



Photo: HELUKABEL®

## Robotic Cables




## Robotic Cables

With over 30 years of experience with cables and lines, we also have the right solutions for the demands placed on the components to be installed by the applications of the robot.

Our specialists work with you to select the correct cables, wires, supplemental systems and also construct the pre-assembled cable protection system to suit your particular application.

H

# Contents

Description	Page
ROBOFLEX recycle ..... 	H 4
ROBOFLEX 2001 / 2001-C, Robot cables, meter marking ..... 	H 6
ROBOFLEX 150,...151,...152,...153, PUR, flame retardant, halogen-free, for torsional stress, meter marking ..... 	H 7
ROBOFLEX 156-flat, PUR, flame retardant, halogen-free, for torsional stress .....	H 9
ROBOFLEX sewer robot, trailing .....	H 10

# ROBOFLEX recycle



## Technical data

- **Approval:**  
UL/cUL approved, UL-Style 20233
- **Production**  
in accordance with VDE standards
- **Temperature range:**  
fixed installation -40 °C to +105 °C  
flexible -30 °C to +105 °C
- **Nominal voltage:**  
300 V
- **Test voltage:**  
2000V
- **Minimum bending radius:**  
approx. 7.5 x cable diameter (for flexible installation)
- **Traversing speed:**  
max. 3.3 m/s for 5 m of horizontal traverse path length
- **Acceleration:**  
max. 5 m/s<sup>2</sup>
- **Flexing and torsion cycles:**  
min. 10 million.
- **Torsional stress:**  
+/- 360 °/m

## Cable structure

- Assembly (3-pin)**
- Bare copper litz wire
  - Core insulation TPE
  - Cores stranded in layers
  - -D-screen: screened version for robot application
  - -C-screen: in drag chain systems
  - Sheath, special mix
  - weld splatter resistant, dull, low adhesion, flame retardant and self-extinguishing according (to DIN VDE 0472 part 804 test method B, IEC 60332-1)
  - Sheath colour: see below

## Properties

- very good resistance to oil as per DIN EN 60811-2-1
- good resistance to acids, alkalis and solvents
- not cross-linked
- weld splatter resistant
- recyclable
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Free of substances harmful to paint adhesion Substances
- very high mechanical load capacity
- abrasion resistant
- wear-resistant
- Highly flexible
- UV-resistant

## Application

The cables with this new sheath material cover all requirements for very large mechanical stresses for abrasion, tear resistance, torsion, flexing, flexibility and oil resistance. Using for automation technology, plant and machine construction, fixture construction for handling devices, welding devices and welding tongs, assembly and handling devices, machining production, welding robots and tool machines, blast furnaces and rolling mills.

The completely new feature of this cable is the weld splatter resistance without the otherwise usual and required cross-linking process.

- Our newly developed non-cross-linked thermoplastic elastomer is fully recyclable.
- In contrast to this, the usual, cross-linked, thermoplastic elastomers cannot be recycled and put a not insignificant stress on our environment.
- This must be particularly interesting for customers who have an environment management system according to DIN EN ISO14001 and thus place a great deal of importance on the use of recyclable materials.
- A significantly longer service life than that of existing cables on the market, because it can be used in highly flexible applications, for example on robots (torsion) and in drag chains (dynamic load).

☞ The product is conformed with the EC Low-Voltage Directive 2006/95/EG.

## ROBOFLEX recycle

Part no.	Jacket colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	
701889	Black RAL 9005	3 x 0,25	brown, blue, black	X	4,4	7,2	22,0	-
701891	Yellow RAL 1021	3 x 0,25	brown, blue, black	X	4,4	7,2	22,0	-
701890	Grey RAL 7001	3 x 0,25	brown, blue, black	X	4,4	7,2	22,0	-
701894	Yellow RAL 1021	4 x 0,25	brown, blue, black, white	X	4,7	9,6	26,0	-
701892	Black RAL 9005	4 x 0,25	brown, blue, black, white	X	4,7	9,6	26,0	-
701893	Grey RAL 7001	4 x 0,25	brown, blue, black, white	X	4,7	9,6	26,0	-
701897	Yellow RAL 1021	5 x 0,25	brown, blue, black, white, grey	X	4,8	12,0	30,0	-
701895	Black RAL 9005	5 x 0,25	brown, blue, black, white, grey	X	4,8	12,0	30,0	-
701896	Grey RAL 7001	5 x 0,25	brown, blue, black, white, grey	X	4,8	12,0	30,0	-
702805	Yellow RAL 1021	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
702803	Black RAL 9005	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
702804	Grey RAL 7001	8 x 0,25	DIN 47100	X	6,0	19,2	55,0	-
701900	Yellow RAL 1021	3 x 0,34	brown, blue, black	X	4,9	9,8	30,0	-
701898	Black RAL 9005	3 x 0,34	brown, blue, black	X	4,9	9,8	30,0	-
701899	Grey RAL 7001	3 x 0,34	brown, blue, black	X	4,9	9,8	30,0	-

Continuation ▶

# ROBOFLEX recycle



## ROBOFLEX recycle

Part no.	Jacket colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
701903	Yellow RAL 1021	4 x 0,34	brown, blue, black, white	X	5,2	13,1	43,0
701901	Black RAL 9005	4 x 0,34	brown, blue, black, white	X	5,2	13,1	43,0
701902	Grey RAL 7001	4 x 0,34	brown, blue, black, white	X	5,2	13,1	43,0
701906	Yellow RAL 1021	5 x 0,34	brown, blue, black, white, grey	X	5,9	16,4	54,0
701904	Black RAL 9005	5 x 0,34	brown, blue, black, white, grey	X	5,9	16,4	54,0
701905	Grey RAL 7001	5 x 0,34	brown, blue, black, white, grey	X	5,9	16,4	54,0
702808	Yellow RAL 1021	8 x 0,34	DIN 47100	X	6,8	26,1	78,0
702806	Black RAL 9005	8 x 0,34	DIN 47100	X	6,8	26,1	78,0
702807	Grey RAL 7001	8 x 0,34	DIN 47100	X	6,8	26,1	78,0
701910	Yellow RAL 1021	5 G 0,5	JZ, black with numbering + greenyellow	X	6,0	24,0	65,0
701908	Black RAL 9005	5 G 0,5	JZ, black with numbering + greenyellow	X	6,0	24,0	65,0
701909	Grey RAL 7001	5 G 0,5	JZ, black with numbering + greenyellow	X	6,0	24,0	65,0
701913	Yellow RAL 1021	5 G 0,75	JZ, black with numbering + greenyellow	X	7,0	36,0	80,0
701911	Black RAL 9005	5 G 0,75	JZ, black with numbering + greenyellow	X	7,0	36,0	80,0
701912	Grey RAL 7001	5 G 0,75	JZ, black with numbering + greenyellow	X	7,0	36,0	80,0

## ROBOFLEX recycle screened, D-screen

Part no.	Jacket colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
703843	Black RAL 9005	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703845	Yellow RAL 1021	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703844	Grey RAL 7001	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703848	Yellow RAL 1021	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703846	Black RAL 9005	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703847	Grey RAL 7001	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703851	Yellow RAL 1021	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703849	Black RAL 9005	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703850	Grey RAL 7001	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703869	Yellow RAL 1021	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703867	Black RAL 9005	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703868	Grey RAL 7001	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703854	Yellow RAL 1021	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703852	Black RAL 9005	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703853	Grey RAL 7001	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703857	Yellow RAL 1021	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703855	Black RAL 9005	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703856	Grey RAL 7001	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703860	Yellow RAL 1021	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703858	Black RAL 9005	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703859	Grey RAL 7001	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703872	Yellow RAL 1021	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703870	Black RAL 9005	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703871	Grey RAL 7001	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703863	Yellow RAL 1021	5 G 0,5	JZ, black with numbering + greenyellow	X	7,0	52,0	76,0
703861	Black RAL 9005	5 G 0,5	JZ, black with numbering + greenyellow	X	7,0	52,0	76,0
703866	Yellow RAL 1021	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0
703864	Black RAL 9005	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0
703865	Grey RAL 7001	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0

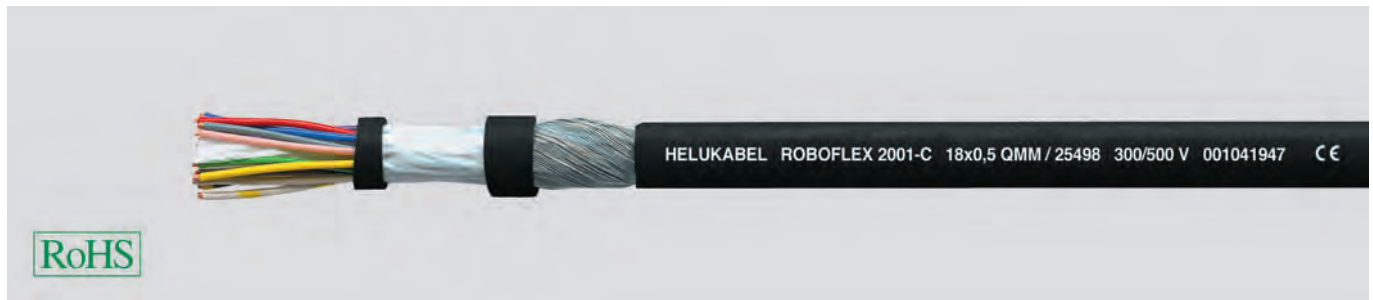
## ROBOFLEX recycle screened, C-screen

Part no.	Jacket colour	Cable structure No. cores x cross-sec. mm <sup>2</sup>	Core colours	High flex **	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km
703873	Black RAL 9005	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703875	Yellow RAL 1021	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703874	Grey RAL 7001	3 x 0,25	brown, blue, black	X	5,0	17,0	44,6
703878	Yellow RAL 1021	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703876	Black RAL 9005	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703877	Grey RAL 7001	4 x 0,25	brown, blue, black, white	X	5,2	19,4	46,3
703881	Yellow RAL 1021	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703879	Black RAL 9005	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703880	Grey RAL 7001	5 x 0,25	brown, blue, black, white, grey	X	5,3	22,5	50,0
703899	Yellow RAL 1021	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703897	Black RAL 9005	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703898	Grey RAL 7001	8 x 0,25	DIN 47100	X	6,8	34,1	53,5
703884	Yellow RAL 1021	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703882	Black RAL 9005	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703883	Grey RAL 7001	3 x 0,34	brown, blue, black	X	5,2	19,6	48,2
703887	Yellow RAL 1021	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703885	Black RAL 9005	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703886	Grey RAL 7001	4 x 0,34	brown, blue, black, white	X	5,4	23,7	53,0
703890	Yellow RAL 1021	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703888	Black RAL 9005	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703889	Grey RAL 7001	5 x 0,34	brown, blue, black, white, grey	X	5,8	28,7	61,9
703902	Yellow RAL 1021	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703900	Black RAL 9005	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703901	Grey RAL 7001	8 x 0,34	DIN 47100	X	7,3	58,0	85,0
703893	Yellow RAL 1021	5 G 0,5	JZ, black with numbering + greenyellow	X	7,0	52,0	76,0
703891	Black RAL 9005	5 G 0,5	JZ, black with numbering + greenyellow	X	7,0	52,0	76,0
703892	Grey RAL 7001	5 G 0,5	JZ, black with numbering + greenyellow	X	7,0	52,0	76,0
703896	Yellow RAL 1021	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0
703894	Black RAL 9005	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0
703895	Grey RAL 7001	5 G 0,75	JZ, black with numbering + greenyellow	X	7,6	70,0	93,0

Dimensions and specifications may be changed without prior notice.



# ROBOFLEX 2001 / 2001-C Robot cables, meter marking



## Technical data

- Special TPE-E/PUR adapted to DIN VDE 0245, 0250, 0282
- **Temperature range**  
flexing -30 °C to +80 °C  
fixed installation -40 °C to +80 °C
- **Nominal voltage**  
up to 0,34 mm<sup>2</sup> 350 V (operating peak voltage)  
above 0,5 mm<sup>2</sup> U<sub>0</sub>/U 300/500 V
- **Test voltage**  
up to 0,34 mm<sup>2</sup> 1,5 kV, 5 minutes  
above 0,5 mm<sup>2</sup> 3,0 kV, 5 minutes
- **Mutual capacitance**  
core/core approx. 100 nF/km  
core/screen approx. 120 nF/km
- **Inductance approx.**  
0,69 mH/km
- **Minimum bending radius**  
7,5x cabel ø

## Cable structure

- Bare copper, stranded to DIN VDE 0295 and IEC 60228, fine or extra fine wires, cl. 5 or cl. 6, BS 6360 cl. 5 or 6, up to 0,34 mm<sup>2</sup> cl. 5, above 0,5 mm<sup>2</sup> cl. 6
- Special core insulation, TPE
- Cores coded up to 0,34 mm<sup>2</sup> according DIN 47100  
above 0,5 mm<sup>2</sup> black cores with continuous white numbering according to DIN VDE 0293
- Green-yellow earth core in the outer layer (3 cores and above)
- Cores stranded in layers with optimal lay-length
- Special separating foil
- Cable structure C-type, cu-screen of helically wound, approx. 85-95% coverage
- Outer sheath, special polyurethane
- Colour black (RAL 9005)
- with meter marking, change-over in 2011

## Properties

- High flexibility at low temperatures
- High abrasion resistance
- Loadable under torsion stress ±360 °/meter
- Low adhesion
- **Resistant to**  
Microbes and rotting  
Oxygene and ozone  
Vibrations  
UV-radiation  
Oil and fats resistant
- PUR-jacket flame retardant according to DIN VDE 0482 part 265-2-1/ EN 50265-2-1/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

## Application

These special robotic control and signal cables specially designed for torsion and bending stresses in robots and connecting handling tools. EMC = Electromagnetic compatibility. To optimise the EMC features we recommend a large round contact of the copper braiding on both ends.

CE – The product is conformed with the EC Low-Voltage Directive 2006/95/EG.

### ROBOFLEX 2001

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25459	7 G 0,25	5,8	16,8	48,0	24
25439	12 G 0,25	7,6	28,8	71,0	24
25460	25 G 0,25	10,6	60,0	143,0	24
25461	2 G 0,34	4,0	6,6	28,0	22
25462	3 G 0,34	4,0	9,8	34,0	22
25440	7 G 0,34	5,7	22,8	51,0	22
25449	12 G 0,34	8,3	39,2	69,0	22
25463	12 G 0,5	10,4	57,8	90,0	20
25519	16 G 0,5	11,6	76,8	277,0	20
25464	18 G 0,5	12,7	86,4	121,0	20
25465	25 G 0,5	14,2	120,0	256,0	20
25466	4 G 0,75	6,0	28,8	63,0	18
25450	7 G 0,75	7,9	50,4	96,0	18
25467	12 G 0,75	11,5	84,4	171,0	18
25468	14 G 0,75	12,8	100,8	200,0	18
25469	2 G 1	5,5	19,2	48,0	17
25470	3 G 1	6,0	29,0	60,0	17
25471	4 G 1	6,3	38,4	78,0	17
25472	7 G 1	8,5	67,2	131,0	17
25473	12 G 1	12,5	115,2	216,0	17
25474	18 G 1	15,4	172,8	306,0	17
25475	25 G 1	17,4	240,0	432,0	17
25476	34 G 1	21,3	326,4	569,0	17
25477	41 G 1	23,2	393,6	694,0	17
25520	3 G 1,5	6,9	43,2	94,0	16
25529	4 G 1,5	7,9	57,6	107,0	16
25559	5 G 1,5	8,6	72,0	121,0	18
25509	8 G 1,5	11,1	115,2	292,0	16
25478	12 G 1,5	15,5	172,8	356,0	16
25479	18 G 1,5	19,3	259,2	445,0	16
25480	25 G 1,5	21,8	360,0	636,0	16
25481	3 G 2,5	8,4	72,0	136,0	14
25482	4 G 2,5	9,1	96,0	170,0	14
25483	3 G 4	10,3	116,0	227,0	12
25530	4 G 4	11,2	153,6	261,0	12
25510	4 G 6	14,1	230,4	341,0	10
25484	3 G 10	15,6	288,0	518,0	8
25485	3 G 16	18,2	460,8	722,0	6
25486	3 G 25	22,9	720,0	1180,0	4
25487	3 G 35	26,5	1008,0	1600,0	2

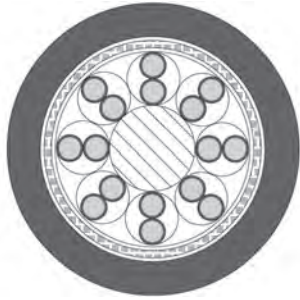
### ROBOFLEX 2001-C

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
25539	10 G 0,14	7,8	34,2	62,0	26
25488	12 G 0,14	7,8	42,1	95,0	26
25489	18 G 0,14	9,7	54,5	120,0	26
25490	25 G 0,14	10,9	69,0	158,0	26
25491	12 G 0,25	8,3	59,5	126,0	24
25492	18 G 0,25	10,1	80,0	164,0	24
25493	25 G 0,25	11,1	103,0	215,0	24
25494	12 G 0,34	8,8	78,0	160,0	22
25495	18 G 0,34	10,8	101,0	210,0	22
25496	25 G 0,34	12,0	158,0	305,0	22
25497	12 G 0,5	11,2	117,0	175,0	20
25498	18 G 0,5	13,6	160,0	231,0	20
25499	25 G 0,5	14,8	255,0	347,0	20
25500	12 G 0,75	11,8	155,0	220,0	18
25501	18 G 0,75	15,0	210,0	305,0	18
25502	25 G 0,75	16,6	275,0	415,0	18
705462	3 G 1	6,3	76,0	90,0	22
25503	12 G 1	13,0	190,0	265,0	17
25504	18 G 1	16,1	245,0	390,0	17
25505	25 G 1	18,1	345,0	540,0	17
25506	12 G 1,5	16,2	260,0	345,0	16
25507	18 G 1,5	20,3	370,0	485,0	16
25508	25 G 1,5	22,5	498,0	710,0	16

Dimensions and specifications may be changed without prior notice. (RH01)



# ROBOFLEX 150,...151,...152,...153 PUR, flame retardant, halogen-free, for torsional stress, meter marking



## Technical data

- Special TPE-E/PUR robot cable
- Based on DIN VDE 0245, 0250, 0281, 0282
- **Temperature range**  
flexing -40 °C to +80 °C
- **Nominal voltage**  
up to 0,34 mm<sup>2</sup> 350 V  
0.5 mm<sup>2</sup> and greater U<sub>0</sub>/U 300/500 V
- **Test voltage**  
up to 0,34 mm<sup>2</sup> 1500 V  
0.5 mm<sup>2</sup> and greater 3000 V
- **Insulation resistance**  
min. 20 MΩm x km
- **Max. torsion angle**  
±360 °/metre
- **Mutual capacitance**  
core/core approx. 100 nF/km  
core/screen approx. 120 nF/km
- **Minimum bending radius**  
approx. 15x cable ø

## Cable structure

- Special bare copper, extra-fine wire acc. to DIN VDE 0295 cl. 6 + IEC 60228 cl. 6
- TPE-E core insulation
- Black cores continuous white numbering according to DIN VDE 0293 + gnye
- Special optimised stranding
- High-grade slide wrapping
- with meter marking, change-over in 2011
- Tinned copper twist screen
- PUR outer sheath
- Sheath colour: grey (RAL 7001) or black
- **Part. nos. 77261-77263, 76158, 70561, 77267, 77268, 76165, 76166, 77424**
- Core colours DIN 47100
- **Part nos. 71820, 74658, 77264, 75253, 76167**
- Construction as above, but 0,5 (1,5) mm<sup>2</sup> cores screened with aluminium-coated polyester foil
- **Part no. 72214**
- Construction as above, but 0,5 mm<sup>2</sup> pair screened with tinned twist screen
- **Part nos. 77265, 77266, 77269, 77270**
- Construction as above, but 1,0 mm<sup>2</sup> pair only, screened with tinned twist screen
- **Part no. 77469**
- Construction as above, but
- 6 cores, 1,5 mm<sup>2</sup>, screened with tinned twist screen
- 4 pairs, 0,25 mm<sup>2</sup>, screened with tinned twist screen
- Sheath colour: orange (RAL 2003)
- with meter marking, change-over in 2011

## Properties

- PUR outer sheath, low adhesion, abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- PUR sheath, self-extinguishing and flame retardant according to VDE 0482-332-1-2, DIN EN 60332-1-2/ IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- The smooth, high-grade core insulation, together with special stranding configuration and slide wrapping ensure long service life under combined bending and torsional stresses

## Application

These cables are specially designed for combined torsional and bending stresses. They are employed both for power supply and for the transmission of control and monitoring signals. Roboflex cables are used in assembly and welding robots, in handling and automation centres, in transport and conveyor equipment, and on turntables and swivel tables. In other words, anywhere where there is no defined cable routing with only alternating bending cycles on a single plane such as in drag chains.

CE= The product is conformed with the EC Low-Voltage Directive 2006/95/EG.

Continuation ►

# ROBOFLEX 150,...151,...152,...153 PUR, flame retardant, halogen-free, for torsional stress, meter marking



## ROBOFLEX 150 (screened), Sheath colour grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
77261	( 12 x 0,25)	8,3	59,5	126,0	24
77266	( 23 x 1 + 2 x 1,0)	17,4	262,0	473,0	-
71789	( 4 x 1,5)	8,9	81,7	150,0	16
75251	( 4 x 2,5)	11,2	134,0	280,0	14
75252	( 4 x 4)	13,1	200,0	400,0	12
76157	( 4 x 6)	15,4	286,0	550,0	10
77262	( 3 x 2 x 0,14)	5,8	17,0	43,0	26
77263	( 4 x 2 x 0,14)	6,9	37,0	75,0	26
76158	( 5 x 2 x 0,34)	9,2	65,0	116,0	22
70561	( 8 x 2 x 0,34)	10,2	90,0	150,0	22
71820	( 4 x 1,5 + (2 x 0,62))	10,5	106,8	195,0	16
74658	( 4 x 1,5 + (2 x 0,5))	10,7	95,0	180,0	16
77264	( 4 x 1,5 + (2 x 1,0))	11,1	128,0	220,0	16
75253	( 4 x 2,5 + (2 x 0,5))	12,5	180,0	270,0	14
72214	( 4 x 4 + (2 x 0,5))	13,5	260,0	340,0	12
76159	( 4 x 4 + (2 x 1,0))	14,0	237,0	350,0	12
76160	( 4 x 6 + (2 x 1,0))	16,0	341,0	500,0	10
77265	( 16 x 1 + (2 x 1,0))	16,7	197,0	380,0	17

## ROBOFLEX 151, Sheath colour grey

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
70116	12 G 0,5	8,3	57,6	131,0	20
76168	4 G 1,5	8,5	57,6	106,0	16
76169	4 G 2,5	10,8	96,0	196,0	14
76170	4 G 4	12,7	153,6	283,0	12
76171	4 G 6	15,0	230,4	432,0	10

Dimensions and specifications may be changed without prior notice.

## ROBOFLEX 152 (screened), Sheath colour black

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76161	( 4 x 1,5)	8,9	81,7	150,0	16
76162	( 4 x 2,5)	11,2	164,0	280,0	14
76163	( 4 x 4)	13,1	222,0	400,0	12
76164	( 4 x 6)	15,4	305,0	550,0	10
77267	( 3 x 2 x 0,14)	5,8	23,0	43,0	26
77268	( 4 x 2 x 0,14)	6,9	26,6	55,0	26
77424	( 3 x 2 x 0,25)	7,3	32,0	65,0	24
76165	( 5 x 2 x 0,34)	9,2	65,0	116,0	22
76166	( 8 x 2 x 0,34)	10,2	90,0	150,0	22
75415	( 4 x 1,5 + (2 x 0,5))	10,7	95,0	170,0	16
75416	( 4 x 2,5 + (2 x 0,5))	11,8	115,0	220,0	14
75940	( 4 x 2,5 + (2 x 1,0))	12,3	147,0	250,0	14
75167	( 4 x 4 + (2 x 0,5))	13,5	260,0	340,0	12
75417	( 4 x 4 + (2 x 1,0))	14,0	237,0	350,0	12
75418	( 4 x 6 + (2 x 1,0))	16,0	316,0	500,0	10
77269	( 16 x 1 + (2 x 1,0))	16,7	176,0	380,0	17
77270	( 23 x 1 + (2 x 1,0))	17,4	262,0	473,0	17
77469	( 5 x 2,5 + (6 x 1,5) + 4 x (2 x 0,25))	16,7	320,0	460,0	14

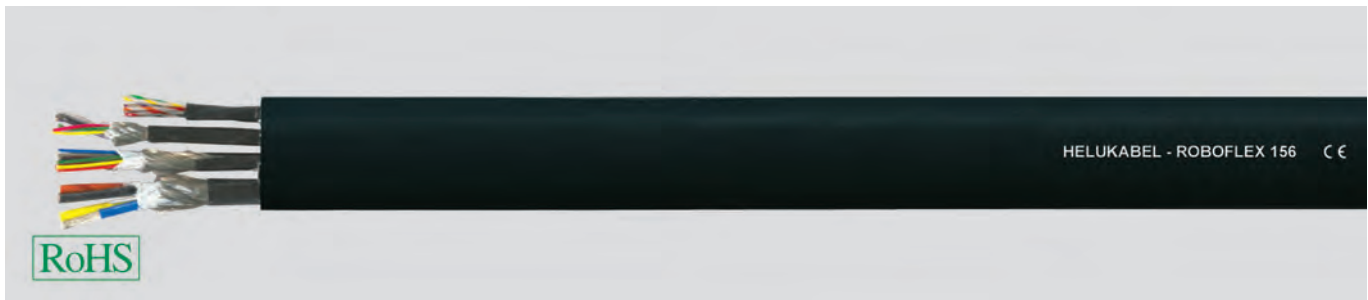
## ROBOFLEX 153, Sheath colour black

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
76172	4 G 1,5	8,5	57,6	106,0	16
76174	4 G 4	12,7	153,6	283,0	12
76175	4 G 6	15,0	230,4	432,0	10

H



# ROBOFLEX 156-flat PUR, flame retardant, halogen-free, for torsional stress



## Technical data

- Special TPE-E/PUR robot cable adapted to DIN VDE 0245, 0250, 0281, 0282
- **Temperature range**  
flexing -40 °C to +80 °C
- **Nominal voltage**  
up to 0,34 mm<sup>2</sup> 350 V  
0,5 mm<sup>2</sup> and greater 300/500 V
- **Test voltage**  
up to 0,5 mm<sup>2</sup> 1500 V  
0,5 mm<sup>2</sup> and greater 3000 V
- **Insulation resistance**  
min. 20 MΩm x km
- **Max. torsion angle**  
±360 °/metre
- **Mutual capacitance** (signal cores)  
core/core approx. 100 nF/km  
core/screen approx. 120 nF/km
- **Minimum bending radius**  
approx. 15x cable ø

## Cable structure

- Tinned copper conductor, 19x0,32/1,5 mm<sup>2</sup>,  
19x0,102/0,15 mm<sup>2</sup>
- 4 stranded cores 1,5 mm<sup>2</sup>  
Screen of tinned copper braid  
TPE-E sheath, black
- 12 cores 0,15 mm<sup>2</sup> stranded together  
Screen of tinned copper braid  
TPE-E sheath, black
- 6 cores 0,15 mm<sup>2</sup> stranded in paired  
Screen of tinned copper braid  
TPE-E sheath, black
- 10 stranded cores 0,15 mm<sup>2</sup>  
Screen of tinned copper braid  
Black TPE-E sheath
- Over the 4 elements in parallel PUR sheath
- Outer sheath colour black

## Properties

- The smooth, very high quality core insulation, together with the special threading lay and the sliding wrapper ensure a long service life under combined bending and torsional stress
- PUR sheath, matt, low adhesion, flame retardant

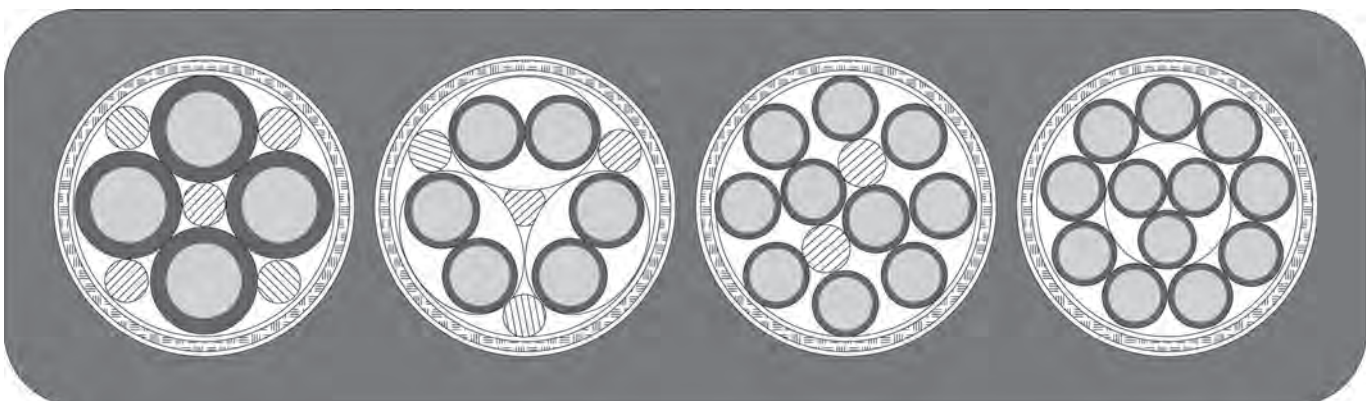
## Application

These cables are specially designed for combined torsional and bending stresses. They are employed both for power supply and for the transmission of control and monitoring signals. Roboflex cables are used in assembly and welding robots, in handling and automation centres, in transport and conveyor equipment, and on turntables and swivel tables. In other words, anywhere where there is no defined cable routing with only alternating bending cycles in one plane, such as in energy supply chains, for example.

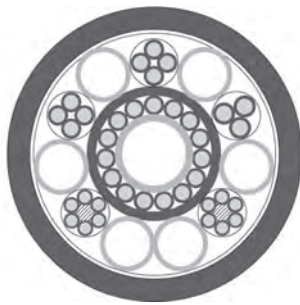
CE = The product is conformed with the EC Low-Voltage Directive 2006/95/EG.

Part no.	No. cores x cross-sec. mm <sup>2</sup>	Outer Ø approx. mm	Cop. weight kg / km	Weight approx. kg / km	AWG-No.
78499	( 4 x 2 + 12 x 0,15 + 3 x 2 x 0,15 + 10 x 0,15)	7,2	128,6	200,0	16

Dimensions and specifications may be changed without prior notice. (RH01)



# ROBOFLEX sewer robot trailing



## Technical data

- **Temperature range**  
flexing -40 °C to +80 °C
- **Nominal voltage**  
300/500 V
- **Test voltage** 3000 V
- **Insulation resistance**  
min. 20 MOhm x km

## Cable structure

### Part No. 74540

- Bare copper, ultra-fine wire conductors acc. to DIN VDE 0295 cl. 6 and/or IEC 60228 cl. 6
- Core insulation TPE-E, black with numbering
- 3 COAX 187/U stranded
- Cores and COAX elements and PVC sleeves, special stranded
- PUR outer sheath with embedded high-tensile and high-torsion resistant Kevlar braid
- Sheath colour orange (RAL 2003)

### Part No. 70581

- Bare copper, ultra-fine wire conductors acc. to DIN VDE 0295 cl. 6 or IEC 60228 cl. 6
- PVC core insulation, colour code DIN 47100
- Cores stranded with COAX
- Overall screening with tinned copper braid, coverage approx. 85%
- Special PVC sheath
- Sheath colour grey (RAL 7001)

### Part No. 76397 (trailing cable for video cameras)

- Tinned copper conductor, fine wire stranded
- Core insulation of cell polypropylene
- Screen of aluminium-coated polyester foil and tinned copper braiding
- PUR outer jacket
- Sheath colour blue (RAL 5015)

## Properties

- To enhance reliability and tensile strength, a high-tensile and high-torsion resistant Kevlar braid is incorporated into the extremely robust PUR sheath
- **Part No. 74540+76397**
- PUR sheath: low adhesion, extremely abrasion resistant, halogen-free, resistant to UV, oil, hydrolysis and microbial attack
- **Part No. 70581**
- Special PVC sheath, largely oil resistant, self-extinguishing and flame retardant, test method B acc. to DIN VDE 0472 part 804 and IEC 60332-1, chemical resistant (see table Technical Information)

## Application

These cables are designed for use with autonomous sewer robots.

These robots are used to inspect municipal sewer networks and if necessary to locate leaks or blockages. Some of these robots are even able to seal such leaks after detecting them. Besides cores for power supply, they also contain data cables, hoses for various drives, and coaxial cables for the video camera mounted on the robot.

CE – The product is conformed with the EC Low-Voltage Directive 2006/95/EG.

Part No.	No cores x cross-sec mm <sup>2</sup>	Outer ø ca. mm	Cop. weight kg/km	Weight ca. kg/km
74540	22x0,5+6x0,75+3x1+4x1,5+3xCOAX +PVC sleeves	26,8	206,0	450
700766	4x0,14+12x1+3x2,5+1xCOAX +4xPA sleeves	33,5	394,2	1080

Part No.	No cores x cross-sec mm <sup>2</sup>	Outer ø ca. mm	Cop. weight kg/km	Weight ca. kg/km
70581	12 x 0,25+1 x COAX	8,0	73,0	108
76397	1 x 1,22	6,5	24,0	50

Dimensions and specifications may be changed without prior notice. (RH01)