Robot
Twistable cables

chainflex® types

chainflex® cable	Jacket	Shield	Bending radius twisted, min. [factor x d]	Temperature twisted from/to [°C]	Approvals and standards	Oil resistant	Torsion resistant	v max. twisted [°/s]	a max. twisted [°/s²]	Page
Twistable cables										
Information twistable cables										362
Exclusive! chainflex® guarantee – guaranteed lifetime										▶ Selection table page 364
Hybrid cables/Control cables										
CFROBOT9	PUR	✓	10	-25/ +80		✓	✓	180	60	366
CF77.UL.D	PUR		6.8	-25/ +80		✓	✓	180	60	370
CFROBOT2	PUR	✓	10	-25/ +80		✓	✓	180	60	374
Data cables										
CFROBOT3	PUR	✓	10	-25/ +80		✓	✓	180	60	376
Bus cables										
CFROBOT8	PUR	✓	10	-25/ +70		✓	✓	180	60	378
Measuring system cables										
CFROBOT4	PUR	✓	10	-25/ +80		✓	✓	180	60	380
Fibre optic cables										
CFROBOT5	TPE		10	-35/ +80		✓	✓	180	60	384
Power cables/Servo cables										
CFROBOT6	PUR		10	-25/ +80		✓	✓	180	60	386
CFROBOT7	PUR	✓	10	-25/ +80		✓	✓	180	60	388
CFROBOT	TPE	✓	10	-35/ +90		✓	✓	180	60	392

chainflex® cables for robots

Ever more complex sequences of movements in industrial applications demand twistable and/or three-dimensional flexible cables with a long service life similar to the classic chainflex® cables for use in linear e-chainsystems®.
Wires, stranded, shields and sheathing materials must compensate both major changes in bending load and changes in diameter due to torsional movements. For this purpose, different "soft" structural elements e.g. rayon fibres, PTFE elements or filling elements that absorb torsion forces are used in chainflex® ROBOT cables.

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

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

The highly abrasion-resistant, halogen-free and flame-resistant PUR sheathing mixture in motor, hybrid/control cables and bus cables protects the torsion-optimised stranded elements from possible damage.
The highly abrasion-resistant, halogen-free TPE-sheath mixture matches the special requirements of the twistable FOC and individual wires, and also protects the stranded elements.

Unlike cables for linear e-chainsystems®, the "mechanical stress" for these cables is in the combination of bending, torsion and centrifugal forces that cannot usually be determined by design in advance 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 possibility of using a certain cable in torsion applications.

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

According to this standard, all chainflex® ROBOT cables of a triflex® R 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. 2500 mm with 270°torsion with an extreme load through centrifugal forces and heavy blows such as those that can occur with 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-mentioned igus® standard and have been approved for use in torsion applications.

The following twistable CF ROBOT cable types are currently available:

- Hybrid/Control cables
- Motor/Servo cables
- Bus/Data Cables
- Fibre optic cables

We can also offer you chainflex® ROBOT cables prefitted with the plug-in connectors of your choice as readycable®, or as a ready-to-install readychain® cable assembly.

Test data ▶ Page 61

chainflex® guarantee ▶▶ Guaranteed lifetime (1)

	chainflex® cable	Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Bending radius min. [factor x d]	Bending radius min. [factor x d]	Bending radius min. [factor x d]	Page
Twistable cables					5 million cycles *	7.5 million cycles *	10 million cycles *	
	CF ROBOT9	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	366
	CF77.UL.D	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	370
	CF ROBOT2	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	374
	CF ROBOT3	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	376
	CF ROBOT8	-25 / -15 -15 / +60 +60 / +70	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	378
	CF ROBOT4	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	380
	CF ROBOT5	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	384
	CF ROBOT6	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	386
	CF ROBOT7	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	388
	CF ROBOT	-35 / -25 -15 / +80 +80 / +90	180	60	±150 ±180 ±150	±90 ±120 ±90	±30 ±60 ±30	392

(1) Exclusive! Guaranteed lifetime for this series according to the guarantee conditions ► Page 22-25

* Guaranteed lifetime, higher numbers of double strokes possible.

PUR Hybrid cable, twistable | CFROBOT9

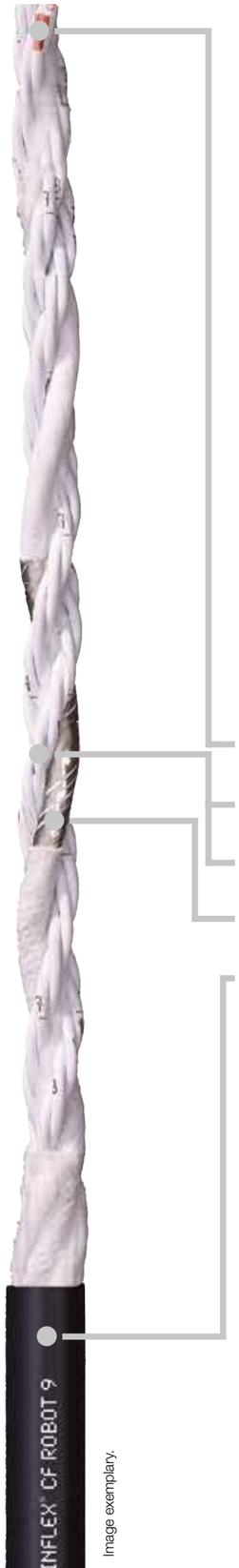

Image exemplary.

- For twistable applications
- PUR outer jacket
- Unshielded/shielded
- Oil-resistant and coolant-resistant
- Notch-resistant
- Flame-retardant
- Hydrolysis-/microbe-resistant
- PVC-free/halogen-free

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-25 °C to +80 °C
	flexible	-40 °C to +80 °C (following EN 60811-504)
	fixed	-50 °C to +80 °C (following DIN EN 50305)
v max. twisted		180°/s
a max. twisted		60°/s²
Travel distance		Robots and motions in 3D area, Class 7
Torsion		± 180°, with 1 m cable length

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	▶ Schedule Delivery Program
Element shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical.
Outer jacket	Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in energy chains® (following DIN VDE 0282, Part 10). Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500 V (following DIN VDE 0245)
Testing voltage	2000 V (following DIN EN 50396)

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications **7** travel distance twisted **3** oil-resistant

Halogen-free	Following EN 50267-2-1
UL/CSA	**≤ 0.5 mm²:** Style 10467 and 20317, 300 V, 80 °C **> 0.5 mm²:** Style 10493 and 20317, 300 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01254
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

igus® chainflex® cables in application of a multi-dimensional moving energy chain triflex® R for 6-axis robots.

... no minimum order quantity ...

CFROBOT9
PUR
± 180°

PUR Hybrid cable, twistable | CFROBOT9

Class 6.7.3

6 extremely heavy duty applications 7 travel distance twisted 3 oil-resistant

CFROBOT9
PUR
± 180°

Image exemplary.

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part No.	Core group	Colour code
CFROBOT9.001	5 G 1.0 + (2 x 1.0)C	10.5	86	142	**CFROBOT9.001**	5G1.0 (2x1.0)C	Cores black with white numerals 1-4, one core green-yellow Cores white with black numerals 5-6
CFROBOT9.002	2x3x0.75 + (3x0.75)C	11.5	82	145	**CFROBOT9.002**	2x3x0.75 (3x0.75)C	Cores white with black numerals 4-9 Cores white with black numerals 1-3
CFROBOT9.003	2x0.5 + (2x0.5)C	10.0	29	80	**CFROBOT9.003**	2x0.5 (2x0.5)C	blue/black white/brown
CFROBOT9.004	16 G 1.0 + (2 x 1.0)C	16.0	207	324	**CFROBOT9.004**	16G1.0 (2x1.0)C	Cores white with black numerals 1-4, 7-17, one core green-yellow Cores white with black numerals 5-6
CFROBOT9.005	23 G 1.0 + (2 x 1.0)C	19.5	286	462	**CFROBOT9.005**	23G1.0 (2x1.0)C	Cores white with black numerals 1-4, 7-24, one core green-yellow Cores white with black numerals 5-6
CFROBOT9.006	24 G 1.0 + (2 x 1.0)C	20.0	299	476	**CFROBOT9.006**	24G1.0 (2x1.0)C	Cores white with black numerals 1-4, 7-25, one core green-yellow Cores white with black numerals 5-6
CFROBOT9.007	(15x(2x0.25)C+(4x0.25)C)C	18.5	245	384	**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	66	120	**CFROBOT9.010**	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red

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

Order example: CFROBOT9.001 – in your desired length (0.5 m steps)
CFROBOT9 chainflex® series .001 Code nominal cross section

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...
(up to 10 cuts of the same types)

... no minimum order quantity ...

PUR Control cable, twistable | CF77.UL.D

Image exemplary.

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

Dynamic information

[°C] R	**Bending radius**	**twisted**	minimum 6.8 x d
		flexible	minimum 5 x d
		fixed	minimum 4 x d
°C	**Temperature**	**twisted**	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
v	**v max. twisted**	180°/s	
a	**a max. twisted**	60°/s²	
[m]	**Travel distance**	Robots and motions in 3D area, Class 7	
± X°	**Torsion**	± 180°, with 1 m cable length	

Cable structure

Conductor
Fine-wire stranded conductor consisting of bare copper wires (following EN 60228)

Core insulation
Mechanically high-quality TPE mixture.

Core stranding
Number of cores <12: cores stranded in a layer with short pitch length
Number of cores ≥ 12: Cores combined in bundles and stranded together around a centre for high tensile stresses with adapted, short pitch lengths and pitch directions, especially low-torsion structure.

Core identification
Cores < 0.5 mm²: Colour code in accordance with DIN 47100
Cores ≥ 0.5 mm²: Cores black with white numerals, one core green-yellow
CF77.UL.03.04.INI: brown, blue, black, white

Outer jacket
Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN VDE 0282 Part 10).
Colour: Window grey (similar to RAL 7040)
CF77.UL.03.04.INI: Colour: Colza yellow (similar to RAL 1021)

Electrical information

U	**Nominal voltage**	**Number of cores < 12:** 300/500 V **Number of cores < 12 (0.25-0.34):** 300/500 V **Number of cores ≥ 12:** 300/500 V (following DIN VDE 0245)
	Testing voltage	2000 V (following DIN EN 50396)

EPLAN download, configurators ▶ www.igus.eu/CF77R

1,040 types from stock no cutting costs ...
(up to 10 cuts of the same types)

Class 5.7.3

5 heavy duty applications 7 travel distance twisted 3 oil-resistant

Properties and approvals

UV-resistance	Medium
Oil	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, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following EN 50267-2-1
UL/CSA	**< 0.5 mm²:** Style 10493 and 20233, 300 V, 80 °C **≥ 0.5 mm²:** Style 11323 and 21223, 1000 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
GL	Certified according to GL Type Testing – Certificate No.: 61 935-14 HH
EAC	Certified according to No. TC RU C-DE.ME77.B.01254
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF77.UL.05.12.D, tested by IPA according to standard 14644-1
DESINA	According to VDW, DESINA standardisation
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications with average sun radiation
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

... no minimum order quantity ...

CF77.UL.D
PUR
± 180°

PUR Control cable, twistable | CF77.UL.D

Class 5.7.3 5 heavy duty applications 7 travel distance twisted 3 oil-resistant

CF77.UL.D
PUR
± 180°

Image exemplary.

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.02.04.D	4 x 0.25	5.5	11	35
CF77.UL.03.04.INI	4 x 0.34	5.5	17	40
CF77.UL.05.04.D	4 G 0.5	6.0	22	44
CF77.UL.05.05.D	5 G 0.5	6.5	28	52
CF77.UL.05.07.D	7 G 0.5	8.0	41	80
CF77.UL.05.12.D	12 G 0.5	10.0	66	132
CF77.UL.05.18.D	18 G 0.5	12.0	99	184
CF77.UL.05.25.D	25 G 0.5	14.0	138	247
CF77.UL.05.30.D	30 G 0.5	15.0	165	325
CF77.UL.07.03.D	3 G 0.75	6.5	24	55
CF77.UL.07.04.D	4 G 0.75	7.0	32	64
CF77.UL.07.05.D	5 G 0.75	7.5	40	75
CF77.UL.07.07.D	7 G 0.75	8.5	56	106
CF77.UL.07.12.D	12 G 0.75	12.0	96	192
CF77.UL.07.18.D	18 G 0.75	13.5	143	260
CF77.UL.07.20.D	20 G 0.75	14.5	159	292
CF77.UL.07.25.D	25 G 0.75	16.0	198	368
CF77.UL.07.36.D	36 G 0.75	18.5	297	524
CF77.UL.07.42.D [1.7]	42 G 0.75	21.0	365	604
CF77.UL.10.02.D	2 x 1.0	6.5	22	54
CF77.UL.10.03.D	3 G 1.0	6.5	32	65
CF77.UL.10.04.D	4 G 1.0	7.0	43	79
CF77.UL.10.05.D	5 G 1.0	8.0	53	97
CF77.UL.10.07.D	7 G 1.0	9.0	74	119
CF77.UL.10.12.D	12 G 1.0	12.5	127	234
CF77.UL.10.18.D	18 G 1.0	15.0	191	339
CF77.UL.10.25.D	25 G 1.0	17.0	264	452
CF77.UL.10.42.D	42 G 1.0	22.5	462	708

[1.7] Delivery time: 7 weeks
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.
G= with green-yellow earth core x= without earth core

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.15.03.D	3 G 1.5	7.5	48	86
CF77.UL.15.04.D	4 G 1.5	8.0	64	105
CF77.UL.15.05.D	5 G 1.5	8.5	80	125
CF77.UL.15.07.D [17]	7 G 1.5	10.5	111	174
CF77.UL.15.12.D	12 G 1.5	14.0	191	308
CF77.UL.15.18.D	18 G 1.5	17.0	286	477
CF77.UL.15.25.D	25 G 1.5	19.5	396	630
CF77.UL.15.36.D [1.7]	36 G 1.5	23.5	594	891
CF77.UL.15.42.D [1.7]	42 G 1.5	26.5	729	1040
CF77.UL.25.03.D	3 G 2.5	8.5	80	124
CF77.UL.25.04.D	4 G 2.5	9.5	106	155
CF77.UL.25.05.D	5 G 2.5	10.5	132	192
CF77.UL.25.07.D [17]	7 G 2.5	12.5	185	270
CF77.UL.40.04.D [1.7]	4 G 4.0	11.5	185	257

[1.7] Delivery time: 7 weeks
[17] Using the cables with "7 G 1.5 mm² and „7 G 2.5 mm² it is essential: Bending radius ≥ 17 x d with travel distance ≥ 5 m. When the travel distance is not less than 5 m, a bending radius not lass than 17 x d has to be used.
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.
G= with green-yellow earth core x= without earth core

Order example: CF77.UL.10.03.D – in your desired length (0.5 m steps)
CF77.UL.D chainflex® series .10 Code nominal cross section .03 Number of cores

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

EPLAN download, configurators ▶ www.igus.eu/CF77R

1,040 types from stock no cutting costs ...
(up to 10 cuts of the same types)

... no minimum order quantity ...

PUR Control cable, twistable | CFROBOT2

Image exemplary.

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

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-25 °C to +80 °C
	flexible	-40 °C to +80 °C (following EN 60811-504)
	fixed	-50 °C to +80 °C (following DIN EN 50305)
v max. twisted	180°/s	
a max. twisted	60°/s²	
Travel distance	Robots and motions in 3D area, Class 7	
Torsion	± 180°, with 1 m cable length	

Cable structure

Conductor Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Core identification Cores black with white numerals, one core green-yellow

Element shield Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85 % optical.

Outer jacket Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN VDE 0282, Part 10).
Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage 300/500 V (following DIN VDE 0245)

Testing voltage 2000 V (following DIN EN 50396)

Properties and approvals

UV-resistance High

Oil Oil-resistant (following DIN EN 50363-10-2), Class 3

Flame-retardant According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications 7 travel distance twisted 3 oil-resistant

Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following EN 50267-2-1
UL/CSA	Style 10493 and 20317, 300 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01254
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT2.07.04.C	(4 G 0.75)C	8.5	45	84
CFROBOT2.07.05.C	(5 G 0.75)C	8.5	54	94
CFROBOT2.07.07.C	(7 G 0.75)C	10.0	75	130
CFROBOT2.07.12.C [1.10)]	(12 G 0.75)C	14.0	131	219
CFROBOT2.07.18.C	(18 G 0.75)C	16.5	197	321

[1.10)] Delivery time: 10 weeks
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.
G= with green-yellow earth core x= without earth core

... no minimum order quantity ...

CFROBOT2
PUR
± 180°

PUR Data cable, twistable | CFROBOT3

Image exemplary.

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

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-25 °C to +80 °C
	flexible	-40 °C to +80 °C (following EN 60811-504)
	fixed	-50 °C to +80 °C (following DIN EN 50305)
v max. twisted	180°/s	
a max. twisted	60°/s²	
Travel distance	Robots and motions in 3D area, Class 7	
Torsion	± 180°, with 1 m cable length	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	Colour code in accordance with DIN 47100
Inner jacket	PUR mixture adapted to suit the requirements in e-chains®.
Overall shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical.
Outer jacket	Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in energy chains® (following DIN VDE 0282, Part 10). Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	300/500 V (following DIN VDE 0245)
Testing voltage	2000 V (following DIN EN 50396)

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 50363-10-2), Class 3

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1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications 7 travel distance twisted 3 oil-resistant

Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL/CSA	Style 10497 and 20911, 300 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01254
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15			±150	±90	±30
-15 / +70	180	60	±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

	Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
New	**CFROBOT3.02.04.02**	(4x(2x0.25))C	11.0	50	149
	CFROBOT3.02.06.02	(6x(2x0.25))C	12.0	64	171
New	**CFROBOT3.02.08.02**	(8x(2x0.25))C	13.5	81	228
	CFROBOT3.05.05.02	(5x(2x0.5))C	13.0	90	223

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

... no minimum order quantity ...

CFROBOT3
PUR
± 180°

PUR Bus cable, twistable | CFROBOT8

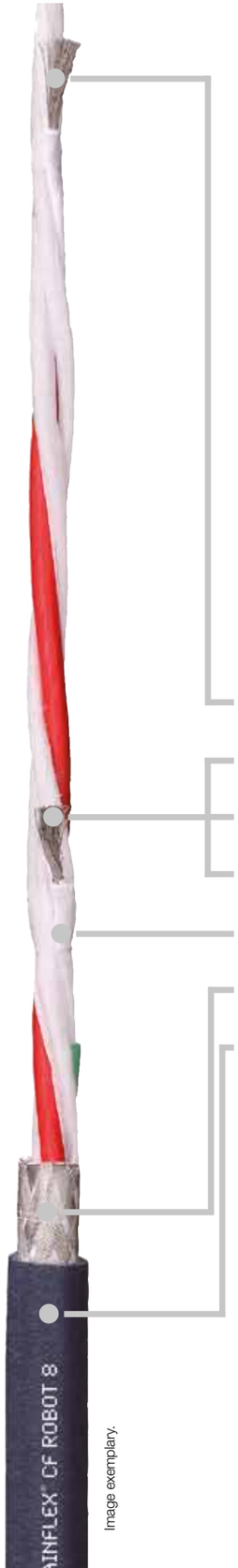

Image exemplary.

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

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-25 °C to +70 °C
	flexible	-40 °C to +70 °C (following EN 60811-504)
	fixed	-50 °C to +70 °C (following DIN EN 50305)
v max. twisted	180°/s	
a max. twisted	60°/s²	
Travel distance	Robots and motions in 3D area, Class 7	
Torsion	± 180°, with 1 m cable length	

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
Core insulation	According to bus specification
Core stranding	According to bus specification
Core identification	According to bus specification ▶ Schedule Delivery Program
Intermediate layer	Foil taping over the external layer.
Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80 % optical.
Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains®. Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	50 V
Testing voltage	500 V

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 50363-10-2), Class 3

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1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications **7** travel distance twisted **3** oil-resistant

Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
UL/CSA	**≤ 0.25 mm²:** Style 1589 and 20236, 30 V, 80 °C **> 0.25 mm²:** Style 1589 and 20963, 30 V, 80 °C
EAC	Certified according to No. TC RU C-DE.ME77.B.01218
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +60			±180	±120	±60
+60 / +70			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT8.001 (Profibus)	(2x0.35)C	8.0	29	62
CFROBOT8.022 (Can-Bus)	(4x0.5)C	7.0	43	72
CFROBOT8.045 (GigE)	4x(2x0.14)C	8.5	39	69
CFROBOT8.060 (Profinet)	(2x(2x0.34))C	8.5	36	70

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

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
CFROBOT8.001	150	(2x0.35)C	red, green
CFROBOT8.022	120	(4x0.5)C	white, green, brown, yellow (star-quad stranding)
CFROBOT8.045	100	(4x(2x0.14)C)	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
CFROBOT8.060	100	(2x(2x0.34))C	white/blue, yellow/orange

... no minimum order quantity ...

CFROBOT8
PUR
± 180°

PUR Measuring system cable, twistable | CFROBOT4

Class 6.7.3

6 extremely heavy duty applications 7 travel distance twisted 3 oil-resistant

CFROBOT4
PUR
± 180°

Image exemplary.

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

Dynamic information

Bending radius		twisted	minimum 10 x d
		flexible	minimum 8 x d
		fixed	minimum 5 x d
Temperature		twisted	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
v max. twisted			180°/s
a max. twisted			60°/s²
Travel distance			Robots and motions in 3D area, Class 7
Torsion			± 180°, with 1 m cable length

Cable structure

Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
Core insulation	Mechanically high-quality TPE mixture.
Core identification	According to measuring system specification ▶ Schedule Delivery Program
Element shield	Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85 % optical.
Overall shield	Torsion resistant tinned braided copper shield. Coverage approx. 80 % optical.
Outer jacket	Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in energy chains® (following DIN VDE 0282, Part 10). Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	50 V
Testing voltage	500 V

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following EN 50267-2-1
UL/CSA	Style 1589 and 20236, 30 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01218
CTP	Certified according to No. C-DE.PB49.B.00416
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

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PUR Measuring system cable, twistable | CFROBOT4

Class 6.7.3

6 extremely heavy duty applications 7 travel distance twisted 3 oil-resistant

CFROBOT4
PUR
± 180°

Image exemplary.

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter 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	65	119	**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
CFROBOT4.002 [1.10)]	(3x(2x0.14)C+2x(0.5)C)C	10.5	70	122	**CFROBOT4.002** [1.10)]	3x(2x0.14)C 2x(0.5)C	green/yellow, black/brown, red/orange black, red
CFROBOT4.006	(3x(2x0.14)C+(4x0.14)+ (4x0.22)+(2x0.5))C	11.5	78	143	**CFROBOT4.006**	3x(2x0.14)C (4x0.14) (4x0.22) (2x0.5)	green/yellow, brown/black, red/orange grey/blue/white-yellow/white-black brown-yellow/brown-grey/green-black/green-red brown-red/brown-blue
CFROBOT4.009	(4x(2x0.25)+(2x0.5))C	9.5	51	93	**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	52	96	**CFROBOT4.015**	4x(2x0.14) 4x0.5	brown/green, violet/yellow, grey/pink, red/black blue, white, brown-green, white-green
CFROBOT4.028 [16)]	(2x(2x0.20)+(2x0.38))C	7.5	47	75	**CFROBOT4.028** [16)]	2x(2x0.20) (2x0.38)	green/yellow, pink/blue red/black

[1.10)] Delivery time: 10 weeks
[16)] Colour outer jacket: Yellow-green (similar RAL 601[8)]
Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.
G= with green-yellow earth core x= without earth core

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

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

... no minimum order quantity ...

TPE Fibre optic cable, twistable | CFROBOT5

Class 6.7.4 6 extremely heavy duty applications 7 travel distance twisted 4 oil-resistant

CFROBOT5
TPE
± 180°

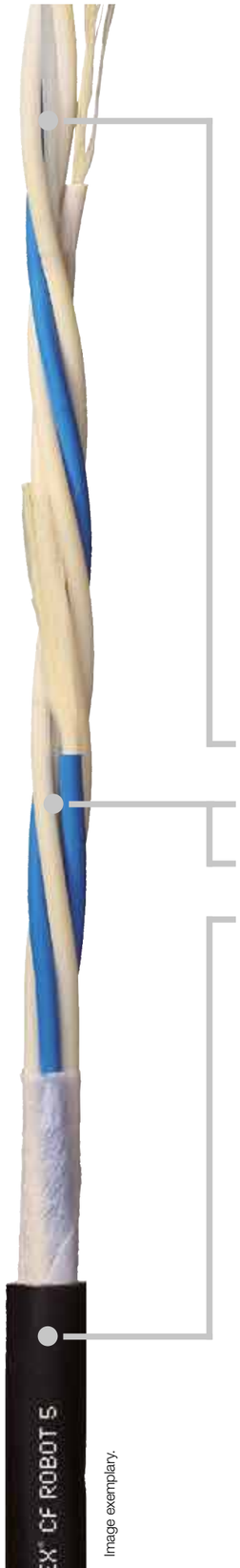

Image exemplary.

- For twistable applications
- TPE outer jacket
- Oil-resistant
- Bio-oil-resistant
- UV-resistant
- Low-temperature-flexible
- Hydrolysis-/microbe-resistant
- PVC-free/halogen-free

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-35 °C to +80 °C
	flexible	-50 °C to +80 °C (following EN 60811-504)
	fixed	-55 °C to +80 °C (following DIN EN 50305)
v max. twisted		180°/s
a max. twisted		60°/s²
Travel distance		Robots and motions in 3D area, Class 7
Torsion		± 180°, with 1 m cable length

Cable structure

Fibre optic cables	50/125 µm, 62.5/125 µm special fixed wire elements with aramide strain relief.
Core stranding	FOC wires stranded with high-tensile aramide dampers around the GRP central element.
Core identification	▶ Schedule Delivery Program
Outer jacket	Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in e-chains®. Colour: Jet black (similar to RAL 9005)

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following EN 50267-2-1

Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF9.15.07, tested by IPA according to standard 14644-1
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35 / -25			±150	±90	±30
-25 / +70	180	60	±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling

Delivery program Part No.	Number of fibres	Fibre diameter approx. [µm]	External diameter max. [mm]	Weight [kg/km]
CFROBOT5.500	2	62.5/125	8.5	87
CFROBOT5.501	2	50/125	8.5	87

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth with 850 nm [MHz x km]	Attenuation with 850 nm [dB/km]	Bandwidth with 1300 nm [MHz x km]	Attenuation with 1300 nm [dB/km]	Colour code
CFROBOT5.500	≥ 200	≤ 3.0	≥ 500	≤ 0.7	orange with white numerals
CFROBOT5.501	≥ 500	≤ 2.5	≥ 500	≤ 0.7	blue with white numerals

Order example: CFROBOT5.501 – in your desired length (0.5 m steps)
CFROBOT5 chainflex® series .501 Code Type of fibres

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...
(up to 10 cuts of the same types)

... no minimum order quantity ...

PUR Power cable, twistable | CFROBOT6

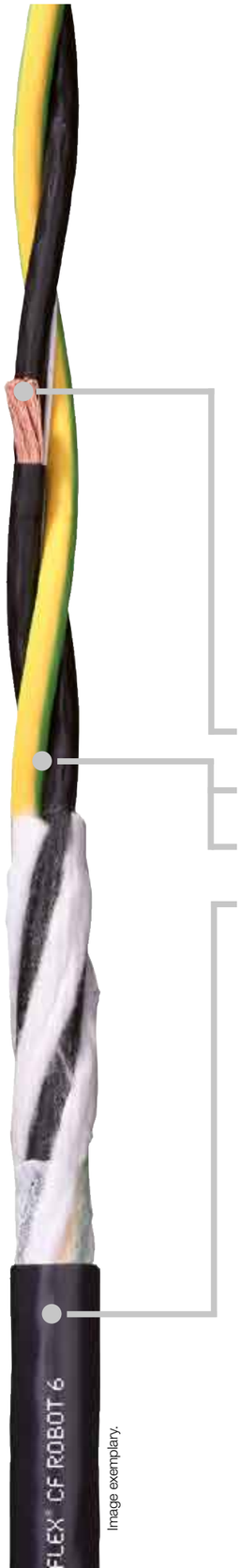

Image exemplary.

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

Dynamic information

[°C] R	**Bending radius**	**twisted**	minimum 10 x d
		flexible	minimum 8 x d
		fixed	minimum 5 x d
°C	**Temperature**	**twisted**	-25 °C to +80 °C
		flexible	-40 °C to +80 °C (following EN 60811-504)
		fixed	-50 °C to +80 °C (following DIN EN 50305)
v	**v max. twisted**	180°/s	
a	**a max. twisted**	60°/s²	
[m]	**Travel distance**	Robots and motions in 3D area, Class 7	
± X°	**Torsion**	± 180°, with 1 m cable length	

Cable structure

	Conductor	Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).
	Core insulation	Mechanically high-quality TPE mixture.
	Core identification	Power cores: Cores black with white numerals, one core green-yellow. ▶ Schedule delivery program
	Outer jacket	Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in e-chains® (following DIN VDE 0282, Part 10). Colour: Steel blue (similar to RAL 5011)

Electrical information

U	**Nominal voltage**	600/1000 V (following DIN VDE 0250)
	Testing voltage	4000 V (following DIN EN 50396)

Properties and approvals

UV	**UV-resistance**	High
oil	**Oil**	Oil-resistant (following DIN EN 50363-10-2), Class 3
	Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
	Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications **7** travel distance twisted **3** oil-resistant

Halogen-free	Following EN 50267-2-1
UL/CSA	Style 10492 and 21223, 1000 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01255
CTP	Certified according to No. C-DE.PB49.B.00420
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1.
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT6.100.03	3G10	16.0	317	414
CFROBOT6.160.03	3G16	18.5	508	618
CFROBOT6.250.03	3G25	23.0	795	962
CFROBOT6.350.03	3G35	25.5	1122	1298

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

Order example: CFROBOT6.100.03 – in your desired length (0.5 m steps)
CFROBOT6 chainflex® series .100 Code nominal cross section .03 Number of cores

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

... no minimum order quantity ...

CFROBOT6
PUR
± 180°

PUR Power cable, twistable | CFROBOT7

Image exemplary.

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

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-25 °C to +80 °C
	flexible	-40 °C to +80 °C (following EN 60811-504)
	fixed	-50 °C to +80 °C (following DIN EN 50305)
v max. twisted	180°/s	
a max. twisted	60°/s²	
Travel distance	Robots and motions in 3D area, Class 7	
Torsion	± 180°, with 1 m cable length	

Cable structure

Conductor Stranded conductor in especially bending-resistant version consisting of bare copper wires (following EN 60228).

Core insulation Mechanically high-quality TPE mixture.

Core identification **Power cores:** Cores black with white numerals, one core green-yellow. ▶ Schedule delivery program
2 Control pairs: Core black with white numerals.
1. Control core: 5 2. Control core: 6
3. Control core: 7 4. Control core: 8
4 Control pairs: Colour code in accordance with DIN 47100

Overall shield Extremely torsion-resistant tinned braided copper shield. Coverage approx. 85% optical.

Outer jacket Low-adhesion, halogen-free, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in energy chains® (following DIN VDE 0282, Part 10).
Colour: Steel blue (similar to RAL 5011)

Electrical information

Nominal voltage	600/1000 V (following DIN VDE 0250)
Testing voltage	4000 V (following DIN EN 50396)

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.3

6 extremely heavy duty applications **7** travel distance twisted **3** oil-resistant

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)
Halogen-free	Following EN 50267-2-1
UL/CSA	Style 10492 and 21223, 1000 V, 80 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01255
CTP	Certified according to No. C-DE.PB49.B.00420
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF27.07.05.02.01.D, tested by IPA according to standard 14644-1
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-25 / -15	180	60	±150	±90	±30
-15 / +70			±180	±120	±60
+70 / +80			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

... no minimum order quantity ...

CFROBOT7
PUR
± 180°

PUR Power cable, twistable | CFROBOT7

Class 6.7.3

6 extremely heavy duty applications **7** travel distance twisted **3** oil-resistant

CFROBOT7
PUR
± 180°

Image exemplary.

Delivery program Part No. Without control pair	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT7.15.03.C	(3G1.5)C	8.5	64	103
CFROBOT7.15.04.C	(4G1.5)C	9.5	82	127
CFROBOT7.25.03.C	(3G2.5)C	10.0	98	147
CFROBOT7.25.04.C	(4G2.5)C	10.5	127	182
CFROBOT7.60.04.C	(4G6.0)C	15.0	296	403
2 Control pairs				
CFROBOT7.15.15.02.02.C	(4G1.5+2x(2x1.5)C)C	16.5	211	325
CFROBOT7.25.15.02.02.C	(4G2.5+2x(2x1.5)C)C	17.0	259	381
4 Control pairs				
CFROBOT7.40.02.02.04.C	(4G4+4x(2x0.25)C)C	17.0	270	384

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

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

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

1,040 types from stock no cutting costs ...
(up to 10 cuts of the same types)

... no minimum order quantity ...

TPE Motor cable, twistable | CFROBOT

Image exemplary.

- For twistable applications
- TPE outer jacket
- Shielded
- Oil-resistant, bio-oil-resistant
- PVC-free
- UV-resistant
- Flame-retardant
- Hydrolysis-/microbe-resistant

Dynamic information

Bending radius	**twisted**	minimum 10 x d
	flexible	minimum 8 x d
	fixed	minimum 5 x d
Temperature	**twisted**	-35 °C to +90 °C
	flexible	-45 °C to +100 °C (following EN 60811-504)
	fixed	-50 °C to +100 °C (following DIN EN 50305)
v max. twisted	180°/s	
a max. twisted	60°/s²	
Travel distance	Robots and motions in 3D area, Class 7	
Torsion	± 180°, with 1 m cable length	

Cable structure

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

Electrical information

Nominal voltage	600/1000 V (following DIN VDE 0250)
Testing voltage	4000 V (following DIN EN 50396)

Properties and approvals

UV-resistance	High
Oil	Oil-resistant (following DIN EN 60811-2-1), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4
Flame-retardant	According to IEC 60332-1-2, CEI 20-35, FT1, VW-1
Silicon-free	Free from silicon which can affect paint adhesion (following PV 3.10.7 – status 1992)

EPLAN download, configurators ▶ www.igus.eu/CFROBOT

1,040 types from stock no cutting costs ...

(up to 10 cuts of the same types)

Class 6.7.4

6 extremely heavy duty applications **7** travel distance twisted **4** oil-resistant

UL/CSA	Style 10258 and 21387, 1000 V, 90 °C
NFPA	Following NFPA 79-2012 chapter 12.9
EAC	Certified according to No. TC RU C-DE.ME77.B.01255
CTP	Certified according to No. C-DE.PB49.B.00420
CEI	Following CEI 20-35
Lead free	Following 2011/65/EC (RoHS-II)
Clean room	According to ISO Class 1. Outer jacket material complies with CF34.UL.25.04.D, tested by IPA according to standard 14644-1
CE	Following 2006/95/EC

Guaranteed lifetime according to guarantee conditions (Page 22-25)

Cycles *			5 million	7.5 million	10 million
Temperature, from/to [°C]	v max. [°/s] twisted	a max. [°/s²] twisted	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]
-35 / -25			±150	±90	±30
-15 / +80	180	60	±180	±120	±60
+80 / +90			±150	±90	±30

* Higher number of cycles possible - please ask for your individual calculation.

Typical application areas

- For extremely heavy duty applications with torsion movements
- Almost unlimited resistance to oil, also with bio-oils
- Indoor and outdoor applications, UV-resistant
- Especially for robots and movements in the 3D range
- Robots, handling, spindle drives

Delivery program Part No.	Number of cores and conductor nominal cross section [mm²]	External diameter max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT.035	(1x10.0)C	10.5	134	209
CFROBOT.036	(1x16.0)C	12.0	202	293
CFROBOT.037	(1x25.0)C	14.5	318	454
CFROBOT.038	(1x35.0)C	15.5	431	574
CFROBOT.039	(1x50.0)C	18.0	601	781

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

Order example: CFROBOT.035 – in your desired length (0.5 m steps)
CFROBOT chainflex® series .035 Code Nominal cross section

Online order ▶ www.chainflex.eu/CFROBOT

Delivery time 24h or today.
Delivery time means time until shipping of goods.

... no minimum order quantity ...

CFROBOT
TPE
± 180°