# Wistable Sable Sable Sable



cable 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	
Twistable cables																				
nformation abou	t twi	stal	ble c	ables															380	
Control cables																				
CF77.UL.D	PUR		6.8	-25/+80		a <b>11</b> 00 a					Roms Q			UK CA	✓	✓	180	60	384	
FROBOT2	PUR	✓	10	-25/+80		5 <b>Al</b> us (1	NFPA				ROHS ?	con-	Ce	UK CA	✓	✓	180	60	388	
Data cable																				
CFROBOT3	PUR	✓	10	-25/+80		s <b>RL</b> us (1)	NFPA				ROHS P	ean-	Ce	UK CA	✓	✓	180	60	390	
Measuring syste	m ca	ble	•																	
CFROBOT4	PUR	√	10	-25/+80		<b>Rus</b> n				REAS	Roms ?	ean- oom	(	UK CA	✓	√	180	60	392	
Fibre Optic Cable	е																			
CFROBOT5	TPE		10	-35/+80	c (UL) u Listed			C 🕕 A		REAC	ROHS ?	can-	Ce	UK	✓	✓	180	60	396	
Motor cables																				
CFROBOT6	PUR		10	-25/+80		s <b>Al</b> us n					ROHS Q	ean-	(	UK CA	✓	√	180	60	398	
FROBOT7	PUR	✓	10	-25/+80		s <b>"Al</b> us (1)					Roms e	ean-	(	UK	✓	✓	180	60	400	
Spindle cable/Si	ngle	cor	e																	
FROBOT	TPE	✓	10	-35/+90	c (U) u LISTED	• <b>A</b> lus (•		C 🕐 A		ER[ 👳	Roms e	con-	Ce	UK	✓	✓	180	60	404	
Bus cables																				
CFROBOT8	PUR	✓	10	-25/+70	c (U) LISTED	5 <b>. Al</b> us (n		C 🕕 A			ROHS P	ean-	Ce	UK	✓	✓	180	60	406	
FROBOT8.PLUS	PUR	✓	10	-25/+70							Roms of	ean-	(	UK CA	✓	✓	360	60	410 <mark>N</mark> e	•w
Hybrid cable																				
FROBOT9	PUR	✓	10	-25/+80	C (U) U LISTED			C UP A			ROHS	ean-	Ce	UK CA	√	✓			414	
6-month chainfle auaranteed servi Selection table Vith the help of the ch alculate the expected www.igus.eu	ex <sup>®</sup> ( ce lif e pag hainfle: d servi chair	gua ie fo je 3 x <sup>®</sup> s ce lif	rante or pr 82 ervice fe of c	ee edictat life calcu chainflex <sup>®</sup>	<b>ole</b> i ulato <sup>0</sup> cab	r <b>eliab</b> r, you bles sp	<b>vility</b> can qu jecifica	uickl Ily fo	y anı or yo	d easil ur app	y licatic	on:	Gu			ee ≫	ig ch gu cal on cy	us 36-n ainflex uarante service culator 2 billio ycles pe	nonth cable e and life r based on test er year	



www.igus.eu/chainflexlife

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

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





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Test data ► Page 51

<del>IQUS</del>

- 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.



chainfl	ex <sup>®</sup> guar	ranto	ee		Guara	nte	ed ser	vic	e life "	
	chainflex <sup>®</sup> cables	Temperature, from/to [°C]	v max. [°/s]	a max. [°/s²]	Minimum bend radius [factor x d]		Minimum bend radius [factor x d]		Minimum bend radius [factor x d]	Page
Twistable cables			twisted	TWISTED	5 million cycles *		7.5 million		10 million cycles *	
Control cables					0,000		6,000		0,000	
	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
Data cable										
Sur 22	CFROBOT3	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	390
Measuring system ca	ble									
	CFROBOT4	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	392
Fibre Optic Cable										
	CFROBOT5	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	396
Motor cables										
	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
Spindle cable/Single	core									
	CFROBOT	-35 / -25 -15 / +80 +80 / +90	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	404
Bus cables										
	CFROBOT8	-25 / -15 -15 / +60 +60 / +70	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	406
	CFROBOT8.PLUS New!	-25 / -15 -15 / +60 +60 / +70	360	60	±330 ±360 ±330		±240 ±270 ±240		±150 ±180 ±150	410
Hybrid cable										
	CFROBOT9	-25 / -15 -15 / +70 +70 / +80	180	60	±150 ±180 ±150		±90 ±120 ±90		±30 ±60 ±30	414

<sup>(1)</sup> Guaranteed service life for these series (details **>** see page 28-29)

\* Higher number of double strokes? Calculate service life online: > www.igus.eu/chainflexlife

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



Properties and approvals

UV resistance

Testing voltage



For torsion applications

Cycles guaranteed

- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant

### nomio information







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

Jynai	nic information		
	Bend radius	flexible twisted	minimum 6.8 x d
		fixed	minimum 4 x d
°C	Temperature	flexible twisted	-25°C up to +80°C
$(\bigcirc$		fixed	-50°C up to +80°C (following DIN EN 50305)
Č	v max.	twisted	180°/s
a	a max.	twisted	60°/s <sup>2</sup>
	Travel distance	Robots and 3D m	ovements, Class 1
5	Torsion	Torsion ±180°, wit	th 1m cable length, Class 3
<b>1</b>		(except for 5-core	types $\ge 4.0$ mm <sup>2</sup> $\triangleright$ <b>Product range table</b> )
Cable	structure		•
	Conductor	Finely stranded co 60228).	onductor consisting of bare copper wires (following DIN EN
$\overline{\mathbb{Q}}$	Core insulation	Mechanically high	-quality TPE mixture.
	Core structure	Number of cores Number of cores a high tensile stre and directions. Es	<ul> <li>&lt; 12: Cores wound in a layer with short pitch length.</li> <li>&gt; 12: Cores wound in bundles which are then wound around another the start of the</li></ul>
X	Core identification	Cores < 0.5mm <sup>2</sup> :	Colour code in accordance with DIN 47100.
(0		Cores ≥ 0.5mm <sup>2</sup> : CF77.UL.02.03.IN	Black cores with white numbers, one green-yellow core.
		CF77.UL.03.04.IN	<b>II:</b> brown, blue, black, white
		CF77.UL.03.05.IN	<b>II:</b> brown, blue, black, white, green-yellow
	Outer jacket	Low-adhesion, ha	logen-free, highly abrasion resistant PUR mixture, adapted to
(8		suit the requireme	nts in e-chains <sup>®</sup> (following DIN EN 50363-10-2)
		Colour: Window-g	rey (similar to RAL 7040)
		Variants 🕨 Produ	ct range table
Electr	ical information		
L	Nominal voltage	300/500V (followir	ng DIN VDE 0298-3)
<b>7</b> 0		Number of cores	< 12:
		Cores < 0.5mm <sup>2</sup> :	300V (following UL)

# Class 5.1.3.3

**Basic requirements Travel distance Oil resistance** Torsion

Oil resistance	Oil-resistant (following DIN EN 50
Offshore	MUD-resistant following NEK 606
Flame-retardant	According to IEC 60332-1-2, Cab
Silicone-free	Free from silicone which can affec 1992)
Halogen-free	Following DIN EN 60754
UL verified	Certificate No. B129699: "igus service life calculator based on 2
	See data sheet for details > www
NFPA NFPA	Following NFPA 79-2018, chapte
DNV	Type Approval Certificate TAE000
EAC	Certificate No. RU C-DE.ME77.B
REACH	In accordance with regulation (EC
Rous Lead-free	Following 2011/65/EC (RoHS-II/F
clean-	According to ISO Class 1, mater
	According to VDW, DESINA stand
	Following 2014/35/EU
	In accordance with the valid regul

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

Cycles*	5 million	7.5 million	10 million			
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]			
-25/-15	±150	±90	±30			
-15/+70	±180	±120	±60			
+70/+80	±150	±90	±30			
Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife						

### Typical application areas

- For heavy-duty applications, Class 5
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±180°, with 1m cable length, Class 3
  - Indoor and outdoor applications with average sun radiation
  - Robots, handling, spindle drives

Medium

Cores ≥ 0.5mm<sup>2</sup>: 1000V (following UL)

2,000V (following DIN EN 50395)

Number of cores ≥ 12: 1000V (following UL)

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igus



363-10-2), Class 3

6 - status 2016

ble Flame, VW-1, FT1, FT2 / Horizontal Flame

ct paint adhesion (following PV 3.10.7 – status

36-month chainflex cable guarantee and billion test cycles per year" w.igus.eu/CF77ULD

er 12.9

)03X1

.00300/19

C) No. 1907/2006 (REACH)

RoHS-III)

ial/cable tested by IPA according to DIN EN

dardisation

lations of the United Kingdom (as at 08/2021)











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

### **Basic requirements Travel distance Oil resistance** Torsion

# igus° chainflex° CF77.UL.D

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

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]
CF77.UL.15.03.D	3G1.5
CF77.UL.15.04.D	4G1.5
CF77.UL.15.05.D	5G1.5
CF77.UL.15.07.D <sup>17)</sup>	7G1.5
CF77.UL.15.12.D	12G1.5
CF77.UL.15.18.D	18G1.5
CF77.UL.15.25.D	25G1.5
CF77.UL.15.36.D	36G1.5
CF77.UL.25.03.D	3G2.5
CF77.UL.25.04.D	4G2.5
CF77.UL.25.05.D	5G2.5
CF77.UL.25.07.D <sup>17)</sup>	7G2.5
CF77.UL.25.12.D	12G2.5

<sup>17)</sup> When using the cables with "7G1.5mm<sup>2</sup>" and "7G2.5mm<sup>2</sup>" minimum bend radius must be 17.5xd with gliding travel distance  $\geq$  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



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Class 5.1.3.3

Cables available in the chainflex<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case





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

<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

### EPLAN download, configurators ► www.igus.eu/CF77ULD



Outer diameter

(d) max.

[mm]

7.0

7.5

8.0

9.5

13.0 17.0

19.5 23.5

> 8.5 9.5

10.0 12.0

17.0





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











REACH









Copper

index

[kg/km]

46

61

75

105

179

268

297

551

75

95

Weight

[kg/km]

71

88

105

152

297

405

564

848

132

167







**S** 387

# Control cable | PUR | chainflex® CFROBOT2



36	10 million	R-B
Cue chantes Gue chantes	Cycles guaranteed	







- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant

### Г

•	Flame-retardant	

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

Dynan	nic information			
	Bend radius	flexible twisted	minimum 10 x d	
		fixed	minimum 5 x d	
°C	Temperature	flexible twisted	-25°C up to +80°C	
(		fixed	-50°C up to +80°C (following DIN EN 50305)	
Č	v max.	twisted	180°/s	
a C	a max.	twisted	60°/s <sup>2</sup>	
	Travel distance	Robots and 3D movements, Class 1		
±x°)	Torsion	Torsion $\pm 180^{\circ}$ , with 1m cable length, Class 3		
Cable	structure			
	Conductor	Stranded conduct copper wires (follo	or in especially bending-resistant version consisting of bare wing DIN EN 60228).	
(Q	Core insulation	Mechanically high-quality TPE mixture.		
	Core identification	Black cores with v	vhite numbers, one green-yellow core.	
6	Overall shield	Extremely torsion-	resistant tinned wound copper shield.	
$(\bigcirc$		Coverage approx.	85% optical	
Q	Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains <sup>®</sup> (following DIN EN 50363-10-2)		

Colour: Steel blue (similar to RAL 5011)

300/500V (following DIN VDE 0298-3)

2,000V (following DIN EN 50395)

300V (following UL)

**Electrical information** 

Nominal voltage 4. Testing voltage 

# 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

### EPLAN download, configurators ► www.igus.eu/CFROBOT2

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

# Class 6.1.3.3

CA

**UK** UKCA

**Basic requirements** Travel distance Oil resistance Torsion

UL verified	Certificate No. B129699: "igua service life calculator based on
L/CSA AWM	See data sheet for details ► ww
NFPA NFPA	Following NFPA 79-2018, chapt
EAC	Certificate No. RU C-DE.ME77.
REACH	In accordance with regulation (E
Rouse Lead-free	Following 2011/65/EC (RoHS-II/
clean room	According to ISO Class 1. The o CF77.UL.05.12.D - tested by IP/
CECE	Following 2014/35/EU

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

ycles*	5 million	
Temperature, from/to [°C]	Torsion max. [°/m]	Т
-25/-15	±150	
-15/+70	±180	
+70/+80	±150	

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

### Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±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

# chainflex CASE

### Cables available in the chainflex<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case

suit the requirements in e-chains® (following DIN EN 50363-10-2)



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us 36-month chainflex cable guarantee and 2 billion test cycles per year" ww.igus.eu/CFROBOT2

ter 12.9

.B.00300/19

EC) No. 1907/2006 (REACH)

/RoHS-III)

outer jacket material of this series complies with PA according to standard DIN EN ISO 14644-1

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

Torsion max.

[°/m]

±30

±60

±30

orsion max. [°/m] ±90 ±120

±90





























36 10 million

Cycles guaranteed

# Data cable | PUR | chainflex<sup>®</sup> CFROBOT3

10 x d

Bend radius, e-chain®

±180°/m

Torsion angle



image

ble

<ul> <li>Fo</li> <li>PU</li> <li>Sh</li> <li>Oil</li> </ul>	r torsion applicatio IR outer jacket ielded -resistant and coo	ons olant-resistant	<ul> <li>Flame-retardant</li> <li>PVC and halogen-free</li> <li>Notch-resistant</li> <li>Hydrolysis and microbe-resistant</li> </ul>
Dynai	mic information		
<b>R</b>	Bend radius	flexible twisted	minimum 10 x d
	<b>T</b>	fixed	minimum 5 x d
Ĵ	Temperature	flexible twisted	-25°C UP to +80°C
	N POY	lixed twistod	-50 C up to +60 C (tollowing Din En 50505)
$\bigcirc$	v max.	IWISIEG	180 /s
a	a max.	twisted	60°/s <sup>2</sup>
	Travel distance	Robots and 3D m	ovements, Class 1
	Torsion	Torsion ±180°, wi	th 1m cable length, Class 3
Cable	structure		
6	Conductor	Stranded conduc	tor in especially bending-resistant version consisting of bare
100	7	copper wires (follo	wing DIN EN 60228).
Q	Core insulation	Mechanically high	-quality TPE mixture.
6	Core structure	Cores twisted in	pairs with a short pitch length, core pairs then wound with
1.9	,	short pitch lengths	5.
	Core identification	Colour code in ac	cordance with DIN 47100.
	Overall shield	Extremely torsion-	resistant tinned wound copper shield.
n (Ch	4	Coverage approx.	85% optical
	Outer jacket	Low-adhesion, ha	alogen-free, highly abrasion resistant PUR mixture, adapted
9		to suit the requirer	ments in e-chains® (following DIN EN 50363-10-2)
_		Colour: Steel blue	(similar to RAL 5011)
Electr	ical information	000/500)//(	
μ	ivominai voitage	300/5000 (Tollowing L	19 UIN VUE (1298-3)
	Testing voltage		-) DIN EN 50305)
	resung voltage		
Prope	erties and approvals		
- <b>UV</b> -	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

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

# Class 6.1.3.3

🔍 UL verified

L/CSA AWM

EAC

C€<sup>CE</sup>

CA

Cy

**UK** UKCA

REACH REACH

RoHS Lead-free

Cleanroom

**Basic requirements Travel distance** Oil resistance Torsion

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

/cles*	5 million	
Temperature, from/to [°C]	Torsion max. [°/m]	٦
-25/-15	±150	
-15/+70	±180	
+70/+80	±150	

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

### Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±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

EU2023

EU2023

S

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



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

More on this on page 24/25 and online: www.igus.eu/cf-case



s 36-month chainflex cable guarantee and 2 billion test cycles per year" w.igus.eu/CFROBOT3

er 12.9

B.00300/19

C) No. 1907/2006 (REACH)

RoHS-III)

uter jacket material of this series complies with A according to standard DIN EN ISO 14644-1

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

Torsion max.

[°/m]

±30

±60

±30

Torsion max. [°/m] ±90 ±120

±90



























36 10 million

• PUR outer jacket

Shielded

Cycles guaranteed

For torsion applications

• Oil-resistant and coolant-resistant

# Measuring system cable | PUR | chainflex® CFROBOT4

Bend radius, e-chain®

Flame-retardant

Notch-resistant

• PVC and halogen-free

Hydrolysis and microbe-resistant

10 x d

±180°/m

Torsion angle



Dynai	mic information Bend radius	flexible twisted fixed	minimum 10 x d minimum 5 x d	
°	Temperature	flexible twisted	-25°C up to +80°C	
(		fixed	-50°C up to +80°C (following DIN EN 50305)	
Č	v max.	twisted	180°/s	
a	a max.	twisted	60°/s <sup>2</sup>	
	Travel distance	Robots and 3D m	ovements, Class 1	
2	Torsion	Torsion $\pm 180^{\circ}$ , with 1m cable length, Class 3		
Cable	structure			
	Conductor	Stranded conduct copper wires (follo	or in especially bending-resistant version consisting of tinned wing DIN EN 60228).	
6	Core insulation	Mechanically high	-quality TPE mixture.	
No.	Core identification	According to mea	suring system specification.	
(00	,	Product range	table	
Q	Element shield	Extremely torsion-	resistant tinned wound copper shield.	
	Overall shield	Extremely torsion-	resistant tinned wound copper shield.	
n (Ôr	I.	Coverage approx.	80% optical	
R	Outer jacket	Low-adhesion, ha suit the requirement	logen-free, highly abrasion resistant PUR mixture, adapted to nts in e-chains <sup>®</sup> (following DIN EN 50363-10-2)	
		Variants   Produce	ct range table	

### **Electrical information**



50V 30V (following UL) 500V

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



# Class 6.1.3.3

EAC

C€<sup>CE</sup>

CA

**UK** UKCA

REACH REACH

RoHS Lead-free

Cleanroom

Properties and approvals	
UV resistance	High
Oil resistance	Oil-resistant (following D
Flame-retardant	According to IEC 60332
Silicone-free	Free from silicone which 1992)
Halogen-free	Following DIN EN 60754
UL verified	Certificate No. B12969 service life calculator ba
CRLus UL/CSA AWM	See data sheet for detai

Following NFPA 79-2018, chapter 12.9

Certificate No. RU C-DE.ME77.B.00295/19

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

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

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 stroke	es? Service life calculation of	online 🕨 www.igus.eu/chainflexl	ife

### 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







DIN EN 50363-10-2), Class 3

2-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame

can affect paint adhesion (following PV 3.10.7 - status

99: "igus 36-month chainflex cable guarantee and ased on 2 billion test cycles per year" ils www.igus.eu/CFROBOT4

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





393



CFROBOT4

PUR





















CE UK CA

# Measuring system cable | PUR | chainflex® CFROBOT4

Basic requirements Travel distance Oil resistance Torsion

Class 6.1.3.3

igus<sup>®</sup> chainflex<sup>®</sup> CFROBOT 4

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

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

<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<sup>®</sup> CASE

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More on this on page 24/25 and online: www.igus.eu/cf-case



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EU202;

S

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

Order online ► www.igus.eu/CFROBOT4

Delivery time 24hrs or today.

Delivery time means time until goods are shipped.

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







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





























ck/brown, red/orange ellow/white-black h-blue ck/brown, red/orange ellow/white-black y-brown/green-black/green-red h-blue

e/violet, grey/pink, red/black

ow/violet, grey/pink, red/black n-green, white-green k/blue

Fibre Optic Cable | TPE | chainflex<sup>®</sup> CFROBOT5

TPE





For torsion applications

Oil and bio-oil-resistant



flexible twisted minimum 10 x d

minimum 5 x d

180°/s

60°/s<sup>2</sup>

Torsion ±180°, with 1m cable length, Class 3

adapted to suit the requirements in e-chains®.

24568 with Plantocut 8 S-MB tested by DEA), Class 4

service life calculator based on 2 billion test cycles per year"

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

Colour: jet black (similar to RAL 9005)

Robots and 3D movements, Class 1

aramid strain relief elements.

Product range table

reinforced plastic central element.

-25°C up to +80°C

fixed

fixed

twisted

twisted

High

1992)

flexible twisted





- Low-temperature-flexible
- Hydrolysis and microbe-resistant
- PVC and halogen-free

-55°C up to +80°C (following DIN EN 50305)

50/125µm, 62.5/125µm bending-resistant solid glass fibre optic cores, with

FOC cores wound with high-tensile aramid dampers around a glass-fibre

Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture,

Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA

Free from silicone which can affect paint adhesion (following PV 3.10.7 - status

Certificate No. B129699: "igus 36-month chainflex cable guarantee and

• UV-resistant

• TPE outer jacket

### **Dynamic information**

\* Temperature

v max.

a max.

±X°

62

Bend radius

Travel distance

Core structure

Core identification

Outer jacket

Properties and approvals

UV resistance

Oil resistance

Silicone-free

Halogen-free

UL verified

REACH

Torsion

Cable structure Conductor



**Basic requirements Travel distance Oil resistance** Torsion

Cleanroom **(€**<sup>CE</sup> **UK** UKCA CO

Class 6.1.4.3

Following 2014/35/EU

Guaranteed	service lit	fe (details	see page	28-29)

	5 million	
Temperature, from/to [°C]	Torsion max. [°/m]	
-35/-25	±150	
-25/+70	±180	
+70/+80	±150	
where number of double atra	lucal Carvian life coloulation online	~ <b>&gt;</b>

\* Higher number of double strokes? Service life calculation online b 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.	Weight
		[mm]	[kg/km]
CFROBOT5.500 <sup>11)</sup>	2x62.5/125	8.5	53
CFROBOT5.501	2x50/125	8.5	53

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

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits. G = with green-vellow 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>11)</sup>	≥ 200	≤ 3.0	≥ 500	≤ 0.7	orange with white numbers
CFROBOT5.501	≥ 500	≤ 2.5	≥ 500	≤ 0.7	blue with white numbers



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EU202

Cables available in the chainflex<sup>®</sup> CASE

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More on this on page 24/25 and online: www.igus.eu/cf-case

REACH	
RoHS	Lead-free

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

Following DIN EN 60754

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

mage

in)



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

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

Torsion max.

[°/m]

±30

±60

±30

	lion

Torsion max. [°/m] ±90 ±120 ±90



Guarantee

iaus chainfle







397

REACH

RoHS

clean room

CE

UK CA



CFROBOT5



# Motor cable | PUR | chainflex® CFROBOT6











- PUR outer jacket
- Oil-resistant and coolant-resistant
- Flame-retardant
- **Dynamic information**

PVC and h	nalogen-free
-----------	--------------

- Notch-resistant
- Hydrolysis and microbe-resistant

Bend radius	flexible twisted	minimum 10 x d
	flexible twisted	$-25^{\circ}$ C up to $+80^{\circ}$ C
	fixed	$-55^{\circ}$ C up to $+80^{\circ}$ C (following DIN EN 50305)
v max.	twisted	180°/s
a max.	twisted	60°/s²
Travel distance	Robots and 3D m	ovements, Class 1
Torsion	Torsion ±180°, wi	th 1m cable length, Class 3
Cable structure		
Conductor	Stranded conduct copper wires (follow	tor in especially bending-resistant version consisting of bare owing DIN EN 60228).
Core insulation	Mechanically high	-quality TPE mixture.
Core identification	Black cores with v	white numbers 1-2, one green-yellow core.
Outer jacket	Low-adhesion, ha suit the requireme	logen-free, highly abrasion resistant PUR mixture, adapted to nts in e-chains <sup>®</sup> (following DIN EN 50363-10-2)
	Colour: Steel blue	(similar to RAL 5011)
Electrical information		
Manufacture Local Land		

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

### Properties and approvals

40

	resistance	High
Oil r	esistance	Oil-resistant (following DIN EN 50363-10-2), Class 3
Flan	ne-retardant	According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame
Silic	one-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
hal Halo	ogen-free	Following DIN EN 60754

# Class 6.1.3.3

UL verified

UL/CSA AWM

EHE EAC

CECE

CA

**UK** UKCA

REACH REACH

RoHS Lead-free

Cleanroom

**Basic requirements** Travel distance Oil resistance Torsion

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 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)

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	
Temperature, from/to [°C]	Torsion max. [°/m]	٦
-25/-15	±150	
-15/+70	±180	
+70/+80	±150	

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

### Typical application areas

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

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFROBOT6.160.03 <sup>11)</sup>	3G16	18.0	475	578
CFROBOT6.250.03 <sup>11)</sup>	3G25	22.0	737	896

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

**IOUS** 

EU2023

EU202

**OUS** 

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

Example image

### EPLAN download, configurators ► www.igus.eu/CFROBOT6



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

Torsion max.

[°/m]

±30

±60

±30

orsion max. [°/m] ±90 ±120

±90



























UK CA

# Motor cable | PUR | chainflex<sup>®</sup> CFROBOT7



**Basic requirements Travel distance Oil resistance** Torsion

Following DIN EN 60754

High

1992)

none Oil-resistant (following DIN EN 50363-10-2), Class 3 According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame Free from silicone which can affect paint adhesion (following PV 3.10.7 - status

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/CFROBOT7

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)

Following 2014/35/EU

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

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

Cycles*	5 million	7.5 million	10 million	
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]	
-25/-15	±150	±90	±30	
-15/+70	±180	±120	±60	
+70/+80	±150	±90	±30	
Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife				

### Typical application areas

Class 6.1.3.3

Properties and approvals

Oil resistance

Flame-retardant

Silicone-free

Halogen-free

🔍 UL verified

UL/CSA AWM

NFPA

NFPA

EHE EAC

CECE

CA

**UK** UKCA

REACH REACH

RoHS Lead-free

Cleanroom

UV resistance

- 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

### EPLAN download, configurators ► www.igus.eu/CFROBOT7

EU2023

EU202



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







401



CFROBOT7



















RoHS



CE UK

# Motor cable | PUR | chainflex<sup>®</sup> CFROBOT7

### **Basic requirements Travel distance** Oil resistance Torsion

### IGUS" CHAINFLEX" CF ROBOT 7

### 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]
2 control pairs				
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
4 control pairs				
CFROBOT7.40.02.02.04.C	(4G4.0+4x(2x0.25)C)C	17.0	253	366
without control pair				
CFROBOT7.15.03.C	(3G1.5)C	8.5	61	98
CFROBOT7.15.04.C	(4G1.5)C	9.5	77	120
CFROBOT7.25.03.C	(3G2.5)C	10.0	93	142
CFROBOT7.25.04.C	(4G2.5)C	11.0	119	173
CFROBOT7.60.04.C	(4G6.0)C	15.0	278	374



Class 6.1.3.3



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

<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<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case



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

# CFROBOT7 chainflex<sup>®</sup> series .15 Code nominal cross section .03 Number of cores















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

### TPE

# Spindle cable/Single core | TPE | chainflex<sup>®</sup> CFROBOT

<b>36</b>	<b>10 million</b> Cycles guaranteed	E 10 Benc	<b>x d</b> I radius, e-chain <sup>®</sup>	t180	<b>0°/m</b> angle
<ul> <li>For</li> <li>TP</li> <li>Shi</li> <li>Oil</li> </ul>	r torsion application E outer jacket ielded and bio-oil-resista	ons ant	<ul> <li>PVC-free</li> <li>UV-resista</li> <li>Flame-ret</li> <li>Hydrolysia</li> </ul>	ant ardant s and microb	oe-resistant
Dynan	nic information	flovible twisted	minimum 10 v d		
	Bend radius	fixed	minimum 10 x a		
°C	Temperature	flexible twisted	$-35^{\circ}$ C up to $\pm 90^{\circ}$ C		
Ĉ	Temperature	fixed	$-50^{\circ}$ C up to $+100^{\circ}$ C	(following DIN FI	N 50305)
v	v max.	twisted	180°/s	(	
a	a max.	twisted	60°/s <sup>2</sup>		
	Travel distance	Robots and 3D m	ovements, Class 1		
±x°)	Torsion	Torsion ±180°, wit	th 1m cable length, Cla	ass 3	
<u> </u>					

### Cable structure

Conductor	Extremely bend-resistant cable.
Core insulation	Mechanically high-quality TPE mixture.
Overall shield	Extremely torsion-resistant tinned wound copper shield. Coverage approx. 90% optical
Outer jacket	Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains <sup>®</sup> . Colour: jet black (similar to RAL 9005)
lectrical information	
Ku Nominal voltage	600/1,000V (following DIN VDE 0298-3) 1,000V (following UL)
Testing voltage	4,000V (following DIN EN 50395)
Properties and approvals	
UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA

24568 with Plantocut 8 S-MB tested by DEA), Class 4 Flame-retardant According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame Silicone-free Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) UL verified Certificate No. B129699: "igus 36-month chainflex cable guarantee and

service life calculator based on 2 billion test cycles per year"

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

**Oil resistance** Class 6.1.4.3 Torsion UL/CSA AWM See data sheet for details > www.igus.eu/CFROBOT Following NFPA 79-2018, chapter 12.9 EHEEAC Certificate No. RU C-DE.ME77.B.00863/20

**Basic requirements** 

Travel distance

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

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

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)

/cles*	5 million	
Temperature, from/to [°C]	Torsion max. [°/m]	Т
-35/-25	±150	
-25/+70	±180	
+70/+80	±150	

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

### Typical application areas

**. . . .** 

REACH REACH

RoHS Lead-free

CECE

CA

**UK** UKCA

Cleanroom

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ±180°, with 1m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, handling, spindle drives

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

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



# Cables available in the chainflex<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case

EU2023



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

Torsion max.

[°/m]

±30

±60

±30

orsion max. [°/m] ±90 ±120 ±90

























PUR

36 10 million

• PUR outer jacket

Shielded

Cycles guaranteed

For torsion applications

• Oil-resistant and coolant-resistant

# Bus cable | PUR | chainflex® CFROBOT8

🚗 10 x d

Bend radius, e-chain®

Flame-retardant

Notch-resistant

±180°/m

Torsion angle

Hydrolysis and microbe-resistant



	Bend radius	flexible twisted	minimum 10 x d	
		fixed	minimum 5 x d	
°C	Temperature	flexible twisted	-25°C up to +70°C	
$( \subset$	-	fixed	-50°C up to +70°C (following DIN EN 50305)	
V	v max.	twisted	180°/s	
a	a max.	twisted	60°/s²	
	Travel distance	Robots and 3D m	ovements, Class 1	
£30	Torsion	Torsion ±180°, wi	th 1m cable length, Class 3	
Cable	structure			
6	Conductor	Stranded conduct	or in especially bending-resistant version consisting of tinned	
(000		or bare copper wi	res (following DIN EN 60228).	
6	Core insulation	According to bus	specification.	
6	Core structure	According to bus	specification.	
X	Core identification	According to bus	specification.	
(00		Product range	table	
Q	Intermediate layer	Foil taping over th	e outer layer.	
	Overall shield	Torsion resistant t	inned braided copper shield.	
(Ç		Coverage approx.	80% optical	
6	Outer jacket	Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted		
		to suit the requirer	ments in e-chains® (following DIN EN 50363-10-2)	
		Colour: Steel blue	(similar to RAL 5011)	
Electr	ical information			
K.	Nominal voltage	50V		
¥		300V (following U	L)	

**Basic requirements Travel distance Oil resistance** Torsion

# Class 6.1.3.3

Properties and approvals	
UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50
Flame-retardant	According to IEC 60332-1-2, Ca
Silicone-free	Free from silicone which can affe 1992)
UL verified	Certificate No. B129699: "igus service life calculator based on 2
	See data sheet for details ▶ ww
EAC	Certificate No. RU C-DE.ME77.E
REACH	In accordance with regulation (E
Rouse Lead-free	Following 2011/65/EC (RoHS-II/
clean- room	According to ISO Class 1. The ou CF77.UL.05.12.D - tested by IPA
CECE	Following 2014/35/EU
	In accordance with the valid regu

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

Cycles*	5 million	
Temperature, from/to [°C]	Torsion max. [°/m]	
-25/-15	±150	
-15/+60	±180	
+60/+70	±150	
Rade and second and affected at the	-los -0. O	

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

### Typical application areas

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

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EU2020

**IQUS** 

### EPLAN download, configurators ► www.igus.eu/CFROBOT

500V

Testing voltage



0363-10-2), Class 3

ble Flame, VW-1, FT1, FT2 / Horizontal Flame

ct paint adhesion (following PV 3.10.7 – status

s 36-month chainflex cable guarantee and 2 billion test cycles per year" w.igus.eu/CFROBOT8

3.00295/19

C) No. 1907/2006 (REACH)

RoHS-III)

uter jacket material of this series complies with A according to standard DIN EN ISO 14644-1

lations of the United Kingdom (as at 08/2021)

Torsion max.

[°/m]

±30

±60

±30

Torsion max. [°/m] ±90 ±120

±90



























# Bus cable | PUR | chainflex® CFROBOT8

### **Basic requirements Travel distance** Oil resistance Torsion

Class 6.1.3.3

## 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]
	Profibus (1x2x0.64mm)				
PROFO BUS	CFROBOT8.001	(2x0.35)C	8.0	28	63
	CAN-Bus				
	CFROBOT8.022	(4x0.5)C	7.5	41	78
	DeviceNet				
	CFROBOT8.030	(2xAWG24)C +(2xAWG22)C	9.5	31	77
	Ethernet/CAT5e/PoE				
	CFROBOT8.045	4x(2x0.15)C	9.5	48	96
	Ethernet/CAT6/PoE				
	CFROBOT8.049	4x(2x0.15)C	9.5	48	96
	Ethernet/CAT6A				
	CFROBOT8.050	4x(2x0.15)C	10.5	51	134
	Ethernet/CAT7				
	CFROBOT8.052	4x(2x0.15)C	10.5	51	134
	Profinet				
Ether <b>CAT</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



PROF NET

### Cables available in the chainflex<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case



EU2023

EU2023

### 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.

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Profibus (1x2x0.64mm	n)		
CFROBOT8.001	150	(2x0.35)C	red, green
CAN-Bus			
CFROBOT8.022	120	(4x0.5)C	white, green, brown, yellow (star-quad)
DeviceNet			
CFROBOT8.030	120	(2xAWG24)C	white/blue
		(2xAWG22)C	red/black
Ethernet/CAT5e/PoE			
CFROBOT8.045	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6/PoE			
CFROBOT8.049	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT6A			
CFROBOT8.050	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Ethernet/CAT7			
CFROBOT8.052	100	4x(2x0.15)C	white-green/green, white-orange/orange, white-blue/blue, white-brown/brown
Profinet			
CFROBOT8.060	100	(2x(2x0.34))C	white/blue, yellow/orange









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



















CE UK CA





409

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

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

# Bus cable | PUR | chainflex® CFROBOT8.PLUS









New



- PUR outer jacket
- Shielded
- Oil-resistant and coolant-resistant
- Flame-retardant

### • PVC and halogen-free Notch-resistant

- Hydrolysis and microbe-resistant

### and a stand a sure and a star D

ynai	mic information		
	Bend radius	flexible twisted	minimum 10 x d
ŝ	Temperature	flexible twisted	-25°C up to +70°C
		fixed	-50°C up to +70°C (following DIN EN 50305)
Č	v max.	twisted	360°/s
a	a max.	twisted	60°/s <sup>2</sup>
	Travel distance	Robots and 3D m	ovements, Class 1
	Torsion	Torsion ±360°, wit	h 1m cable length, Class 4
able	structure		
	Conductor	Stranded conduct	or in especially bending-resistant version consisting of bare
(%	,	copper wires (follo	wing DIN EN 60228).
6	Core insulation	According to bus	specification.
6	Core structure	According to bus	specification.
	Core identification	According to bus	specification.
(7		Product range	table
6	Intermediate layer	Foil taping over the	e outer layer.
	Overall shield	Torsion resistant ti	nned braided copper shield.
(9	)	Coverage approx.	80% optical
		<b>e</b>	-

Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains<sup>®</sup> (following DIN EN 50363-10-2) Colour: Steel blue (similar to RAL 5011)

### **Electrical information**

 $(\phi$ 

Outer jacket



50V 30V (following UL) 500V

# UV resistance Oil resistance

Class 6.1.3.4

Properties and approvals

High

Flame-retardant

Silicone-free

Halogen-free

ha

1992) Following DIN EN 60754

🔍 UL verified

L/CSA AWM

EAC

RoHS Lead-free

CECE

CA

EU2023

**IQUS** 

EU202

**UK** UKCA

REACH REACH

Cleanroom

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

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	
Temperature, from/to [°C]	Torsion max. [°/m]	Т
-25/-15	±330	
-15/+60	±360	
+60/+70	±330	

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

### Typical application areas

- For heaviest duty applications with torsion movements, Class 6
- Especially for robots and 3D movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ±360°, with 1m cable length, Class 4
- Indoor and outdoor applications, UV-resistant
- Robots, handling, spindle drives

### EPLAN download, configurators ► www.igus.eu/CFROBOT8PLUS

**Basic requirements** 



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

According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame

Free from silicone which can affect paint adhesion (following PV 3.10.7 - status

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/CFROBOT8PLUS

Certificate No. RU C-DE.ME77.B.00295/19

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

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

Torsion max.

[°/m]

±150

±180

±150

orsion max. [°/m] ±240

±270 ±240

































# Bus cable | PUR | chainflex® CFROBOT8.PLUS

# New

# Class 6.1.3.4

Profibus (1x2x0.64mm) CFROBOT8.PLUS.001

CFROBOT8.PLUS.022

Ethernet/CAT5e/PoE CFROBOT8.PLUS.045

Ethernet/CAT6/PoE CFROBOT8.PLUS.049

CFROBOT8.PLUS.050

CFROBOT8.PLUS.060<sup>2)</sup>

Ethernet/CAT6A

Profinet

Part No.

CAN-Bus

**Basic requirements Travel distance** Torsion

Characteristic wave

impedance approx. [Ω]

150

120

100

100

100

100

igus chainflex CFROBOT8.PLUS

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]
	Profibus (1x2x0.64mm)				
PROFU" BUS	CFROBOT8.PLUS.001	(2x0.25)C	9.0	30	80
	CAN-Bus				
New	CFROBOT8.PLUS.022	(4x0.5)C	9.5	47	103
	Ethernet/CAT5e/PoE				
	CFROBOT8.PLUS.045	(4x(2x0.15))C	7.5	32	67
	Ethernet/CAT6/PoE				
New	CFROBOT8.PLUS.049	(4x(2x0.15))C	7.5	32	67
	Ethernet/CAT6A				
New	CFROBOT8.PLUS.050	(4x(2x0.15)C)C	10.5	49	115
999 <b>99</b> 0	Profinet				
Ether CAT.	CFROBOT8.PLUS.060 <sup>2)</sup>	(4x0.34)C	7.0	32	64

The chainflex<sup>®</sup> 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



### Cables available in the chainflex<sup>®</sup> CASE

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



More on this on page 24/25 and online: www.igus.eu/cf-case



Order online ► www.igus.eu/CFROBOT8PLUS

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

### 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.

### EPLAN download, configurators ► www.igus.eu/CFROBOT8PLUS



low 1 2 unsupported 1 2 none 1 2 none 1 2	3       4       5       6       7       highest         3       4       5       6       ≥ 400m         3       4       highest       ±360°	CFROBOT8. PLUS PUR ±360°/m
		Guarantee Gus chairflex <b>366</b> Control
		igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year
Core group	Colour code	•
(2x0.25)C	red, green	
(4x0.5)C	white, green, brown, yellow (star-quad)	C UL US LISTED
4x(2x0.15))C	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown	c <b>FL</b> us
4x(2x0.15)C	white-green/green, white-orange/orange white-blue/blue, white-brown/brown	e, hech
4x(2x0.15)C	white-green/green, white-orange/orange white-blue/blue, white-brown/brown	э, с <b>ф</b> а
(4x0.38)C	white, orange, blue, yellow (star-quad)	

# Order example: CFROBOT8.PLUS.060 - to your desired length (0.5m steps)

(4x(2x0.

4x(2x0.

4x(2x0.





🔊 413

EHC

REACH

RoHS

clean-room

CE

UK CA

# Hybrid cable | PUR | chainflex<sup>®</sup> CFROBOT9



<b>10 million</b>	Bend ra	<b>d</b>	<b>±180°/m</b>
Cycles guaranteed		dius, e-chain <sup>®</sup>	Torsion angle
r torsion applications R outer jacket shielded/shielded -resistant and coolant <sup>.</sup>	-resistant	<ul> <li>Flame-re</li> <li>PVC and</li> <li>Notch-re</li> <li>Hydrolys</li> </ul>	etardant d halogen-free esistant sis and microbe-resistant

### **Dynamic information**

	Bend radius	e-chain <sup>®</sup> twisted flexible fixed	minimum 10 x d minimum 8 x d minimum 5 x d
ĉ	Temperature	e-chain <sup>®</sup> twisted flexible fixed	-25°C up to +80°C -40°C up to +80°C (following DIN EN 60811-504) -50°C up to +80°C (following DIN EN 50305)
v C	v max.	twisted	180°/s
a	a max.	twisted	60°/s²
	Travel distance	Robots and 3D mo	ovements, Class 1
	Torsion	Torsion ±180°, with	h 1m cable length, Class 3
able	structure		
6	Conductor	Stranded conducted copper wires (follow	or in especially bending-resistant version consisting of bare wing DIN EN 60228).
(Q	Core insulation	Mechanically high-	quality TPE mixture.
( Co	Core identification	Product range	table
Q	Element shield	Extremely torsion-r Coverage approx.	resistant tinned wound copper shield. 85% optical
62	Outer jacket	Low-adhesion, hal to suit the requiren Colour: Steel blue	logen-free, highly abrasion resistant PUR mixture, adapted nents in e-chains <sup>®</sup> (following DIN EN 50363-10-2) (similar to RAL 5011)

### **Electrical information**

L	Nominal voltage	300/500V (following DIN VDE 0298-3)
70		300V (following UL)
	Testing voltage	2,000V (following DIN EN 50395)

Class 6.1.3.3

**Properties** 

**Basic requirements Travel distance Oil resistance** Torsion

Properties and approvals	
UV resistance	High
Oil resistance	Oil-resistant (following DIN EN 50
Flame-retardant	According to IEC 60332-1-2, Cat
Silicone-free	Free from silicone which can affect 1992)
Halogen-free	Following DIN EN 60754
UL verified	Certificate No. B129699: "igus service life calculator based on 2
UL/CSA AWM	See data sheet for details > www
NFPA	Following NFPA 79-2018, chapte
EAC	Certificate No. RU C-DE.ME77.B
REACH	In accordance with regulation (EC
Rous Lead-free	Following 2011/65/EC (RoHS-II/F
clean- room	According to ISO Class 1. The ou
CECE	Following 2014/35/EU
	In accordance with the valid regul

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

Cycles*	5 million	7.5 million	10 million	
Temperature, from/to [°C]	Torsion max. [°/m]	Torsion max. [°/m]	Torsion max. [°/m]	
-25/-15	±150	±90	±30	
-15/+70	±180	±120	±60	
+70/+80	±150	±90	±30	
Higher number of double strokes? Service life calculation online ▶ www.igus.eu/chainflexlife				

### Typical application areas

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

image

### EPLAN download, configurators ► www.igus.eu/CFROBOT9



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0363-10-2), Class 3

ble Flame, VW-1, FT1, FT2 / Horizontal Flame

ct paint adhesion (following PV 3.10.7 – status

36-month chainflex cable guarantee and 2 billion test cycles per year" w.igus.eu/CFROBOT9

er 12.9

8.00300/19

C) No. 1907/2006 (REACH)

RoHS-III)

Iter jacket material of this series complies with according to standard DIN EN ISO 14644-1

lations of the United Kingdom (as at 08/2021)





415

CFROBOT9

PUR

±180°/m

Guarantee

36

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

**c**RLus

NFPA

EAE

REACH

RoHS

clean room

CE

UK CA



# Hybrid cable | PUR | chainflex® CFROBOT9

Basic requirements Travel distance Oil resistance Torsion

Class 6.1.3.3

Oil resistance Torsion

# igus<sup>®</sup> chainflex<sup>®</sup> CFR0B0T 9

### Example image

Part No.	Number of cores and conductor nominal cross section [mm²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]	Part	t No.	Core group	Colour code
CFROBOT9.007 11)	(15x(2x0.25)C+(4x0.25)C)C	18.5	229	369	CFR	ROBOT9.007 <sup>11)</sup>	15x(2x0.25)C	colour code in accordance with DIN 47100
							(4x0.25)C	white/green/brown/yellow (CAN-Bus)
CFROBOT9.010 <sup>11)</sup>	(4x(2x0.25)C)C	10.5	63	116	CFR	ROBOT9.010 <sup>11)</sup>	4x(2x0.25)C	white/brown, green/yellow, grey/pink, blue/red

<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<sup>®</sup> CASE

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

More on this on page 24/25 and online: www.igus.eu/cf-case





 $igus^{\circledast}$  chainflex^{\circledast} cables in a triflex^{\circledast} R multi-dimensionally moving energy supply system for 6-axis robots

EU2023

IQUS<sup>®</sup>

EU2023

S

EPLAN download, configurators ► www.igus.eu/CFROBOT9

































