TECHLINE®
IMPROVING FLEXIBILITY

Linear Actuator LA33

Data Sheet

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Contents

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Introduction

The actuator LA33 combines compact design and high power in a solution fit for use in industrial settings and for demanding applications that require customized interfaces, faster, silent operation or to work in rough and extreme environments.

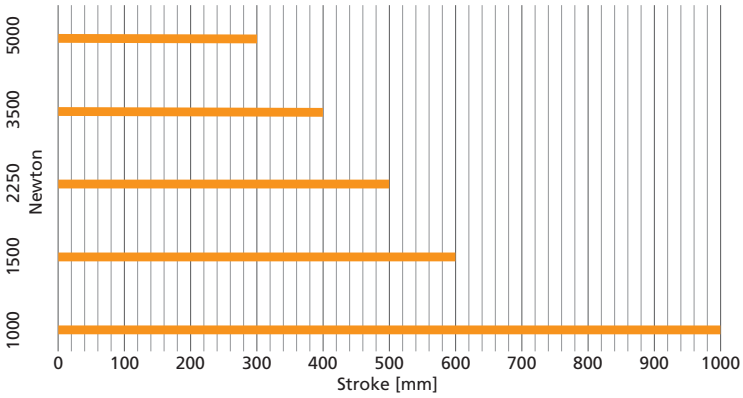
Features

- 12, 24 or 48 VDC permanent magnetic motor
- Maximum load from 500 N - 5,000 N depending on gear ratio and spindle pitch
- Maximum. speed up to 70 mm/sec. depending on load and spindle pitch
- Stroke length from 100 to 600 mm (1000 mm with maximum 1000 N as special item)
- Heavy duty aluminium housing for harsh conditions
- Highly efficient acme thread spindle
- Protection class: IP66 for outdoor use (dynamic), furthermore the actuator can be washed down by a high pressure cleaner (IP69K – static)
- Hand crank for manual operation
- Integrated brake, high self-lock ability
- Endplay – 2.5 mm maximum
- Non rotating piston rod eye
- Built-in endstop switches
- Noise level: 73 dB (A) measuring method DS/EN ISO 8746 actuator not loaded
  70 dB (A) measuring method DS/EN ISO 8746 actuator not loaded (Plastic gear)
- Self-lock (with shorted power cables)

Options in general

- Exchangeable cables in different lengths
- Adjustable magnetic sensors for Endstop Reached signals (code no. 1017031)
- Hall effect sensor
- IC options including:
  - IC (Integrated Controller)
  - IC with I/O
  - IC Integrated Parallel Controller
  - LIN bus communication and CAN bus communication (see CAN bus user manual)
  - Analogue or digital feedback for precise positioning
  - Proportional control
  - Endstop Reached
  - PC configuration tool

Load vs. stroke length



- For applications operating only in pull the limitations are 600 mm stroke and 5,000 N load
- 1000 mm with maximum 1000 N in push and 1500 N in pull available as special item. (For plastic gears there is no difference between push and pull loads).
- Safety factor 2

Technical specifications:

12 V motor:

Type	Thrust max. Push/ Pull (N)	Self-lock max. Push (N)	Self-lock max. Pull (N)	Spin-dle Pitch (mm) /Gear	*Typical speed (mm/s)		Stroke length (mm) in steps of 50mm			*Typical Amp. (A)		End-play mm +/-
					No load	Full load	Min.		Max.	No load	Full load	
33090xxxxxxxxA...	5000	5000	5000	9 / A	9	6	100	-	300**	2.8	10	1
33150xxxxxxxxA...	3500	3500	3500	15 / A	15	9	100	-	400**	2.8	10	1.25
33150xxxxxxxxA...	2250	2250	2250	15 / B	23	15	100	-	500**	2.8	10	1.25
33200xxxxxxxxA...	1500	1500	1500	20 / B	34	24	100	-	600	2.0	10	2.5
33200xxxxxxxxA...	500	500	500	20 / C	68	52	100	-	600	5.0	12	2.5

24V motor:

Type	Thrust max. Push/ Pull (N)	Self-lock max. Push (N)	Self-lock max. Pull (N)	Spin-dle Pitch (mm) /Gear	*Typical speed (mm/s)		Stroke length (mm) in steps of 50mm			*Typical Amp. (A)		End-play mm +/-
					No load	Full load	Min.		Max.	No load	Full load	
33090xxxxxxxxB...	5000	5000	5000	9 / A	9	7	100	-	300**	1.8	6.5	1
33150xxxxxxxxB...	3500	3500	3500	15 / A	15	13	100	-	400**	1.8	7.0	1.25
33150xxxxxxxxB...	2250	2250	2250	15 / B	25	21	100	-	500**	1.8	6.6	1.25
33200xxxxxxxxB...	1500	1500	1500	20 / B	35	30	100	-	600	1.8	6.5	2.5
33200xxxxxxxxB...	500	500	500	20 / C	80	72	100	-	600	3	7	2.5

48 V Motor:

Type	Thrust max. Push/ Pull (N)	Self-lock max. Push (N)	Self-lock max. Pull (N)	Spin-dle Pitch (mm) /Gear	*Typical speed (mm/s)		Stroke length (mm) in steps of 50mm			*Typical Amp. (A)		End-play mm +/-
					No load	Full load	Min.		Max.	No load	Full load	
33090xxxxxxxxJ...	5000	5000	5000	9 / A	9	7	100	-	300**	0.9	3.2	1
33150xxxxxxxxJ...	3500	3500	3500	15 / A	15	13	100	-	400**	0.9	3.5	1.25
33150xxxxxxxxJ...	2250	2250	2250	15 / B	25	21	100	-	500**	0.9	3.3	1.25
33200xxxxxxxxJ...	1500	1500	1500	20 / B	35	30	100	-	600	0.9	3.2	2.5
33200xxxxxxxxJ...	500	500	500	20 / C	80	72	100	-	600	0.9	3.5	2.5

* The typical values can have a variation of ± 20% on the current values and ± 10% on the speed values. Measurements are made with an actuator in connection with a stable power supply and an ambient temperature at 20 °C.

** There are limitations on the stroke length if you need full load, please see "Load vs. stroke length" on page 5.

Please note that all actuators featuring 'IC Advanced with softstop towards end stop' or 'IC Parallel', 'LINBUS', 'CAN bus', 'MODBUS' will run at a regulated speed, which is typically around 80% of the nominal speed.

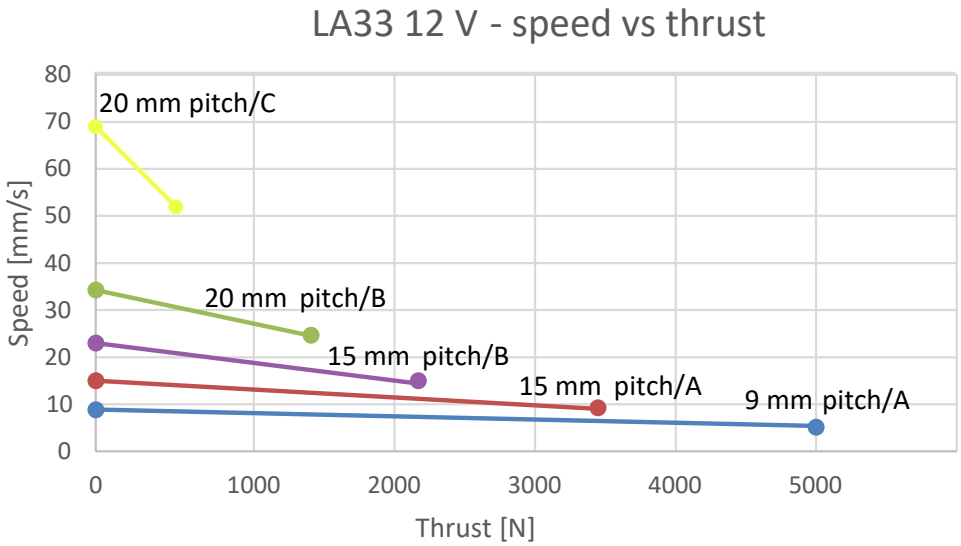
It is possible to maintain an endstop reached signal, after the actuator has stopped, with other feedback systems than those available with Integrated Controller. -This comes at the cost of the better self-lock and the improved ability to prevent back-drive, which a shorted motor provides. It requires that supply on both brown, blue, red and black wires is maintained.
See conection diagrams for"Actuator with Endstop Reached" for connections.

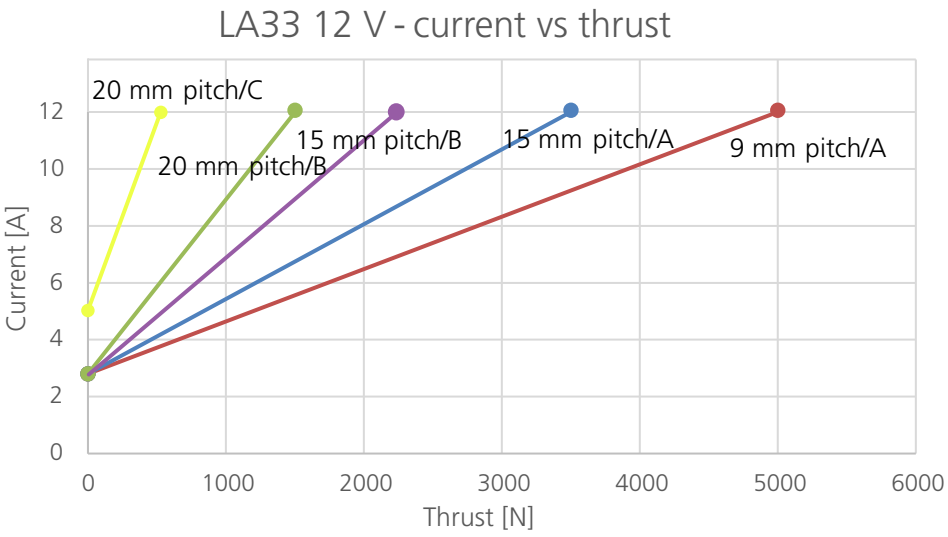
Gear ratios:

Type		Gear ratio	9mm spindle	15mm spindle	20mm spindle
Gearbox	33xxxxxxxxxxxxxxxxA...	1:67	5000 N	3500 N	-
	33xxxxxxxxxxxxxxxxB...	1:39	-	2250 N	1500 N
	33xxxxxxxxxxxxxxxxC...	1:16	-	-	500 N

Speed and current curves 12 V

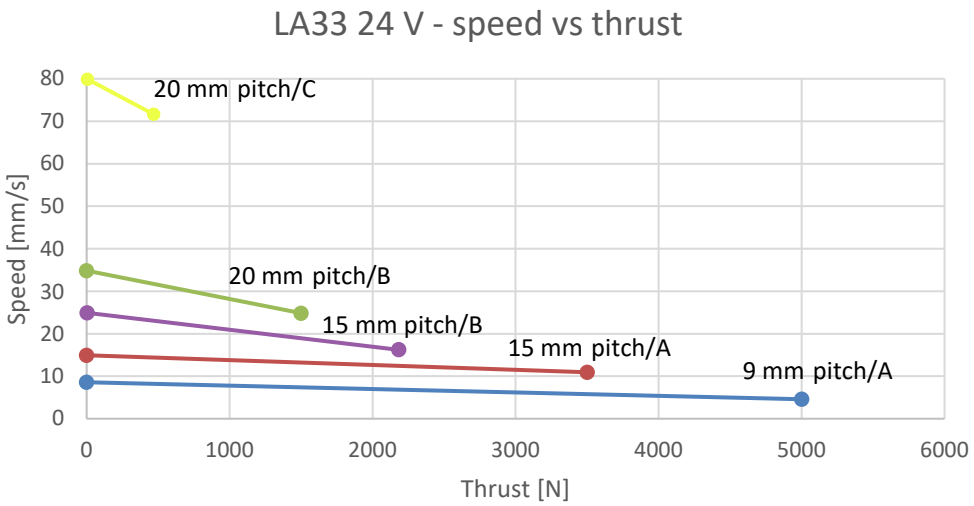
The values below are typical values and made with a stable power supply and an ambient temperature of 20° C.

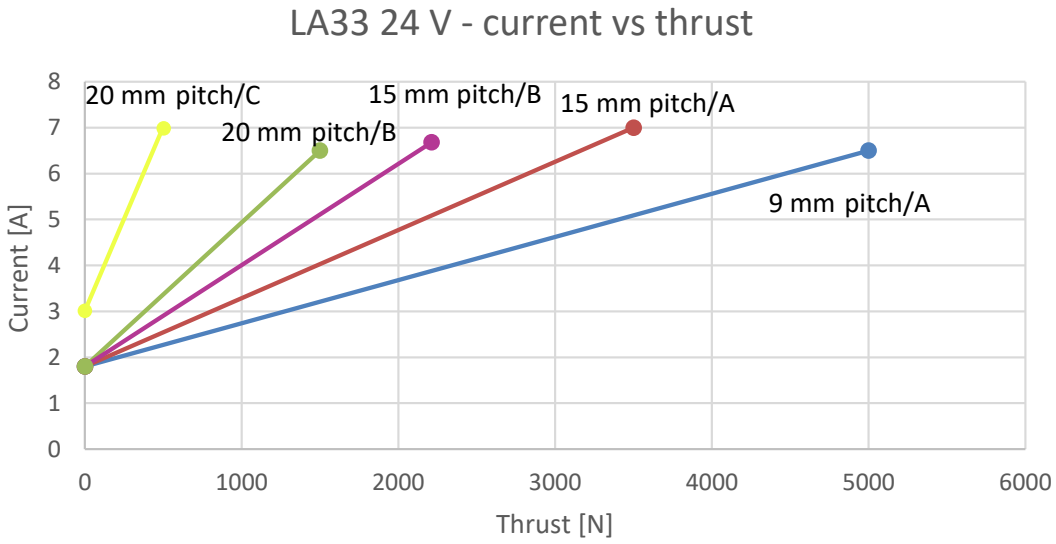




Speed and current curves 24 V

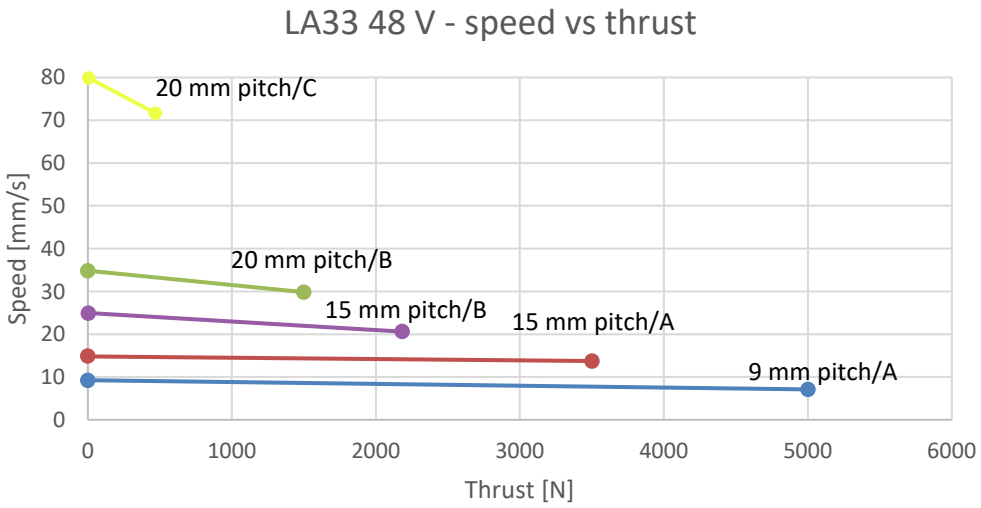
The values below are typical values and made with a stable power supply and an ambient temperature of 20˚ C. The performance is reduced at low temperatures (below -5° C).

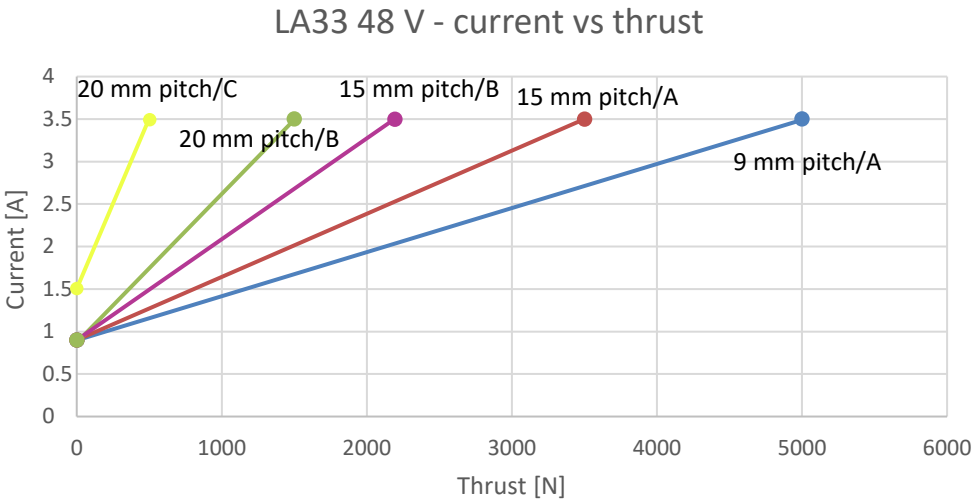




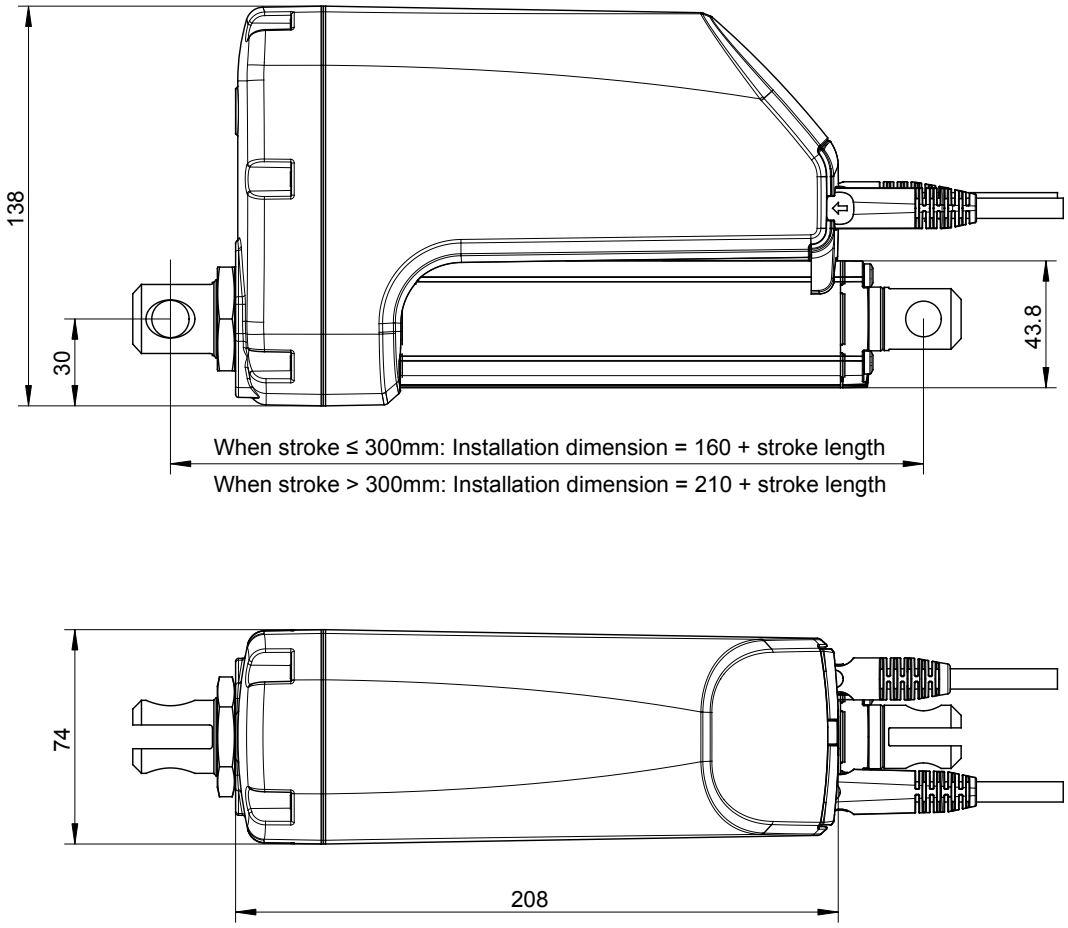
Speed and current curves 48 V

The values below are typical values and made with a stable power supply and an ambient temperature of 20˚ C. The performance is reduced at low temperatures (below -5° C).





Built-in dimensions:



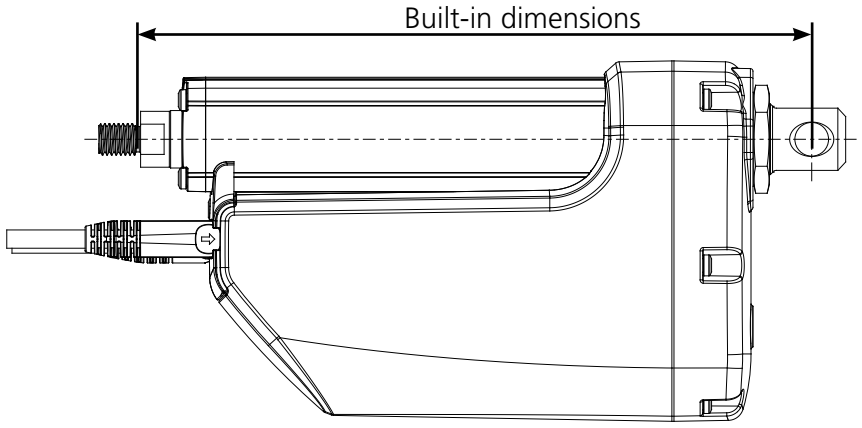
Stroke and built-in tolerances:

Endstop options	Descriptions	Stroke tolerance	Example for 200mm stroke	BID tolerance	Example for 360mm BID
All	With built-in limit switches or Integrated Controller	+/-2mm	198 to 202mm	+/- 4mm	356 to 364mm

Built-in dimensions:

Piston rod	"1 and A" / to the centre of the hole		"2 and B" / to the centre of the hole		"5" / from the surface		"C and D" / to the centre of the hole	
Back fixture	Stroke < = 300	Stroke > 300	Stroke < = 300	Stroke > 300	Stroke < = 300	Stroke > 300	Stroke < = 300	Stroke > 300
	160	210	160	210	157*	207*	171	221

* These built-in dimensions are measured according to the illustration below.



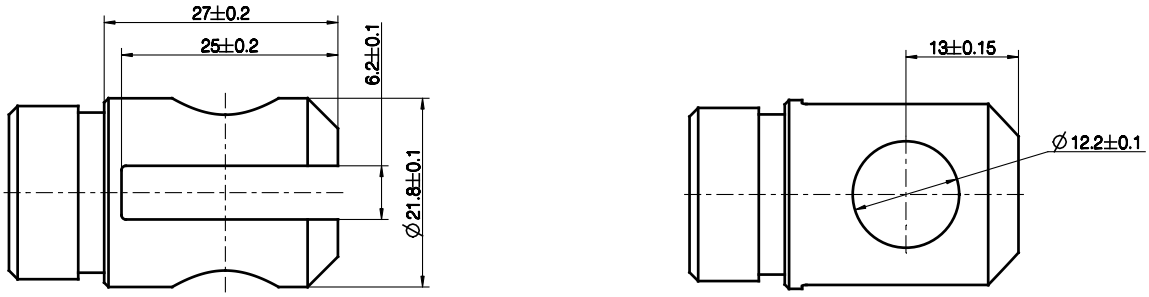
Piston Rod Eyes:

Please note, that when ordering AISI 304 piston rod eye and back fixture - stainless steel screws and nuts are not automatically included.

Option "1" and "A"

Piston 0331036, Zinc coated steel

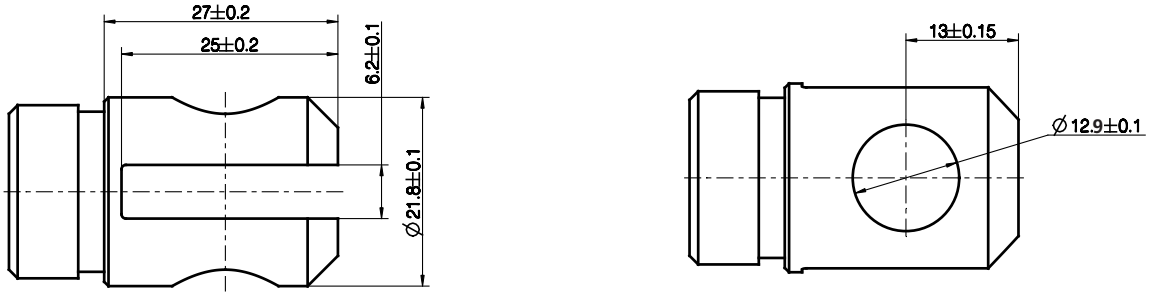
Piston 0331140, Stainless steel AISI 304



Option "2" and "B"

Piston 0331014, Zinc coated steel

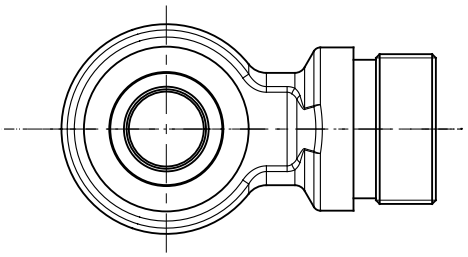
Piston 0331139, Stainless steel AISI 304

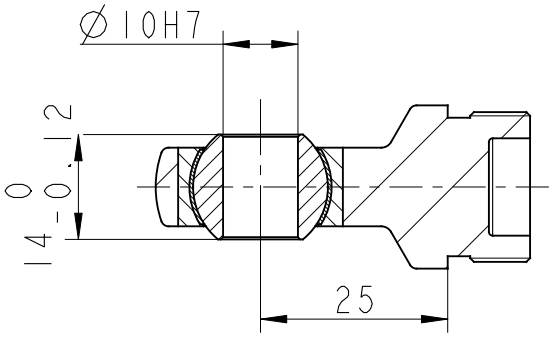


Piston Rod Eyes:

Option "C"

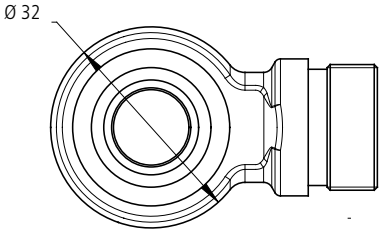
Piston 0351043, Stainless steel AISI 304

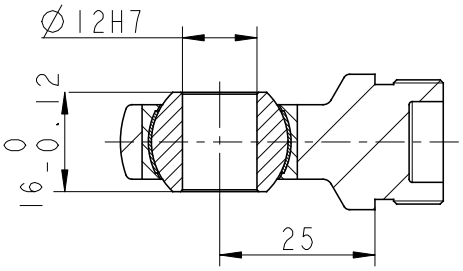




Option "D"

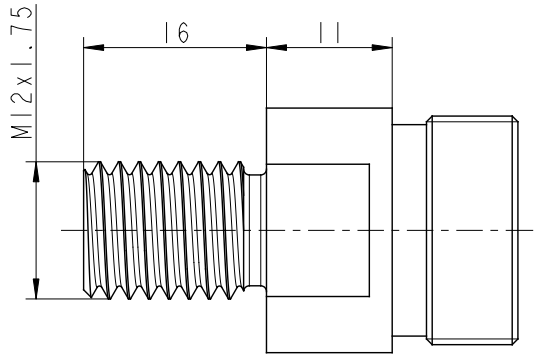
Piston 0351035, Stainless steel AISI 304

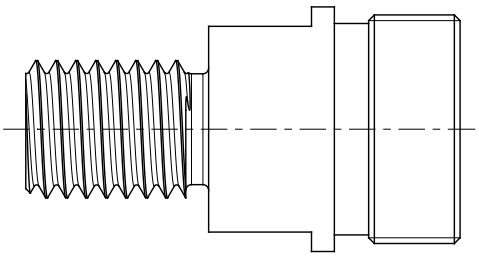




Option "5"

Piston 0231094, Stainless steel AISI 304





The Piston Rod Eye is only allowed to turn 0 - 90 degrees

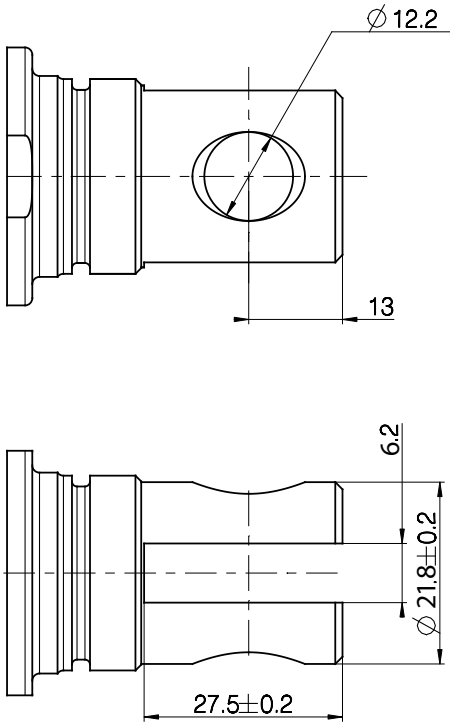
Back fixtures:

Option "1" and "2"

LINAK P/N: 0331160, Zink coated steel

Option "A" and "B"

LINAK P/N: 0331158, Stainless steel AISI 304

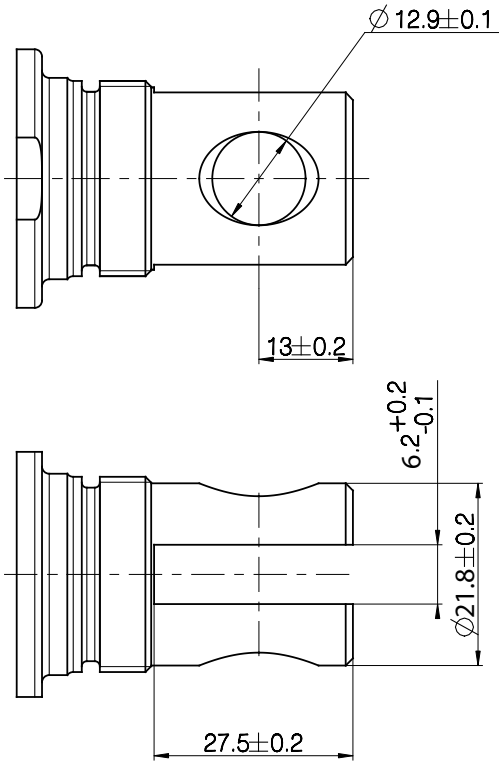


Option "3"

LINAK P/N: 0331159, Zink coated steel

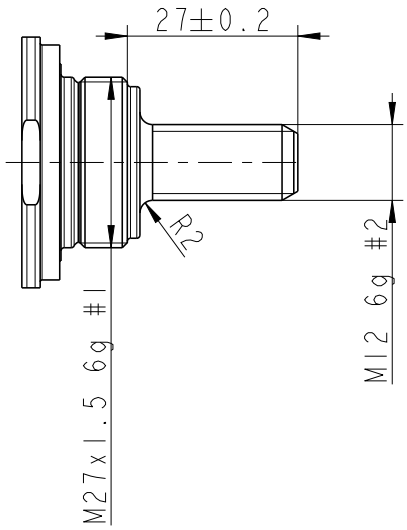
Option "C" and "D"

LINAK P/N: 0331157, Stainless steel AISI 304



Option "5"

LINAK P/N: 0331156, Stainless steel AISI 303



Back fixture orientation:

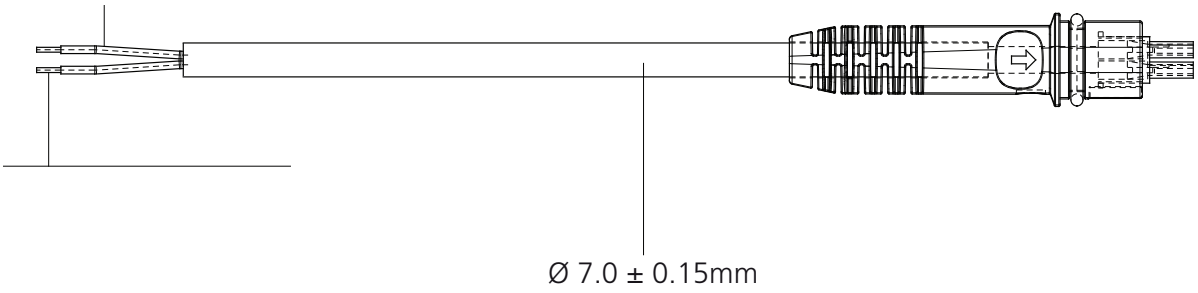
"0" Degrees

"90" Degrees

NB. All with tolerance of ± 4 °

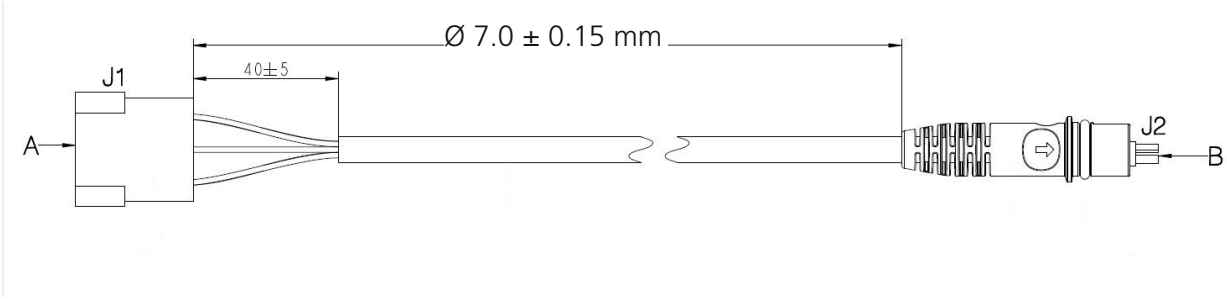
Cables:

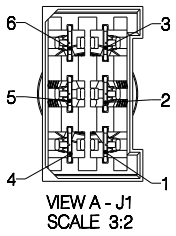
Power cable dimensions

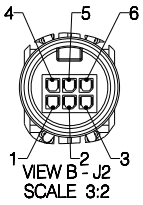


Pin	Outer dimensions		Core dimensions*	
1	Blue	Ø 2.8 mm	Ø 2 mm²	AWG:14
2	Brown	Ø 2.8 mm	Ø 2 mm²	AWG:14

6-pin Signal cable dimensions





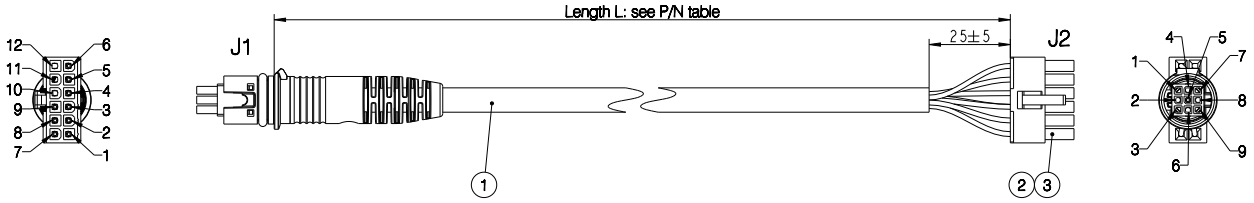


Connection table		
J1	Color	J2
1	Black	1
2	Red	2
3	White	3
4	Violet	4
5	Yellow	5
6	Green	6

Pin	Outer dimensions		Core Dimensions*	
1	Black	Ø 1.5 mm	0.5 mm²	AWG: 20
2	Red	Ø 1.5 mm	0.5 mm²	AWG: 20
3	White	Ø 1.5 mm	0.5 mm²	AWG: 20
4	Violet	Ø 1.5 mm	0.5 mm²	AWG: 20
5	Yellow	Ø 1.5 mm	0.5 mm²	AWG: 20
6	Green	Ø 1.5 mm	0.5 mm²	AWG: 20

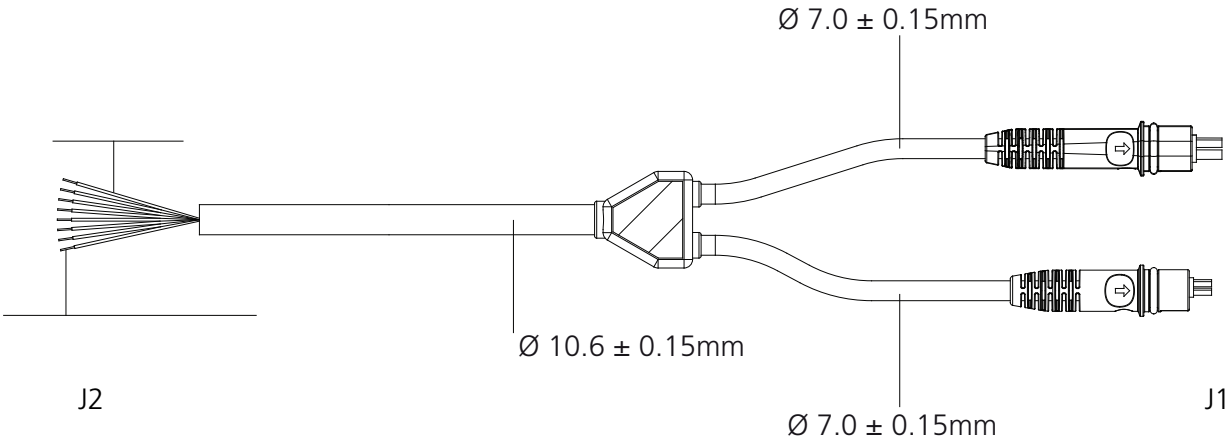
*AWG: American Wire Gauge

9 pin signal cable dimensions



Pin:	Outer dimensions		Core dimensions*	
1	Grey:	Ø 1.5mm	0.5mm²	AWG: 20
2	Orange:	Ø 1.5mm	0.5mm²	AWG: 20
3	White:	Ø 1.5mm	0.5mm²	AWG: 20
4	Violet:	Ø 1.5mm	0.5mm²	AWG: 20
5	Yellow:	Ø 1.5mm	0.5mm²	AWG: 20
6	Green:	Ø 1.5mm	0.5mm²	AWG: 20
7	Black:	Ø 1.5mm	0.5mm²	AWG: 20
8	Red:	Ø 1.5mm	0.5mm²	AWG: 20
9	Light blue:	Ø 1.5mm	0.5mm²	AWG: 20

Y-cable dimensions



Pin**:	Outer dimensions		Core dimensions*	
1	Blue:	Ø 2.8mm	2.0mm²	AWG: 14
2	Brown:	Ø 2.8mm	2.0mm²	AWG: 14
3	Black:	Ø 1.5mm	0.5mm²	AWG: 20
4	Red:	Ø 1.5mm	0.5mm²	AWG: 20
5	White:	Ø 1.5mm	0.5mm²	AWG: 20
6	Violet:	Ø 1.5mm	0.5mm²	AWG: 20
7	Yellow:	Ø 1.5mm	0.5mm²	AWG: 20
8	Green:	Ø 1.5mm	0.5mm²	AWG: 20

*AWG: American Wire Gauge

**Pin connections are the same for both AMP and Deutsch connectors

Standard cable Article numbers

Power cables								
Plug types	**Article no.**	**Material**	**# Wires**	**mm²**	**AWG**	**Colour**	**Length (mm)**	**Cable type**
Flying leads	CAB0367046 - 1500	PVC	2	2.0	14	Black	1500	Straight
Flying leads	CAB0367046 - 5000	PVC	2	2.0	14	Black	5000	Straight
Signal cables:								
Flying leads*	CAB0367049-1500	PVC	6	0.5	20	Black	1500	Straight
Flying leads*	CAB0367049-5000	PVC	6	0.5	20	Black	5000	Straight
Flying leads**	CAB0368543-5000	PVC	9	0.5	20	Black	5000	Straight
Flying leads	0367020-1500	PVC	6 2	0.5 2.0	20 14	Black	1500	Y-Cable
* The cable comes with an FASTIN FASTON AMP connector that can be removed for flying leads ** The cable comes with an CviLux AMP connector that can be removed for flying leads								

Cable kit Article numbers

Buslink® cable kits:			
System:	**Article no.**	**Pins:**	**Including:**
IC: Basic, Advanced and Parallel	0367999	6	(Adapter + USB2Lin)
CAN bus / CANopen with 6 pin	0367997	6	(Adapter + USB2Lin)

Actuator Connect® cable kits:			
System:	**Article no.**	**Pins:**	**Including:**
I/O & CAN bus / CanOpen with 9 pins	0367996	9	(Adapter + USB2Lin)

Latest versions of both Buslink® and Actuator Connect® can be downloaded at the LINAK/TECHLINE page.

Electrical installation:

To ensure maximum self-locking ability, please be sure that the motor is shorted when stopped. Actuators with integrated controller provide this feature, as long as the actuator is powered.

When using soft stop on a DC-motor, a short peak of higher voltage will be sent back towards the power supply. It is important when selecting the power supply that it does not turn off the output, when this backwards load dump occurs.

Manual Hand Crank

The manual Hand Crank can be used in the case of power failure.

The cover over the Allen Key socket must be unscrewed before the Allen Key can be inserted and the Hand Crank operated.

Hand Crank Torque: 6-8 Nm

Hand Crank rpm: Maximum. 65

- The power supply has to be disconnected during manual operation.
- If the actuator is operated as a Hand crank, it must only be operated by hand, otherwise there is a potential risk of overloading and hereby damaging the actuator
- Actuators with absolute positioning must be initialised after use of the manual hand-crank, because their positioning will be displaced when the power is disconnected
- After using the hand crank the ingress protection will be lower - even if the cover is properly mounted

Environmental tests – Climatic

Salt mist.	EN ISO 9227	Dynamic salt spray test: Salt solution: 5% sodium chloride (NaCl) Temperature: 35 ± 2°C Duration: 500 h Actuator is operated
Thermal shock		Dunk test: Actuator is heated to +85 °C for 4h and submerged into a 0 °C cold salt-water-detergent solution for 2h Followed by 18 h dry time Duration: 5 cycles
Degrees of protection	EN60529 - IP66	IP6X - Dust: Dust-tight, No ingress of dust Actuator is not activated
	EN60529 - IP66	IPX6 - Water: Ingress of water in quantities causing harmful effects is not allowed Duration: 100 litres pr. minute in 3 minutes Actuator is not activated
	DIN40050 - IP69K	IPX9K: High pressure cleaner Temperature: +80°C Water pressure: 80-100 bar Water flow: 14-16 l/min Duration: 30 sec. each at 4 different angles 0°, 30°, 60° and 90° Actuator is not activated Ingress of water in quantities causing harmful effects is not allowed

Environmental tests – Mechanical

Test	Specification	Comment
Mechanical Shock (Handling) - Drop test		3 drops on 6 faces onto a concrete floor Drop height: 500 mm on all faces
Vibration Random	The specification is based on ISO 16750-3:2012(E) Test VII and should therefore be performed according to IEC 60068-2-64, random vibration. The PSD level is increased in the frequency range from 10 to 400[Hz]	Random vibration: From 10Hz to 2000 Hz Duration: 32 h/axis Acceleration: 6.9 [g_{rms}]

Environmental tests – Electrical

Standard	Specification	FOCUS ON
EN/IEC 60204-1:2006 + A1:2009 + AC:2010	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	• INDUSTRIAL AUTOMATION
EN/IEC 61000-6-1: 2007	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light industrial environments	• INDUSTRIAL AUTOMATION
EN/IEC 61000-6-2: 2005 + AC:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	• INDUSTRIAL AUTOMATION
EN/IEC 61000-6-3: 2007 + A1:2011 + AC:2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	• INDUSTRIAL AUTOMATION
EN/IEC 61000-6-4: 2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards: Emission standard for industrial environments	• INDUSTRIAL AUTOMATION
ISO 16750-2:2012	Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads	• ROAD VEHICLES
ISO 7637-2:2011	Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only	• ROAD VEHICLES
ISO 7637-3:2007	Electrical disturbances from conduction and coupling - Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines	• ROAD VEHICLES
CISPR 25 IEC:2008	Radio disturbance characteristics – Limits and methods of measurement for the protection of on-board receivers	• VEHICLE, BOATS AND INTERNAL COMBUSTION ENGINES
ISO 11452-1, 2, 4		

All electrical tests are conducted and radiated emission (EMC) tests.

The above standards can all be found in the TRD8166, TRD8293 and TRD8416 documents.

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