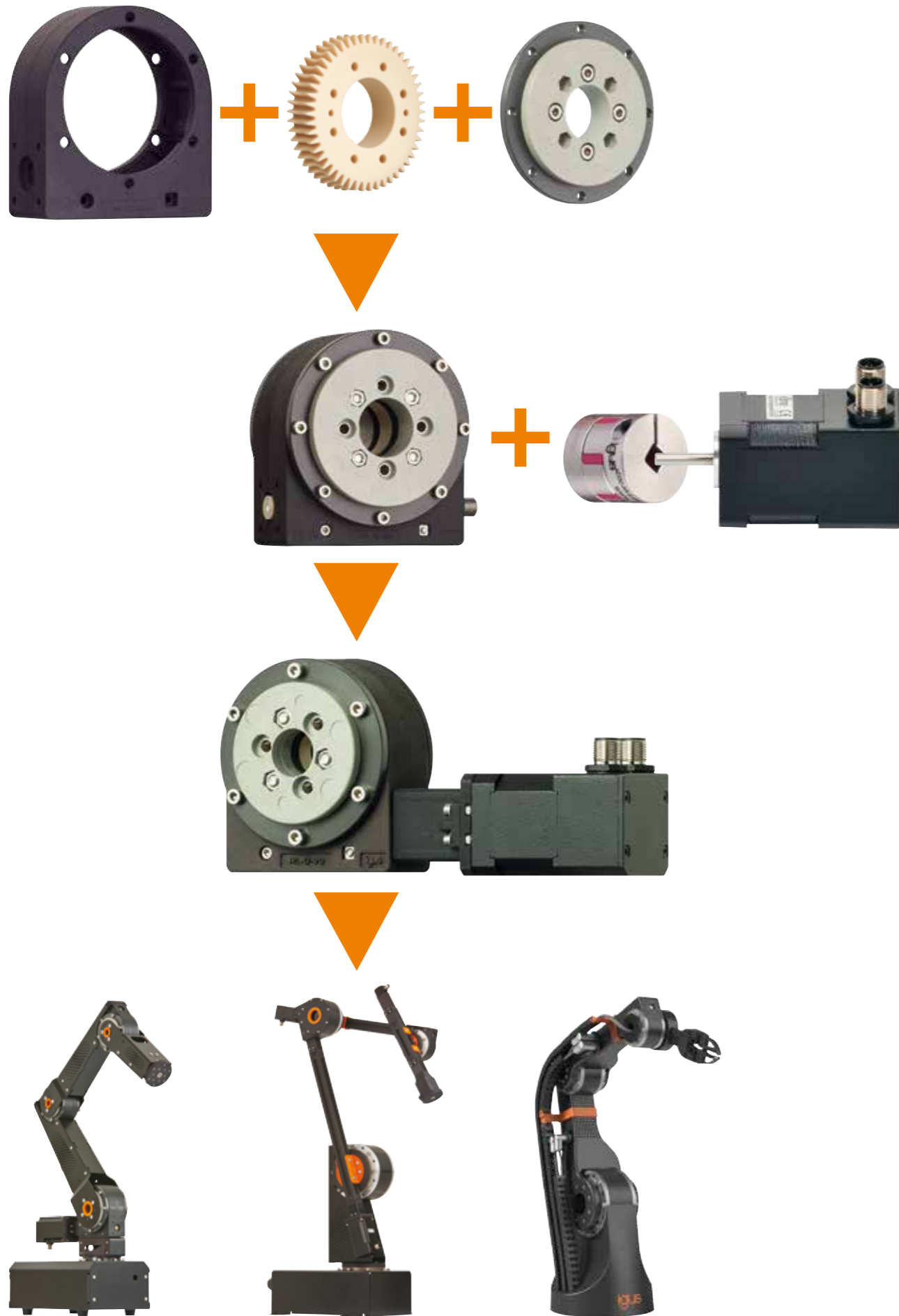


# robotlink<sup>®</sup>

robotlink.eu... Components for low-cost robots... 04.2017 ...



# 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.




Martin Raak  
Product manager roboLink®  
e-mail: mraak@igus.de  
Phone.: +49 2203 9649-409


 [blog.igus.eu/category/roboLink](http://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 pivot units
- Articulated arms with different kinematics, low-cost automation, pick & place, teaching, research, training

**igus® – plastics for longer life®**

 [www.igus.eu/roboLink](http://www.igus.eu/roboLink)  
Also visit our igus® website [www.igus.eu](http://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 22



Accessories

► Page 23

Electro-mechanical robot arms



roboLink® C arms

► Page 25



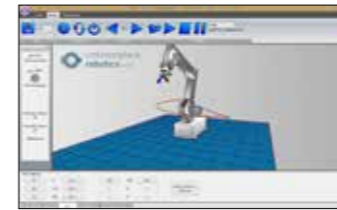
roboLink® Q arms

► Page 28



roboLink® online designer

► Page 31



CPR control

► Page 32

roboLink® W draw-wire technology



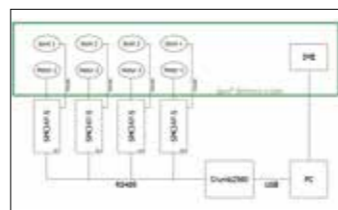
Rope drive for rotating joint

► Page 38



Complete 6 DOF unit

► Page 40



Open source

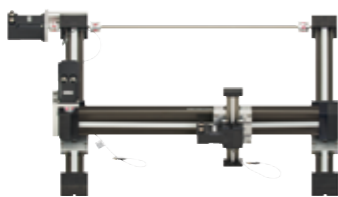
► Page 44



Software for programming articulated joints

► Page 45

Linear robots for predefined surfaces and spaces



Multi-axis modular drylin® linear robots

► [www.igus.eu/gantry](http://www.igus.eu/gantry)

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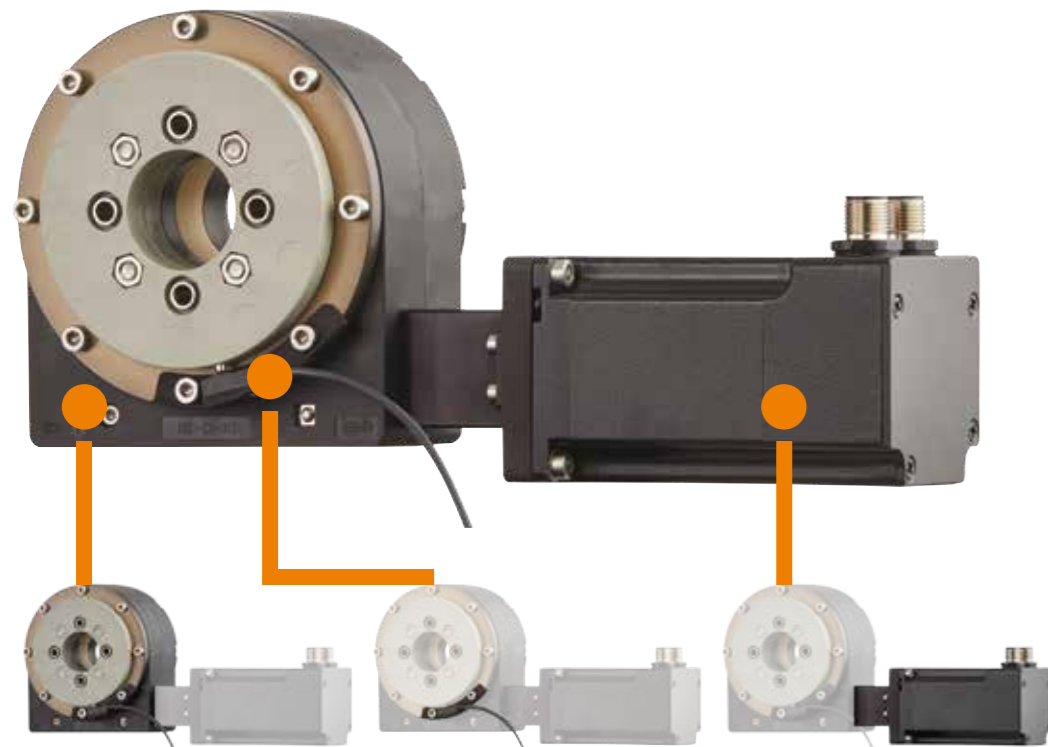
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# robolink® components

## 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

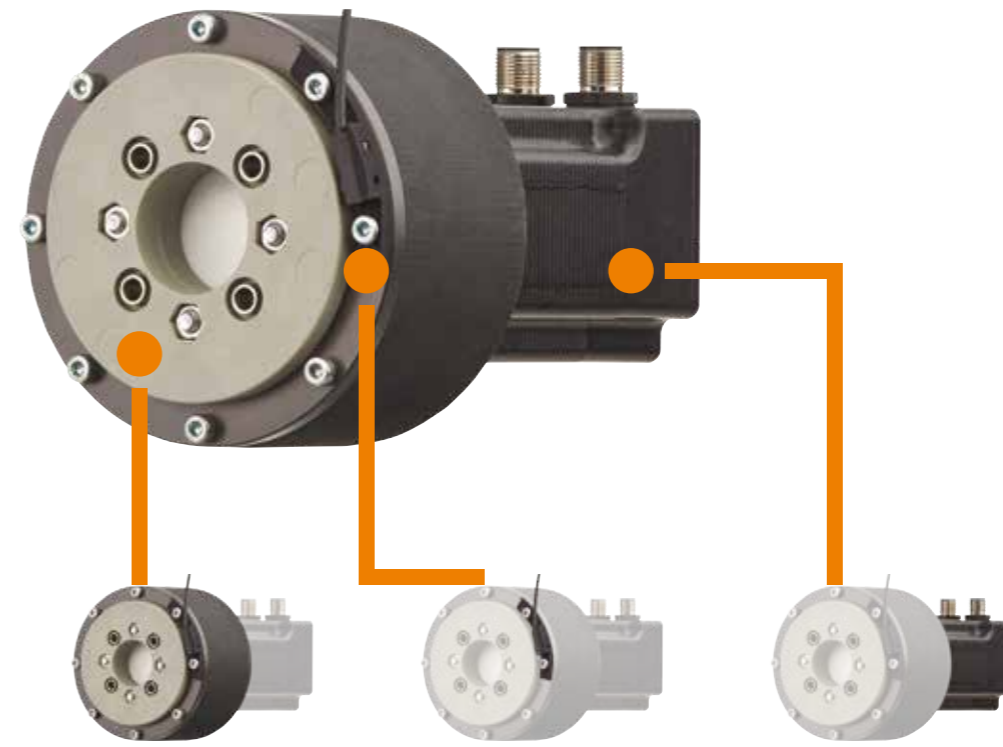
More combinations  
► From page 12

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

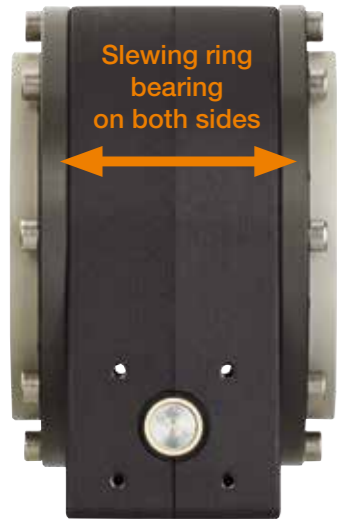
More combinations  
► From page 22

**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]
<b>RL-D-20-101-38-01000</b>	
roboLink®	
Type "D"	
Installation size	
Symmetric, 2 PRT	
Reduction gearing	
Options	

Versions:

Standard: -01000

FULL PLASTIC: -03011

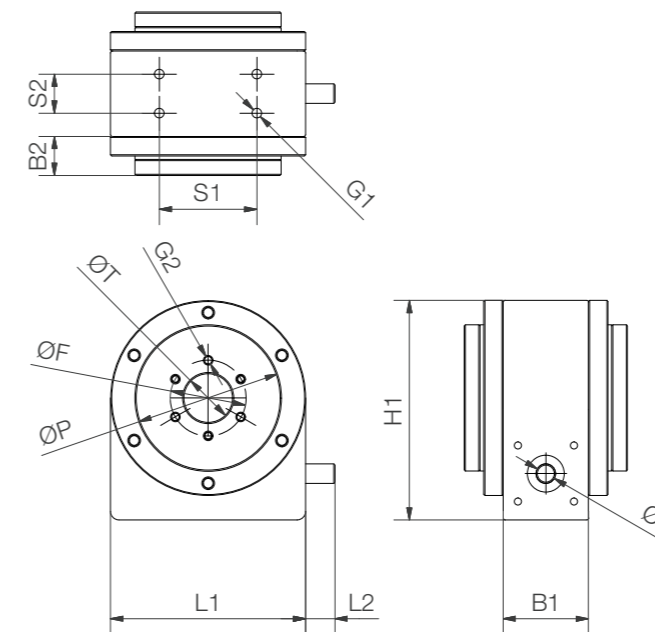
High end: -01033

## 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 (PRT02-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]	38 / 70	5 / 30 / 50 / 70	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	G1	G2	S1	S2	Prices [€]		
														1-9	10-24	25-49
<b>Size 20</b>																
RL-D-20-101-38-01000	20	8	60	31	80.5	12	35	10.5	90.5	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	M4	3 x M5	55	20	186.00	168.30	155.01
RL-D-20-101-38-01033	20	8	60	31	80.5	12	35	16	90.5	M4	6 x M4	80	30	327.00	295.81	272.45
<b>Size 30</b>																
RL-D-30-101-50-01000	30	10	80	42.5	100.5	12	45	12.5	110.5	M4	4 x M5	40	16	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	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	M4	8 x M4	80	30	345.00	312.45	287.78
<b>Size 50</b>																
RL-D-50-101-48-01000	50	15	120	60	150.5	13	60	13	170.5	M6	8 x M6	40	16	424.00	361.08	324.45
RL-D-50-101-48-03011	50	15	120	60	150.5	13	60	13	170.5	M6	8 x M6	55	20	390.00	332.19	298.49
RL-D-50-101-48-01033	50	15	120	65	150.5	13	60	21.5	170.5	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]
<b>RL-D-20-102-38-01004</b>	
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

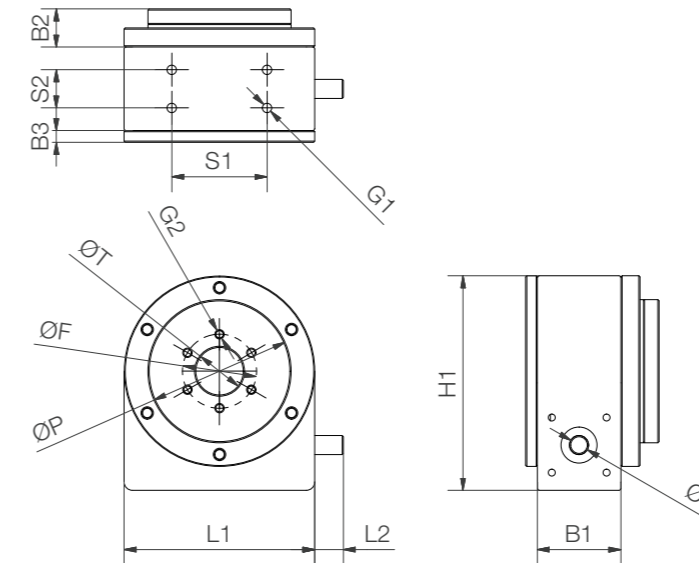
### Technical data

		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]	38 / 70	5 / 30 / 50 / 70	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



Delivery time  
2-3 days

# roboLink® D | Robot joint | PRT slewing ring bearings



### 3 versions

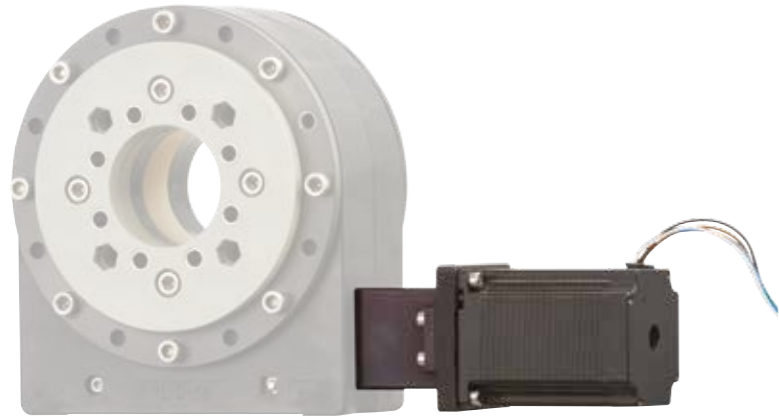
- **Standard (-01004):** 1 pc aluminium PRT (PRT-02-xx-AL), aluminium worm shaft (AL hard-anodised). Application e.g. in our low-cost robot arms as front joints (RL-D-20 and RL-D-30).
- **FULL PLASTIC (-03014):** 1 pcs low-cost PRT (PRT-02-xx-LC), worm shaft made from plastic RN33. Application e.g. for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

### Dimensions [mm]

Part No.	ØT	ØS	ØP	ØF	L1	L2	B1	B2	B3	H1	G1	G2	S1	S2	Prices [€]		
															1-9	10-24	25-49
															Quantity	Quantity	Quantity
<b>Size 20</b>																	
RL-D-20-102-38-01004	20	8	60	31	80.5	12	35	10.5	5	90.5	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	M4	3 x M5	55	20	167.00	151.47	139.51
RL-D-20-102-38-01035	20	8	60	31	80.5	12	35	16	5	90.5	M4	6 x M4	80	30	272.00	246.51	227.05
<b>Size 30</b>																	
RL-D-30-102-50-01004	30	10	80	42.5	100.5	12	45	12.5	6	110.5	M4	4 x M5	40	16	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	M4	4 x M5	55	20	193.00	174.88	161.07
RL-D-30-102-50-01035	30	10	80	42.5	100.5	12	45	19.5	6	110.5	M4	8 x M4	80	30	288.00	260.38	239.82
<b>Size 50</b>																	
RL-D-50-102-48-01004	50	15	120	60	150.5	13	60	13	6	170.5	M6	4 x M6	40	16	381.00	324.97	292.00
RL-D-50-102-48-03014	50	15	120	60	150.5	13	60	13	6	170.5	M6	4 x M6	55	20	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	M6	8 x M6	80	30	414.00	352.56	316.79

# 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](#)

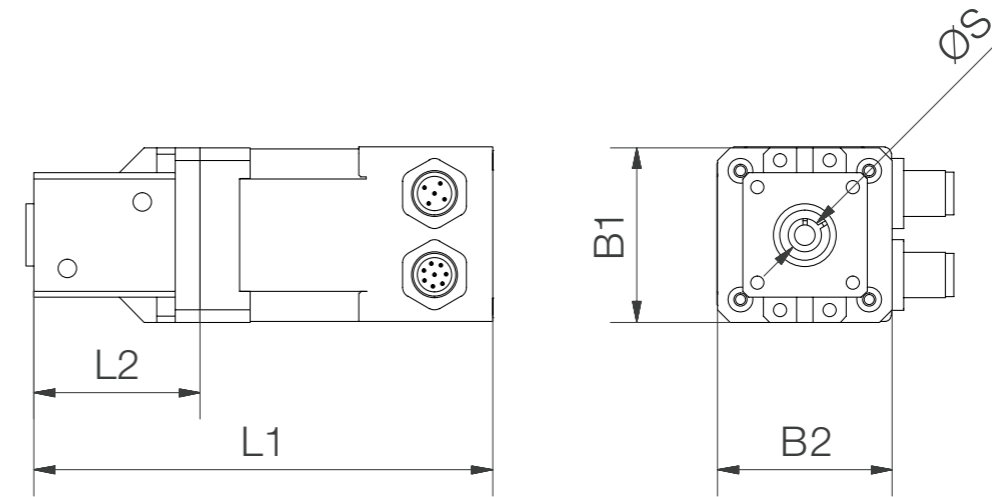
### Motor kit

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	1,1140	1,860	2,540	2,970	
Max. radial torque strength (short-term) [Nm]	5	6	12	21	38	
Max. radial torque strength (long-term) [Nm]	4	5	8	18	33	
Max. speed (at max. load) [rpm]	5	4	4	4	4	
Max. axial dynamic load (horizontal installation) [N]	> 500	> 700	> 700	> 1,200	> 1,200	

# robolink® D | Robot joint | Motor kit



### Dimensions [mm]

Part No.	ØS	L1	L2	B1	B2	Prices [€]		
						1-9 Quantity	10-24 Quantity	25-49 Quantity
<b>NEMA17</b>								
RL-D-20-MK-C-N17-00	8	99.4	40	42	42	93.90	81.31	72.71
RL-D-20-MK-C-N17-01	8	110.4	40	42	42	153.55	137.98	128.19
RL-D-20-MK-C-N17-02	8	110.4	40	42	42	241.55	221.58	210.02
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	81.31	72.71
RL-D-30-MK-C-N17-01	10	110.4	40	42	42	153.55	137.98	128.19
RL-D-30-MK-C-N17-02	10	110.4	40	42	42	241.55	221.58	210.20
RL-D-30-MK-C-N17-NM	10	–	40	42	42	56.55	45.83	37.97
<b>NEMA23</b>								
RL-D-30-MK-C-N23-00	10	118	42	56.4	56.4	159.58	141.58	131.22
RL-D-30-MK-C-N23-01	10	140	42	56.4	56.4	207.76	187.35	176.03
RL-D-30-MK-C-N23-02	10	140	42	56.4	56.4	294.36	269.62	256.57
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	141.58	131.22
RL-D-50-MK-C-N23-01	15	146	48	60	60	207.76	187.35	176.03
RL-D-50-MK-C-N23-02	15	146	48	60	60	294.36	269.62	256.57
RL-D-50-MK-C-N23-NM	15	–	48	60	60	89.78	72.72	60.28
<b>NEMA23XL</b>								
RL-D-50-MK-C-N23XL-00	15	136.5	48	60	60	186.12	166.79	155.90
RL-D-50-MK-C-N23XL-01	15	158.5	48	60	60	274.12	250.40	237.75
RL-D-50-MK-C-N23XL-02	15	158.5	48	60	60	376.95	348.08	333.38
RL-D-50-MK-C-N23XL-NM	15	–	48	60	60	89.78	72.72	60.28

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

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:

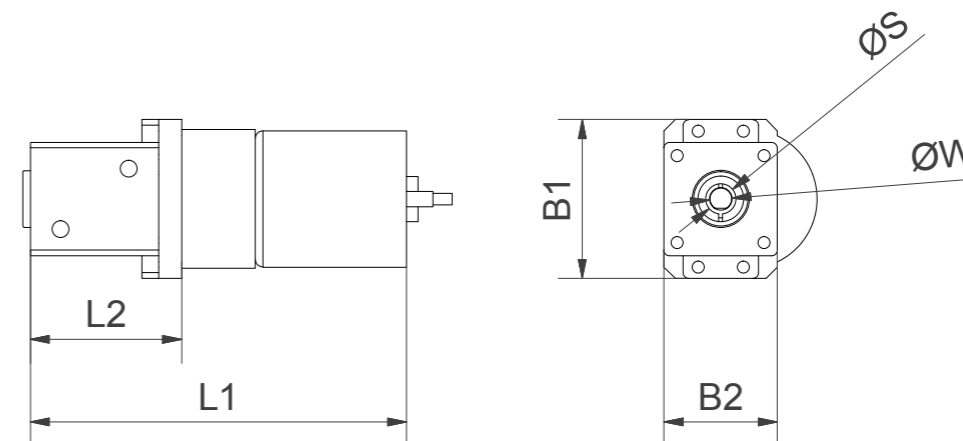
RL-D-20-MK-C-DCxx-04  
 RL-D-30-MK-C-DCxx-04  
 RL-D-50-MK-C-DCxx-04

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
<b>Size 20</b>						
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
<b>Size 30</b>						
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
<b>Size 50</b>						
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

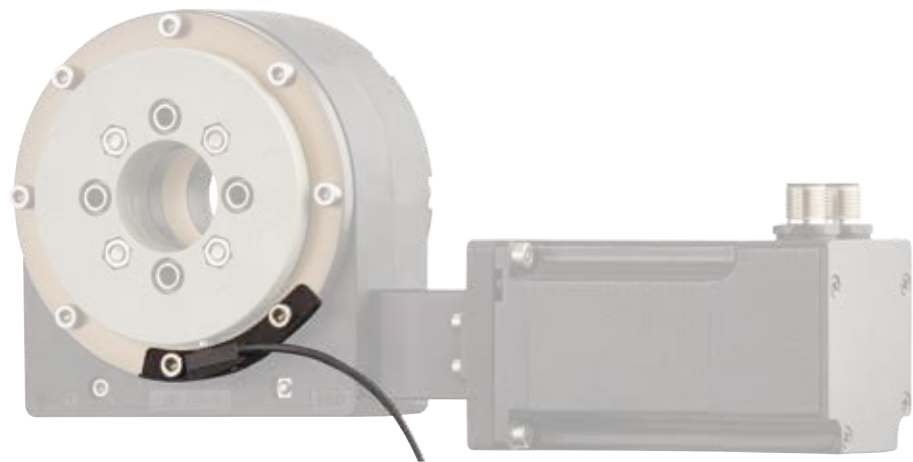
Assembly costs motor kit	1-9 Piece	10-24 Piece	25-49 Piece
	[€]	[€]	[€]
RL-D-MONT-MOT-01	34.80	28.30	18.55

 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	100 mA

## INI-Kit – Prices [€]

Part No.	1-9 Piece [€]	10-24 Piece [€]	25-49 Piece [€]
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
<b>Assembly costs INI kit</b>			
RL-D-MONT-INI-01	18.50	15.50	13.90



**Selection:**  
Initiator kit, drive encoder or output encoder



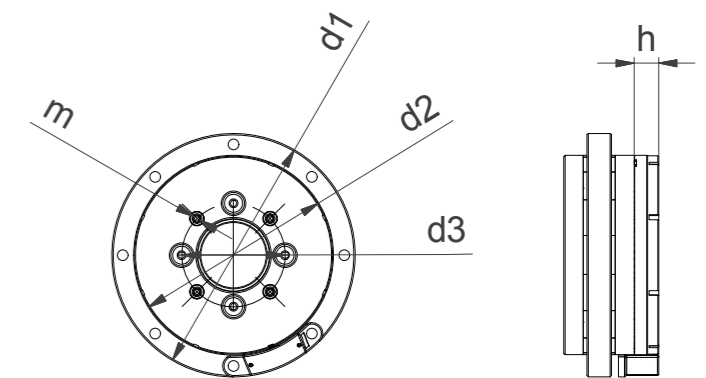
**Delivery time**  
2-3 days

# 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 Quantity	from 10 Quantity
RL-D-20-EK-01	80	60	31	3 x M4	10	47	PRT-01	142.00	On request
RL-D-20-EK-02	80	60	31	3 x M4	10	47	PRT-02	142.00	On request
RL-D-30-EK-01	80	60	31	3 x M4	10	63	PRT-01	154.00	On request
RL-D-30-EK-02	80	60	31	3 x M4	10	63	PRT-02	154.00	On request
RL-D-50-EK-01	150	120	65	4 x M6	10	94	PRT-01	182.00	On request
RL-D-50-EK-02	150	120	65	4 x M6	10	94	PRT-02	182.00	On request

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



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

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

**Advantages of strain wave gears:**

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

**Typical application areas:**

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

# robolink® S | Strain wave gear

## Size



RL-S-17-...



RL-S-20-...



RL-S-30-...

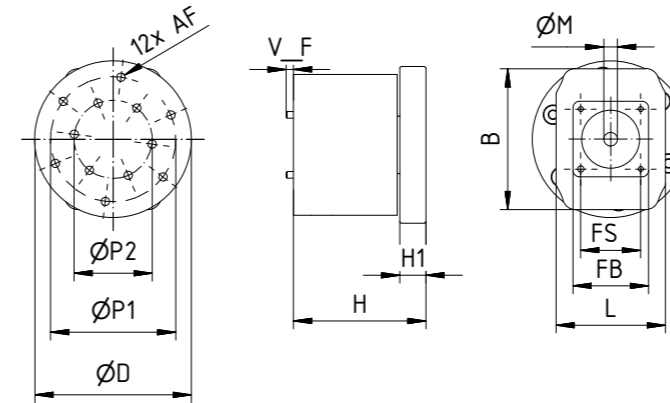
### General properties

- 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
- Light and compact

### Technical data – Standard Version

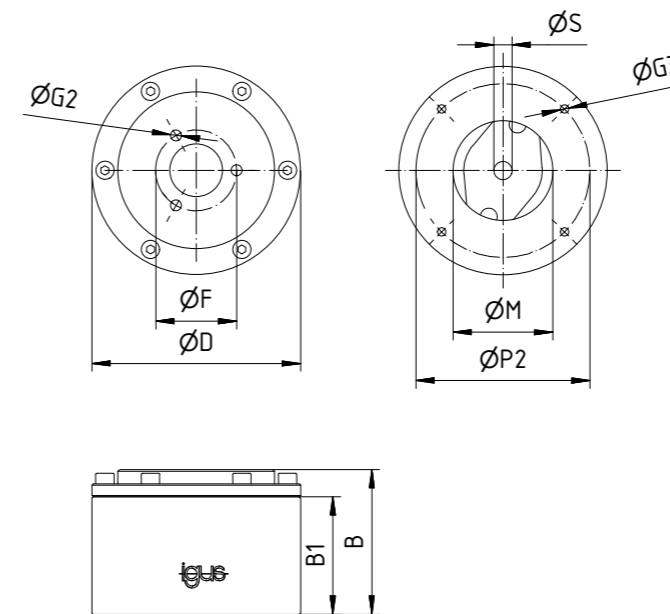
Part No.	Weight [g]	Reduction gearing	Efficiency	Moment of breakage at the output		Max. output torque	
				(static) [Nm]	(long-term) [Nm]	(short-term) [Nm]	
RL-S-17-N11-00-28-020K0	100	28:1	> 0.2	26	0.5	0.75	
RL-S-17-N17-00-28-020K0	100	28:1	> 0.25	50	1.5	3.0	
RL-S-20-N23-00-38-12000	290	38:1	> 0.3	50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

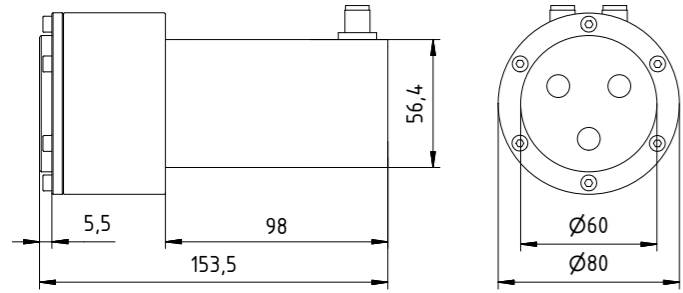
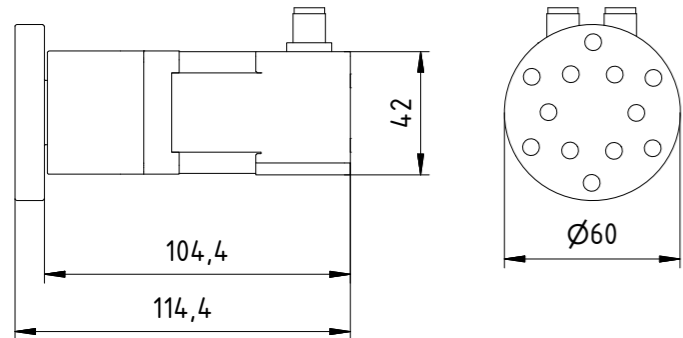
Part No.	ØD	ØP1	ØP2	AF	V_F	H	ØM	FS	FB	L	B	H1	Prices [€]
RL-S-17-N11-00-28-020K0	60	48	30	M4x8	M2.5x2.75	50.75	5	23	29	42	54	10	108.00
RL-S-17-N17-00-28-020K0	60	48	30	M4x8	M3x5.4	44	5	31	42	42	42	10	108.00



### 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	4xM5	31	66.67	6.35 mm (1/4")	172.00
0-RL-S-30-N23-00-38-02000	100	66.5	38	54	12.5	M5 x 15.5	4xM5	42.5	66.67	6.35 mm (1/4")	upon request

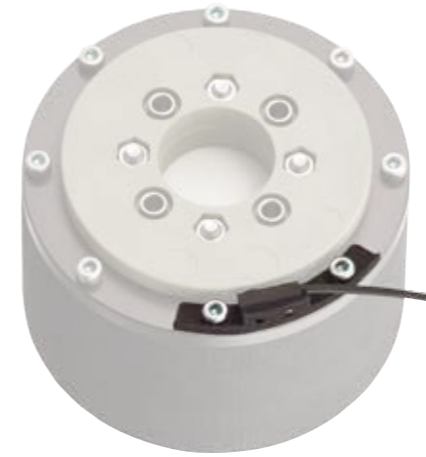
# roboLink® S | Strain wave gear with motor



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	411.46
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	327.88

# 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

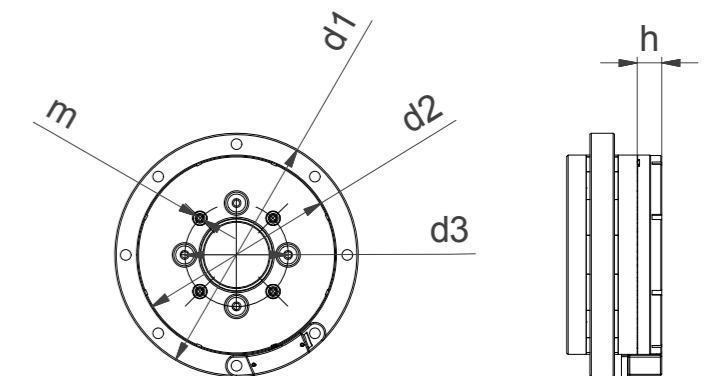
### INI kit

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 Piece	10-24 Piece	25-49 Piece
RL-S-17-IK-01	38.00	34.20	32.30
RL-S-20-IK-01	41.00	36.90	34.85
<b>Assembly costs INI kit</b>			
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 Piece [€]	10-24 Piece [€]	25-49 Piece [€]
RL-D-MONT-INI-01	18.50	15.50	13.90

Standard joints (from stock)



**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,- €

Special solutions (upon request)



**roboLink® P – arm**  
Individual arms as  
attractive plastic robot  
arms for roboLink® D

Other connecting technologies upon request

DOF: Degree of freedom

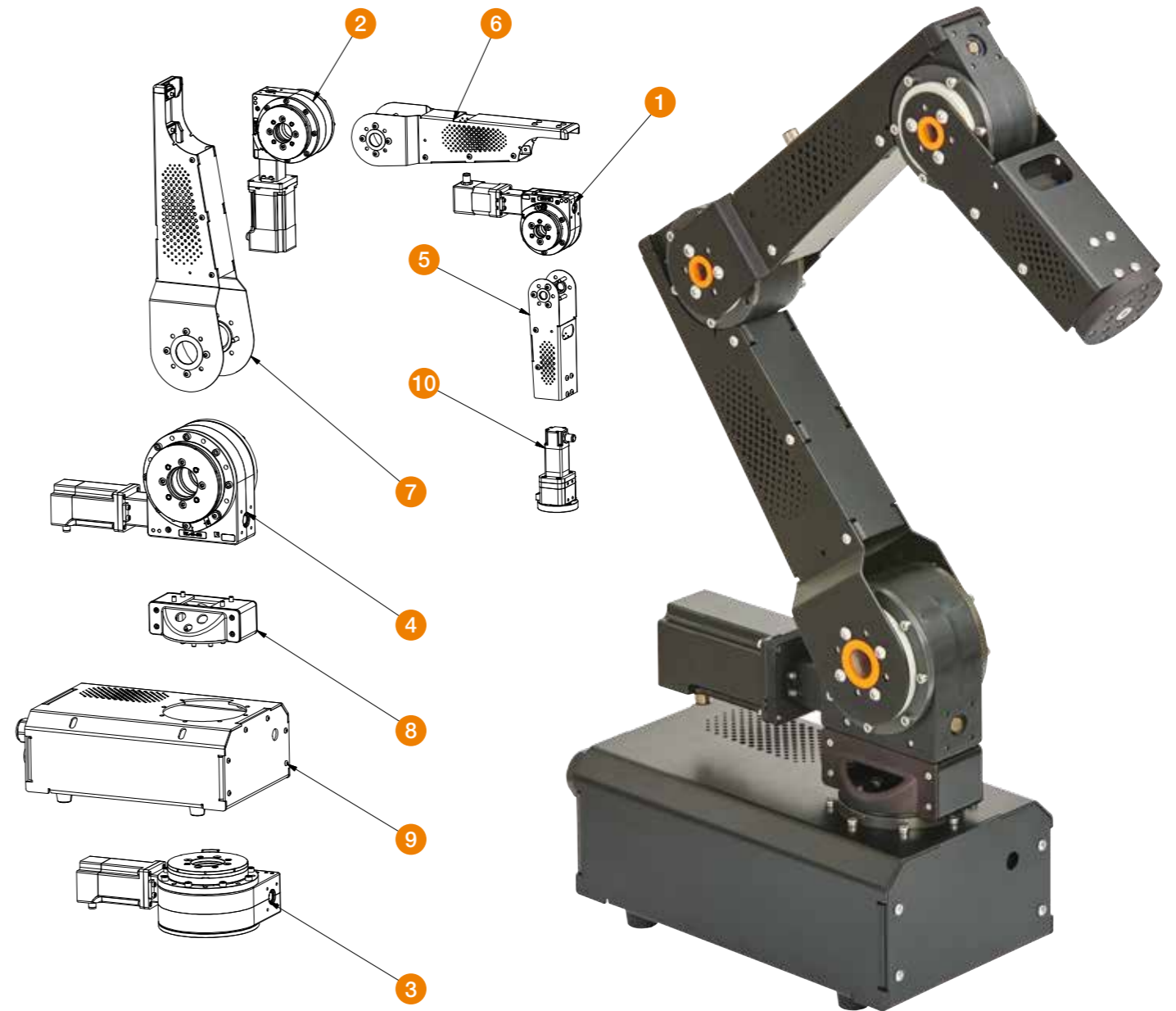


Image exemplary

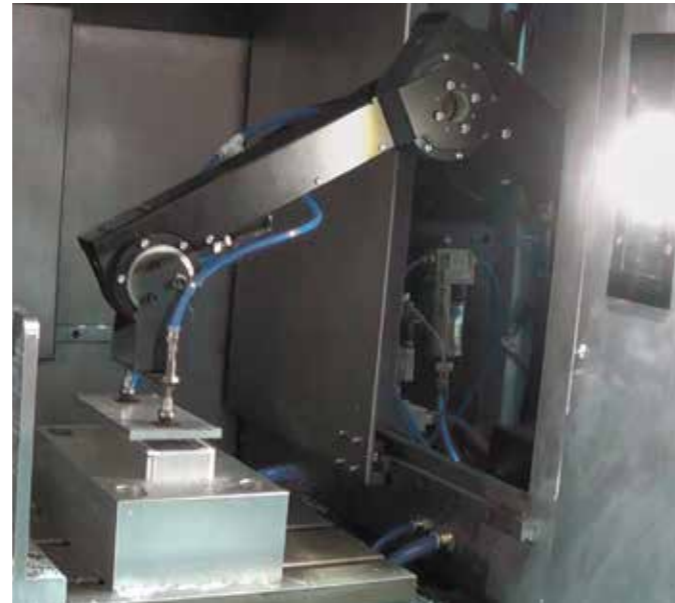
**Configuration example**

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

# roboLink® | RL-DC standard configuration



New design 2017!



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**

roboLink®	Type	Robot arm	Joint configuration 30-30-20-20	Joint configuration 50-50-30-20	5th axis with RL-S-17 strain wave gear	Version designation	Output encoder
-----------	------	-----------	---------------------------------	---------------------------------	--	---------------------	----------------

5 m 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

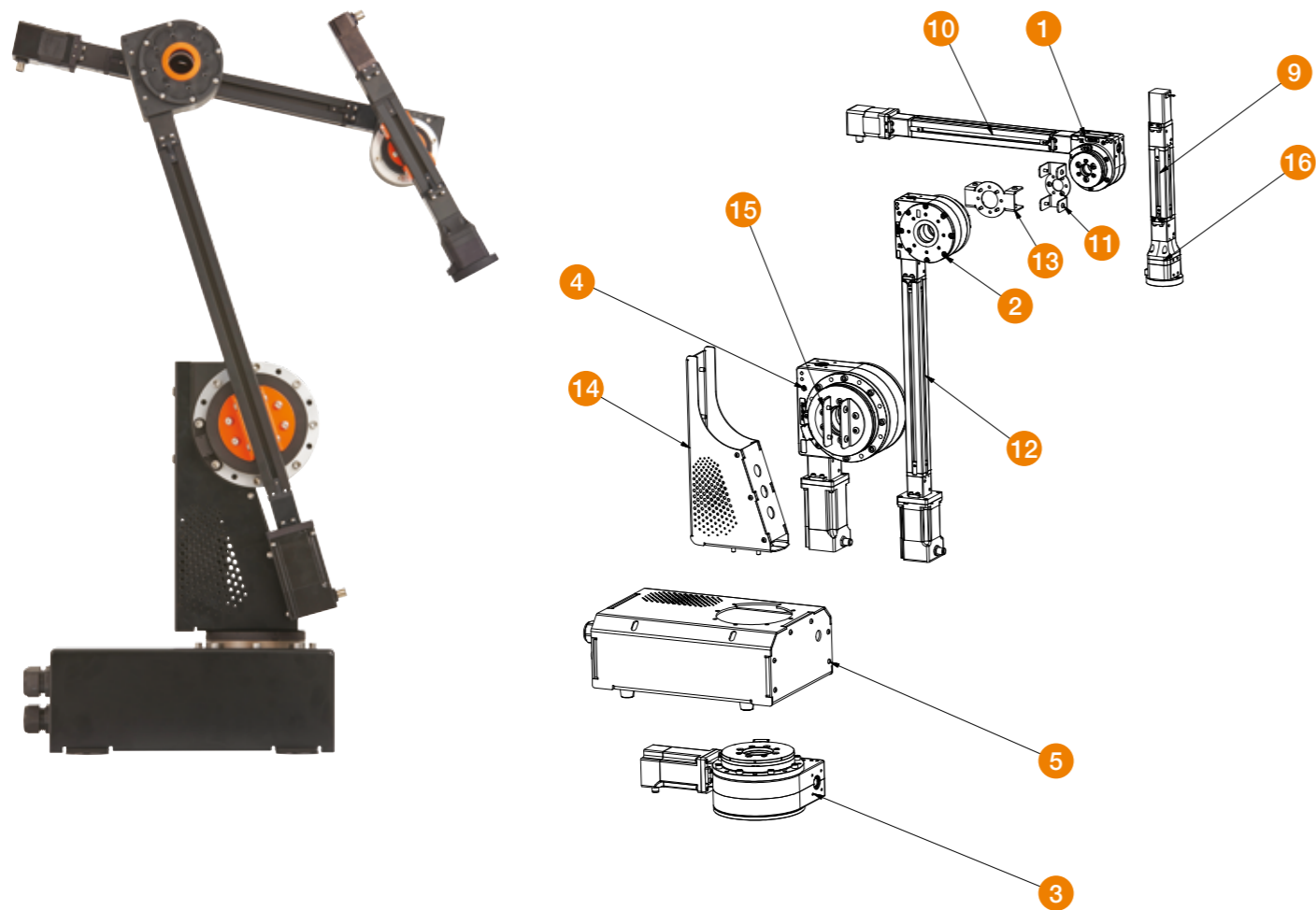
► From page 18

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 on 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

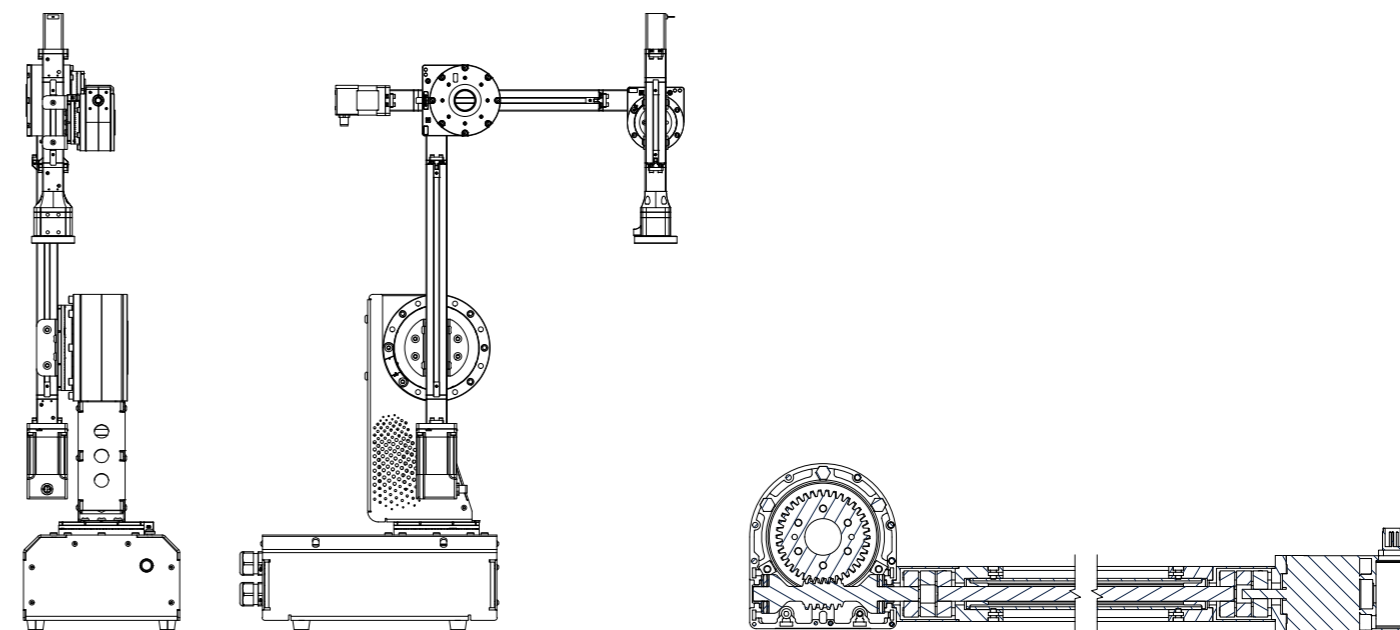
## Configuration example

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 connection 370 mm
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	Connecting part Base-50	15	Connecting part 50-P30
9	Profile connection 160 mm	16	RL-S-17
10	Profile connection 300 mm		

Available on 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 on 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



More Information about roboLink® D modular system

► From page 6

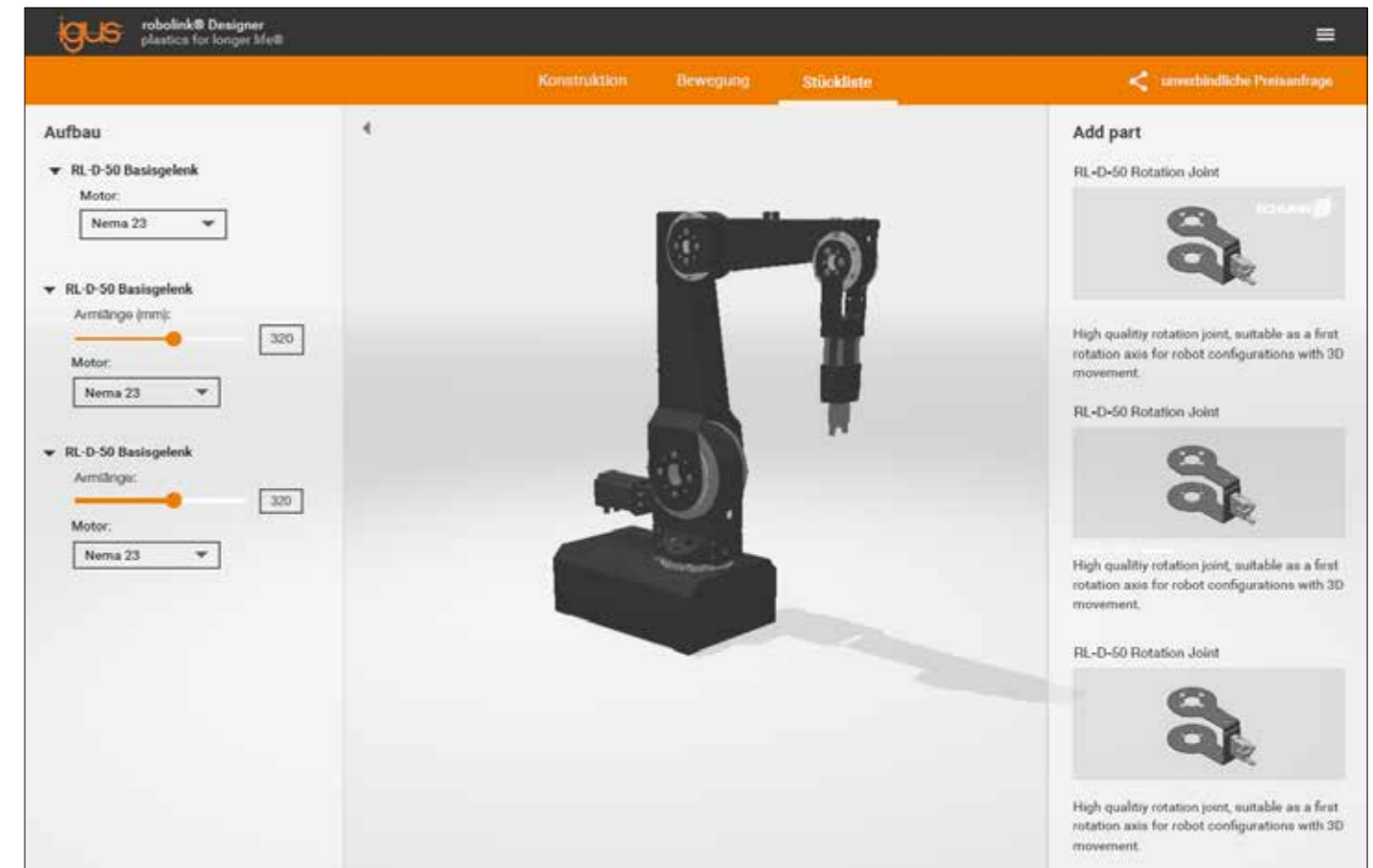
Information about the new roboLink® strain wave gears

► From page 18

Part No.	Designation	Prices [€]
RL-DQ-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 on 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.

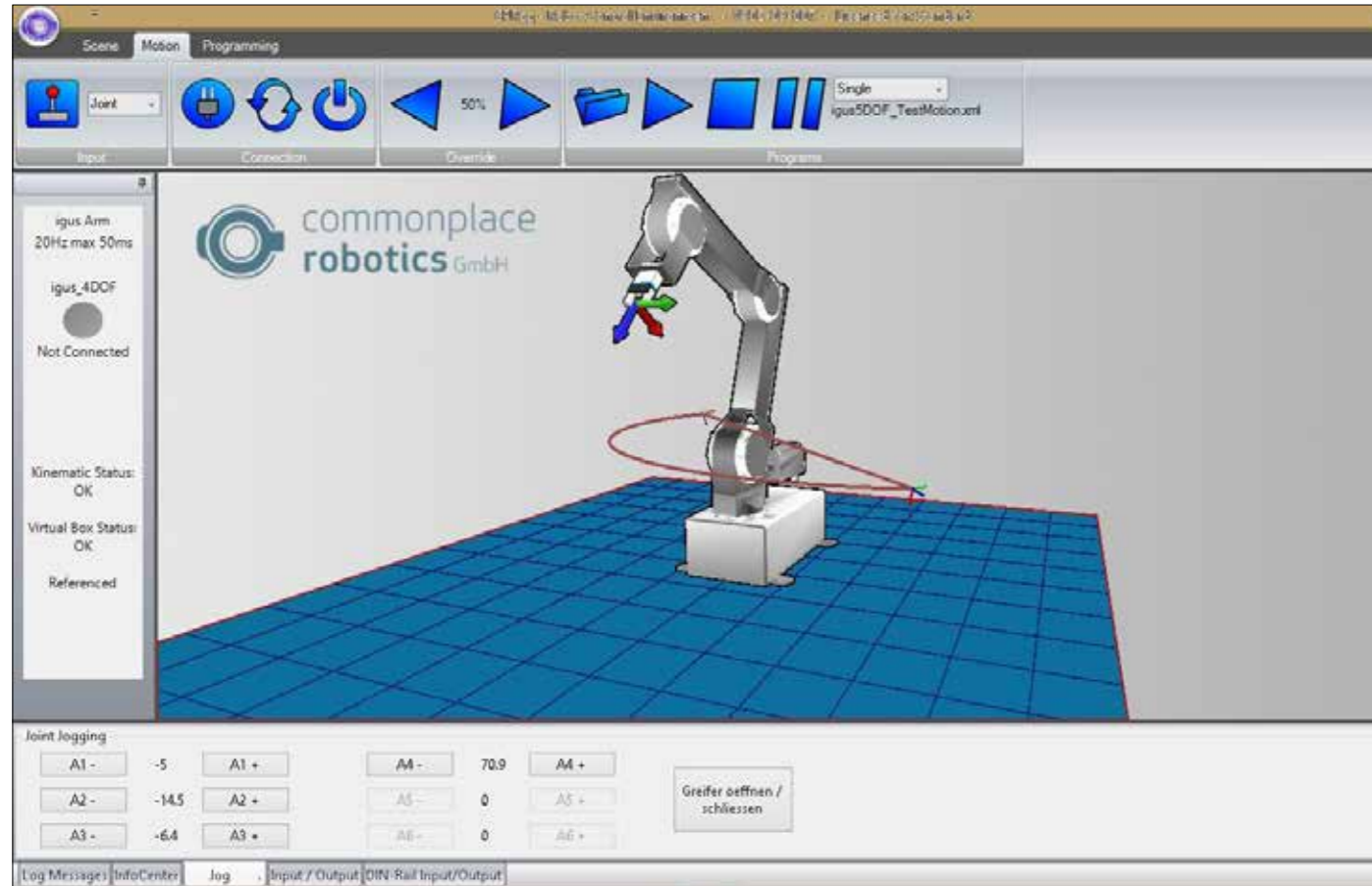
- Select roboLink® components step by step, and in this way individually configure the robotic arm from the first axis up to the tool
- Adaptation to work space thanks to individual selection of arm length
- Simulate movements by rotating individual joints
- Output of the parts list
- Direct request option
- Also suitable for iPad



[www.igus.eu/roboLink-designer](http://www.igus.eu/roboLink-designer)



**robolink® | Control**  
**robolink® software for programming articulated joints**



- 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



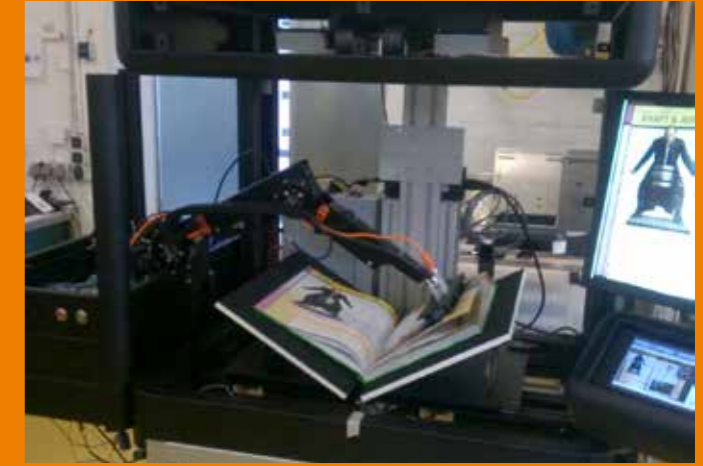
Scope of supply: control system, CPRog software, 24 V power, USB-CAN adapter, connecting cable  
 Also needed: Windows PC, power supply unit, gripper, safety-relevant components

**Special possibilities for a Cartesian control system of robolink® articulated arms**  
 BECKHOFF: controller CX5130, stepper controller, EL7047

**robolink® RL-D application examples**



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



Automatic book scanner with 2 DOF (EPS GmbH)



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



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



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



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

roboLink® joints and systems



Rotating joint  
▶ From page 38



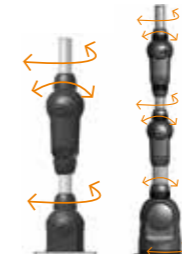
Pivoting joint  
▶ From page 38



Base joint  
▶ From page 38



2-axis joint  
▶ From page 38



Infinite possibilities  
▶ From page 39

roboLink® components



Angle sensors  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



2-jaw gripper  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



3-jaw gripper  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Drive units  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Complete 6 DOF unit  
▶ From page 40

roboLink® accessories



Camera adapter  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Drive wheel  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Clamping tool  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Wire end bottom and wires  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Bowden cable  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)



Connecting tubes  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)

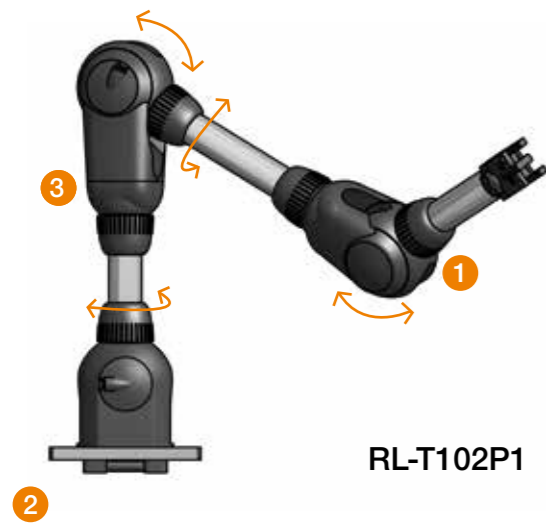


Flange shaft support  
▶ [www.igus.eu/roboLink](http://www.igus.eu/roboLink)

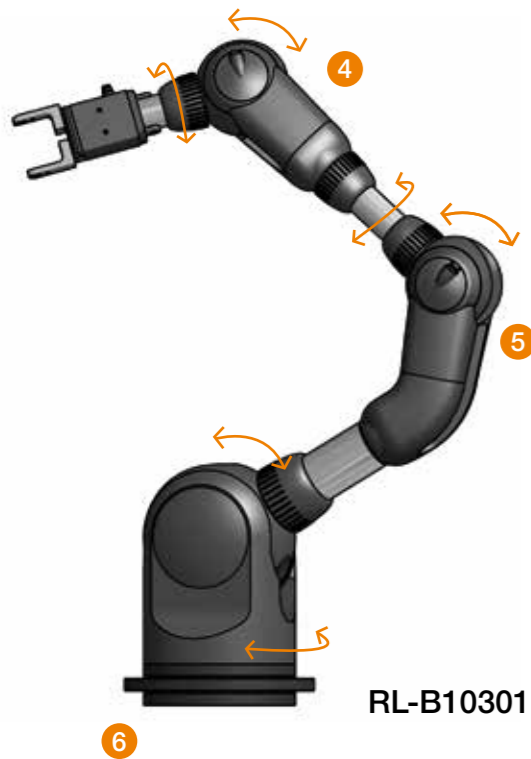
roboLink® software



roboLink® software  
"open source"  
▶ From page 44



RL-T102P1



RL-B10301

## Components kit to make robotic systems

A couple of years ago, we established our objective to develop a modular kit 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.

### 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)

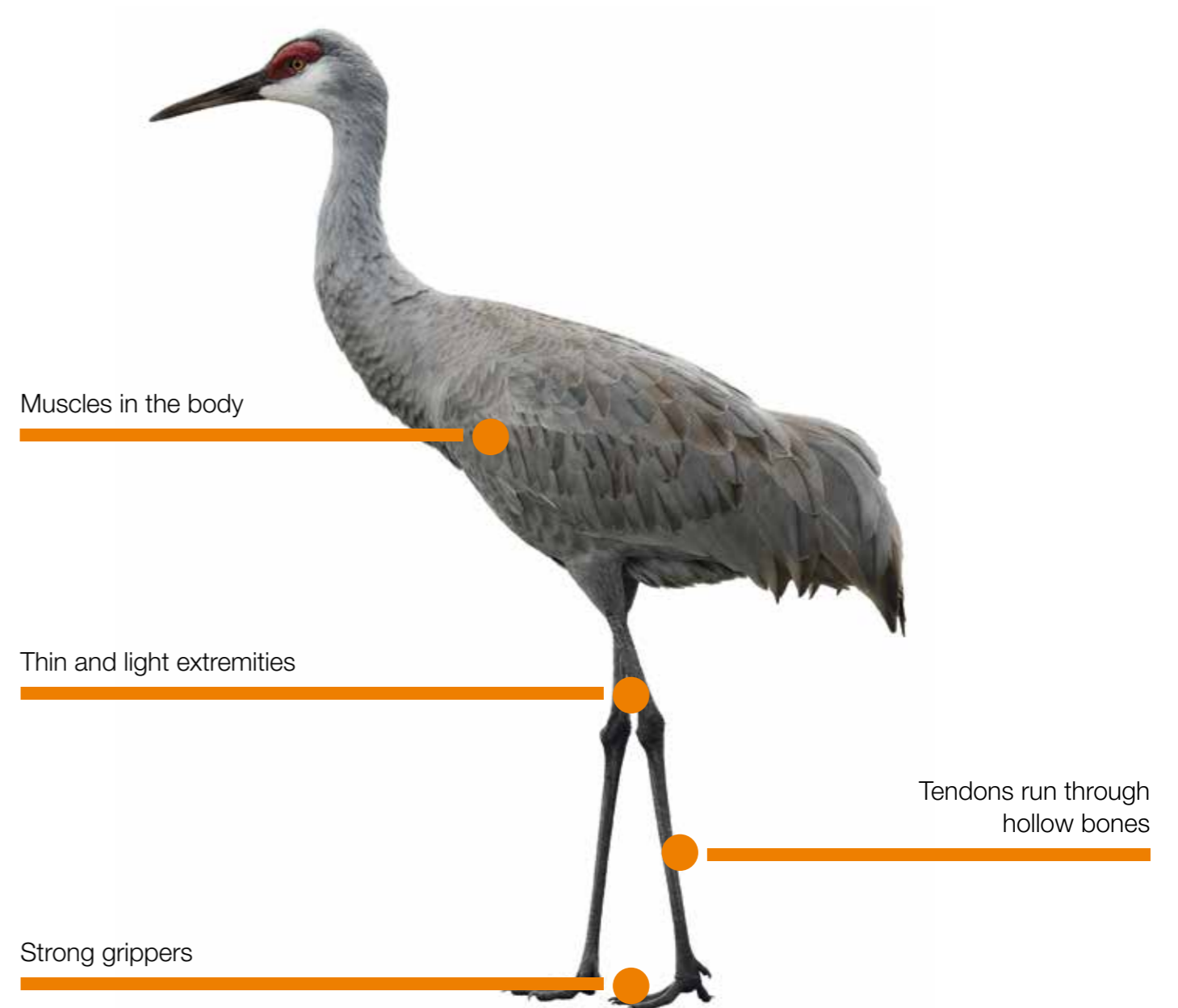
### Configuration example RL-B10301

- 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

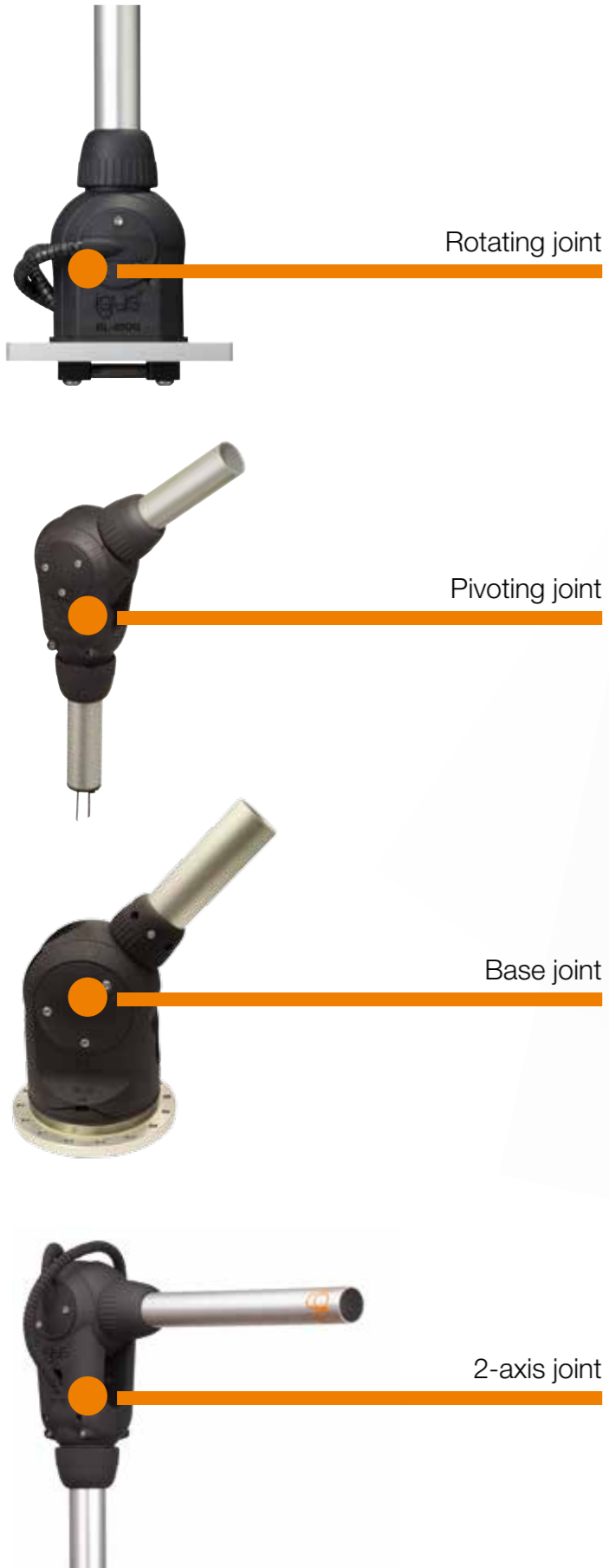
roboLink® joints were patented in 2009 as a “bionic” concept (see pic. below, the crane). The basic RL-50-001 joint can pivot and rotate like a human elbow and is actuated by wires

(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 350 g).




# 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](http://www.igus.eu/robolink-joint)

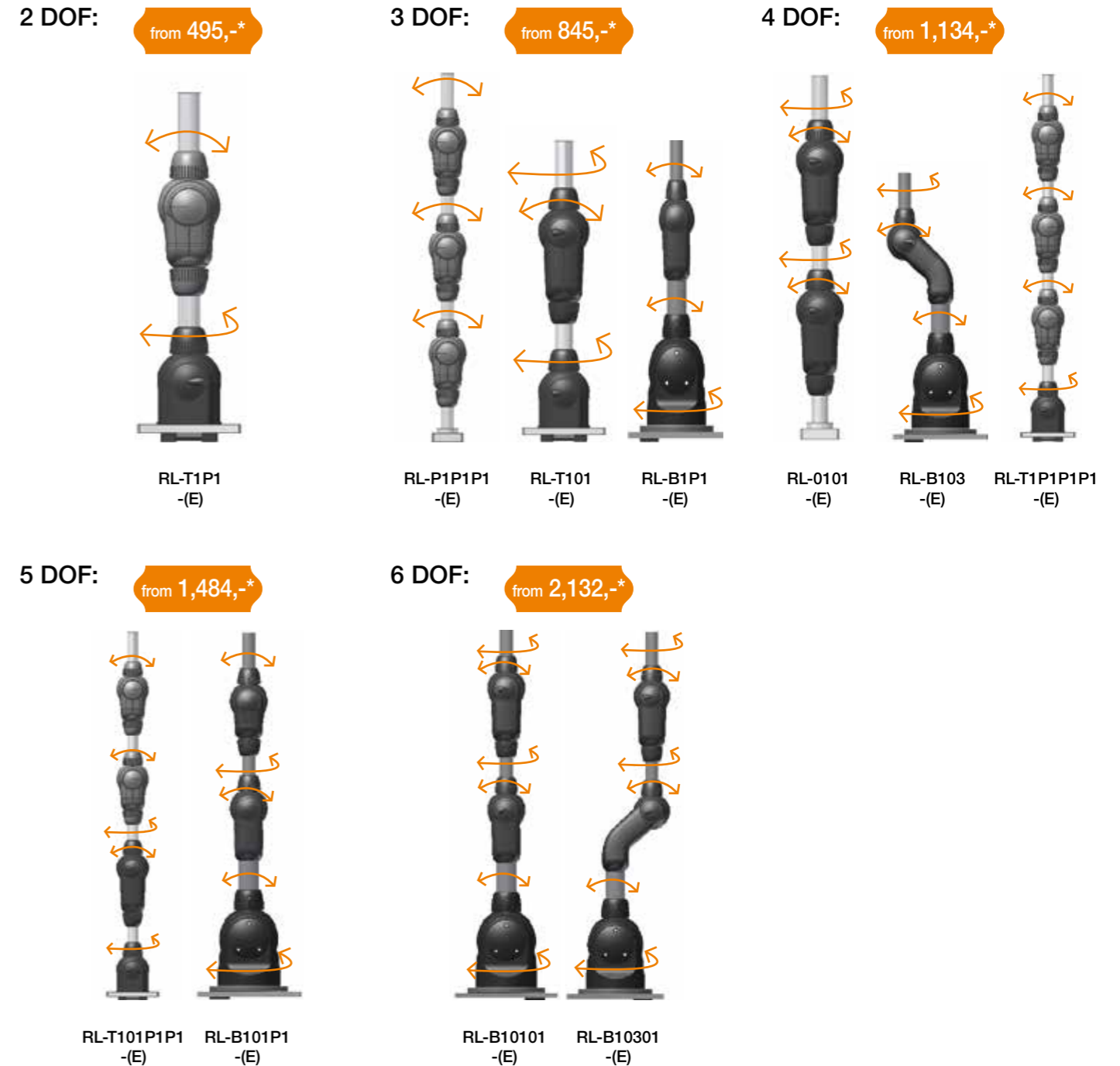


# robolink® W | System examples

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

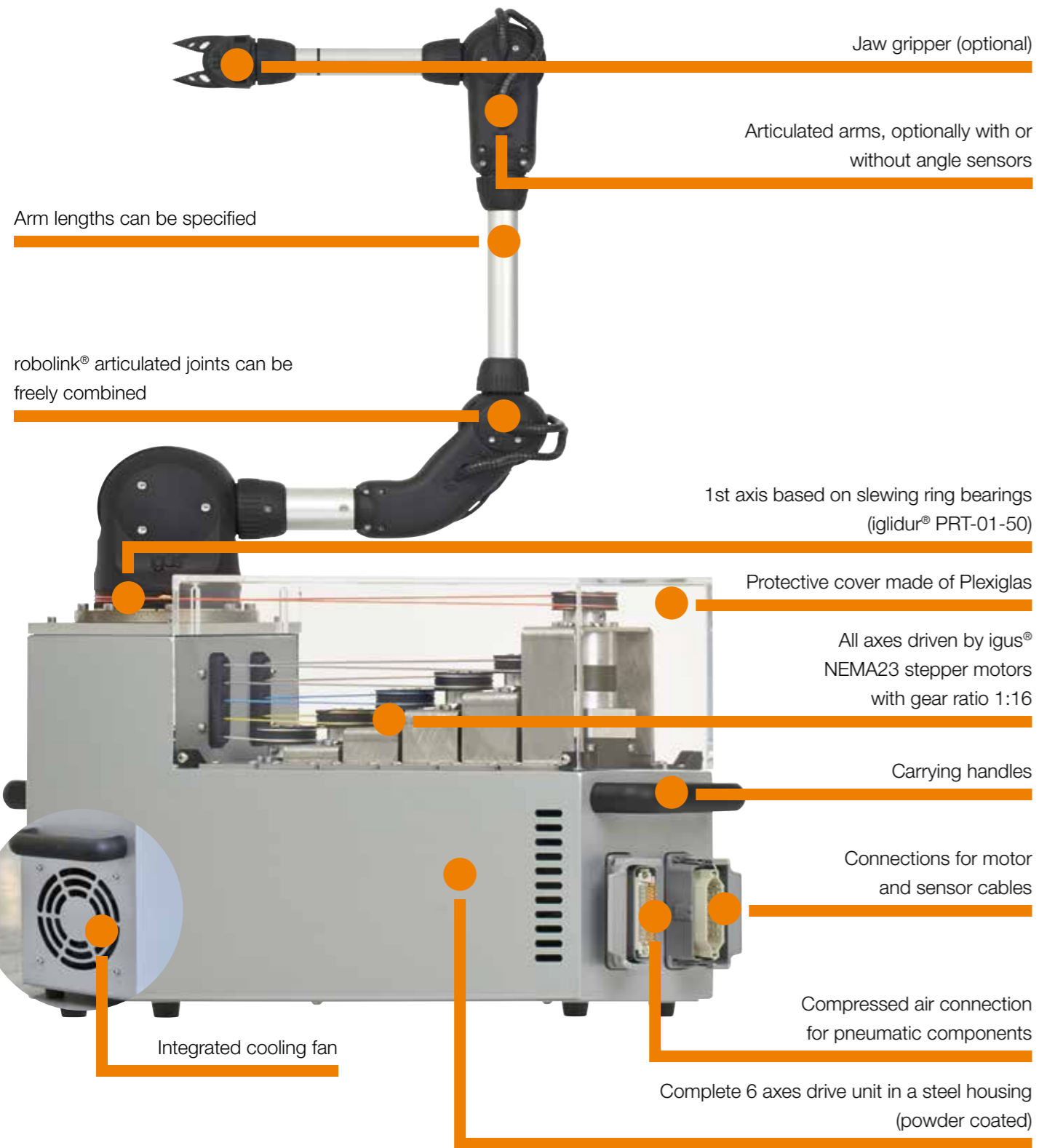
The plastic joints are linked by aluminium tubes, which can be made to specified lengths for every joint arm. In order to reduce weight further there are also options for carbon fibre or reinforced plastic tubes. The actuation wires are fed

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



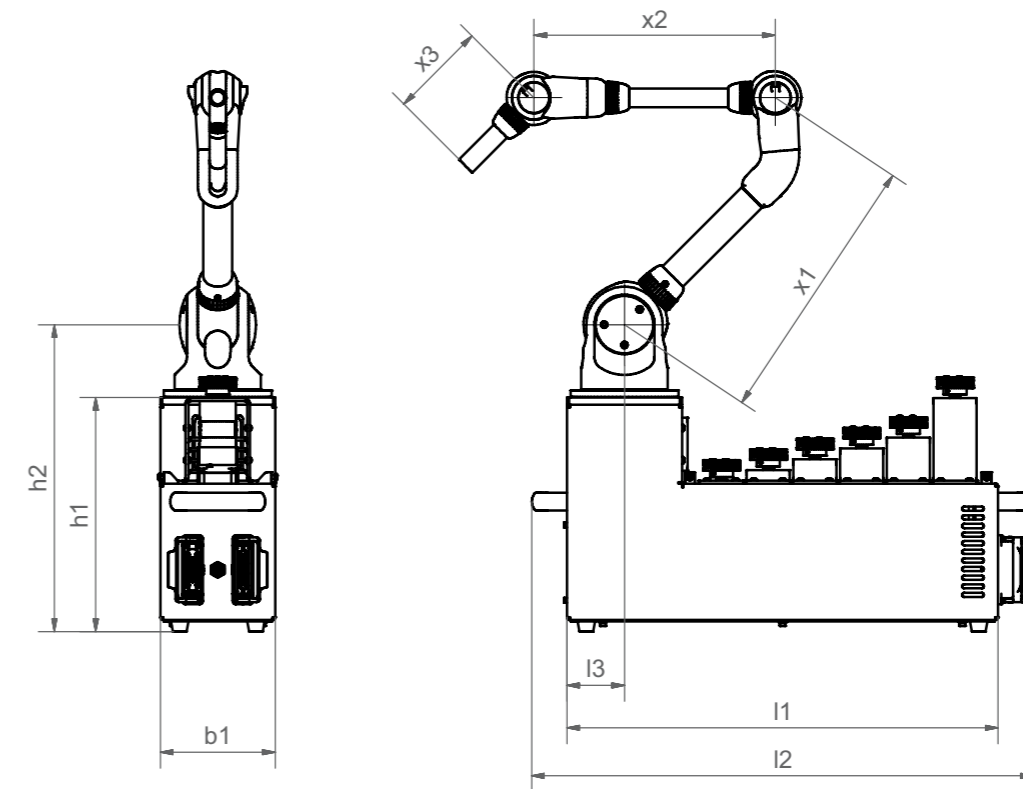
**Cables:**  
Motor and sensor cables available from stock

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




## Dimensions [mm]

Part No.	Specification	b1	h1	h2	l1	l2	l3	Standard arm lengths			1 Quantity
								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 = 100 mm; other lengths available

## Prices [€]

 **Delivery time** Cables: from stock  
Complete drive unit: 5–10 days

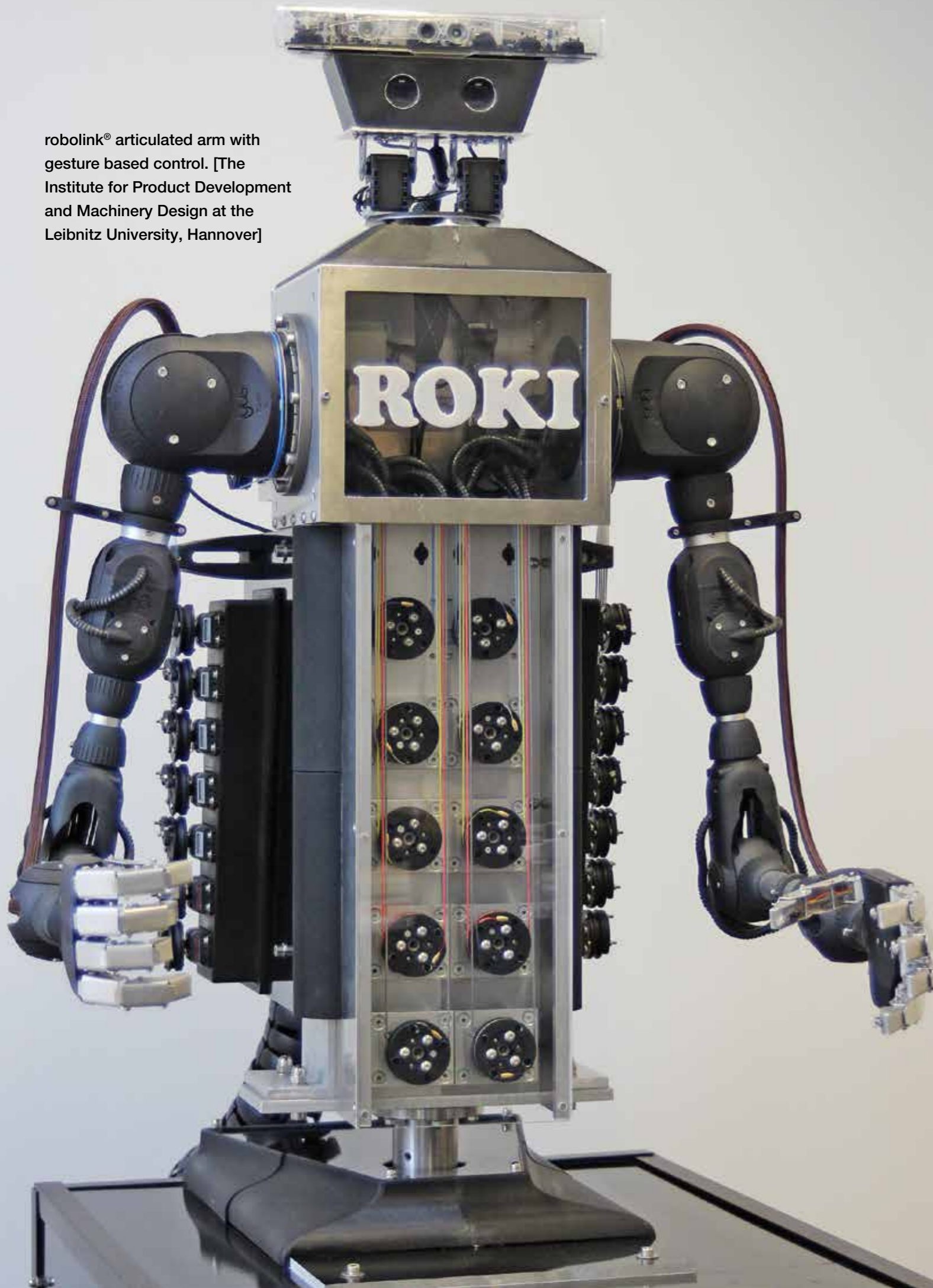


Developer blog, prices and delivery time ► [www.igus.eu/robolink](http://www.igus.eu/robolink) 41



# 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]

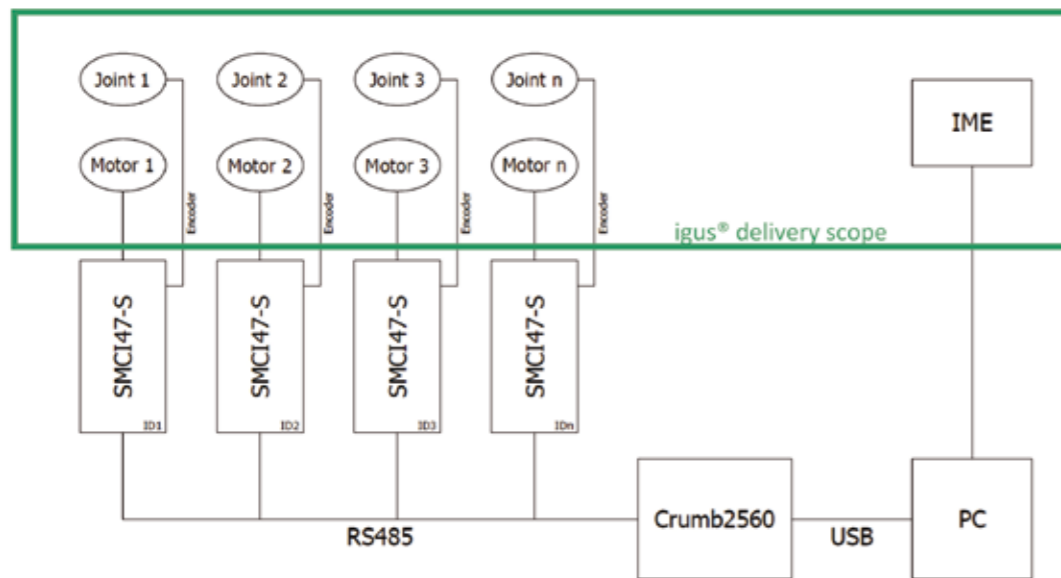
igus® uses its own control system for internal use. It consists of stepper motor controllers by Nanotec® and a Crumb 2560 ATmega Chip. The controllers make use of an RS485 bus which is transferred via USB by the Crumb chip (see picture below). For this hardware configuration, igus® offers an open source 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

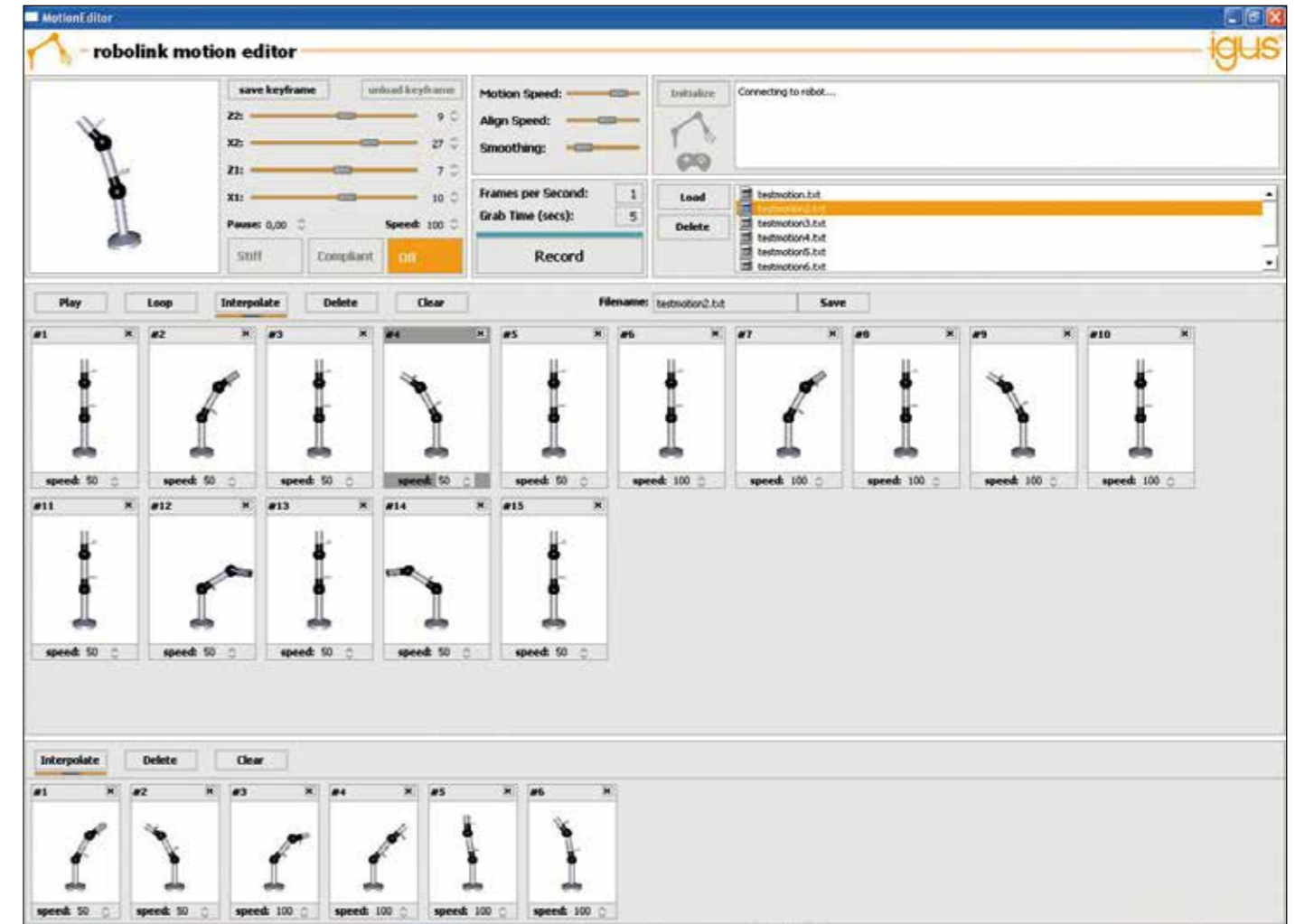
You can use our roboLink® modular kit to easily implement your individual ideas and concepts. No matter if you use 1, 2, 3, 4, 5 or 6 axes.

- 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.



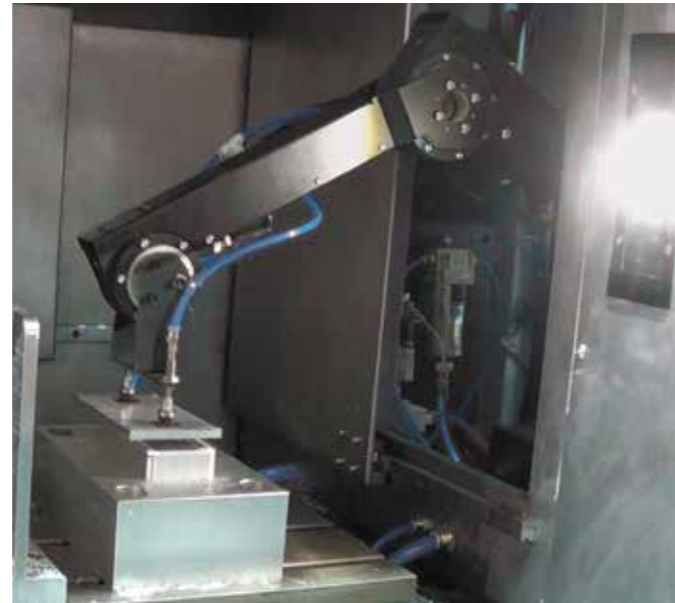
## roboLink® software for programming articulated arms: IME (igus® motion editor)

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](http://www.igus.eu/roboLink-software)

**i** More information about software also online in roboLink® blog  
 ► [www.igus.eu/roboLink/blog](http://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]	9.5		18.5	
Reach [mm]	600		750	
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]	10.5		20.0	
Reach [mm]	600		750	
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



robolink® DQ in use in igus® e-chain® production.

robolink® DQ (4 DOF\*)

	Small versions		Large versions	
	With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight [kg]	9.0		17.5	
Reach [mm]	600		750	
Payload [g]	1,500		4,000	
Precision [mm]	1		1	
Part No.	RL-DQ-RBT-3322-BC	...-AE	RL-DQ-RBT-5532-BC	...-AE
Prices	3,277,- €	2,963,- €	3,565,- €	3,324,- €

robolink® DQ (5 DOF\*)

	Small versions		Large versions	
	With motor encoder and INI	With output encoder	With motor encoder and INI	With output encoder
Weight [kg]	10.0		19.0	
Reach [mm]	600		750	
Payload [g]	1,000		3,500	
Precision [mm]	1		1	
Part No.	RL-DQ-RBT-3322S-BC	...-AE	RL-DQ-RBT-5532S-BC	...-AE
Prices	3,752,- €	3,414,- €	3,987,- €	3,775,- €

\* DOF: Degree of freedom





# igus®.eu/8pm

Orders can be placed until 8:00 pm local time. Ordering and deliveries weekdays from 7.00 am to 8.00 pm, Saturday from 8.00 am to 12.00 pm.

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igus® is certified in accordance with ISO 9001:2008 and ISO/TS 16949:2009 in the field of energy supply systems, cables and harnessing, as well as plastic plain bearings.

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igus® GmbH Spicher Str. 1a 51147 Cologne  
Phone +49-2203-9649-409 Fax +49-2203 9649-222  
info@igus.de [www.igus.eu](http://www.igus.eu)

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Subject to technical alterations. MAT0071620.20 as of 04/2017

