

# 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. [°/s²] twisted	Page	
<b>Twistable cables</b>										
<b>Information about twistable cables</b>									380	
<b>Control cables</b>										
CF77.UL.D	PUR		6.8	-25/+80		✓	✓	180	60	384
CFROBOT2	PUR	✓	10	-25/+80		✓	✓	180	60	388
<b>Data cable</b>										
CFROBOT3	PUR	✓	10	-25/+80		✓	✓	180	60	390
<b>Measuring system cable</b>										
CFROBOT4	PUR	✓	10	-25/+80		✓	✓	180	60	392
<b>Fibre Optic Cable</b>										
CFROBOT5	TPE		10	-35/+80		✓	✓	180	60	396
<b>Motor cables</b>										
CFROBOT6	PUR		10	-25/+80		✓	✓	180	60	398
CFROBOT7	PUR	✓	10	-25/+80		✓	✓	180	60	400
<b>Spindle cable/Single core</b>										
CFROBOT	TPE	✓	10	-35/+90		✓	✓	180	60	404
<b>Bus cables</b>										
CFROBOT8	PUR	✓	10	-25/+70		✓	✓	180	60	406
CFROBOT8.PLUS	PUR	✓	10	-25/+70		✓	✓	360	60	410 <span>New</span>
<b>Hybrid cable</b>										
CFROBOT9	PUR	✓	10	-25/+80		✓	✓			414

## 36-month chainflex® guarantee

Guaranteed service life for predictable reliability

► Selection table page 382

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](http://www.igus.eu/chainflexlife)



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



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 51



chainflex® cables	Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s <sup>2</sup> ] 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 *	
<b>Control cables</b>							
 CF77.UL.D	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	384
 CFROBOT2	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	388
<b>Data cable</b>							
 CFROBOT3	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	390
<b>Measuring system cable</b>							
 CFROBOT4	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	392
<b>Fibre Optic Cable</b>							
 CFROBOT5	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	396
<b>Motor cables</b>							
 CFROBOT6	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	398
 CFROBOT7	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	400
<b>Spindle cable/Single core</b>							
 CFROBOT	-35 / -25 -15 / +80 +80 / +90	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	404
<b>Bus cables</b>							
 CFROBOT8	-25 / -15 -15 / +60 +60 / +70	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	406
 CFROBOT8.PLUS <span style="background-color: orange; color: white; padding: 2px;">New!</span>	-25 / -15 -15 / +60 +60 / +70	360	60	±330 ±360 ±330	±240 ±270 ±240	±150 ±180 ±150	410
<b>Hybrid cable</b>							
 CFROBOT9	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	414

# 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

	<b>Bend radius</b>	<b>flexible twisted</b>	minimum 6.8 x d
		<b>fixed</b>	minimum 4 x d
	<b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +80°C
		<b>fixed</b>	-50°C up to +80°C (following DIN EN 50305)
	<b>v max.</b>	<b>twisted</b>	180°/s
	<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
	<b>Travel distance</b>	Robots and 3D movements, Class 1	
	<b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3 (except for 5-core types ≥ 4.0mm <sup>2</sup> ► <a href="#">Product range table</a> )	

## Cable structure

	<b>Conductor</b>	Finely stranded conductor consisting of bare copper wires (following DIN EN 60228).
	<b>Core insulation</b>	Mechanically high-quality TPE mixture.
	<b>Core structure</b>	<b>Number of cores &lt; 12:</b> Cores wound in a layer with short pitch length. <b>Number of cores ≥ 12:</b> 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.
	<b>Core identification</b>	<b>Cores &lt; 0.5mm<sup>2</sup>:</b> Colour code in accordance with DIN 47100. <b>Cores ≥ 0.5mm<sup>2</sup>:</b> Black cores with white numbers, one green-yellow core. <b>CF77.UL.02.03.INI:</b> brown, blue, black <b>CF77.UL.03.04.INI:</b> brown, blue, black, white <b>CF77.UL.03.05.INI:</b> brown, blue, black, white, green-yellow
	<b>Outer jacket</b>	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 ► <a href="#">Product range table</a>

## Electrical information

	<b>Nominal voltage</b>	300/500V (following DIN VDE 0298-3) <b>Number of cores &lt; 12:</b> <b>Cores &lt; 0.5mm<sup>2</sup>:</b> 300V (following UL) <b>Cores ≥ 0.5mm<sup>2</sup>:</b> 1000V (following UL) <b>Number of cores ≥ 12:</b> 1000V (following UL)
	<b>Testing voltage</b>	2,000V (following DIN EN 50395)

## Properties and approvals

	<b>UV resistance</b>	Medium
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Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	3	4	highest			
Torsion	none	1	2	3	4	±360°			

## Class 5.1.3.3

	<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
	<b>Offshore</b>	MUD-resistant following NEK 606 - status 2016
	<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
	<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	<b>Halogen-free</b>	Following DIN EN 60754
	<b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
	<b>UL/CSA AWM</b>	See data sheet for details ► <a href="http://www.igus.eu/CF77ULD">www.igus.eu/CF77ULD</a>
	<b>NFPA</b>	Following NFPA 79-2018, chapter 12.9
	<b>DNV</b>	Type Approval Certificate TAE00003X1
	<b>EAC</b>	Certificate No. RU C-DE.ME77.B.00300/19
	<b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
	<b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)
	<b>Cleanroom</b>	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
	<b>DESINA</b>	According to VDW, DESINA standardisation
	<b>CE</b>	Following 2014/35/EU
	<b>UK CA</b>	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](http://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

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

igus 36-month  
chainflex cable  
guarantee and  
service life  
calculator based  
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CFRIP

UL LISTED

UL

nec

NFPA

CE

DNV

EAC

REACH

RoHS

clean-room

DESINA

CE

UK CA

Example image

igus® chainflex® CF77.UL.D

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

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 <sup>12)</sup>	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 <sup>12)</sup>	4x0.34	6.0	14	37
CF77.UL.03.05.INI <sup>12)</sup>	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

<sup>12)</sup> 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

## Class 5.1.3.3

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 <sup>17)</sup>	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 <sup>17)</sup>	7G2.5	12.0	174	270
CF77.UL.25.12.D	12G2.5	17.0	297	479

<sup>17)</sup> When using the cables with "7G1.5mm²" and "7G2.5mm²" 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/cf-case](http://www.igus.eu/cf-case)



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/CF77ULD](http://www.igus.eu/CF77ULD)

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

EPLAN download, configurators ► [www.igus.eu/CF77ULD](http://www.igus.eu/CF77ULD)



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

# 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

<b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
<b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-50°C up to +80°C (following DIN EN 50305)
<b>v max.</b>	<b>twisted</b>	180°/s
<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
<b>Travel distance</b>	Robots and 3D movements, Class 1	
<b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3	

## Cable structure

<b>Conductor</b>	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
<b>Core insulation</b>	Mechanically high-quality TPE mixture.
<b>Core identification</b>	Black cores with white numbers, one green-yellow core.
<b>Overall shield</b>	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
<b>Outer jacket</b>	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

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

## Properties and approvals

<b>UV resistance</b>	High
<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
<b>Halogen-free</b>	Following DIN EN 60754

EPLAN download, configurators ► [www.igus.eu/CFROBOT2](http://www.igus.eu/CFROBOT2)

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



EU2023

EU2023



Basic requirements  
Travel distance  
Oil resistance  
Torsion

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

## Class 6.1.3.3

UL verified

UL/CSA AWM

NFPA

EAC

REACH

Lead-free

Cleanroom

CE

UKCA

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](http://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

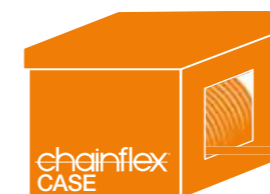
\* Higher number of double strokes? Service life calculation online ► [www.igus.eu/chainflexlife](http://www.igus.eu/chainflexlife)

## 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 [mm <sup>2</sup> ]	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

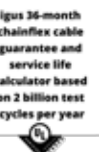
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core x = without earth core



## 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/cf-case](http://www.igus.eu/cf-case)



# 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
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

## Dynamic information

<b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
<b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-50°C up to +80°C (following DIN EN 50305)
<b>v max.</b>	<b>twisted</b>	180°/s
<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
<b>Travel distance</b>	Robots and 3D movements, Class 1	
<b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3	

## Cable structure

<b>Conductor</b>	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
<b>Core insulation</b>	Mechanically high-quality TPE mixture.
<b>Core structure</b>	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
<b>Core identification</b>	Colour code in accordance with DIN 47100.
<b>Overall shield</b>	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
<b>Outer jacket</b>	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

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

## Properties and approvals

<b>UV resistance</b>	High
<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
<b>Halogen-free</b>	Following DIN EN 60754

Example image

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



EU2023

## Class 6.1.3.3

- UL verified
- UL/CSA AWM
- NFPA
- EAC
- REACH
- Lead-free
- Cleanroom
- CE
- UKCA

Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	3	4	highest			
Torsion	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](http://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](http://www.igus.eu/chainflexlife)

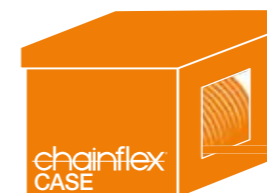
## Typical application areas

- 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 [mm <sup>2</sup> ]	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 <sup>11)</sup>	(8x(2x0.25))C	13.5	66	170
CFROBOT3.05.05.02	(5x(2x0.5))C	12.5	80	170

<sup>11)</sup> Phase-out model

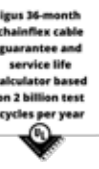
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core x = without earth core



## Cables available in the chainflex® CASE

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/cf-case](http://www.igus.eu/cf-case)



# 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	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
Temperature	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-50°C up to +80°C (following DIN EN 50305)
v max.	<b>twisted</b>	180°/s
a max.	<b>twisted</b>	60°/s <sup>2</sup>
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. ► <b>Product range table</b>
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 ► <b>Product range table</b>

## 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	7	≥ 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 ► <a href="http://www.igus.eu/CFROBOT4">www.igus.eu/CFROBOT4</a>
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
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](http://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

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

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

CFRIP

UL LISTED

UL

nec

NFPA

CE

DNV

EAC

REACH

RoHS

clean-room

UL

CE

UKCA

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

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

UL





Example image

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT4.001	(3x(2x0.14)C + (4x0.14)+(2x0.5))C	10.5	62	115
CFROBOT4.006	(3x(2x0.14C+(4x0.14) + (4x0.22)+(2x0.5))C	11.5	74	135
CFROBOT4.009	(4x(2x0.25)+(2x0.5))C	9.0	48	90
CFROBOT4.015	(4x(2x0.14)+4x0.5)C	9.0	49	91
CFROBOT4.028 <sup>13)</sup>	(2x(2x0.20)+(2x0.38))C	7.5	44	72

<sup>13)</sup> 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**

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/cf-case](http://www.igus.eu/cf-case)



Part No.	Core group	Colour code
CFROBOT4.001	3x(2x0.14)C	green/yellow, black/brown, red/orange
	4x0.14	grey/blue/white-yellow/white-black
	2x0.5	brown-red/brown-blue
CFROBOT4.006	3x(2x0.14)C	green/yellow, black/brown, red/orange
	(4x0.14)	grey/blue/white-yellow/white-black
	(4x0.22)	yellow-brown/grey-brown/green-black/green-red
CFROBOT4.009	(2x0.5)	brown-red/brown-blue
	4x(2x0.25)	brown/green, blue/violet, grey/pink, red/black
CFROBOT4.015	2x0.5	white, brown
	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
CFROBOT4.015	4x0.5	blue, white, brown-green, white-green
	4x(2x0.14)	brown/green, yellow/violet, grey/pink, red/black
CFROBOT4.028 <sup>13)</sup>	2x(2x0.20)	green/yellow, pink/blue
	(2x0.38)	red/black

- 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](http://www.igus.eu/CFROBOT4)
- Delivery time 24hrs or today.  
Delivery time means time until goods are shipped.



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® CFROBOT5

**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

<b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
<b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-55°C up to +80°C (following DIN EN 50305)
<b>v max.</b>	<b>twisted</b>	180°/s
<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
<b>Travel distance</b>	Robots and 3D movements, Class 1	
<b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3	

## Cable structure

<b>Conductor</b>	50/125µm, 62.5/125µm bending-resistant solid glass fibre optic cores, with aramid strain relief elements.
<b>Core structure</b>	FOC cores wound with high-tensile aramid dampers around a glass-fibre reinforced plastic central element.
<b>Core identification</b>	► <a href="#">Product range table</a>
<b>Outer jacket</b>	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

<b>UV resistance</b>	High
<b>Oil resistance</b>	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
<b>Halogen-free</b>	Following DIN EN 60754
<b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
<b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
<b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)

EPLAN download, configurators ► [www.igus.eu/CFROBOT5](http://www.igus.eu/CFROBOT5)

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



EU2023

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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 6.1.4.3

Cleanroom  
 CE  
 UK UKCA

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](http://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 <sup>1)</sup>	2x62.5/125	8.5	53
CFROBOT5.501	2x50/125	8.5	53

<sup>1)</sup> 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

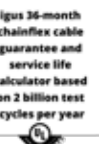
Part No.	Bandwidth [MHz x km] @ 650nm	Attenuation [dB/km] @ 650nm	Bandwidth [MHz x km] @ 850nm	Attenuation [dB/km] @ 850nm	Fibre identification
CFROBOT5.500 <sup>1)</sup>	≥ 200	≤ 3.0	≥ 500	≤ 0.7	orange with white numbers
CFROBOT5.501	≥ 500	≤ 2.5	≥ 500	≤ 0.7	blue with white numbers



## 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/cf-case](http://www.igus.eu/cf-case)



UL-verified chainflex® guarantee ... [www.igus.eu/ul-verified](http://www.igus.eu/ul-verified)

# Motor cable | PUR | chainflex® CFROBOT6

**36** 10 million  
Cycles guaranteed

**10 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	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
Temperature	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-55°C up to +80°C (following DIN EN 50305)
v max.	<b>twisted</b>	180°/s
a max.	<b>twisted</b>	60°/s <sup>2</sup>
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 1-2, one green-yellow core.
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)

## 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

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

- UL verified
- UL/CSA AWM
- NFPA
- EAC
- REACH
- Lead-free
- Cleanroom
- CE
- UKCA

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/CFROBOT6](http://www.igus.eu/CFROBOT6)

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 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](http://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 [mm <sup>2</sup> ]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT6.160.03 <sup>1)</sup>	3G16	18.0	475	578
CFROBOT6.250.03 <sup>1)</sup>	3G25	22.0	737	896

<sup>1)</sup> 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

Guarantee  
igus chainflex  
**36**  
months

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

CFRIP

UL LISTED

UL US

NEC

NFPA

UL CA

DNV

EAC

REACH

RoHS

Cleanroom

IP67

CE

UKCA

Example image

IGUS® CHAINFLEX® CF ROBOT 6

EPLAN download, configurators ► [www.igus.eu/CFROBOT6](http://www.igus.eu/CFROBOT6)

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

igus

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igus

UL-verified chainflex® guarantee ... [www.igus.eu/ul-verified](http://www.igus.eu/ul-verified)

# 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

 <b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
 <b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +80°C
	<b>fixed</b>	-55°C up to +80°C (following DIN EN 50305)
 <b>v max.</b>	<b>twisted</b>	180°/s
 <b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
 <b>Travel distance</b>	Robots and 3D movements, Class 1	
 <b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3	

## Cable structure

 <b>Conductor</b>	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
 <b>Core insulation</b>	Mechanically high-quality TPE mixture.
 <b>Core identification</b>	<b>Power cores:</b> Black cores with white numbers, one green-yellow core. <b>2 control pairs:</b> Black cores with white numbers. 1. Control core: 5 2. Control core: 6 3. Control core: 74. Control core: 8 <b>4 Control pairs:</b> Colour code in accordance with DIN 47100
 <b>Overall shield</b>	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
 <b>Outer jacket</b>	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









 <b>Nominal voltage</b>	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
 <b>Testing voltage</b>	4,000V (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

 <b>UV resistance</b>	High
 <b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
 <b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
 <b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
 <b>Halogen-free</b>	Following DIN EN 60754
 <b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
 <b>UL/CSA AWM</b>	See data sheet for details ► <a href="http://www.igus.eu/CFROBOT7">www.igus.eu/CFROBOT7</a>
 <b>NFPA</b>	Following NFPA 79-2018, chapter 12.9
 <b>EAC</b>	Certificate No. RU C-DE.ME77.B.00863/20
 <b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
 <b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)
 <b>Cleanroom</b>	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
 <b>CE</b>	Following 2014/35/EU
 <b>UKCA</b>	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](http://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

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

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

CFRIP

LISTED

UL

nec

NFPA

CUA

DNV

EAC

REACH

RoHS

clean-room

UL

CE

UKCA

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

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

UL

# 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]
<b>2 control pairs</b>				
CFROBOT7.07.03.02.02.C <sup>11)</sup>	(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
<b>4 control pairs</b>				
CFROBOT7.40.02.02.04.C	(4G4.0+4x(2x0.25)C)C	17.0	253	366
<b>without control pair</b>				
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

<sup>11)</sup> 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

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/cf-case](http://www.igus.eu/cf-case)



**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](http://www.igus.eu/CFROBOT7)

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



EPLAN download, configurators ► [www.igus.eu/CFROBOT7](http://www.igus.eu/CFROBOT7)



# 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

<b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
<b>Temperature</b>	<b>flexible twisted</b>	-35°C up to +90°C
	<b>fixed</b>	-50°C up to +100°C (following DIN EN 50305)
<b>v max.</b>	<b>twisted</b>	180°/s
<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
<b>Travel distance</b>	Robots and 3D movements, Class 1	
<b>Torsion</b>	Torsion ±180°, with 1m cable length, Class 3	

## Cable structure

<b>Conductor</b>	Extremely bend-resistant cable.
<b>Core insulation</b>	Mechanically high-quality TPE mixture.
<b>Overall shield</b>	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 90% optical
<b>Outer jacket</b>	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

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

## Properties and approvals

<b>UV resistance</b>	High
<b>Oil resistance</b>	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
<b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"

EPLAN download, configurators ► [www.igus.eu/CFROBOT](http://www.igus.eu/CFROBOT)

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



EU2023

## Class 6.1.4.3

- UL/CSA AWM
- NFPA
- EAC
- REACH
- Lead-free
- Cleanroom
- CE
- UKCA

Basic requirements	low	1	2	3	4	5	6	7	highest
Travel distance	unsupported	1	2	3	4	5	6	≥ 400m	
Oil resistance	none	1	2	3	4	highest			
Torsion	none	1	2	3	4	±360°			

See data sheet for details ► [www.igus.eu/CFROBOT](http://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

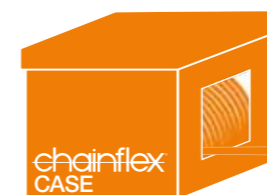
\* Higher number of double strokes? Service life calculation online ► [www.igus.eu/chainflexlife](http://www.igus.eu/chainflexlife)

## 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 [mm <sup>2</sup> ]	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

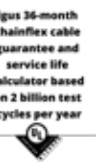
Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.  
G = with green-yellow earth core x = without earth core



## 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/cf-case](http://www.igus.eu/cf-case)



Example image

igus® chainflex® CFROBOT

# 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	<b>flexible twisted</b>	minimum 10 x d
	<b>fixed</b>	minimum 5 x d
 Temperature	<b>flexible twisted</b>	-25°C up to +70°C
	<b>fixed</b>	-50°C up to +70°C (following DIN EN 50305)
 v max.	<b>twisted</b>	180°/s
 a max.	<b>twisted</b>	60°/s <sup>2</sup>
 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. ► <a href="#">Product range table</a>
 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 ► <a href="http://www.igus.eu/CFROBOT8">www.igus.eu/CFROBOT8</a>
 EAC	Certificate No. RU C-DE.ME77.B.00295/19
 REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
 RoHS	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
 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/+60	±180	±120	±60
+60/+70	±150	±90	±30

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

Guarantee  
igus chainflex  
**36**  
up to 36 months guarantee

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

CFRIP

UL LISTED

UL

nec

NFPA

CUPA

DNV

EAC

REACH

RoHS

clean-room

UL

CE

UKCA

Guarantee  
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**36**  
up to 36 months guarantee

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

UL



igus® chainflex® CFROBOT 8

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]
<b>Profibus (1x2x0.64mm)</b>				
CFROBOT8.001	(2x0.35)C	8.0	28	63
<b>CAN-Bus</b>				
CFROBOT8.022	(4x0.5)C	7.5	41	78
<b>DeviceNet</b>				
CFROBOT8.030	(2xAWG24)C +(2xAWG22)C	9.5	31	77
<b>Ethernet/CAT5e/PoE</b>				
CFROBOT8.045	4x(2x0.15)C	9.5	48	96
<b>Ethernet/CAT6/PoE</b>				
CFROBOT8.049	4x(2x0.15)C	9.5	48	96
<b>Ethernet/CAT6a</b>				
CFROBOT8.050	4x(2x0.15)C	10.5	51	134
<b>Ethernet/CAT7</b>				
CFROBOT8.052	4x(2x0.15)C	10.5	51	134
<b>Profinet</b>				
CFROBOT8.060	(2x(2x0.34))C	8.5	34	74

**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/cf-case](http://www.igus.eu/cf-case)



**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.

**Class 6.1.3.3**

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
<b>Profibus (1x2x0.64mm)</b>			
CFROBOT8.001	150	(2x0.35)C	red, green
<b>CAN-Bus</b>			
CFROBOT8.022	120	(4x0.5)C	white, green, brown, yellow (star-quad)
<b>DeviceNet</b>			
CFROBOT8.030	120	(2xAWG24)C (2xAWG22)C	white/blue red/black
<b>Ethernet/CAT5e/PoE</b>			
CFROBOT8.045	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Ethernet/CAT6/PoE</b>			
CFROBOT8.049	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Ethernet/CAT6a</b>			
CFROBOT8.050	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Ethernet/CAT7</b>			
CFROBOT8.052	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Profinet</b>			
CFROBOT8.060	100	(2x(2x0.34))C	white/blue, yellow/orange



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



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





# 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

	<b>Bend radius</b>	<b>flexible twisted</b>	minimum 10 x d
		<b>fixed</b>	minimum 5 x d
	<b>Temperature</b>	<b>flexible twisted</b>	-25°C up to +70°C
		<b>fixed</b>	-50°C up to +70°C (following DIN EN 50305)
	<b>v max.</b>	<b>twisted</b>	360°/s
	<b>a max.</b>	<b>twisted</b>	60°/s <sup>2</sup>
	<b>Travel distance</b>	Robots and 3D movements, Class 1	
	<b>Torsion</b>	Torsion ±360°, with 1m cable length, Class 4	

## Cable structure

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

	<b>Nominal voltage</b>	50V 30V (following UL)
	<b>Testing voltage</b>	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

	<b>UV resistance</b>	High
	<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
	<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
	<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	<b>Halogen-free</b>	Following DIN EN 60754
	<b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
	<b>UL/CSA AWM</b>	See data sheet for details ► <a href="http://www.igus.eu/CFROBOT8PLUS">www.igus.eu/CFROBOT8PLUS</a>
	<b>EAC</b>	Certificate No. RU C-DE.ME77.B.00295/19
	<b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
	<b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)
	<b>Cleanroom</b>	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
	<b>CE</b>	
	<b>UKCA</b>	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](http://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

Guarantee  
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**36**  
up to 36 months guarantee

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

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NFPA

CUPA

DNV

EAC

REACH

RoHS

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Guarantee  
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**36**  
up to 36 months guarantee

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

UL



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]
<b>Profibus (1x2x0.64mm)</b>				
CFROBOT8.PLUS.001	(2x0.25)C	9.0	30	80
<b>CAN-Bus</b>				
<b>New</b> CFROBOT8.PLUS.022	(4x0.5)C	9.5	47	103
<b>Ethernet/CAT5e/PoE</b>				
CFROBOT8.PLUS.045	(4x(2x0.15))C	7.5	32	67
<b>Ethernet/CAT6/PoE</b>				
<b>New</b> CFROBOT8.PLUS.049	(4x(2x0.15))C	7.5	32	67
<b>Ethernet/CAT6A</b>				
<b>New</b> CFROBOT8.PLUS.050	(4x(2x0.15))C	10.5	49	115
<b>Profinet</b>				
CFROBOT8.PLUS.060 <sup>2)</sup>	(4x0.34)C	7.0	32	64

The chainflex® types marked with <sup>2)</sup> 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

## Class 6.1.3.4

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
<b>Profibus (1x2x0.64mm)</b>			
CFROBOT8.PLUS.001	150	(2x0.25)C	red, green
<b>CAN-Bus</b>			
CFROBOT8.PLUS.022	120	(4x0.5)C	white, green, brown, yellow (star-quad)
<b>Ethernet/CAT5e/PoE</b>			
CFROBOT8.PLUS.045	100	(4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
<b>Ethernet/CAT6/PoE</b>			
CFROBOT8.PLUS.049	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Ethernet/CAT6A</b>			
CFROBOT8.PLUS.050	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
<b>Profinet</b>			
CFROBOT8.PLUS.060 <sup>2)</sup>	100	(4x0.38)C	white, orange, blue, yellow (star-quad)



### 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/cf-case](http://www.igus.eu/cf-case)



### 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.

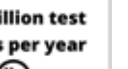
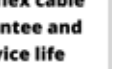
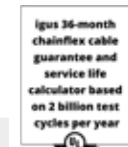
igus® advises you when you are designing your bus system to take all these factors into account and, with extensive tests, helps you to ensure the process reliability of your system from the very beginning.

**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/CFROBOT8PLUS](http://www.igus.eu/CFROBOT8PLUS)

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

EPLAN download, configurators ► [www.igus.eu/CFROBOT8PLUS](http://www.igus.eu/CFROBOT8PLUS)



# 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

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

## Cable structure

<b>Conductor</b>	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228).
<b>Core insulation</b>	Mechanically high-quality TPE mixture.
<b>Core identification</b>	► <a href="#">Product range table</a>
<b>Element shield</b>	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 85% optical
<b>Outer jacket</b>	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

<b>Nominal voltage</b>	300/500V (following DIN VDE 0298-3) 300V (following UL)
<b>Testing voltage</b>	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	7	≥ 400m
none	1	2	3	4	highest			
none	1	2	3	4	±360°			

# Class 6.1.3.3

## Properties and approvals

<b>UV resistance</b>	High
<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
<b>Flame-retardant</b>	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
<b>Halogen-free</b>	Following DIN EN 60754
<b>UL verified</b>	Certificate No. B129699: "igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year"
<b>UL/CSA AWM</b>	See data sheet for details ► <a href="http://www.igus.eu/CFROBOT9">www.igus.eu/CFROBOT9</a>
<b>NFPA</b>	Following NFPA 79-2018, chapter 12.9
<b>EAC</b>	Certificate No. RU C-DE.ME77.B.00300/19
<b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
<b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)
<b>Cleanroom</b>	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
<b>CE</b>	Following 2014/35/EU
<b>UKCA</b>	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

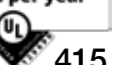
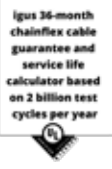
## Guaranteed service life (details see page 28-29)

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](http://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

igus® chainflex® CFROBOT 9

EPLAN download, configurators ► [www.igus.eu/CFROBOT9](http://www.igus.eu/CFROBOT9)

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



EU2023

EU2023



UL-verified chainflex® guarantee ... [www.igus.eu/ul-verified](http://www.igus.eu/ul-verified)

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]
CFROBOT9.007 <sup>11)</sup>	(15x(2x0.25)C+(4x0.25)C)C	18.5	229	369
CFROBOT9.010 <sup>11)</sup>	(4x(2x0.25)C)C	10.5	63	116

<sup>11)</sup> 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.	Core group	Colour code
CFROBOT9.007 <sup>11)</sup>	15x(2x0.25)C (4x0.25)C	colour code in accordance with DIN 47100 white/green/brown/yellow (CAN-Bus)
CFROBOT9.010 <sup>11)</sup>	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red



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



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