Installation Instructions for *LinMot®* Linear Motor

Version 2.24

CAUTION

MAGSPRING SLIDERS CONTAIN NEODYMIUM MAGNETS WHICH MAY DISTURB OR DAMAGE MAGNETIC DATA CARRIERS AND DELICATE ELECTRONIC EQUIPMENT LIKE PACEMAKERS, CELLPHONES,COMPUTERS OR WATCHES MERELY BY COMING CLOSE TO THEM.
DO NOT HEAT THE SLIDERS. THE MAGNETS WILL BE DESTROID BY TEMPERATURE HIGHER THAN 120°C (240°F)

WHEN HANDLING SLIDERS BE AWARE THAT, DUE THE STRONG MAGNETIC ATTRACTION, INJURY FROM FINGERS BEING PNICHED BETWEEN THE SLIDER AND NEARBY STEEL PARTS IS A VERY REAL POSSIBILITY IF CAUTION IS NOT EXERCISED.

AVOID HITTING SLIDERS AGAINST STEEL PARTS, TOOLS, ETC., AS THIS MAY PERMANENTLY DAMAGE THE SLIDER (SURFACE DAMAGE OR BENDING.) DO NOT SAW, TURN, DRILL OR CUT OF THE SLIDERS BECAUSE THIS WILL DESTROY THE SLIDERS AND MAY LEAD TO INFLAMMABLE DUST.

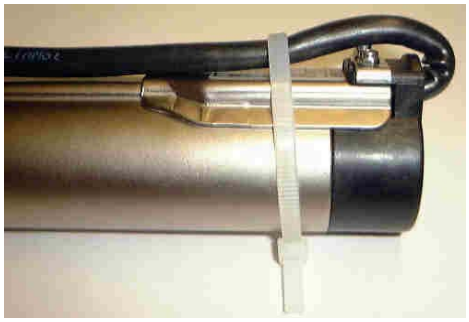
THE SLIDERS OF LINMOT® MOTORS CAN REACH TEMPERATURES WHICH MAY CAUSE BURNS UPON BEING TOUCHED.

THE SLIDERS OF LINMOT® LINEAR MOTORS ARE FAST-MOVING MACHINE PARTS. THE USER MUST TAKE ALL NECESSARY PRECAUTIONS TO PREVENT THEIR BEING TOUCHED (PROVIDE COVERS, PROTECTION AGAINST TOUCHING ETC.).

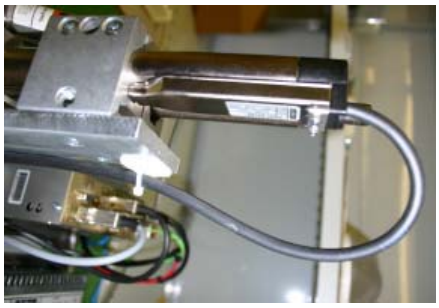
Content

Cable / Electrical Connection of *LinMot*® Linear Motors

- **Do not connect or disconnect motor when there is power on the controller.**
- **The cable attached to the stator is NOT a high flex / trailing chain cable. For moving cable applications please use our special LinMot *KS..* high flex / trailing chain cables.**
- **Do not bend cable over end of stator. Maintain minimum bending radius of 25 mm (1 in).**



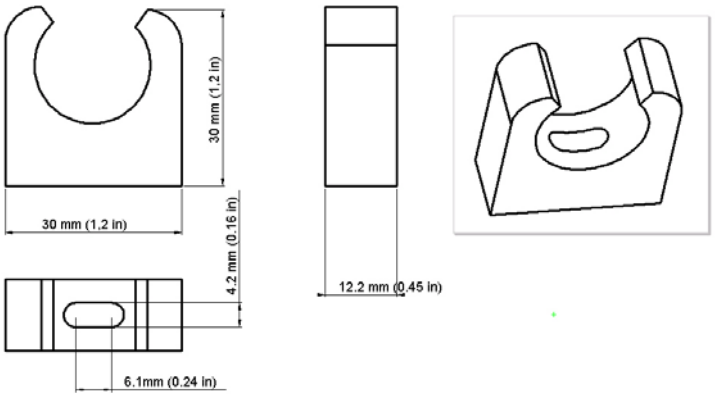
WRONG !!



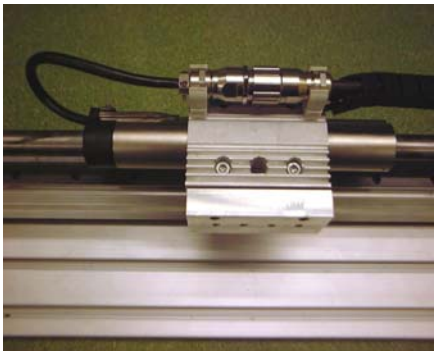
Maintain minimum bending radius of 25 mm

Mounting Clips for M-Typ IP67 connectors

Every M-Type Stator is delivered with two mounting clips for the metallic IP67 connectors. In moving stator applications or in an environment with heavy vibrations it is important that the heavy IP67 connectors are mounted to the machine. Otherwise the metallic connectors may start to oscillate and damage the stator cable.
In addition it is recommended that the high flex/trailing chain cable be placed in a cable track as showing in the picture below.



Material: Polypropylene Color: Grey RAL 7035
Part.-No: 0150-3076



LinMot® PS01-37x120-M stator in a moving stator application with mounting clips for IP67connectors.
Note: Motor cable is not moved!
Minimal bending radius is maintained.

Water tight shrink Tube MCP01-18 for IP67 connections

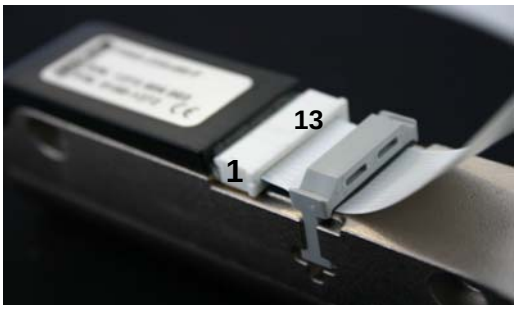
The special shrink tube MCP01-18 is a heat shrink tube with heat activated sealant which is used to increase the resistant to water infiltration.

Material: Polyolefin
Part-No: 0150-3089

Stator PS02-23Sx80-F with flat cable connection

Contacts on the upper side of cable (visible)

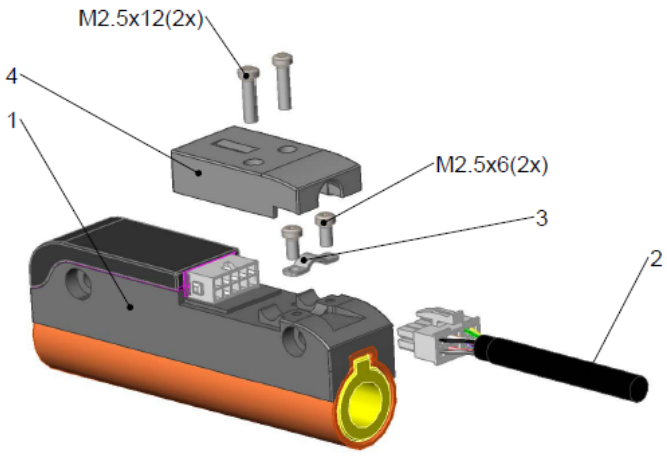
The PS02-23Sx80-F stator is to be connected with a 13 pin flat conductor cable. The flat conductor cable may be connected directly on the integrated ZIF connector (ZIF-Line from Molex, 13 pin, pitch 1.25 mm).



Do not connect or disconnect motor when there is power on the controller: Connecting the flat cable will most probably lead to shortcuts and destroy motor and controller if done under power!

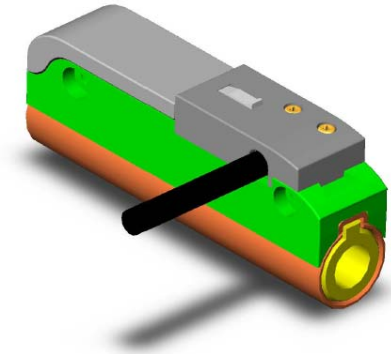
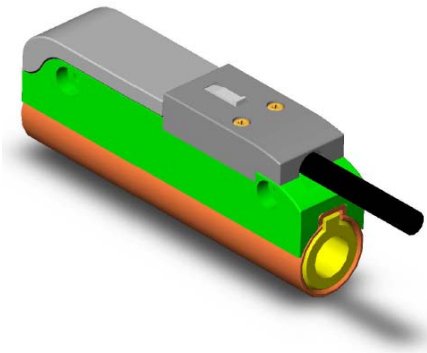
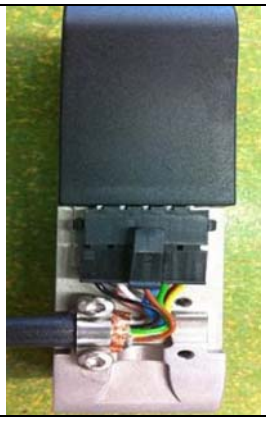
KF02-D15/F-0,8	Flat Conductor 0.08m	(length 80 mm)	(3.15 in)	Part-No 0150-2150
KF02-D15/F-0,8	Flat Conductor 0.16m	(length 160 mm)	(6.30 in)	Part-No 0150-2156
KF02-D15/F-0,8	Flat Conductor 0.32m	(length 320 mm)	(12.6 In)	Part-No 0150-2152
KF02-D15/F-0,8	Flat Conductor 0.48m	(length 480 mm)	(18.9 in)	Part-No 0150-2154
KF02-D15/F-0,8	Flat Conductor 0.70m	(length 700 mm)	(27.6 in)	Part-No 0150-2158
K05-D/D15-1	Adapter cable D/D15, length 1 m (39.4 in) for PS02-23Sx80-F			Part-No 0150-1936

Stator PS02-23Sx80F-HP-K (0150-1285) with round cable

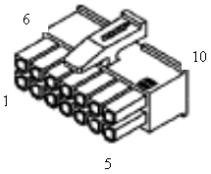
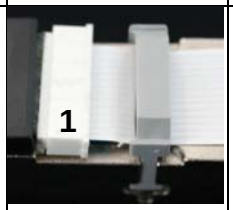


1	Stator PS02-23Sx80F-HP-K
2	Cable with connector
3	Shielding and cable relief
4	Cover (3 pc supplied back/left/right outlet)

Spar part -Kit
Part-No: 0150-3351 PSM02-23Sx80-K
includes Pos 3 and 4 with all screws

	
	
Cable outlet to left (or to the right) side (See internal Connector with relief and shielding)	Cable outlet to the back (See internal Connector with relief and shielding)

Connector Assignment of Stators

Connector Type	D-Sub 9 pol		K-Connector AMP-Micro Mate-N-Lok, 10 pol		Flat cable ZIF-Line Molex, 13 pin, pitch 1.25 mm	D-Sub 15 pol		Phoenix Connector		M-Connector		C-Connector	R-Connector
Stators	*PS01-23x80 PS01-23x160*		*PS02-23Sx80F-HP-K*		*PS02-23Sx80-F*	*Adapter cable to flat cable PS01-23Sx80*		*PS01-37x120 PS01-37x240 PS01-37x240F*		*PS01-23x..-M PS01-37x..-M*		*PS01-37x120..-C PS01-37x240..-C PS01-48x..-C*	*P0S1-23x80..-R PS01-23x160..-R*
	PIN	**Wire**	**PIN**	**Wire**	**Pin & Wire**	**PIN**	**Wire**	**PIN**	**Wire**	**PIN**	**Wire**	**Pin**	**Pin**
Phase1+	1	red	1	red	12&13	7&15	red	1	red	1	red	A	1
Phase1-	6	pink	4	pink	3&4	3&10	pink	2	pink	2	pink	B	2
Phase2+	2	blue	2	blue	10&11	6&14	blue	3	blue	3	blue	C	3
Phase2-	7	grey	5	grey	1&2	2&9	grey	4	grey	4	grey	D	4 (-)
+5V	3	white	9	white	5	11	white	5	white	5	white	E	A
GROUND*	8	brown	8	brown	7	12	Inner shield	6	brown	6	brown	F	B
Sensor Sin	4	yellow	6	yellow	9	13	yellow	7	yellow	7	yellow	G	C
Sensor Cos	9	green	7	green	8	5	green	8	green	8	green	H	D
Temp sensor	5	black	10	black	6	4	black	9	black	9	black	L	E
SHIELD* of stator and stator cable	Case	shield	Case (cable relief)	shield	No shield	Case	Outer shield	10	Inner & outer shield	Case	Inner & outer shield	Case	Case
Connector on the stator (-cables)						Pin 1 and 8 not connected							

***Note:**
Extension cables are double shielded. The two shields of the extension cables must not be connected together: The inner shield of the extension cables is used as GROUND and must be connected to GROUND*, only the outer shield must be connected to SHIELD* of the connectors.

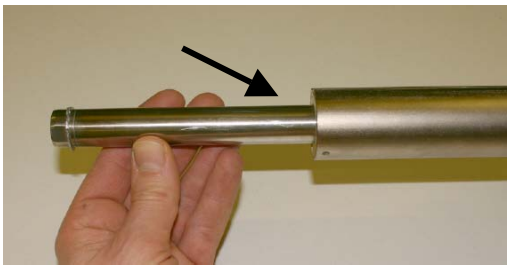
Caution: **Do not connect or disconnect motor when there is power on the controller.**
Double-check each connection! Wrong connections can destroy controller and stator!

Assembling and mounting of *LinMot*® Linear Motors

The sliders of *LinMot*® Linear Motors must be handled with care specially if not assembled with the stator! Damaging or warping of the slider can result in shortened life and/or failure of the motor. The slider is essentially a high-precision machine component assembled from a thin steel tube, neodymium magnets and plastic material.

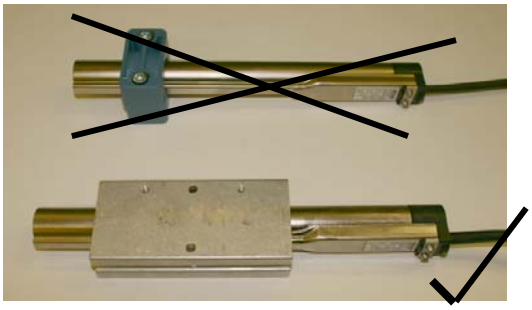
Entering the slider into the stator

NOTE: the sliders are not symmetrical. Behavior of the motor is different depending on the direction of the slider. All data sheets for the Linear Motors refer to the situation as shown bellow. Use different direction of the slider if Linear Motor is used together with H-Guides of *LinMot*® (see assembly instruction for H-Guides).

a	 Clean the slider with disposable paper.	**b**	 Lubricate the slider in accordance with the 'lubrication order' (see passage 'maintenance').
c	 Slider end with lasered serial no	**d**	 Enter the slider (end with lasered serial no towards stator as shown.

Mounting the stator

The stators are mounted by clamping. As clamping device the *LinMot*® flange should be used or a similar construction. Most important is a broad clamping surface in order to get a good power dissipation. The clamping force has to fix not to compress the stator! (Hint: Don't use tightening tools with lever arm without an additional torque measurement). Forced air cooling increases the continuous force of the Liner Motors by factor 1.8.

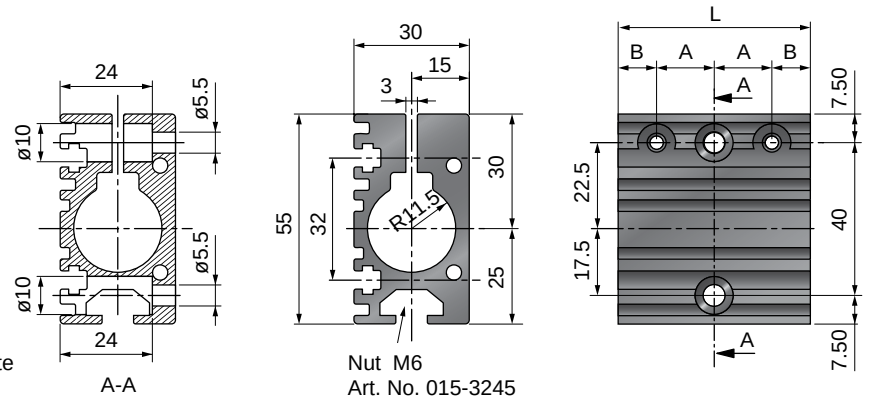


Top: Wrong Mounting! Poor power dissipation
Bottom: standard *LinMot*® flange

Forced air cooling with *LinMot*® Cooling Flange

Mounting Flanges

PF02-23

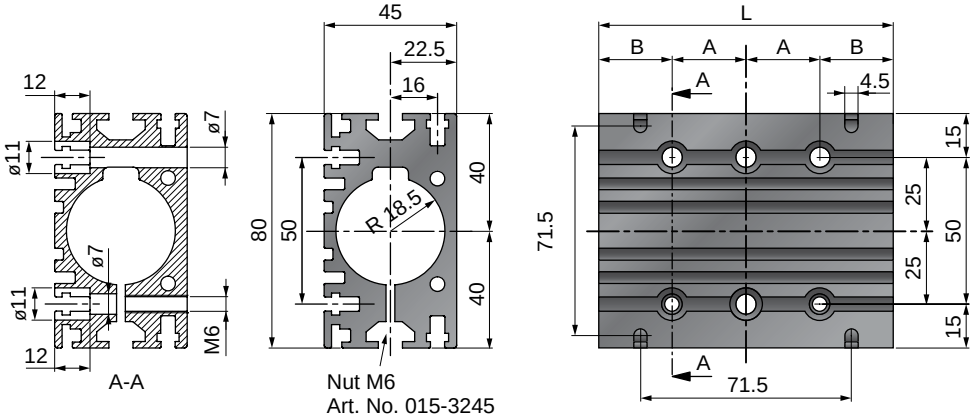


Max torque for clamp plate screws: 4Nm (2.95 lbf ft)

Nut M6
Art. No. 015-3245

Article	Description	L [mm]	A [mm]	B [mm]	Weight [g]	Art- No
PF02-23x50	Flange 23x50 mm	50	15	10	115	0150-2102
PF02-23x120	Flange 23x120 mm	120	30	30	280	0150-2103
PF02-23x170	Flange 23x170 mm	170	45	40	390	0150-2117

PF02-37

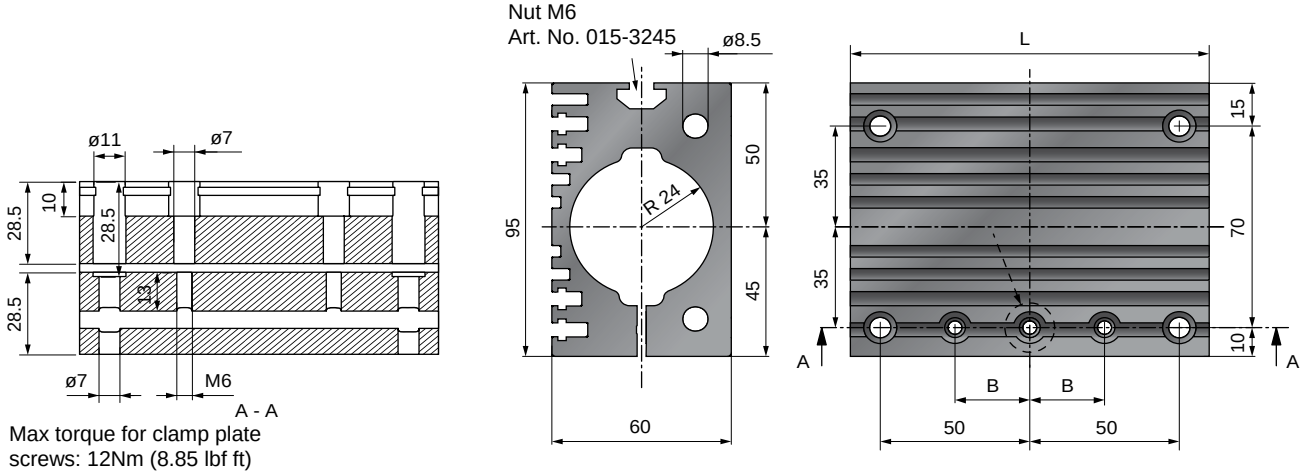


Max torque for clamp plate screws: 8Nm (5.9 lbf ft)

Nut M6
Art. No. 015-3245

Article	Description	L [mm]	A [mm]	B [mm]	Weight [g]	Art- No
PF02-37x100	Flange 37x100 mm	100	25	25	450	0150-1998
PF02-37x140	Flange 37x140 mm	140	50	20	630	0150-2105
PF02-37x200	Flange 37x200 mm	200	50	50	920	0150-1999

PF01-48

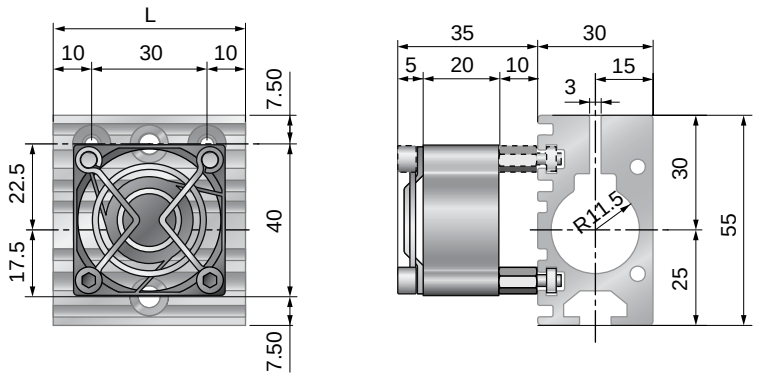


Max torque for clamp plate screws: 12Nm (8.85 lbf ft)

Article	Description	L [mm]	A [mm]	B [mm]	Weight [g]
PF01-48x120	Flange 48x120 mm	120	25	970	0150-1976
PF01-48x226	Flange 48x226 mm	226	85	1855	0150-2108
PF01-48x240	Flange 48x240 mm	240	85	1970	0150-1975

Fan Kits for Flanges

Option Fan for PF02-23

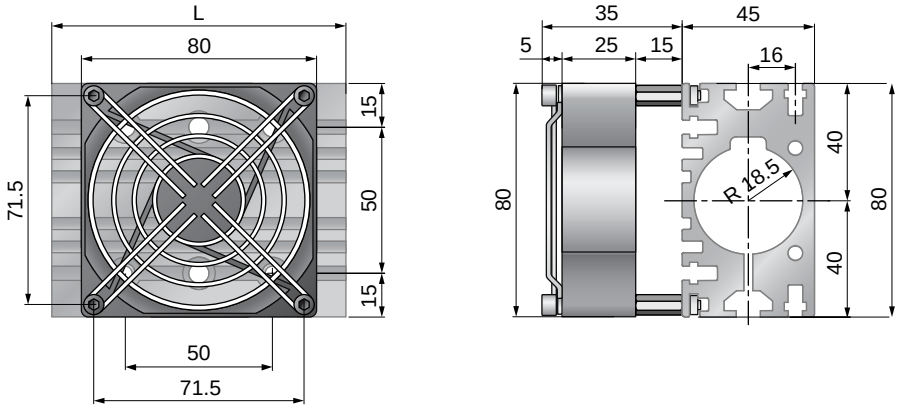


Power Supply Fan :
24VDC, 70mA

Air flow:
15m^3/h

Article	Description	Art-No
HV01-23	Fan Kit for H01-23 und PF02-23	0150-5050

Option Fan for PF02-37

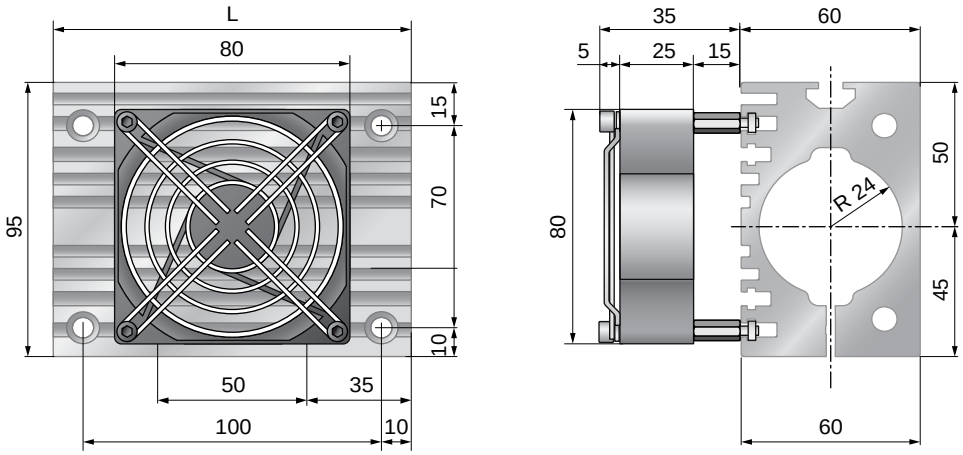


Power Supply Fan:
24VDC, 120mA

Air flow:
80m^3/h

Article	Description	Art-No
HV01-37/48	Fan Kit for H01-37, B01-37 und PF02-37	0150-5051

Option Fan for PF01-48



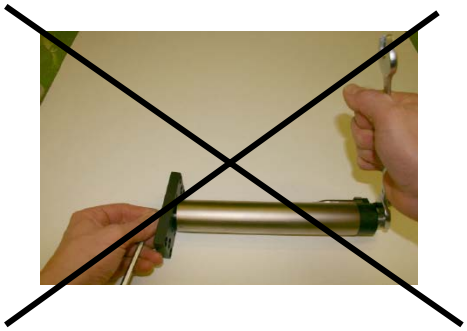
Power Supply Fan:
24VDC, 120mA

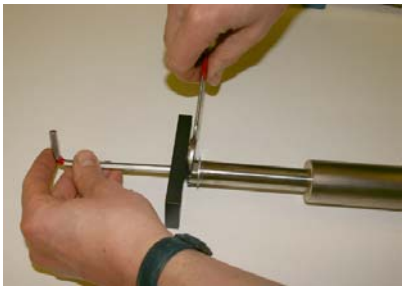
Air flow:
80m^3/h

Article	Description	Art-No
HV01-37/48	Fan Kit for H01-48, B01-48 und PF01-48	0150-5051

Mounting the Payload

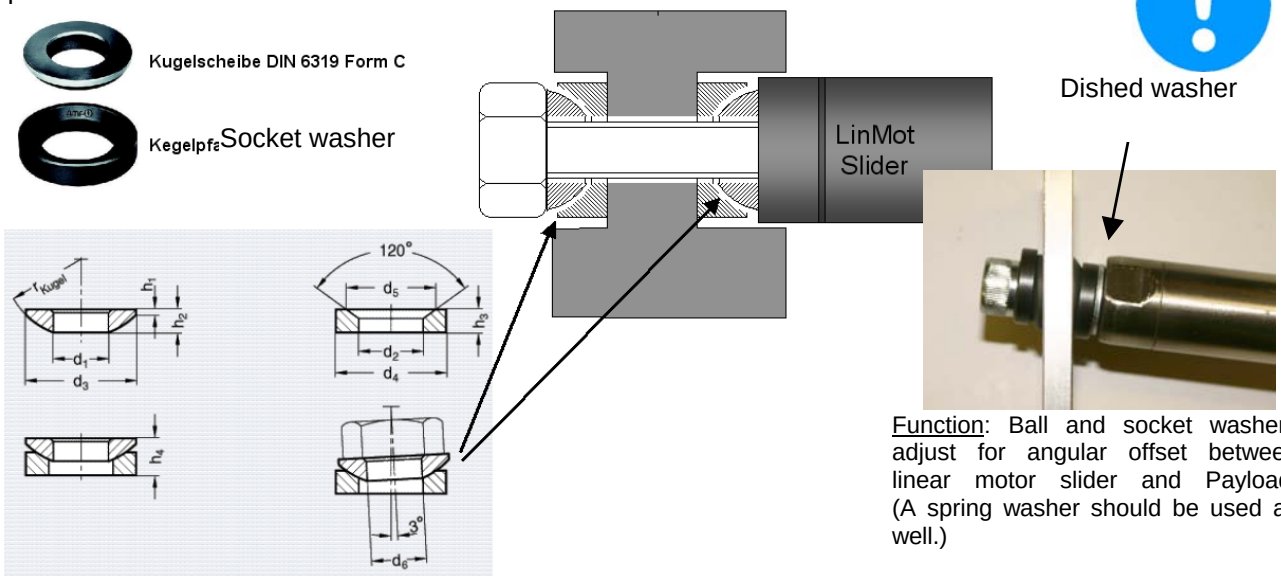
The load mass must be mounted holding only the end of the slider facing the load mass with a suitable open-end wrench (caution on account of possible magnetic attraction). Under no circumstances may the delicate slider tube or the opposite end of the slider be used as “clamping piece”.





Proper mounting of Payload (Adjustment of an Angle Offset)

Fixed End Washer Set PLF01-xx consisting of two pair of ball and socket washers, allows adjustment of an angle offset. The adjustment in the x- and y- direction is done by using an oversized hole for the mounting plate screw.



Function: Ball and socket washers adjust for angular offset between linear motor slider and Payload. (A spring washer should be used as well.)

Screw	d_1	d_2	d_3	d_4	d_5	h_1	h_2	h_3	h_4
M5 12 mm sliders	5,2 mm (0,20 in)	6,0 mm (0.24 in)	10,5 mm (0.41 in)	10,5 mm (0.41 in)	9,5 mm (0.37 in)	0,5 mm (0.02 in)	2,0 mm (0.08 in)	2,1 mm (0.08 in)	3,2 mm (0.13 in)
M8 20 mm sliders	8,4 mm (0,33 in)	9,6 mm (0.38 in)	17 mm (0.67 in)	17 mm (0.67 in)	14,5 mm (0.57in)	0,6 mm (0.02in)	3,2 mm (0.13 in)	3,5 mm (0.14 in)	5,5 mm (0.21 in)
M10 28 mm sliders	10.5 mm (0,41 in)	12 mm (0.47in)	21 mm (0.83 in)	21 mm (0.83in)	18,5 mm (0.73in)	0,8 mm (0.03in)	4,0 mm (0.16 in)	4,2 mm (0.17 in)	6,7 mm (0.26 in)

Part List:	PLF01-12 (Part-No 0150-3085)	PLF01-20 (Part-No 0150-3083)	PLF01-28 (Part-No 0150-3087)
2 Ball washer	DIN 6319 C / M5	DIN 6319 C / M8	DIN 6319 C / M10
2 Socket washer	DIN 6319 D / M5	DIN 6319 D / M8	DIN 6319 D / M10
1 dished washer	DIN 2093 A / M5 ∅10	DIN 2093 A / M8 ∅16	DIN 2093 A / M10 ∅20

Special Considerations in Moving Stator Applications

In moving Stator applications, the stator is attached to its own support bearing and the Slider is mounted to the machine. In these applications it is recommended that special hardware be used to mount the slider in order to reduce potential binding problems caused by misalignment.
Note also that high flex trailing chain cable, with cable track, **must** be used in moving stator applications.

Fixed Slider End (Ball and Socket Mounting)

Principle of a Moving Stator application

Floating Bearing

Proper Mounting of Stationary Sliders

The Slider must, of course, be mounted parallel to the path of the moving Stator in order to avoid binding. One end of the slider should be "fixed" in the x-direction in order for the motor to maintain positional accuracy. It is best that the other end of the slider be allowed to "float" just a bit in order to compensate for small amounts of misalignment and "sag" found with longer sliders. *LinMot* has available a kit that makes proper mounting of 20mm and 28mm sliders quite easy. Install the Stator with the back end (cable or connector end) towards the 'fixed' end of the slider. The affect of any misalignment between Slider and the Stator is some what reduced because the sleeve bearing in the Stator ends 5 cm (2 inches) from the back end of the Stator.

LinMot® Slider Mounting Kit *PLM01-20-MK and PLM01-28-MK* (for 20 and 28 mm sliders)

This kit provides one set of mounting parts for each end of the slider.

PLF01-20 / PLF01-28 **Ball and socket washers** that permit radial adjustment of the slider position, compensation for angular offset between the end of the slider and its mounting plate, and firm attachment of the slider to its support (Dimensions see section "Hint for proper mounting of Payload"`)
PLL01-20 / PLL01-28 Floating bearing assembly that permits radial adjustment of slider position, and permits a **small** amount of radial and axial movement.

PLF01-20 / PLF01-28
Ball and Socket Mounting

PLL01-20 / PLL01-28
Floating Bearing Mounting

Distance Slider Mounting Surfaces

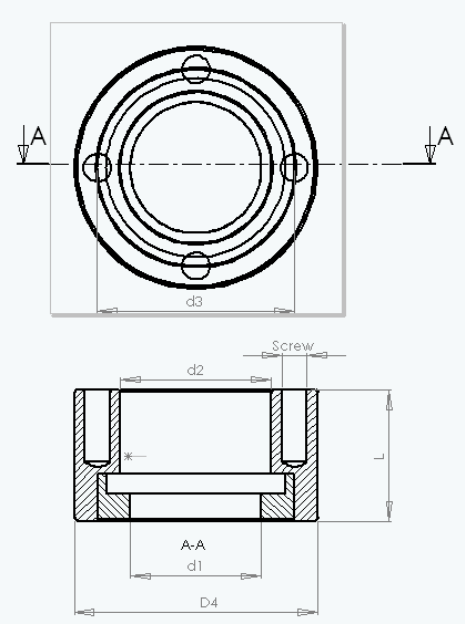
The distance between the mounting surface and end of slider at the fixed end is 6.7 mm (0.25 in)(ball and socket washer). The slider should extend about 14 to 19 mm (0.4 to 0.8 in) into the floating bearing. Therefore; the distance between the two mounting surfaces = slider length + 6.7 mm + (1 to 6 mm)
Nominal distance between mounting surfaces is: slider length + 10 mm (0.4 in).

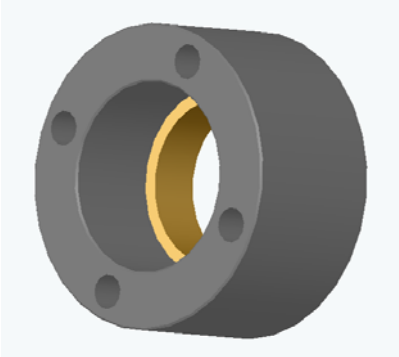
Contents of the mounting kits

pc	PLM01-20-MK (Part-No 0150-3079)	PLM01-28-MK (Part-No 0150-3095)
1	PLF01-20 Ball & Socket Part-No. 0150-3083	PLF01-28 Ball & Socket Part-No. 0150-3087
1	PLL01-20 Floating Bearing Part-No. 0150-3084	PLL01-28 Floating Bearing Part-No. 0150-3094
1	Socket hd. cap screw DIN 912/M8 L=35 mm (1.38 in)	Socket hd. cap screw DIN 912/M10 L=35 mm (1.38 in)
4	Socket hd. cap screw DIN 912/M5 L=20 mm (0.78 in)*	Socket hd. cap screw DIN 912/M5 L=20 mm (0.78 in)*

(*for use with 12 mm (1/2 in) thick mounting plates)

FLOATING BEARING PLL02-12, PLL01-20 and PLL01-28





Material:
Casing: stainless steel 1.4305
Bearing: Spring steel DIN17223
NBR (Nitril-Butadien-Rubber)

	Part-No	d1	d2	d3	D4	L	Screws
PLL02-12	**0150-3111**	12 mm (0.47 in)	o-ring only	-	22 mm (0.87 in)	6.6 mm (0.26 in)	-
PLL01-20	**0150-3084**	20 mm (0.79 in)	23 mm (0.90 in)	30 mm (1.18 in)	37 mm (1.46 in)	20 mm (0.79 in)	M5
PLL01-28	**0150-3094**	28 mm (1,10 in)	32 mm (1.26 in)	40 mm (1.57 in)	48 mm (1.89 in)	20 mm (0.79 in)	M5

Installation guide for the mounting kit PLM01-20-MK and PLM01-28-MK

a

Mount stator to its support bearing

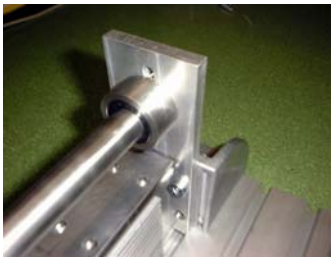
b

Insert slider into stator

c

Mount fixed end of slider to its support using ball & socket washers – do not tighten the screw

d



Place the floating bearing on the slider and attach to its support– do not tighten the screws

e

Move stator (back end!) to the fixed end of slider, center slider in stator and tighten the screw.

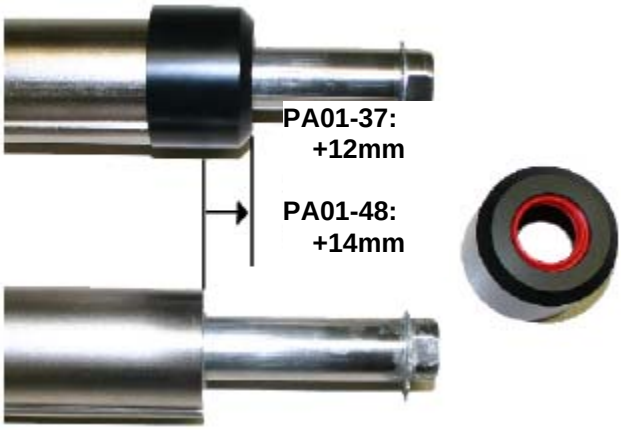
f

Move stator (front side) to the floating bearing and tighten screws

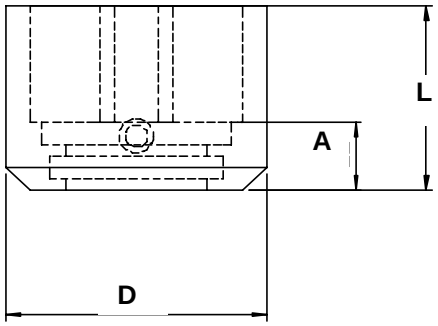
Seals for Stators

Stators equipped with front and back seals. Seals increase the maintenance interval time and make maintenance easy because a grease gun can be used. In addition the seals keep the lubricant cleaner and control the amount of lubricant.

Back seal **Front seal**



Seal Dimensions



Material:
Casing: POM
Wisher: H-PU

	Description	Art- No.	D	L	A	Weight
Seal for PS01-23 Stators (Front)	PA01-23/12-F	0150-3125	29mm (1.14in)	33mm (1.30in)	14mm (0.55in)	0.014kg
Seal for PS01-37 Stators (Front)	PA01-37/20-F	0150-3126	45mm (1.77in)	32mm (1.26in)	12mm (0.47in)	0.028kg
Seal for PS01-37-C Stators (Back)	PA01-37/20-R	0150-3201	45mm (1.77in)	32mm (1.26in)	12mm (0.47in)	0.026kg
Seal for PS01-37 Stators with cable outlet (Back)	PA01-37/20-R cable	0150-3221	45mm (1.77in)	40mm (1.57in)	12mm (0.47in)	0.030kg
Seal for PS01-48 Stators (Front)	PA01-48/20-F	0150-3127	58mm (2.28in)	32mm (1.26in)	14mm (0.55in)	0.056kg
Seal for PS01-48R Stators (Back)	PA01-48/20-R	0150-3202	58mm (2.28in)	32mm (1.26in)	14mm (0.55in)	0.050kg

First place stator in the flange than press seal on the front or back end of the stator, fasten the screws (if equipped). The stator length over all will be increased by 12mm (0.47in) for the series P01-37 motors and 14mm (0.55 in) for the series P01-48 motors for each seal. → the length of a stator equipped with front and back seal will be increased by 24mm (0.94 in) for the series P01-37 motors and 28mm (1. in) for the series P01-48 motors.

Use grease fitting to lubricate the motor with a grease gun.

Maintenance of *LinMot*® Linear Motors

The maintenance schedule below is based on a 5-day week with 8 working hours daily. Central European industrial operating conditions are assumed. Where conditions differ, as with severe and permanent fouling, direct sunshine, operation out in the open etc., the maintenance intervals must be shortened till empirical values for the particular application are obtained. Accordingly a distinction is drawn between the maintenance schedules for standard applications and first applications or arduous conditions.

Maintenance schedule for standard applications

	Less than 120 strokes/min	120 to 360 strokes/min	Over 360 strokes/min
Comissioning	Inspection and lubrication	Inspection and lubrication	Inspection and lubrication
every 3 months	--	Inspection	Inspection and lubrication
every 6 months	Inspection	Inspection and lubrication	Inspection and lubrication

Maintenance schedule for first applications / arduous

	Less than 120 strokes/min	120 to 360 strokes/min	Over 360 strokes/min
Comissioning	Inspection and lubrication	Inspection and lubrication	Inspection and lubrication
after the first 8 hours	Inspection	Inspection	Inspection
after the first week' operation	Inspection	Inspection	Inspection
every 3 months	Inspection	Inspection	Inspection and lubrication
every 6 months	Inspection and lubrication	Inspection and lubrication	Inspection and lubrication

Inspection

The following must be checked when inspecting the drives:

- Is the slider lubricated completely.
- Is the lubricant not 'decomposed' ?
- Can the slider be moved easily?

Cleaning

On no account may brushes or similar be used for cleaning purposes. No cleansing fluids containing solvents, kerosene or similar are to be used.

- Carefully withdraw the slider from the stator.
- Clean the slider and stator with soft disposable paper, assisted by methylated spirit or alcohol possibly Lubricate the slider and introduce it carefully

Lubricating instructions

The lubricant reduces the friction between the chromium-nickel steel surface of the slider and the plastic plain bearing. In addition it prevents (fretting) corrosion. The lubricant employed must not attack the material of the plain bearing and must be temperature resistant up to 150ºC. Important also is that it should retain low viscosity at low temperatures and not evaporate. The following lubricant is recommended:

LinMot*® Lubricant LU02 *Art. No. 0150-1953 (8g)

LinMot*® Lubricant LU02 *Art. No. 0150-1954 (50g)

LinMot*® Lubricant LU02 *Art. No. 0150-1955 (1000g)

LinMot® LU02 Lubricant corresponds to KLÜBERSYNTH UH1 14-31 which was developed for the food processing industry.

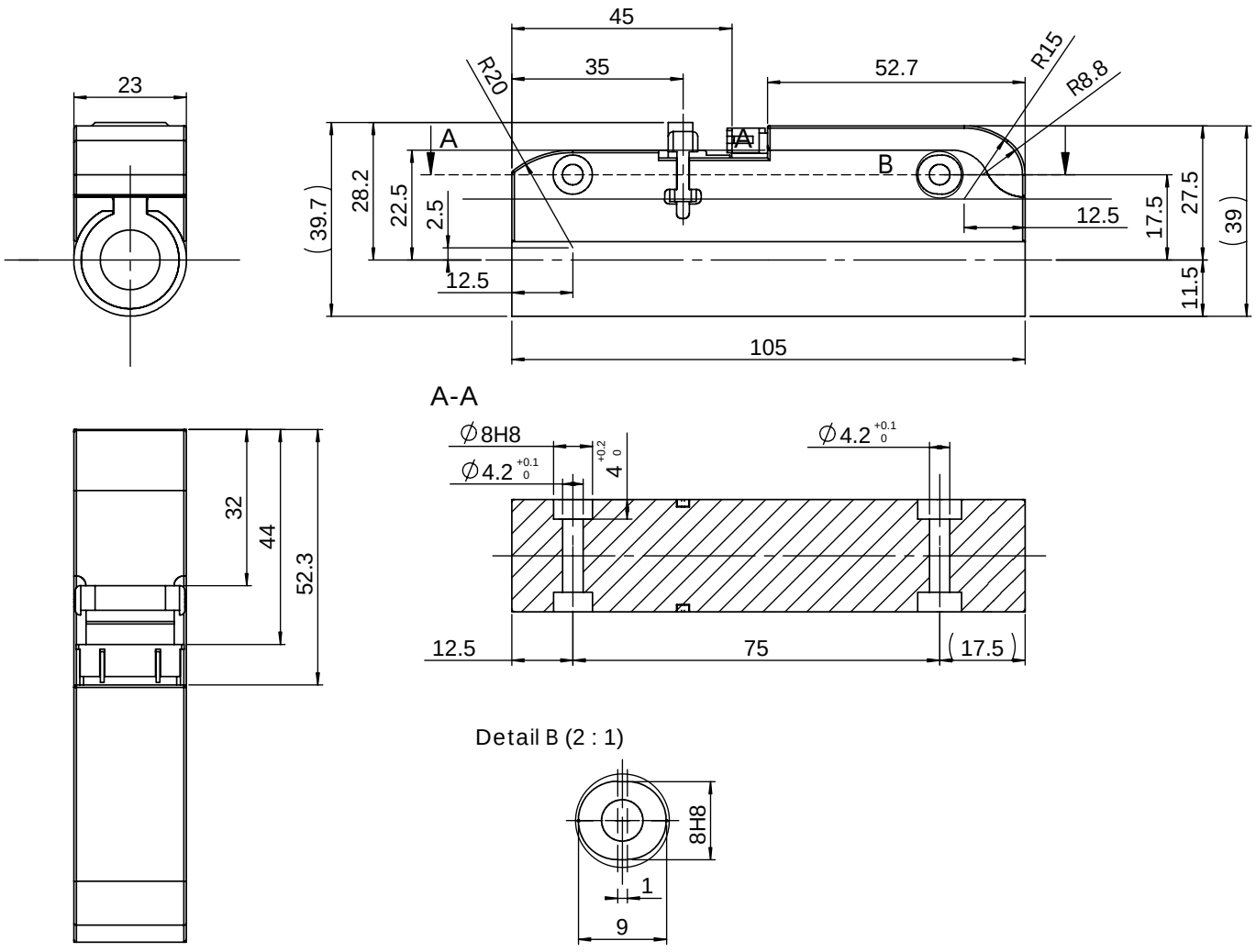
Storage / transport

- Sliders are to be stored and transported only in the plastic containers (with cardboard inlay) provided for this, or already fitted in *LinMot*® *P* stators and secured.
- Maximum storage temperature: 70 °C

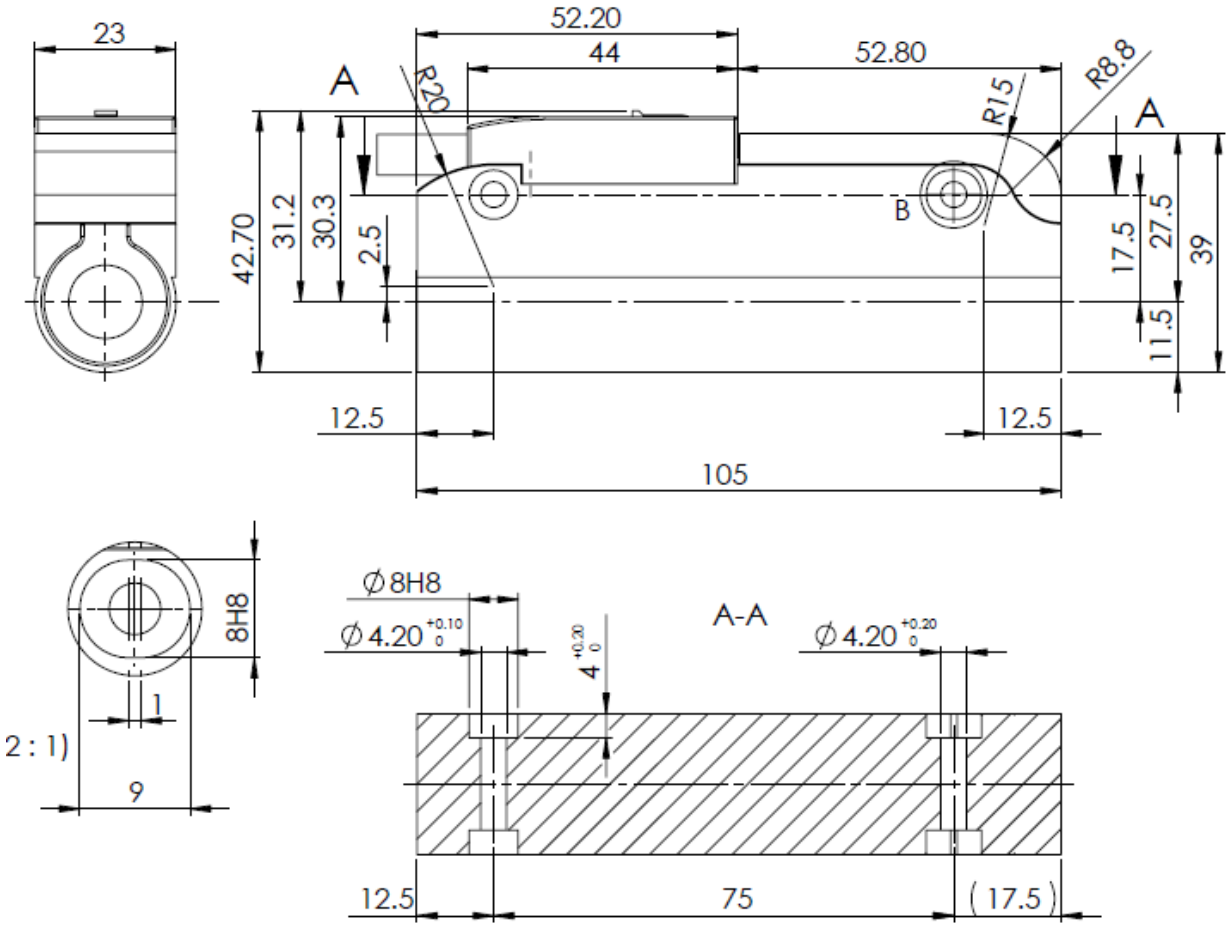
Stator Dimensions

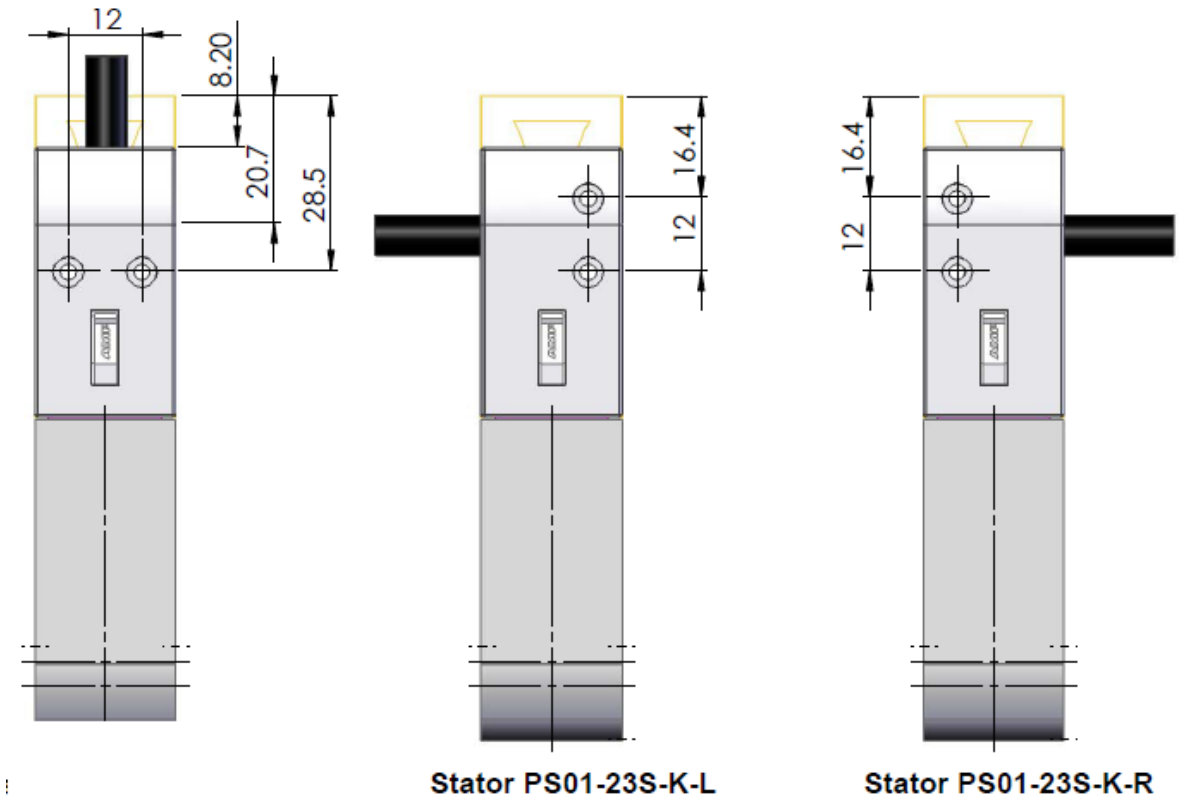
All dimensions in Milimeter

Stator PS02-23Sx80-F



Stator PS02-23Sx80F-HP-K

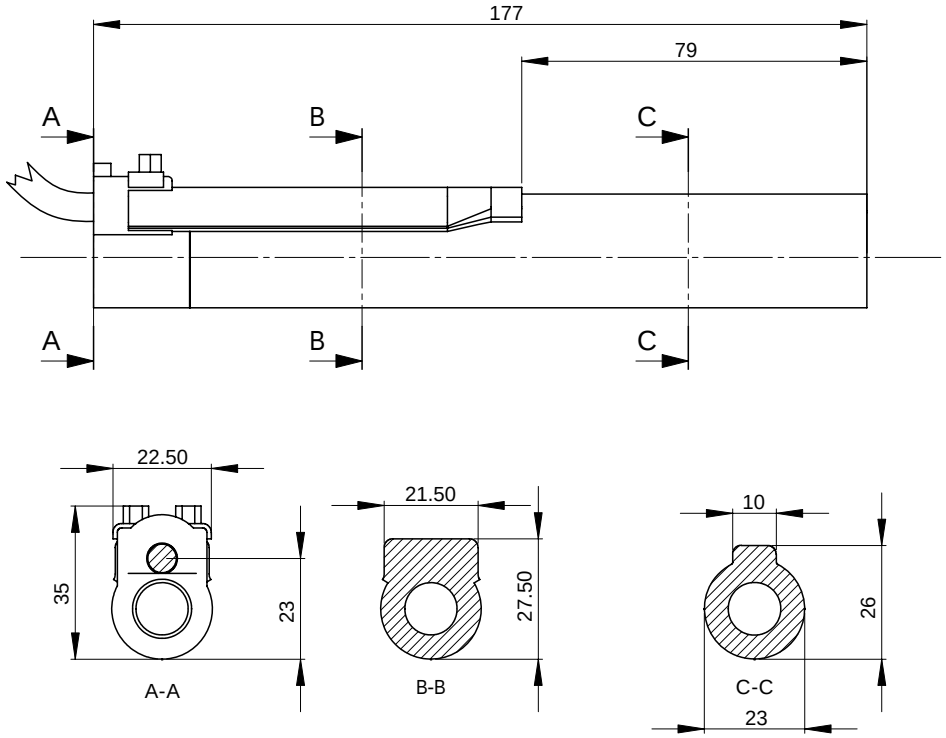




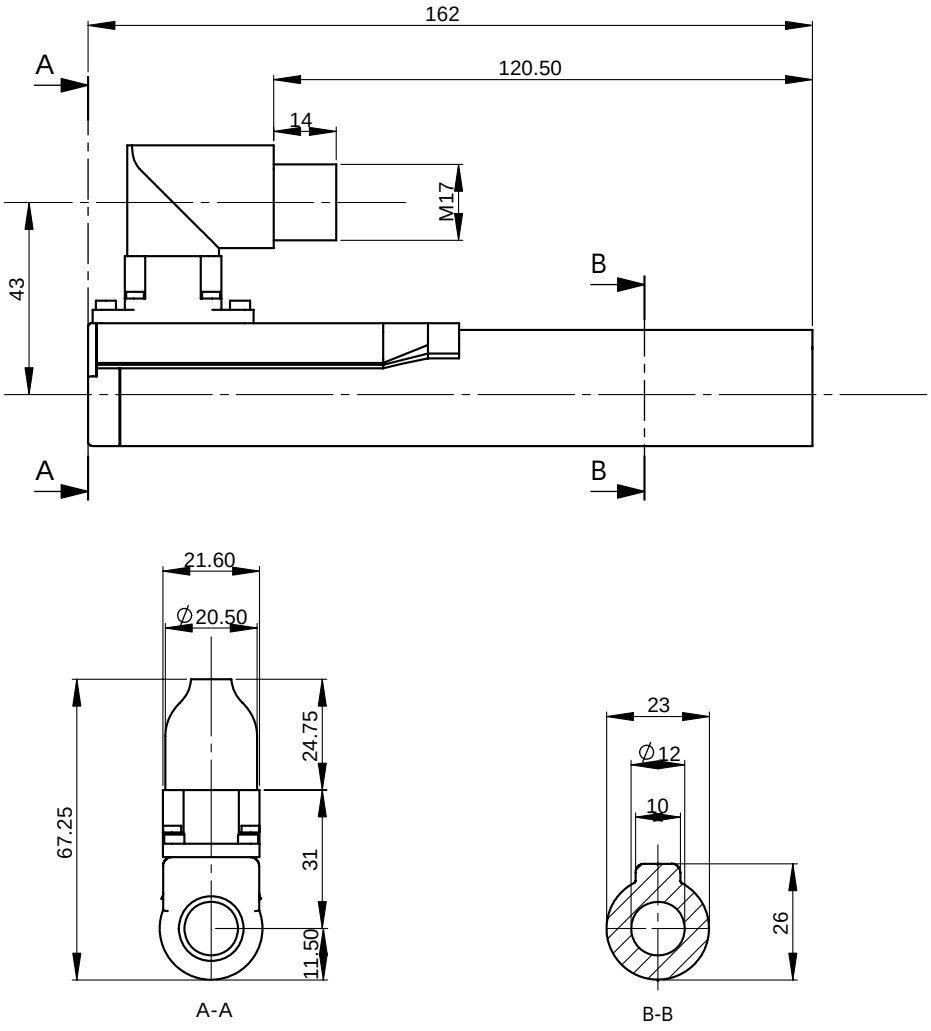
Stator PS01-23S-K-L

Stator PS01-23S-K-R

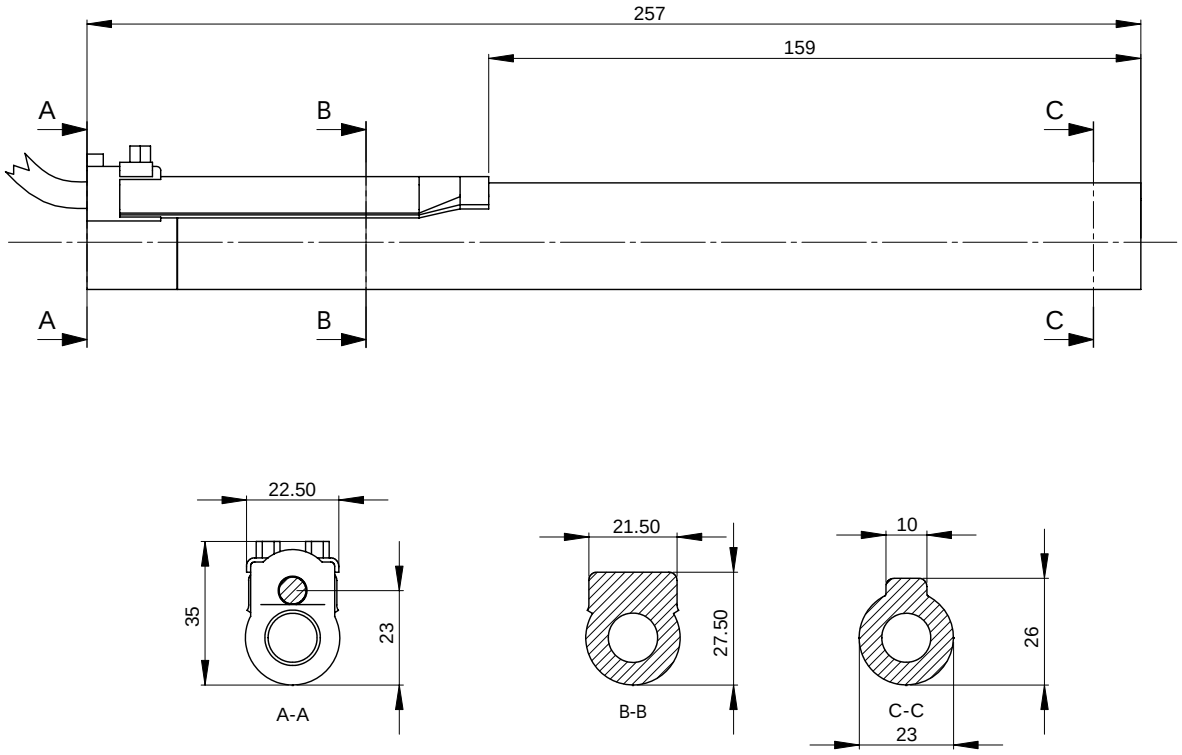
Stator PS01-23x80



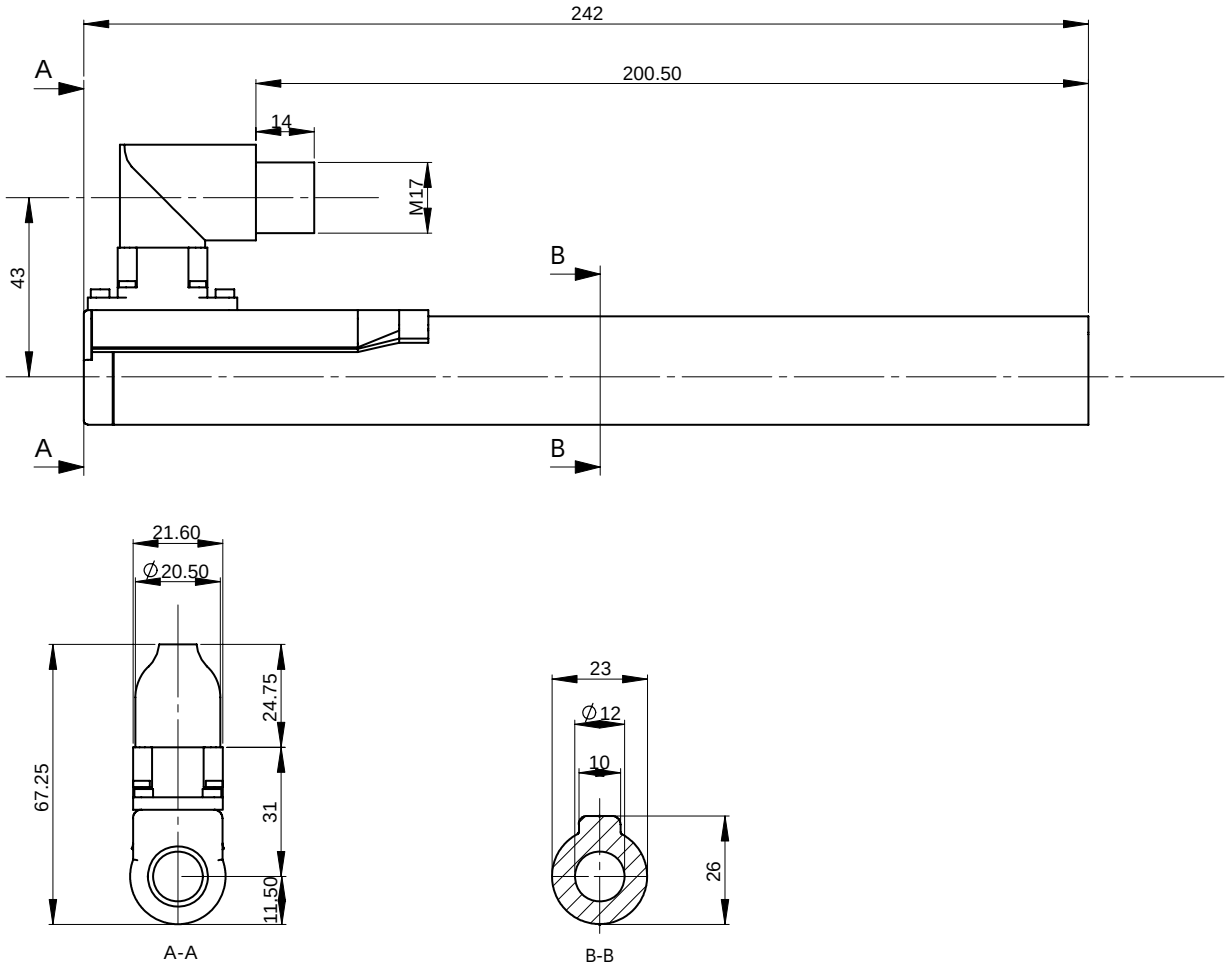
Stator PS01-23x80..-R



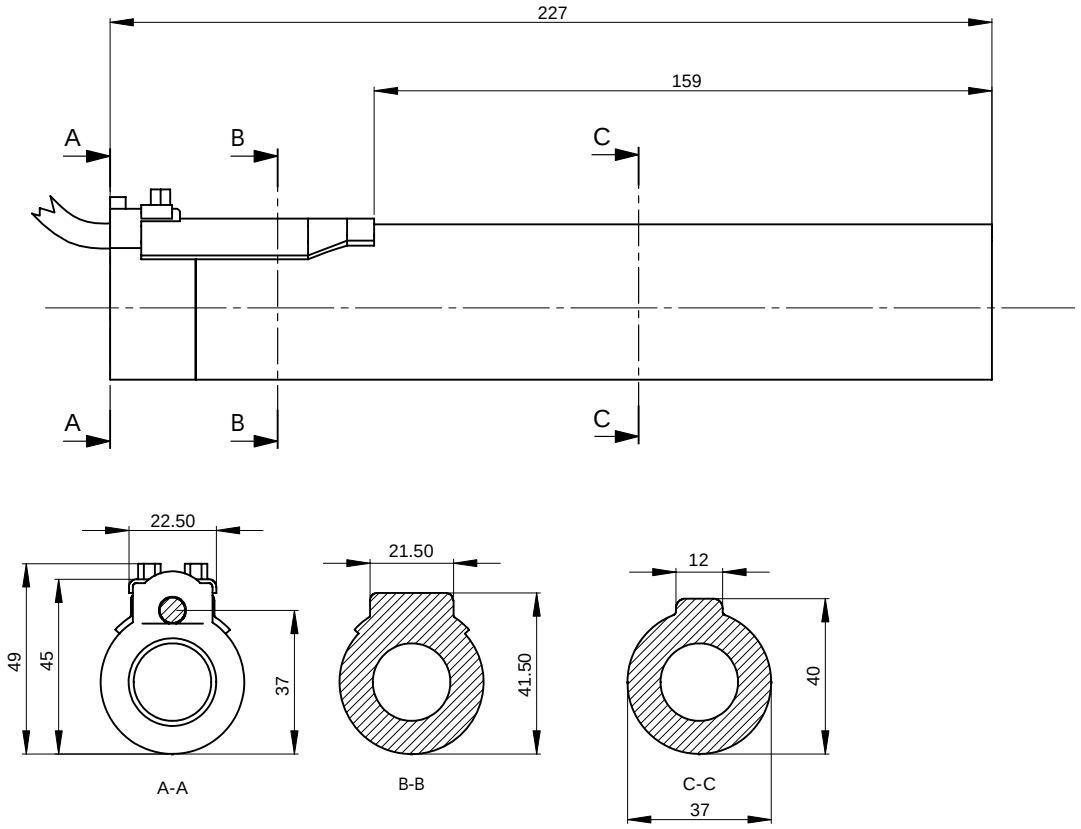
Stator PS01-23x160



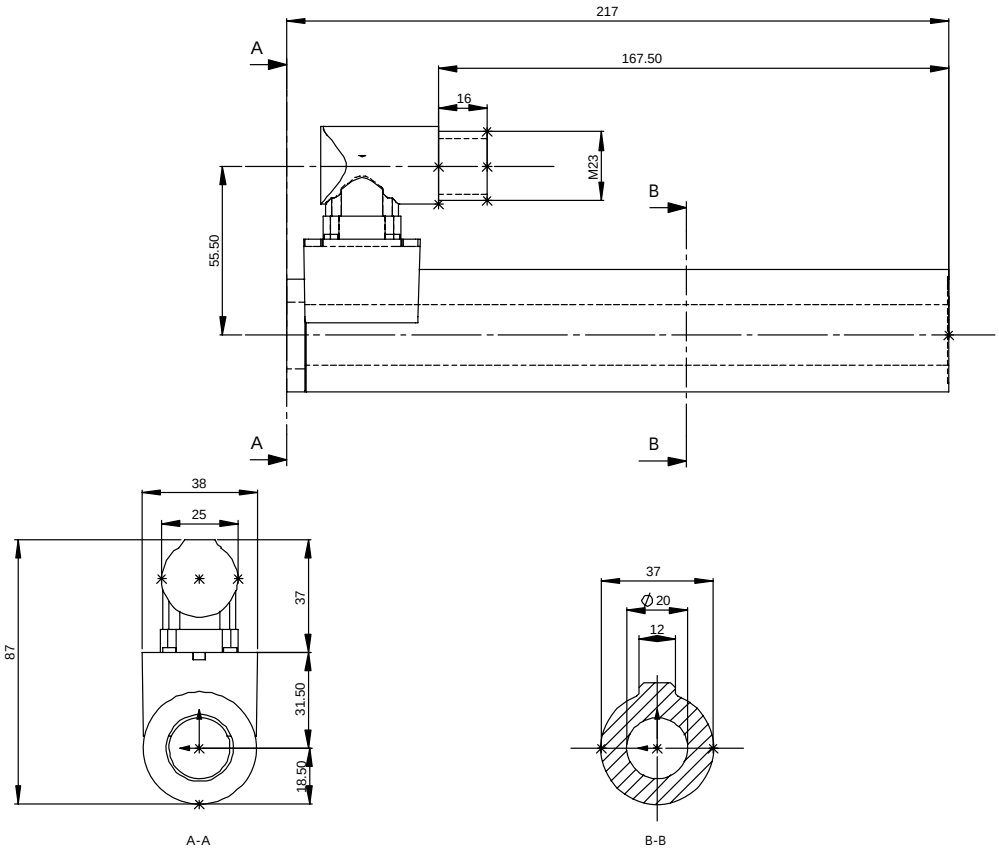
Stator PS01-23x160..-R



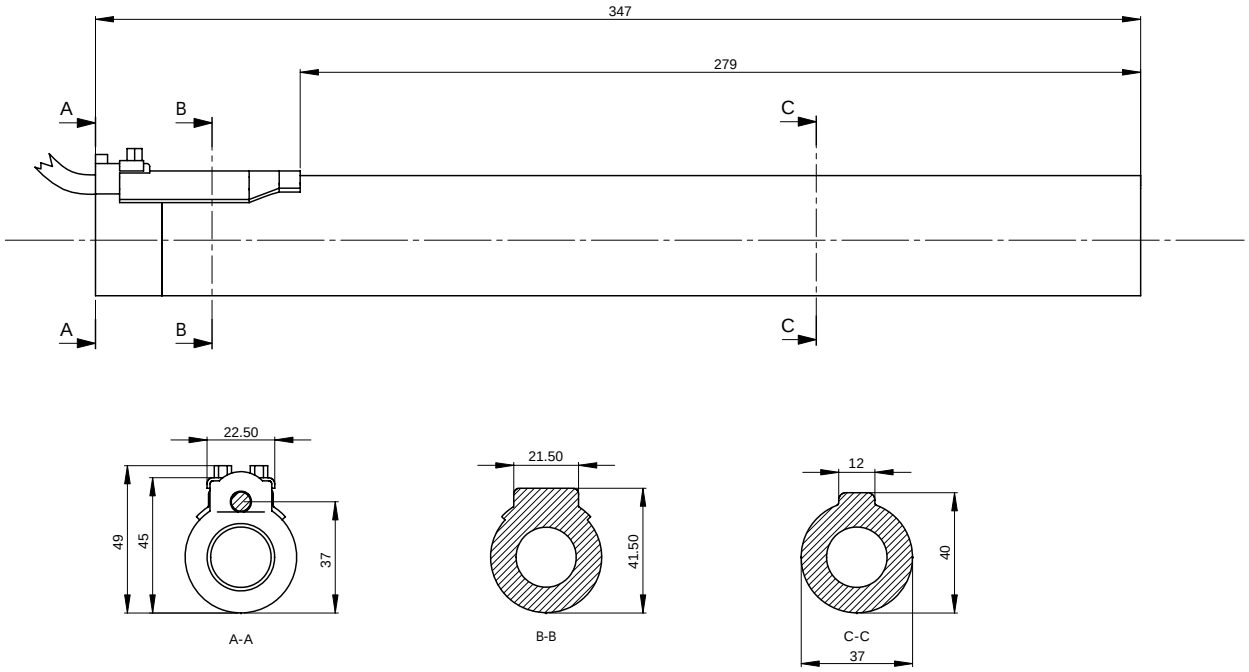
Stator PS01-37x120



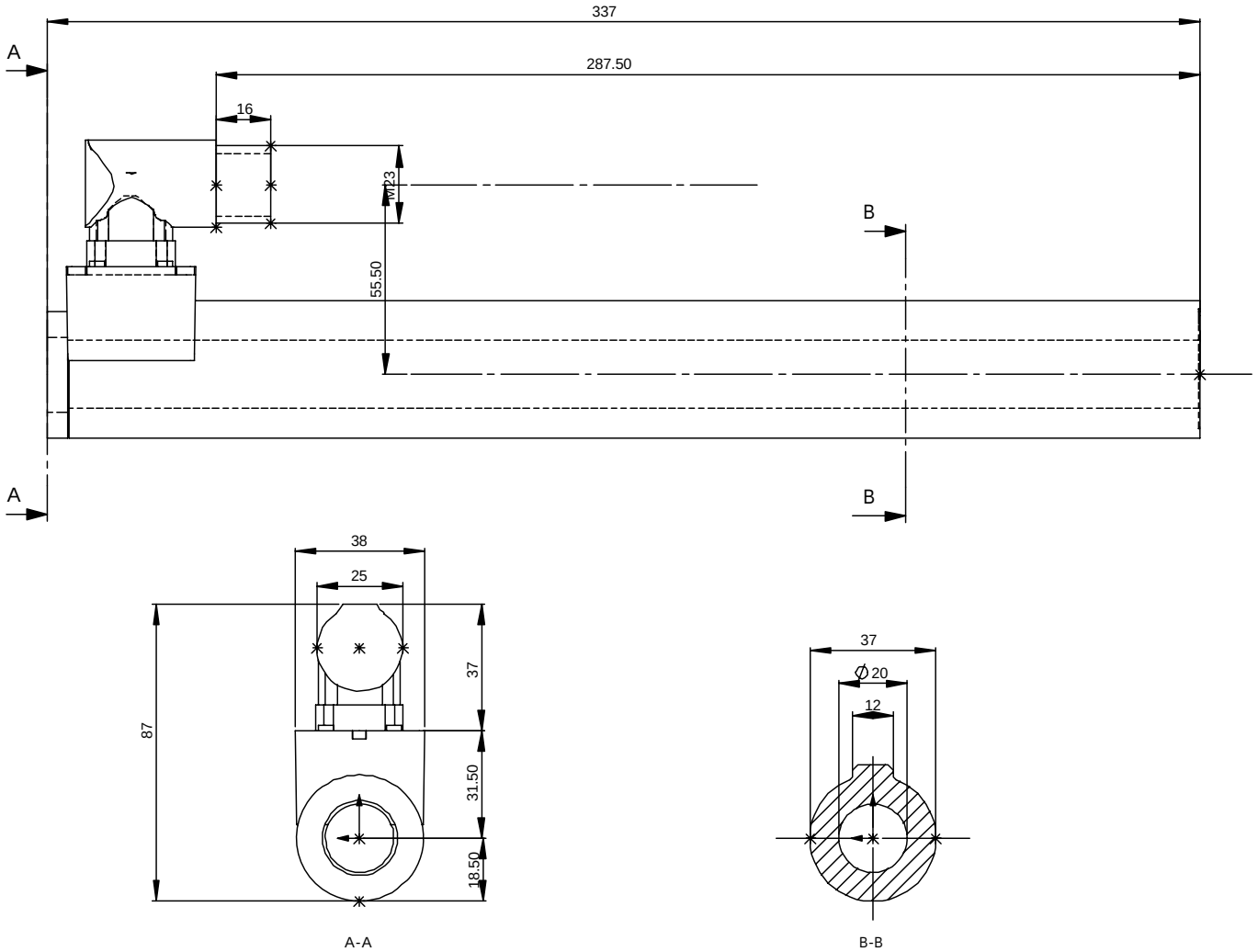
Stator PS01-37x120..-C



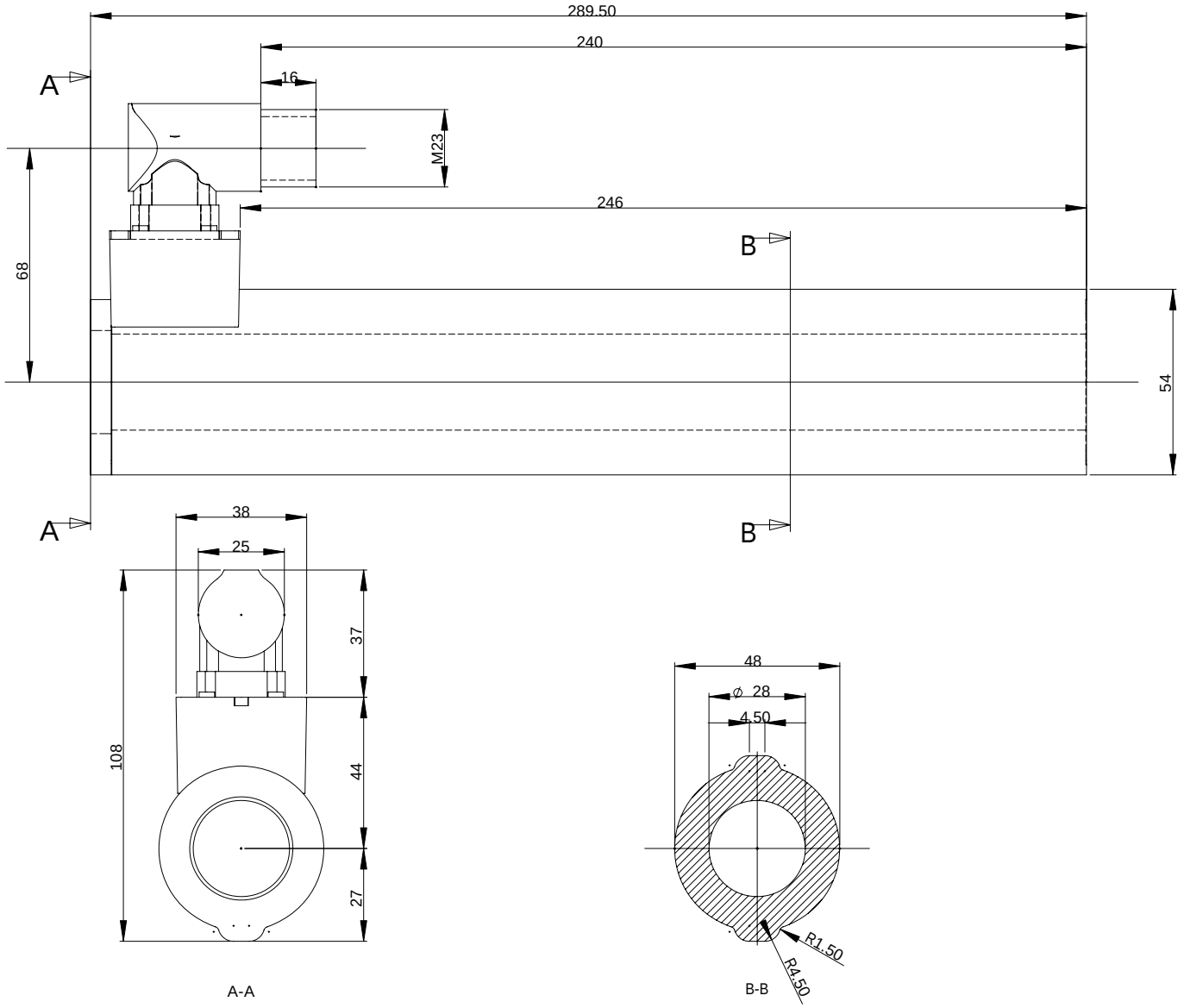
Stator PS01-37x240



Stator PS01-37x240..-C



Stator PS01-48x240..-C



Trouble Shooting for Stators

The following tables show the resistive value between the different connector pins for each stator type. If the value is not in a range of +/- 10% the stator may be damaged (temperature of the stator for all measurements: 20°C).

PS01–23x80 (0150-1201)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 6	10 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 2 / Pin 7	10 Ω
5V / GND	White / Brown	Pin 3 / Pin 8	505 Ω / 275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 4 / Pin 8	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 9 / Pin 8	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 5 / Pin 8	10.5kΩ / >20 MΩ*
Phase / GND	-	Pin 1, 2, 6, 7 / Pin 8	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–23x80-M (0150-1208)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	10 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	10 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	505 Ω / 275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10.5kΩ / >20 MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–23x80-R (0150-1233)

Phase1+ / Phase1-		Pin 1 / Pin 2	10 Ω
Phase2+ / Phase2-		Pin 3 / Pin 4(-)	10 Ω
5V / GND		Pin A / Pin B	505 Ω / 275 Ω*
Sensor Sinus / GND		Pin C / Pin B	37.5 kΩ
Sensor Cosine / GND		Pin D / Pin B	37.5 kΩ
Temp. Sensor / GND		Pin E / Pin B	10.5kΩ / >20 MΩ*
Phase / GND		Pin 1, 2, 3, 4(-) / Pin B	>20 MΩ
All Pin / Shield		Pin 1 – E / Housing	>20 MΩ

PS02–23Sx80-F (0150-1272)

Phase1+ / Phase1-		Pin 12&13 / Pin 3&4	10 Ω
Phase2+ / Phase2-		Pin 10&11 / Pin 1&2	10 Ω
5V / GND		Pin 5 / Pin 7	505 Ω / 275 Ω**
Sensor Sinus / GND		Pin 9 / Pin 7	37.5 kΩ
Sensor Cosine / GND		Pin 8 / Pin 7	37.5 kΩ
Temp. Sensor / GND		Pin 6/ Pin 7	10.5kΩ / >20 MΩ***
Phase / GND		Pin 1,2,3,4,10,11,12,13 / Pin 7	>20 MΩ
All Pin / Shield		Pin 1 – 13 / Housing	>20 MΩ

PS01–23Sx80F-HP-K (0150-1285)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 4	4,2 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 2 / Pin 5	4,2 Ω
5V / GND	White / Brown	Pin 9 / Pin 8	505 Ω / 275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 6 / Pin 8	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 7 / Pin 8	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 10 / Pin 8	10.5kΩ / >20 MΩ*
Phase / GND	-	Pin 1, 2, 4, 5 / Pin 8	>20 MΩ
All Pin / Shield	-	Pin 1 – 10 / Housing	>20 MΩ

* For stators with serial no. before xxxx.3IJ.xxx
** For stators with serial no. before xxxx.3UZ.xxx
*** For stators with serial no. before xxxx.371.xxx

PS01–23x160 (0150-1202)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 6	20 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 2 / Pin 7	20 Ω
5V / GND	White / Brown	Pin 3 / Pin 8	505 Ω / 275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 4 / Pin 8	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 9 / Pin 8	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 5 / Pin 8	10.5kΩ / >20 MΩ**
Phase / GND	-	Pin 1, 2, 6, 7 / Pin 8	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–23x160-M (0150-1209)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	20 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	20 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	505 Ω / 275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10.5kΩ / >20 MΩ**
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–23x160-R (0150-1234)

Phase1+ / Phase1-		Pin 1 / Pin 2	20 Ω
Phase2+ / Phase2-		Pin 3 / Pin 4(-)	20 Ω
5V / GND		Pin A / Pin B	505 Ω / 275 Ω***
Sensor Sinus / GND		Pin C / Pin B	37.5 kΩ
Sensor Cosine / GND		Pin D / Pin B	37.5 kΩ
Temp. Sensor / GND		Pin E / Pin B	10.5kΩ
Phase / GND		Pin 1, 2, 3, 4(-) / Pin B	>20 MΩ
All Pin / Shield		Pin 1 – E / Housing	>20 MΩ

PS01–23x160F (0150-1206)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	8.5 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	8.5 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	505 Ω
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10.5kΩ
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Pin 10	>20 MΩ

PS01–23x160H-HP-R(0150-1254)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	4.0 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	4.0 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	505 Ω
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	37.5 kΩ
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	37.5 kΩ
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10.5kΩ
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Pin 10	>20 MΩ

* For stators with serial no. before xxxx.3IL.xxx
** For stators with serial no. before xxxx.2VM.xxx
*** For stators with serial no. before xxxx.3IH.xxx

PS01–37x120 (0150-1204)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	6 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	6 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	155 Ω /275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	33 kΩ / 40 kΩ*
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	33 kΩ / 40 kΩ*
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10kΩ / >20MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Pin 10	>20 MΩ

PS01–37x120-M (0150-1210)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	6 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	6 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	155 Ω /275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	33 kΩ / 40 kΩ*
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	33 kΩ / 40 kΩ*
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10kΩ / >20MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–37x120-C (0150-1223)

Phase1+ / Phase1-		Pin A / Pin B	6 Ω
Phase2+ / Phase2-		Pin C / Pin D	6 Ω
5V / GND		Pin E / Pin F	155 Ω /275 Ω*
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / 40 kΩ*
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / 40 kΩ*
Temp. Sensor / GND		Pin L / Pin F	10kΩ / >20MΩ*
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–37x120F-HP-C (0150-1251)

Phase1+ / Phase1-		Pin A / Pin B	2.6Ω
Phase2+ / Phase2-		Pin C / Pin D	2.6 Ω
5V / GND		Pin E / Pin F	155 Ω
Sensor Sinus / GND		Pin G / Pin F	33 kΩ
Sensor Cosine / GND		Pin H / Pin F	33 kΩ
Temp. Sensor / GND		Pin L / Pin F	10kΩ
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–37x240 (0150-1203)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	11.5 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	11.5 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	155 Ω /275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	33 kΩ / 40 kΩ*
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	33 kΩ / 40 kΩ*
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10kΩ / >20MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Pin 10	>20 MΩ

PS01–37x240-M (0150-1211)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	11.5 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	11.5 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	155 Ω /275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	33 kΩ / 40 kΩ*
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	33 kΩ / 40 kΩ*
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10kΩ / >20MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

* For stators with serial no. before xxxx.38A.xxx

PS01–37x240-C (0150-1224)

Phase1+ / Phase1-		Pin A / Pin B	11.5 Ω
Phase2+ / Phase2-		Pin C / Pin D	11.5 Ω
5V / GND		Pin E / Pin F	155 Ω /275 Ω*
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / 40 kΩ*
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / 40 kΩ*
Temp. Sensor / GND		Pin L / Pin F	10kΩ / >20MΩ*
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–37x240F-M (0150-1213)

Phase1+ / Phase1-	Red / Pink	Pin 1 / Pin 2	4.8 Ω
Phase2+ / Phase2-	Blue / Gray	Pin 3 / Pin 4	4.8 Ω
5V / GND	White / Brown	Pin 5 / Pin 6	155 Ω /275 Ω*
Sensor Sinus / GND	Yellow / Brown	Pin 7 / Pin 6	33 kΩ / 40 kΩ*
Sensor Cosine / GND	Green / Brown	Pin 8 / Pin 6	33 kΩ / 40 kΩ*
Temp. Sensor / GND	Black / Brown	Pin 9 / Pin 6	10kΩ / >20MΩ*
Phase / GND	-	Pin 1, 2, 3, 4 / Pin 6	>20 MΩ
All Pin / Shield	-	Pin 1 – 9 / Housing	>20 MΩ

PS01–37x240F-C (0150-1225)

Phase1+ / Phase1-		Pin A / Pin B	4.8 Ω
Phase2+ / Phase2-		Pin C / Pin D	4.8 Ω
5V / GND		Pin E / Pin F	155 Ω /275 Ω*
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / 40 kΩ*
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / 40 kΩ*
Temp. Sensor / GND		Pin L / Pin F	10kΩ / >20MΩ*
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–48x240-C (0150-1219)

Phase1+ / Phase1-		Pin A / Pin B	3.1 Ω
Phase2+ / Phase2-		Pin C / Pin D	3.1 Ω
5V / GND		Pin E / Pin F	155 Ω
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / >20 MΩ**
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / >20 MΩ**
Temp. Sensor / GND		Pin L / Pin F	10 kΩ
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–48x240F-C (0150-1220)

Phase1+ / Phase1-		Pin A / Pin B	1.1 Ω
Phase2+ / Phase2-		Pin C / Pin D	1.1 Ω
5V / GND		Pin E / Pin F	155 Ω
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / >20 MΩ**
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / >20 MΩ**
Temp. Sensor / GND		Pin L / Pin F	10 kΩ
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

PS01–48x360F-C (0150-1220)

Phase1+ / Phase1-		Pin A / Pin B	1.5 Ω
Phase2+ / Phase2-		Pin C / Pin D	1.5 Ω
5V / GND		Pin E / Pin F	155 Ω
Sensor Sinus / GND		Pin G / Pin F	33 kΩ / >20 MΩ**
Sensor Cosine / GND		Pin H / Pin F	33 kΩ / >20 MΩ**
Temp. Sensor / GND		Pin L / Pin F	10 kΩ
Phase / GND		Pin A,B,C,D / Pin F	>20 MΩ
All Pin / Shield		Pin A-L / Housing	>20 MΩ

* For stators with serial no. before xxxx.38A.xxx
** For stators with serial no. before xxxx.3IK.xxx

Caution: Handling Instructions for Sliders

LinMot® Slider

LinMot® Linear Motor sliders must be handled with care especially if not assembled within the stator! Damaging or warping of the slider can result in shortened life and/or failure of the motor. The slider is essentially a high-precision machine component consisting of neodymium magnets and plastic materials assembled in a thin steel tube. Do not use sliders who are already damaged on the surface (scratches, deformation, etc.). This can provide a further damage of the stator! Keep slider away from unshielded flame or heat. Temperature of more than 120°C will cause demagnetization.

Magnetism

LinMot® sliders contain neodymium magnets which may disturb or damage magnetic data carriers and delicate electronic equipment merely by coming close to them. Examples for such equipment are: television and computer monitors, credit cards and EC-cards, computers, floppy discs and other data storage medium, video tapes, mechanical watches, hearing devices and loudspeaker. Heart pacemakers can be disturbed by strong magnets. Keep a minimum distance of 1m.

Crushes

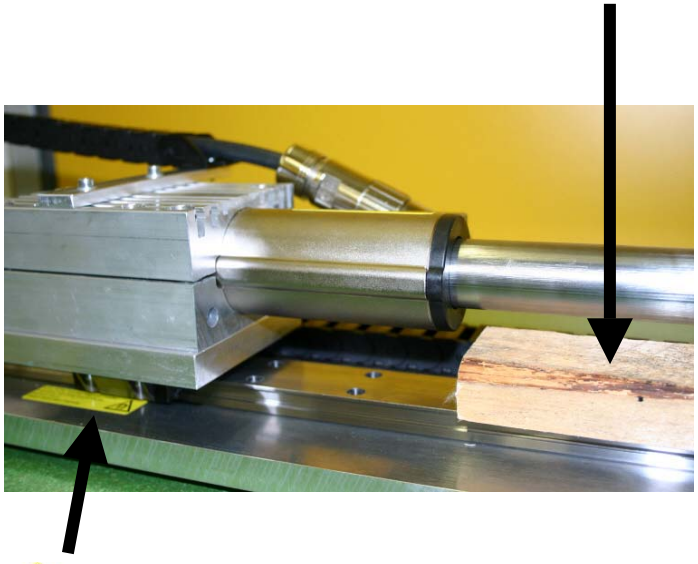
When handling sliders be aware that, due the strong magnetic attraction, serious injury from fingers being pinched between the slider and nearby steel parts is a very real possibility if caution is not exercised.

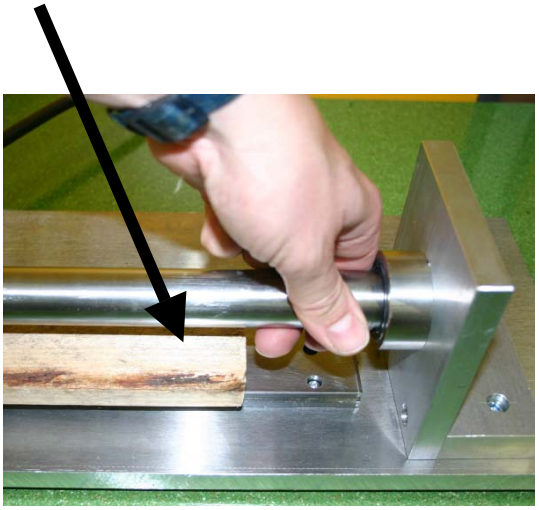
No modification of sliders provided by customers is allowed!

Do not modify the slider in any way. Any modification could destroy the included magnets and magnet dust can be builded. Magnet dust is easily enflammable! NdFeB-Magnets are not made of steel. These magnets are sintered and due to that highly breakable.

Special instruction for handling of long sliders (moving stator applications)

As long as the slider is not fastened on both ends a non magnetic block must be placed between the slider and the steel bearing guide. Make sure that in any step of the installation there is no possibility that the slider can be attracted to steel parts. Use wood or aluminum blocks thicker than 15 mm (0.6in) to provide minimum spacing.





After the installation of the slider a safety label has to be placed close to the slider.

Declaration of Conformity CE-Marking

Manufacturer: NTI AG
LinMot ®
Haerdlistrasse 15
8957 Spreitenbach
Switzerland
Tel.: +41 (0) 56 419 91 91
Fax: +41 (0) 56 419 91 92

Products: *LinMot* ® Linear Servo Motors

Type	Art.-No.	Type	Art.-No.
PS01-23x80	0150-1201	PS01-23x80-M	0150-1208
PS01-23x160	0150-1202	PS01-23x160-M	0150-1209
PS01-23x160F	0150-1206	PS01-37x120-M	0150-1210
PS01-23x80-R	0150-1233	PS01-23x160-R	0150-1234
PS02-23Sx80-F*	0150-1272	PS01-23x160H-HP-R	0150-1254
PS02-23Sx80-F-AGI*	0150-1273	PS01-37x240-M	0150-1211
PS02-23Sx80F-HP-K	0150-1285	PS01-37x120-C	0150-1223
PS01-37x120	0150-1204	PS01-37x240-C	0150-1224
PS01-37x240	0150-1203	PS01-48x240F-C	0150-1220
PS01-37x240F-M	0150-1213	PS01-48x360F-C	0150-1269
PS01-48x240-C	0150-1219	PS01-48x240F-SSC-C	0150-1267
PS01-37x120F-HP-C	0150-1251	PS01-48x240F-SSC-C-FC	0150-1268
PS01-37x120F-HP-SSC-R	0150-1282	PS01-48x240F-SSC-C-Cw	0150-1274
PS01-37x120F-HP-SSC-R-FC	0150-1283	PS01-48x240F-SSC-C-CW-FC	0150-1275
PS01-23x80	0150-1201	PS01-48x360F-SSC-C	0150-1269
PS01-23x160	0150-1202	PS01-48x360F-SSC-C-FC	0150-1270
PS01-23x160F	0150-1206	PS01-48x360F-SSC-C-Cw	0150-1271

*shielded flat cable needed

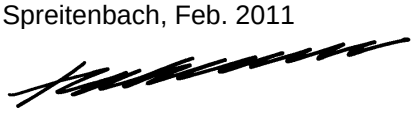
The product must be mounted and used in strict accordance with the installation instruction contained within the User's Manual, a copy of which may be obtained from NTI AG.
I declare that as the authorized representative, the above information in relation to the supply/manufacture of this product is in conformity with the stated standards and other related documents in compliance with the protection requirements of the EMC Directive (89/336/EEC) and is marked in accordance with the CE Marking Directive (93/68/EEC).

Standards Complied with:

Conducted EMI EN 61000-6-4	EN 55011	Class A
Electromagnetic Suspectibility EMC EN 61000-6-2	EN 61000-4-2	4 kV / 8kV
	EN 61000-4-4	1 kV / 2kV
	EN 61000-4-3	10 V/m
	EN 61000-4-6	10 V
	ENV 50204	10 V/m

Company
NTI AG

Spreitenbach, Feb. 2011



Dr.-Ing. Ronald Rohner / CEO NTI AG

Contact Addresses

NTI AG
LinMot
Haerdlistrasse 15
CH-8957 Spreitenbach
Switzerland

Tel.: +41 (0)56-419 91 91
Fax: +41 (0)56-419 91 92
E-Mail: office@linmot.com
Web: www.linmot.com

LinMot Inc.
N5750 Townline Road
Elkhorn
WI 53121
USA

Sales: 877-546-3270
262-743-2555
Tech. Service: 877-804-0718
262-743-1284
Fax: 800-463-8708
262-723-6688
E-Mail: sales@linmot-usa.com
Web: www.linnmot-usa.com