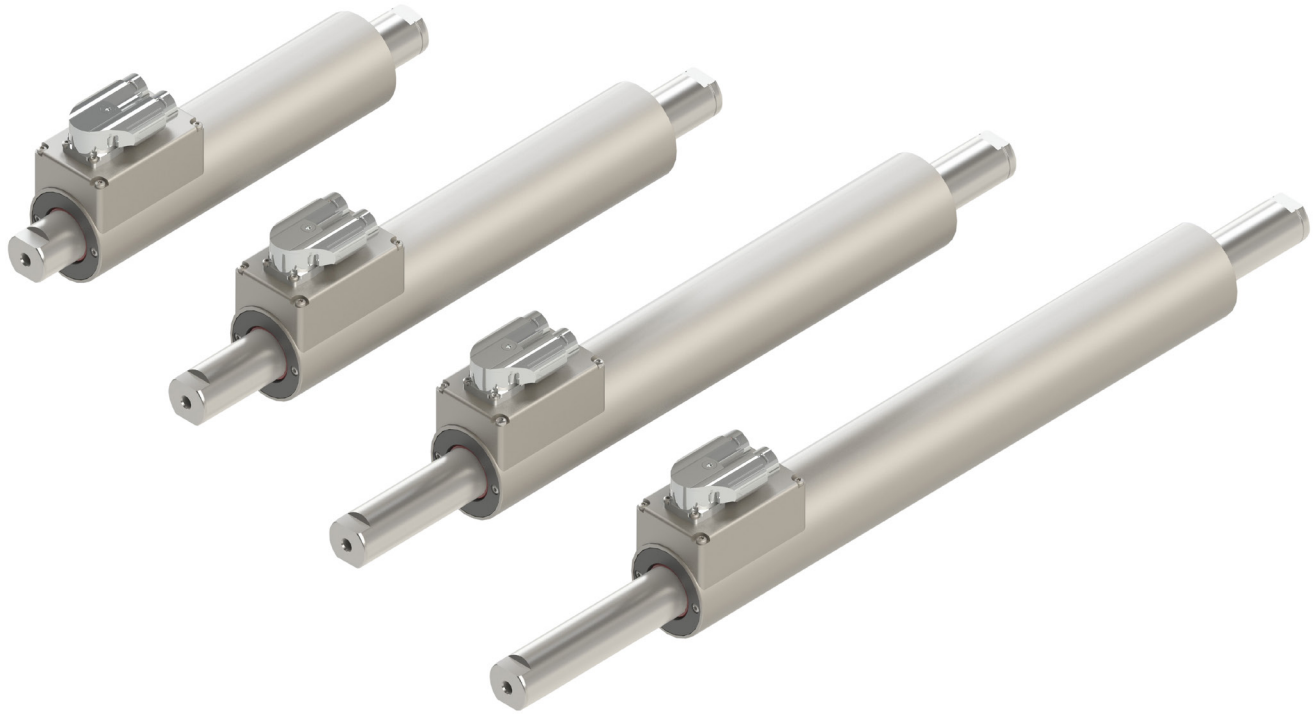
Linear Motor Series P10-54 for third party drives



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Motor Specification

		PS10-54x120U	PS10-54x180U	PS10-54x240U	PS10-54x300U
Maximum stroke	mm	2240	2180	2120	2060
Peak force [6/7]	N	357	535	714	892
Continuous stall force [1]	N	70	105	140	175
Continuous stall force [2]	N	102	153	204	255
Continuous stall force [3]	N	not defined	not defined	not defined	not defined
Peak velocity [4]	m/s	8.5	11.1	8.4	8.7
Peak acceleration [6/7]	m/s^2	245	366	410	413

Electrical Specification

		PS10-54x120U	PS10-54x180U	PS10-54x240U	PS10-54x300U
Nominal DC-Link voltage	Vdc	560	560	560	560
Maximum DC-Link voltage	Vdc	680	680	680	680
Peak current [6/7]	A_{pk}	7.8	15.2	15.2	19.8
Peak current [6/7]	A_{rms}	5.5	10.7	10.7	14.0
Continuous stall current [1]	A_{rms}	1.1	2.1	2.1	2.7
Continuous stall current [2]	A_{rms}	1.6	3.1	3.1	4.0
Force constant @ 25°C	N/A_{rms}	65	50	66	64
Back EMF constant (ph-ph) @ 25°C	$V_{pk}/(m/s)$	53	41	54	52
Resistance @ 25°C (ph-ph)	Ohm	14.5	5.7	7.6	5.6
Resistance @ 120°C (ph-ph)	Ohm	19.9	7.8	10.4	7.7
Inductance (ph-ph)	mH	12.7	5.0	6.6	4.9
Current Saturation	A	8.6	16.7	16.7	21.8

Thermal Specification

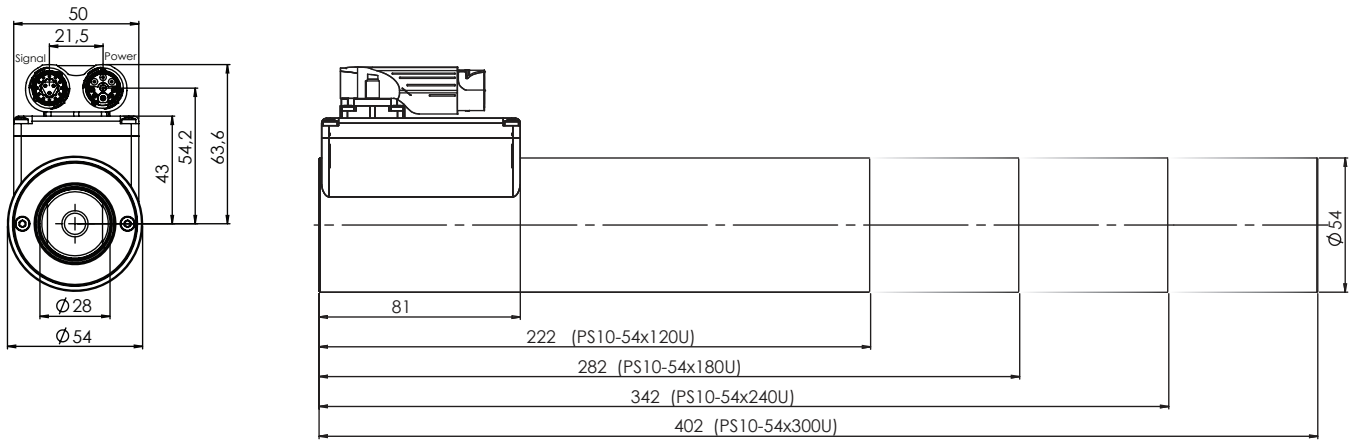
		PS10-54x120U	PS10-54x180U	PS10-54x240U	PS10-54x300U
Max. winding temp.	°C	120	120	120	120
Max. duration with peak current	s	6.5	6.5	6.5	6.5
Max. power dissipation [1/2]	W	35 / 75	53 / 113	70 / 150	88 / 188
Thermal resistance [1/2]	°C/W	2.44 / 1.14	1.62 / 0.76	1.22 / 0.57	0.98 / 0.46
Thermal time constant [1/2]	s	3000 / 900	3000 / 900	3000 / 900	3000 / 900
Thermal winding capacity [1]	J/°C	56	84	112	140
$I^2 t$ value[5]	$A^2 s$	not defined	not defined	not defined	not defined

Mechanical Specification

		PS10-54x120U	PS10-54x180U	PS10-54x240U	PS10-54x300U
Stator length	mm	222	282	342	402
Stator diameter	mm	54	54	54	54
Stator mass	kg	1.3	2	2.65	3.3
Slider length (min/max)	mm	350 / 2500	330 / 2500	410 / 2500	500 / 2500
Slider diameter	mm	28	28	28	28
Slider mass	kg/m	4.6	4.6	4.6	4.6
Magnetic period (el. cycle)	mm	30	30	30	30

1) Motor with flange @ 25°C ambient temperature
2) Motor with flange and fan cooling @ 25°C ambient temperature
4) PWM Duty Cycle = 80%, DC Link voltage = 560V
5) Motor @ max. ambient temperature
6) Real time calculation of motor winding temperature required (including monitoring).
7) Temperature monitoring on temperature sensor signal only. No use of thermal model calculation.

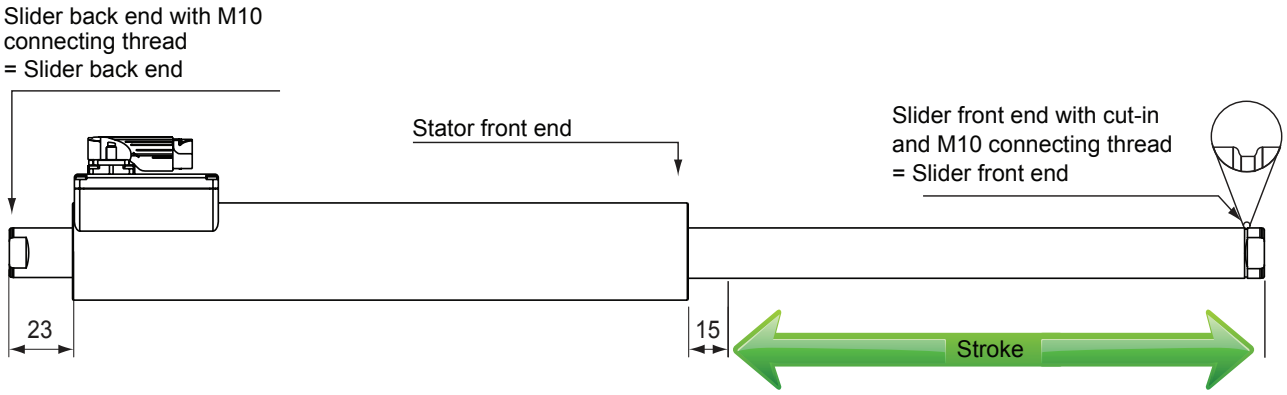
Mechanical Dimensions



Materials

Stator surface	Iron, nickel plated
Slider surface	Stainless steel (1.4301)
Slider Bushing	POM based

Strokes



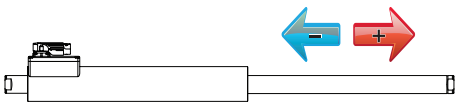
Stator	PS10-54x120	PS10-54x180	PS10-54x240	PS10-54x300
Slider	**Stroke in mm**			
PL01-28x350/270	90	30		
PL01-28x410/330	150	90	30	
PL01-28x500/420	240	180	120	60
PL01-28x620/540	360	300	240	180
PL01-28x710/630	450	390	330	270
PL01-28x800/720	540	480	420	360
PL01-28x920/840	660	600	540	480
PL01-28x1010/930	750	690	630	570
PL01-28x1220/1140	960	900	840	780
PL01-28x1400/1320	1140	1080	1020	960
PL01-28x1610/1530	1350	1290	1230	1170
PL01-28x1820/1740	1560	1500	1440	1380
PL01-28x2000/1920	1740	1680	1620	1560
PL01-28x2210/2130	1950	1890	1830	1770
PL01-28x2300/2220	2040	1980	1920	1860
PL01-28x2450/2370	2190	2130	2070	2010
PL01-28x2500/2430	2240	2180	2120	2060

Environnement, EMC & Certifications

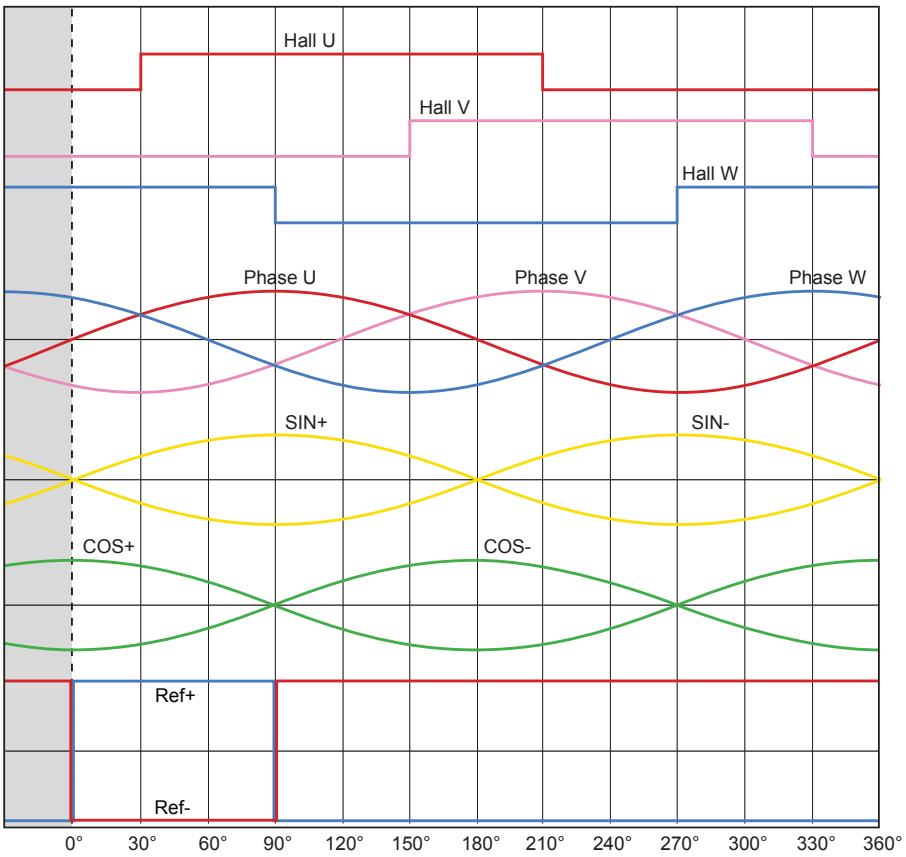
Operating Temperature	-10°C to +80°C
Storage Temperature	-25°C to +80°C
Ingress Protection	TBD
Altitude (above mean sea level)	TBD
	TBD
Overvoltage Category	TBD
Pollution degree	TBD
EMC	TBD
CE	TBD
UL	TBD

Integrated Position Feedback

The Linear Motor Series P10-54 has noncontact, integral position feedback.
No external encoder is required. Position output is industry standard 1Vpp sin/cos signals with 60mm period. The position sensor outputs analogue, differential sine and cosine signals to provide position feedback.
The relation between the phase current and the position sensor output is shown on the right. (SIN+ and SIN- encoder signal is always in phase with motor current phase U).



The arrows indicate the direction of movement of the slider. The stator is locked into position.



One magnetic period (360°) corresponds to 60mm stroke

		P10-54x...-D0x
Output signal period	mm	60
Signal amplitude[3]	V_{pp}	1
Termination[3]	Ohm	120
Supply voltage	Vdc	5 - 12
Power consumption	mW	< 1000
		(I < 150 mA @ 5VDC, I < 80mA @ 12VDC)[2]
Position repeatability[1]	um	10
Linearity over 1m[1]	%	< ± 0.035

1) Dependent on the amplifier. Under constant operating conditions
2) Power effeciency of the motor electronics varies with supply voltage
3) Applicable for sin+/sin-, cos+/cos- and ref+/ref- signals.
Hall U/V/W are open collector signals.

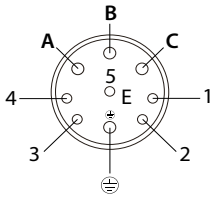
Integrated Position Feedback

Overheat protection is provided by three internal thermistors embedded in the motor windings. These thermistors are monitored by the motor's electronics. A single thermistor is emulated based on the maximum of the measured temperature values. This is done to accurately monitor the temperature over the whole length of the stator and to react as fast as possible to dynamic changes in a single motor phase.

As the motor winding temperature reaches its absolute maximum value, the drive amplifier or servo controller must disable the motor in order to protect the motor from overheat damages.

Attention: It is strongly recommended that the motor over-temperature sensor is connected to the drive amplifier or servo controller at all times in order to reduce the risk of damage to the motor due to excessive temperatures. The motor encoder has to be powered to ensure correct temperature read-outs.

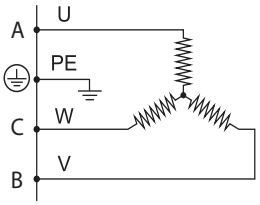
Power Connector



mating view
(connector on motor)

Connector type:
Intercontec Series 915, 9-pin
locktec (ESTB 202 NN00 44L05 3000)

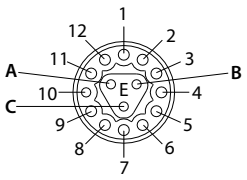
Cable type:
screened motor cable, wire diameter=1.0mm²



Pin	P10-54x...-D01	Wire Color
A	Phase U	Red
PE	Protective Earth	Yellow/Green
B	Phase V	Blue
C	Phase W	Green
1	n.c.	n.c.
2	n.c.	n.c.
3	n.c.	n.c.
4	n.c.	n.c.
5	n.c.	n.c.

Encoder Connector

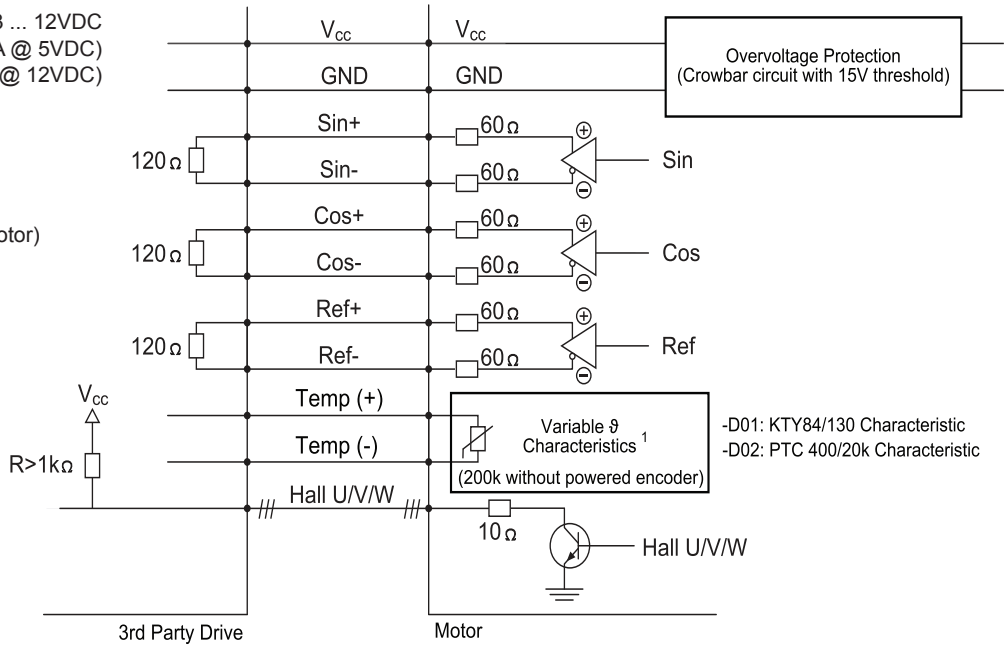
3 ... 12VDC
(Imax < 150mA @ 5VDC)
(Imax < 80mA @ 12VDC)



mating view
(connector on motor)

Connector type:
Intercontec Series 915, 15-pin,
locktec (ESTB 205 NN00 43L00 3000)

Cable type:
screened twisted pair encoder cable,
wire diameter=0.5mm²



Pin	Signal Type	P10-54x...-D01	Wire Color
1	Supply	+Vcc	White
2	Supply	GND	Brown
3	Encoder 1Vpp	Sine+	Grey
4	Encoder 1Vpp	Sine-	Pink
5	Encoder 1Vpp	Cosine+	Blue
6	Encoder 1Vpp	Cosine-	Red
7	-	-	-
8	-	-	-
9	Temperature[1]	TempEM+/TS+	Yellow-Brown
10	Temperature[1]	TempEM-/TS-	White-Yellow
11	Encoder 1Vpp	REF+	Black
12	Encoder 1Vpp	REF-	Violet
A	Encoder (open collector)	Hall U	Grey-Red
B	Encoder (open collector)	Hall V	Red-Blue
C	Encoder (open collector)	Hall W	White-Green

1) The temperature evaluation circiut must be powered from the encoder supply and must be at the same potential.
The grounds of the temperature evaluation circuit and the encoder have to be connected.
The encoder must have been powered on for at least 50 ms, before valid temperatures can be measured. If the encoder is powered off, 200k Ohms are measured between Pins 16 and 17.
The maximum voltage between Pin 16 and 17 must not exceed 16 VDC. The maximum current must not exceed 15 mA.
With HW V1.0 and below, the maximum readable temperature is limited to approx. 100 °C @ 5VDC between Pins 16 and 17 (Standard readable temperature range -20 - 200 °C.

Stator and Sliders

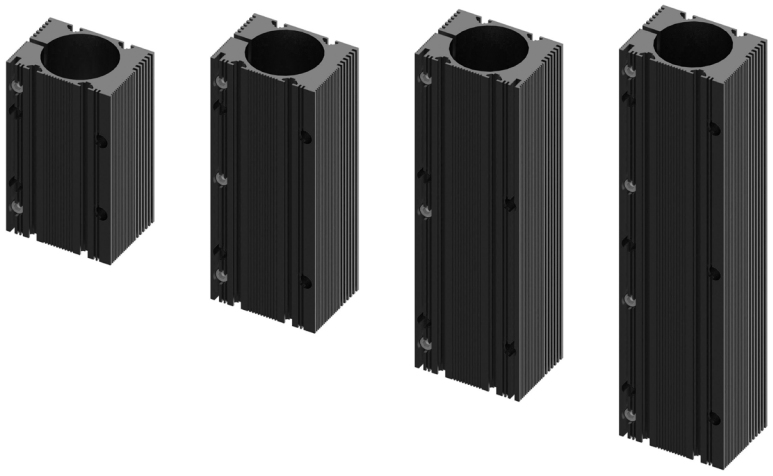
Item	Description	Part Number
PS10-54x120U-BL-TU-D01	Stator 3x400VAC, Sin/Cos Encoder 1Vpp, KTY	0150-2726
PS10-54x180U-BL-TU-D01	Stator 3x400VAC, Sin/Cos Encoder 1Vpp, KTY	0150-2727
PS10-54x240U-BL-TU-D01	Stator 3x400VAC, Sin/Cos Encoder 1Vpp, KTY	0150-2728
PS10-54x300U-BL-TU-D01	Stator 3x400VAC, Sin/Cos Encoder 1Vpp, KTY	0150-2729

Slider Series PL01-28		
Item	**Description**	**Part Number**
PL01-28x350/270	Slider 'standard'	0150-1380
PL01-28x410/330	Slider 'standard'	0150-1381
PL01-28x500/420	Slider 'standard'	0150-1382
PL01-28x620/540	Slider 'standard'	0150-1383
PL01-28x710/630	Slider 'standard'	0150-1384
PL01-28x800/720	Slider 'standard'	0150-1385
PL01-28x920/840	Slider 'standard'	0150-1386
PL01-28x1010/930	Slider 'standard'	0150-1387
PL01-28x1220/1140	Slider 'standard'	0150-1388
PL01-28x1400/1320	Slider 'standard'	0150-1389
PL01-28x1610/1530	Slider 'standard'	0150-1390
PL01-28x1820/1740	Slider 'standard'	0150-1395
PL01-28x2000/1920	Slider 'standard'	0150-1396
PL01-28x2210/2130	Slider 'standard'	0150-1397
PL01-28x2300/2220	Slider 'standard'	0150-1528
PL01-28x2450/2370	Slider 'standard'	0150-1398
PL01-28x2500/2430	Slider 'standard'	0150-1426

Trailing Chain High Flex Power & Encoder Cables

Cables		
Item	**Description**	**Part Number**
KPS07-04/02-./Tk-10	Power trailing chain cable ./Tk, 10m	0150-3626
Special cable KPS07-04/02-./Tk-.	Power trailing chain cable ./Tk, Custom Length	0150-3622
KSS05-02/13-./Uk-10	Encoder trailing chain cable ./Uk, 10m	0150-3627
Special cable KSS05-02/13-./Uk-	Encoder trailing chain cable ./Uk, Custom Length	0150-3619

Flanges and Fan



Flanges PF10-54		
Item	**Description**	**Part Number**
PF10-54x140	Flange for PS10-54x120	0150-2733
PF10-54x200	Flange for PS10-54x180	0150-2734
PF10-54x260	Flange for PS10-54x240	0150-2735
PF10-54x320	Flange for PS10-54x300	0150-2736

Fan		
Item	**Description**	**Part Number**
HV01-37/48	Fan kit for H01-37/48 & PF02-37/48	0150-5051

Drive Compatibility

Manufacturer	Type	Note
Siemens	Sinamics S120 with SMC20 encoder module	Connect sense supply
B&R	ACOPOS with AC0124 encoder module	-
Bosch	Indradrive Cs	-
Robox	SPIMD20	No temperature monitoring ->
		May result in severe motor damage
Schneider Electric	Lexium32M with analog encoder module	-
Rockwell	Kinetix 6200/6500	-
Lenze	-	-
AMK	-	-

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