fibres/ Fibre diameter/ Conductor nominal cross section	Outer diameter (d) max. [mm]	Weight [kg/km]
CFROBOT5.500 ¹¹⁾	2x62.5/125	8.5	53
CFROBOT5.501 ¹¹⁾	2x50/125	8.5	53

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

Part No.	Bandwidth [MHz x km] @ 650nm	Attenuation [dB/km] @ 650nm	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Fibre identification
CFROBOT5.500 ¹¹⁾	≥ 200	≤ 3.0	≥ 500	≤ 0.7	orange with white numbers
CFROBOT5.501 ¹¹⁾	≥ 500	≤ 2.5	≥ 500	≤ 0.7	blue with white numbers



Cables available in the chainflex® CASE

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More on this on page 24/25 and online: www.igus.eu/cfcase



Example image

Motor cable | PUR | chainflex® CFROBOT7

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +80°C
		fixed	-55°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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

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	Power cores: Black cores with white numbers, one green-yellow core. 2 control pairs: Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 74. Control core: 8 4 Control pairs: Colour code in accordance with DIN 47100	
	Overall 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)	

Electrical information

	Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)	
	Testing voltage	4,000V (following DIN EN 50395)	

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36-month guarantee ... more than 1,350 cable types from stock ... no cutting charges



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Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Class 6.1.3.3

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, 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)
	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 data sheet for details ► www.igus.eu/CFROBOT7
	NFPA	Following NFPA 79-2018, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.00863/20
	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 Following 2014/35/EU
	CE	
	UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

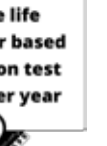
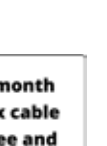
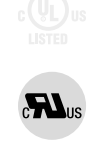
Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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



Example image

Motor cable | PUR | chainflex® CFROBOT7

Class 6.1.3.3

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			



Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
2 control pairs				
CFROBOT7.07.03.02.02.C	(4G0.75+2x(2x0.34)C)C	11.5	88	155
CFROBOT7.15.15.02.02.C	(4G1.5+2x(2x1.5)C)C	16.5	197	304
CFROBOT7.25.15.02.02.C	(4G2.5+2x(2x1.5)C)C	16.5	243	349
4 control pairs				
CFROBOT7.40.02.02.04.C	(4G4.0+4x(2x0.25)C)C	17.0	253	366
without control pair				
CFROBOT7.15.03.C	(3G1.5)C	8.5	61	98
CFROBOT7.15.04.C	(4G1.5)C	9.5	77	120
CFROBOT7.25.03.C	(3G2.5)C	10.0	93	142
CFROBOT7.25.04.C	(4G2.5)C	11.0	119	173
CFROBOT7.60.04.C	(4G6.0)C	15.0	278	374

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

Order example: **CFROBOT7.15.03.C** – to your desired length (0.5m steps)
CFROBOT7 chainflex® series .15 Code nominal cross section .03 Number of cores

Order online ► www.igus.eu/CFROBOT7

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.



Cables available in the chainflex® CASE

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More on this on page 24/25 and online: www.igus.eu/cfcase



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UL-verified chainflex® guarantee ... www.igus.eu/ul-verified

395



Spindle cable/Single core | TPE | chainflex® CFROBOT

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- TPE outer jacket
- Shielded
- Oil and bio-oil-resistant
- PVC-free
- UV-resistant
- Flame-retardant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-35°C up to +90°C
		fixed	-50°C up to +100°C (following DIN EN 50305)
	v max.	twisted	180°/s
	a max.	twisted	60°/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

	Conductor	Extremely bend-resistant cable.
	Core insulation	Mechanically high-quality TPE mixture.
	Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 90% optical
	Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®. Colour: jet black (similar to RAL 9005)

Electrical information

	Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
	Testing voltage	4,000V (following DIN EN 50395)

Properties and approvals

	UV resistance	High
	Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
	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)
	UL verified	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"

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36-month guarantee ... more than 1,350 cable types from stock ... no cutting charges



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Class 6.1.4.3

UL/CSA AWM

NFPA

EAC

REACH

Lead-free

Cleanroom

CE

UKCA

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

See data sheet for details ► www.igus.eu/CFROBOT

Following NFPA 79-2018, chapter 12.9

Certificate No. RU C-DE.ME77.B.00863/20

In accordance with regulation (EC) No. 1907/2006 (REACH)

Following 2011/65/EC (RoHS-II/RoHS-III)

According to ISO Class 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1
Following 2014/35/EU

In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35/-25	±150	±90	±30
-25/+70	±180	±120	±60
+70/+80	±150	±90	±30

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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, also with bio-oils, Class 4
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, spindle drives

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT.035	(1x10)C	10.5	125	194
CFROBOT.036	(1x16)C	12.0	189	269
CFROBOT.037	(1x25)C	14.5	298	392
CFROBOT.038	(1x35)C	15.5	403	528

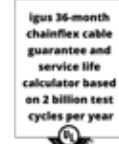
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x = without earth core



Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this on page 24/25 and online: www.igus.eu/cfcase



Example image

Bus cable | PUR | chainflex® CFROBOT8

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +70°C
		fixed	-50°C up to +70°C (following DIN EN 50305)
	v max.	twisted	180°/s
	a max.	twisted	60°/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of tinned or bare copper wires (following DIN EN 60228).	
	Core insulation	According to bus specification.	
	Core structure	According to bus specification.	
	Core identification	According to bus specification. ► Product range table	
	Intermediate layer	Foil taping over the outer layer.	
	Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% 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)	

Electrical information

	Nominal voltage	50V 300V (following UL)
	Testing voltage	500V

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Class 6.1.3.3

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, 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)
	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 data sheet for details ► www.igus.eu/CFROBOT8
	EAC	Certificate No. RU C-DE.ME77.B.00295/19
	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 Following 2014/35/EU
	CE	
	UK CA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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/+60	±180	±120	±60
+60/+70	±150	±90	±30

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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

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guarantee and
service life
calculator based
on 2 billion test
cycles per year

CE

UL

UL

nec

NFPA

CUPA

DNV

EAC

REACH

RoHS

clean-room

UL

CE

UK CA

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Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)								
CFROBOT8.001	(2x0.35)C	8.0	28	63	CFROBOT8.001	150	(2x0.35)C	red, green
CAN-Bus								
CFROBOT8.022	(4x0.5)C	7.5	41	78	CFROBOT8.022	120	(4x0.5)C	white, green, brown, yellow (star-quad)
DeviceNet								
CFROBOT8.030	(2xAWG24)C+(2xAWG22)C	9.5	31	77	CFROBOT8.030	120	(2xAWG24)C (2xAWG22)C	white/blue red/black
Ethernet/CAT5/PoE								
CFROBOT8.045	4x(2x0.15)C	9.5	48	96	CFROBOT8.045	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6/PoE								
CFROBOT8.049	4x(2x0.15)C	9.5	48	96	CFROBOT8.049	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6a								
CFROBOT8.050	4x(2x0.15)C	10.5	51	134	CFROBOT8.050	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT7								
CFROBOT8.052	4x(2x0.15)C	10.5	51	134	CFROBOT8.052	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Profinet								
CFROBOT8.060	(2x(2x0.34))C	8.5	34	74	CFROBOT8.060	100	(2x(2x0.34))C	white/blue, yellow/orange

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



Cables available in the chainflex® CASE

Simple savings on delivery, storage space and re-ordering with the chainflex® CASE - ship'n store by igus®.

More on this on page 24/25 and online: www.igus.eu/cfcase



Technical note on bus cables

chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.

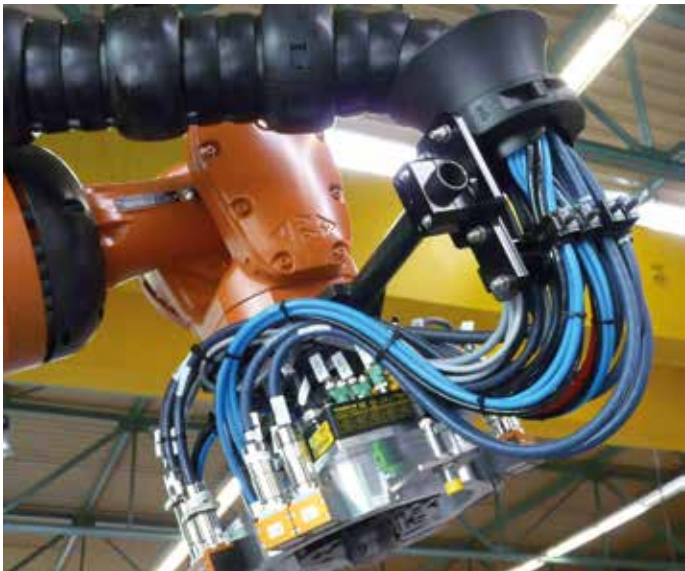
The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.

It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.

The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used.

What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.

igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.



CFROBOT® cables used in robots for the automated systems in fuel tank production. These are supplied as fully harnessed readychain® systems.



Bus cable | **PUR** | chainflex® CFROBOT8.PLUS

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±360°/m
Torsion angle

- For torsion applications
- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic information

	Bend radius	flexible twisted	minimum 10 x d
		fixed	minimum 5 x d
	Temperature	flexible twisted	-25°C up to +70°C
		fixed	-50°C up to +70°C (following DIN EN 50305)
	v max.	twisted	360°/s
	a max.	twisted	60°/s²
	Travel distance	Robots and 3D movements, Class 1	
	Torsion	Torsion ±360°, with 1m cable length, Class 4	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).	
	Core insulation	According to bus specification.	
	Core structure	According to bus specification.	
	Core identification	According to bus specification. ► Product range table	
	Intermediate layer	Foil taping over the outer layer.	
	Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80% 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)	

Electrical information

	Nominal voltage	50V 30V (following UL)
	Testing voltage	500V

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Class 6.1.3.4

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, 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)
	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 data sheet for details ► www.igus.eu/CFROBOT8.PLUS
	EAC	Certificate No. RU C-DE.ME77.B.00295/19
	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 Following 2014/35/EU
	CE	
	UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

Cycles*	5 million	7.5 million	10 million
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25/-15	±330	±240	±150
-15/+60	±360	±270	±180
+60/+70	±330	±240	±150

* Higher number of double strokes? Service life calculation online ► www.igus.eu/chainflexlife

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 ±360°, with 1m cable length, Class 4
- Indoor and outdoor applications, UV-resistant
- Robots, handling, spindle drives

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cycles per year

CE

UL

UL

nec

NFPA

CUPA

DNV

EAC

REACH

RoHS

clean-room

UL

CE

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cycles per year

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Bus cable | PUR | chainflex® CFROBOT8.PLUS

Class 6.1.3.4



Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm)								
CFROBOT8.PLUS.001	(2x0.25)C	9.0	30	80	CFROBOT8.PLUS.001	150	(2x0.25)C	red, green
Ethernet/CAT5e/PoE								
CFROBOT8.PLUS.045	(4x(2x0.15))C	7.5	32	67	CFROBOT8.PLUS.045	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet								
CFROBOT8.PLUS.060 ²⁾	(4x0.34)C	7.0	32	64	CFROBOT8.PLUS.060 ²⁾	100	(4x0.38)C	white, orange, blue, yellow (star-quad)

The chainflex® types marked with ²⁾ are cables designed as a star-quad.

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



Cables available in the chainflex® CASE

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More on this on page 24/25 and online: www.igus.eu/cfcase



Technical note on bus cables

chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to diverse media.

The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, that greater value is placed on a high degree of EMC reliability.

It is also ensured that the electrical values remain stable over the long term in spite of permanent movement.

The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used.

What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals.

igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.



Order example: **CFROBOT8.PLUS.060** – to your desired length (0.5m steps)
CFROBOT8.PLUS chainflex® series **.060** Code bus type



Order online ► www.igus.eu/CFROBOT8.PLUS



Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

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Hybrid cable | PUR | chainflex® CFROBOT9

36 10 million
Cycles guaranteed

10 x d
Bend radius, e-chain®

±180°/m
Torsion angle

- 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

Dynamic information

	Bend radius	e-chain® twisted	minimum 10 x d
		flexible	minimum 8 x d
		fixed	minimum 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	
	Torsion	Torsion ±180°, with 1m cable length, Class 3	

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)	

Electrical information

	Nominal voltage	300/500V (following DIN VDE 0298-3) 300V (following UL)	
	Testing voltage	2,000V (following DIN EN 50395)	

Basic requirements
Travel distance
Oil resistance
Torsion

low	1	2	3	4	5	6	7	highest
unsupported	1	2	3	4	5	6	≥ 400m	
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

Class 6.1.3.3

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, 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)
	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 data sheet for details ► www.igus.eu/CFROBOT9
	NFPA	Following NFPA 79-2018, chapter 12.9
	EAC	Certificate No. RU C-DE.ME77.B.00300/19
	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 Following 2014/35/EU
	CE	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Guaranteed service life (details see page 28-29)

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

* Higher number of double strokes? Service life calculation online ► [www.igus.eu/chainflexlife](#)

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

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service life
calculator based
on 2 billion test
cycles per year

CE

UL

nec

NFPA

EAC

REACH

RoHS

clean-room

CE

UK
CA

UL

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Example image



Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part No.	Core group	Colour code
CFROBOT9.001 ¹¹⁾	5G1.0+(2x1.0)C	10.0	82	136	CFROBOT9.001 ¹¹⁾	5G1.0 (2x1.0)C	white with black numbers 1-4, one green-yellow core white with black numbers 5-6
CFROBOT9.006 ¹¹⁾	24G1.0+(2x1.0)C	19.0	280	453	CFROBOT9.006 ¹¹⁾	24G1.0 (2x1.0)C	white with black numbers 1-4, 7-25 one green-yellow core white with black numbers 5-6
CFROBOT9.007	(15x(2x0.25)C+(4x0.25)C)C	18.5	229	369	CFROBOT9.007	15x(2x0.25)C (4x0.25)C	colour code in accordance with DIN 47100 white/green/brown/yellow (CAN-Bus)
CFROBOT9.010	(4x(2x0.25)C)C	10.5	63	116	CFROBOT9.010	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red

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



Cables available in the chainflex® CASE

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More on this on page 24/25 and online: www.igus.eu/cfcase



igus® chainflex® cables in a triflex® R multi-dimensionally moving energy supply system for 6-axis robots

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