TECHLINE®
IMPROVING FLEXIBILITY

Linear Actuator LA21

Data Sheet

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Preface

Dear User,

We are delighted that you have chosen a LINAK® product.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, lifting columns, desk frames, electric control boxes, controls, batteries, accessories and chargers.

This User Manual does not address the end user. It is intended as a source of information for the equipment or system manufacturer only, and it will tell you how to install, use and maintain your LINAK electronics. The manufacturer of the end product has the responsibility to provide a User Manual, where relevant safety information from this manual is passed on to the end user.

We are convinced that your LINAK product/system will give you many years of problem-free operation.

Before our products leave the factory, they undergo both function and quality testing. Should you, nevertheless, experience problems with your product/system, you are always welcome to contact your supplier.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you. Locate your local contact information on the back page.

LINAK provides a warranty on all products. (See warranty section).

This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly, and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK systems can affect their operation and durability. The products may only be opened by authorised personnel.

This User Manual has been written based on the present technical knowledge. LINAK reserves the right to carry out technical modifications and keeps the associated information updated.

LINAK A/S

Terms of use

LINAK® takes great care in providing accurate and up-to-date information on its products. However, the user is responsible for determining the suitability of LINAK products for a specific application.

Due to continual development, LINAK products are subject to frequent modifications and changes. LINAK reserves the rights to conduct modifications, updates, and changes without any prior notice. For the same reason, LINAK cannot guarantee the correctness and actual status of imprinted information on its products.

LINAK uses its best efforts to fulfil orders. However, for the reasons mentioned above, LINAK cannot guarantee availability of any particular product at any given time. LINAK reserves the right to discontinue the sale of any product displayed on its website or listed in its catalogues or in other written material created and produced by LINAK, LINAK subsidiaries, or LINAK affiliates.

All sales are subject to the 'Standard Terms of Sale and Delivery for LINAK A/S' available on LINAK websites.

Introduction

The LA21 is a small yet powerful industrial electric linear actuator designed for fast and precise positioning. Featuring an integrated controller, its compact form and broad customization options make it ideal for applications where space is limited but performance is critical.

Engineered to deliver consistent accuracy and reliable positioning, the LA21 is also resilient to harsh industrial conditions, including vibrations, dust, and moisture. Despite its compact size, it includes the same advanced features found in our larger actuators, making it a versatile solution for industries like agriculture, construction, and automation.

Safety instructions

Please read this safety information carefully.

Be aware of the following three symbols throughout the document:

Warning!
Failing to follow these instructions can cause accidents resulting in serious personal injury.

Recommendations
Failing to follow these instructions can result in the actuator suffering damage or being ruined.

Additional information
Usage tips or additional information that is important in connection with the use of the actuator.

Furthermore, ensure that all staff who are to connect, mount, or use the actuator are in possession of the necessary information and that they have access to this user manual.

Persons who do not have the necessary experience or knowledge of the product/products must not use the product/products. Besides, persons with reduced physical or mental abilities must not use the product/products, unless they are under surveillance or they have been thoroughly instructed in the use of the apparatus by a person who is responsible for the safety of these persons.

Moreover, children must be under surveillance to ensure that they do not play with the product.

Before you start mounting/dismounting, ensure that the following points are observed:

- The actuator is not in operation.
- The actuator is free from loads that could be released during this work.

Before you put the actuator into operation, check the following:

- The actuator is correctly mounted as indicated in the relevant user instructions.
- The equipment can be freely moved over the actuator's whole working area.
- The actuator is connected to a suitable electricity supply with the correct voltage.
- Ensure that the voltage applied matches to the voltage specified on the actuator label.
- Ensure that the connection bolts can withstand the wear.
- Ensure that the connection bolts are secured safely.

During operation, please be aware of the following:

- Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
- Only use the actuator within the specified working limits.
- Do not step on or kick the actuator.

When the equipment is not in use:

- Switch off the mains supply in order to prevent unintentional operation.
- Regularly check for excessive wear.

Classification

The equipment is not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.

Warnings

- Do not sideload the actuator
- When mounting the actuator in the application ensure that the bolts can withstand the wear and that they are secured safely
- If irregularities are observed, the actuator must be replaced
- Do not lift or carry the actuator on its cables

Recommendations

- Do not place load on the actuator housing
- Prevent impact or blows, or any other form of stress to the housing
- Ensure that the cable cover is mounted correctly. Use 2 Nm torque
- Ensure that the duty cycle and the usage temperatures for actuators are respected
- Ensure that the cable cannot be squeezed, pulled or subjected to any other stress
- During system design -ensure that wire connections are made inside a closed and protective enclosure, to obtain compliance with the IP protection requirements
- Furthermore, it will be good practice to ensure that the actuator is fully retracted in the “normal” position. The reason is that there will be a negative pressure inside the actuator if it is extended which over time can lead to water entering the actuator
- It's good practice to mount the actuator with the motor housing facing upwards and the wires pointing downwards for outdoor applications. This helps protect the motor from environmental elements like rain and debris, ensuring better performance and longevity

Features

- 12, 24 or 48 V DC permanent magnetic motor
  (12 and 24 V DC available without Integrated Controller)
- Load from 500 N - 3.500 (depending on gear ratio and spindle pitch)
- Max. speed 85 mm/sec. (depending on motor, gear ratio and spindle pitch)
- Stroke length from 50 to 800 mm (with Integrated Controller from 70 to 800 mm)
- Built-in endstops reached function
- Highly efficient acme thread spindle
- Safety factor 2: The actuator has been certified to withstand static loads that are twice the magnitude of its dynamic load capacity without sustaining damage.
- Heavy duty aluminium housing for challenging environmental conditions
- Protection class: IP66 for outdoor use (dynamic). Furthermore, the actuator can be washed down by a high pressure cleaner (IP69K - static)
- Integrated brake with high self-lock ability
- Non-rotating piston rod eye
- Mechanical endstop
- Hand crank for manual operation

Options in general

- Back Fixture options as male adapter and various slotted in both 0 or 90 degrees
- Piston Rod Eyes options as male adapter, various slotted and ball eyes
- Exchangeable cables in different lengths
- Anodised housing for extreme corroding environments -see paragraph regarding 'Special anodised housing'
- When ordering AISI 304 piston rod eye and back fixture, stainless steel screws are automatically included
- Feedback interfaces:
    - Built-in endstop switches
    - Analogue or digital position feedback from hall effect sensor
- Integrated Controller with contactless incremental encoder, contactless calibration (Zero-point) and following interfaces:
    - I/O
    - CAN SAE J1939
    - CANopen
    - LIN bus
    - Modbus RTU
    - Modbus TCP/IP
    - EtherNet/IP
    - PROFINET
    - IO-Link
- Specific interface user manuals are available at the TECHLINE webpage containing both Connection Diagrams and I/O Specifications
- PC configuration tool (Actuator Connect™)

Usage

- Duty cycle up to 800 mm stroke: max. 20% (240 s drive and 960 s rest)
- Ambient operating temperature: Full performance from -20°C to +65°C
  -30 to -20°C (reduced load 50%)
  -40 to -30°C (no load)
  +65 to + 85°C (reduced duty cycle)
- Storage temperature:
  Actuator is not activated/ connected: -40°C to +70°C
  -55°C to +95°C for 24 hours for Standard platform
  -55°C to +105°C for 24 hours for Integrated Control platform
- Acclimatisation before usage.
- Relative humidity: Full performance from 20% to 80% - non-condensing
- Cyclic state: 93% to 98% - non-condensing +25°C to +55°C for 12 hours
- Steady state 93% to 95% - non-condensing +40 °C for 56 Days
- Atmospheric pressure: 795 to 1060 hPa
- Meters above sea level: Max. 2000 meters

Ordering Example

21 050 200 0 A 01 B A - 6 1 1 B 1 XXXX N C S 0 0 0

Actuator type	**21**	=	Linear Actuator LA21			
Spindle type	030	=	3 mm (3,500 N)	**050**	=	5 mm (2,500 N)
	090	=	9 mm (1,500 N)	150	=	15 (900 N)
	200	=	20 mm (500 N)			
Stroke length	**200**	=	XXX Length in mm 50-800 (70-800 for Integrated Controller)			
Not used	**0**	=	Default			
Feedback	0	=	No Feedback	F	=	PWM
	A	=	Analogue feedback (Hall potentiometer) (V or mA)			
	K	=	Single Hall			
Platform			**Endstop switch principle**			
	01	=	Standard with power switch			
IC based:			**Zero Point**			**Zero Point with split supply**
	B3	=	I/O Basic	A7	=	CAN bus (J1939)
	C3	=	I/O Customised	A8	=	CANopen
	F3	=	I/O Full	0E	=	Modbus TCP/IP
	0B	=	IO-Link	2E	=	Ethernet/IP
	14	=	Modbus RTU RS485	4E	=	Profinet
				37	=	SAE CAN J1939 Off-highway
				38	=	CANopen Off-highway
Motor type	A	=	12 V DC			
	B	=	24 V DC			
	J	=	48 V DC			
Housing	**A**	=	Standard aluminum housing	9	=	Harsh environment housing
Not used	**-**	=	Default			
Colour*	**6**	=	Standard housing (Grey)	9	=	Harsh housing (Black)
Back fixture	**1**	=	0 °	4	=	Male Adapter (Outer thread)
	2	=	90°			

*The choice of color is not optional but is determined by the type of housing.

Piston rod eye	**1**	=	Slotted	4 6	= =	Male Adapter (Outer thread) Ball eye
Gear	A	=	Ratio 1:25 (500 N)	**B**	=	Ratio 1:37 (900 N, 1,500 N, 2,500 N and 3,500 N)
Brake	**1**	=	With Brake			
Built-in dimension	xxxx	=	Measured in mm			
Endstop reached output*	A B C	= = =	A_HIGH / A_HIGH A_LOW / A_HIGH A_HIGH / A_LOW			
In/Out	D **N**	= =	A_LOW / A_LOW LOW / LOW			
Plug type	0 J 9 **C** R	= = = = =	No plug (when no cable is chosen) Deutsch Deutsch - Moulded Flying leads M12 Modbus	H K 7 E N	= = = = =	AMP AMP Super Seal AMP Super Seal - Moulded M12 Y Ethernet M12 IO-Link
Cable	0 **S** V	= = =	No cable selected Straight cable Y-Cable with 90° angled connectors	A Y	= =	Mounted with 90° angled connectors Y-Cable (combined power and signal cable)
Parallel mode	**0**	=	Parallel disabled	2-8	=	Critical parallel (number of actuators in the parallel system)
SW config.	**0**	=	Default software			
Not used	**0**	=	Default			

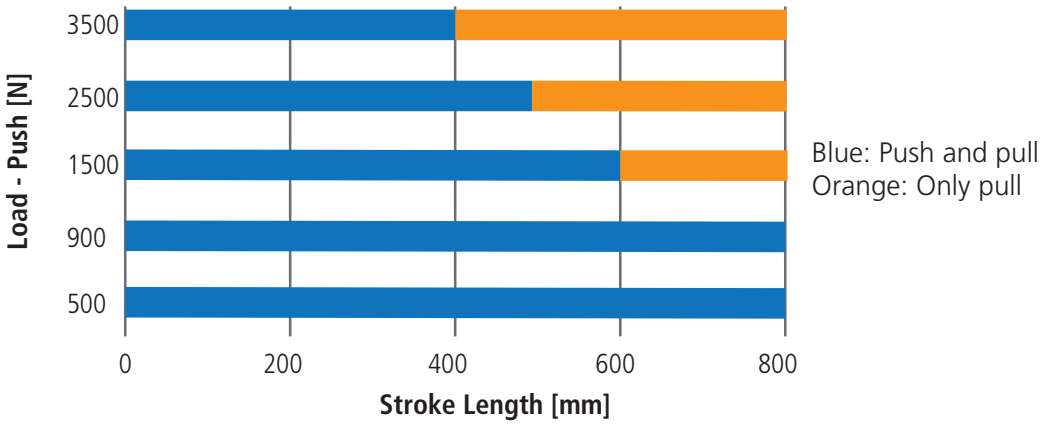
* A_High is active high and A_LOW is active low. HIGH is constant high and LOW is constant low.

Active high: The signal goes from low to high, when the endstop is reached.

Active low: The signal goes from high to low, when the endstop is reached.

Low: The signal stays low at all times.

Load vs stroke length



- For applications that only operate in pull, the limitations are 800 mm stroke and 3.500 N load

Technical specifications

12 V

Load max. (N)	Self-lock min. (N)	Pitch (mm/ spindle rev.)	Gear/ Ratio	Hall Resolution mm/count	End-play in mm	Typical speed* (mm/s) load		IC with regu-lated Speed (mm/s) ***	Typical amp.*/** (A)	
									12 V	
						No load	Full load		No load	Full load
500	500	20	A 1:24	0.474	2.1	75	67	58	3.5	6.8
900	1,800	15	B 1:37	0.234	1.0	37	33	28	3.0	6.4
1,500	3,000	9	B 1:37	0.140	0.6	21	19	16	3.5	6.7
2,500	5,000	5	B 1:37	0.078	0.4	12	10	9	3.0	8.5
3,500	7,000	3	B 1:37	0.046	0.2	8	6	5	3.0	8.5

24 V

Load max. (N)	Self-lock min. (N)	Pitch (mm/ spindle rev.)	Gear/ Ratio	Hall Resolution mm/count	End-play in mm	Typical speed* (mm/s) load		IC with regu-lated Speed (mm/s) ***	Typical amp.*/** (A)	
									24 V	
						No load	Full load		No load	Full load
500	500	20	A 1:24	0.474	2.1	75	64	58	1.7	3.7
900	1,800	15	B 1:37	0.234	1.1	36	31	28	1.8	3.5
1,500	3,000	9	B 1:37	0.140	0.7	21	18	16	2.0	4.5
2,500	5,000	5	B 1:37	0.078	0.4	12	10	9	1.5	4.1
3,500	7,000	3	B 1:37	0.046	0.2	8	6	5	1.5	4.5

48 V

Load max. (N)	Self-lock min. (N)	Pitch (mm/ spindle rev.)	Gear/ Ratio	Hall Resolution mm/count	End-play in mm	Typical speed* (mm/s) load		IC with regu-lated Speed (mm/s) ***	Typical amp.*/** (A)	
									48 V	
						No load	Full load		No load	Full load
500	500	20	A 1:24	0.474	2.1	85	80	78	1	2.5
900	1,800	15	B 1:37	0.234	1.1	42	39	38	1	2.5
1,500	3,000	9	B 1:37	0.140	0.6	25	23	22	1	2.5
2,500	5,000	5	B 1:37	0.078	0.4	15	14	12	1	2.5
3,500	7,000	3	B 1:37	0.046	0.2	11	10	7	1	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.

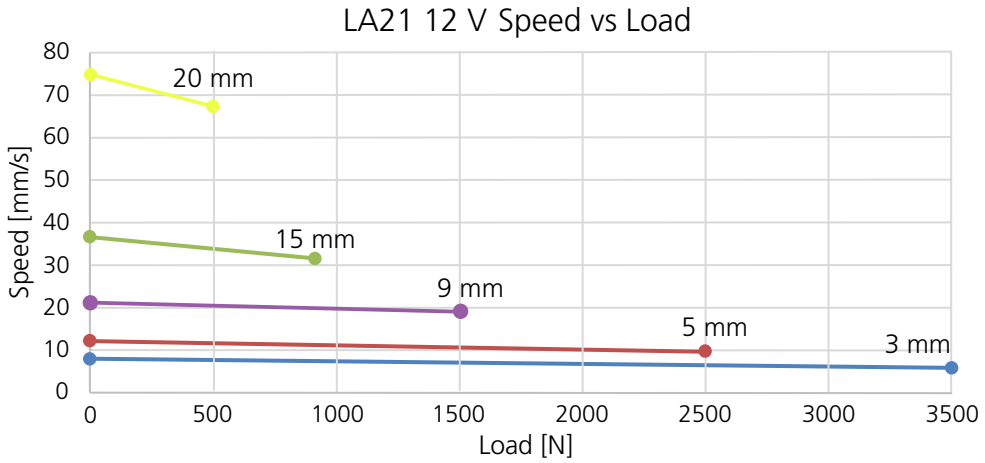
** Depending on temperature (see speed and current curves).

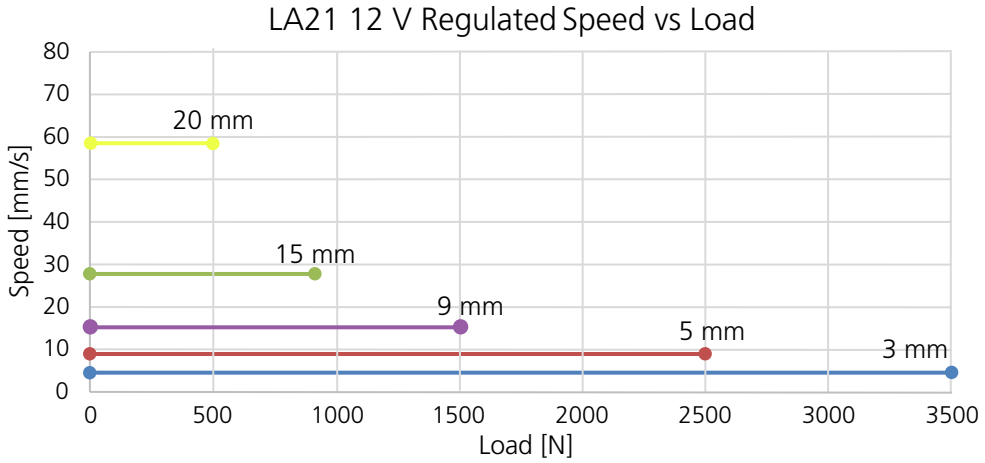
*** By default, the IC Actuator operates with unregulated speed.
To enable regulated speed, set the ramp-down time stop setting to any value other than 0.

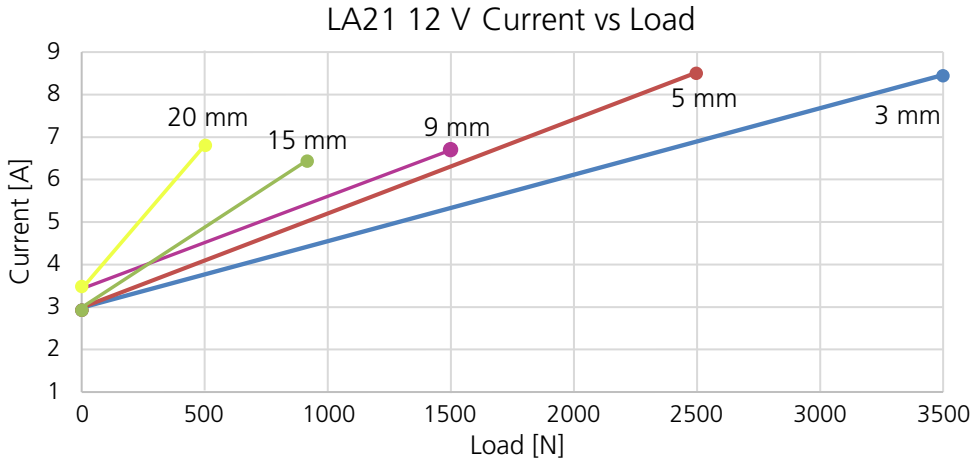
To maximise the self-locking ability, ensure that the motor is shorted when stopped.
(The shown self-locking values are measured without shorted motor).
-Actuators with an Integrated Controller provide this feature as long as the actuator is powered.

Speed and current curves

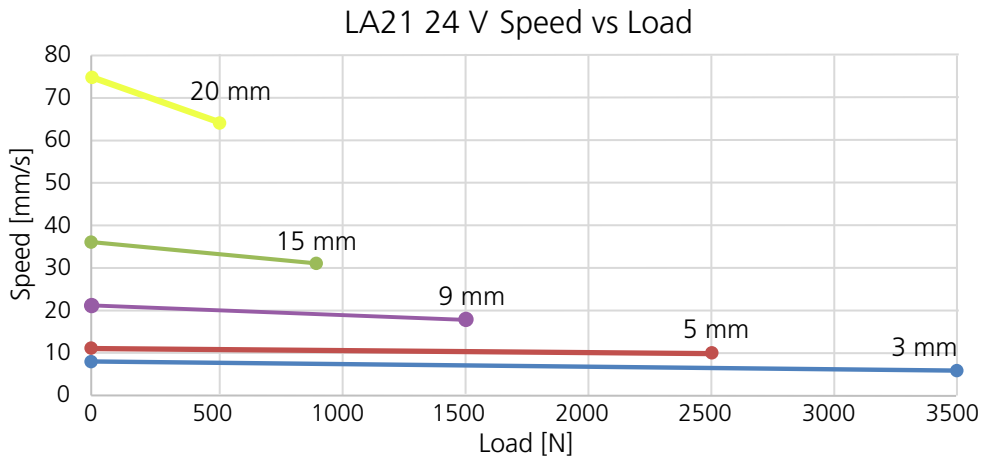
The typical values below are made with a stable power supply and an ambient temperature of 20°C.

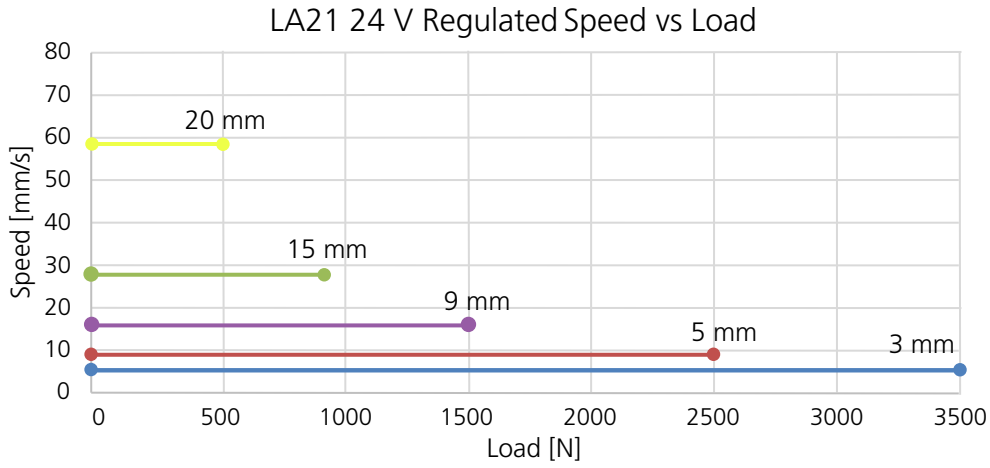


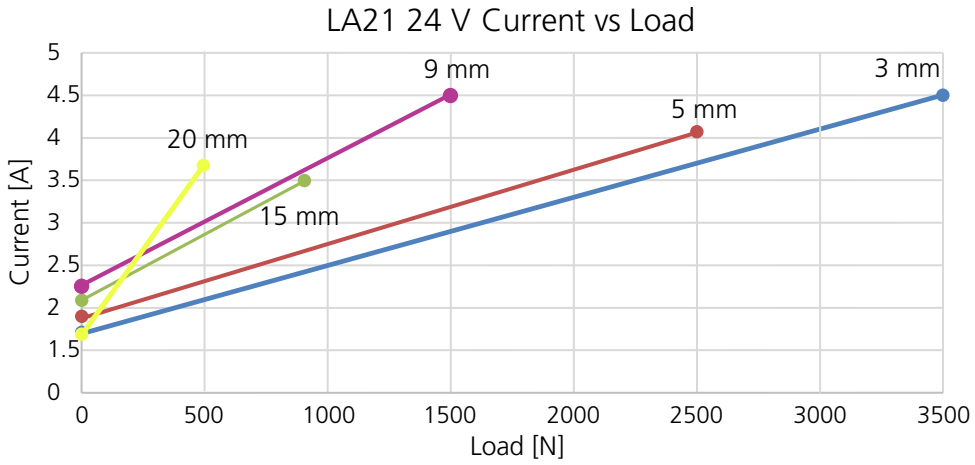




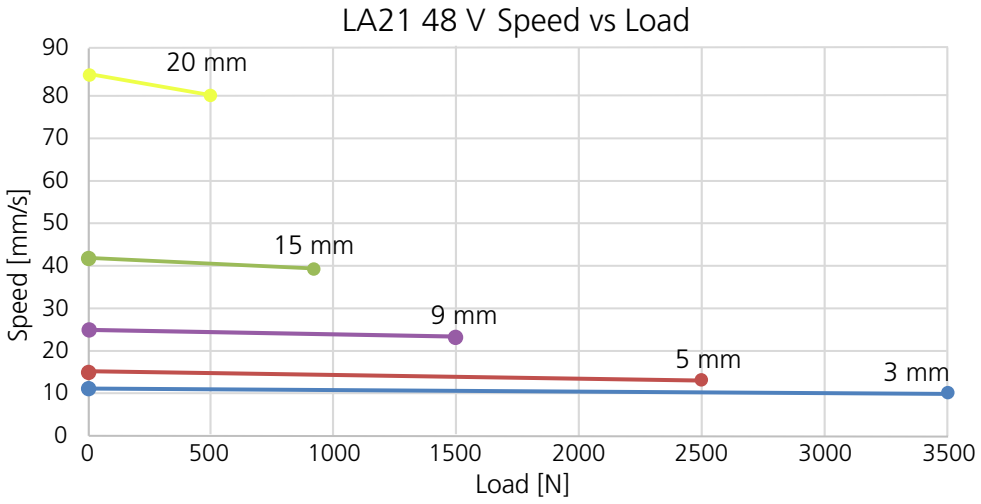
The typical values below are made with a stable power supply and an ambient temperature of 20°C.

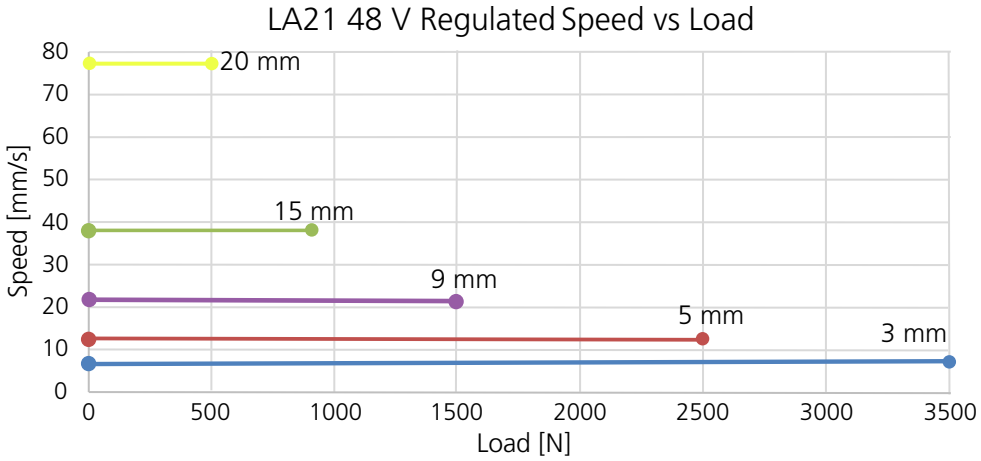


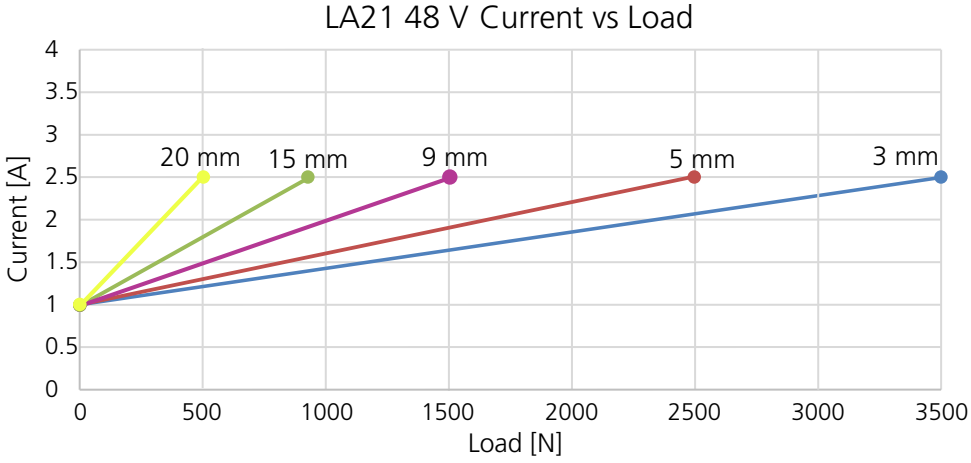




The typical values below are made with a stable power supply and an ambient temperature of 20°C.

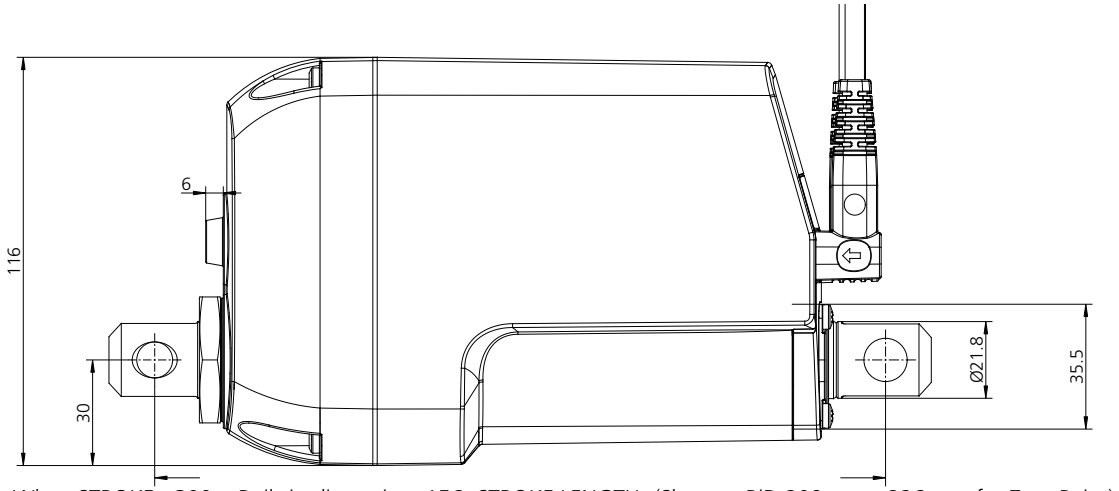




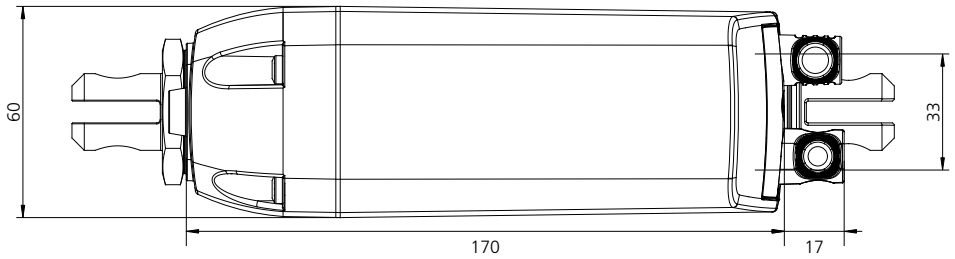


Built-in dimensions

All dimensions are in mm



When STROKE ≤300 = Built-in dimension; 156+STROKE LENGTH -(Shortest BiD 209 mm - 226 mm for Zero Point)
When STROKE >300 = Built-in dimension; 206+STROKE LENGTH



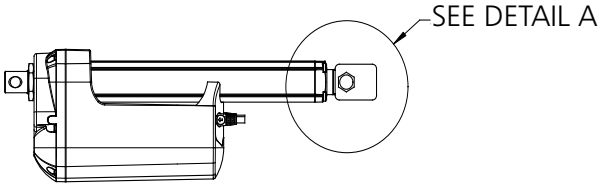
When selecting a piston rod eyes and back fixtures the built-in dimensions of the actuator can change. Please check this in the corresponding chapters

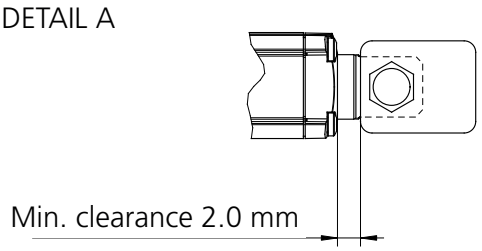
Stroke and built-in tolerances

Platforms		Stroke tolerance	Example for 200 mm stroke	BiD tolerance	Example for 356 mm BiD
01	Standard with power switch	± 1 mm	199 to 201 mm	± 1 mm	355 to 357 mm
B3 C3 F3 0B 14 A7 A8 2E 0E 14	I/O Basic I/O Customised I/O Full IO-Link Modbus RTU SAE CAN bus (J1939) CANopen EtherNet/IP Modbus TCP/IP Modbus RTU	± 1 mm	199 to 201 mm	± 1 mm	355 to 357 mm
37 38	SAE CAN J1939 Off-highway CANopen Off-highway	± 1 mm	199 to 201 mm	± 1 mm	355 to 357 mm

Keep a clearance when mounting a bracket

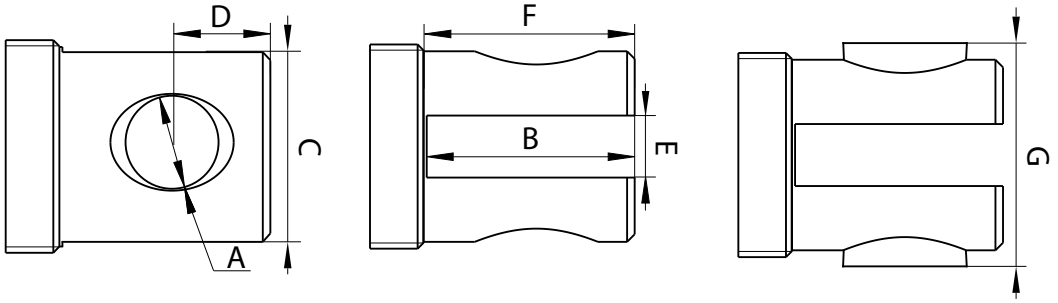
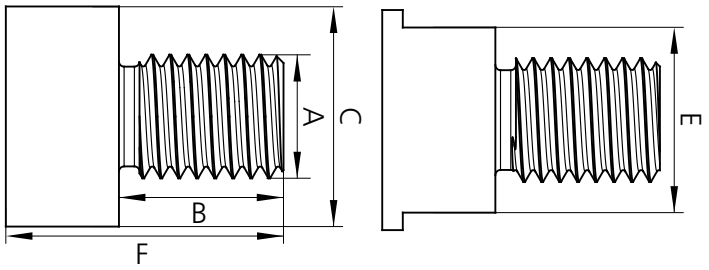
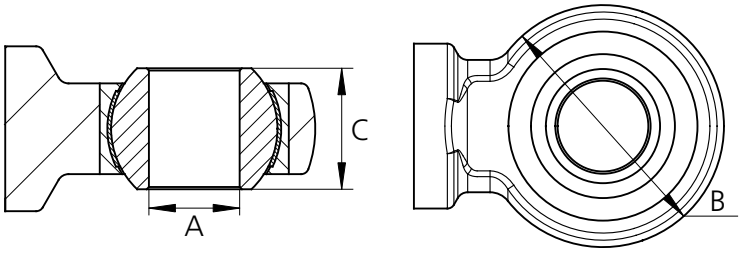
When mounting a custom bracket on the moving part of the actuator, please observe the minimum clearance between bracket and cylinder top when fully retracted. This will prevent jamming and destruction of the actuator drive train.





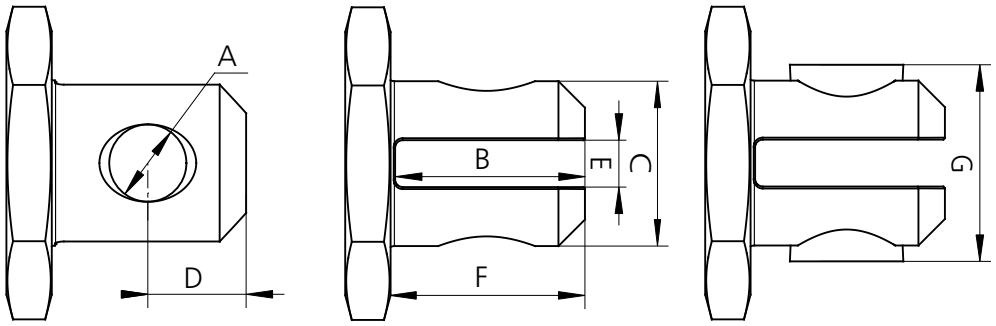
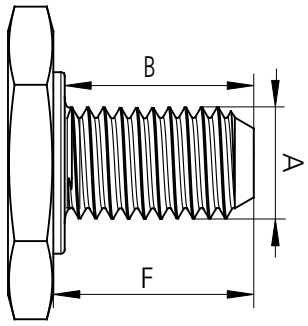
Piston Rod Eyes

All dimensions are in mm. Piston rod eyes are allowed to turn 0-180°

Option	Piston Rod Eye	Material	A	B	C	D	E	F (~)	G	Change in BiD	P/N
1	Slotted	Zink coated steel	Ø 10.2	25.1	21.8	13	6.2	26.2	-	0	0231033
1	Slotted	AISI 304	Ø 10.2	25.1	21.8	13	6.2	26.2	-	0	0231096
1	Slotted	Zink coated steel	Ø 12.2	25.1	21.8	13	6.2	26.2	-	0	0331036
1	Slotted	AISI 304	Ø 12.2	25.1	21.8	13	6.2	26.2	-	0	0331140
1	Slotted	Zink coated steel	Ø 12.9	25.1	21.8	13	6.2	26.2	-	0	0331014
1	Slotted	AISI 304	Ø 12.9	25.1	21.8	13	6.2	26.2	-	0	0331139
1	Slotted	Zink coated steel + bushings	Ø 10.2	25.1	21.8	13	6.2	26.2	26	0	0231016
1	Slotted	AISI 304 + bushings	Ø 10.2	25.1	21.8	13	6.2	26.2	26	0	0231095
											
4	Male adaptor	AISI 304	M12 X 1.75	16	21.3	-	17.9	27	-	-3	0231094
											
6	Ball eye	AISI 304 (Ball only 440C)	Ø 10 H7	32	14	-	-	-	-	+11	0351053
6	Ball eye	AISI 304 (Ball only 440C)	Ø 12 H7	32	16	-	-	-	-	+11	0351035
											

Back Fixtures

All dimensions are in mm

Option	Back Fixture	Material	A	B	C	D	E	F (~)	G	Change in BiD	P/N
1 or 2	Slotted	Zink coated steel	Ø 10.2	25.1	21.8	13	6.2	26.2	-	0	1086W1026
1 or 2	Slotted	Zink coated steel	Ø 12.2	25.1	21.8	13	6.2	26.2	-	0	1086W1052
1 or 2	Slotted	Zink coated steel	Ø 12.9	25.1	21.8	13	6.2	26.2	-	0	1086W1053
1 or 2	Slotted	AISI 304	Ø 10,2	25.1	21.8	13	6.2	26.2	-	0	1086W1059
1 or 2	Slotted	AISI 304	Ø 12.2	25.1	21.8	13	6.2	26.2	-	0	1086W1056
1 or 2	Slotted	AISI 304	Ø 12.9	25.1	21.8	13	6.2	26.2	-	0	1086W1057
1 or 2	Slotted	Zink coated steel + POM bushings	Ø 10.2	25.1	21.8	13	6.2	26.2	26	0	1086W1062
1 or 2	Slotted	AISI 304 + POM bushings	Ø 10.2	25.1	21.8	13	6.2	26.2	26	0	1086W1063
											
4	Male adapter	AISI 304	M12 X 1.75	25.1	-	-	-	26.2	-	-13	1086W1058
											

Back fixture orientation

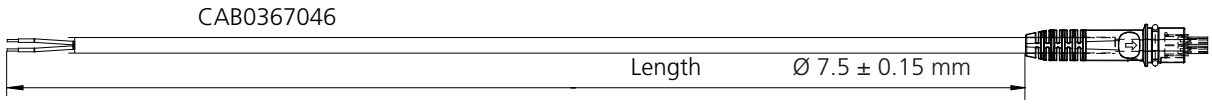
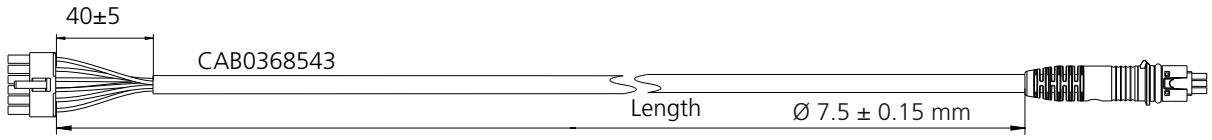
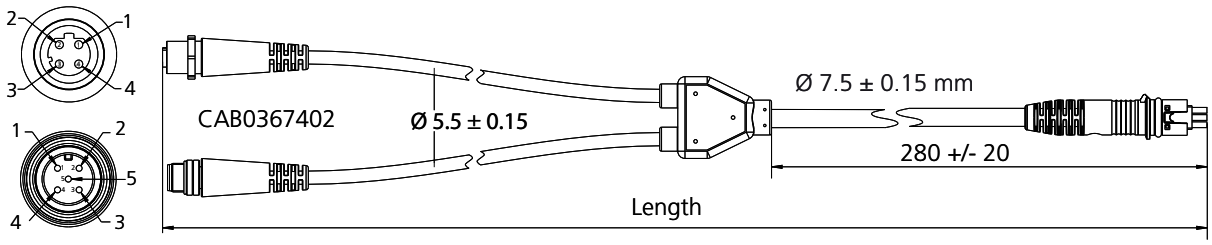
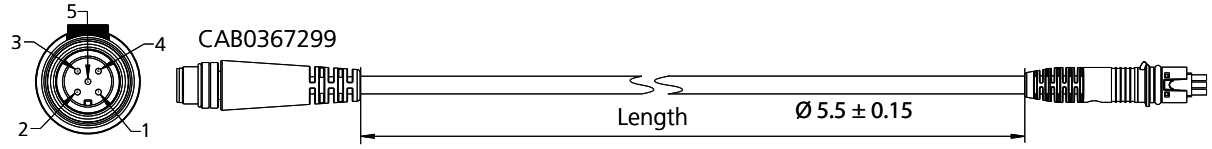
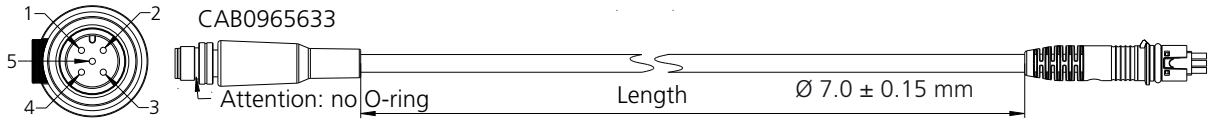
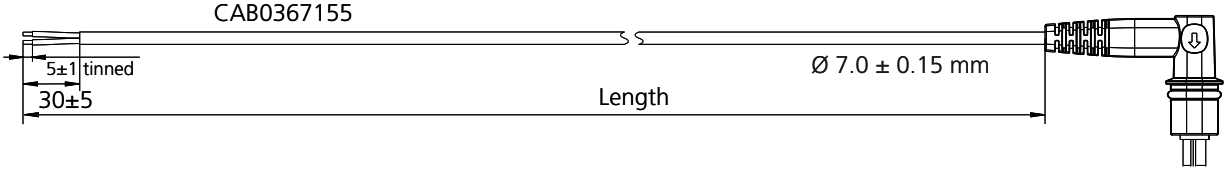
Electrical installation

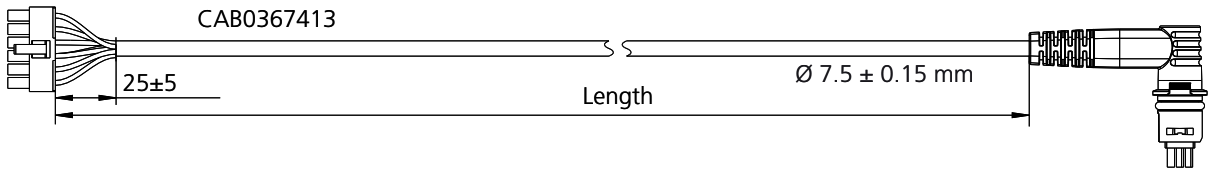
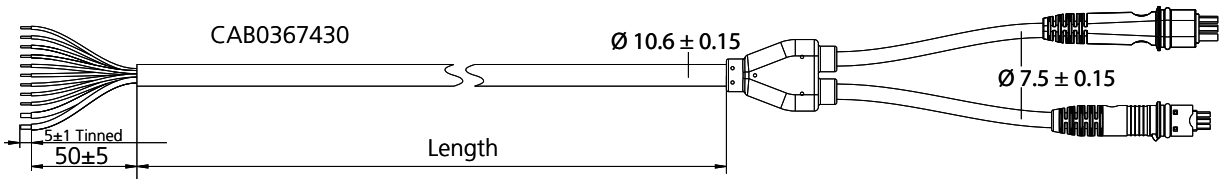
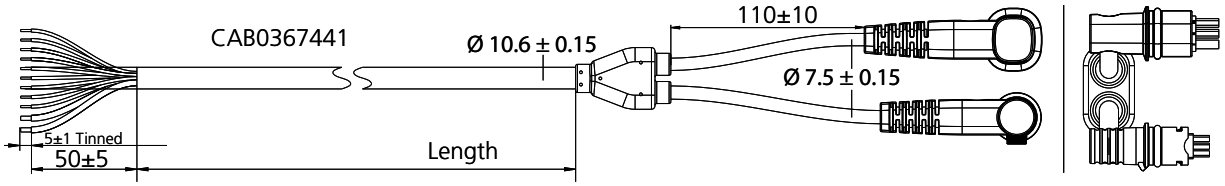
- To ensure maximum self-locking ability, please be sure that the motor is shorted when stopped. Actuator with Integrated Controller provide this feature, as long as the actuator is powered.
- When using soft stop on a DC-motor, the actuator can send a short high-voltage pulse to the power supply. It is important to make sure that it does not turn off the output when this backwards load dump occurs.
- The actuator includes a soft stop feature with a duration of 300 ms. This minimizes voltage peaks sent back to the power supply. Ensure the selected power supply does not disable the output during these reverse load dumps.
- The actuator utilizes a Hall-based position system. To maintain reliable position feedback throughout the product's lifespan, the actuator must be capable of recalibration within the application.

Calibration process

- **Without Integrated Controller:** Calibration is performed when the actuator moves to the endstop position in either direction and activates the endstop switch.
- **With Integrated Controller:** Calibration is performed when the actuator moves outward over a range of 35-70 mm in one continuous motion, without altering speed or stopping
- For actuators without an Integrated Controller, ensure the power supply is monitored externally. It must be disconnected in the event of a current overload to prevent damage. IC actuators come with built-in overcurrent protection, eliminating the need for external monitoring.

Cables

Cable P/N Table					
Option	**Cable type**	**# Wires**	**mm²**	**Length in mm**	**LINAK P/N**
S	Power cable	2	2.0	1,500	CAB0367046-1500
S	Power cable	2	2.0	5,000	CAB0367046-5000
					
S	Straight signal cable	9	0.5	1,500	CAB0368543-1500
S	Straight signal cable	9	0.5	5,000	CAB0368543-5000
					
S	Ethernet connection cable	9	0.5	600	CAB0367402
					
S	IO-Link connection cable	5	0.5	600	CAB0367299
					
S	Modbus RTU connection	5	0.5	1000	CAB 0965633-1000
					
A	Angled power cable	2	2.0	1,500	CAB0367155-1500
A	Angled power cable	2	2.0	5,000	CAB0367155-5000
					

Cable P/N Table					
Option	**Cable type**	**# Wires**	**mm²**	**Length in mm**	**LINAK P/N**
A	Angled signal cable	9	0.5	1,500	CAB0367413-1500
A	Angled signal cable	9	0.5	5,000	CAB0367413-5000
					
Y	Straight Y-cable Power and Signal	2 9	2.0 0.5	1,500	CAB0367430-1500
Y	Straight Y-cable Power and Signal	2 9	2.0 0.5	5,000	CAB0367430-5000
					
V	Angled Y-cable Power and Signal	2 9	2.0 0.5	1,500	CAB0367441-1500
V	Angled Y-cable Power and Signal	2 9	2.0 0.5	5,000	CAB0367441-5000
					

Power cable dimensions

Colour	Outer dimensions	Wire mm²	Pin
Blue	Ø2.8 mm	2.0	1
Brown	Ø2.8 mm	2.0	2

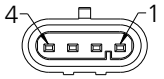
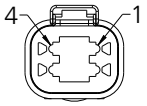
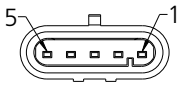
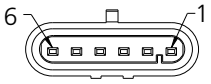
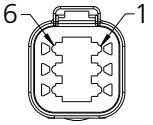
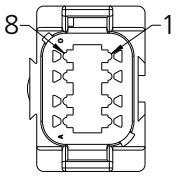
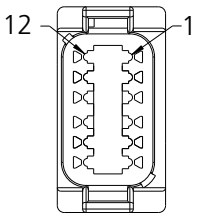
9-pin Signal cable dimensions

Colour	Outer dimensions	Wire mm²	Pin
Black	Ø1.5 mm	0.5	1
Red	Ø1.5 mm	0.5	2
Yellow	Ø1.5 mm	0.5	3
Green	Ø1.5 mm	0.5	4
Orange	Ø1.5 mm	0.5	5
Light Blue	Ø1.5 mm	0.5	6
Violet	Ø1.5 mm	0.5	7
White	Ø1.5 mm	0.5	8
Grey	Ø1.5 mm	0.5	-

Y-cable dimensions

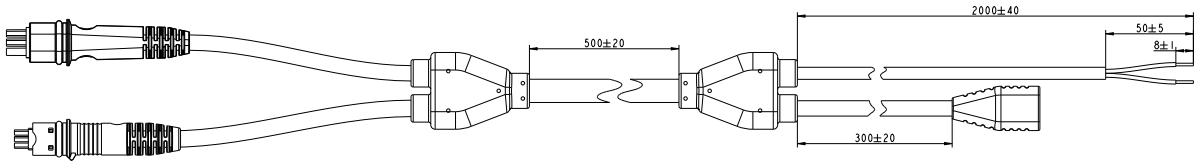
Colour	Outer dimensions	Wire mm²	Pin
Blue	Ø2.8 mm	2.0	1
Brown	Ø2.8 mm	2.0	2
Orange	Ø1.5 mm	0.5	3
Yellow	Ø1.5 mm	0.5	4
Green	Ø1.5 mm	0.5	5
Black	Ø1.5 mm	0.5	6
Red	Ø1.5 mm	0.5	7
Light Blue	Ø1.5 mm	0.5	8
Violet	Ø1.5 mm	0.5	9
White	Ø1.5 mm	0.5	10
Grey	Ø1.5 mm	0.5	-

Plugs

Plug type	AMP	Deutsch
2-pin		
4-pin		
5-pin		N/A
6-pin		
8-pin	N/A	
12-pin	N/A	

Actuator Connect cable

Actuator Connect™ cable					
Option	**Platform**	**Pins**	**Includes**	**Colour**	**Article no.**
B3 C3 F3 0B A7 A8 2E 0E 4E 14 37 38	I/O Basic I/O Customised I/O Full IO-Link CAN bus (J1939) CANopen EtherNet/IP Modbus TCP/IP PROFINET Modbus RTU SAE CAN J1939 Off-highway CANopen Off-highway	Signal-power + RJ45	(Adapter + USB2Lin)	Grey	0367996



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

Current limits

As described in the algorithm on previous page

Platform		12 V	24 V	48 V	Reference temperature: 0°C
B3 C3 F3	I/O Basic I/O Customised I/O Full	10 A	5 A	4 A	Above
		15 A	10 A	6 A	Below
0B	IO-Link	-	5 A	-	Above
		-	10 A	-	Below
14	Modbus RTU	-	5 A	4 A	Above
		-	10 A	6 A	Below
A7 A8	CANbus J1939 CANopen	-	5 A	4 A	Above
		-	10 A	6 A	Below
0E 2E 4E	Modbus TCP/IP Ethernet PROFINET	-	5 A	4 A	Above
		-	10 A	6 A	Below
37 38	CAN bus J1939 Off-highway CANopen Off-highway	10 A	5 A	-	Above
		15 A	10 A	-	Below

Max. Current

The current is not limited by actuators without Integrated Controller.
The value shown below represents the anticipated current consumption at maximum load.

For more details, refer to: Recommended fuse for actuators without Integrated Controller.

Platform		12 V	24 V	Reference temperature: 0°C
01	Standard with power switch	8 A	5 A	Above
		8 A	5 A	Below

Manual hand crank

The manual Hand Crank can be used in the case of a power failure and is only intended for emergency use.

The cover over the Torx socket must be unscrewed before the Torx 15 driver can be inserted and the hand crank operated.

Hand crank torque: 9 Nm

Hand crank rpm: Max. 65

Piston rod movement per turn:					
Spindle pitch	3 mm	5 mm	9 mm	15 mm	20 mm
Gear A	-	-	-	-	14
Gear B	1.4	2.3	4.2	7	-

- 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 thereby damaging the actuator.
  Use your hand to turn the crank. Do not use power tools!
- The ingress protection will be less than IP66 once the plug has been removed
- Move the actuator to its starting position after using the crank.
  Failing to do so can damage the actuator and/or the application it is used for

Environmental tests – Climatic

Test	Specification	Comment
Cold Test		Min. operation temperature : -40°C for 72 hours (Actuator is connected but not activated) Min. storage temperature : -55°C for 24 hours (Actuator is not activated/connected)
Dry Heat		Max. operation temperature : +85°C for 72 hour (Actuator is connected but not activated) Max. storage temperature : +105°C for 24 hours (Actuator is not activated/connected)

Test	Specification	Comment
Storage in Moisture	EN 60068-2-30	Temperature : +40°C and humidity cycling op to 100 % RH. Actuator operated with 20% duty cycle
Operating in Moisture	EN 60068-2-7	The actuators are tested at +40°C at 93% relative humidity for 21 days
Degrees of Protection	EN 60529 – IP66	IP6X - Dust: Dust-tight, No ingress of dust Actuator is not activated IPX6 - Water: Ingress of water in quantities causing harmful effects is not allowed Duration: 100 liters per minute in 3 minutes Actuator is not activated
	DIN 40050 – IP69K	IPX9K: High pressure cleaner Temperature: +90°C Water pressure: 350 bar Duration: 30 sec. in each direction. Actuator is not activated Ingress of water in quantities causing harmful effects is not allowed
Dunk test		The actuator has been warmed up to 85 °C for 4 hours. After this it is cooled down in 0 °C salt water. Cooling time: 2 hours. This is done 5 times.
Chemicals	BS 7691 Section 6.11.2.4	Diesel Hydraulic Oil Ethylene Glycol Urea Nitrogen Diesel Exhaust Fluid (DEF) NPK Fertilizer* (7.5% each N P & K) Liquid Lime
Harsh -Housing option: 9		
Salt Mist	DS/EN ISO 9227	The salt spray test is performed according to DS/EN ISO 9227 "Corrosion tests in artificial atmospheres" at 35±2°C The assembled housings are unpowered. Test duration is 500 hours

Environmental tests - Mechanical

Test	Specification	Comment
Drop test		2 drops on 6 faces onto a concrete floor. Drop height: 1000 mm
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]	From 10 Hz to 2000 Hz Duration: 32 h/axis Acceleration: 6.9 [grms]

Environmental tests - Electrical

Test	Specification	Comment
	EN/IEC 60204-1:2018	Safety for machinery - Electrical equipment of machines - Part 1: General requirements
Immunity	EN/IEC 61000-6-1:2019	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - immunity for residential, commercial and light industrial environments
Immunity	EN/IEC 61000-6-2:2019	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - immunity for industrial environments
Emission	EN/IEC 61000-6-4:2019	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - emission standards for industrial environments
Off-highway -Platform option: 37 & 38		
	ISO 16750-2:2012 +A1:2011	Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads
	ISO 7637-2:2011	Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only
Automotive Transients	ISO 7637-3:2007	Electrical disturbances from conduction and coupling - Part 3: Electrical transient transmission by capacitive coupling via lines other than supply lines
	CISPR 25 IEC:2008	Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers

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