

## Datasheet

### Torque sensor

# DRVL

**27 torque ranges from 0,02 Nm up to 20.000 Nm  
precise measurement of torque, rpm  
and angle of rotation**

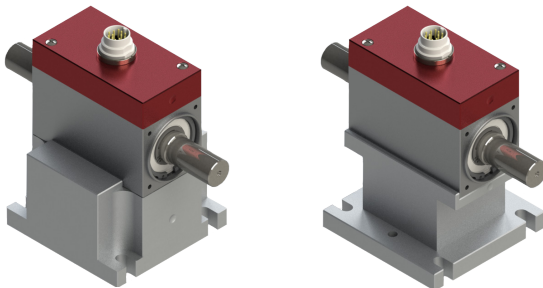
### Option „F“ with base

Alternative fastening option,  
enables simplified attachment!  
Easy to assemble!

Alignment in the longitudinal axis using a parallel key,  
oriented and unmistakable installation  
(for example after recalibration)  
by means of parallel pins

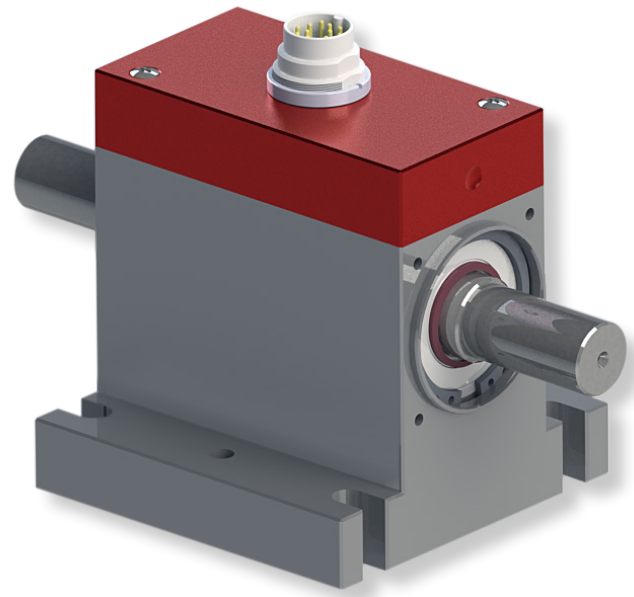
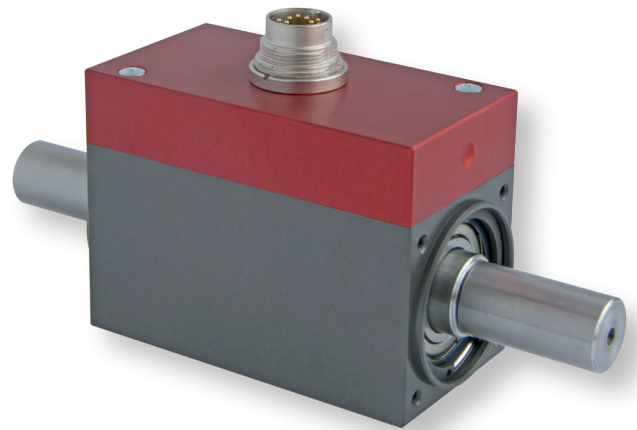
### Accessory mounting adapter

Precise peak height adjustment  
to a desired level.  
Hole pattern is the same as option with base.



### Features

- contactless signal transmission
- integral signal amplifier
- low moment of inertia
- rpm measurement (optional)
- angle of rotation measurement (optional)
- advanced electromagnetic compatibility (EMC)
- adjustable output level for rpm- and angle signal (5 - 24 V)
- larger rpm range for rpm- and angle measurements
- frequency output 10 kHz  $\pm$  5 kHz
- larger input voltage range (10 - 28,8 V)
- compact dimensions, universally applicable
- strain gauge technology
- option base
- accessory mounting adapter
- 0.05% linearity error option



Series DRVL torque sensors are suitable for lab and industrial applications because of their small size and multiple mounting options. As supply voltage and output signal are transmitted without contact, the device can operate continuously with low wear and largely maintenance-free.

These sensors are also available with optional rpm and angular measurement for a host of applications. The integrated signal amplifier is powered with 10 - 28,8 V DC and outputs an electrically isolated analog signals of 0  $\pm$  10 V and 10 kHz  $\pm$  5 kHz

The standard version has smooth shaft ends, several types are available with optional parallel keys (see table).

A factory calibration certificate with 25% increments (left, right) is included in the scope of delivery.

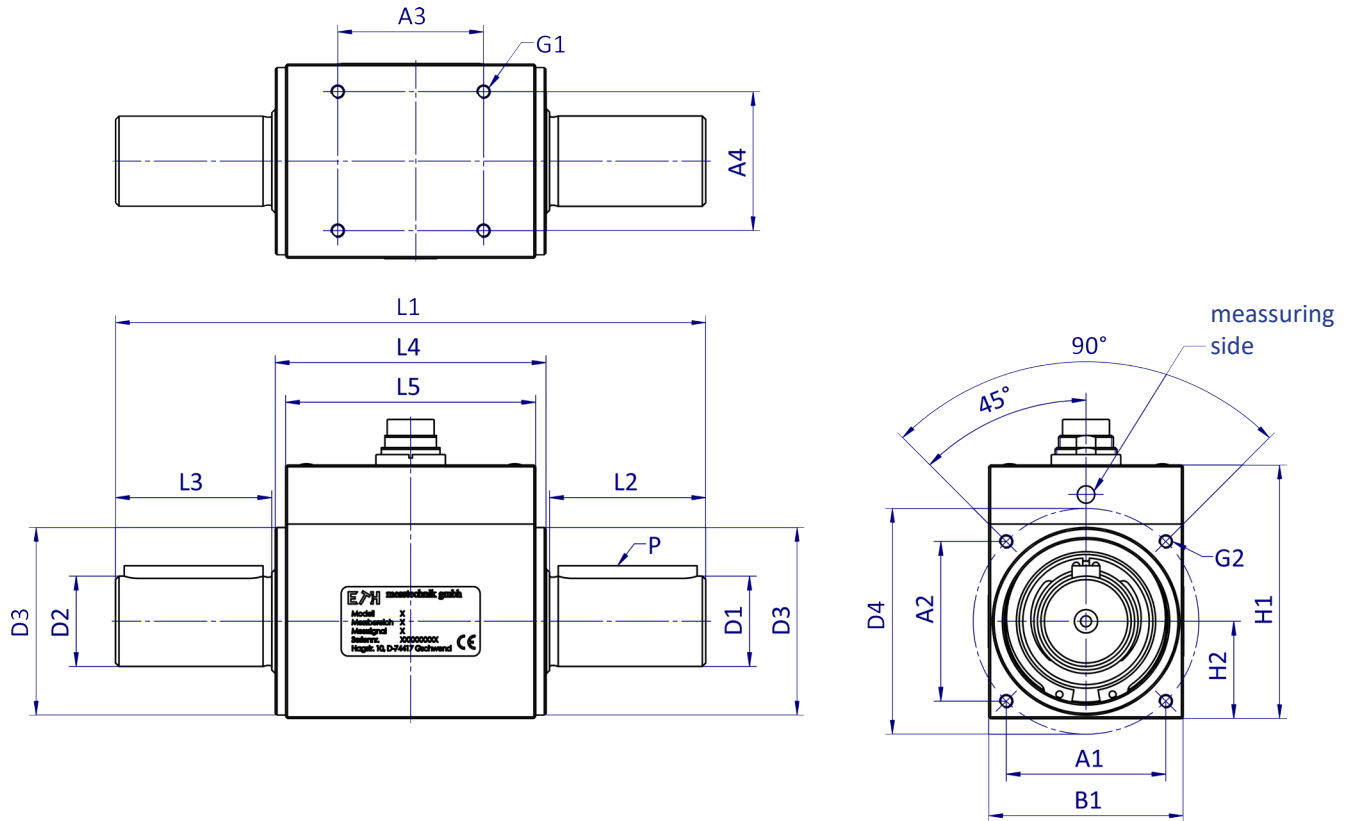
## Electrical specifications DRVL

Supply voltage:	10 - 28,8 V DC		
Power consumption:	at Ub 12 V approx. 180 mA (switching converter 2.2 W)		
Rise time 10-90 %:	2 ms (optional 400 µs)		
Limit frequency -3 dB:	200 Hz (optional 1 kHz)		
	Voltage output:	Output frequency:	
Output signal:	0 ± 10 V	10 kHz ± 5 kHz	
Resolution:	16 bit ± 0,38 mV	16 bit ± 0,19 mHz	
Max. output range:	± 11 V	± 6,3 KHz	
Internal resistance:	100 Ω	–	
Ripple:	< 100 mVpp	–	
Nonlinearity/max. measurement error (of full scale):			
DRVL:	0,15 % (optional 0,1 %)	0,15 % (optional 0,1 %)	
DRVL-I to DRVL-VI:	0,1 % (optional 0,05 %)	0,1 % (optional 0,05 %)	
Error for Hysteresis:	0,1 %	0,1 %	
Deviation at zero point:	≤ 50 mV	≤ 50 Hz	
Operating temperature:	0 - 60 °C		
Compensated temperature range:	5 - 45 °C		
Temperature error			
Zero point:	0,02 % / K		
Sensitivity:	0,01 % / K		
Mechanical overload:	100 %		
Internal protection:	IP40		
Connection:	12pin-connector (circular connector series 680)		
<b>Interference emission</b>			
Basic standard	Frequency range		
EN55011 Limit class B	150 kHz - 6 GHz		
<b>Immunity to interference</b>			
Basic standard	Testing accuracy	coupling	Result
EN61000-4-2:2009 Electrostatic discharge (ESD)	4 kV	direct	A
EN61000-4-2:2009 Electrostatic discharge (ESD)	4 kV	indirect	A
EN61000-4-3:2009 Electromagnetic fields	10 V/m	indirect	A
EN61000-4-4:2009 Bursts	2 kV	indirect	A
EN61000-4-5:2005 Surge voltages	1 kV	direct	B
EN61000-4-6:2009 Conductor-borne RF disturbances	10 V/m	indirect	A
EN61000-4-8:2005 Power frequency magnetic fields	30 A/m	indirect	A
A: Deviation of outputs during the test < 0.3 % of full scale			
B: Deviation of outputs during the test > 0.3 % of full scale			

	Rpm option (n)	Angle option (w)
Max rpm:	37.000 min <sup>-1</sup> * depending on size	20.000 min <sup>-1</sup> *
Output:	TTL or over voltage on pin 5 V < U < 24 V	
Impedance:	22 Ω	22 Ω
I <sub>max</sub> :	20 mA	20 mA
Pulses/rev.:	60	2 x 360
Resolution:	--	1°
Phase shift:	--	Channel A 90° at right spin of propulsion side

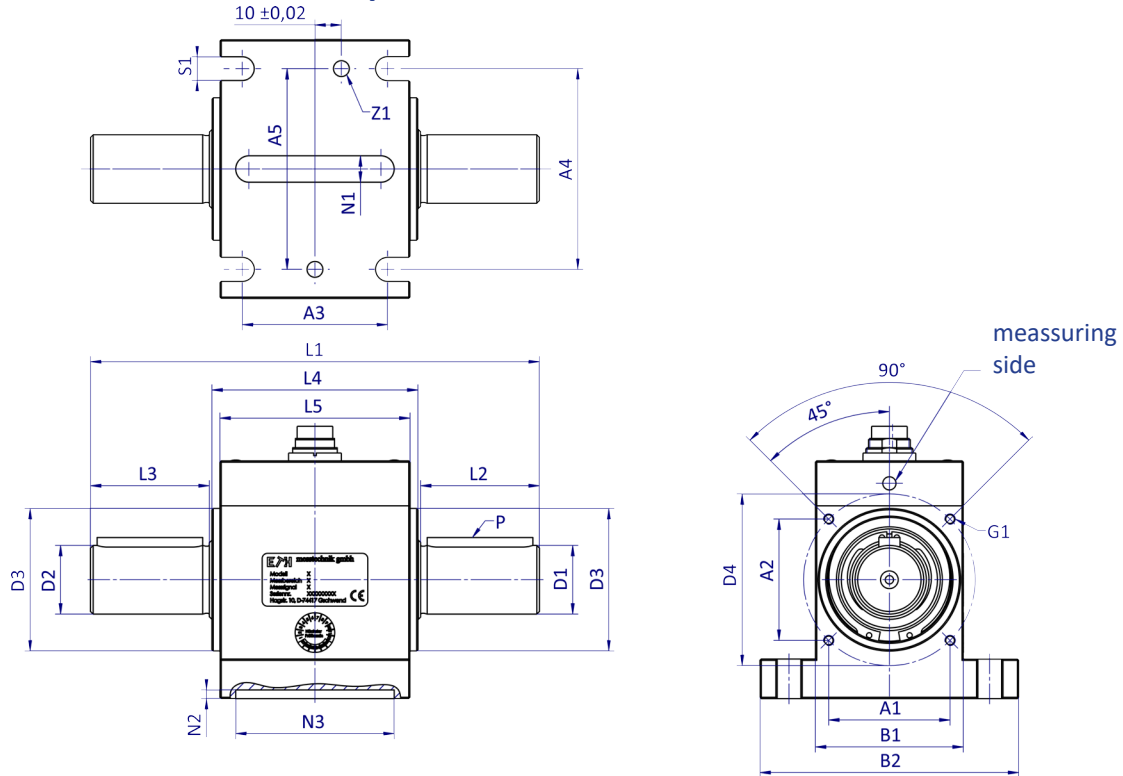
\* The values are valid for ETH test cables ≤ 10 m, the maximum permissible rpm of the sensor must be observed.

## Mechanical dimensions DRVL



Type	DRVL	DRVL-I	DRVL-Ib	DRVL-II	DRVL-III	DRVL-IV	DRVL-V	DRVL-VI	
Torque	0,02	0,05	2	1	5	50	500	2000	10.000
ranges:	0,05	0,1		2	10	100	1000	3000	15.000
(± 0 - ... )	0,10	0,2		5	20	150	1300	4000	20.000
[Nm]		0,5		10	30	200	1500	5000	
		1			50	300			
<b>Dimensions: [mm]</b> (Other ranges upon request; General tolerances DIN 2768-m)									
L1	82	89	95	110	145	170	270	320	355
L2	7,5	11	14	18	30	45	85	110	115
L3	7,5	10	14	18	30	45	85	110	115
L4	67	66	72	83	78	90	--	--	
L5	63	62	68	79	72	84	95	121	
B1	32	28	36	42	56	88	105	168	
H1	47	54	58	58	73	104	121	185	
H2 ± 0,05	14	14	18	21	28	44	52,5	84	
D1 g6	3	8	8	10	15	26	45	70	110
D2 g6	3	5	6	10	15	26	45	70	110
D3 -0,1	15	27	32	38	54	80	--	--	
D4 ± 0,1	(→ A1&A2)	32	38	46	65	98	--	--	
A1 ± 0,1	24	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	--
A2 ± 0,1	22	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	--
A3	50	40	56	60	42	46	75	91	
A4	24	22	24	32	40	70	85	138	
G1	M2,5 x 5	M3 x 5	M3 x 6	M3 x 6	M4 x 8	M6 x 12	M8 x 16	M10x16	
G2 both sides	M2,5 x 5	M3 x 6	M3 x 6	M3 x 6	M4 x 8	M6 x 12	--	--	
P (DIN 6885) optional	--	--	2x A3x3x14	2x A5x5x25	2x A8x7x40	4x A14x9x80	4x A20x12x100	--	
Weight approx. [g]	200	170	340	600	1300	4500	11.500	33.000	

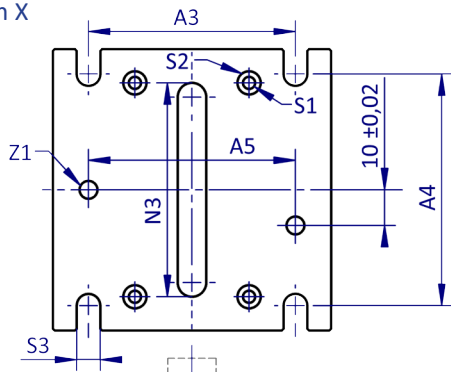
## Mechanical dimensions DRVL option „F“ with base



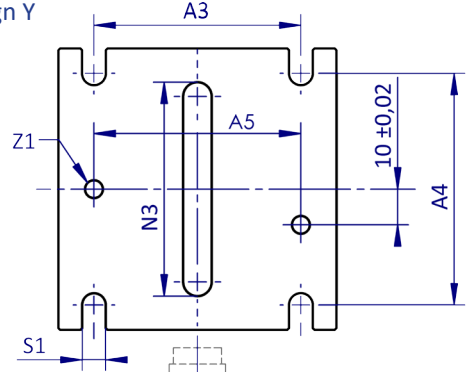
Type	DRVL-F	DRVL-I-F	DRVL-Ib-F	DRVL-II-F	DRVL-III-F	DRVL-IV-F	DRVL-V-F	DRVL-VI-F	
Torque	0,02	0,05	2	1	5	50	500	10.000	
ranges:	0,05	0,1		2	10	100	1000	15.000	
(± 0 - ... )	0,10	0,2		5	20	150	1300	20.000	
[Nm]		0,5		10	30	200	1500	5000	
		1		50	300				
<b>Dimensions: [mm]</b> (Other ranges upon request; General tolerances DIN 2768-m)									
L1	82	89	95	110	145	170	270	320	355
L2	7,5	11	14	18	30	45	85	110	115
L3	7,5	10	14	18	30	45	85	110	115
L4	63	62	68	79	72	84	95	121	
L5	67	66	72	83	78	90	--	--	
B1	56	60	78	78	98	158	208	298	
B2	32	28	36	42	56	88	105	168	
H1	78	85	85	82	90	172	228,5	316	
H2 ± 0,05	45	45	45	45	45	112	160	215	
H3	12	12	15	15	15	20	30	40	
D1 g6	3	8	8	10	15	26	45	70	110
D2 g6	3	5	6	10	15	26	45	70	110
D3 -0,1	15	27	32	38	54	80	--	--	
D4 ± 0,1	(→ A1&A2)	32	38	45	65	98	--	--	
A1	24	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	--	--	
A2	22	(→ D4)	(→ D4)	(→ D4)	(→ D4)	(→ D4)	--	--	
A3 ± 0,1	50	50	50	65	55	65	70	90	
A4 ± 0,1	44	44	58	58	76	124	156	233	
A5 ± 0,02	44	44	58	58	76	124	156	233	
G1 both sides	M2,5 x 5	M3 x 6	M3 x 6	M3 x 6	M4 x 8	M6 x 12	--	--	
S1	5,5	5,5	6,6	6,6	9	11	13	17	
Z1 E8	4	4	5	5	6	8	10	12	
N1 H8	6	6	8	8	10	10	10	10	
N2 +0,2	2,8	2,8	3,3	3,3	3,3	3,3	3,3	3,3	
N3 +0,3	50	50	60	60	60	60	80	100	
P (DIN 6885) optional	--	--	2x A3x3x14	2x A5x5x25	2x A8x7x40	4x A14x9x80	4x A20x12x100	--	
Weight approx.[g]	400	400	600	900	1600	6600	15.000	43.000	

# Mechanical dimensions mounting adapter M-DRVL

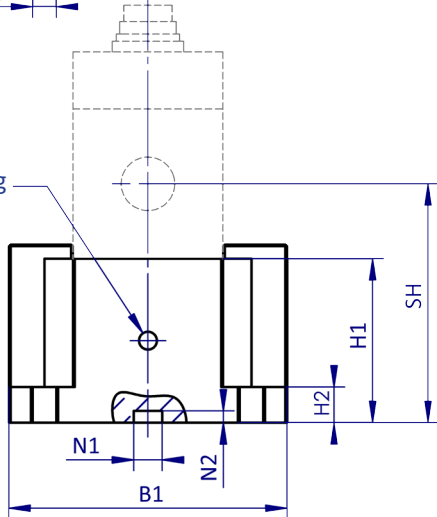
Design X



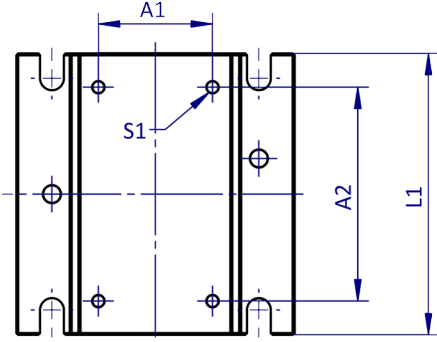
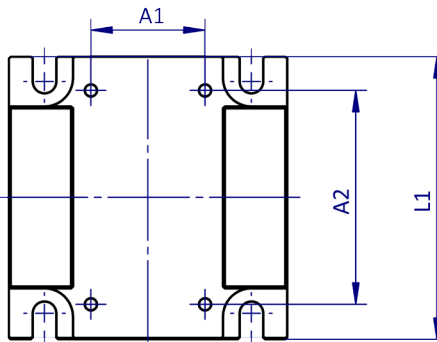
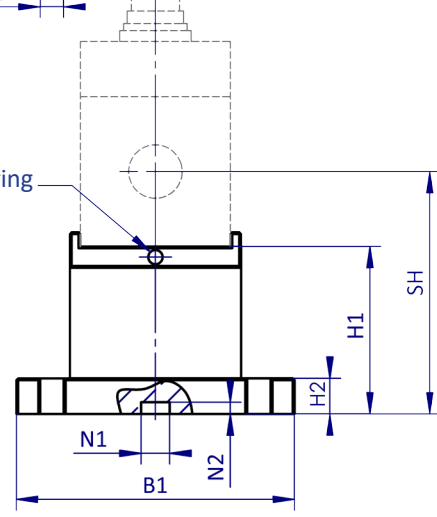
Design Y



measuring side



measuring side



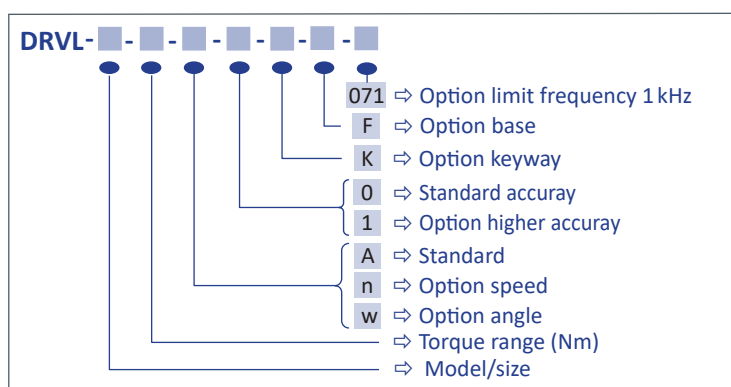
Type	M-DRVL		M-DRVL-I		M-DRVL-Ib		M-DRVL-II		M-DRVL-III		M-DRVL-IV		M-DRVL-V		M-DRVL-VI	
Design	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
SH	23...55	≥56	25...60	≥61	29...65	≥66	32...67	≥68	41...84	≥85	67...119	≥120	93...154	≥155	152...211	≥212
<b>Dimensions: [mm]</b>																
L1	63		62		68		79		72		84		95		121	
B1	56		60		78		78		98		158		208		298	
H1	= SH - 14		= SH - 14		= SH - 18		= SH - 21		= SH - 28		= SH - 44		= SH - 52,5		= SH - 84	
H2	8		10		10		10		12		15		25		35 32	
A1	24		22		24		32		40		70		85		138	
A2	50		40		56		60		42		46		75		91	
A3	44		44		58		58		76		124		156		233	
A4	50		50		50		65		55		65		70		90	
S1	2,9		3,4		3,4		3,4		4,5		6,6		9		11	
S2	6,5 --		6,5 --		6,5 --		6,5 --		8,5 --		11,5 --		15,5 --		18,5 --	
S3	5,5		5,5		6,6		6,6		9		11		13		17	
Z1 E8	4		4		5		5		6		8		10		12	
N1 H8	6		6		8		8		10		10		10		10	
N2 +0,2	2,8		2,8		3,3		3,3		3,3		3,3		3,3		3,3	
N3 +0,3	50		50		60		60		60		60		80		100	
Weight approx. [g]	80...330 ≥230		110...380 ≥220		150...430 ≥350		180...660 ≥420		230...850 ≥500		740...2200 ≥1300		1900...4100 ≥2800		5700...9900 ≥6800	

Ordering code: M-[Sensor-type]-SH[peak height in mm] → Example: M-DRVL-II-SH65

## Mechanical specifications DRVL

Type	Torque range (0 - ...) [Nm]	Max. rpm [min <sup>-1</sup> ]	Spring constant [Nm/rad]	Mass moment of inertia [g x cm <sup>2</sup> ]			Max. axial load [N]	Max. radial load [N]
				Total	Drive side	Measuring side		
DRVL	0,02	20.000	8	7	7	0,1	35	30
	0,05	20.000	8	7	7	0,1	35	30
	0,10	20.000	8	7	7	0,1	35	30
DRVL-I	0,05	37.000	25	10	10	0,2	105	2
	0,1	37.000	40	10	10	0,2	140	3
	0,2	37.000	40	10	10	0,2	140	3
	0,5	37.000	80	10	10	0,3	160	4
	1	37.000	80	10	10	0,3	210	7
	2	37.000	213	10	10	0,4	210	13
DRVL-Ib	1	26.000	250	29	24	5,5	630	10
	2	26.000	250	29	24	5,5	630	10
	5	26.000	710	29	24	5,6	725	25
	10	26.000	1319	30	24	5,9	725	50
DRVL-II	5	19.000	955	98	65	32	1200	15
	10	19.000	2115	98	66	32	1300	30
	20	19.000	3955	99	66	32	1300	60
	30	19.000	5335	100	67	33	1300	100
	50	19.000	6700	103	68	34	1300	155
DRVL-III	50	13.500	17.000	774	428	346	1800	125
	100	13.500	30.000	782	432	350	1800	215
	150	13.500	44.000	796	439	357	1800	340
	200	13.500	54.000	809	446	364	1800	450
	300	13.500	66.000	837	459	377	1800	650
DRVL-IV	500	7900	259.000	9930	5290	4640	4150	650
	1000	7900	387.000	10.140	5395	4745	4150	1275
	1300	7900	429.000	10.280	5465	4815	4150	1650
	1500	7900	449.000	10.380	5515	4865	4150	1650
DRVL-V	2000	6300	1.430.000	62.905	32.560	30.345	4800	1950
	3000	6300	1.820.000	63.505	32.860	30.645	4800	2930
	4000	6300	2.090.000	64.225	33.220	31.005	4800	3880
	5000	6300	2.270.000	65.005	33.610	31.395	4800	4000
DRVL-VI	10.000	4000	8.200.000	434.720	221.570	213.150	11.800	8000
	15.000	4000	10.440.000	442.430	225.430	217.000	11.800	8000
	20.000	4000	11.800.000	450.880	229.650	221.230	11.800	8000

## Ordering code



## Available accessories

- ETH-Measurement cable
- Display and evaluation devices
- Couplings