

robotlink[®]

igus.eu ... Components for low-cost robots ... 07.2018...



modular system



Robotic joints and components made from igus® tribo-polymers.

Our basic idea is to give developers, labs, and automation integrators access to a joint modular system to construct customised robots which can be used in the most different applications. Always at the lowest possible costs, with the appropriate technology. The required number of joint axes in the appropriate geometric constellation is often decisive for the correct solution.

Our roboLink® joints (RL-D worm gear and RL-S strain wave gear) can be combined with each other and powered with different motors. In the framework of the modular system concept, our customers can select either joints, joints with our igus® motors or predefined articulated arm configurations and receive them within short delivery times.

Central characteristics of our joints are lubrication-free plastic gears (worm, strain wave and the new cycloidal gear), igus® bearing technology (usually with our PRT polymer slewing ring bearings), and a variety of modular versions.

The main components of the modular system at the moment are:

- RL-D joints with worm gear in 3 installation sizes with currently 8 transmission ratios as standard
- RL-S joints with strain wave gear in 2 sizes
- A large number of motor kits for direct linkage to the above gears
- External incremental encoder kits for angle monitoring and referencing
- RL-C or RL-Q connection system in order to make modular articulated arms from the joints
- Standard articulated arms up to 5 axes from the above-named components

In addition, our axes can also be combined with igus® linear technology and open up another area for customised automation solutions.

The basic idea underlying the igus® draw wire technology RL-W is based on the bionic principle of the decoupling of joints and motors in order to obtain especially light and flexible arms. These products are used in service robotics and in projects with human-machine interaction.




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 blog.igus.eu/category/roboLink


Application areas:


- Single joints as driven slewing rings in a horizontal installation position or as positioning units or as rotating axes in linear systems
- Combined joints as rotary-drive units
- Articulated arms with different kinematics, low-cost automation, pick & place, teaching, research, training

igus® – plastics for longer life®

 www.igus.eu/roboLink
Also visit our igus® website www.igus.eu, explore other products, technical details, novelties, helpful online tools, and benefit from our online product range – any hour of the day.

 **Delivery**
free within Germany for orders over EUR 150.00

 **Payment**
2% discount within 14 days net within 30 days

 Our offers are exclusively directed to dealers / resellers. The quoted unit prices in Euros are net prices without VAT. All previous price lists become invalid with the publication of this price list.

roboLink® D components



Joint with plastic worm gear

► Page 8



Motor kits

► Page 12



Accessories

► Page 16



Joint with plastic strain wave gear

► Page 20



Motor kits

► Page 24



Accessories

► Page 25

Electro-mechanical robot arms



roboLink® C arms

► Page 28



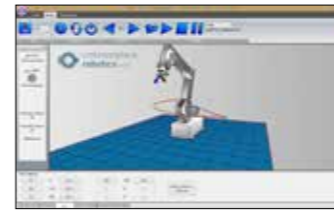
roboLink® Q arms

► Page 30



roboLink® online designer

► Page 33



CPR control

► Page 34

roboLink® W draw wire technology



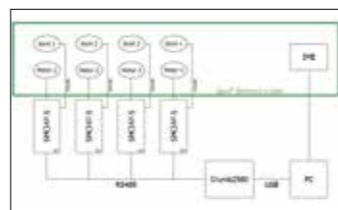
Rope drive for rotating joint

► Page 38



Complete 6 DOF unit

► Page 44



Open source

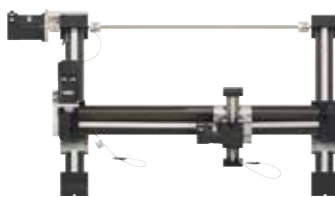
► Page 48



Software for programming articulated joints

► Page 49

Linear robots for predefined surfaces and spaces



Multi-axis modular system for drylin® linear robots

► www.igus.eu/gantry

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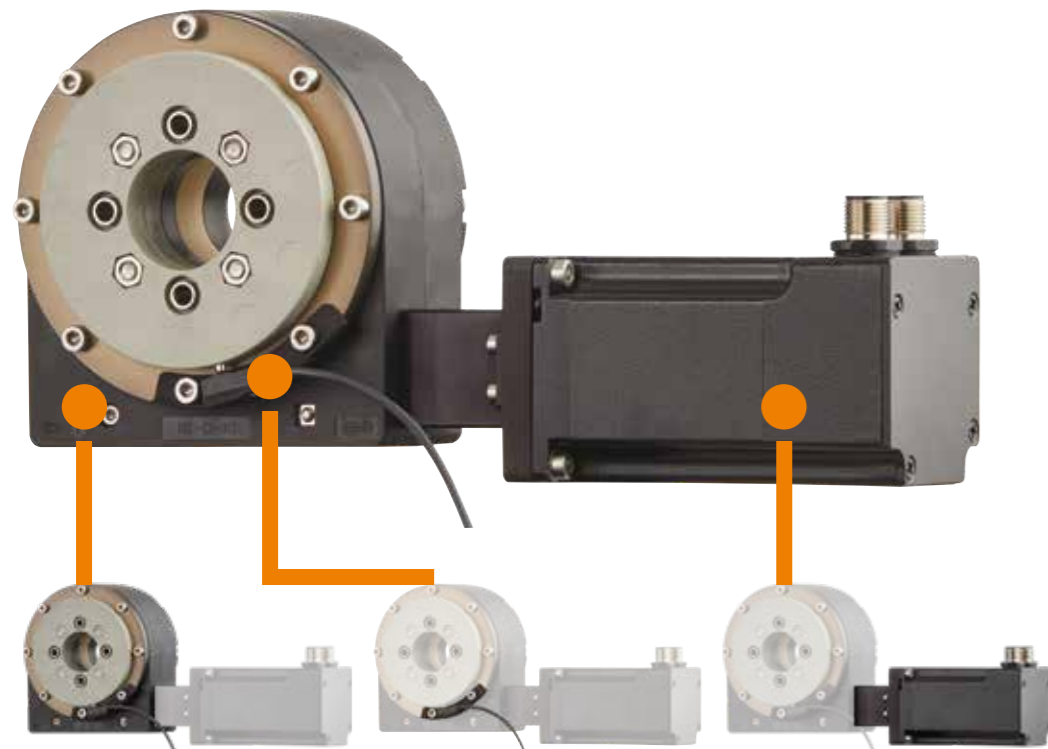
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robolink® components

RL-D joints standard configuration



Configuration example: RL-D-30-A0100

- consisting of
- RL-D-30-102-50-01035
 - RL-D-30-MK-C-N23-02
 - RL-D-30-IK-001
 - RL-D-MONT-MOT-01
 - RL-D-MONT-INI-01

RL-D-30-102-50-01035

Asymmetric joint
i=50:1
Quality: high end

more joints
▶ from page 8

RL-D-30-IK-001

Proximity switch kit
for RL-D-30 joints

more information
▶ from page 16

RL-D-30-MK-C-N23-02

Motor kit for RL-D-30
NEMA23 stepper motor
+ encoder

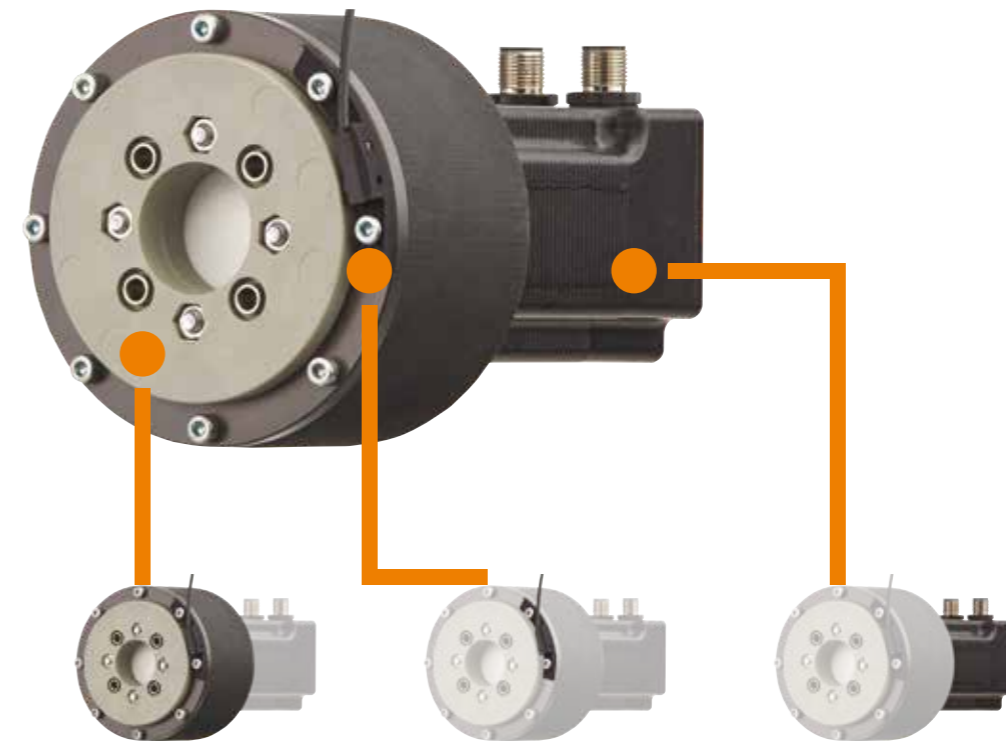
more combinations
▶ from page 12

RL-D-MONT-MOT-01
RL-D-MONT-IK-01

Motor and proximity
switch kit assembly
incl. functional check

robolink® components

RL-S joints standard configuration



Configuration example: RL-S-20-A0100

- consisting of
- RL-S-20-N23-00-38-12000
 - RL-S-20-MK-N23-02
 - RL-S-20-IK-01
 - RL-S-MONT-MOT-01
 - RL-S-MONT-INI-01

RL-S-20-N23-00-38-12000

Asymmetric joint
i=38:1
Quality: high end

more joints
▶ from page 20

RL-S-20-IK-01

Proximity switch kit
for RL-S-20 joints

more information
▶ from page 23

MOT-AN-S-060-020-056-M-A-AAAC

Motor for RL-S-20
NEMA23 stepper motor
+ encoder

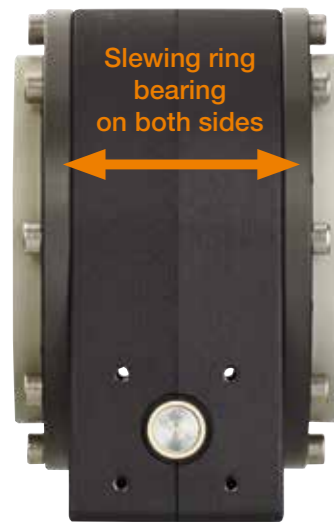
more combinations
▶ from page 22

RL-S-MONT-MOT-01
RL-S-MONT-INI-01

Motor and proximity
switch kit assembly
incl. functional check

roboLink® D | Robot joint

Symmetrical - with two PRT slewing ring bearings



Order key

Type	Dimensions [mm]
RL-D-20-101-38-01000	
roboLink®	
Type "D"	
Installation size	
Symmetric, 2 PRT	
Reduction gearing	
Options	

Versions:

Standard: -01000

FULL PLASTIC: -03011

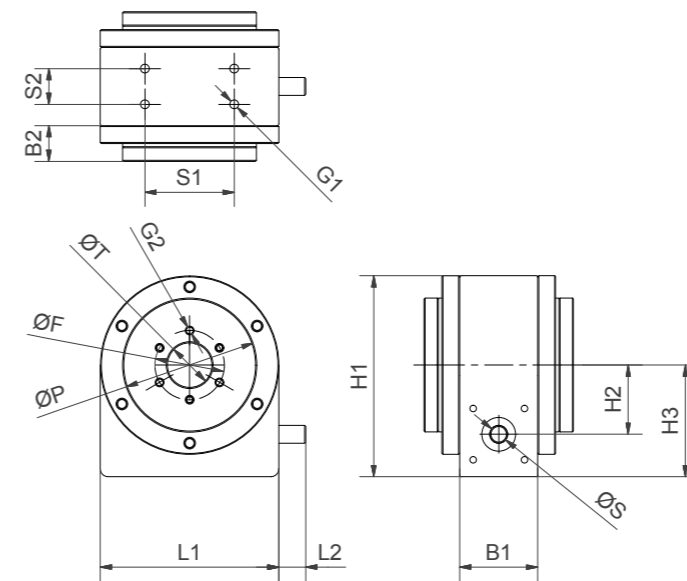
High end: -01033

roboLink® D robot joint with two PRT slewing ring bearings

Slewing ring bearing (iglidur® PRT) with a plastic housing. The drive component is a worm gear. The centre hole remains free for feeding cables etc. through. The articulated joints can be ordered with or without motor.

- Self-locking drive only for reduction gearing of 1:70
- Standard motor option: stepper motor NEMA17 / 23 / 23XL
- INI kit for zero position optionally adaptable

roboLink® D | Robot joint | PRT slewing ring bearings



3 versions

- **Standard (-01000):** 2 pcs aluminium PRT (PRT-02-xx-AL), aluminium worm shaft (AL hard-anodised). Application e.g. in our low-cost robot arms as front joints (RL-D-20 and RL-D-30).
- **FULL PLASTIC (-03011):** 2 pcs low-cost PRT (PRT-02-xx-LC), worm shaft made from plastic RN33. Application e.g. for manual adjustments.
- **High end (-01033):** 2 pcs PRT design 01 (PRT-01-xx), aluminium worm shaft (AL hard-anodised), high rigidity. Application e.g. as the first pivoting axis in roboLink® articulated arms.

Technical data

		RL-D-20-101	RL-D-30-101	RL-D-50-101
Size	[mm]	90 x 80 x 67	110 x 100 x 94	170 x 150 x 103
Shaft diameter	[mm]	8	10	15
Reduction gearing	[1:x]	3/5/8/16/38/70	3/5/8/30/50/70	3/5/16/48/70
Axis distance	[mm]	31	40	63
Backlash	[°]	< 0.5	< 0.5	< 0.5
Breakaway torque	[cNm]	< 5	< 7	< 10
Max. axial dyn. load on output	[N]	> 500	> 700	> 1,200

Dimensions [mm]

Part No.	ØT	ØS	ØP	ØF	L1	L2	B1	B2	H1	H2	H3	G1	G2	S1	S2	Prices [€]		
																1-9 pieces	10-24 pieces	25-49 pieces
Size 20																		
RL-D-20-101-38-01000	20	8	60	31	80.5	12	35	10.5	90.5	31	50.25	M4	3 x M5	40	16	202.00	182.93	168.49
RL-D-20-101-38-03011	20	8	60	31	80.5	12	35	10.5	90.5	31	50.25	M4	3 x M5	40	16	186.00	168.30	155.01
RL-D-20-101-38-01033	20	8	60	31	80.5	12	35	16	90.5	31	50.25	M4	6 x M4	40	16	327.00	295.81	272.45
Size 30																		
RL-D-30-101-50-01000	30	10	80	42.5	100.5	12	45	12.5	110.5	40	60.25	M4	4 x M5	55	20	233.00	211.20	194.53
RL-D-30-101-50-03011	30	10	80	42.5	100.5	12	45	12.5	110.5	40	60.25	M4	4 x M5	55	20	215.00	194.31	178.97
RL-D-30-101-50-01033	30	10	80	42.5	100.5	12	45	19.5	110.5	40	60.25	M4	8 x M4	55	20	345.00	312.45	287.78
Size 50																		
RL-D-50-101-48-01000	50	15	120	65	150.5	13	60	13	170.5	63	95.25	M6	8 x M6	80	30	424.00	361.08	324.45
RL-D-50-101-48-03011	50	15	120	65	150.5	13	60	13	170.5	63	95.25	M6	8 x M6	80	30	390.00	332.19	298.49
RL-D-50-101-48-01033	50	15	120	65	150.5	13	60	21.5	170.5	63	95.25	M6	8 x M6	80	30	538.00	462.02	415.15

Delivery time
2-3 days

roboLink® D | Robot joint

Asymmetrical - with one PRT slewing ring bearing and cover plate



Order key

Type	Dimensions [mm]
RL-D-20-102-38-01004	
roboLink®	
Type "D"	
Installation size	
Asymmetric, 1 PRT	
Reduction gearing	
Options	

Versions:

Standard: -01004

FULL PLASTIC: -03014

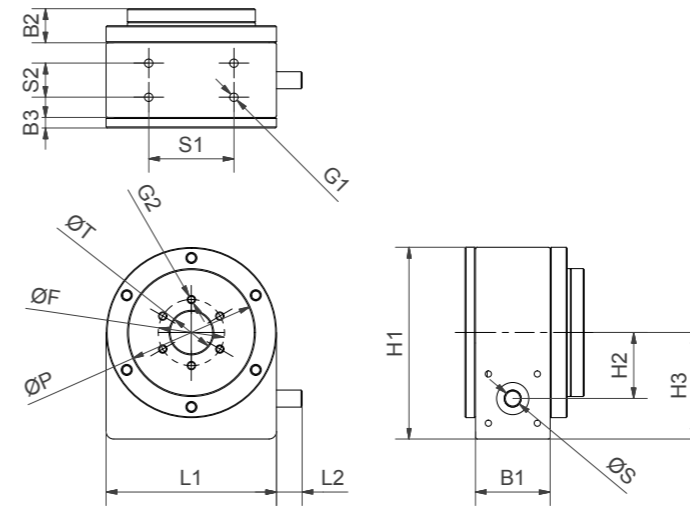
High end: -01035

roboLink® D robot joint with one PRT slewing ring bearing and cover plate

Slewing ring bearing (iglidur® PRT) in a plastic housing. The drive component is a worm gear. The centre hole remains free for feeding cables etc. through. The articulated joints can be ordered with or without motor.

- Self-locking drive only for reduction gearing of 1:70
- Standard motor option: stepper motor NEMA17 / 23 / 23XL
- Application e.g. horizontal on base plate

roboLink® D | Robot joint | PRT slewing ring bearings



3 versions

- **Standard (-01004):** 1 pc aluminium PRT (PRT-02-xx-AL), aluminium worm shaft (AL hard-anodised). Application e.g. in our low-cost robot arms as front joints (RL-D-20 and RL-D-30).
- **FULL PLASTIC (-03014):** 1 pc low-cost PRT (PRT-02-xx-LC), worm shaft made from plastic RN33. Application e.g. for manual adjustments.
- **High end (-01035):** 1 pc PRT design 01 (PRT-01-xx), aluminium worm shaft (AL hard-anodised), high rigidity. Application e.g. as first rotating axis in roboLink® articulated arms

Technical data

		RL-D-20-102	RL-D-30-102	RL-D-50-102
Size	[mm]	90 x 80 x 67	110 x 100 x 94	170 x 150 x 103
Shaft diameter	[mm]	8	10	15
Reduction gearing	[1:x]	3/5/8/16/38/70	3/5/8/30/50/70	3/5/16/48/70
Axis distance	[mm]	31	40	63
Backlash	[°]	< 0.5	< 0.5	< 0.5
Breakaway torque	[cNm]	< 5	< 7	< 10
Max. axial dyn. load on output	[N]	> 500	> 700	> 1,200

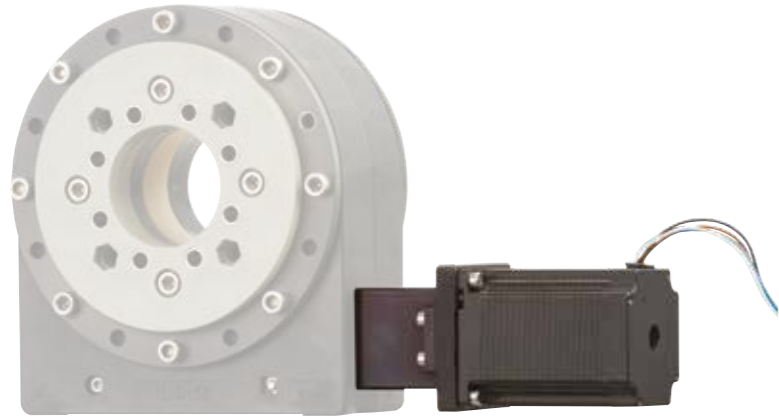
Dimensions [mm]

Art.-Nr.	ØT	ØS	ØP	ØF	L1	L2	B1	B2	B3	H1	H2	H3	G1	G2	S1	S2	Prices [€]		
																	1-9 pieces	10-24 pieces	25-49 pieces
Size 20																			
RL-D-20-102-38-01004	20	8	60	31	80.5	12	35	10.5	5	90.5	31	50.25	M4	3 x M5	40	16	182.00	164.64	151.64
RL-D-20-102-38-03014	20	8	60	31	80.5	12	35	10.5	5	90.5	31	50.25	M4	3 x M5	40	16	167.00	151.47	139.51
RL-D-20-102-38-01035	20	8	60	31	80.5	12	35	16	5	90.5	31	50.25	M4	6 x M4	40	16	272.00	246.51	227.05
Size 30																			
RL-D-30-102-50-01004	30	10	80	42.5	100.5	12	45	12.5	6	110.5	40	60.25	M4	4 x M5	55	20	210.00	190.08	175.08
RL-D-30-102-50-03014	30	10	80	42.5	100.5	12	45	12.5	6	110.5	40	60.25	M4	4 x M5	55	20	193.00	174.88	161.07
RL-D-30-102-50-01035	30	10	82	42.5	100.5	12	45	19.5	6	110.5	40	60.25	M4	8 x M4	55	20	288.00	260.38	239.82
Size 50																			
RL-D-50-102-48-01004	50	15	120	65	150.5	13	60	13	6	170.5	63	95.25	M6	4 x M6	80	30	381.00	324.97	292.00
RL-D-50-102-48-03014	50	15	120	65	150.5	13	60	13	6	170.5	63	95.25	M6	4 x M6	80	30	351.00	298.97	268.64
RL-D-50-102-48-01035	50	15	120	65	150.5	13	60	21.5	6	170.5	63	95.25	M6	8 x M6	80	30	414.00	352.56	316.79

Delivery time
2-3 days

robolink® D | Motor kit | Stepper motor

robolink® D robot joint with direct drive



- Adaptable to various motors, standard option:
NEMA17 / 23 / 23XL stepper motor
- INI kit for zero position optionally adaptable ► [page 16](#)

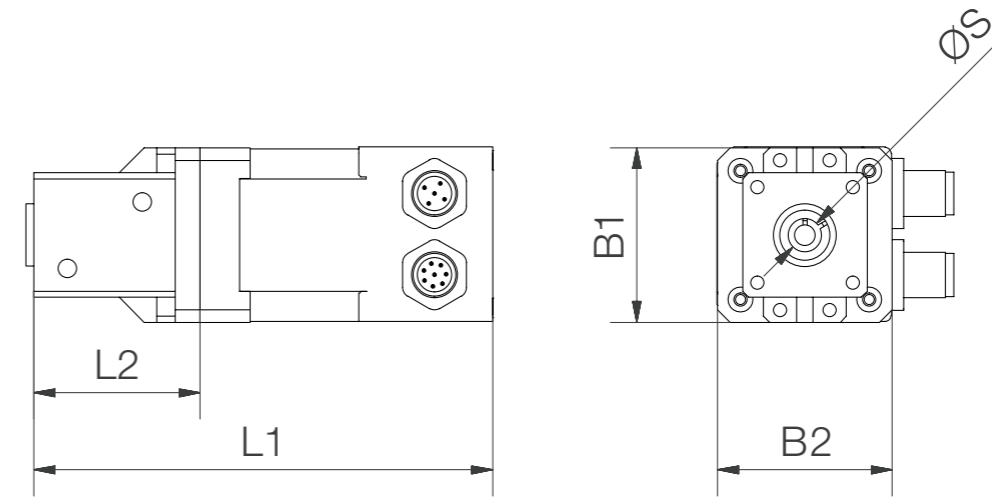
Motor kit

Motor type	Distance over hubs [mm]	Versions
igus® stepper motor		
NEMA17, NEMA23, NEMA23XL	42, 56, 60	-00: with strand wires -01: with stepper motor without encoder -02: with motor encoder

Technical data – joints with motor

Joint	Size 20		Size 30		Size 50	
	RL-D-20-101-38-XXxx	RL-D-30-101-50-XXxx	RL-D-30-101-50-XXxx	RL-D-50-101-48-XXxx	RL-D-50-101-48-XXxx	RL-D-50-101-48-XXxx
Motor	+ NEMA17	+ NEMA17	+ NEMA23	+ NEMA23	+ NEMA23	+ NEMA23XL
Motor type	Stepper motor					
Weight (with standard joint) [g]	890	1,140	1,860	2,540	2,540	2,970
Max. radial torque strength (short-term) [Nm]	5	6	12	21	21	38
Max. radial torque strength (long-term) [Nm]	4	5	8	18	18	33
Max. speed (at max. load) [rpm]	5	4	4	4	4	4
Max. axial dynamic load (horizontal installation) [N]	> 500	> 700	> 700	> 1,200	> 1,200	> 1,200

robolink® D | Robot joint | Motor kit



Dimensions [mm]

Part No.	ØS	L1	L2	B1	B2	Prices [€]		
						1-9 pieces	10-24 pieces	25-49 pieces
NEMA17								
RL-D-20-MK-C-N17-00	8	99.4	40	42	42	93.90	84.87	77.33
RL-D-20-MK-C-N17-01	8	110.4	40	42	42	153.55	141.54	132.81
RL-D-20-MK-C-N17-02	8	110.4	40	42	42	241.55	225.14	214.65
RL-D-20-MK-C-N17-NM	8	–	40	42	42	56.55	45.83	37.97
RL-D-30-MK-C-N17-00	10	99.4	40	42	42	93.90	84.87	77.33
RL-D-30-MK-C-N17-01	10	110.4	40	42	42	153.55	141.54	132.81
RL-D-30-MK-C-N17-02	10	110.4	40	42	42	241.55	225.14	214.65
RL-D-30-MK-C-N17-NM	10	–	40	42	42	56.55	45.83	37.97
NEMA23								
RL-D-30-MK-C-N23-00	10	118	42	56.4	56.4	159.58	146.07	135.26
RL-D-30-MK-C-N23-01	10	140	42	56.4	56.4	207.76	191.84	180.07
RL-D-30-MK-C-N23-02	10	140	42	56.4	56.4	294.36	274.11	260.61
RL-D-30-MK-C-N23-NM	10	–	42	56.4	56.4	89.78	72.72	60.28
RL-D-50-MK-C-N23-00	15	124	48	60	60	159.58	146.07	135.26
RL-D-50-MK-C-N23-01	15	146	48	60	60	207.76	191.84	180.07
RL-D-50-MK-C-N23-02	15	146	48	60	60	294.36	274.11	260.61
RL-D-50-MK-C-N23-NM	15	–	48	60	60	89.78	72.72	60.28
NEMA23XL								
RL-D-50-MK-C-N23XL-00	15	136.5	48	60	60	186.12	171.28	159.94
RL-D-50-MK-C-N23XL-01	15	158.5	48	60	60	274.12	254.88	241.78
RL-D-50-MK-C-N23XL-02	15	158.5	48	60	60	376.94	352.57	337.42
RL-D-50-MK-C-N23XL-NM	15	–	48	60	60	89.78	72.72	60.28

Assembly costs motor kit	1-9 pieces [€]	10-24 pieces [€]	25-49 pieces [€]
RL-D-MONT-MOT-01	34.80	28.30	18.85

Delivery time
2–3 days

robolink® D | Motor Kit | DC Motor

robolink® D robot joint with direct drive



- Easy rotary movements without control technology
- Only voltage supply needed

Available DC motors:

MOT-AE-B-024-001-037-F-A-AAAA (0.1 Nm)
 MOT-AE-B-024-003-037-F-A-AAAA (0.3 Nm)
 MOT-AE-B-024-005-036-F-A-AAAA (0.5 Nm)
 MOT-AE-B-024-007-037-F-A-AAAA (0.7 Nm)
 MOT-AE-B-024-010-042-F-A-AAAA (1.0 Nm)
 MOT-AE-B-024-015-037-F-A-AAAA (1.5 Nm)
 MOT-AE-B-024-018-042-F-A-AAAA (1.8 Nm)

Motor kits:

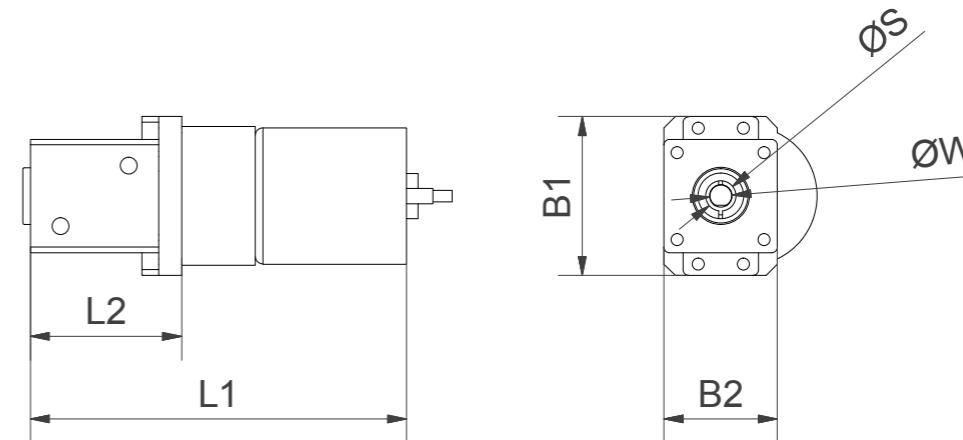
RL-D-20-MK-C-DCxx-04
 RL-D-30-MK-C-DCxx-04
 RL-D-50-MK-C-DCxx-04

xx = DC motor type

Technical data

	Unit	
Maximum voltage	[VDC]	24
Nominal voltage	[VDC]	24
Nominal torque	[Nm]	0.1–1.8
Start up torque	[Nm]	0.3–6
Idling speed	[rpm]	22–440
Rated speed	[rpm]	17–350
Nominal current	[A]	0.5–2.3


robolink® D | Motor kit | DC Motor



Dimensions [mm]

Part No.	ØS	ØW	L1	L2	B1	B2
Size 20						
RL-D-20-MK-C-DC01-04	8	6	100	40	42	30
RL-D-20-MK-C-DC03-04	8	6	102	40	42	30
RL-D-20-MK-C-DC05-04	8	6	126	40	42	30
RL-D-20-MK-C-DC07-04	8	6	105	40	42	30
RL-D-20-MK-C-DC10-04	8	8	145	40	42	30
Size 30						
RL-D-30-MK-C-DC01-04	10	6	100	40	42	30
RL-D-30-MK-C-DC03-04	10	6	102	40	42	30
RL-D-30-MK-C-DC05-04	10	6	126	40	42	30
RL-D-30-MK-C-DC07-04	10	6	105	40	42	30
RL-D-30-MK-C-DC10-04	10	8	145	40	42	30
RL-D-30-MK-C-DC15-04	10	6	107	40	42	30
RL-D-30-MK-C-DC18-04	10	8	152	40	42	30
Size 50						
RL-D-50-MK-C-DC01-04	15	6	108	48	59	42
RL-D-50-MK-C-DC03-04	15	6	110	48	59	42
RL-D-50-MK-C-DC05-04	15	6	134	48	59	42
RL-D-50-MK-C-DC07-04	15	6	113	48	59	42
RL-D-50-MK-C-DC10-04	15	8	153	48	59	42
RL-D-50-MK-C-DC15-04	15	6	115	48	59	42
RL-D-50-MK-C-DC18-04	15	8	160	48	59	42

Assembly costs motor kit	1-9 pieces [€]	10-24 pieces [€]	25-49 pieces [€]
RL-D-MONT-MOT-01	34.80	28.30	18.55

 Delivery time
2–3 days

roboLink® D | Robot joint | INI kit

roboLink® D robot joint with direct drive



INI kit

Fitting	Switching output	Switching function	Operating voltage	Rated operational current
M8 x 1	PNP	NO (Closer)	10...30 V DC	100mA

INI kit - prices [€]

Part No.	1-9 pieces [€]	10-24 pieces [€]	25-49 pieces [€]
RL-D-20-IK-001	38.00	34.20	32.30
RL-D-30-IK-001	41.00	36.90	34.85
RL-D-50-IK-001	44.00	39.96	37.74
Assembly costs INI kit			
RL-D-MONT-INI-01	18.50	15.50	13.90



Selection:

Initiator kit, drive encoder or output encoder

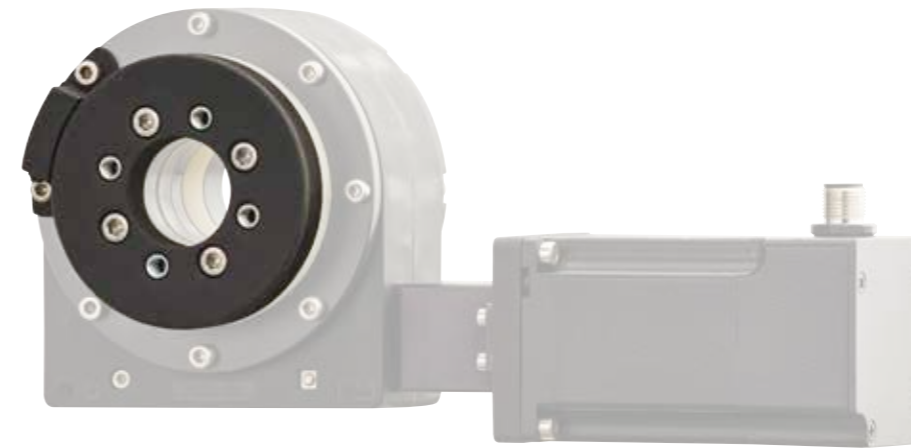


Delivery time

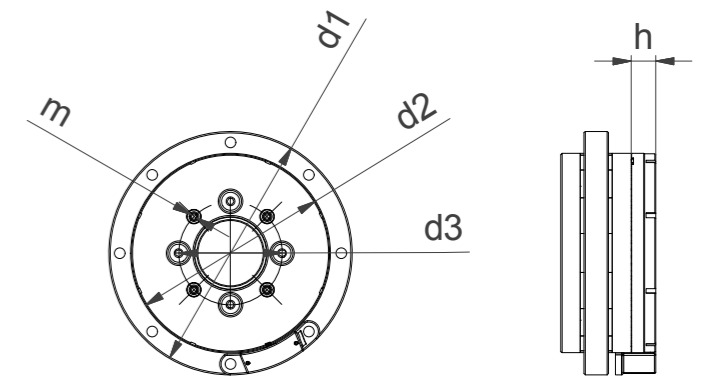
2-3 days

roboLink® D | Robot joint | Output encoder

Output encoder for RL-D gearboxes



Measurement of the angular position of the joint on the output side by means of an external angle sensor. Hall sensor for the neutral position and incremental A/B signals with a high resolution for the control system. The INI switch and the motor encoder can therefore be dispensed with.



Conductor colours of sensor cable

+5V	GND	Hall sensor	Encoder Index	Encoder A channel	Encoder B channel
red	black	white	green	blue	yellow

Dimensions [mm]

Part No.	d1	d2	d3	m	h	Pole pairs	for	Prices [€]	
								1-9 pieces	from 10 pieces
RL-D-20-EK-01	80	60	31	3 x M4	10	47	PRT-01	142.00	Upon request
RL-D-20-EK-02	80	60	31	3 x M4	10	47	PRT-02	142.00	Upon request
RL-D-30-EK-01	80	60	31	3 x M4	10	63	PRT-01	154.00	Upon request
RL-D-30-EK-02	80	60	31	3 x M4	10	63	PRT-02	154.00	Upon request
RL-D-50-EK-01	150	120	65	4 x M6	10	94	PRT-01	182.00	Upon request
RL-D-50-EK-02	150	120	65	4 x M6	10	94	PRT-02	182.00	Upon request

Assembly costs encoder kit	1-9 pieces [€]	10-24 pieces [€]	25-49 pieces [€]
RL-D-MONT-INI-01	34.80	28.30	18.55

robolink® D | RL-D-PT

Rotary-drive unit



Rotary-drive unit for highly precise manual adjustment of components

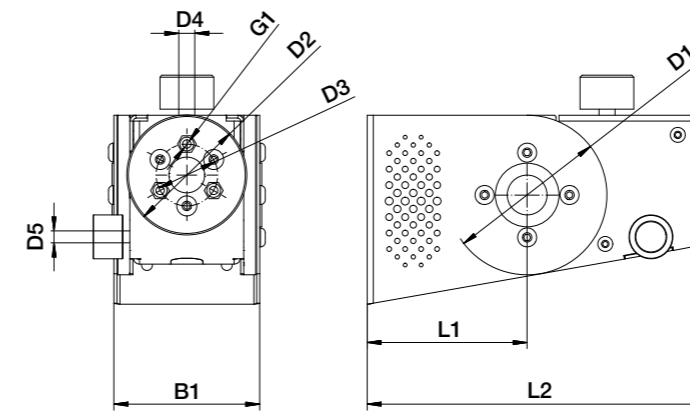
- 2 lubrication-free robolink® gearboxes with a transmission ratio of 1:70, incl. two hand wheels
- Gearboxes are self-locking
- Pivoting: RL-D-30, gearbox set 1:70
- Rotating: RL-D-20, gearbox set 1:70
- Lubrication-free support with igus® plain bearings

Typical application areas:

- Adjustment of satellite dishes
- Manual adjustment of instruments or devices
- Format adjustments

robolink® D | RL-D-PT

Rotary-drive unit



reddot design award
winner 2018

Dimensions [mm]

Part No.	L1	L2	B1	D1	D2	D3	D4	D5	G1	Prices [€]
RL-D-PT-30-20-70-AA	80	170	73	80	60	31	8	6	3 x M5	233.00





roboLink® S – low clearance strain wave gear made from plastic

Coaxial gearbox added to the gearbox portfolio of igus®. Can be adapted to different motors, like the RL-D worm gear.

Advantages of strain wave gears:

- Low clearance
- Lightweight
- High transmission ratios in one stage
- High static holding strength

Typical application areas:

- 5th axis for igus® articulated arms
- Low-cost robotics

roboLink® S | Strain wave gear

Size



RL-S-17-...



RL-S-20-...



RL-S-30-...

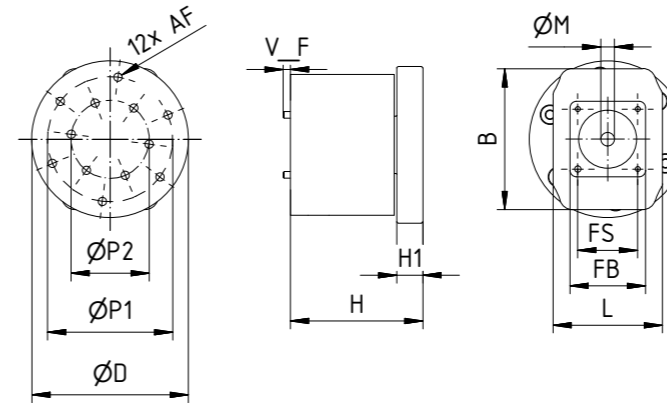
Properties

- Main components : igus® PRT-01/-02, shaft generator, flexible inner ring, outer ring
- RL-S-20: self-locking drive - slewing ring bearing remains in position when powered off
- Lightweight and compact

Technical data - standard version

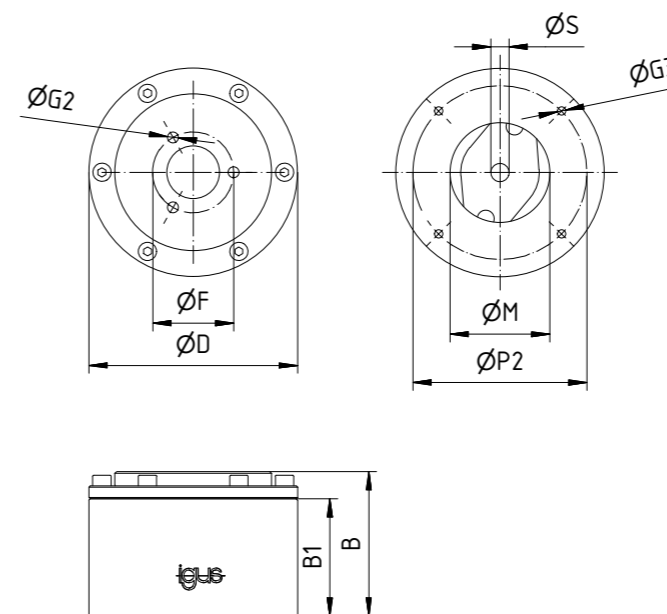
Part No.	Weight [g]	Reduction gearing	Efficiency	Moment of breakage at the output		Max. output torque	
				(static) [Nm]	(long-term) [Nm]	(short-term) [Nm]	
RL-S-17-N11-00-28-020K0	100	28:1	> 0.2	26	0.5	0.75	
RL-S-17-N17-00-28-020K0	100	28:1	> 0.25	26	1.5	3.0	
RL-S-20-N23-00-38-12000	290	38:1	> 0.3	50	3.0	5.0	
RL-S-30-N23-NM-38-02000	490	38:1	> 0.3	50	8.0	10.0	

roboLink® S | Strain wave gear



Dimensions [mm]

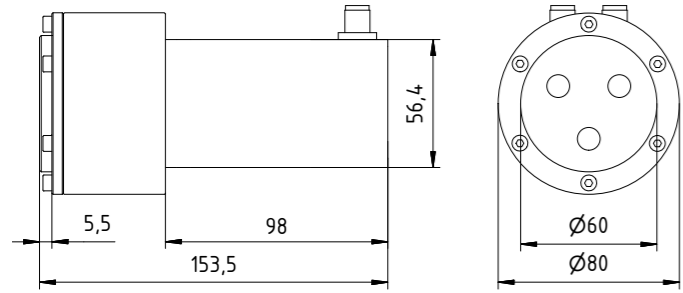
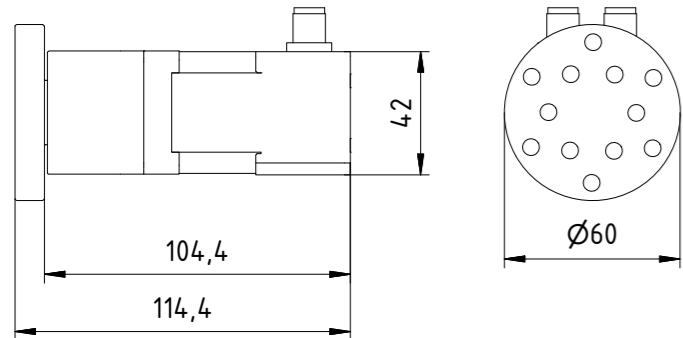
Part No.	ØD	ØP1	ØP2	AF	V_F	H	ØM	FS	FB	L	B	H1	Prices [€]
RL-S-17-N11-00-28-020K0	60	48	30	M4x8	M2.5x2.75	50.75	5	23	29	42	54	10	108.00
RL-S-17-N17-00-28-020K0	60	48	30	M4x8	M3x5.4	44	5	31	42	42	42	10	108.00



Dimensions [mm]

Part No.	ØD	B	ØM	B1	B2	ØG2	ØG3	ØP1	ØP2	ØS	Prices [€]
RL-S-20-N23-00-38-12000	80	55.5	38	45	10.5	M5 x 15.5	4xM4	31	66.67	6.35mm (1/4")	172.00
RL-S-30-N23-00-38-02000	100	66.5	38	54	12.5	M5 x 15.5	4xM4	42.5	66.67	6.35mm (1/4")	upon request

roboLink® S | Strain wave gear with motor



Part No.	Gear	Motor	Specification	Prices [€]
RL-S-17-A0164	RL-S-17-N17-00-28-020K0	MOT-AN-S-060-005-042-M-C-AAAC	NEMA17 stepper motor with encoder and M12 connector	327.88
RL-S-20-A0165	RL-S-20-N23-00-38-12000	MOT-AN-S-060-020-056-M-C-AAAC	NEMA23 stepper motor with encoder and M12 connector	411.46

roboLink® S | Strain wave gear | Options

Initiator kit for RL-S gears



- INI kit for zero positions optional
- Can also be retrofitted for sizes RL-S-17, RL-S-20 and RL-S-30

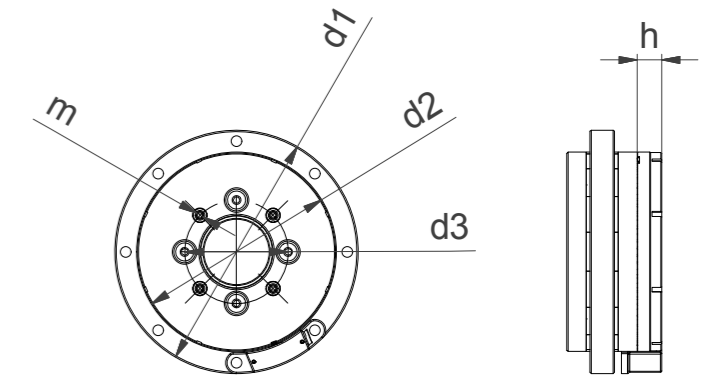
INI kit

Fitting	Switching output	Switching function	Operating voltage	Rated operational current
M8 x 1	PNP	NO (Closer)	10...30 V DC	100 mA

INI kit - prices [€]

Part No.	1-9 pieces	10-24 pieces	25-49 pieces
RL-S-17-IK-01	38.00	34.20	32.30
RL-S-20-IK-01	41.00	36.90	34.85
Assembly costs INI kit			
RL-D-MONT-INI-01	18.50	15.50	13.90

Output encoder for RL-S gearboxes



Dimensions [mm]

Part No.	d1	d2	d3	m	h	Prices [€]
RL-S-17-EK-xx*	-	-	-	-	-	114.00
RL-S-20-EK-xx	80	60	31	3 x M5	10	142.00
RL-S-30-EK-xx	100	82	42.5	4 x M5	10	154.00

* The RL-S-17 output encoder does not change the outer dimensions.

Assembly costs encoder kit	1-9 pieces [€]	10-24 pieces [€]	25-49 pieces [€]
RL-D-MONT-INI-01	18.50	15.50	13.90



roboLink® C – arm
For direct drive
roboLink® D

8 base configuration up to 5 DOF

from 2,548,-€



roboLink® Q - arm
For direct drive
roboLink® S and
roboLink® D

8 base configuration up to 5 DOF

from 2,963,-€

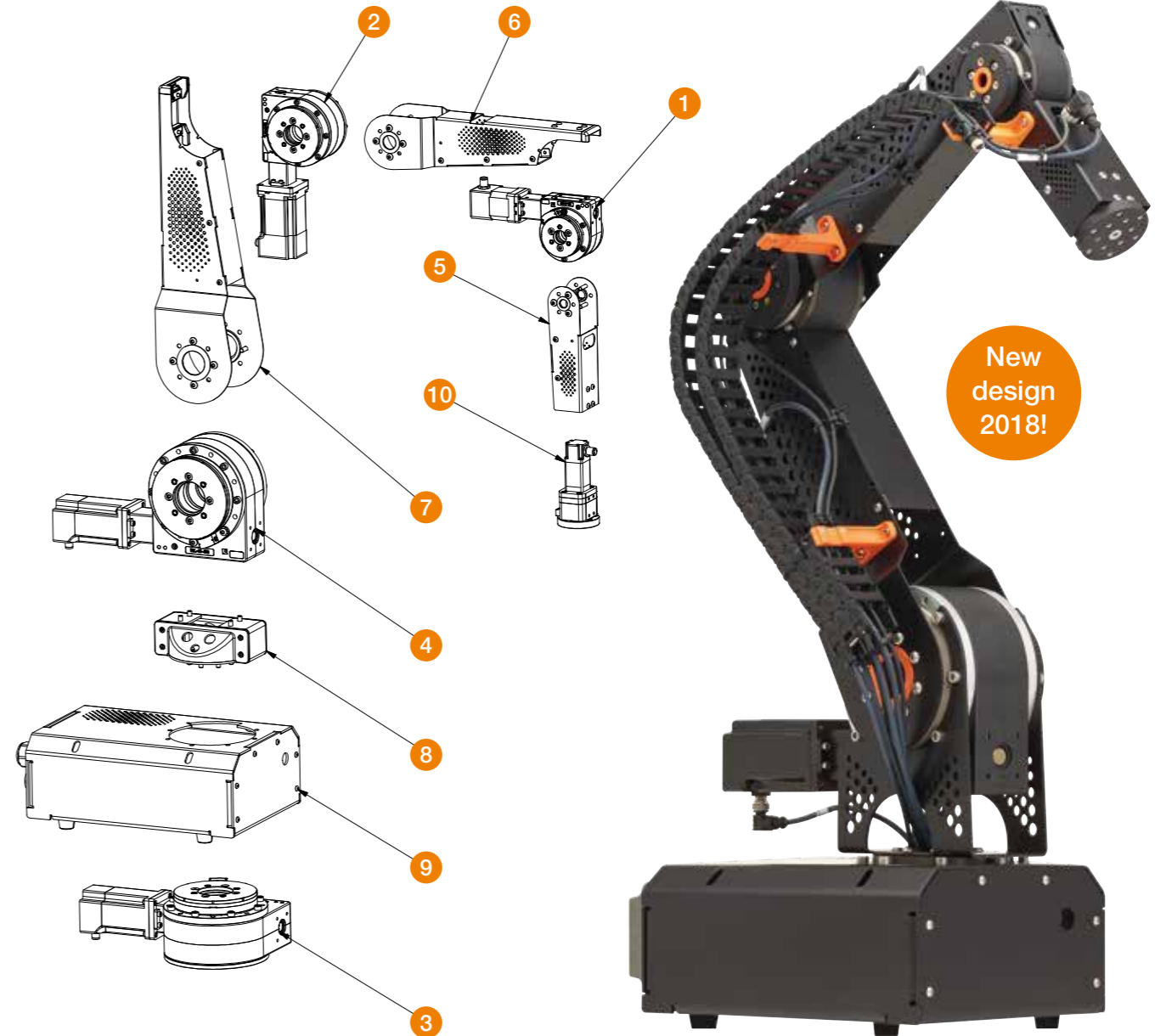


Image exemplary

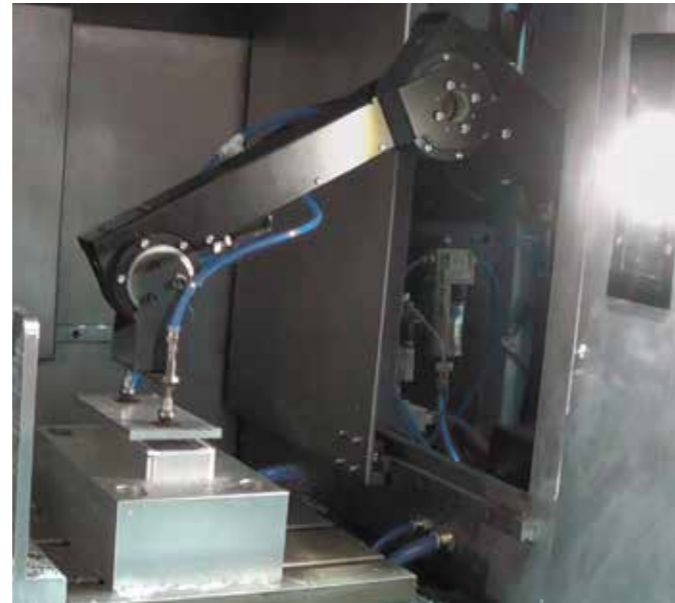
Configuration example

1	RL-D-20...01000 / MK-N17-01 / EK	6	270mm connecting part
2	RL-D-30...01000 / MK-N23-01 / EK	7	350mm connecting part
3	RL-D-50...01035 / MK-N23XL-01 / EK	8	50-50 connecting part
4	RL-D-50...01033 / MK-N23XL-01 / EK	9	Base-50 connecting part
5	170mm connecting part	10	RL-S-17

roboLink® | RL-DC standard configuration



New design 2018!



Milling with a roboLink® DC

Typical application areas:

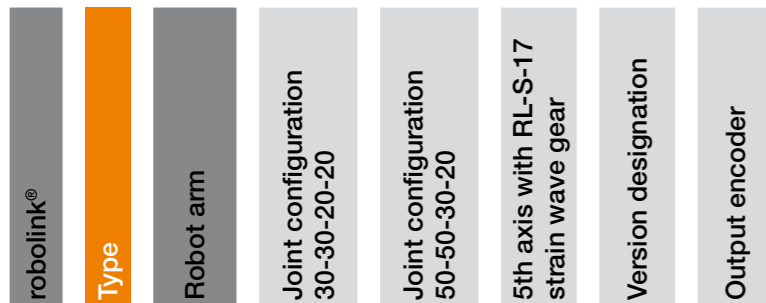
- Low-cost robotics
- Simple handling
- Pick and place

Part No.	Designation	Prices [€]
RL-D-RBT-3322-BC	4 axes roboLink® DC, small version, with motor encoder and INI	2,766.00
RL-D-RBT-3322-BC-AE	4 axes roboLink® DC, small version, with output encoder	2,548.00
RL-D-RBT-5532-BC	4 axes roboLink® DC, large version, with motor encoder and INI	3,437.00
RL-D-RBT-5532-BC-AE	4 axes roboLink® DC, large version, with output encoder	3,195.00
RL-D-RBT-3322S-BC	5 axes roboLink® DC, small version, with motor encoder and INI	3,174.00
RL-D-RBT-3322S-BC-AE	5 axes roboLink® DC, small version, with output encoder	2,932.00
RL-D-RBT-5532S-BC	5 axes roboLink® DC, large version, with motor encoder and INI	3,845.00
RL-D-RBT-5532S-BC-AE	5 axes roboLink® DC, large version, with output encoder	3,579.00

Order key

Type Dimensions [mm]

RL - D - RBT - 3322 - 5532 - S - BC - AE



5m cables for each motor, encoder, INI routed out of the base

roboLink® | 5th axis for roboLink® RL-DC



5th axis for roboLink® RL-DC with RL-S-17 strain wave gear adaptable to roboLink® RL-D-20

- Axis of rotation with igus® stepper motor NEMA11 and encoder
- Direct screw-connection to the RL-S-17 strain wave gear
- The output disc has an INI switch for zero point definition
- The motor-gearbox unit is directly connected to the roboLink® RL-D-20-101-38-01000 standard joint by means of an adapter plate (4th axis in the modular articulated arm, "big" and "small version")
- Cables (motor, encoder and initiator cables are placed in the existing e-chainsystem® of the joint)
- Output encoder optional

i More Information about roboLink® D modular system

► from page 6

Information about the new roboLink® strain wave gears

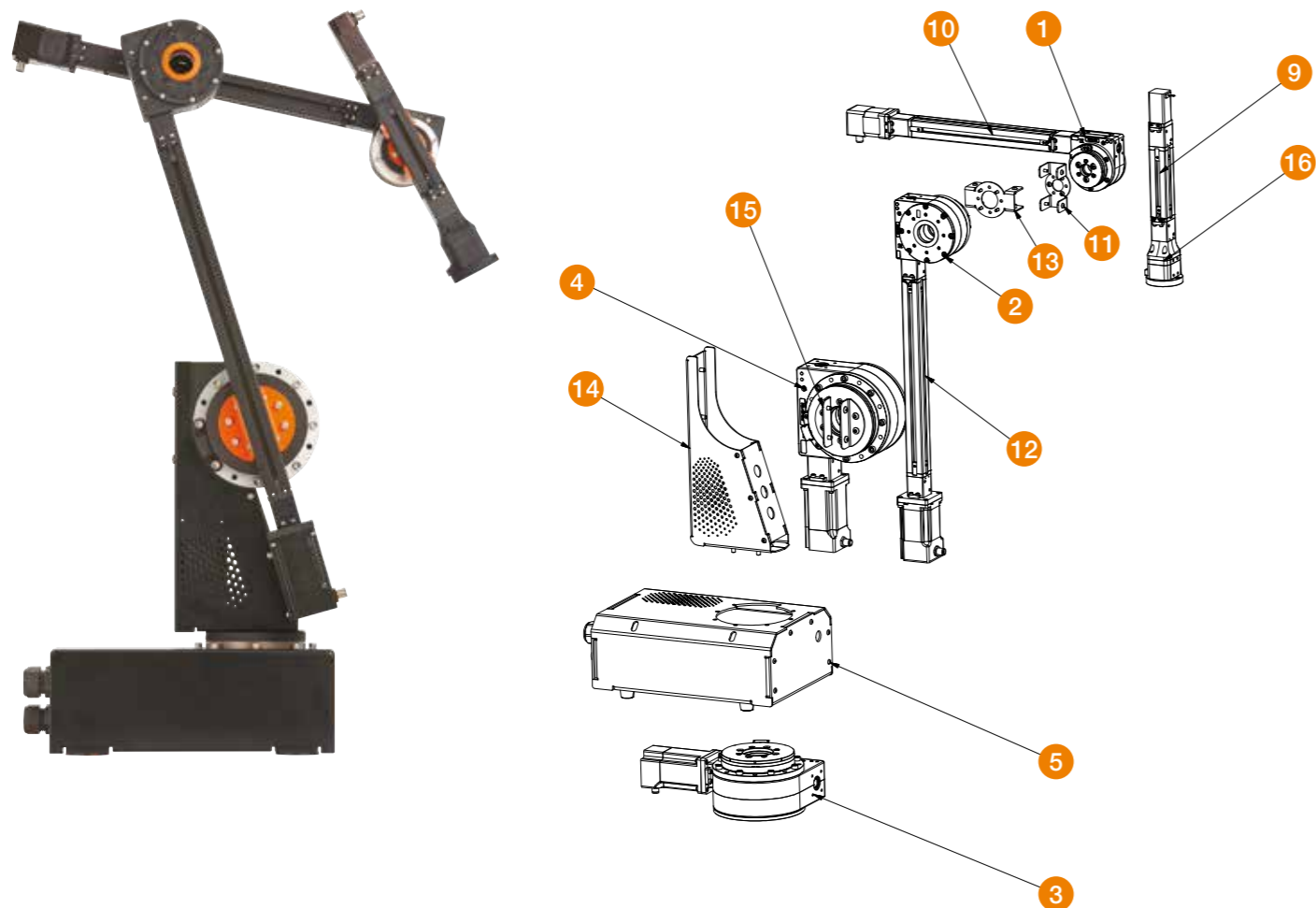
► from page 18

Part No.	Designation	Prices [€]
RL-DC-S17-N11-AA	5th axis for RL-DC with motor encoder and INI	408.00
RL-DC-S17-N11-AA-AE	5th axis for RL-DC with output encoder	384.00

Available upon request

robolink® DQ/SQ

robolink® SQ and DQ with worm and strain wave gears




Combination of different gear types, worm gear and new igus® strain wave gear. With it, the prototype of a 5-axis pivoting robot arm can be configured.

i More Information about robolink® D modular system
▶ from page 6

Information about the new robolink® strain wave gears
▶ from page 18

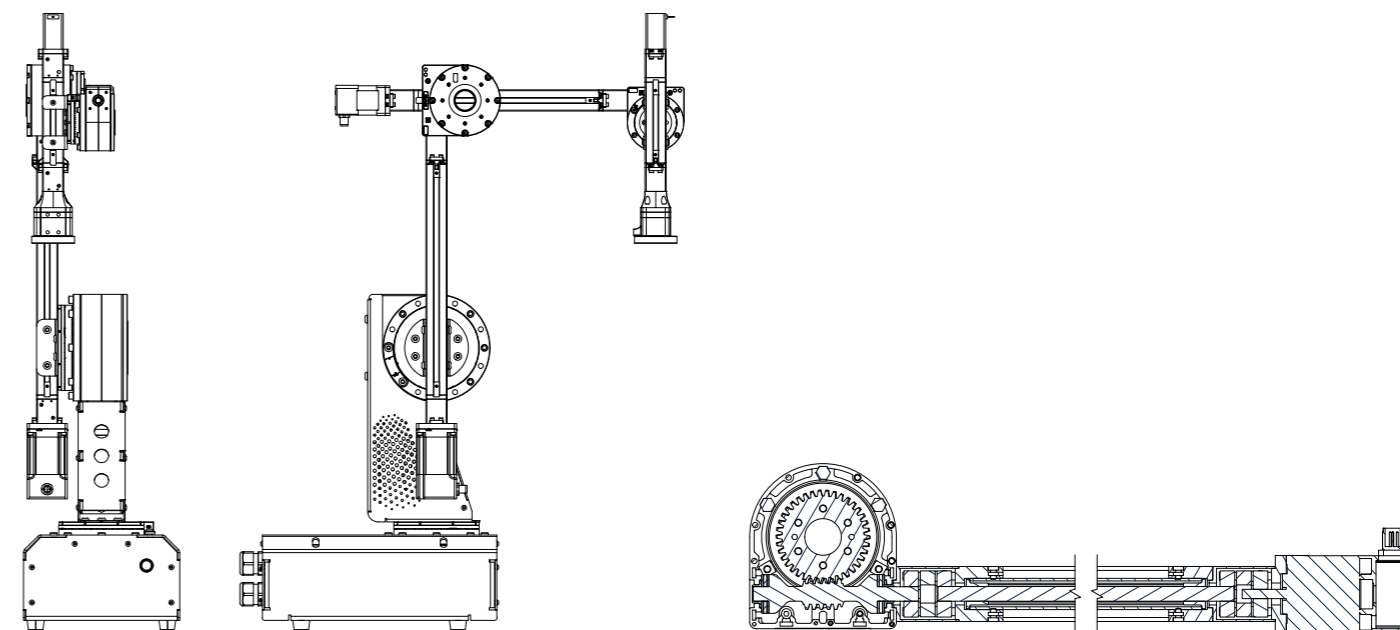
Configuration example

1 RL-D-20...01035 / MK-N17-01 / EK	11 Connecting part 20-P30
2 RL-D-30...01053 / MK-N23-01 / EK	12 Profile connector 370mm
3 RL-D-50...01035 / MK-N23XL-01 / EK	13 Connecting part 30-P30
4 RL-D-50...01035 / MK-N23XL-01 / EK	14 Connecting part L-50-50
5 Base-50 connecting part	15 Connecting part 50-P30
9 Profile connector 160mm	16 RL-S-17
10 Profile connector 300mm	

 Available upon request

robolink® DQ

robolink® DQ with decoupled motors



New concept compared to connection with folded sheet-metal parts. Motor and joint are uncoupled by means of a standard profile. As a result, the operating temperature in the joint is reduced and the motor is used as a counterweight to the joint (optimisation of the payload). The geometry of the articulated arm can be altered within minutes.


Typical application areas:

- Low-cost robotics
- Simple handling
- Pick and place

i More Information about robolink® D modular system
▶ from page 6

Information about the new robolink® strain wave gears
▶ from page 18

Part No.	Designation	Prices [€]
RL-DQ-RBT-3322-BC	4 axes robolink® DQ, small version, with motor encoder and INI	3,277.00
RL-DQ-RBT-3322-BC-AE	4 axes robolink® DQ, small version, with output encoder	2,963.00
RL-DQ-RBT-5532-BC	4 axes robolink® DQ, large version, with motor encoder and INI	3,565.00
RL-DQ-RBT-5532-BC-AE	4 axes robolink® DQ, large version, with output encoder	3,324.00
RL-DQ-RBT-3322S-BC	5 axes robolink® DQ, small version, with motor encoder and INI	3,752.00
RL-DQ-RBT-3322S-BC-AE	5 axes robolink® DQ, small version, with output encoder	3,414.00
RL-DQ-RBT-5532S-BC	5 axes robolink® DQ, large version, with motor encoder and INI	3,987.00
RL-DQ-RBT-5532S-BC-AE	5 axes robolink® DQ, large version, with output encoder	3,775.00

 Available upon request

robolink® | 5th axis for robolink® RL-DQ



5th axis for robolink® RL-DQ with RL-S-17 strain wave gear

- Axis of rotation with igus® stepper motor NEMA11 with encoder
- Connected to the RL-S-17 strain wave gear by means of a standard 30x30 aluminium section
- The output disc has an INI switch for zero point definition
- On the profile, the motor-gearbox unit is connected to the RL-D-20-101-38-01000 standard joint (4th axis in modular articulated arm)
- Cables (motor, encoder and initiator cables) are placed in the existing e-chainsystem® of the 4-axis articulated arm
- Output encoder optional

i More Information about robolink® D modular system
▶ from page 6

Information about the new robolink® strain wave gears
▶ from page 18

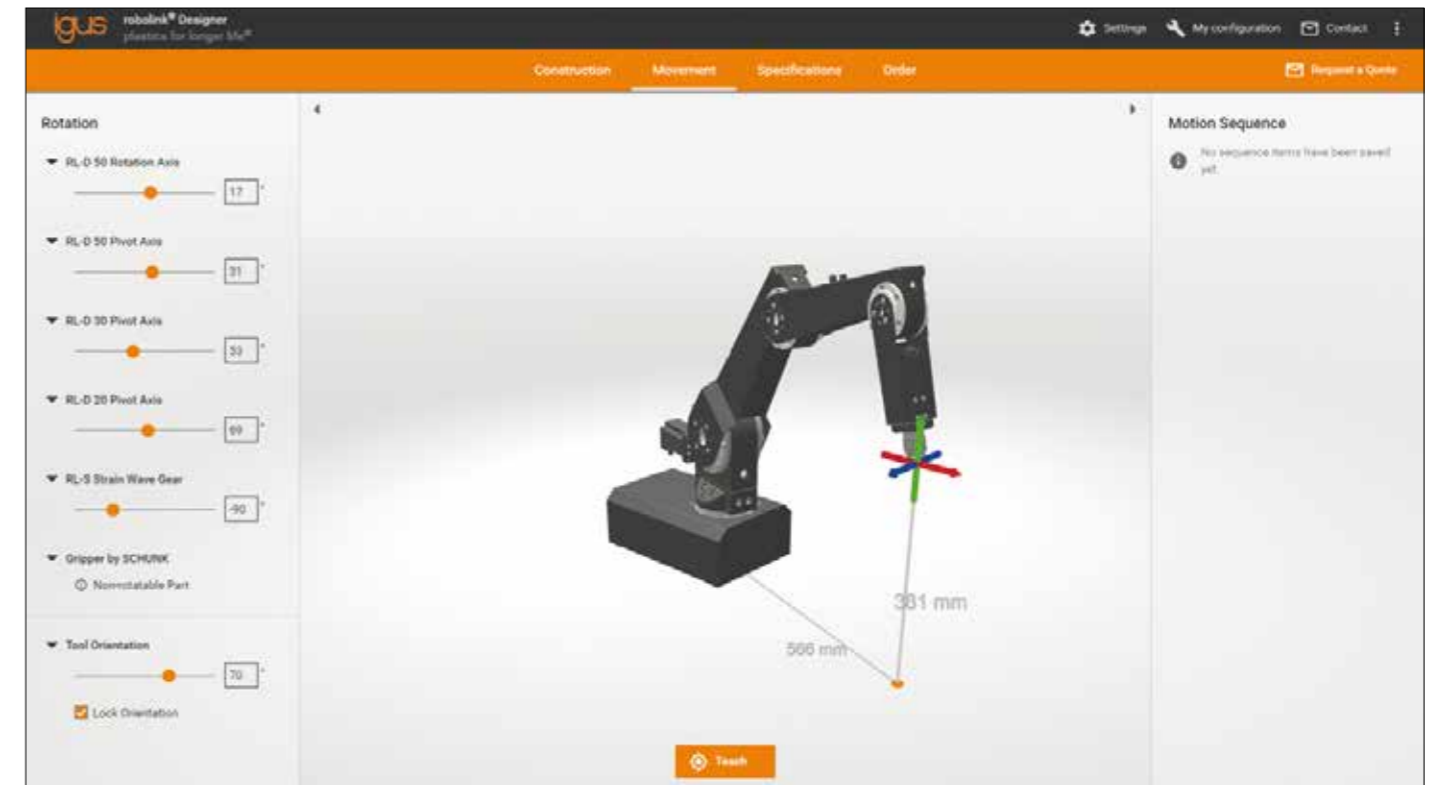


reddot design award
winner 2018

Part No.	Designation	Prices [€]
RL-DQ-S17-N11-AA	5th axis for RL-DQ with motor encoder and INI	475.00
RL-DQ-S17-N11-AA-AE	5th axis for RL-DQ with output encoder	451.00

Available upon request

robolink® | Online designer Digital modular kit configurator for robolink®

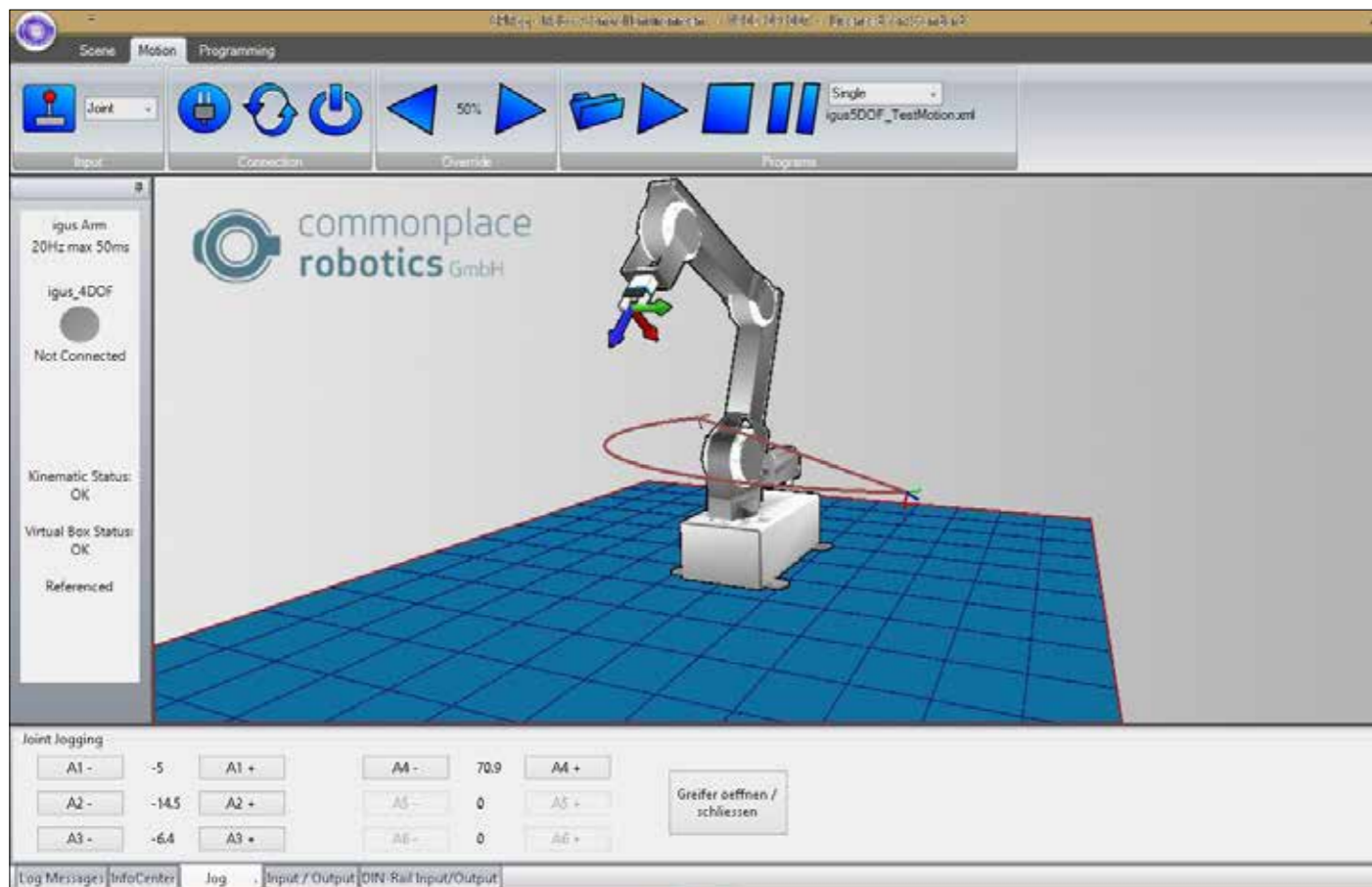


With the new robolink® designer, you can quickly and easily configure your individual robolink® D robot arm online, in an intuitive CAD interface.

- Select robolink® components step by step, individually configure the robotic arms from the first axis up to the tool
- Adapt to your working space with free selection of arm length
- Output the max. payload and the max. range of your individual configuration
- Output the parts list
- Save and download your individual configurations
- Also usable on a tablet/smartphone
- Inverse kinematics: Simulate movement of the entire robot arm by pulling the tool axis
- "Teach" function for learning movement sequences with several intermediate steps

- Simulate robot arm movements by rotating individual joints
- Calculate the work space and output of the tool centre point
- Maximum range and movable weight can be calculated
- Get an indication of the price and delivery time for your configured robot arm
- Direct request option
- Simply transfer to the shopping cart, no minimum order quantity

www.igus.eu/roboLink-designer



- Modular control
- 3D user interface
- Intuitive operator control
- Axis linear movements
- CAN-Bus interface
- Easy-to-maintain DIN rail modules
- Control system for 4, 5, 6-axis robot arms
- Control system for 3, 4-axis linear robots



Scope of supply: control system, CPRog software, 24V power, USB-CAN adapter, connecting cable
 Also needed: Windows PC, power supply unit, gripper, safety-relevant components

Special possibilities for a Cartesian control system of roboLink® articulated arms

BECKHOFF: controller CX5130, stepper controller, EL7047

Supplier:

Commonplace Robotics GmbH
 www.cpr-robots.com
 www.cpr-roboter.de
 info@commonplacrobotics.de



- Integrated motor controller, digital inputs/outputs and control computer
- Touch display for operator control
- Programming via connected laptop with intuitive 3D interface
- Advantage: Very compact design without additional control cabinet
- Modular control
- CAN-Bus interface
- Control system for 4 or 5-axis robot arms

Technical data – roboLink® compact

		4 DOF*	5 DOF*
		RL-DCi-4S	RL-DCi-4S
Model name			
Operating voltage	[VDC]	24	24
Nominal power (at full load)	[W]	120	120
Max. payload (incl. gripper)	[kg]	1	0.5
Weight (without power supply unit, ext. display)	[kg]	11	12
Dimensions (base)	[mm]	360 x 160	
Reach	[mm]	510	
Precision (WDH precision)	[mm]	1	1
Max. speed (TCP)	[m/s]	-0.1	-0.1

Dimensions [mm]

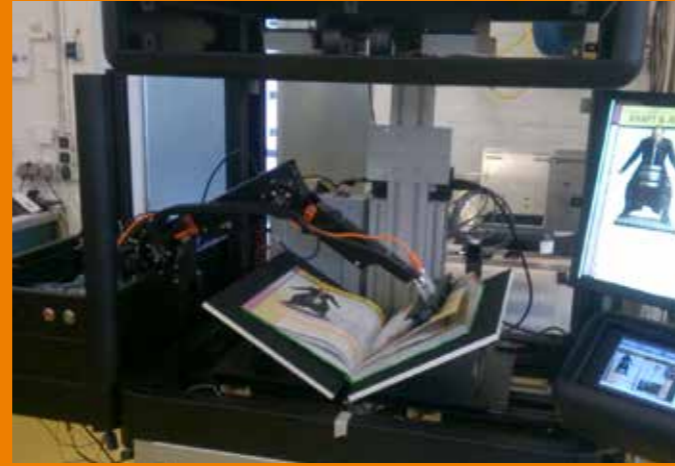
Part No.	L1	L2	L3	X1	X2	X3	X4
RL-DCi-4S	280	160	360	217.5	270	240	-
RL-DCi-5S	280	160	360	227.5	270	240	170

* DOF: degree of freedom

robolink® RL-D application examples



robolink® D for checking printed circuit boards (4Stars Engineering Systems GmbH)



Automatic book scanner with 2 DOF (EPS GmbH)



Camera-based control of a sensorless RL-D arm with 5 DOF (RoVi Robot Vision, TU Munich, LMT)



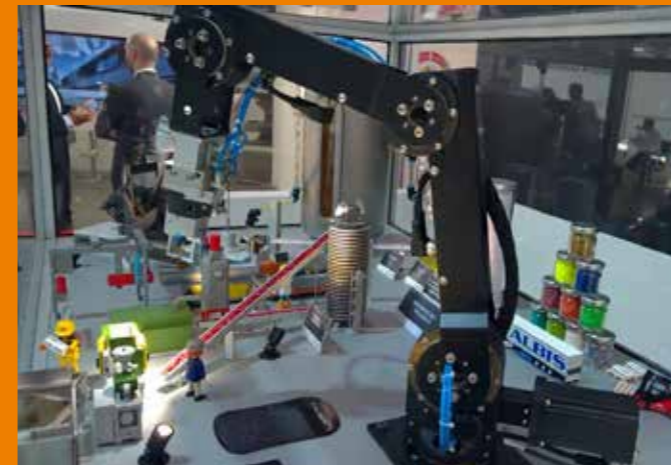
Injection-moulding process with automated handling thanks to robolink® D with 4 DOF (Dr. BOY GmbH & Co. KG)



robolink® D – Suction arm in a machine tool (igus®)



Storage and retrieval unit with two RL-D and drylin® linear guides (MATRIUM GmbH)



robolink® D with 4 DOF as manipulator in demo factory (ALBIS PLASTIC GmbH)



Measuring machine with RL-DQ-RBT-5532S and CPR control system for sorting good from bad parts (PROFACTOR GmbH)



Trade fair machine – 5 DOF robot arm with RL-D and RL-S joints. System simulates real use in the igus® factory (igus®)



Manual adjustment of a receiver unit for satellite signals



Trade fair machine RL-DQ-RBT-5532S-AC with 5 DOF and 3-finger gripper (igus®)



Winding machine prototype for BLDC motors with robolink® and drylin® components (Commonplace Robotics)

roboLink® joints and systems



Rotating joint
▶ from page 38



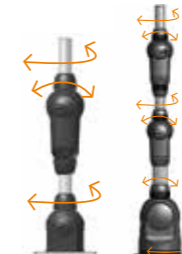
Pivoting joint
▶ from page 38



Base joint
▶ from page 38



2-axis joint
▶ from page 38



Infinite possibilities
▶ from page 39

roboLink® components



Angle sensors
▶ www.igus.eu/roboLink



2-jaw gripper
▶ www.igus.eu/roboLink



3-jaw gripper
▶ www.igus.eu/roboLink



Drive units
▶ www.igus.eu/roboLink



Complete 6 DOF unit
▶ from page 40

roboLink® accessories



Camera adapter
▶ www.igus.eu/roboLink



Drive wheel
▶ www.igus.eu/roboLink



Clamping tool
▶ www.igus.eu/roboLink



Wire end bottom and wires
▶ www.igus.eu/roboLink



Bowden cable
▶ www.igus.eu/roboLink



Connecting tubes
▶ www.igus.eu/roboLink



Flange shaft support
▶ www.igus.eu/roboLink

roboLink® software



roboLink® software
"open source"
▶ from page 44

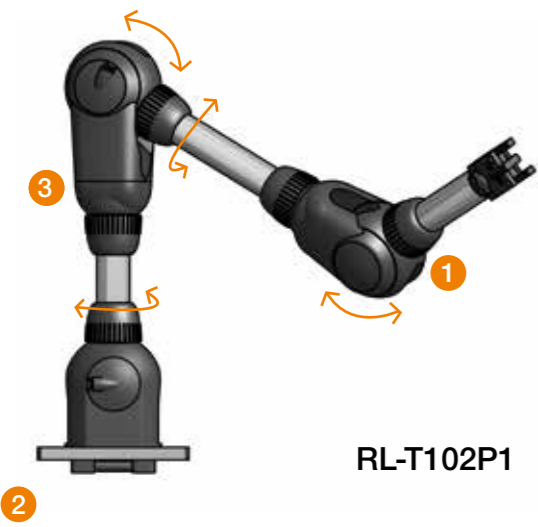
Components kit to make robotic systems

A couple of years ago, we established our objective to develop a modular system of mechanical components for the assembly of robotic systems. The first component in this system was a plastic link with tendon drive.

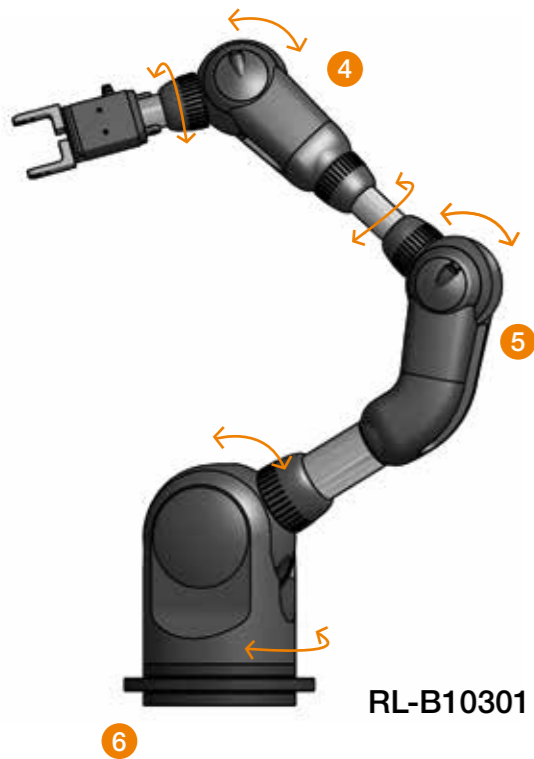
This element has the following special properties: lightweight, compact and unlimited. Universities and R&D organisations use these components to build customised systems.

The main components of the roboLink® W set are:

- Wire driven joints with 1 or 2 degrees of freedom (DOF)
- Electrical grippers
- Direct driven joints "roboLink® D"
- Open source software IME (igus® motion editor)
- The main components are made from plastics and produced by laser sintering (SLS), injection-moulded parts made from igus® tribo polymers are planned.



RL-T102P1



RL-B10301

Configuration example RL-T102P1

- 1 RL-50-PL1 – swivel joint (1 DOF)
- 2 RL-50-TL1 – rotating joint (1 DOF)
- 3 RL-50-002 – 2-axis joint (2 DOF)

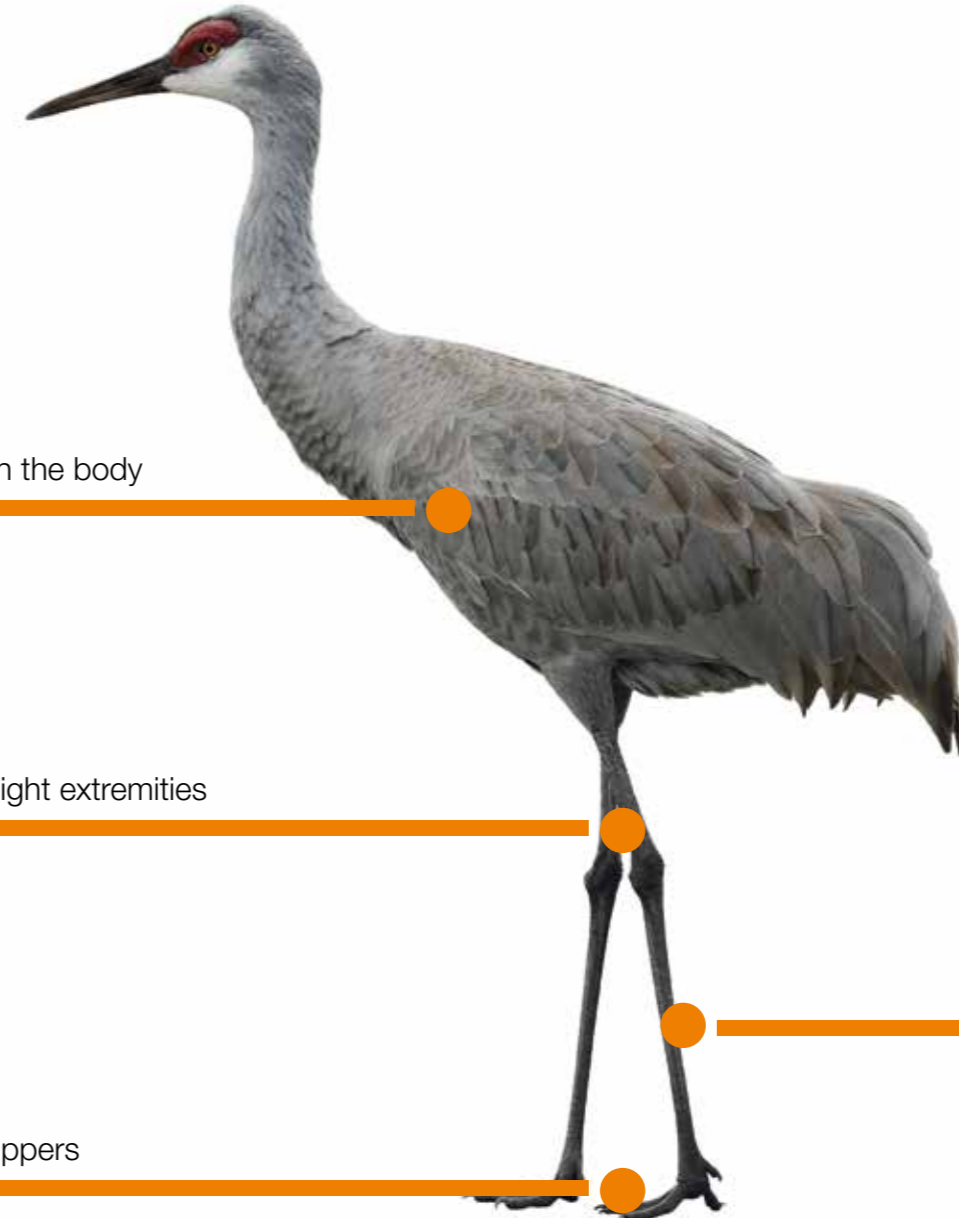
Configuration example RL-B10301

- 4 RL-50-001 – 2-axis joint (2 DOF)
- 5 RL-50-003 – 2-axis joint (2 DOF)
- 6 RL-90-BL1 – base joint (2 DOF)

Bionic model of a crane

roboLink® joints were patented in 2009 as a "bionic" concept (see pic. below, the crane). The basic RL-50-001 joint can pivot and rotate like a human elbow and is actuated by wires

(tendons). This means that the actuators can be placed away from the joint, resulting in a very lightweight arm (one joint with 2 DOF weighs just 350g).



Muscles in the body

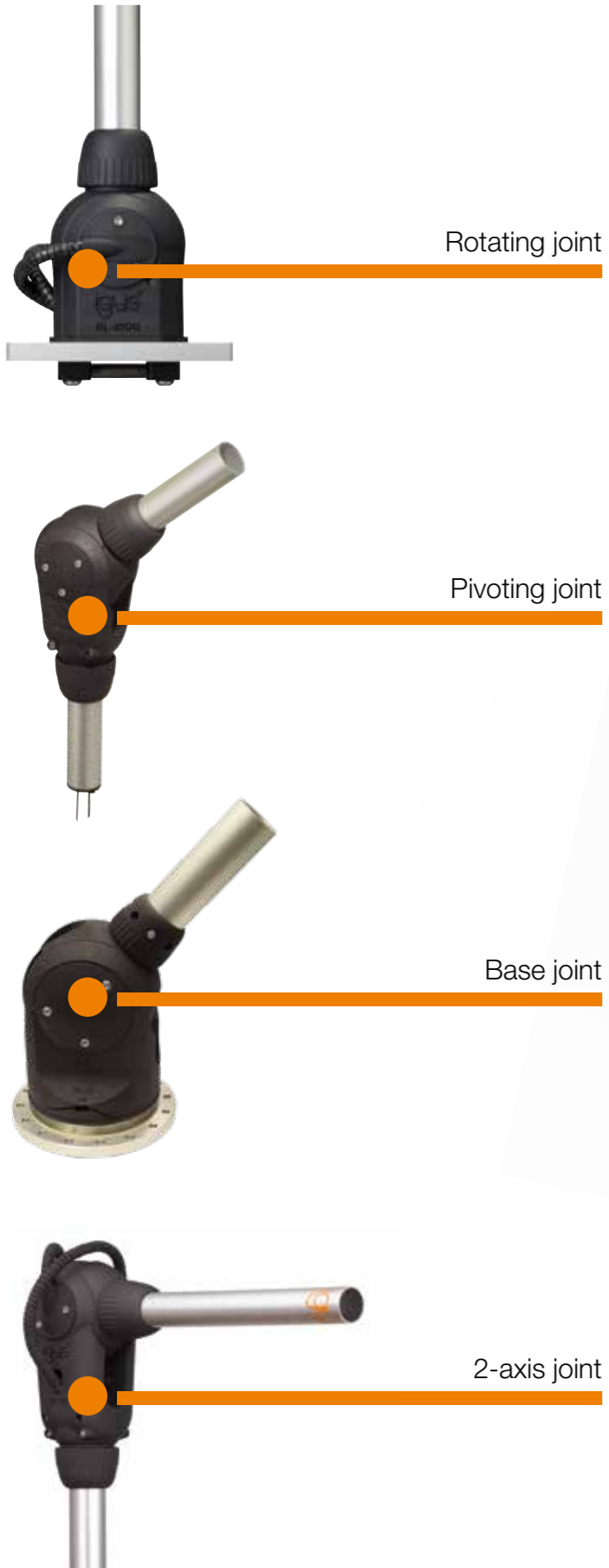
Thin and light extremities

Strong grippers


Tendons run through hollow bones

robolink® W | Joints

Different joints



Today, 7 different joint types are available. There are a large number of combination options. The pivoting range can be varied ($\pm 90^\circ$, $+130/-50^\circ$, $+180^\circ/0^\circ$) and there is a choice of rotating or pivoting joints. For higher load requirements a base joint RL-90-BL1 is available.

 **More information**
 ▶ www.igus.eu/robolink-joint

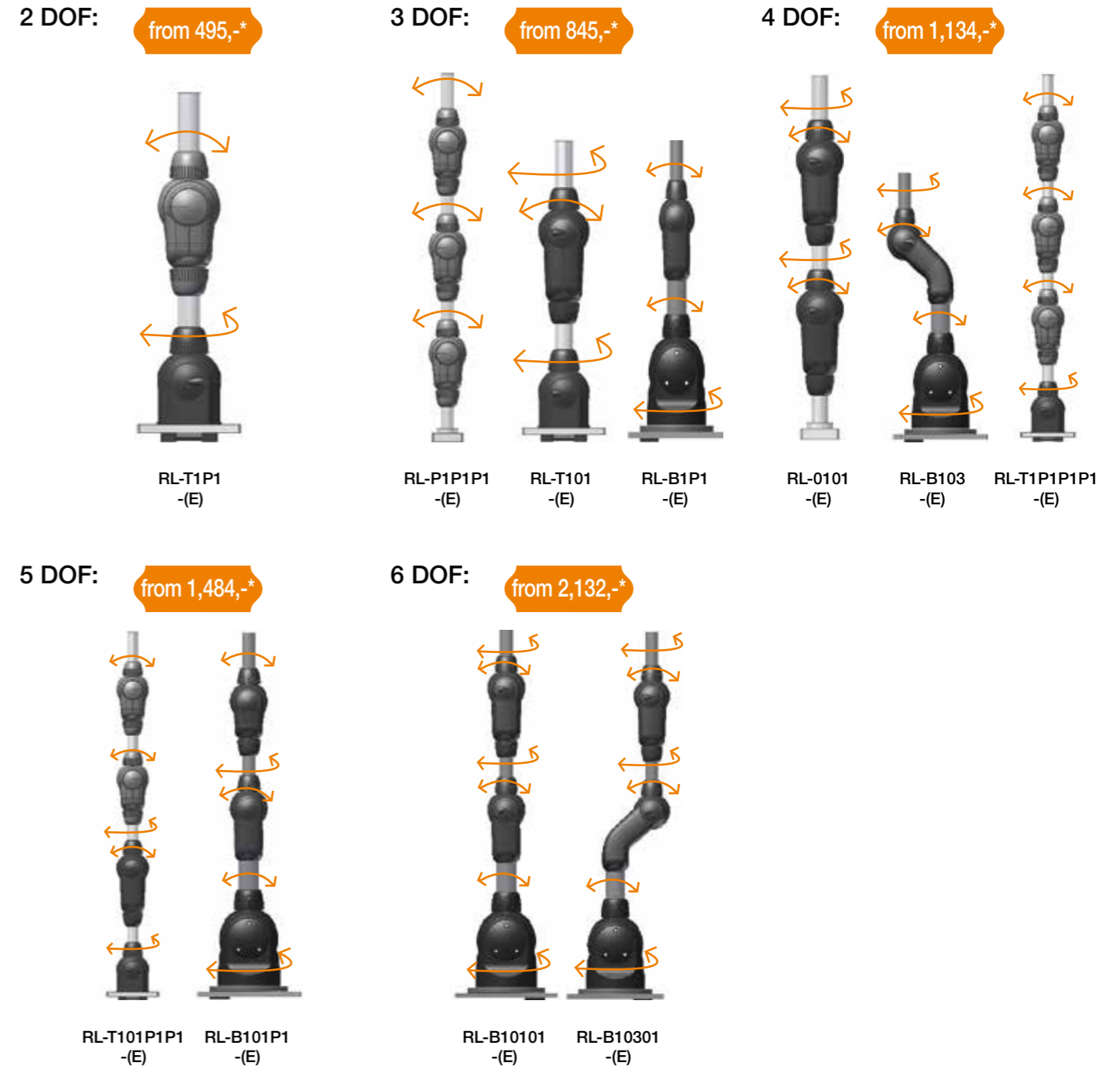


robolink® W | System examples

7 joint variants ... unlimited possibilities ... several possible combinations ...

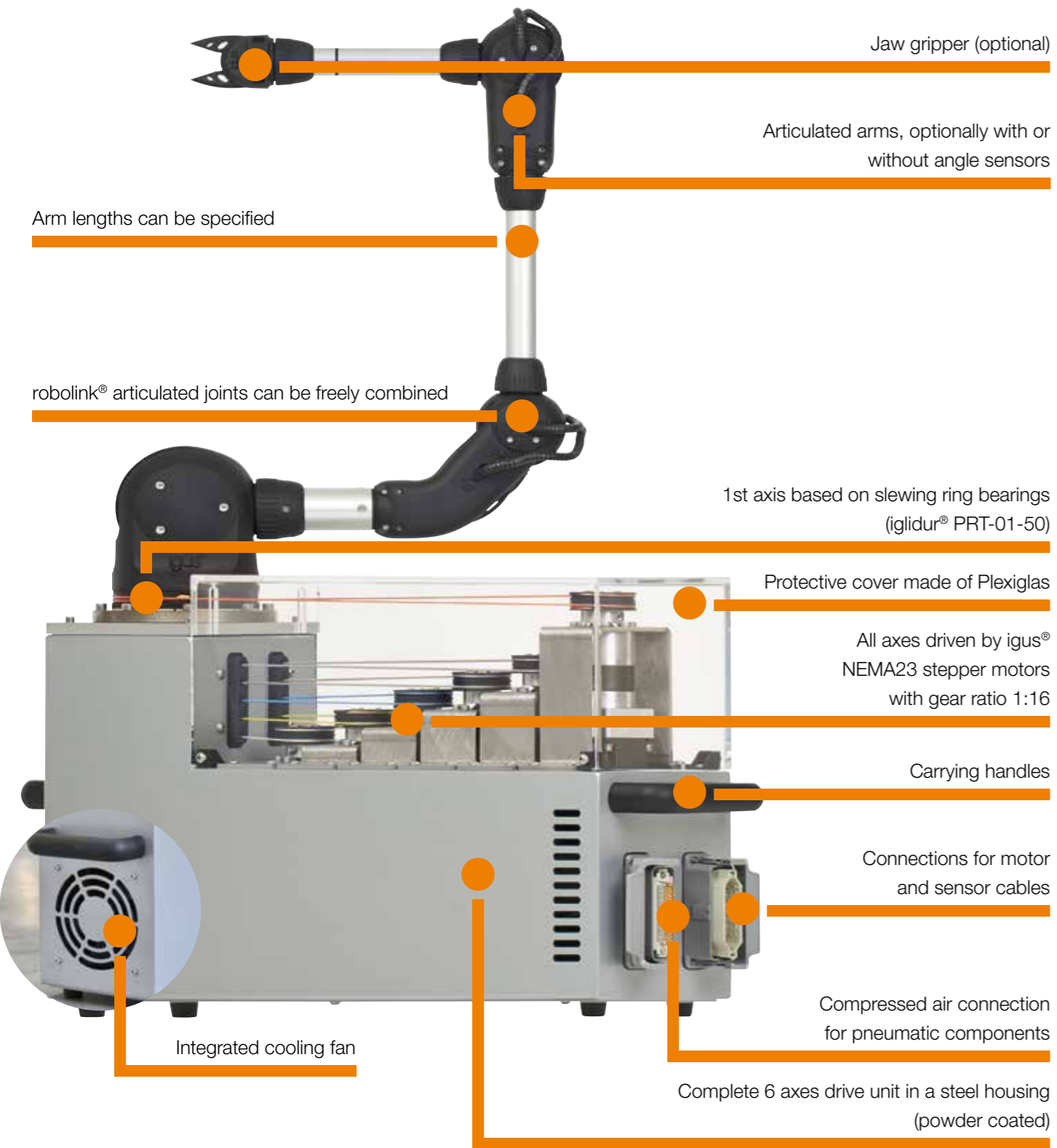
The plastic joints are linked by aluminium tubes, which can be made to specified lengths for every joint arm. In order to reduce weight further there are also options for carbon fibre or reinforced plastic tubes. The actuation wires are fed

through the arms. These are specially developed Bowden cables. This method enables flexibility within the design stage allowing from 1 DOF up to a maximum of 6 DOF.



* System price in EUR for 1 unit purchases, incl. aluminium tubes and wires (no sensors)
 DOF: degree of freedom

robolink® W | Drive units 6 DOF



Cables:
Motor and sensor cables available from stock

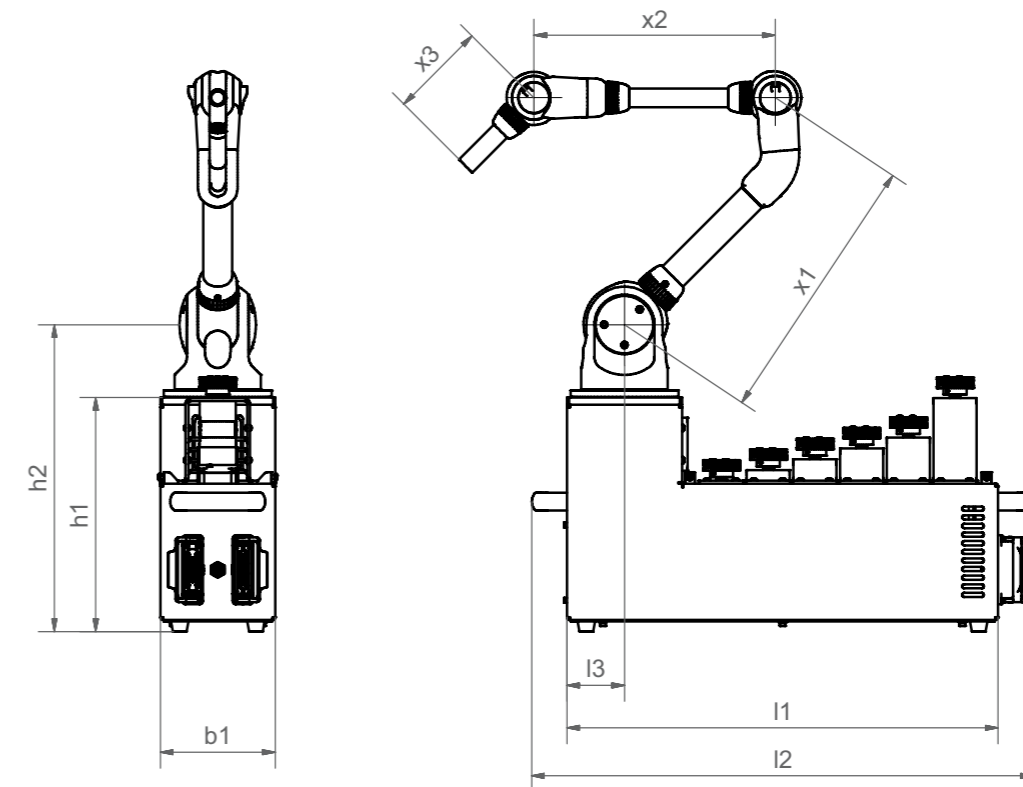
Connectors:
2 versions available: Socket/plug and socket/open



robolink® W | Drive units 6 DOF

Cables

	Motor cable Socket/connector	Motor cable Socket/open	Sensor cable Socket/connector	Sensor cable Socket/open
Part No.	RL-CB13-CAB-MOT-01	RL-CB13-CAB-MOT-02	RL-CB13-CAB-SENS-01	RL-CB13-CAB-SENS-02
Length	3 m	3 m	3 m	3 m
Cable type	igus® CF130.05.25.UL	igus® CF130.05.25.UL	igus® CF2.01.48	igus® CF2.01.48
Number of cables / cross section	25 x 0.5 mm ²	25 x 0.5 mm ²	48 x 0.15 mm ²	48 x 0.15 mm ²
Connector housing	Harting Han 16 A	Harting Han 16 A	Harting Han 16 A	Harting Han 16 A
Socket	Harting Han 25 D	Harting Han 25 D	D-Sub 50 pol	D-Sub 50 pol
Connectors	Harting Han 25 D	"open" side for individual connection	D-Sub 50 pol	"open" side for individual connection
Price in € / piece	130.31	101.50	202.37	170.91




Dimensions [mm]

Part No.	Specification	b1	h1	h2	l1	l2	l3	Standard arm lengths			1 pieces
								x1*	x2*	x3*	
RL-B10201-DU3623L	Without angular encoders	160	326	427	600	698	80	280	236	134	from 5,846.40
RL-B10201-E-DU3623L	With angular encoders	160	326	427	600	698	80	280	236	134	from 6,992.40

* Standard tube length = 100mm; other lengths available

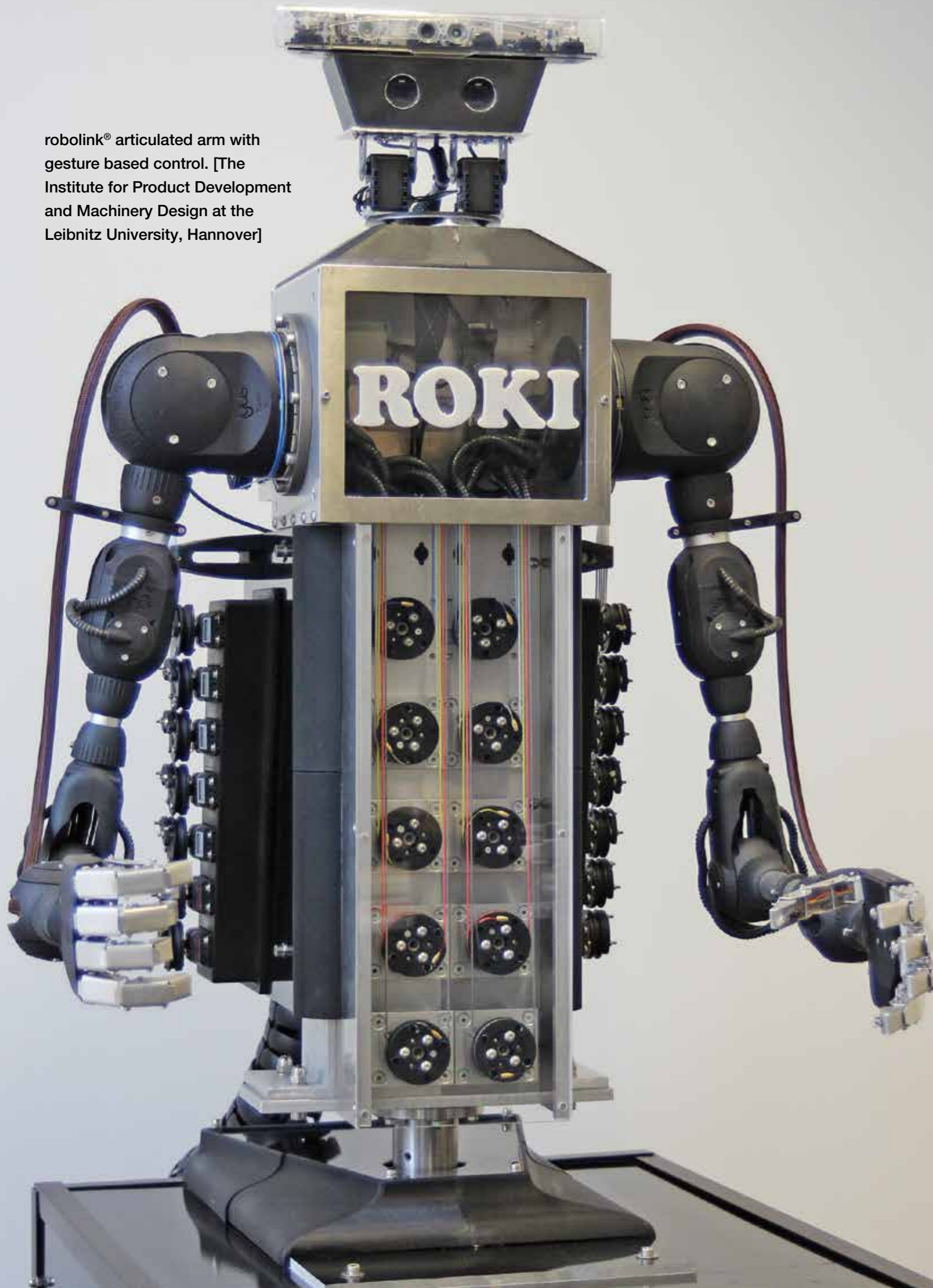
Prices [€]

 **Delivery time** Cables: from stock
complete drive unit: 5-10 days



roboLink® application examples

roboLink® articulated arm with gesture based control. [The Institute for Product Development and Machinery Design at the Leibnitz University, Hannover]



Manual workstation support system with human-machine interface for the production of the Manufacturing Technology Lab (LaFT) at Helmut-Schmidt University in Hamburg



Special design with 4 DOF, 3 joints in series (Fraunhofer IFF Magdeburg)



Submerged camera guidance, articulated arm with 4 DOF (igus®)



The Technical University at Wroclaw, Poland equipped its autonomous robot FLASH with 2 roboLink® articulated arms, each with 4 DOF.



"HOBBIT" service robotics project at TU Vienna. roboLink® articulated joints on autonomous systems. (Project partner Hella Automation, Austria)

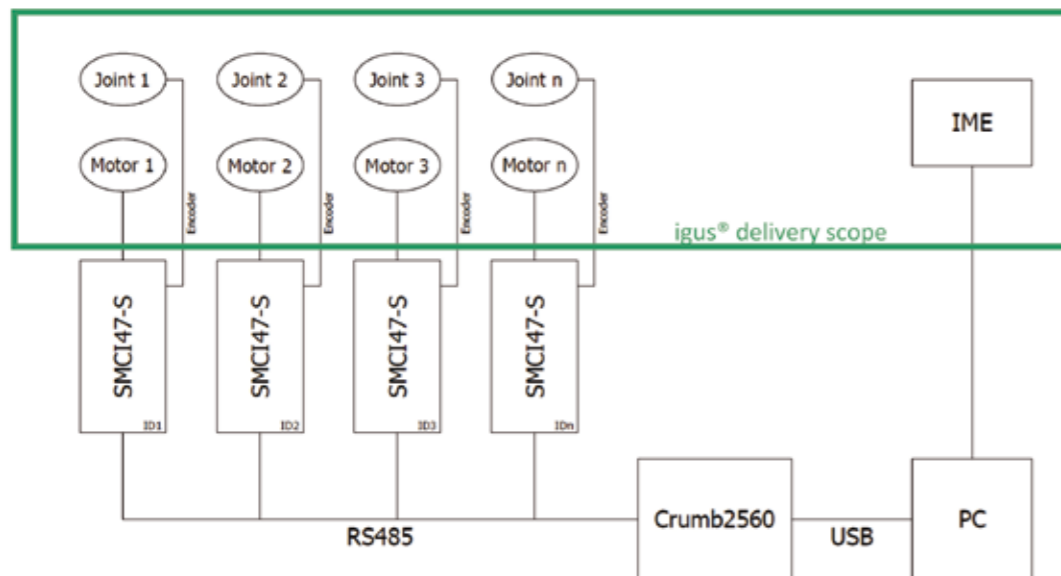
igus® uses its own control system for internal use. It consists of stepper motor controllers by Nanotec® and a Crumb 2560 ATmega Chip. The controllers make use of an RS485 bus which is transferred via USB by the Crumb chip (see picture below). For this hardware configuration, igus® offers an open source software named IME ("igus® motion editor"). The software has been developed by the University of Bonn, Institute for computer science. It is a stand-alone software for easy programming of roboLink® systems and can be configured for individual joint arms (1-6 DOF).



Open source software for the roboLink® modular system

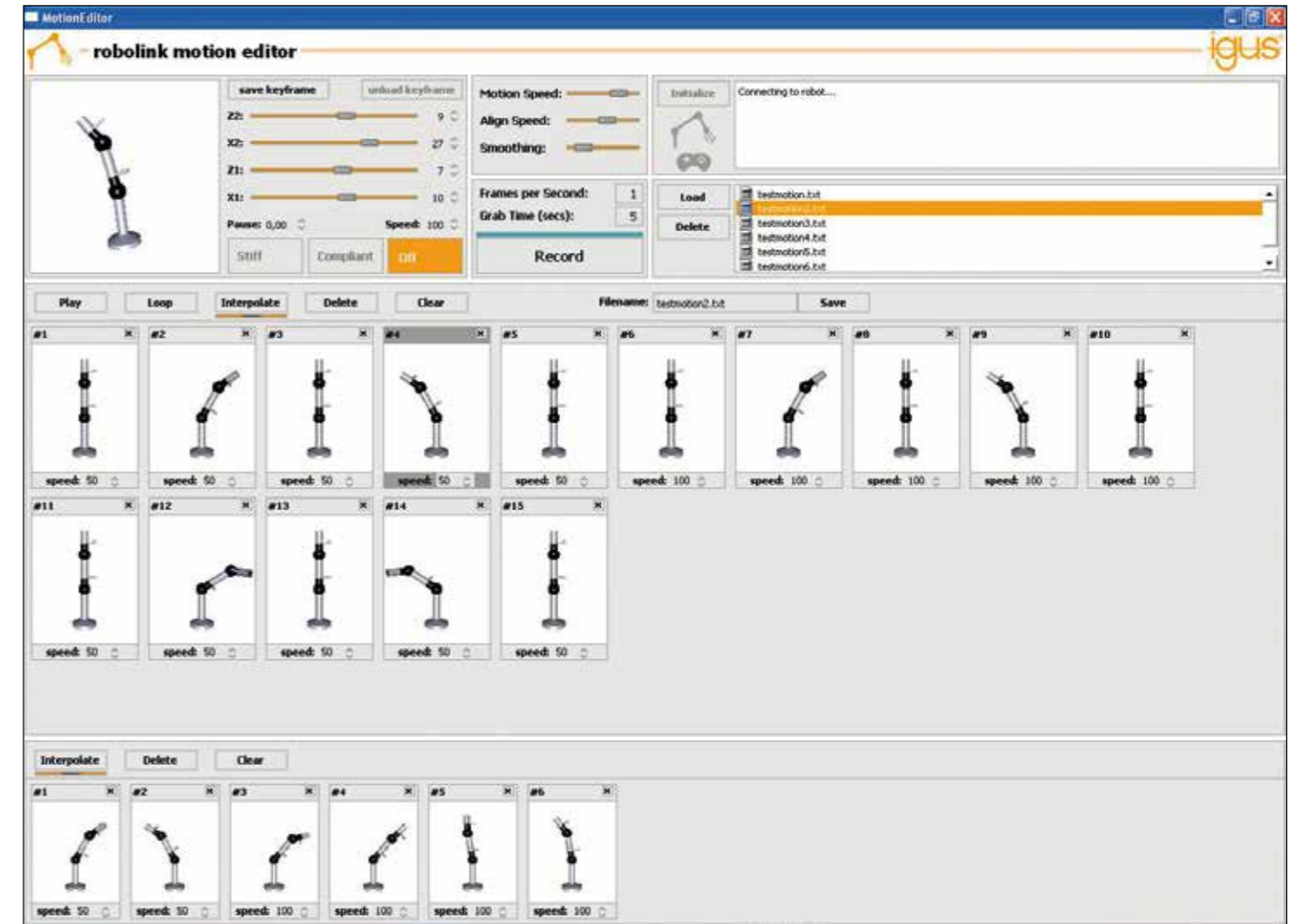
You can use our roboLink® modular kit to easily implement your individual ideas and concepts. No matter if you use 1, 2, 3, 4, 5 or 6 axes.

- Free of charge
- Intuitive programming
- For all versions of articulated arms, 1-6 DOF
- Simple control software



Hardware configuration:

Stepper motor control - NANOTEC SMC147-S2, memory-chip Crumb2560 ATmega USB module.



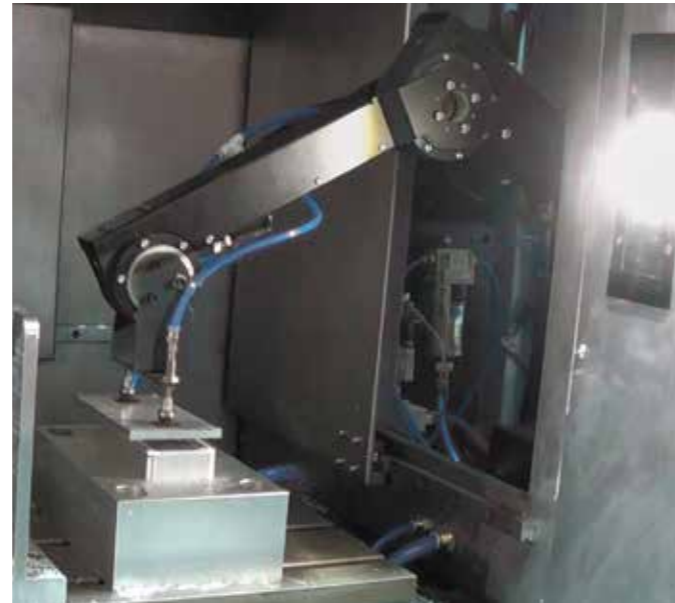
roboLink® software for programming articulated arms: IME (igus® motion editor)

A large number of options exist to control roboLink® articulated arms. For controlling of igus® stepper motors usually using stepper motor cards. Additionally a higher level control is required to coordinate the axes. igus® has developed a simple, intuitive control software, which allows the programming of articulated arms (1-6 DOF).

Simple control software: free of charge, open source

► www.igus.eu/roboLink-software

i More information about software also online in roboLink® blog
 ► www.igus.eu/roboLink/blog



Milling with a roboLink® DC

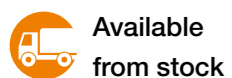
roboLink® DC (4 DOF*)

	Small versions		Large versions	
	With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight [kg]	12.1	10.9	21.4	20.2
Reach [mm]	510		620	
Payload [g]	1,000		3,000	
Precision [mm]	1		1	
Part No.	RL-D-RBT-3322-BC	...-AE	RL-D-RBT-5532-BC	...-AE
Prices	2,766,- €	2,548,- €	3,437,- €	3,195,- €

roboLink® DC (5 DOF*)

	Small versions		Large versions	
	With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight [kg]	13.2	11.7	22.4	21.0
Reach [mm]	680		790	
Payload [g]	500		2,500	
Precision [mm]	1		1	
Part No.	RL-D-RBT-3322S-BC	...-AE	RL-D-RBT-5532S-BC	...-AE
Prices	3,174,- €	2,932,- €	3,845,- €	3,579,- €

* DOF: degree of freedom
For more information see ► page 27–28



Electrical control included (Commonplace Robotics)
Software runs on external Windows PC.

roboLink® DCi-4 (4 DOF*)

	With output encoder
Weight [kg]	12.0
Reach [mm]	680
Payload [g]	1,000
Precision [mm]	1
Part No.	RL-D-RBT-3322S-BC
Prices	4,978,- €

roboLink® DCi-5 (5 DOF*)

	With output encoder
Weight [kg]	13.0
Reach [mm]	680
Payload [g]	500
Precision [mm]	1
Part No.	RL-D-RBT-3322S-BC
Prices	5,492,- €

* DOF: degree of freedom
For more information see ► page 34–35



igus®.eu/8pm

Orders can be placed until 8pm local time. Ordering and deliveries weekdays from 7am to 8pm, Saturday from 8am to 12pm.

No minimum order quantities, no surcharges.

Quick delivery.

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igus® is certified in accordance with ISO 9001:2016 and ISO/TS 16949:2016 in the field of energy supply systems, cables and harnessing, as well as plastic bearings.

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