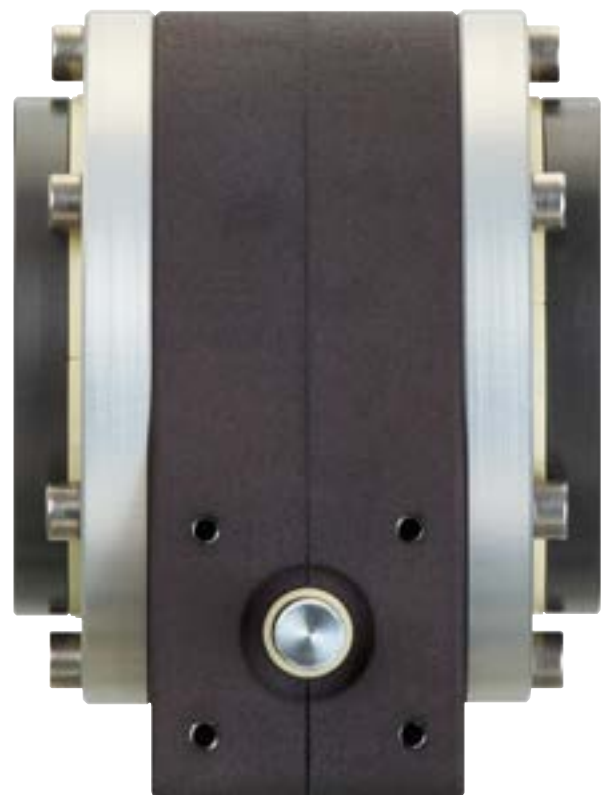
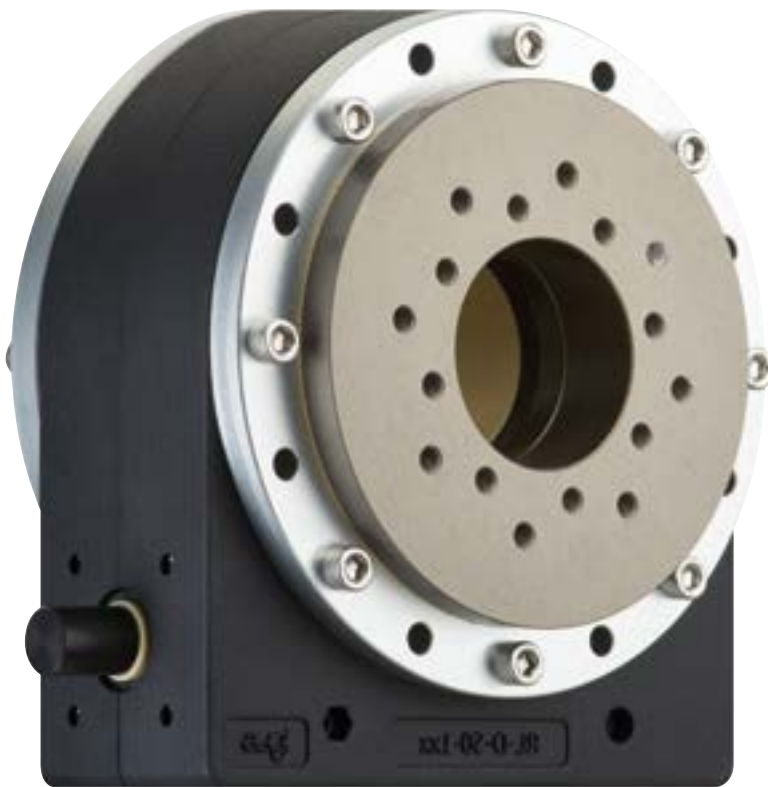

igus® data sheet

roboLink® D rotary axis

symmetric



General properties

- Worm gear with tribologically optimised material compounds
- Self-locking with transmission ratio of 1:70
- Motor drive or manual drive
- INI kit available for all options
- Cost-effective
- Lubrication-free
- Long service life
- Low clearance
- Lightweight

Contents

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Worm gears	page 03
INI kit	page 05
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RL-D-X-101



x= Installation size

... available transmission ratios

	RL-D-20-101	RL-D-30-101	RL-D-50-101
Size (HxWxD) [mm]	90 x 80 x 67	110 x 100 x 94	170 x 150 x 103
Shaft diameter	8mm	10mm	15mm
Transmission	1:38 / 1:70	1:5 / 1:50 / 1:70	1:48 / 1:70
Axis distance	31mm	40mm	63mm
Backlash (output)	< 0.5°	< 0.5°	< 0.5°
Breakaway torque	< 5cNm	< 7cNm	< 10cNm
Max. axial dyn. load on output	> 500N	> 700N	> 1,200N
Speed at max. load	20RPM	12RPM	8RPM

... Technical data

RL-D-20-101-	Weight [gr]	Efficiency * η	Moment of breakage/static	Max. dynamic output torque 12rpm	
				Periodic duty (<30%) **	permanent duty***
38-01033 (1:38)	610	0.45	30Nm	10Nm	5Nm
70-01033 (1:70)	610	0.35	20Nm	5Nm	2.5Nm (9rpm)

RL-D-30-101-	Weight [gr]	Efficiency * η	Moment of breakage/static	Max. dynamic output torque 9rpm	
				Periodic duty (<30%) **	permanent duty***
5-01033 (1:5)	1,180	0.65	40Nm	10Nm	5Nm
50-01033 (1:50)	1,180	0.40	60Nm	20Nm	10Nm
70-01033 (1:70)	1,180	0.30	30Nm	12Nm	7.5Nm (6rpm)

RL-D-50-101-	Weight [gr]	Efficiency * η	Moment of breakage/static	Max. dynamic output torque 6rpm	
				Periodic duty (<30%) **	permanent duty***
48-01033 (1:48)	3,050	0.40	180Nm	50Nm	25Nm
70-01033 (1:70)	3,050	0.30	140Nm	40Nm	20Nm

* average efficiency for an output load of 3Nm

** max. permissible output torque during intermittent operation with ED <30% (robotics)

*** max. permissible output torque during permanent operation (tested at >1,000,000 cycles)

RL-D-30-101-70-01033-PA-HK-HR with manual clamp and position indicator



... available transmission ratios

	RL-D-30-101
Size (HxWxD) [mm]	110 x 100 x 94
Shaft diameter	10mm
Transmission	1:70
Axis distance	40mm
Backlash (output)	< 0.5°
Breakaway torque	< 7cNm
Max. axial dyn. load on output	> 700N

... Technical data

RL-D-30-101-	Weight [gr]	Efficiency * η	Moment of breakage/static	Max. dynamic output torque 12rpm	
				Periodic duty (<30%) **	permanent duty***
70-01033-PA-HK-HR (1:70)	1,180	0.30	30Nm	12Nm	7.5Nm (6rpm)

* average efficiency for an output load of 3Nm

** max. permissible output torque during intermittent operation with ED <30% (robotics)

*** max. permissible output torque during permanent operation (tested at >1,000,000 cycles)

INI kit

RL-D-20-IK-01-P / RL-D-30-IK-01-P / RL-D-50-IK-01-P



Connection	M8x1
Switching output	PNP
Switching function	NO (Normally closed)
Operating voltage	10...30 V DC
Max. switching current	100mA

Motor kit

Option incl. coupling and screw flange



For RL-D-20-....	Motor type	Connection
RL-D-20-MK-C-N17-00	Stepper NEMA17	Stranded wires IP40
RL-D-20-MK-C-N17-01	Stepper NEMA17	Connector M12 IP65
RL-D-20-MK-C-N17-02	Stepper NEMA17	igus encoder motor

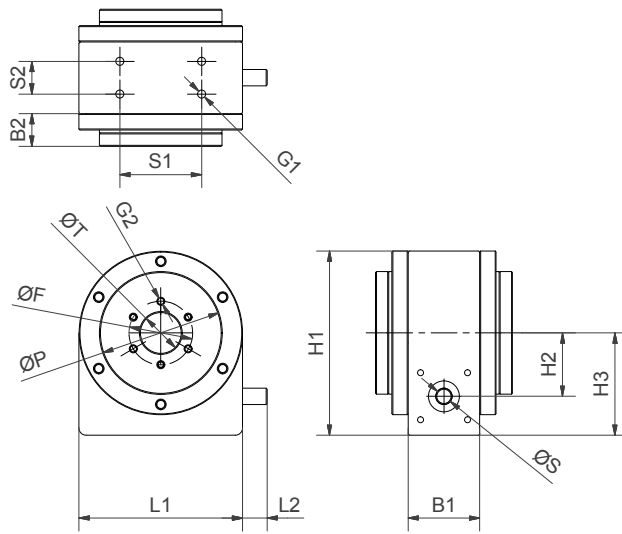
For RL-D-30-....	Motor type	Connection
RL-D-30-MK-C-N17-00	Stepper NEMA17	Stranded wires IP40
RL-D-30-MK-C-N17-01	Stepper NEMA17	Connector M12 IP65
RL-D-30-MK-C-N17-02	Stepper NEMA17	igus encoder motor

RL-D-30-MK-C-N23-00	Stepper NEMA23	Stranded wires IP40
RL-D-30-MK-C-N23-01	Stepper NEMA23	Connector M12 IP65
RL-D-30-MK-C-N23-02	Stepper NEMA23	igus encoder motor

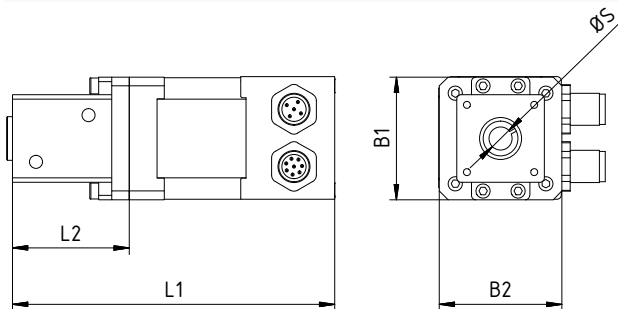
For RL-D-50-....	Motor type	Connection
RL-D-50-MK-C-N23-00	Stepper NEMA23	Stranded wires IP40
RL-D-50-MK-C-N23-01	Stepper NEMA23	Connector M12 IP65
RL-D-50-MK-C-N23-02	Stepper NEMA23	igus encoder motor

RL-D-50-MK-C-N23XL-00	Stepper NEMA23XL	Stranded wires IP40
RL-D-50-MK-C-N23XL-01	Stepper NEMA23XL	Connector M12 IP65
RL-D-50-MK-C-N23XL-02	Stepper NEMA23XL	igus encoder motor

Dimensions



Part number	ØT	ØS	ØP	ØF	L1	L2	B1	B2	H1	S1	S2	G1	G2
RL-D-20-101-38-01033	20	8	60	31	80.5	12	35	16	90.5	40	16	M4	3 x M4
RL-D-30-101-50-01033	30	10	82	42.5	100.5	12	45	19.5	110.5	55	20	M4	8 x M4
RL-D-50-101-48-01033	50	15	120	65	150.5	13	60	21.5	170.5	80	30	M6	8 x M6



	Part number	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-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
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-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
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

Cables

Motor, INI and encoder cables

... At a glance

- Suitable for energy chains
- Shielded and oil-resistant
- Straight and angled connectors

... Motor cables



Flange size 28mm (NEMA11), 42mm (NEMA17), 56mm (NEMA23), 60mm (NEMA23XL)

Bend radius moved < 10m travel: min. 5xd

Part No.	Ø	Jacket	Type	Length	Connector
MAT9043737	5.5mm	TPE	CF9.INI	3m	straight
MAT9043738	5.5mm	TPE	CF9.INI	5m	straight
MAT9043740	5.5mm	TPE	CF9.INI	10m	straight
MAT9043742	5.5mm	TPE	CF9.INI	3m	angled
MAT9043743	5.5mm	TPE	CF9.INI	5m	angled
MAT9043745	5.5mm	TPE	CF9.INI	10m	angled

... INI cables (brake)



Flange size 42mm (NEMA17), 56mm (NEMA23), 60mm (NEMA23XL)

Bend radius moved < 10m travel: min. 5xd

Part No.	Ø	Jacket	Type	Length	Connector
MAT9043716	4.5mm	TPE	CF9.INI	3m	straight
MAT9043717	4.5mm	TPE	CF9.INI	5m	straight
MAT9043719	4.5mm	TPE	CF9.INI	10m	straight
MAT9043724	4.5mm	TPE	CF9.INI	3m	angled
MAT9043725	4.5mm	TPE	CF9.INI	5m	angled
MAT9043727	4.5mm	TPE	CF9.INI	10m	angled

... Encoder cables



Bend radius moved < 10m travel: min. 10xd

Part No.	Ø	Jacket	Type	Length	Connector
MAT90432594-3	7mm	PVC	CF240	3m	straight
MAT90432594-5	7mm	PVC	CF240	5m	straight
MAT90432594-10	7mm	PVC	CF240	10m	straight
MAT90436430-3	7mm	PVC	CF240	3m	angled
MAT90436430-5	7mm	PVC	CF240	5m	angled
MAT90436430-10	7mm	PVC	CF240	10m	angled

More information at:

www.igus.eu/info/drive-technology-drylin-e-faq-data-sheets

Motor control D1 drive



... At a glance

- A wide range of automation tasks by simple parameterisation , no programming necessary
- For single axes, line, low-profile linear and room linear robots and delta robots
- No software installation or app required
- Use with PC, tablet or smart phone
- Stepper (ST), DC and EC/BLDC motors with up to 21A peak currents and 48V
- Digital inputs/outputs, analogue inputs, CANopen, ModbusTCP (Gateway) for connection to master control systems such as Siemens or Beckhoff

... Technical data

Voltage supply	12-24V DC logic, 12-48V DC load
Motor type	Stepper, DC, EC/BLDC motor
Power supply	7A nominal current, 21A peak

More information at:

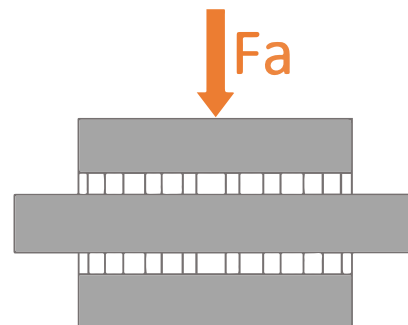
<https://www.igus.eu/info/drive-technology-dryve-motor-control-system>

igus® check list

Calculation example:

Customer requirements

Load capacity (Fa)	: 50kg
Revolutions/min. (n)	: 15/min
Operating mode (1)	: rotating
Operation (2)	: continuous operation
Type of installation	: low profile/vertical
Control system	: 24V
Temperature range	: 35°C
Tilting moment	: No, as centrally arranged



Procedure

1. What technical data is needed for the calculation?

Load capacity	Yes <input checked="" type="checkbox"/>	50kg	No <input type="checkbox"/>
Tilting moment	Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>
Control system	Yes <input checked="" type="checkbox"/>	24V	No <input type="checkbox"/>
Temperature range	Yes <input checked="" type="checkbox"/>	35°C	No <input type="checkbox"/>
Speed	Yes <input checked="" type="checkbox"/>	15 1/min	No <input type="checkbox"/>
Operating mode (1)	<input checked="" type="checkbox"/>	rotating	<input type="checkbox"/> pivoted
Operating mode (2)	<input checked="" type="checkbox"/>	permanent operation	<input type="checkbox"/> intermittent operation

2. How are the individual transmission ratios for design of the motor calculated?

Formula: $n * i$ (Parameters of transmission ratio: table "available transmission ratio" p.3)

RL-D-20-102-

$$15 \frac{1}{\text{min}} * 38 = 570 \frac{1}{\text{min}}$$

$$15 \frac{1}{\text{min}} * 70 = 1050 \frac{1}{\text{min}}$$

RL-D-30-102-

$$15 \frac{1}{\text{min}} * 5 = 75 \frac{1}{\text{min}}$$

$$15 \frac{1}{\text{min}} * 30 = 450 \frac{1}{\text{min}}$$

$$15 \frac{1}{\text{min}} * 50 = 750 \frac{1}{\text{min}}$$

$$15 \frac{1}{\text{min}} * 70 = 1050 \frac{1}{\text{min}}$$

RL-D-50-102-

$$15 \frac{1}{\text{min}} * 48 = 720 \frac{1}{\text{min}}$$

$$15 \frac{1}{\text{min}} * 70 = 1050 \frac{1}{\text{min}}$$

possible as transmission ratio is below the maximum range *See point 3 on the checklist*

3. What transmission ratio is possible?

► Max. speed of 400/min is recommended for the stepper motor, otherwise, the result would be a considerable power drop.

Legend

i	= Transmission ratio
η	= Efficiency
M_{in}	= Input drive torque
M_{out}	= Outgoing drive torque
n	= Speed 1/min

Payload	= Weight that rests on the PRT
Operating mode (1)	= Rotating/pivoted
Operating mode (2)	= Permanent mode/intermittent mode
Type of installation	= horizontal/vertical
Control system	= 24V/48V
Tilting moment	= Exists unless applied centrally

4. How do I calculate the outgoing output torque M_{out} ?

- ▶ Open the "PRT Expert"
- ▶ Enter the values from the customer requirements in order to determine the outgoing output torque M_{out}
- ▶ If there are no values or they are not relevant, enter 0

Pos.	Artikel	Abbildung
1	PRT-01 Hochtemperatur Art.-Nr.: PRT-01-30-H1 Innendurchmesser d: 30 mm Lochteilkreis D1: 91 mm Aussendurchmesser D: 100 mm Verfügbarkeit: Lieferzeit 24 - 48 Std. Preis: 102,11 €	

Service life

Hours 2849
 Rotations 2,564,131

more results

necessary drive torque 3.4Nm

5. How is the input drive torque M_{in} calculated?

For RL-D-30-102-5-01035 (1:5) ▶ $M_{in} = \frac{M_{out}}{i \cdot \eta} = \frac{3.4Nm}{5 \cdot 0.65} = 1.046Nm$

i: 5
 η: 0.65
 M_{out} : 3.4Nm

Read the i and η values from the table "Technical data" (p.3)
 Obtain M_{out} value from the PRT Expert

6. Are the calculated values within the allowed range?

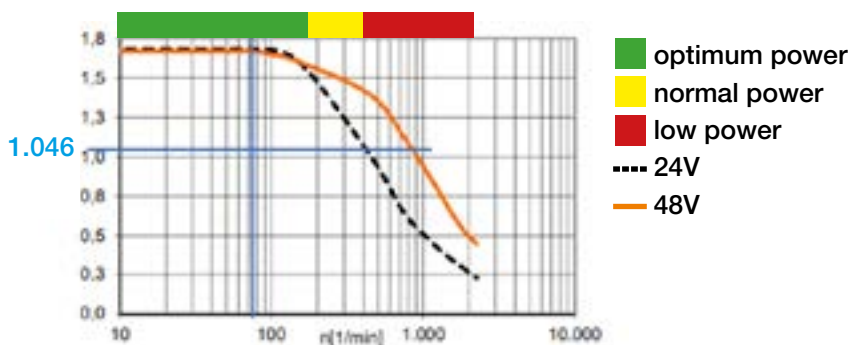
- ▶ See table "Technical data" (p.3), column "permanent duty****"
- ▶ 5Nm > 1.046Nm
- ▶ If the value is appropriate, go to the next step!
- ▶ If the value is NOT appropriate, **it is not possible to use**
- ▶ Customer requirements do not match our products

7. How do I design the motor?

- ▶ Check whether the input drive torque M_{in} & the speed are appropriate

For RL-D-30-102-5-01035 ▶ $15 \frac{1}{min} \cdot 5 = 75 \frac{1}{min}$ $M_{in} = \frac{M_{out}}{i \cdot \eta} = \frac{3.4Nm}{5 \cdot 0.65} = 1.046Nm$

Nema 23 diagram



8. **Conclusion**

- ▶ NEMA23: Use is possible as it is outside borderline range and can produce optimum power, e.g. large loads possible, more speed possible