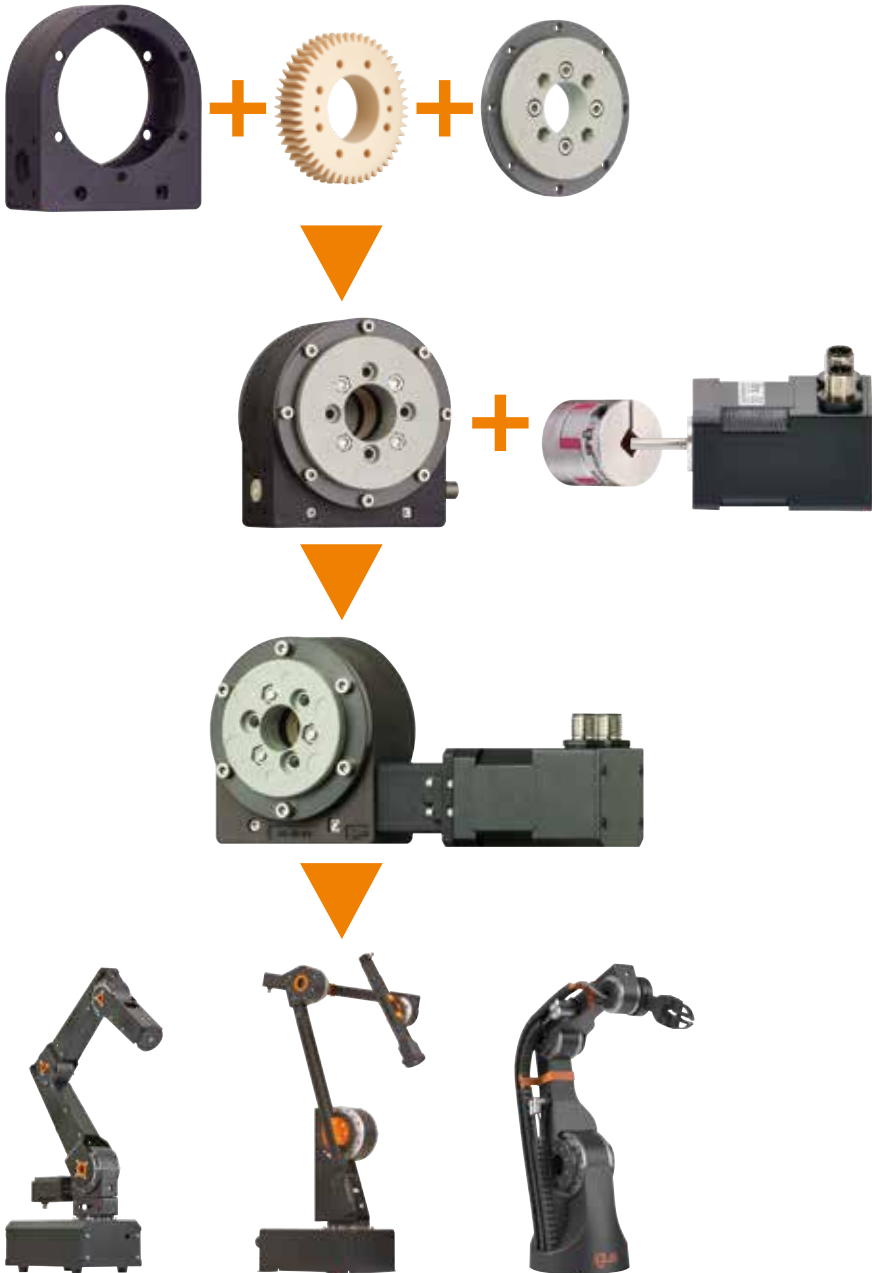


igus.com ...Components for low-cost robots...

robotlink[®]

modular system

roboLink® D components | modular system



Robotic joints and components made from igus® tribo plastics.

The idea behind the roboLink system is to provide developers, labs, and automation integrators access to a customizable, modular system, and to create robotic systems to suit all types of applications at the lowest possible cost.

Our roboLink® joints (RL-D worm gears and RL-S strain wave gears) can be mixed and matched, and powered by a range of motor options. Single components to fully articulated systems are available to ship.

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.



Preston Souza
Product Specialist, roboLink®
email: psouza@igus.com
Phone: 888-803-1895

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 customized 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.

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.com/roboLink

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



roboLink® D components



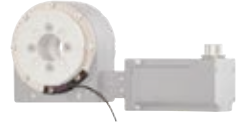
Joint with plastic worm gear

► Page 8



Motor kits

► Page 12



Accessories

► Page 16

Electro-mechanical robot arms



roboLink® C arms

► Page 25



roboLink® Q arms

► Page 28



roboLink® online designer

► Page 33

roboLink® W draw-wire technology



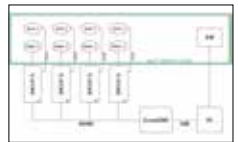
Joint with plastic worm gear

► Page 40



Motor kits

► Page 42



Accessories

► Page 46

Linear robots for predefined surfaces and spaces



Multi-axis modular drylin® linear robots

► www.igus.com/gantry



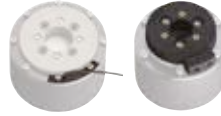
Joint with plastic strain wave gear

► Page 20



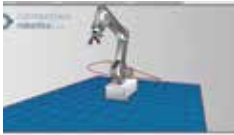
Motor kits

► Page 22



Accessories

► Page 23



CPR control

► Page 34



Software for programming articulated joints

► Page 47

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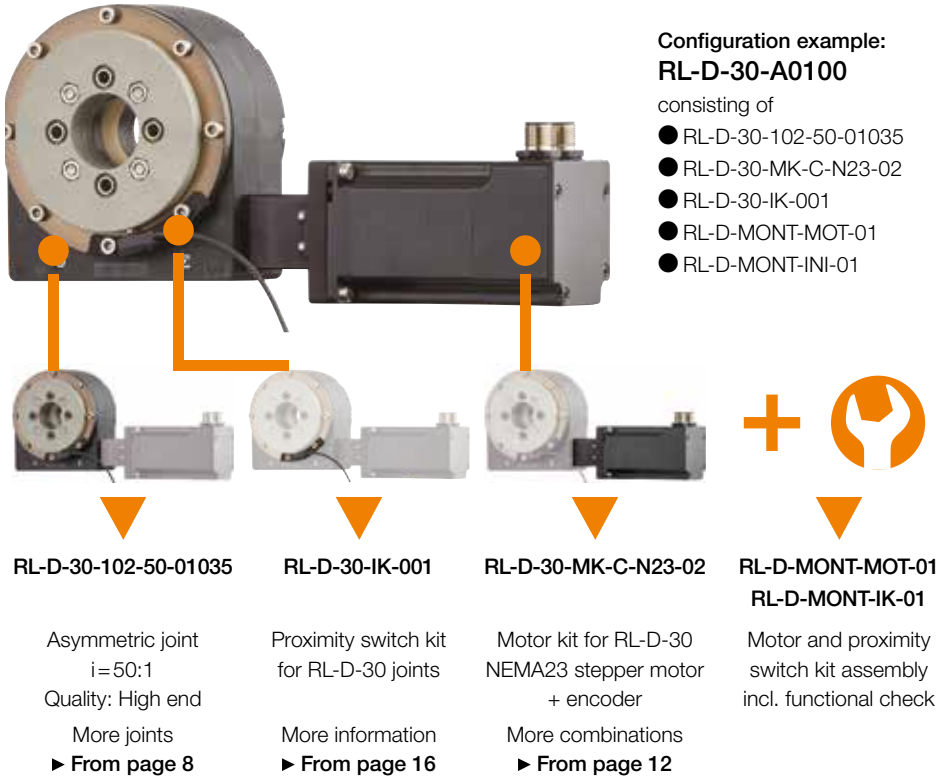
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You can find our GTOB's online under www.igus.eu/web/GTOB

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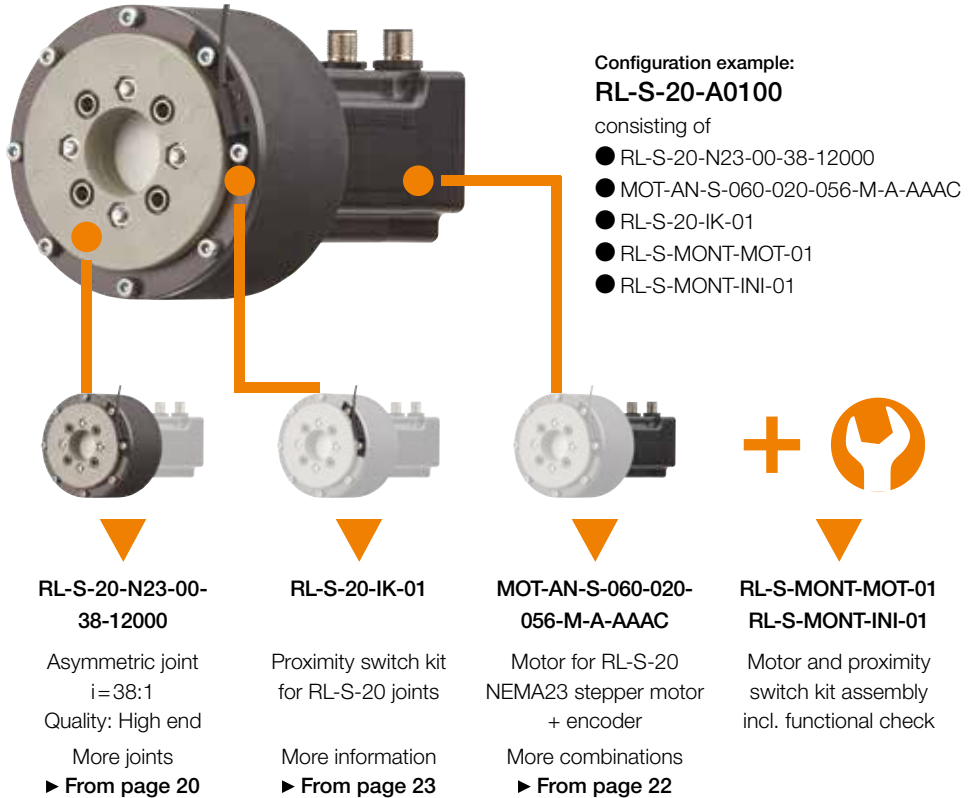
robolink® components

RL-D joints standard configuration



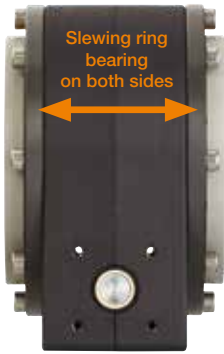
robolink® components

RL-S joints standard configuration



robolink® D | Robot joint

Symmetrical - with two PRT slewing ring bearings



02439 Order key

| Type | | Dimensions [mm] | | |
|----------------|-------------------|-----------------|----------------|------------------|
| RLD - 20 - S - | | 38 - ST | | |
| robolink® D | Installation size | Symmetrical | Reduction gear | Standard version |

robolink® D robot joint with two PRT slewing ring bearings

Slewing ring bearing (iglide® PRT) with a plastic housing. The drive component is a worm gear. The center 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

Versions:

| | |
|-----------|-----|
| Standard: | -ST |
| Low Cost: | -LC |
| High End: | -HE |

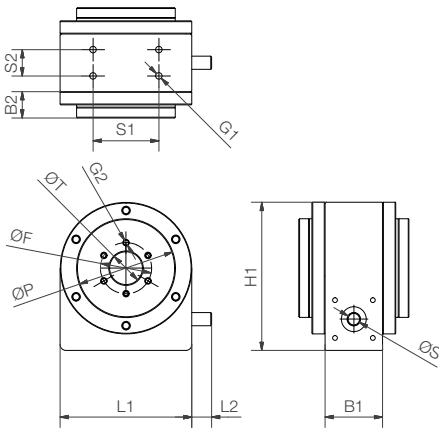
Technical data

| | | RLD-20-S | RLD-30-S | RLD-50-S |
|--------------------------------|-------|--------------|------------------|-----------------|
| 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 |



Shipped from stock

roboLink® D | Robot joint | PRT slewing ring bearings



3 versions

- **STANDARD (-ST):** 2 pcs aluminum PRT (PRT02-xx-AL), aluminum worm shaft (AL hard-anodized). Application e.g. in our low-cost robot arms as front joints (RL-D-20 and RL-D-30).
- **LOW COST (-LC):** 2 pcs low-cost PRT (PRT-02-xx-LC), worm shaft made from plastic RN33. Application e.g. for manual adjustments.
- **HIGH END (-HE):** 2 pcs PRT design 01 (PRT-01-xx), aluminum worm shaft (AL hard-anodized), high rigidity. Application e.g. as the first pivoting axis in roboLink® articulated arms.

Dimensions [mm]

| Part No. | ØT | ØS | ØP | ØF | L1 | L2 | B1 | B2 | H1 | G1 | G2 | S1 | S2 |
|----------------|----|----|-----|------|-------|----|----|------|-------|----|--------|----|----|
| Size 20 | | | | | | | | | | | | | |
| RLD-20-S-38-ST | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 10.5 | 90.5 | M4 | 3 x M5 | 40 | 16 |
| RLD-20-S-38-LC | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 10.5 | 90.5 | M4 | 3 x M5 | 55 | 20 |
| RLD-20-S-38-HE | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 16 | 90.5 | M4 | 6 x M4 | 80 | 30 |
| Size 30 | | | | | | | | | | | | | |
| RLD-30-S-50-ST | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 12.5 | 110.5 | M4 | 4 x M5 | 40 | 16 |
| RLD-30-S-50-LC | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 12.5 | 110.5 | M4 | 4 x M5 | 55 | 20 |
| RLD-30-S-50-HE | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 19.5 | 110.5 | M4 | 8 x M4 | 80 | 30 |
| Size 50 | | | | | | | | | | | | | |
| RLD-50-S-48-ST | 50 | 15 | 120 | 60 | 150.5 | 13 | 60 | 13 | 170.5 | M6 | 8 x M6 | 40 | 16 |
| RLD-50-S-48-LC | 50 | 15 | 120 | 60 | 150.5 | 13 | 60 | 13 | 170.5 | M6 | 8 x M6 | 55 | 20 |
| RLD-50-S-48-HE | 50 | 15 | 120 | 65 | 150.5 | 13 | 60 | 21.5 | 170.5 | M6 | 8 x M6 | 80 | 30 |

roboLink® D | Robot joint

Asymmetrical – with one PRT slewing ring bearing and cover plate



02439 Order key

| Type | | Dimensions [mm] | | |
|----------------|-------------------|-----------------|----------------|------------------|
| RLD - 20 - A - | | 38 - ST | | |
| roboLink® D | Installation size | Asymmetrical | Reduction gear | Standard version |

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

Slewing ring bearing (iglide® PRT) in a plastic housing. The drive component is a worm gear. The center 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

Versions:

| | |
|-----------|-----|
| Standard: | -ST |
| Low Cost: | -LC |
| High End: | -HE |

Technical data

| | | RLD-20-A | RLD-30-A | RLD-50-A |
|--------------------------------|-------|--------------|------------------|-----------------|
| 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 |



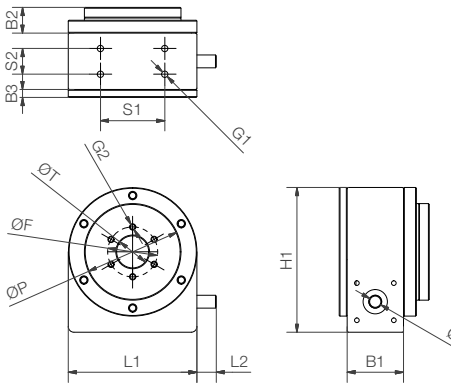
Shipped from stock

roboLink® D | Robot joint | PRT slewing ring bearings



3 versions

- **STANDARD (-ST):** 1 pc aluminum PRT (PRT-02-xx-AL), aluminum worm shaft (AL hard-anodized). Application e.g. in our low-cost robot arms as front joints (RL-D-20 and RL-D-30).
- **LOW COST (-LC):** 1 pcs low-cost PRT (PRT-02-xx-LC), worm shaft made from plastic RN33. Application e.g. for manual adjustments.
- **HIGH END (-HE):** 1 pc PRT design 01 (PRT-01-xx), aluminum worm shaft (AL hard-anodized), high rigidity. Application e.g. as the first rotating axis in roboLink® articulated arms.

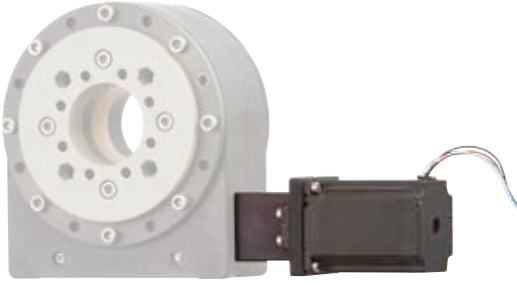


Dimensions [mm]

| Part No. | ØT | ØS | ØP | ØF | L1 | L2 | B1 | B2 | B3 | H1 | G1 | G2 | S1 | S2 |
|----------------|----|----|-----|------|-------|----|----|------|----|-------|----|--------|----|----|
| Size 20 | | | | | | | | | | | | | | |
| RLD-20-A-38-ST | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 10.5 | 5 | 90.5 | M4 | 3 x M5 | 40 | 16 |
| RLD-20-A-38-LC | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 10.5 | 5 | 90.5 | M4 | 3 x M5 | 55 | 20 |
| RLD-20-A-38-HE | 20 | 8 | 60 | 31 | 80.5 | 12 | 35 | 16 | 5 | 90.5 | M4 | 6 x M4 | 80 | 30 |
| Size 30 | | | | | | | | | | | | | | |
| RLD-30-A-50-ST | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 12.5 | 6 | 110.5 | M4 | 4 x M5 | 40 | 16 |
| RLD-30-A-50-LC | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 12.5 | 6 | 110.5 | M4 | 4 x M5 | 55 | 20 |
| RLD-30-A-50-HE | 30 | 10 | 80 | 42.5 | 100.5 | 12 | 45 | 19.5 | 6 | 110.5 | M4 | 8 x M4 | 80 | 30 |
| Size 50 | | | | | | | | | | | | | | |
| RLD-50-A-48-ST | 50 | 15 | 120 | 60 | 150.5 | 13 | 60 | 13 | 6 | 170.5 | M6 | 4 x M6 | 40 | 16 |
| RLD-50-A-48-LC | 50 | 15 | 120 | 60 | 150.5 | 13 | 60 | 13 | 6 | 170.5 | M6 | 4 x M6 | 55 | 20 |
| RLD-50-A-48-HE | 50 | 15 | 120 | 65 | 150.5 | 13 | 60 | 21.5 | 6 | 170.5 | M6 | 8 x M6 | 80 | 30 |

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 |

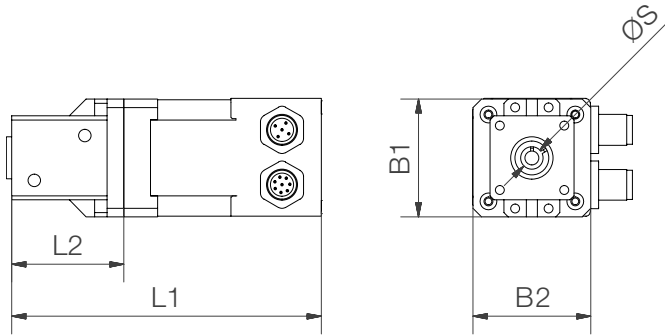
Technical data – joints with motor

| Joint | | Size 20 | | Size 30 | | Size 50 | |
|--|-------|------------------------------|------------------------------|------------------------------|------------------------------|--------------------------------|--|
| | | RLD-20-S-38-XXxx + NEMA17 | RLD-30-S-50-XXxx + NEMA17 | RLD-30-S-50-XXxx + NEMA23 | RLD-50-S-48-XXxx + NEMA23 | RLD-50-S-48-XXxx + 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 | |



Delivery time
2–3 days

roboLink® D | Robot joint | Motor kit



Dimensions [mm]

| Part No. | ØS | L1 | L2 | B1 | B2 |
|-----------------------|----|-------|----|------|------|
| NEMA17 | | | | | |
| RL-D-20-MK-C-N17-00 | 8 | 99.4 | 40 | 42 | 42 |
| RL-D-20-MK-C-N17-01 | 8 | 110.4 | 40 | 42 | 42 |
| RL-D-20-MK-C-N17-02 | 8 | 110.4 | 40 | 42 | 42 |
| RL-D-20-MK-C-N17-NM | 8 | - | 40 | 42 | 42 |
| RL-D-30-MK-C-N17-00 | 10 | 99.4 | 40 | 42 | 42 |
| RL-D-30-MK-C-N17-01 | 10 | 110.4 | 40 | 42 | 42 |
| RL-D-30-MK-C-N17-02 | 10 | 110.4 | 40 | 42 | 42 |
| RL-D-30-MK-C-N17-NM | 10 | - | 40 | 42 | 42 |
| NEMA23 | | | | | |
| RL-D-30-MK-C-N23-00 | 10 | 118 | 42 | 56.4 | 56.4 |
| RL-D-30-MK-C-N23-01 | 10 | 140 | 42 | 56.4 | 56.4 |
| RL-D-30-MK-C-N23-02 | 10 | 140 | 42 | 56.4 | 56.4 |
| RL-D-30-MK-C-N23-NM | 10 | - | 42 | 56.4 | 56.4 |
| RL-D-50-MK-C-N23-00 | 15 | 124 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23-01 | 15 | 146 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23-02 | 15 | 146 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23-NM | 15 | - | 48 | 60 | 60 |
| NEMA23XL | | | | | |
| RL-D-50-MK-C-N23XL-00 | 15 | 136.5 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23XL-01 | 15 | 158.5 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23XL-02 | 15 | 158.5 | 48 | 60 | 60 |
| RL-D-50-MK-C-N23XL-NM | 15 | - | 48 | 60 | 60 |

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

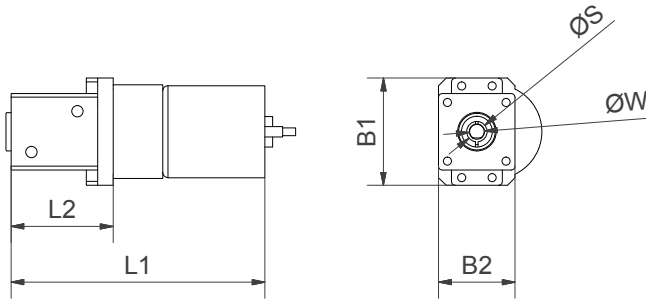
Technical data

| | 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 |



Delivery time
2-3 days

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 |

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 |



Selection:

Initiator kit, drive encoder or output encoder



Delivery time

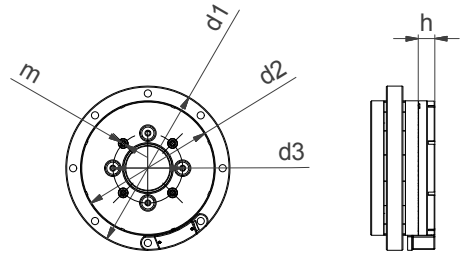
2-3 days

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 |
|---------------|-----|-----|----|--------|----|------------|--------|
| RL-D-20-EK-01 | 80 | 60 | 31 | 3 x M4 | 10 | 47 | PRT-01 |
| RL-D-20-EK-02 | 80 | 60 | 31 | 3 x M4 | 10 | 47 | PRT-02 |
| RL-D-30-EK-01 | 80 | 60 | 31 | 3 x M4 | 10 | 63 | PRT-01 |
| RL-D-30-EK-02 | 80 | 60 | 31 | 3 x M4 | 10 | 63 | PRT-02 |
| RL-D-50-EK-01 | 150 | 120 | 65 | 4 x M6 | 10 | 94 | PRT-01 |
| RL-D-50-EK-02 | 150 | 120 | 65 | 4 x M6 | 10 | 94 | PRT-02 |

roboLink® S | Strain wave gear



roboLink® S | Strain wave gear



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
- Light-weight
- 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-...

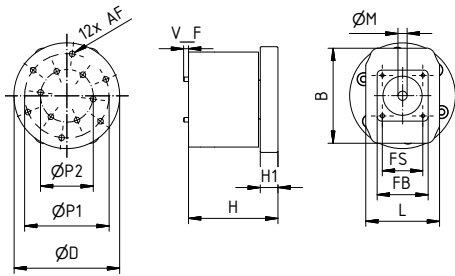
General properties

- 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

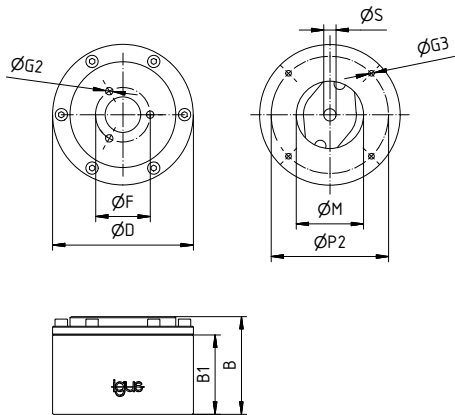
| Part No. | Weight [g] | Reduction gearing | Efficiency | Moment of breakage at the output | Maximum output torque | |
|---------------------------|---------------|----------------------|------------|-------------------------------------|--------------------------|----------------------|
| | | | | (static) [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]

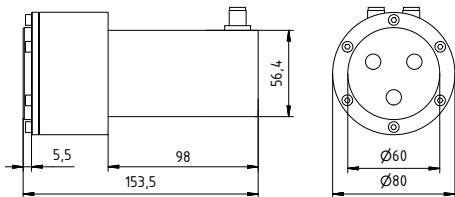
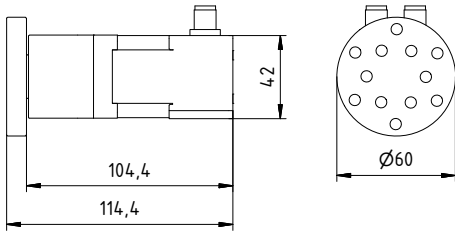
| Part No. | ØD | ØP1 | ØP2 | AF | V_F | H | ØM | FS | FB | L | B | H1 |
|-------------------------|----|-----|-----|------|-----------|-------|----|----|----|----|----|----|
| RL-S-17-N11-00-28-020K0 | 60 | 48 | 30 | M4x8 | M2.5x2.75 | 50.75 | 5 | 23 | 29 | 42 | 54 | 10 |
| RL-S-17-N17-00-28-020K0 |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



Dimensions [mm]

| Part No. | ØD | B | ØM | B1 | B2 | ØG2 | ØG3 | ØP1 | ØP2 | ØS |
|---------------------------|-----|------|----|----|------|-----------|------|------|-------|----------------|
| 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") |
| 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") |

roboLink® S | Strain wave gear with motor



| Part No. | Gear | Motor | Specification |
|---------------|-------------------------|-------------------------------|---|
| 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 |
| 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 |

roboLink® S | Strain wave gear | Options

Initiator kit for RL-S gears

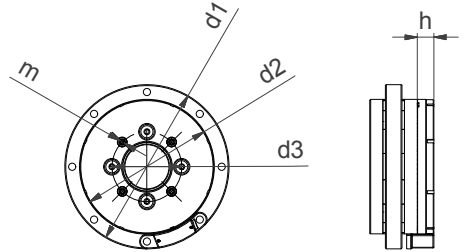


- INI kit for zero positions optional
- Can also be retrofitted for sizes RL-S-17, RL-S-20 and RL-S-30

INI kit

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

Output encoder for RL-S gearboxes



Dimensions [mm]

| Part No. | d1 | d2 | d3 | m | h |
|----------------|-----|----|------|--------|----|
| RL-S-17-EK-xx* | – | – | – | – | – |
| RL-S-20-EK-xx | 80 | 60 | 31 | 3 x M5 | 10 |
| RL-S-30-EK-xx | 100 | 82 | 42.5 | 4 x M5 | 10 |

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

roboLink®

Standard joints (from stock)



roboLink® C – arm
For direct drive
roboLink® D

8 base configuration up to 5 DOF



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

8 base configuration up to 5 DOF

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

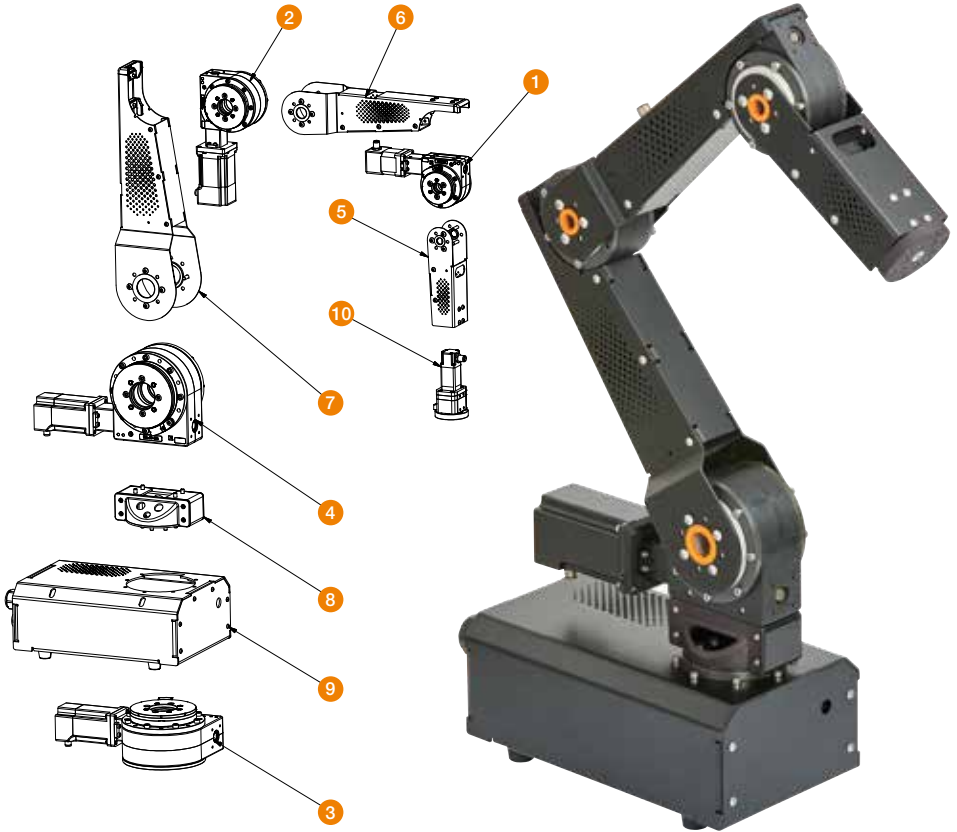


Image exemplary

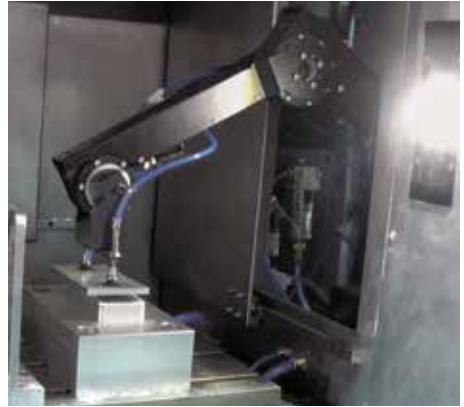
Configuration example

| | | | |
|---|------------------------------------|----|--------------------------|
| 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 |
|----------------------|--|
| RL-D-RBT-3322-BC | 4 axes roboLink® DC, small version, with motor encoder and INI |
| RL-D-RBT-3322-BC-AE | 4 axes roboLink® DC, small version, with output encoder |
| RL-D-RBT-5532-BC | 4 axes roboLink® DC, large version, with motor encoder and INI |
| RL-D-RBT-5532-BC-AE | 4 axes roboLink® DC, large version, with output encoder |
| RL-D-RBT-3322S-BC | 5 axes roboLink® DC, small version, with motor encoder and INI |
| RL-D-RBT-3322S-BC-AE | 5 axes roboLink® DC, small version, with output encoder |
| RL-D-RBT-5532S-BC | 5 axes roboLink® DC, large version, with motor encoder and INI |
| RL-D-RBT-5532S-BC-AE | 5 axes roboLink® DC, large version, with output encoder |

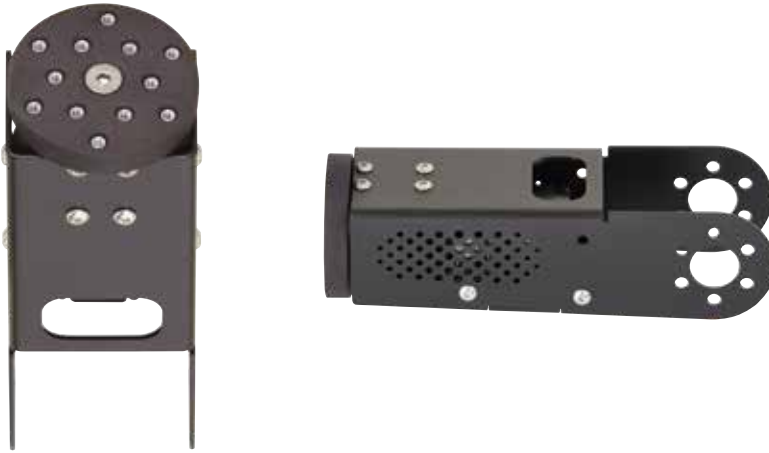
02439 Order key

| 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-chain system® of the joint
- Output encoder optional

 More Information about robolink® D modular system

► From page 6

Information about the new robolink® strain wave gears

► From page 18

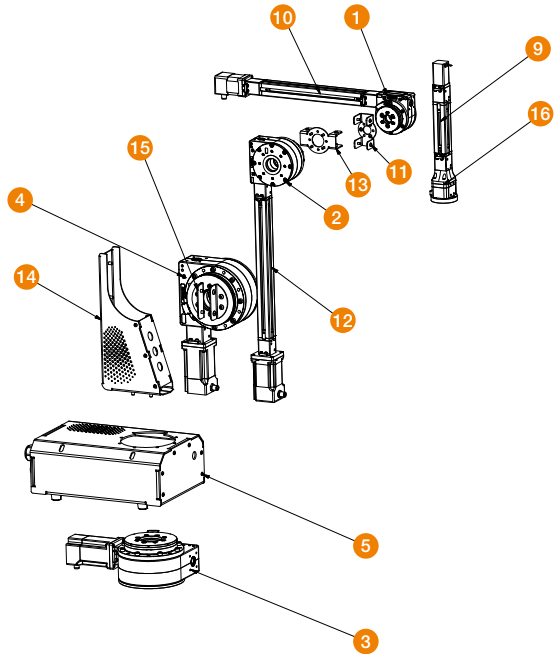
| Part No. | Designation |
|---------------------|---|
| RL-DC-S17-N11-AA | 5th axis for RL-DC with motor encoder and INI |
| RL-DC-S17-N11-AA-AE | 5th axis for RL-DC with output encoder |



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.

More Information about robolink® D modular system


► From page 6

Information about the new robolink® strain wave gears

► From page 18

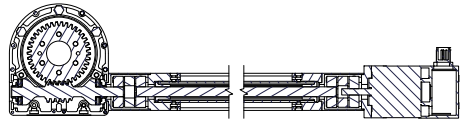
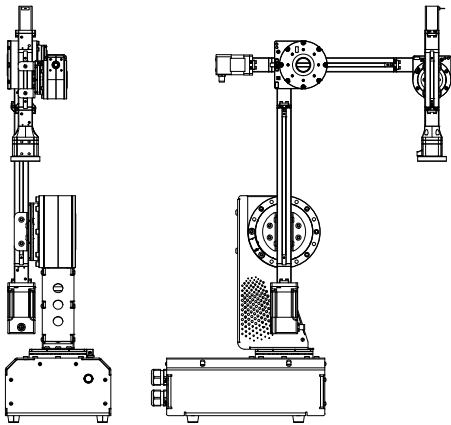
Configuration example

| | |
|--|---|
|  RL-D-20...01035 / MK-N17-01 / EK |  Connecting part 20-P30 |
|  RL-D-30...01053 / MK-N23-01 / EK |  Profile connection 370 mm |
|  RL-D-50...01035 / MK-N23XL-01 / EK |  Connecting part 30-P30 |
|  RL-D-50...01035 / MK-N23XL-01 / EK |  Connecting part L-50-50 |
|  Connecting part Base-50 |  Connecting part 50-P30 |
|  Profile connection 160 mm |  RL-S-17 |
|  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 (optimization of the payload). The geometry of the articulated arm can be altered within minutes.

More Information about robolink® D modular system

► From page 6

Information about the new robolink® strain wave gears

► From page 18

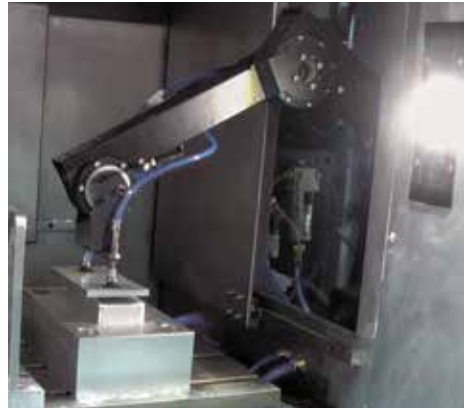
Typical application areas:

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

| Part No. | Designation | |
|-----------------------|--|--|
| RL-DQ-RBT-3322-BC | 4 axes robolink® DQ, small version, with motor encoder and INI | |
| RL-DQ-RBT-3322-BC-AE | 4 axes robolink® DQ, small version, with output encoder | |
| RL-DQ-RBT-5532-BC | 4 axes robolink® DQ, large version, with motor encoder and INI | |
| RL-DQ-RBT-5532-BC-AE | 4 axes robolink® DQ, large version, with output encoder | |
| RL-DQ-RBT-3322S-BC | 5 axes robolink® DQ, small version, with motor encoder and INI | |
| RL-DQ-RBT-3322S-BC-AE | 5 axes robolink® DQ, small version, with output encoder | |
| RL-DQ-RBT-5532S-BC | 5 axes robolink® DQ, large version, with motor encoder and INI | |
| RL-DQ-RBT-5532S-BC-AE | 5 axes robolink® DQ, large version, with output encoder | |

 Available on request

robolink® | Electro mechanical robot arms



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 | [lbs] | 20.9 | | 40.8 | |
| Reach | [mm] | 600 | | 750 | |
| Payload | [lbs] | 2.2 | | 6.5 | |
| Precision | [mm] | 1 | | 1 | |
| Part No. | | RL-D-RBT-3322-BC | ...-AE | RL-D-RBT-5532-BC | ...-AE |

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 | [lbs] | 23 | | 44 | |
| Reach | [mm] | 600 | | 750 | |
| Payload | [lbs] | 1 | | 5.5 | |
| Precision | [mm] | 1 | | 1 | |
| Part No. | | RL-D-RBT-3322S-BC | ...-AE | RL-D-RBT-5532S-BC | ...-AE |

* DOF: Degree of freedom



Available on request

roboLink® | Electro mechanical robot arms



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 [lbs] | 19.8 | | 38.6 | |
| Reach [mm] | 600 | | 750 | |
| Payload [lbs] | 3.3 | | 8.8 | |
| Precision [mm] | 1 | | 1 | |
| Part No. | RL-DQ-RBT-3322-BC | ...-AE | RL-DQ-RBT-5532-BC | ...-AE |

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 [lbs] | 22 | | 41.9 | |
| Reach [mm] | 600 | | 750 | |
| Payload [lbs] | 2.2 | | 7.7 | |
| Precision [mm] | 1 | | 1 | |
| Part No. | RL-DQ-RBT-3322S-BC | ...-AE | RL-DQ-RBT-5532S-BC | ...-AE |

* DOF: Degree of freedom



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 aluminum 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-chain system® 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

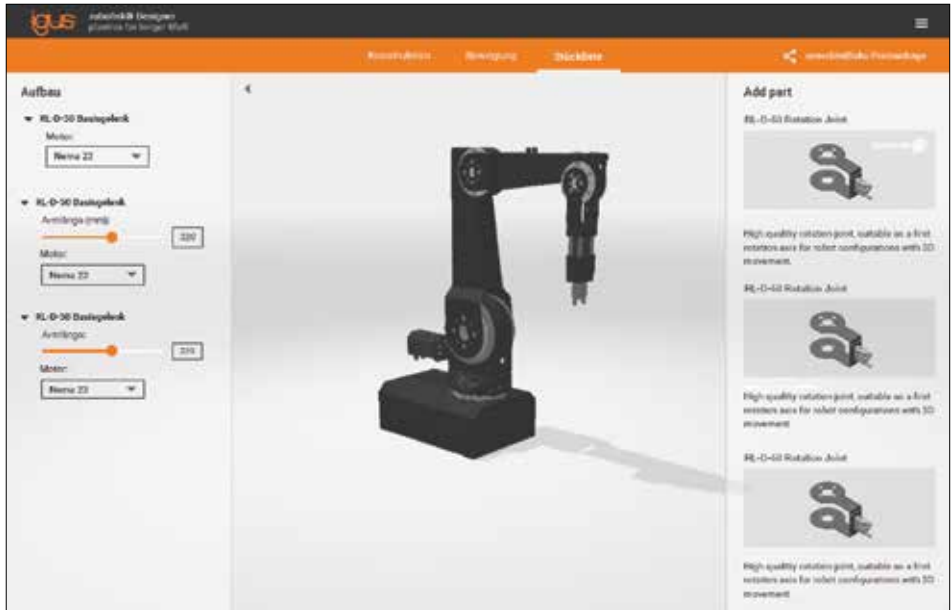
► From page 18

| Part No. | Designation |
|---------------------|---|
| RL-DQ-S17-N11-AA | 5th axis for RL-DQ with motor encoder and INI |
| RL-DQ-S17-N11-AA-AE | 5th axis for RL-DQ with output encoder |



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.

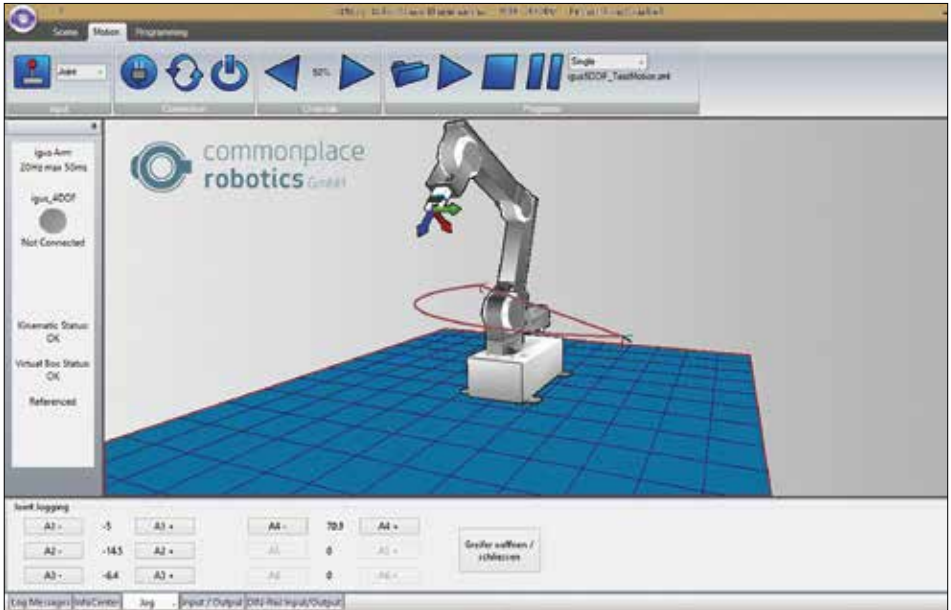
- Select roboLink® components step by step, and in this way individually configure the robotic arm from the first axis up to the tool
- Adaptation to work space thanks to individual selection of arm length
- Simulate movements by rotating individual joints
- Output of the parts list
- Direct request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



www.igus.com/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

robotlink® RL-D application examples



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



Automatic book scanner with 2 DOF
(EPS GmbH)



robotlink® 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 40



Pivoting joint

► From page 40



Base joint

► From page 40

roboLink® components



Angle sensors

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)



2-jaw gripper

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)



3-jaw gripper

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)

roboLink® accessories



Camera adapter

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)



Drive wheel

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)



Clamping tool

► [www.igus.com/
roboLink](http://www.igus.com/roboLink)

roboLink® software



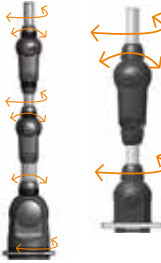
roboLink® software
“open source”

► From page 46



2-axis joint

► From page 40



Infinite possibilities

► From page 41



Drive units



Complete
6 DOF unit



Wire end bottom
and wires

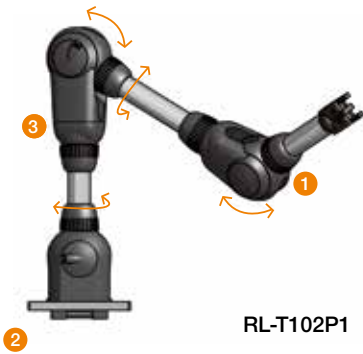


Bowden cable

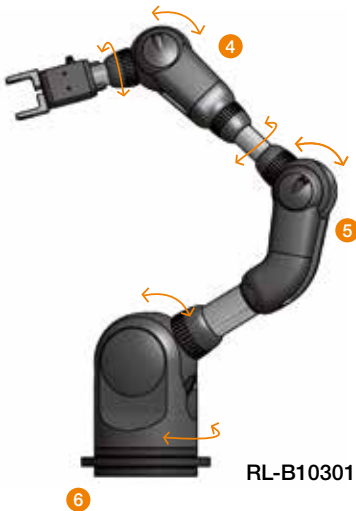


Connecting tubes





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 organizations use these components to build customized 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-molded parts made from igus® tribo polymers are planned.

Configuration example RL-T102P1

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

Configuration example RL-B10301

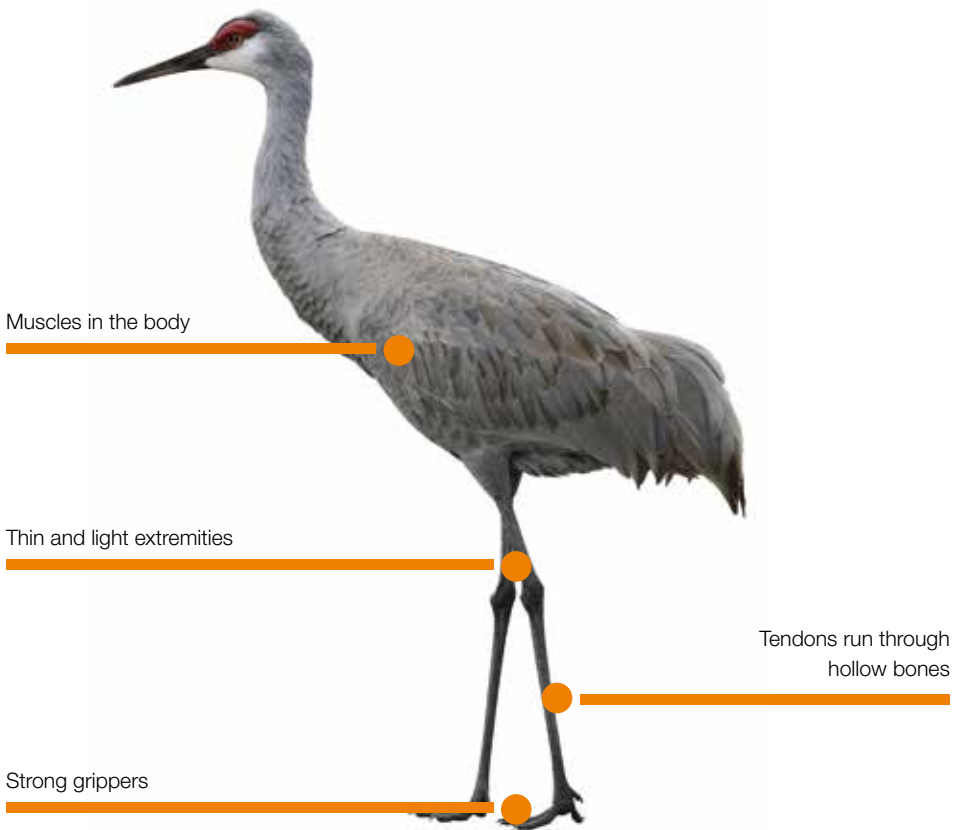
- 4 RL-50-001 – 2-axis joint (2 DOF)
- 5 RL-50-003 – 2-axis joint (2 DOF)
- 6 RL-90-BL1 – base joint (2 DOF)

roboLink® W | The idea

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



Rotating joint



Pivoting joint



Base joint



2-axis joint

Today, 7 different joint types are available. There are a large number of combination options. The pivoting range can be varied ($\pm 90^\circ$, $+130/-50^\circ$, $+180/0^\circ$) 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.com/robolink-joint



roboLink® W | System examples

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

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

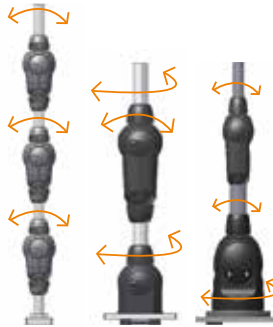
the arms. These are specially developed Bowden cables. This method enables flexibility within the design stage allowing from 1 DOF up to a maximum of 6 DOF.

2 DOF:



RL-T1P1
-(E)

3 DOF:

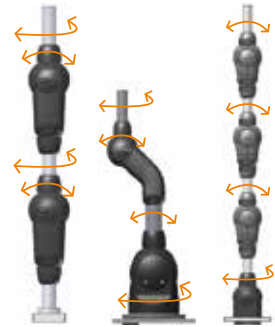


RL-P1P1P1
-(E)

RL-T101
-(E)

RL-B1P1
-(E)

4 DOF:

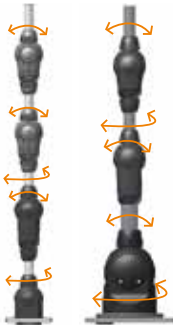


RL-0101
-(E)

RL-B103
-(E)

RL-T1P1P1P1
-(E)

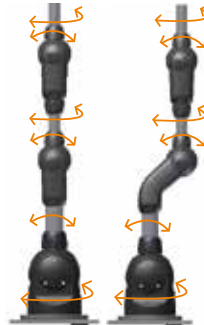
5 DOF:



RL-T101P1P1
-(E)

RL-B101P1
-(E)

6 DOF:

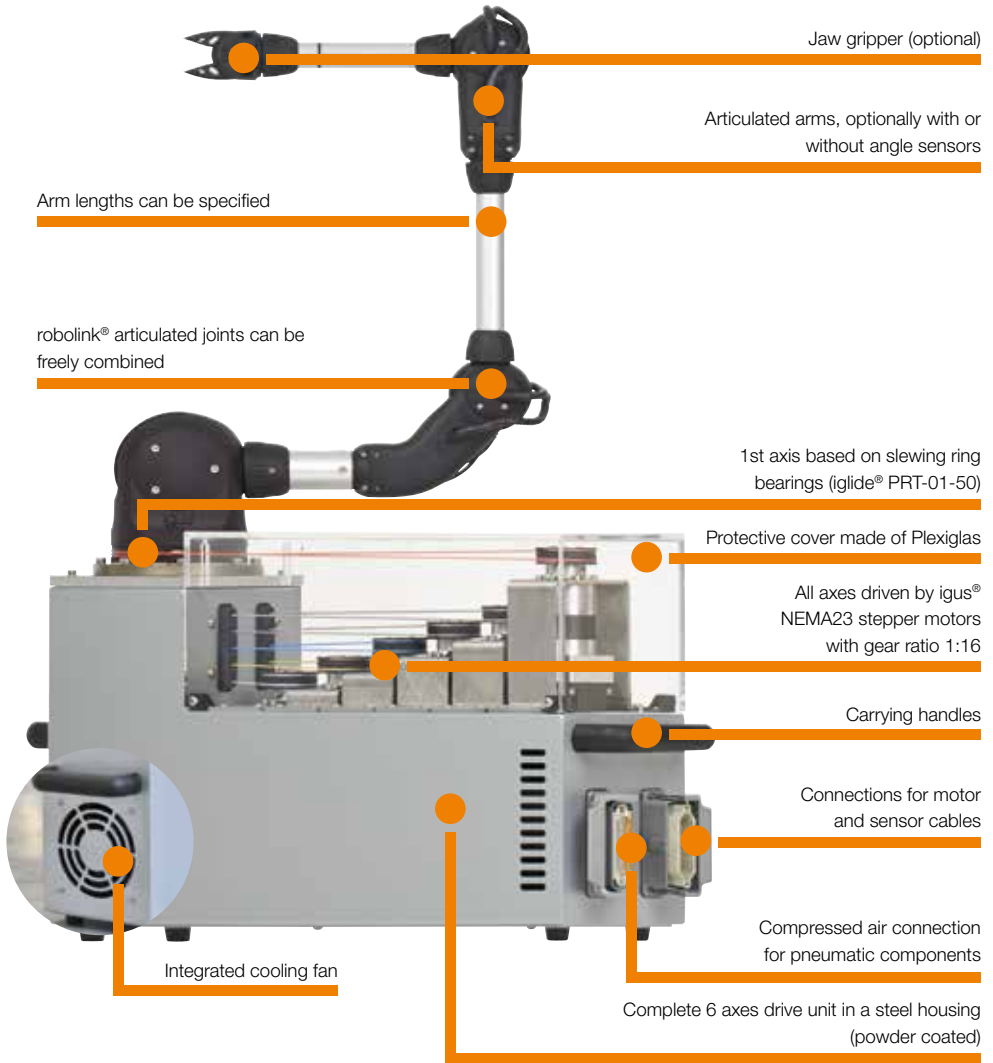


RL-B10101
-(E)

RL-B10301
-(E)

* System price in EUR for 1 unit purchases, including aluminum tubes and wires (no sensors)
DOF: Degree of freedom

roboLink® W | Drive units 6 DOF



Cables:

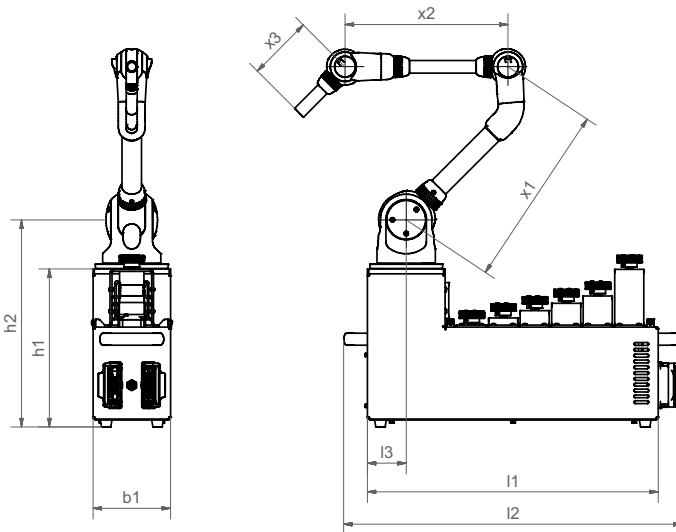
Motor and sensor cables available from stock

Connector:

2 versions available: Socket/plug and socket/open

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 |



| Dimensions [mm] | Specification | b1 | h1 | h2 | l1 | l2 | l3 | Standard arm lengths | | |
|---------------------|--------------------------|-----|-----|-----|-----|-----|----|----------------------|-----|-----|
| Part No. | | | | | | | | x1* | x2* | x3* |
| RL-B10201-DU3623L | Without angular encoders | 160 | 326 | 427 | 600 | 698 | 80 | 280 | 236 | 134 |
| RL-B10201-E-DU3623L | With angular encoders | 160 | 326 | 427 | 600 | 698 | 80 | 280 | 236 | 134 |

* Standard tube length = 100 mm; other lengths available



Complete drive unit available on request

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



robolink application examples



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]

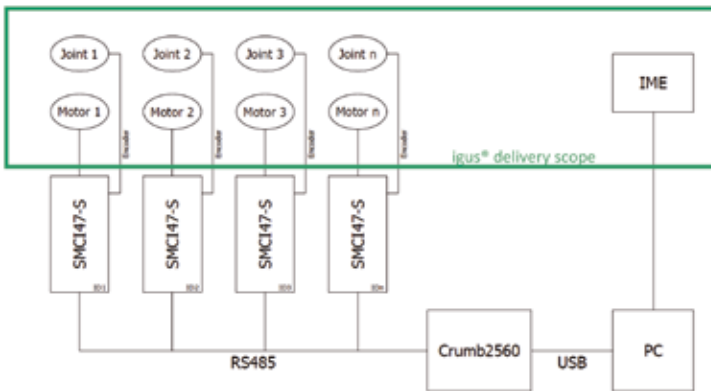
igus® uses its own control system for internal use. It consists of stepper motor controllers by Nanotec® and a Crumb 2560 ATmega Chip. The controllers make use of an RS485 bus which is transferred via USB by the Crumb chip (see picture below). For this hardware configuration, igus® offers an open source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

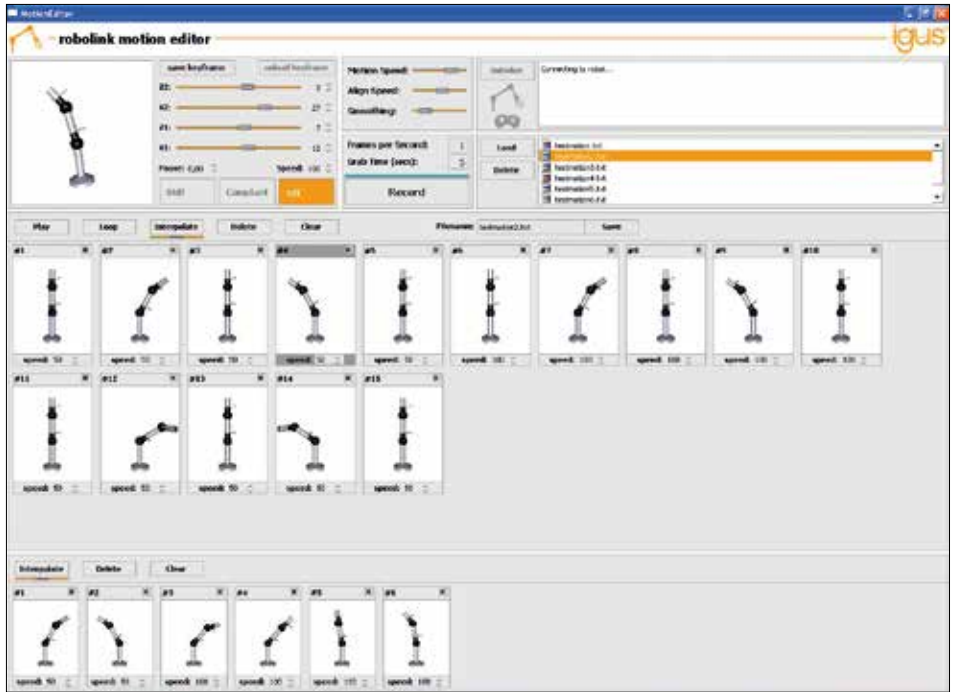
You can use our robolink construction kit to implement your ideas and concepts, cost effective, freely and individually, whether it has 1, 2, 3, 4, 5 or 6 axes.

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



Hardware configuration:

Stepper motor control - NANOTEC SMCI47-S2, memory-chip Crumb2560 ATmega USB module.



Open source software for the roboLink joint construction kit

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.com/roboLink/software



More information about software also online in roboLink® blog

► www.igus.com/roboLink/blog

9001:2015

igus® is certified in accordance with ISO 9001:2015 and ISO/TS 16949:2009 in the field of energy supply systems, cables and harnessing, as well as plastic bearings.



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