



LA12 User Manual

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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, 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 full 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.

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 are only to be opened by authorised personnel.

This User Manual has been written on the basis of 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.

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Safety instructions

Please read this safety information carefully.

Be aware of the following three symbols throughout the user manual:



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 mains electricity supply/transformer with the correct voltage and which is dimensioned and adapted to the actuator in question.
- 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
- Do not sideload the actuator
- 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
- Check regularly for extraordinary 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.



- *Not to be opened by unauthorised personnel.*
- 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.
- For actuators with a stroke length below 130 mm, the extended position of the mechanical endstop will always be at 130 mm. That means, if an actuator has a stroke of 80 mm and the endstop switch in outwards direction fails, the actuator will travel additional 50 mm before reaching mechanical endstop.



- Do not place load on the actuator housing and do prevent impact or blows, or any other form of stress to the housing.
- Ensure that the duty cycle and the usage temperatures for LA12 actuators are respected.
- Ensure that the cable cannot be squeezed, pulled or subjected to any other stress.
- 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 vacuum inside the actuator if it is extended which over time can lead to water entering the actuator.
- If the actuator (without integrated controller) is mounted in an application where a mechanical stop prevents the endstop switches in the actuator from being activated, the actuator must be equipped with an electrical safety device (current monitoring) or external limit switch.
- The cable should not be used for carrying the actuator.
- We recommend taking some precaution and designing the wire connection in such a way that the cable end is kept inside a closed, protected area to guarantee the high IP protection.

Mounting guidelines

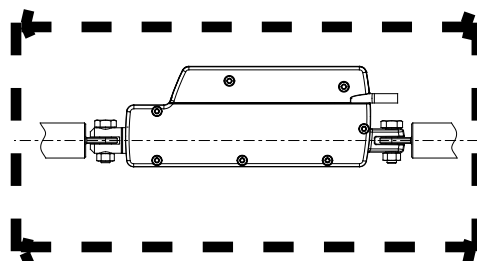
LINAK® linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the units and into brackets on the machine frame and the load.

The mounting pins must be parallel to each other as shown in Figure 1. Pins, which are not parallel to each other, may cause the actuator to bend and be damaged.

The load should act along the stroke axis of the actuator as off-centre loads may cause bending and lead to premature failure. See Figure 2.

Make sure the mounting pins are supported in both ends. Failure to do so could shorten the life of the actuator. Also, avoid applying a skew load on the actuator.

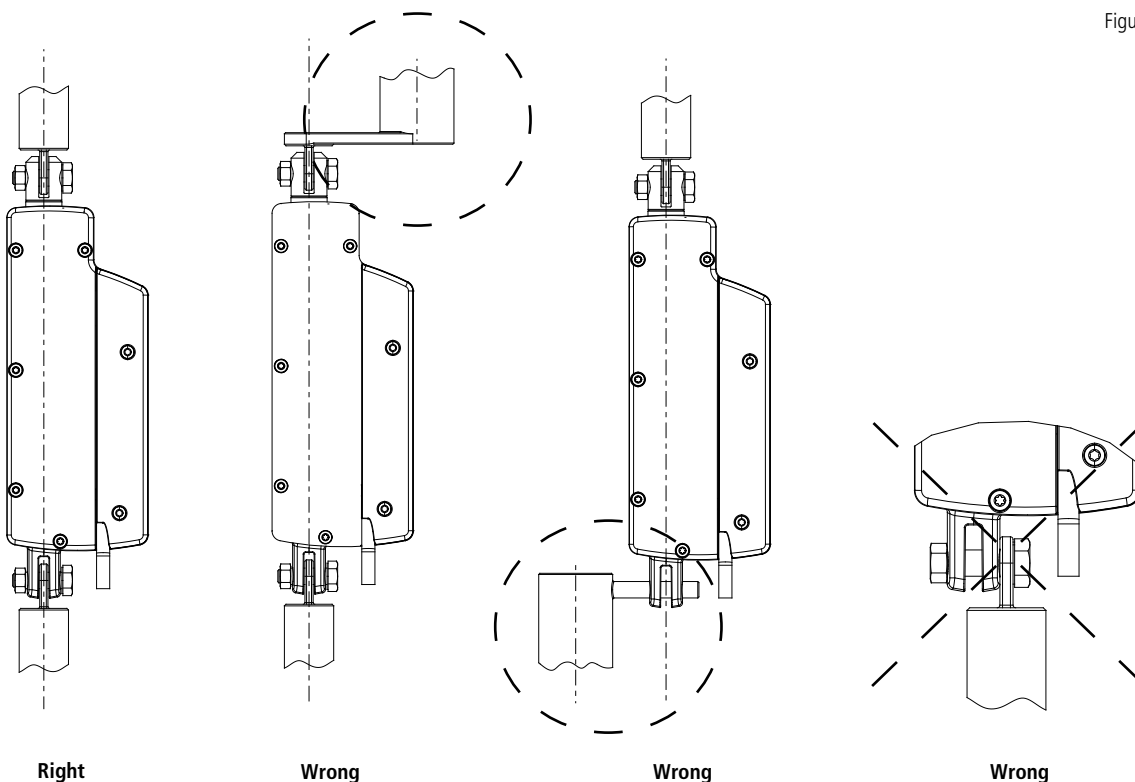
Figure 1



The actuator can rotate around the pivot point in the front and rear end. If this is the case it is of high importance that the actuator is able to move freely over the full stroke length, both during the development and daily operation. Please pay special attention to the area around the housing where parts can be trapped and cause damage to the application and actuator.

In applications with high dynamic forces LINAK recommends not to use the fully extended or retracted position over longer time, as this can damage the endstop system permanently.

Figure 2



Mounting guidelines



- The mounting pins must have the correct dimension.
- The bolts and nuts must be made of a high quality steel grade (e.g. 10.8). No thread on the bolt inside the back fixture or the piston rod eye.
- Bolts and nuts must be protected so there is no risk for them to fall out.
- Do not use a torque that is too high when mounting the bolts for the back fixture or the piston rod eye. This will stress the fixtures.

Please note:

The piston rod eye is only allowed to turn 0-90 degrees.

Instruction concerning the turning of the piston rod eye and inner tube:

- When mounting and taking into use, it is not permitted to make excessive turns of the piston rod eye. In cases where the eye is not positioned correctly, it is permitted to first screw the eye down to its bottom position, at a maximum torque of 2 Nm (1), and thereafter a maximum 90 degrees turn outwards again (2).
- As the piston rod eye can turn freely, it is important to ensure that the eye cannot rotate if the actuator is used in a pull application. If this happens, the actuator will be pulled apart and destroyed.

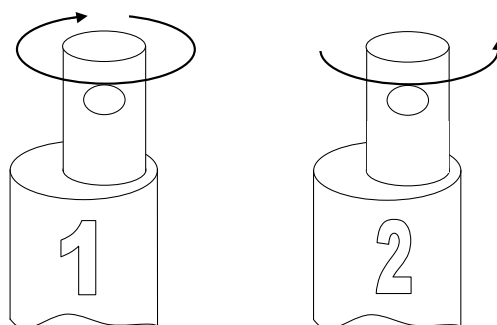


Figure 3



Warning!

If the actuator is used for pull in an application where personal injury can occur, the following is valid:

It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail.

Warning!

LINAK® actuators are not designed for use within the following fields:

- Offshore installations
- Explosive environments
- Aeroplanes and other aircraft
- Nuclear power generation

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.

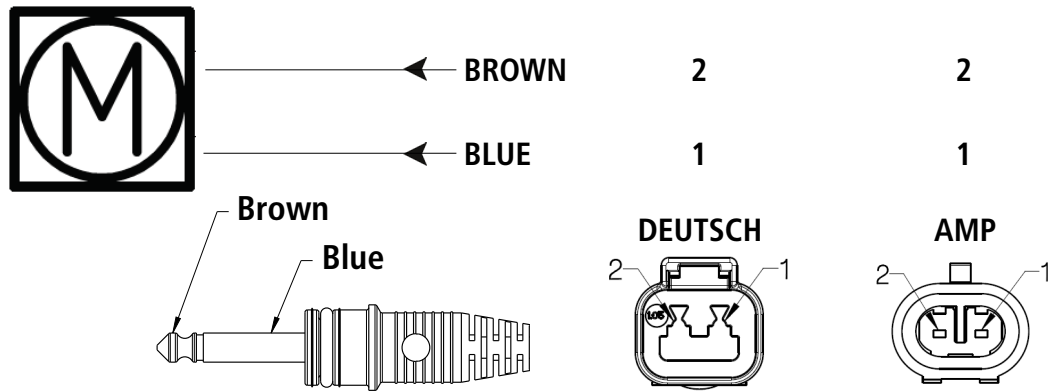
The power supply for actuators without integrated controller must be monitored externally and cut off in case of current overload.

Recommended fuse for actuators without integrated controller

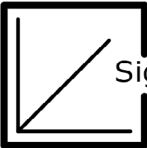
Type	Spindle Pitch (mm)	Thrust max. Push/ Pull (N)	Typical Amp. at full load (A) 24 V - 12 V		Recommended fuse 24 V - 12 V	
12xx00-1xxx12xx	2	750	-	4.6	-	9.2
12xx00-1xxx24xx	2	750	2.2	-	4.4	-
12xx00-2xxx12xx	4	300	-	2.5	-	5.0
12xx00-2xxx24xx	4	300	1.5	-	3.0	-
12xx00-3xxx12xx	6	200	-	2.2	-	4.4
12xx00-3xxx24xx	6	200	1.0	-	2.0	-

Connection diagram

Fig. 4: 12xxxx-xxxxxxx0/1



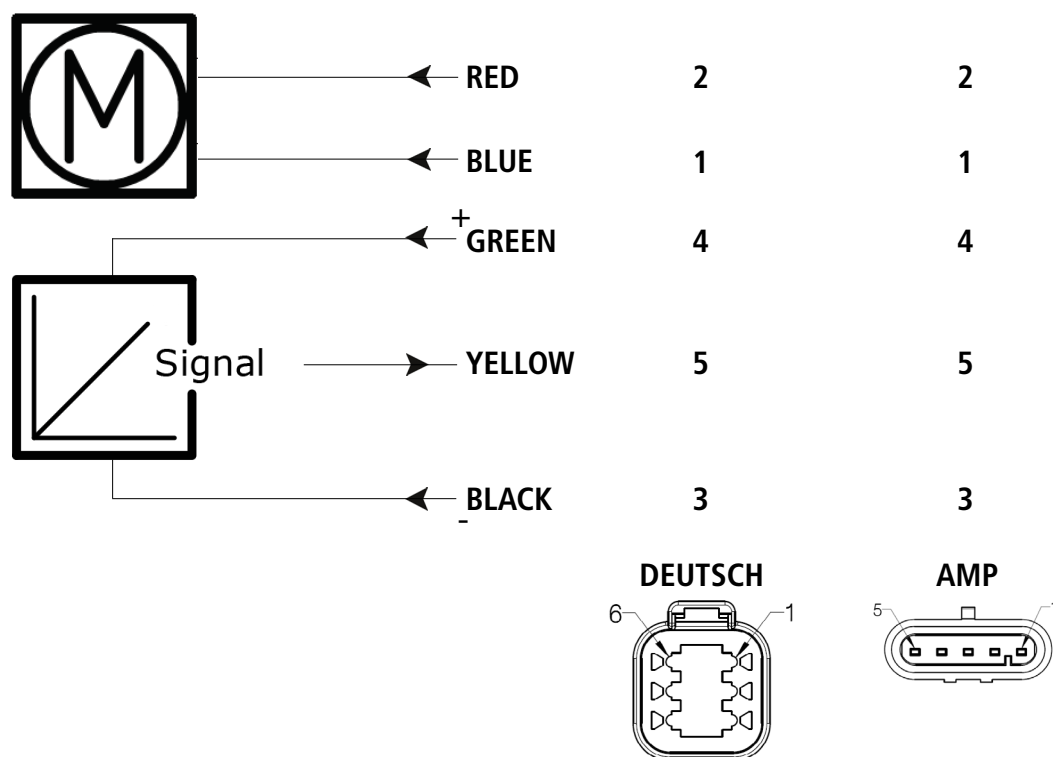
I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer that gives an analogue feedback signal when the actuator moves	
RED	12 or 24 VDC (+/-) 12 V ± 20 % 24 V ± 10 % Under normal conditions:	To extend actuator: Connect Red to positive To retract actuator: Connect Red to negative
Blue	12 V, max. 5 A depending on load 24 V, max. 2.5 A depending on load	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Green	Signal power supply (+) 12-24 VDC	+10 V or other value
Black	Signal power supply GND (-)	
Yellow	Potentiometer feedback Slide potentiometer, 10 kohm 1 kohm = 0 mm stroke 11 kohm = 100 mm stroke The maximum effect: 0.1 W	Linearity: ± 20 % Minimum lifetime: 15,000 cycles Average lifetime: 40,000 cycles Max. current output: 1 mA
Violet	Not to be connected	
White	Not to be connected	
Brown	Not to be connected	


Actuator with absolute positioning - Mechanical potentiometer feedback

Connection diagram

Fig. 5: 12xPxx-xxxxxxx0



I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer that gives an analogue feedback signal when the actuator moves.	
Red	12 or 24 V DC (+/-) 12 V \pm 20 % 24 V \pm 10 % Under normal conditions:	To extend actuator: Connect Red to positive To retract actuator: Connect Red to negative
Blue	12 V, max. 5 A (depending on load) 24 V, max. 2.5 A (depending on load)	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Green	Signal power supply (+) 12-24 V DC	+10 V or other value
Black	Signal power supply GND (-)	

Actuator with absolute positioning - Mechanical potentiometer feedback

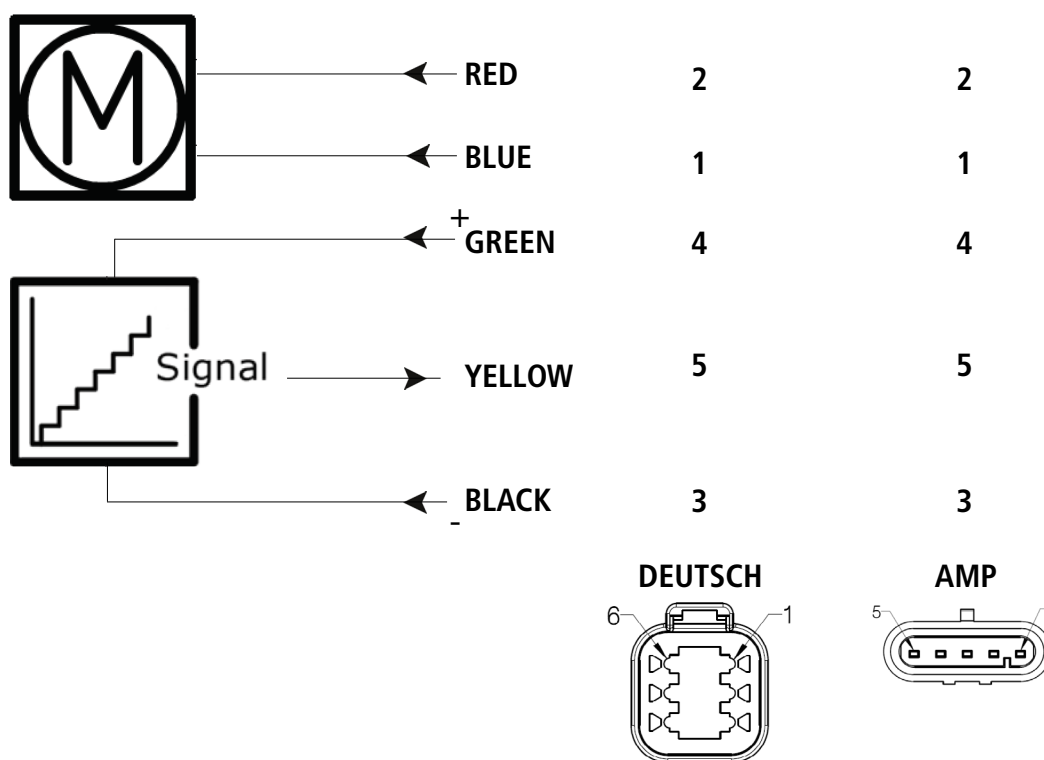
I/O specifications

Yellow	Potentiometer feedback Slide potentiometer, 10 kohm 1 kohm = 0 mm stroke 11 kohm = 100 mm stroke The maximum effect: 0.1 W	Linearity: $\pm 20\%$ Minimum lifetime: 15,000 cycles Average lifetime: 40,000 cycles Max. current output: 1 mA
Violet	Not to be connected	
White	Not to be connected	
Brown	Not to be connected	


Actuator with absolute positioning - Analogue feedback

Connection diagram

Fig. 6: 12xxx-xxxxxx0



I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with an electronic circuit that gives an analogue feedback signal when the actuator moves. See Connection Diagram.	
Red	12 or 24 V DC (+/-) 12 V \pm 20 % 24 V \pm 10 % Under normal conditions:	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	12 V, max. 5 A (depending on load) 24 V, max. 2.5 A (depending on load)	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Green	Signal power supply (+) 12-24 V DC	Current consumption: Max. 60 mA, also when the actuator is not running
Black	Signal power supply GND (-)	

Actuator with absolute positioning - Analogue feedback

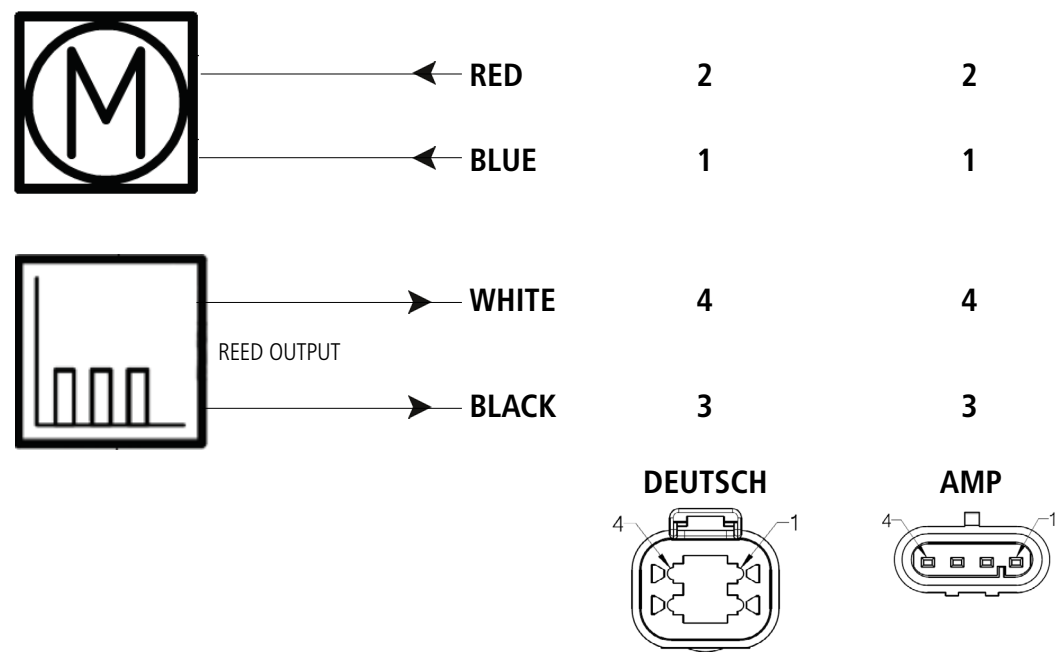
I/O specifications

Yellow	Analogue feedback 0-10 V (Option B) 0.5-4.5 V (Option C)	Tolerances: +/- 0.2 V Max. current output: 1 mA Ripple max.: 200 mV Transaction delay: 100 ms Linear feedback: 0.5 % <i>The actuator should be made to activate its limit switches on a regular basis to ensure more precise positioning.</i>
White	Not to be connected	
Brown	Not to be connected	
Violet	Not to be connected	


Actuator with Reed - Relative positioning 4 wires

Connection diagram

Fig. 7: 12xxxx-xxxxxxx4



I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with a Reed sensor and a spindle magnet that give a relative positioning feedback signal when the actuator moves. The output signal is a PNP signal.	
Red	12 or 24 V DC (+/-) 12 V ± 20 % 24 V ± 10 %	To extend actuator: Connect Red to positive To retract actuator: Connect Red to negative
Blue	Under normal conditions: 12 V, max. 5 A (depending on load) 24 V, max. 2.5 A (depending on load)	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive

Actuator with Reed - Relative positioning 4 wires

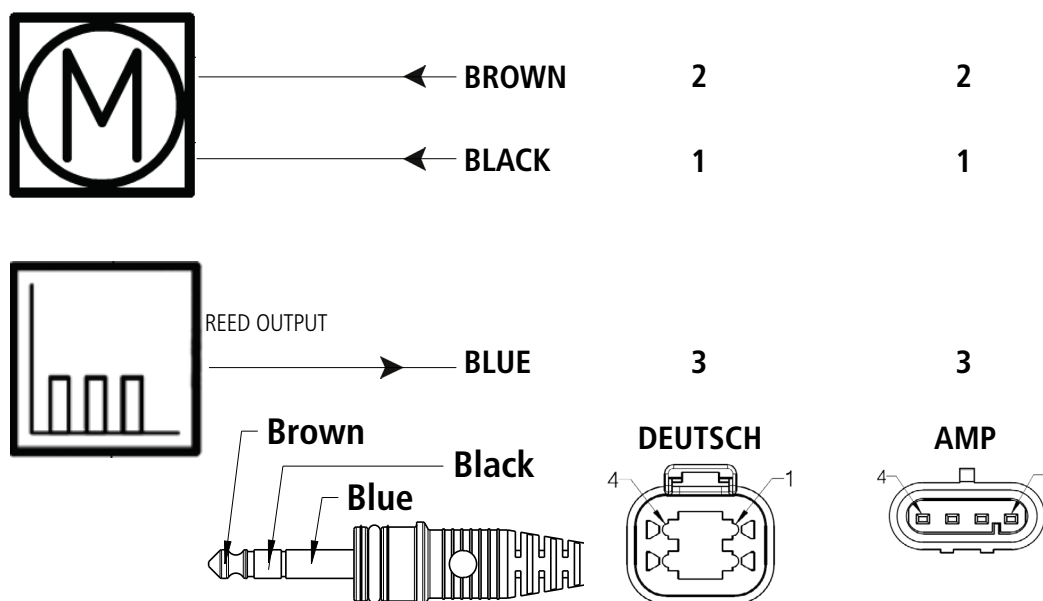
I/O specifications

Black	Reed output: same as input voltage 4 pole magnet (Option M) 2 mm pitch = 0.5 mm per <i>count</i> 4 mm pitch = 1.0 mm per <i>count</i> 6 mm pitch = 1.5 mm per <i>count</i> 10 pole magnet (Option E) 2 mm pitch = 0.2 mm per <i>count</i> 4 mm pitch = 0.4 mm per <i>count</i> 6 mm pitch = 0.6 mm per <i>count</i>	Max. switching capacity 750 mA
White	Signal power supply (+) 12-24 V DC	

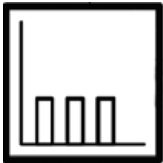
Actuator with Reed - Relative positioning 3 wires

Connection diagram

Fig. 8: 12xRxx-xxxxxxx2/3



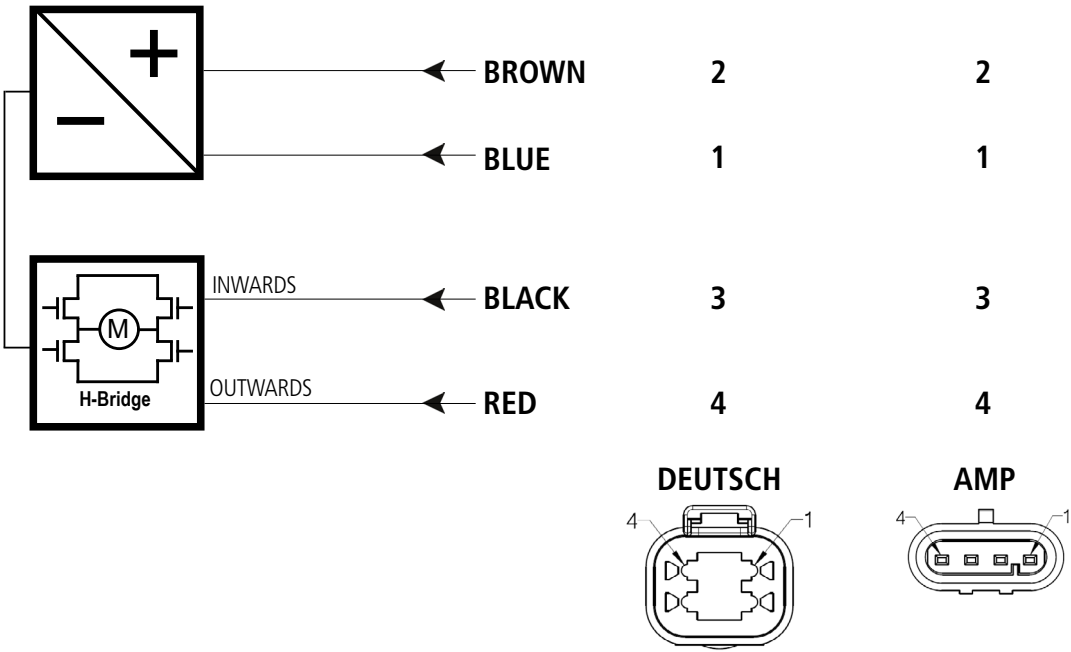
I/O specifications


Input/Output	Specification	Comments
Description	The actuator can be equipped with a Reed sensor and a spindle magnet that give a relative positioning feedback signal when the actuator moves. The output signal is a PNP signal. See Connection Diagram.	
Brown	12 or 24 V DC (+/-) 12 V \pm 20 % 24 V \pm 10 % Under normal conditions:	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Black	12 V, max. 5 A (depending on load) 24 V, max. 2.5 A (depending on load)	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Blue	Reed output: same as input voltage - 1 V 4 pole magnet (Option R) 2 mm pitch = 0.5 mm per <i>count</i> 4 mm pitch = 1.0 mm per <i>count</i> 6 mm pitch = 1.5 mm per <i>count</i>	Max. switching capacity: 750 mA

Actuator with IC (without Endstop Signal out)

Connection diagram

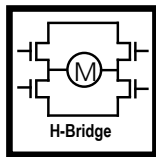
Fig. 9: 12xDxx-xxxxxxx8



 Please be aware that if the power supply is not properly connected, you might damage the actuator!

Actuator with IC (without Endstop Signal out)

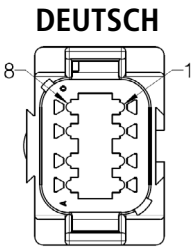
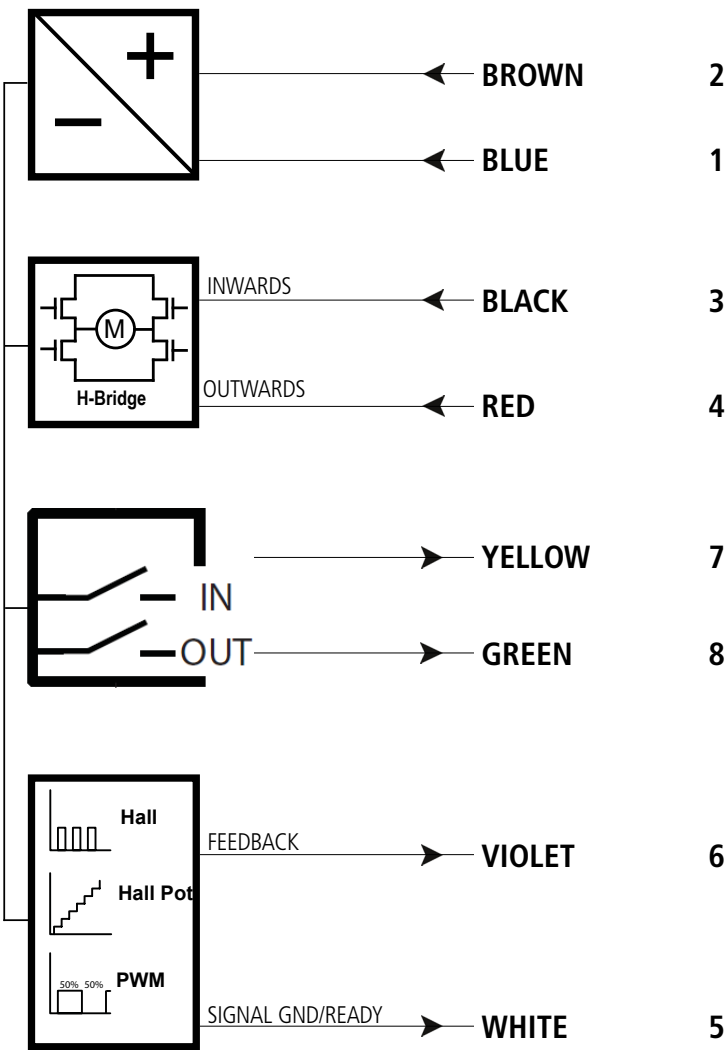
I/O specifications

Input/Output	Specification	Comments
Description	<p>Easy-to-use interface with integrated power electronics (H-Bridge).</p> <p>The actuator can also be equipped with an electronic circuit that gives an absolute or relative feedback signal.</p> <p>The version with "IC option" cannot be operated with PWM (power supply).</p>	
Brown	<p>12-24 V DC</p> <p>Connect Brown to positive (V DC)</p> <p>12 V \pm 20 %</p> <p>24 V \pm 10 %</p> <p>Under normal conditions:</p> <p>12 V, max. 5 A (depending on load)</p> <p>24 V , max. 2.5 A (depending on load)</p>	<p>Note: Do not change the power supply polarity on the Brown and Blue wires!</p> <p>If the temperature drops below 0 °C, all current limits will automatically increase to 11 A.</p>
Blue	<p>12-24 V DC</p> <p>Connect Blue to negative (GND)</p>	
Red	Extends the actuator	<p>On/off voltages:</p> <p>> 67 % of VIN = ON</p> <p>< 33 % of VIN = OFF</p> <p>Input current: 10 mA</p>
Black	Retracts the actuator	

Actuator with IC and Endstop Signals

Connection diagram

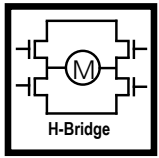
Fig. 10: 12xxx-xxxxxx8



Please be aware that if the power supply is not properly connected, you might damage the actuator!

Actuator with IC and Endstop Signals

I/O specifications

Input/Output	Specification	Comments
Description	<p>Easy-to-use interface with integrated power electronics (H-bridge).</p> <p>The actuator can also be equipped with an electronic circuit that gives an absolute or relative feedback signal.</p> <p>The version with "IC option" cannot be operated with PWM (power supply).</p>	 <p>H-Bridge</p>
Brown	<p>12-24 V DC</p> <p>Connect Brown to positive (VDC)</p> <p>12 V \pm 20 %</p> <p>24 V \pm 10 %</p> <p>Under normal conditions:</p> <p>12 V, max. 5 A (depending on load)</p> <p>24 V, max. 2.5 A (depending on load)</p>	<p>Note: Do not change the power supply polarity on the Brown and Blue wires!</p> <p>If the temperature drops below 0 °C, all current limits will automatically increase to 11 A.</p>
Blue	<p>12-24 V DC</p> <p>Connect Blue to negative (GND)</p>	
Red	Extends the actuator	<p>On/off voltages:</p> <p>> 67 % of V_{IN} = ON</p> <p>< 33 % of V_{IN} = OFF</p> <p>Input current: 10 mA</p>
Black	Retracts the actuator	
Green	Endstop signal out	<p>Output voltage min. $V_{IN} - 1$ V</p> <p>Source current max. 100 mA</p> <p>Endstop signals are NOT potential free.</p>
Yellow	Endstop signal in	

Actuator with IC and Endstop Signals

I/O specifications

Input/Output	Specification	Comments														
Violet	Mechanical slide potentiometer: 0-10 V Slide potentiometer, 10 kohm 1 kohm = 0 mm stroke 11 kohm = 100 mm stroke The maximum effect: 0.1 W	Max. 100 mm stroke Linearity: ± 20 % Minimum lifetime: 15,000 cycles Average lifetime: 40,000 cycles Max. current output: 1 mA														
	Analogue feedback: 0-10 V (Option F) 0.5-4.5 V (Option K)	Tolerances: +/- 0.2 V Max. current output: 1 mA Ripple max.: 200 mV Transaction delay: 100 ms Linear feedback: 0.5 %														
	Single Hall sensor: 2 pulses (Option L) 4 pulses (Option N) <table><tr><th>Actuator</th><th>mm per pulse</th></tr><tr><td>12xLxx-1</td><td>1 mm</td></tr><tr><td>12xNxx-1</td><td>0.5 mm</td></tr><tr><td>12xLxx-2</td><td>2 mm</td></tr><tr><td>12xNxx-2</td><td>1 mm</td></tr><tr><td>12xLxx-3</td><td>3 mm</td></tr><tr><td>12xNxx-3</td><td>1.5 mm</td></tr></table>	Actuator	mm per pulse	12xLxx-1	1 mm	12xNxx-1	0.5 mm	12xLxx-2	2 mm	12xNxx-2	1 mm	12xLxx-3	3 mm	12xNxx-3	1.5 mm	Max. current output: 12 mA Output = input -1 V
	Actuator	mm per pulse														
	12xLxx-1	1 mm														
12xNxx-1	0.5 mm															
12xLxx-2	2 mm															
12xNxx-2	1 mm															
12xLxx-3	3 mm															
12xNxx-3	1.5 mm															
Dual Hall - 10 pulses XOR (Option S) Movement per single Hall pulse: <table><tr><th>Actuator</th><th>mm per pulse</th></tr><tr><td>12xSxx-1</td><td>0.2 mm</td></tr><tr><td>12xSxx-2</td><td>0.4 mm</td></tr><tr><td>12xSxx-3</td><td>0.6 mm</td></tr></table> Frequency: Frequency is 14-26 Hz on Single Hall output depending on load. Every pulse is "ON" for minimum 3 ms. Higher voltage on the motor can result in shorter pulses.	Actuator	mm per pulse	12xSxx-1	0.2 mm	12xSxx-2	0.4 mm	12xSxx-3	0.6 mm	Max. current output: 12 mA Output = input -1 V Min. on time: 2.5 ms							
Actuator	mm per pulse															
12xSxx-1	0.2 mm															
12xSxx-2	0.4 mm															
12xSxx-3	0.6 mm															
None (Option D)	Not available with feedback or endstop out.															

Actuator with IC and Endstop Signals

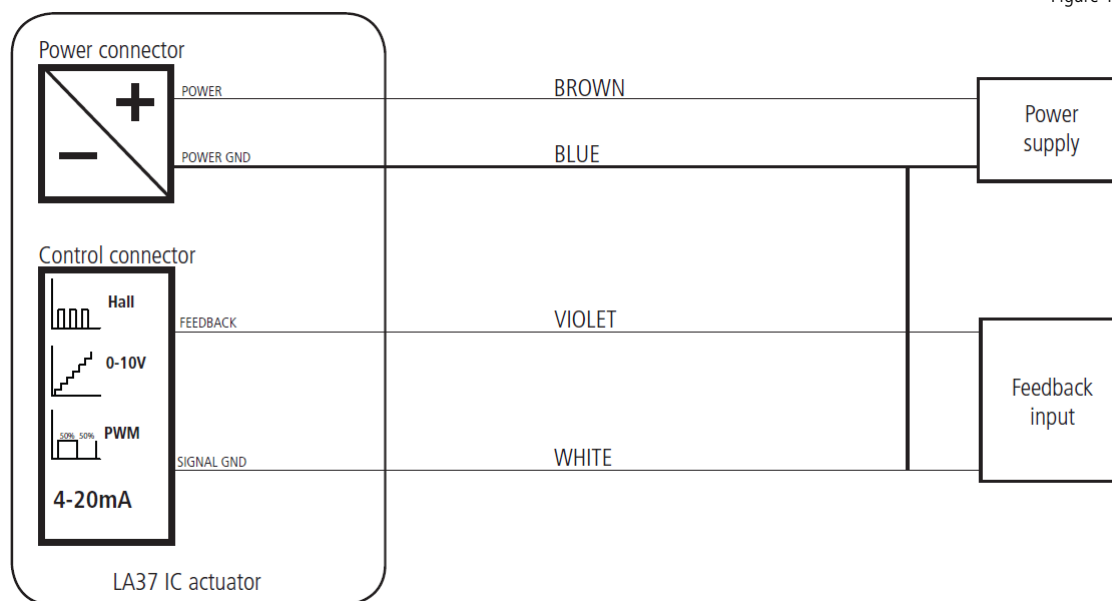
I/O specifications

Input/Output	Specification	Comments
White	Signal GND	Only for mechanical slide potentiometer and analogue feedback Max. 1 mA For correct wiring of power GND and Signal GND, see: Correct Wiring of Power GND and Signal GND for IC
	Ready signal	Only for Single Hall and PWM Max. 10 mA

Correct wiring of Power GND and Signal GND for IC

When using the feedback output, it is important to use the right connection setup. Attention should be paid to the two ground connections: Power GND in the Power Connector and Signal GND in the Control Connector. When using either Analogue feedback or Mechanical potentiometer feedback, the Signal GND must be used. For optimal accuracy, the Signal GND is connected to the Power GND *as close to the feedback input equipment as possible*.

Figure 11



Please note that this section only applies for the following feedback options: 0-10 V, Hall and PWM.

Troubleshooting

Symptom	Possible cause	Action
Motor runs but spindle does not move	Gearing system or spindle damaged	Please contact LINAK®
No motor sound or movement of piston rod	The actuator is not properly connected to the power supply	Check the connection to the power supply or the external control unit (if any)
	Customer fuse burned	Check the fuse
	Cable damaged	Please contact your local LINAK supplier
	<u>For IC only:</u> Wrongly connected	<u>For IC only:</u> Please make sure that the power supply polarity is properly connected, otherwise you might damage the actuator Check the wire connection on the internal control unit
Excessive power consumption	Misalignment or overload in the application	Align or reduce the load
		Try to run the actuator without load
Actuator cannot lift full load or motor runs too slowly	Misalignment or overload in the application	Align or reduce the load
		Try to run the actuator without load
	Insufficient power supply	Check the power supply

Troubleshooting

Symptom	Possible cause	Action
No signal or incorrect feedback output	Cable damaged	Please contact your local LINAK® supplier
	Wrongly connected	Check the wiring
	Signal is constantly high/low	Run the actuator to fully extended and retracted positions
	Feedback output overloaded	Reduce the load according to your chosen feedback type
Actuator runs in smaller steps	Insufficient power supply	Check the power supply
	Load is higher than specified	Reduce the load
Actuator cannot hold the chosen load	Load is higher than specified	Reduce the load



For further assistance, please contact your local LINAK supplier.

Specifications

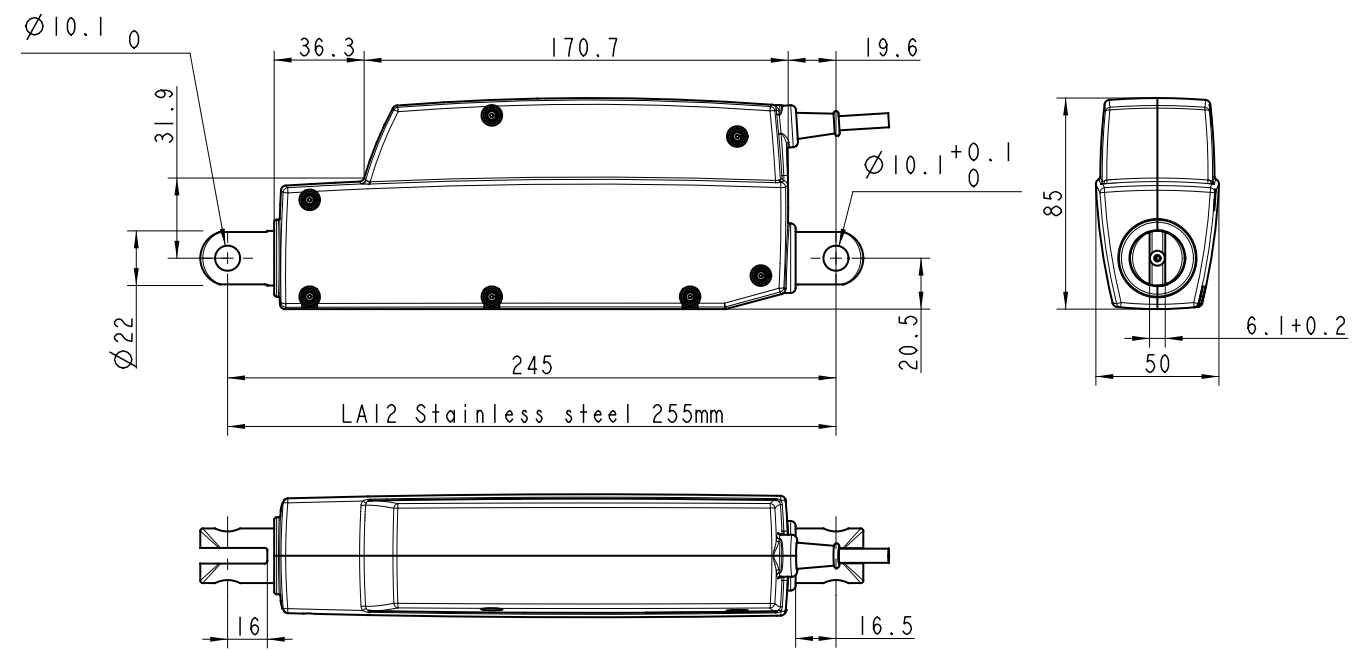
Motor:	Permanent magnet motor 12 or 24 V
Housing:	High strength-plastic housing
Spindle part:	Acme spindle: Trapezoidal spindle with high efficiency
Temperature range:	- 20 °C to +60 °C - 4 °F to +140 °F Full performance +5 °C to +40 °C
End play:	2 mm maximum
Weather protection:	Rated IPX1, or if chosen as option IP66
Endstop switches:	Built-in endstop switches
Piston rod and back fixture:	High-strength plastic as standard

Usage:

- Duty cycle at 750 N and 2 mm pitch is max. 10 %
Duty cycle at 300 N and 4 mm pitch is max. 40 %
Duty cycle at 200 N and 6 mm pitch is max. 60 %
The duty cycles are valid for operation within an ambient temperature of +5 °C to +40 °C
- Storage temperature: -40 °C to + 105 °C
- Noise level: With standard motor: 55-57 dB (A)
Measuring method DS/EN ISO 3743-1, actuator not loaded

Actuator dimensions

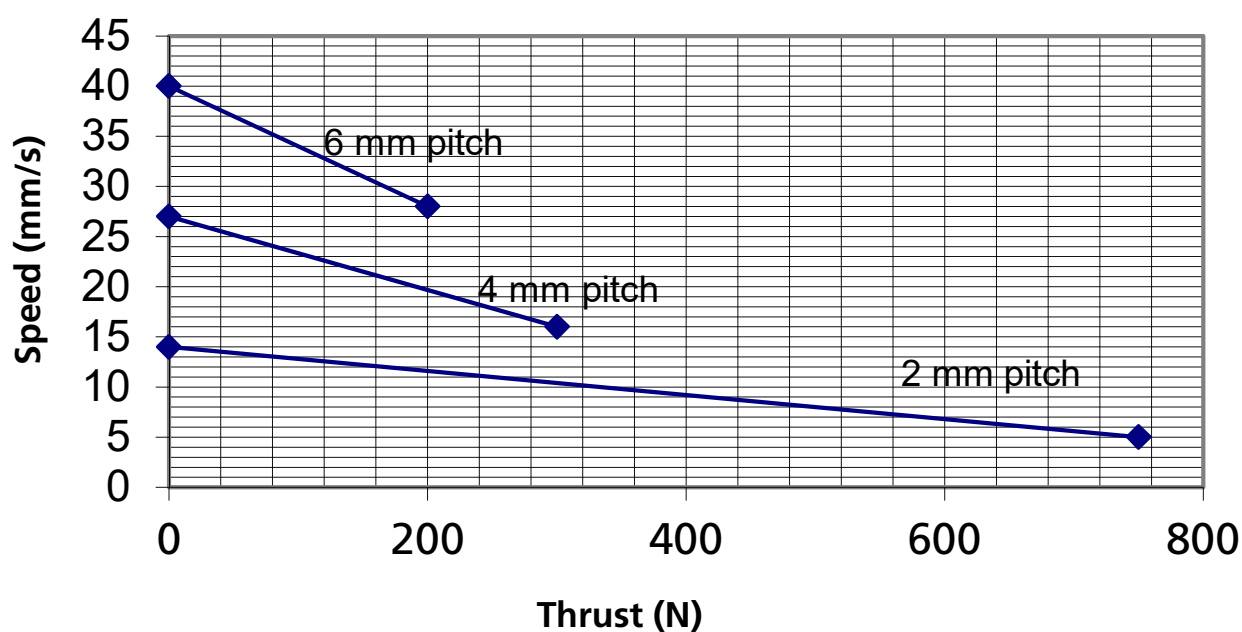
TECHLINE® LA12



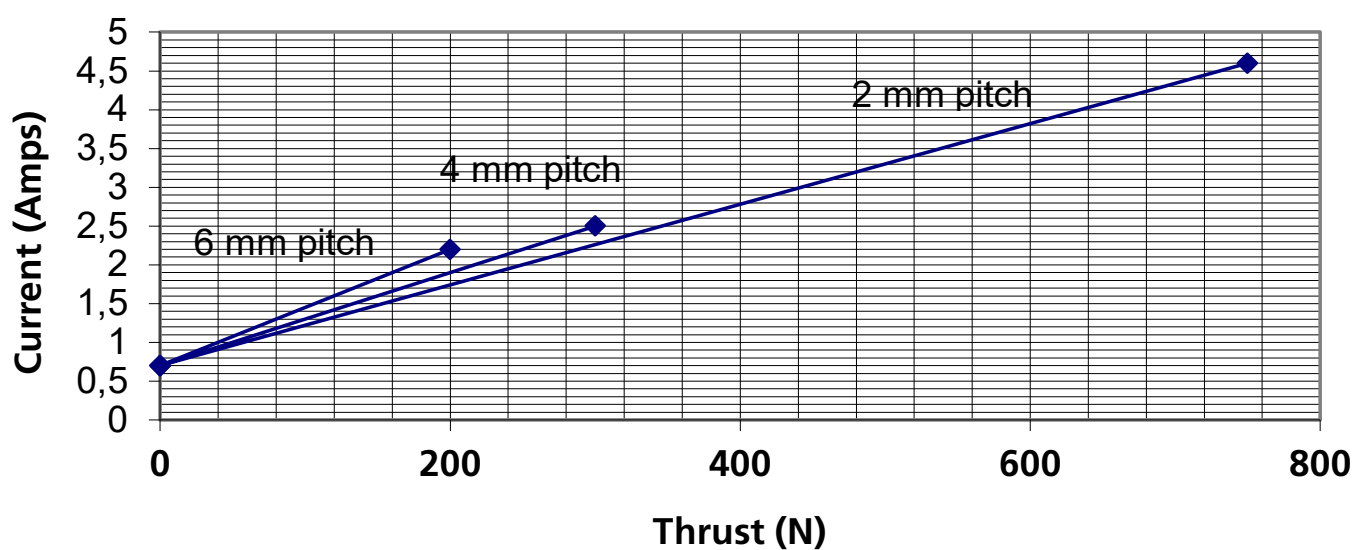
Speed and current curves - 12 V motor

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

LA12 - 12 V Speed vs Thrust



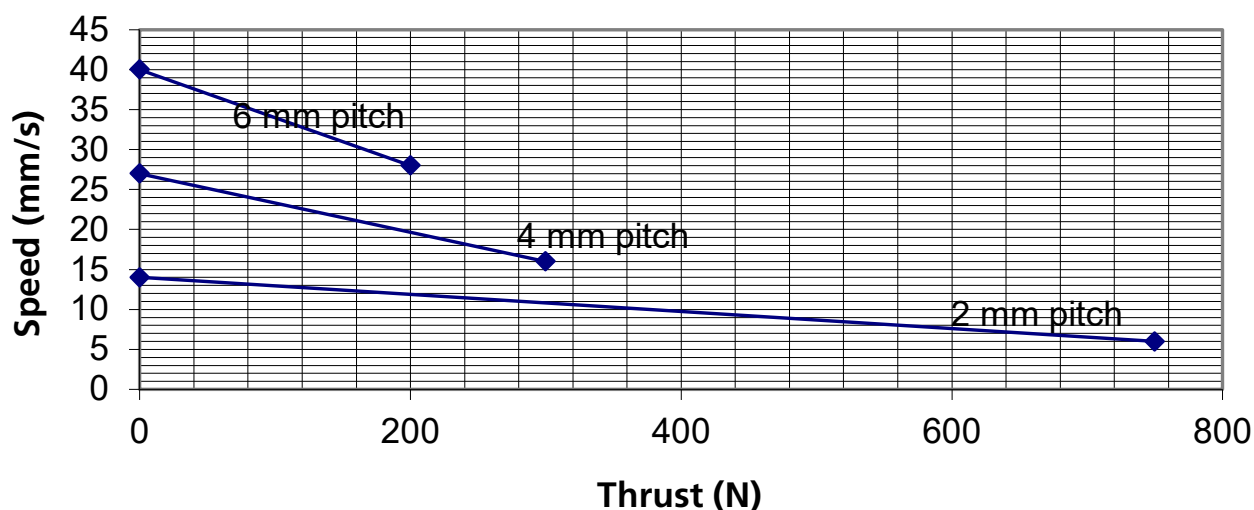
LA12 - 12 V Current vs Thrust



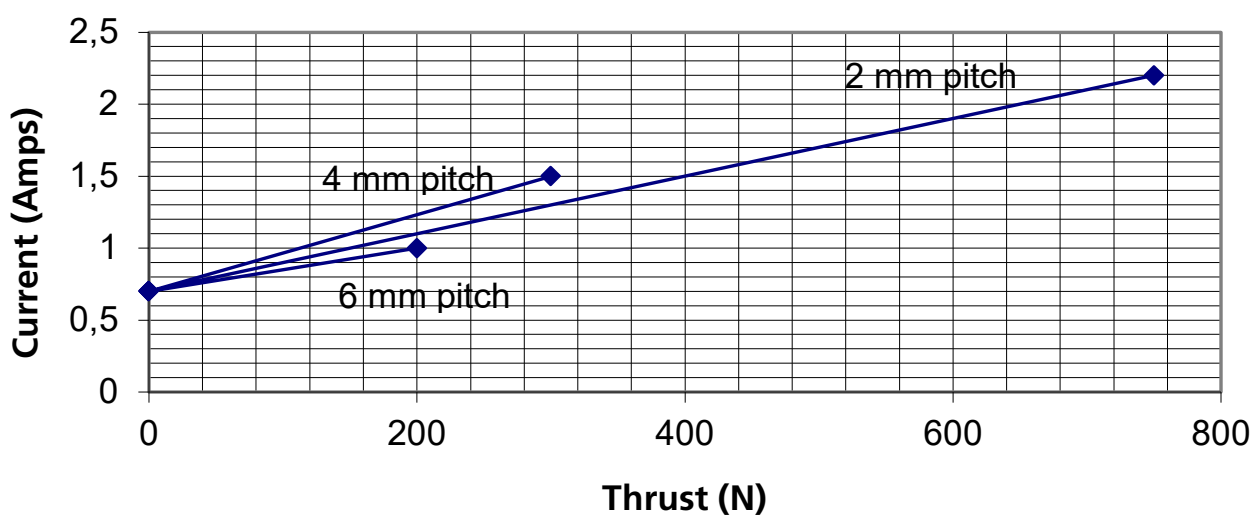
Speed and current curves - 24 V motor

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

LA12 - 24 V Speed vs Thrust



LA12 - 24 V Current vs Thrust



Test of conducted and radiated emission (EMC)

All TECHLINE actuators have been tested in accordance with EN55011 class B (2007) (CISPR 11).
A 1 m cable has been used in the test set-up.

Actuator without H-bridge

1) For normal operation the following is valid:

- Radiated emission requirements are met.
- Conducted emission requirements are met. However, to meet with these requirements a capacitor has been mounted across the motor wires outside the actuator, and tests have then been made with this capacitor. Capacitor values for some of the TECHLINE actuators can be found in the scheme below.



To comply with EN55011 class B (2007) a capacitor must be added across the motor wires, or the connected control box must have similar/better filtering. The actuator is not delivered with a built in capacitor, because then it would not be possible to PWM the motor for those who would want to do that.

Please view the scheme below for the correct choice of capacitor for the actuator in question.

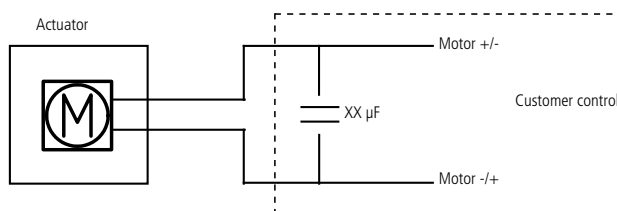
2) For systems/operations that use PWM-control it is up to the customer to test and meet the requirements.

Actuator with H-bridge

1) For normal operation with soft start/stop the following is valid:

- The actuator has been tested when operating with constant 80%-PWM.
- Radiated emission requirements are met.
- Conducted emission requirements are met.

Product	Capacitor value
LA12	1 μ F



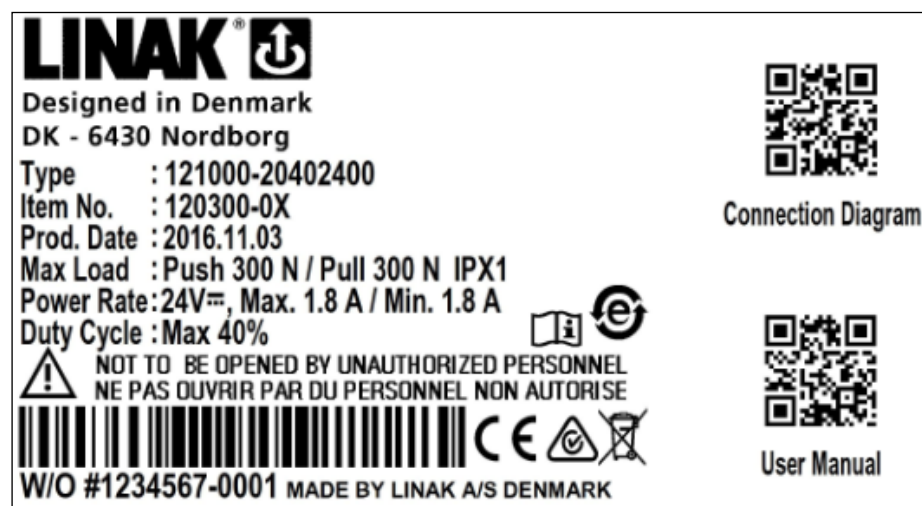
2) For systems with LINAK PWM regulation (among other things parallel operation and speed regulation) the following is valid:

- Radiated emission requirements are met.
- Conducted emission requirements are met.

3) Speed regulation:

- If the speed is regulated below a nominal speed of 80 % (80 %-PWM), it is necessary to mount a filter in order to comply with the conducted emission requirements. For systems/operations that are speed regulated, it is up to the customer to test and meet the requirements.

Label for LA12









1. **Type.: 121000-20402400**
Describes the basic functionality of the product.
2. **Item no.: 120300-0X**
Sales and ordering code.
3. **Prod. Date.: YYYY.MM.DD**
Production date describes when the product has been produced. This date is the reference for warranty claims.
4. **Max Load.: Push 300N / Pull 300N IPX1**
Describes the maximum load that the product can be exposed to in compression and tension. This line also contains a reference to the product's IP protection degree.

5. **Power Rate.: 24 VDC / Max. 2.5 Amp**
Input voltage for the product and maximum current consumption.
6. **Duty Cycle.: Max 40 %**
The duty cycle defines the maximum period during operation without interruption. After operation, a pause must be observed. It is important that the operator follows the instructions of the duty cycle; otherwise, a possible overload may result in reduced product life/errors.
7. **W/O #1234567-0001**
The LINAK work order followed by a unique sequential identification number.

Key to symbols

The following symbols are used on the LA12 label:

Symbol	Norms	Approvals
	WEEE Directive 2002/96/EC	Wheelie bin
	Compliance to all relevant EC directives	CE
	Regulatory Compliance Mark: The Australian safety/EMC regulations	RCM
	China Pollution control mark (also indicates recyclability)	China RoHS legislation
	ISO 7000- 0434A: Caution	
	Operating instructions	

Ordering example



12 X X XX - X XXX XX X X

IC options:	Basic IC
LA12 actuator:	√

Type	12	
	12	= LA12
Back fixture option and position	X	
	1	= Plastic position 01
	2	= Plastic position 02
	3	= Aluminium / 012095 Position 01
	4	= Aluminium / 012095 Position 02
	5	= Stainless steel (AISI 304) / 012114 position 01
	6	= Stainless steel (AISI 304) / 012114 position 02
	X	= Special

*IC options for LA12

T	= Potentiometer 0-10 V / max. 100 mm stroke
D	= None (no EOS out)
F	= Analogue feedback 0-10 V
S	= Single Hall feedback
K	= Analogue feedback 0.5-4.5 V
L	= Hall sensor 2 pulses/spindle revolution, 4 pole magnet
N	= Hall sensor 4 pulses/spindle revolution, 8 pole magnet

Necessary cable type

8 for IC (8 core)
8 for IC (8 core)
8 for IC (8 core)
8 for IC (8 core)
8 for IC (8 core)
8 for IC (8 core)
8 for IC (8 core)

Memory positioning	X		
	0	= None	0 or 1
	B	= Analogue feedback 0-10 V	0 (5 core)
	C	= Analogue feedback 0.5-4.5 V	0 (5 core)
	E	= Reed switch 10 pulses/spindle revolution	4 (4 core)
	M	= Reed switch 4 pulses/spindle revolution	4 (4 core)
	P	= Potentiometer max. 100 mm stroke	0 (5 core)
	R	= Reed switch 4 pulses/spindle revolution	2 or 3 (3 core)

Material	XX	
	00	= Plastic inner tube
	02	= Stainless steel inner tube and stainless steel eye (AISI 303) / 031923 with bushes
	03	= Stainless steel inner tube and stainless steel eye (AISI 304) / 0301244 with bushes

Spindle type	X	
	1	= 2 mm
	2	= 4 mm
	3	= 6 mm

Stroke	XXX	= mm
		min. 019 mm; max. 130 mm (in steps of 1 mm)
		Recommended versions: 040, 070, 100 and 130

Motor	XX	
	12	= 12 V DC
	24	= 24 V DC

IP version	X	
	0	= IPX1
	2	= IP66

Ordering example

12 X X XX - X XXX XX X X

IC INTEGRATED CONTROLLER

IC options:	Basic IC
LA12 actuator:	√

Cable

X

With IC

- 8 = Black straight 2300 mm (8-core)
- J = 8-core black straight 2.3 m Deutsch
- K = 8-core black straight 2.3 m AMP
- S = 8-core black straight 1.5 m SMPS
- X = Special

With analogue feedback

- 0 = 5-core black straight 0.93 m
- I = 5-core black straight 0.93 m Deutsch moulded
- J = 5-core black straight 0.93 m Deutsch
- K = 5-core black straight 0.93 m AMP

With potentiometer

- 0 = 5-core black straight 0.93 m
- J = 5-core black straight 0.93 m Deutsch
- K = 5-core black straight 0.93 m AMP

With reed

- 2 = 3-core stereo Jack black straight 2.3 mm
- 3 = 3-core black straight 0.75 m
- 4 = 4-core black straight 0.75 m
- J = 4-core black straight 0.75 m Deutsch
- K = 4-core black straight 0.75 m AMP

No positioning

- 0 = Black straight 0.75 m
- 1 = Black straight 2.3 m Jack
- I = Black straight 0.75 m Deutsch moulded
- J = Black straight 0.75 m Deutsch
- K = Black straight 0.75 m AMP
- L = Black straight 0.75 m AMP moulded

Maintenance

- The actuator must be cleaned at regular intervals to remove dust and dirt and inspected for mechanical damages or wear.
- Inspect attachment points, wires, piston rod, cabinet, and plug, as well as check that the actuator functions correctly.
- To ensure that the pregreased inner tube remains lubricated, the actuator must only be washed down when the piston rod is fully retracted.
- The actuator is a closed unit and therefore requires no internal maintenance.
- In order to maintain a proper performance of the spherical eyes and to increase the resistance against environmental wear, we strongly recommend that the spherical eyes (ball bearings) mounted on actuators from LINAK are greased with anticorrosive grease or similar.

Repair

Only an authorised LINAK® service centre should repair LINAK actuator systems. Systems to be repaired under warranty must be sent to an authorised LINAK service centre.

In order to avoid the risk of malfunction, all actuator repairs must only be carried out by an authorised LINAK Service shop or repairer, as special tools and parts must be used.

If a system is opened by unauthorised personnel there is a risk that it may malfunction at a later date.

Main groups of disposal

LINAK's products may be disposed of, possibly by dividing them into different waste groups for recycling or combustion.

We recommend that our product is disassembled as much as possible at the disposal and that you try to recycle it.

Product	Metal scrap	Cable scrap	Electronic scrap	Plastic recycling or combustion
LA12	X	X	X	X

Warranty

There is an 18 months' warranty on TECHLINE® products against manufacturing faults calculated from the production date of the individual products (see label). The LINAK® warranty is only valid in so far as the equipment has been used and maintained correctly and has not been tampered with. Furthermore, the actuator must not be exposed to violent treatment. In the event of this, the warranty will be ineffective/invalid. For further details, please see standard terms of sale and delivery for LINAK A/S.

Note:

Only an authorised LINAK® service centre should repair LINAK actuator systems. Systems to be repaired under warranty must be sent to an authorised LINAK service centre.

In order to avoid the risk of malfunction, all actuator repairs must only be carried out by an authorised LINAK Service shop or repairer, as special tools and parts must be used.

If a system is opened by unauthorised personnel, there is a risk that it may malfunction at a later date.

The actuator is not to be opened by unauthorised personnel. In case the actuator is opened, the warranty will be void.



DECLARATION OF CONFORMITY

LINAK A/S
Smedevænget 8
DK - 6430 Nordborg

Hereby declares that

Actuator 12xxxx-xxxxxxx

complies with the EMC Directive 2014/30/EU according to following harmonized standards:

EN 61000-4-2:2009, EN 61000-4-3:2006+A1+A2, EN 61000-4-4:2012, EN 61000-4-5:2014, EN 61000-4-6:2014, EN 61000-4-8:2010, EN55016-1-2:2014, EN 55016-2-1:2014, EN 55016-2-3:2010+A1, EN 55025:2008

complies with RoHS2 Directive 2011/65/EU according to the standard:
EN 50581:2012

Additional information:

The device does comply with the standards:

EN 61000-6-1:2007, Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

EN 61000-6-3:2007, Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

EN 61000-6-2:2005, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-4:2007, Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

The device does also comply with the standards:

ISO 10605:2008, Road vehicles -- Test methods for electrical disturbances from electrostatic discharge

ISO 7637-2:2004, Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only

Nordborg, 2016-08-15



LINAK A/S

John Kling, B.Sc.E.E.

Certification and Regulatory Affairs

Authorized to compile the relevant technical documentation

Original declaration

DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

LINAK A/S
Smedevænget 8
DK - 6430 Nordborg

Herewith declares that LINAK TECHLINE[®] products
as characterized by the following models and types:

Linear Actuators LA12, LA14, LA22, LA23, LA25, LA30, LA35, LA36, LA37

comply with the following parts of the Machinery Directive 2006/42/EC, ANNEX I, *Essential health and safety requirements relating to the design and construction of machinery*:

1.5.1 Electricity supply

The relevant technical documentation is compiled in accordance with part B of Annex VII and that this documentation or part hereof will be transmitted by post or electronically to a reasoned request by the national authorities.

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC where appropriate.

Nordborg, 2014-10-20



LINAK A/S
John Kling, B.Sc.E.E.
Certification and Regulatory Affairs
Authorized to compile the relevant technical documentation

Original Declaration

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