USER MANUAL

TECHLINE®
IMPROVING FLEXIBILITY

LA37 ACTUATOR

To learn more about LINAK, please visit:
www.linak.com

LINAK®
WE IMPROVE YOUR LIFE

Contents

Preface

Dear User,

We are delighted that you have chosen a product from LINAK®.
LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, electric control boxes, controls, and chargers.

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

We are sure 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 LINAK product/system, you are always welcome to contact your local dealer. LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you.

LINAK provides a warranty on all its 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 products/systems can affect their operation and durability. The products are not to be opened by unauthorised personnel.

The User Manual has been written based on our present technical knowledge. We are constantly working on updating the information and we therefore reserve the right to carry out technical modifications.

LINAK A/S

Safety instructions

Please read the following safety information carefully.

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 mains current supply is switched off and the plug has been pulled out.
- 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 whole working area og the actuator.
- 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 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
- Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
- Do not sideload the actuator.
- Use the actuator within the specified working limits only.
- Do not step or kick on the actuator.

When the equipment is not in use
- Switch off the mains supply or pull out the plug in order to prevent unintentional operation.
- Check the actuator and joints for extraordinary wear regularly.
- Do always reinstall the cabel lock and a tight screw with 1.5 Nm +/- 0.3 Nm

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

Important information

Information about the actuators is described under the following two headings:

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

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

Warnings:

- Do not sideload the actuator.
- Only use the actuator within specified working limits.
- When mounting the LA37 in the application ensure that the bolts can withstand the wear and that they are secured safely.

Recommendations:

- 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 cable cover is mounted correctly. Use 1.5Nm torque.
- Ensure that the duty cycle and the usage temperatures for LA37 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 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.

DECLARATION OF CONFORMITY

LINAK A/S
Smedevænget 8

DK - 6430 Nordborg

hereby declares that:

Linear Actuator LA37

complies with the EMC Directive: 2014/30/EU according to following standards:
EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61000-6-3:2007, EN 61000-6-4:2007

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

Nordborg, 2014-06-23

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

Misc. on the TECHLINE® actuator system

Warranty
There is a 18 months' warranty on the TECHLINE products against manufacturing faults calculated from the production date of the individual products (see label). LINAK's 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 personel 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 invalid.

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.
- The actuator is a closed unit and requires no internal maintenance.
- To ensure that the pregreased inner tube remains lubricated, the actuator must only be washed down when the piston rod is fully retracted.

Maintenance of spherical eyes
In order to maintain a proper performance of the spherical eyes and to increase the resistances against hard environmental wear, we strongly recommend that the spherical (ball bearings) eyes mounted on actuators from LINAK are greased with anticorrosive grease or similar.

Warning!
If irregularities are observed, the actuator must be replaced.

Features in general:
- 12, 24 V DC Permanent magnetic motor
- Thrust from 10,000 N - 15,000 N
- Static holding force up to 70 kN in push and pull
- Dynamic wind stress forces 15 kN push/pull 100,000 times
- Max. speed 3.5 mm/sec.
- Stroke length from 100 mm up to 600 mm (Trunnion mounted: 500, 750 and 1,000 mm)
- Built-in electrical endstop
- 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 mm max.
- Non rotating piston rod eye
- Typical noise level without load: 73 dB (A) measuring method DS/EN ISO 8746 actuator not locked

Options in general:
- Different back fixtures and piston rod eyes
- Exchangeable cables in different lengths
- Hall effect sensor
- IC options including IC, Parallel and Bus communication*
- Analogue or digital feedback for precise positioning
- Endstop signals (not potential free)
- When ordering AISI (304 and up) piston rodeye and back fixture, stainless steel screws are automatically included
- Trunnion mounting

Usage:
- Duty cycle at max. load 10% at -30°C to +70°C
- Ambient operating temperature -30°C to +70°C, full 15 kN performance from +5°C to +40°C, and full 10kN performance with Modbus actuators from +5°C to +40°C
- LA37 is equipped with mechanical endstop

***** For Modbus - please see the Modbus installation guide - **http://www.linak.com/techline/?id3=2363**

Modbus actuators only 24V - please see the Modbus installation guide - **http://www.linak.com/techline/?id3=2363**

Special control cabels for the Modbus actuator - please see the Modbus installation guide - **http://www.linak.com/techline/?id3=2363**

Performance with Modbus LA37 is limited. Please see **the LA37 data sheet**

Technical specifications LA37

LA37 with 12 V motor

Order number	Push max. (N)	Pull max. (N)	Self-lock min. (N) Push*	Self-lock min. (N) Pull	Pitch (mm/ spindle rev.)	Typical speed (mm/s) Load		Standard stroke lengths (mm)	Typical amp.** (A) 12 V	
						No	Full		No load	Full load
371CXXX1XXXX1XX	15000	15000	20000	20000	2.5	3.2	3	100-400	4.5	22.5
371CXXXAXXXX1XX	10000	10000	20000	20000	2.5	3.2	3	400-600	4.5	21.0

LA37 with 24 V motor

Order number	Push max. (N)	Pull max. (N)	Self-lock min. (N) Push*	Self-lock min. (N) Pull	Pitch (mm/ spindle rev.)	Typical speed (mm/s) Load		Standard stroke lengths (mm)	Typical amp.** (A) 24 V	
						No	Full		No load	Full load
371CXXX1XXXX2XX	15000	15000	20000	20000	2.5	3.2	3	100-400	2.2	10.0
371CXXXAXXXX2XX	10000	10000	20000	20000	2.5	3.2	3	400-600	2.2	8.0

Technical specifications LA37 - Trunnion mounted

LA37 with 12 V motor - Trunnion mounted

Order number	Push max. (N)	Pull max. (N)	Self-lock min. (N) Push*	Self-lock min. (N) Pull	Pitch (mm/ spindle rev.)	Typical speed (mm/s) Load		Standard stroke lengths (mm)	Typical amp.** (A) 12 V	
						No	Full		No load	Full load
371C0XXXXXXX1XX	15000	15000	20000	20000	2.5	3.2	3	500, 750, 1000	4.5	22.5

LA37 with 24 V motor - Trunnion mounted

Order number	Push max. (N)	Pull max. (N)	Self-lock min. (N) Push*	Self-lock min. (N) Pull	Pitch (mm/ spindle rev.)	Typical speed (mm/s) Load		Standard stroke lengths (mm)	Typical amp.** (A) 24 V	
						No	Full		No load	Full load
371C0XXAXXXX2XX	15000	15000	20000	20000	2.5	3.2	3	500, 750, 1000	2.2	8.0

* *Depending on stroke length in push*

** *Depending on temperature - se curves*

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 since 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. Cantilever mounts are unacceptable.

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 damages 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 end stop system permanently.

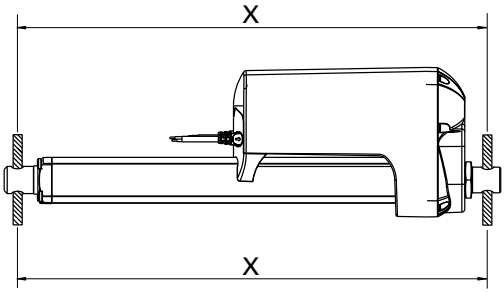


Figure 1

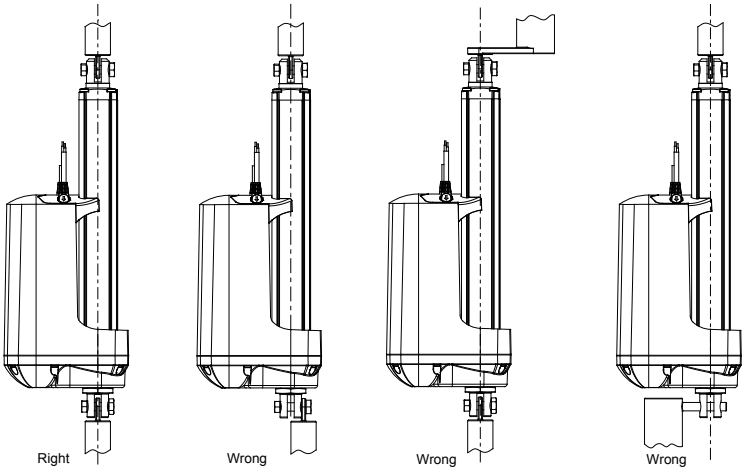


Figure 2

Mounting guidelines

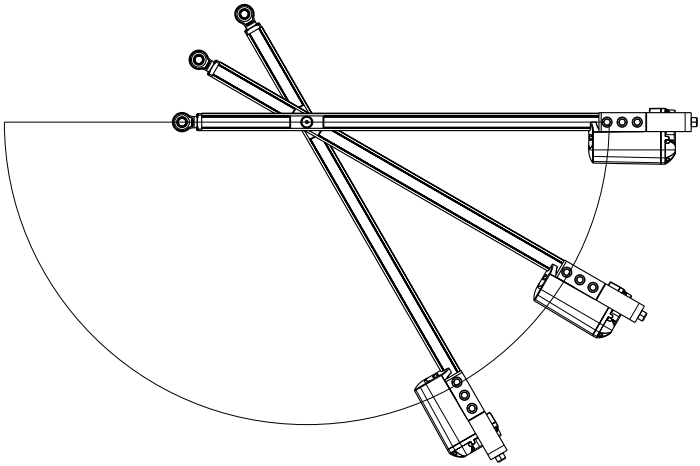
Warning!
If the actuator is used for pull in an application where personal injury can occur, the following is valid:
It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail.

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

Warning!
LINAK's actuators are not designed for use within the following fields:
- Offshore installations
- Aeroplanes and other aircraft
- Explosive environments
- Nuclear power generation

Please note:
- 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

Mounting guidelines - Trunnion mounted



We recommend to orientate the motor housing downwards as shown above. This ia to protect the cables against rain and hail. If possible, the motor should be protected against sun, rain and hail, this prolonges the liftetime of the actuator.

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's actuators are not designed for use within the following fields:
- Offshore installations
- Aeroplanes and other aircraft
- Explosive environments
- Nuclear power generation

If a current peak is appearing (25 A) during normal operation, there is a risk of failure at the internal limit switches. The actuators must be stopped and inspected by a service technician.

We strongly recommend to protect the application against overload by adding overcurrent protection.

Please note:
- 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

The pinion mounting on the solar panel must:

- be of a good workmanship.
- have smooth surfaces that do not wear or rasp the aluminium trunion pins on the actuator.
- be of materials that are able to function with aluminium, also in respect of corrosion.
- have dimensions that allow the actuator to move freely and without any sideload.

It is not allowed to apply any sideload on the actuator.

It is not allowed to overload the actuator. Be aware of extra loads that may be caused by for example wind, snow, service, personnel, animals.

Always ensure that the actuator is supplied with the specified voltage, also at maximum current.

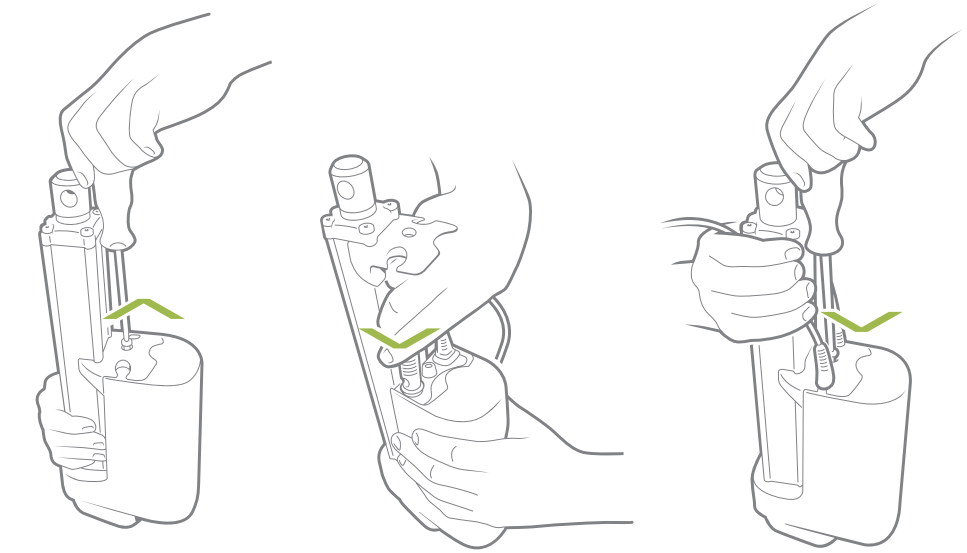
Application hints

The actuator is weatherproof for use in outdoor applications. It should not be used under water.

The duty cycle at max. load is 10% on time. This means if the actuator runs continuously for 15 seconds, it must remain off for 75 seconds before operating again.

It is allowed to both extend and retract the actuator at full stroke length with a load of 15 kN.

Mounting of cables



1. Unscrew the cover and remove the two blind plugs.

2. Plug in the power cable and/or the signal cable.

3. Slide the cover onto the actuator.

   The torque of the cover screw is approx. 1.5 ± 0.3 Nm

   TORX 25IP

When changing the cables on a LINAK actuator, it is important that this is done carefully, in order to protect the plugs and pins. Before the new cable is mounted, we recommend that the socket is greased with vaseline, to keep the high IP protection and ensure an easy mounting. Please be sure that the plug is in the right location and fully pressed in before the cable lid is mounted.

Remove the tinned cable end when the cable end is mechanically connected, the tinned end is only to be used when a soldered connection is made.

Please note that if the cables are mounted and dismounted more than 3 times the plugs can be damaged. We therefore recommend that such cables are discarded and replaced.

We recommend to take some precaution and design the wire connection in a way, where the cable end is kept inside a closed, protected area to guarantee the high IP protection.

Accessories

Cables:

Power cables (ordered separately)	Order no.
1.5 m cable	0367072-1500
5 m	0367072-5000
0.2 m cable (AMP connectors)	0367006

Signal cables (ordered separately)	Order no.
1.5 m cable	0367071-1500-A
5 m	0367071-5000-A

Be aware of Modbus actuator - please see the Modbus installation guide.

Manual Hand Crank

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

6mm Allen Key

(With stainless steel screws: 5mm Allen Key)

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: Max.16 Nm (at maximum load)

Piston Rod movement per turn: Gear C = 4.0 mm

Note:

- 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.

Electrical installation

- To ensure maximum self-locking ability, please be sure that the motor is shorted when stopped.
  Actuators with integrated controller have this feature incorporated.
- 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 overload.

Recommended fuse for actuators without integrated controller

LA37

Type	Spindle Pitch (mm)	Thrust max. Push/Pull (N)	Typical Amp. at full load (A)		Recommended fuse	
			24V	12V	24V	12V
371Cxxx1xxxx1xx	2.5	15000	-	22.5	-	45.0
371CxxxAxxxx1xx	2.5	10000	-	21.0	-	42.0
371Cxxx1xxxx2xx	2.5	15000	10.0	-	20.0	-
371CxxxAxxxx2xx	2.5	10000	8.0	-	16.0	-

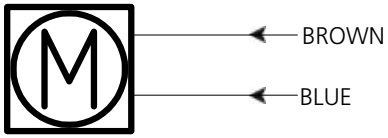
LA37 Trunnion mounted

Type	Spindle Pitch (mm)	Thrust max. Push/Pull (N)	Typical Amp. at full load (A)		Recommended fuse	
			24V	12V	24V	12V
371C0xxxxxxx1xx	2.5	15000	-	22.5	-	45.0
371C0xxAxxxx2xx	2.5	15000	8.0	-	16.0	-

Actuator without feedback

Connection diagram:

Fig. 1 : 37xxxx+10xxxxxx



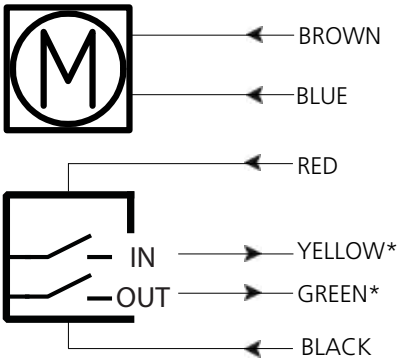
I/O specifications:

Input/Output	Specification	Comments
Description	Permanent magnetic DC motor. See connection diagram, fig. 1 above	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Not to be connected	
Black	Not to be connected	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Not to be connected	
White	Not to be connected	

Actuator with endstop signal output

Connection diagram:

Fig. 2 : 37xxxx+20xxxxxx



*YELLOW/GREEN: Endstop signals out are NOT potential free!

If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with endstop signal output

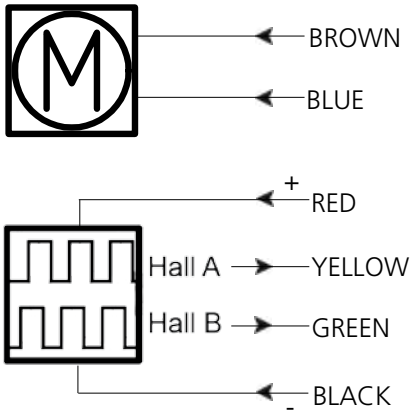
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronically controlled endstop signals out. See connection diagram, fig. 2, page 20	
Brown	12 or 24 VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 40mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Not to be connected	
White	Not to be connected	

Actuator with relative positioning - Dual hall

Connection diagram:

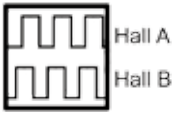
Fig. 3: 37xxxx+0H/1Hxxxxxx



Actuator with relative positioning - Dual hall

I/O specifications:

<table>
<tr><th>Input/Output</th><th colspan="2">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="2">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves.

See connection diagram, fig. 3, page 22</td><td> 
</td></tr>
<tr><td>Brown</td><td colspan="2" rowspan="2">12 or 24VDC (+/-)

12V ± 20%
24V ± 10%

Under normal conditions:
12V, max. 26A depending on load
24V, max. 13A depending on load</td><td>To extend actuator:
Connect Brown to positive

To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative

To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td colspan="2">Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 40mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td colspan="2">Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td>Hall B</td><td rowspan="2">Movement per single hall pulse:

LA371C Actuator = 0.4 mm per pulse</td><td rowspan="2">The Hall sensor signals are generated by the turning of the actuator gearing.

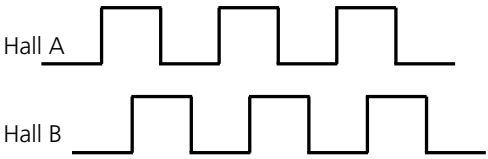
These signals can be fed into a PLC (Programmable Logic Controller). In the PLC the quadrature signals can be used to register the direction and position of the piston rod.

Output voltage min. V_{IN} - 2V
Current output 12mA
Overvoltage on the motor can result in shorter pulses.

N.B. For more precise measurements, please contact LINAK A/S.</td></tr>
<tr><td>Yellow</td><td>Hall A</td></tr>
</table>

Actuator with relative positioning - Dual hall

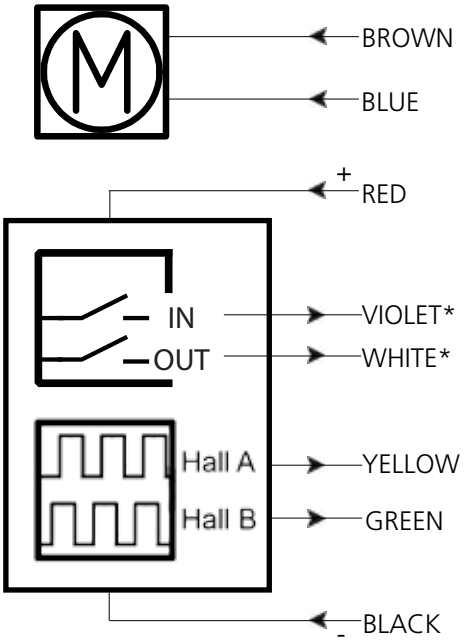
I/O specifications:

Input/Output	Specification	Comments
Violet	Not to be connected	
White	Not to be connected	
Diagram of Dual Hall:	 Fig. 3.1	

Actuator with endstop signals and relative positioning - Dual hall

Connection diagram:

Fig. 4: 37xxxx+2Hxxxxxx



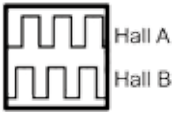
*YELLOW/GREEN: Endstop signals out are NOT potential free!(See I/O Specifications, page 21)

If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with endstop signals and relative positioning - Dual hall

I/O specifications:

<table>
<tr><th>Input/Output</th><th colspan="2">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="2">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves.

See connection diagram, fig. 4, page 25</td><td> 
</td></tr>
<tr><td>Brown</td><td colspan="2" rowspan="2">12 or 24VDC (+/-)

12V ± 20%
24V ± 10%

Under normal conditions:
12V, max. 26A depending on load
24V, max. 13A depending on load</td><td>To extend actuator:
Connect Brown to positive

To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative

To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td colspan="2">Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 40mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td colspan="2">Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td>Hall B</td><td rowspan="2">Movement per single hall pulse:

LA371C Actuator = 0.4 mm per pulse</td><td rowspan="2">The Hall sensor signals are generated by the turning of the actuator gearing.

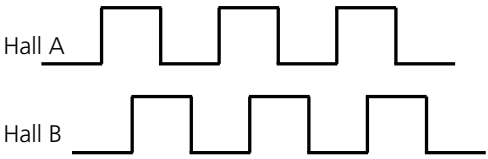
These signals can be fed into a PLC (Programmable Logic Controller). In the PLC the quadrature signals can be used to register the direction and position of the piston rod.

Output voltage min. V_{IN} - 2V
Current output 12mA
Overvoltage on the motor can result in shorter pulses.

N.B. For more precise measurements, please contact LINAK A/S.</td></tr>
<tr><td>Yellow</td><td>Hall A</td></tr>
</table>

Actuator with endstop signals and relative positioning - Dual hall

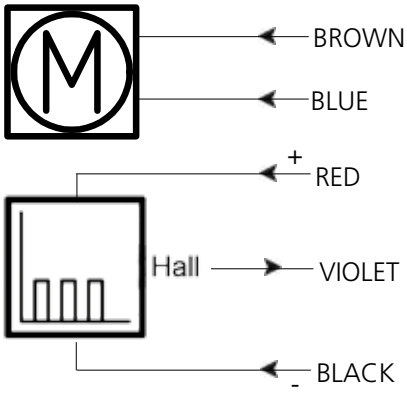
I/O specifications:

Input/Output	Specification	Comments
Violet	Endstop signal in	Output voltage min. V_{IN} - 2V Source current max. 30mA NOT potential free
White	Endstop signal out	
Diagram of Dual Hall:	 Fig. 4.1	

Actuator with relative positioning - Single hall

Connection diagram:

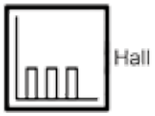
Fig. 5: 37xxxx+1Kxxxxxx



Actuator with relative positioning - Single hall

I/O specifications:

<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.

See connection diagram, fig. 5, page 28</td><td> 
</td></tr>
<tr><td>Brown</td><td rowspan="2">12 or 24VDC (+/-)
12V ± 20%
24V ± 10%

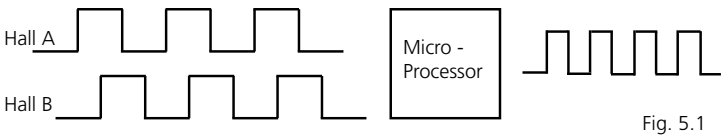
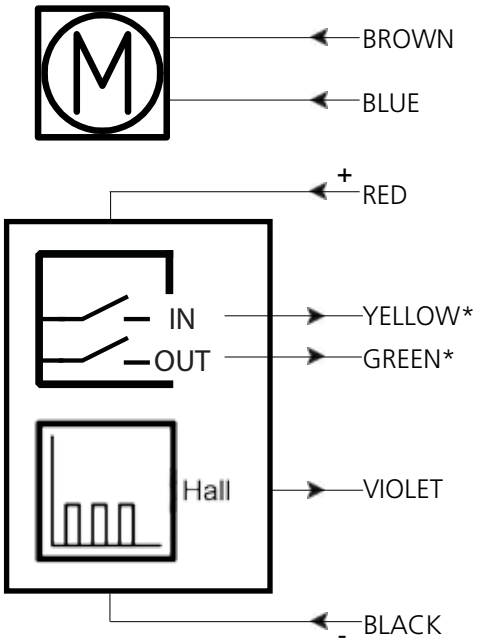
Under normal conditions:
12V, max. 26A depending on load
24V, max. 13A depending on load</td><td>To extend actuator:
Connect Brown to positive
To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative
To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td>Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 40mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td>Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td colspan="2">Not to be connected</td></tr>
<tr><td>Yellow</td><td colspan="2">Not to be connected</td></tr>
<tr><td rowspan="2">Violet</td><td>Single Hall output (PNP)
Movement per Single Hall pulse:
LA371C: Actuator = 0.1372 mm per count
Frequency:
Frequency is 14-26 Hz on Single Hall output depending on load.
Overvoltage on the motor can result in shorter pulses.</td><td>Output voltage min. V_{IN} - 2V
Max. current output: 12mA
Max. 680nF
N.B. For more precise measurements, please contact LINAK A/S.
Low frequency with a high load.
Higher frequency with no load.</td></tr>
<tr><td colspan="2">Diagram of Single Hall: Input Single Hall output
 

Fig. 5.1</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

Actuator with endstop signals and relative positioning - Single hall

Connection diagrams:

Fig. 6: 37xxxx+2Kxxxxxx

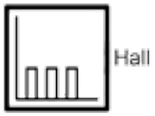
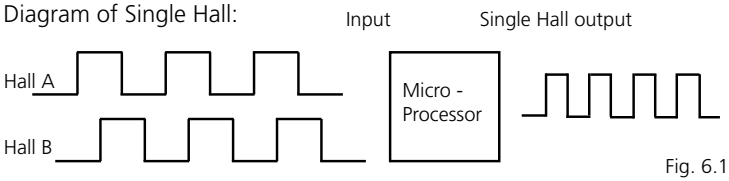


*YELLOW/GREEN: Endstop signals out are NOT potential free!(See I/O Specifications, page 21)

If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with endstop signals and relative positioning - Single hall

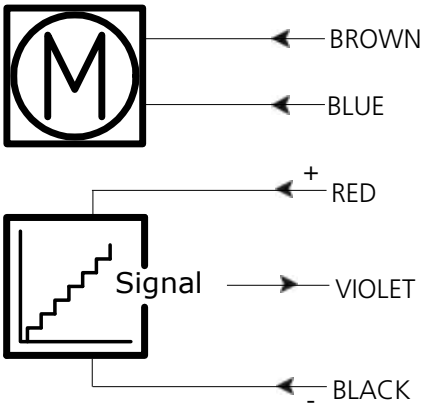
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves. See connection diagram, fig. 6, page 30	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 40mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Single Hall output (PNP) Movement per Single Hall pulse: LA371C: Actuator = 0.1372 mm per count Frequency: Frequency is 14-26 Hz on Single Hall output depending on load. Overvoltage on the motor can result in shorter pulses.	Output voltage min. V_{IN} - 2V Max. current output: 12mA Max. 680nF N.B. For more precise measurements, please contact LINAK A/S. Low frequency with a high load. Higher frequency with no load.
	Diagram of Single Hall:  Fig. 6.1	
White	Not to be connected	

Actuator with absolute positioning - Analogue feedback

Connection diagrams:

Fig. 7: 37xxxx+1B/1Cxxxxxx



Actuator with absolute positioning - Analogue feedback

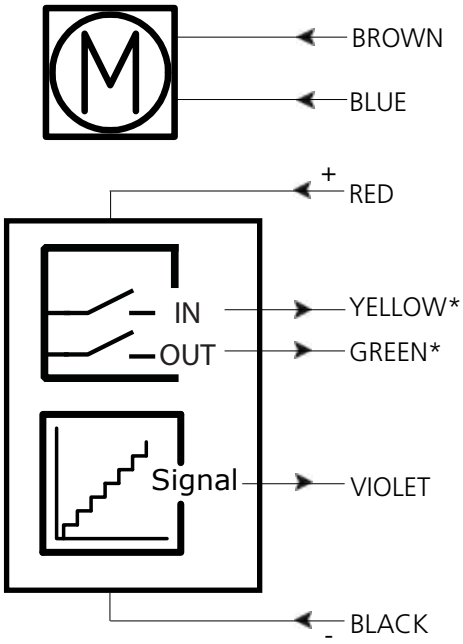
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 7, page 32	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 60mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Analogue feedback 0-10V (Option B) 0.5-4.5V (Option C)	Tolerances +/- 0.2V Max. current output: 1mA Ripple max. 200mV Transaction delay 100ms Linear feedback 0.5% It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Not to be connected	

Actuator with endstop signals and absolute positioning - Analogue feedback

Connection diagrams:

Fig. 8: 37xxxx+2B/2Cxxxxxx



*YELLOW/GREEN: Endstop signals out are NOT potential free! (See I/O Specifications, page 21)

If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with endstop signals and absolute positioning - Analogue feedback

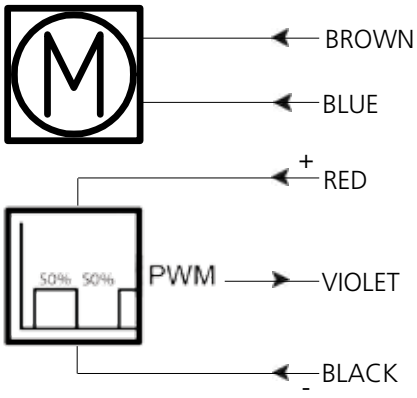
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 8, page 34	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 60mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Analogue feedback 0-10V (Option B) 0.5-4.5V (Option C)	Tolerances +/- 0.2V Max. current output: 1mA Ripple max. 200mV Transaction delay 20ms Linear feedback 0.5% It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Not to be connected	

Actuator with absolute positioning - PWM

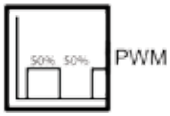
Connection diagrams:

Fig. 9: 37xxxx+15/16xxxxxxx



Actuator with absolute positioning - PWM

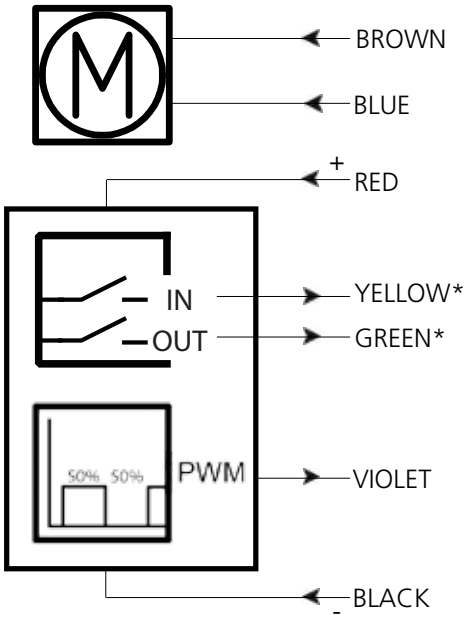
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 9, page 36	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10%	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 60mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Digital output feedback (PNP) 10-90% (Option 5) 20-80% (Option 6)	Output voltage min. V_{IN} - 2V Tolerances +/- 2% Max. current output: 12mA Frequency: 75Hz It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Not to be connected	

Actuator with endstop signals and absolute positioning - PWM

Connection diagrams:

Fig. 10: 37xxxx+25/26xxxxxxx



*YELLOW/GREEN: Endstop signals out are NOT potential free! (See I/O Specifications, page 21)

If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with endstop signals and absolute positioning - PWM

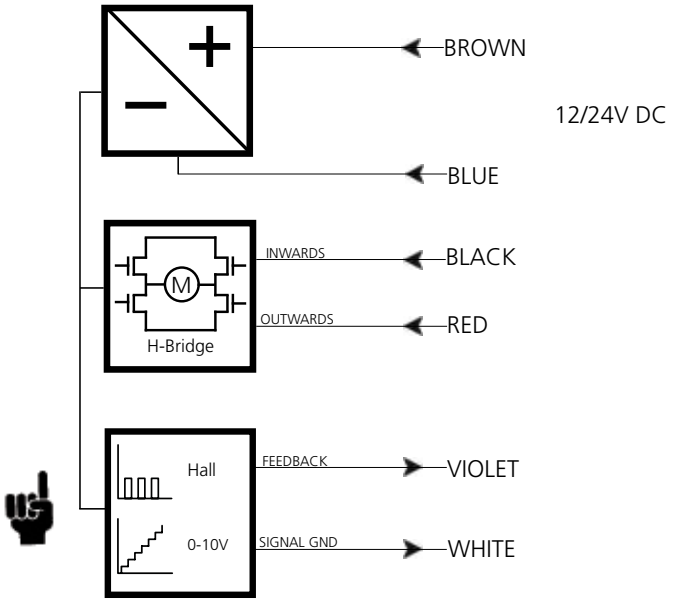
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 10, page 38	
Brown	12 or 24VDC (+/-) 12V ± 20% 24V ± 10%	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 60mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Digital output feedback (PNP) 10-90% (Option 5) 20-80% (Option 6)	Output voltage min. V_{IN} - 2V Tolerances +/- 2% Max. current output: 12mA Frequency: 75Hz It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Not to be connected	

Actuator with IC Basic

Connection diagram:

Fig. 11: 37xxxx+7xxxxxxx

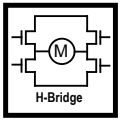


- Please be aware that if the power supply is not properly connected, you might damage the actuator!
- Not programmable with BusLink

It is only possible to order the actuator with one of the two feedback options!

Actuator with IC Basic

I/O specifications:

Input/Output	Specification	Comments
Description	Easy to use interface with integrated power electronics (H-bridge). The actuator can also be equipped with electronic circuit that gives an absolute or relative feedback signal. The version with "IC option" cannot be operated with PWM (power supply). See connection diagram, fig. 11, page 40	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	Note: Do not change the power supply polarity on the brown and blue wires! Power supply GND (-) is electrically connected to the housing If the temperature drops below 0°C, all current limits will automatically increase to 30A
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA
Black	Retracts the actuator	
Green	Not to be connected	
Yellow	Not to be connected	

Actuator with IC Basic

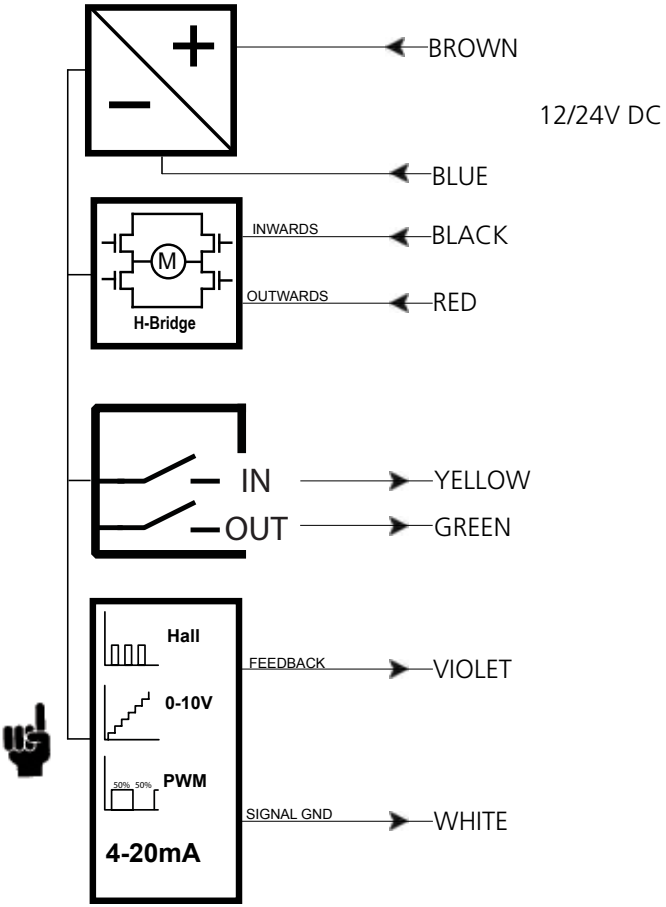
I/O specifications:

Input/Output	Specification	Comments
Violet	Analogue feedback 0-10V (Option 7.2)	Standby power consumption: 12V, 60mA 24V, 45 mA Ripple max. 200mV Transaction delay 20ms Linear feedback 0.5% Max. current output: 1mA It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
	Single Hall output (PNP) (Option 7.1)	Output voltage min. V_{IN} - 2V Max. current output: 12mA For more information see fig. 5.1, page 29
White	Signal GND	For correct wiring of power GND and Signal GND see page 46

Actuator with IC Advanced - with BusLink

Connection diagram:

Fig. 12: 37xxxx+8xxxxxxx



- Configuration of IC Advanced is possible with free BusLink software

It is only possible to configure the actuator with one of the four feedback options at a time!

Please be aware that when chosing single hall, feedback position readout and virtual end-stops are not available in BusLink.

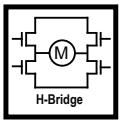
BusLink is available for IC Advanced and can be used for:
Diagnostics, manual run and configuration

Download BusLink software here: **http://www.linak.com/techline/?id3=2363**

For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: **http://www.linak.com/techline/?id3=2356**

Actuator with IC Advanced - with BusLink

I/O specifications:

Input/Output	Specification	Comments
Description	Easy to use interface with integrated power electronics (H-bridge). The actuator can also be equipped with electronic circuit that gives an absolute or relative feedback signal. IC Advanced provides a wide range of possibilities for customisation. The version with "IC option" cannot be operated with PWM (power supply). See connection diagram, fig. 12, page 43	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	Note: Do not change the power supply polarity on the brown and blue wires! Power supply GND (-) is electrically connected to the housing Current limit levels can be adjusted through BusLink If the temperature drops below 0°C, all current limits will automatically increase to 30A
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA
Black	Retracts the actuator	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed. Only use one virtual endstop - keep one end open for initialisation. (See I/O specifications for endstop on page 21).
Yellow	Endstop signal in	

Actuator with IC Advanced - with BusLink

I/O specifications:

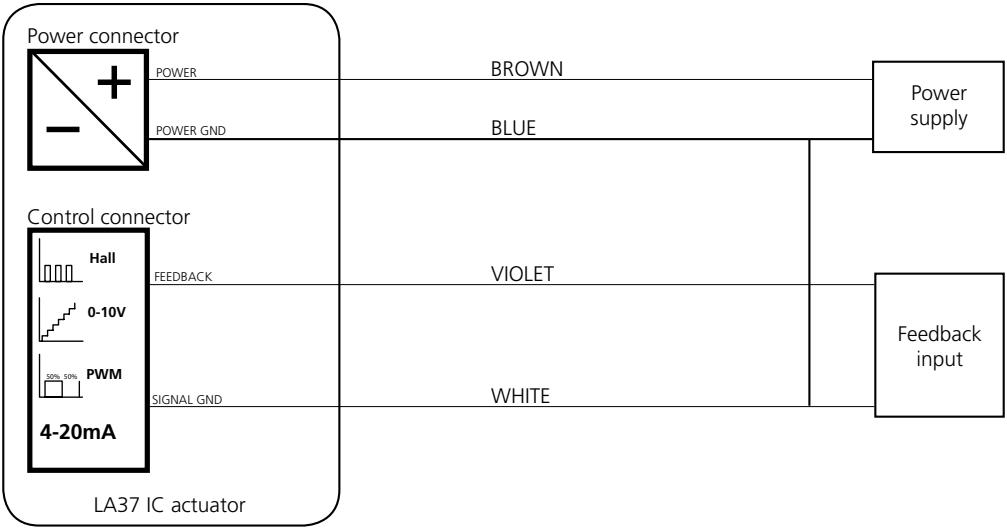
Input/Output	Specification	Comments
Violet	Analogue feedback (0-10V): Configure any high/low combination between 0-10V	Ripple max. 200mV Transaction delay 20ms Linear feedback 0.5% Max. current output. 1mA
	Single Hall output (PNP)	Output voltage min. V_{IN} - 2V Max. current output: 12mA Please be aware that when choosing single hall, feedback position readout and virtual endstops are not available in BusLink. For more information, see fig. 6.1, page 31
	Digital output feedback PWM: Configure any high/low combination between 0-100%	Output voltage min. V_{IN} - 2V Frequency: 75Hz ± 10Hz as standard, but this can be customised. Duty cycle: Any low/high combination between 0 and 100 percent. Open drain source current max. 12mA
	Analogue feedback (4-20mA): Configure any high/low combination between 4-20mA	Tolerances +/- 0.2mA Transaction delay 20ms Linear feedback 0.5% Output: Source Serial resistance: 12V max. 300 ohm 24V max. 900 ohm
	All absolute value feedbacks (0-10V, PWM and 4-20mA)	Standby power consumption: 12V, 60mA 24V, 45mA It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Signal GND	For correct wiring of power GND and Signal GND see page 46

Please note that the BusLink cables must be purchased separately from the actuator!

Item number for BusLink cables: 0367999

Correct wiring of Power GND and Sinal GND for IC Basic and IC Advanced

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 0-10V, Hall or PWM feedback, the Signal GND must be used. For optimal accuracy, the Signal GND is connected to the Power GND as close as possible to the feedback input equipment.

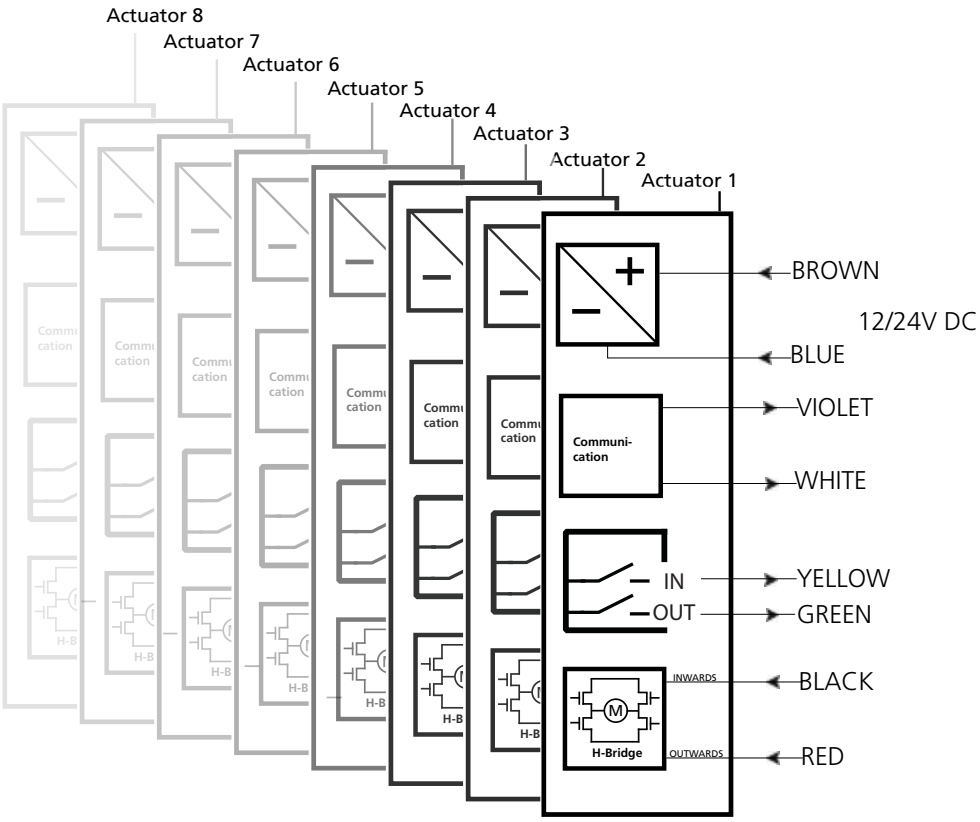


Please note that this section only applies for the following feedback options: 0-10V, Hall and PWM.

Actuator with Parallel

Connection diagram:

Fig. 13: 37xxxx+9xxxxxxx

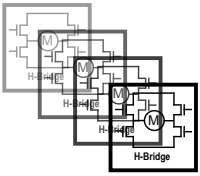


- The green and yellow wires from parallel connected actuators must NOT be interconnected. (See I/O specifications for endstop on page 21).

Only standard power and signal cables are available for parallel.

Actuator with Parallel

I/O specifications:

Input/Output	Specification	Comments
Description	Parallel drive of up to 8 actuators. A master actuator with an integrated H-bridge controller controls up to 7 slaves. The version with "IC option" cannot be operated with PWM (power supply). See connection diagram, fig. 13, page 47	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	Note: Do not change the power supply polarity on the brown and blue wires! The parallel actuators can run on one OR separate power supplies Power supply GND (-) is electrically connected to the housing Current limit levels can be adjusted through BusLink (only one actuator at a time for parallel) If the temperature drops below 0°C, all current limits will automatically increase to 30A
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA It does not matter where the in/out signals are applied. You can either choose to connect the signal cable to one actuator OR you can choose to connect the signal cable to each actuator on the line. Either way this will ensure parallel drive
Black	Retracts the actuator	

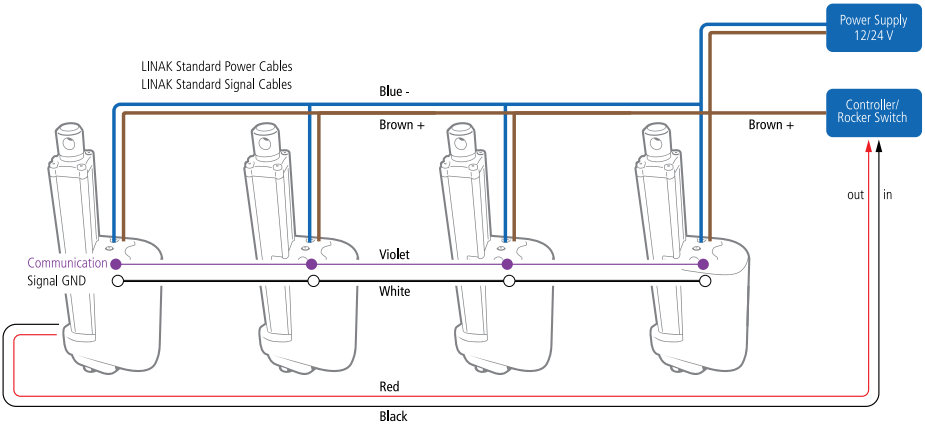
Actuator with Parallel

I/O specifications:

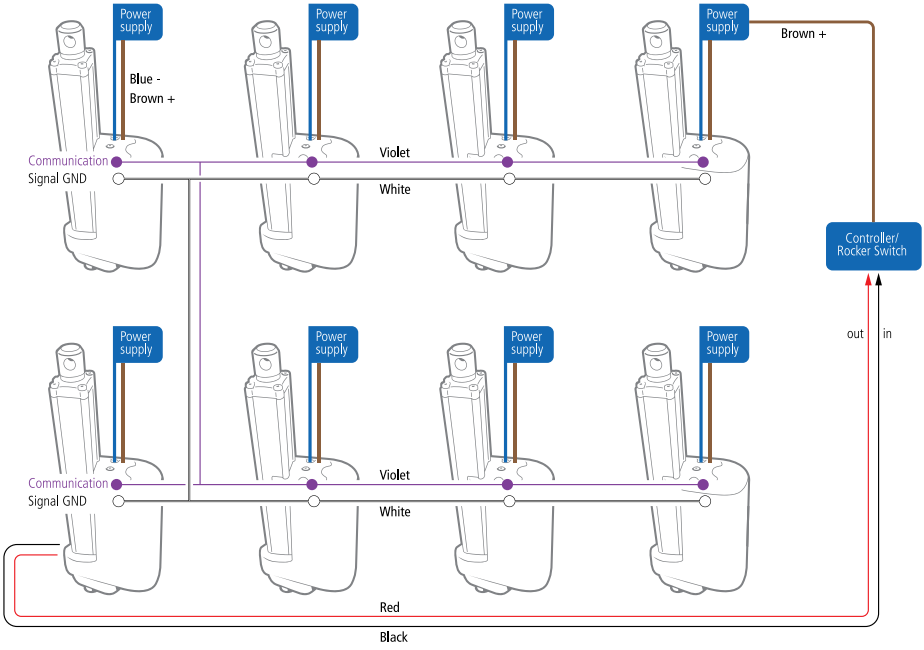
Input/Output	Specification	Comments
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Parallel communication: Violet cords must be connected together	Standby power consumption: 12V, 60mA 24V, 45mA No feedback available during parallel drive
White	Signal GND: White cords must be connected together	For correct wiring of power GND and Signal GND see page 46

The parallel system

The parallel drive function will support a number of actuators working jointly.



It is both possible to run parallel with a single power supply, or to run each actuator with separate power supplies.



Only standard power and signal cables are available for parallel.

The parallel system

- It does not matter where the IN/OUT signal is applied. The signals of all actuators can be connected together
- When all actuators are connected, a Master will automatically be chosen. E.g. with 5 actuators in one system there will be 1 Master and 4 Slaves. The Master can control up to 7 slaves
- If an overload occurs, the running of the actuators will be stopped and blocked in that direction until an activation in the opposite direction has been made, or the system has been re-powered
- Before entering BusLink mode, all actuators must be disconnected. It is only possible to configure one actuator at a time through BusLink
- When changing the actuator configuration, it is important that all actuators in the system have the same configuration before the system starts running. Otherwise, the actuators will not run
- Actuators will be pre-programmed from our production as 2, 3, 4, 5.. etc. parallel systems. Through BusLink it will be possible to add or remove actuators to/from the system
- In case one of the actuators are broken, the system will not move; not even after re-powering. The broken actuator needs to be replaced, before the system can run again. The system will only run, when it is complete

BusLink is available for Parallel

- BusLink can be used for configuration and diagnostics
- Service counter is available with Parallel

Download BusLink software here: **http://www.linak.com/techline/?id3=2363**

For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: **http://www.linak.com/techline/?id3=2356**

Please note that the BusLink cables must be purchased separately from the actuator!
Item number for BusLink cables: 0367999

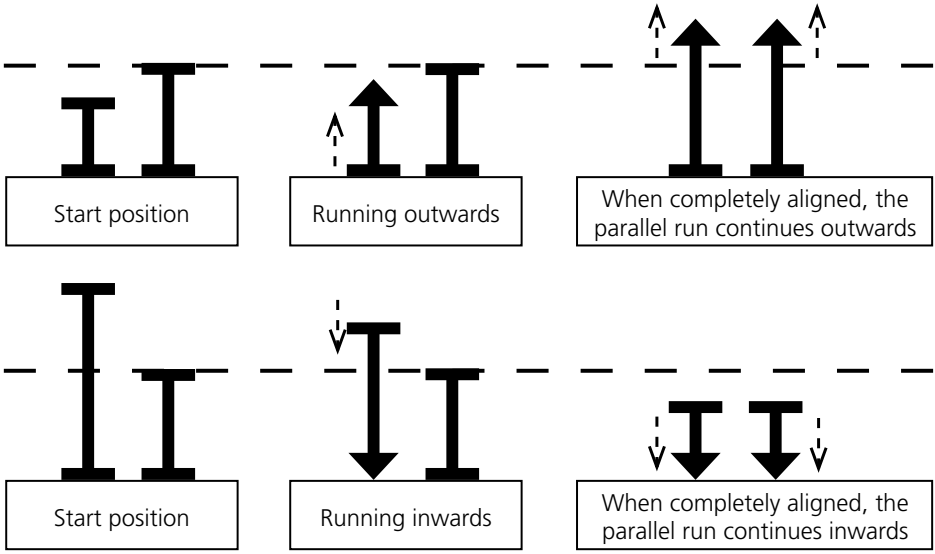
System Monitoring for Parallel

If one of the actuators have one of the following error conditions, the actuator will immediately STOP:

- H-Bridge fault
- Out of the temperature range (High duty cycle protection)
- Overcurrent (Current cut-off if one or all actuators go in mechanical block)
- SMPS fault
- EOS fault switch
- Hall sensor failure
- Position lost
- Overvoltage (43V DC)

Alignment of the parallel actuator system

If the actuators are not in parallel when starting up, the next movement will run in the following manner:

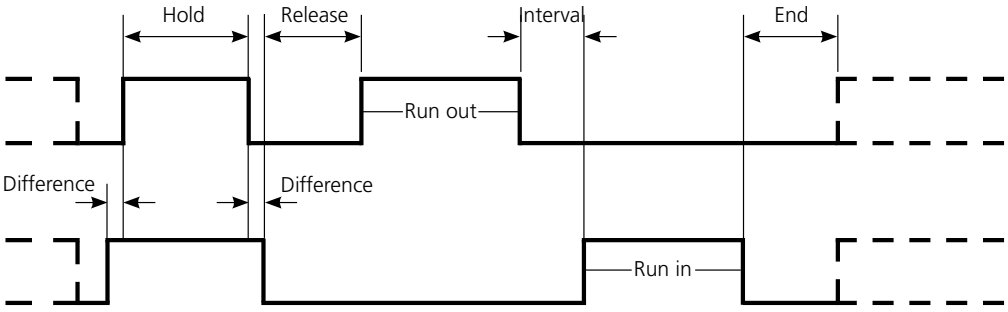


Parallel manual service mode

With the parallel manual service mode it is possible to drive one or more parallel actuators separately, using the red and black wire from each actuator.

Please follow this procedure to manually extend/retract the parallel actuator(s):

	Procedure	Min.	Max.
First step	Disconnect the Purple and White wires between all actuators	-	-
Hold	Put power on the Red and Black wires for 10-30 seconds	10 sec.	30 sec.
Difference	The Red and Black wires must all be connected to the power supply within 0.5 seconds	0 sec.	0.5 sec.
Release	Disconnect all wires and wait 0.5-2 seconds before the next step	0.5 sec.	2 sec.
Extend/Retract	Now choose either to extend or retract the actuator: To extend the actuator: Connect only the Red wire(s) to the power supply To retract the actuator: Connect only the Black wire(s) to the power supply	-	-
Interval	Switch between running in/out as much as needed, without exceeding the 2.0 seconds interval between disconnecting/connecting the Red and Black wires	-	2 sec.
End	To exit the parallel manual mode, diconnect the Red and Black wires for more than 2.0 seconds	2 sec.	-
Back to parallel mode	Before running in standard parallel mode, reconnect all Purple and White wires	-	-



Troubleshooting

Symptom	Possible cause	Action
No motor sound or movement of piston rod	The actuator is not properly connected to the power supply Customer fuse burned Cable damaged	• Check the connection to the power supply or the external control unit (if any) To extend actuator: Connect Brown to positive and Blue to negative To retract actuator: Connect Brown to negative and Blue to positive • Change cable
	IC: Wrongly connected: + Brown, - Blue Signal required for moving outwards: + VCC -> RED Wire Signal required for moving inwards: + VCC -> Black Wire	• Check wire connection (Red/ Black) on control unit • Please contact LINAK
Excessive electricity Consumption	Misalignment or overload in application	• Align or reduce load • Try to run the actuator without load • Please contact LINAK
Motor runs but spindle does not move	Gearing system or spindle damaged	• Please contact LINAK
Actuator cannot lift full load	Clutch is worn Motor is damaged Insufficient power supply **IC:** Current cut off (overload in application)	• Align or reduce load • Check power supply **For IC advanced and Parallel only:** Connect actuator to BusLink and check the current parameters (inwards/outwards) • Please contact LINAK

Troubleshooting

Symptom	Possible cause	Action
No signal from Feedback	Wrongly Connected: Violet: Signal out White: Signal GND Yellow: Endstop In Green: Endstop Out	• Check wiring
	Cable damaged Bad connection Potentiometer damaged Hall sensor or magnet damaged	• Change cable
	For IC Advanced only: Check Feedback option - connect to BusLink	**For IC Advanced only:** Connect actuator to BusLink and check current parameters. Initialise the actuator in both directions • Please contact LINAK
Motor runs too slowly or does not run with full force	Load is higher than specified Voltage drop in cable (Use of long cables can negatively affect the performance of the actuator)	• Reduce load
Motor runs in smaller steps	Insufficient power supply	• Check power supply
	IC: Current Cut-off	**IC:** Connect actuator to BusLink and check current parameters (reason for last stop). For more info, please see page 57
Actuator(s) cannot hold the chosen load	Load is higher than specified	• Reduce load

Troubleshooting for Parallel

Symptom	Possible cause	Action
No actuators in movement	Power supply	• Check power supply source and power connections: Brown + Blue - **Please be aware that if the power supply is not properly connected, you might damage the actuator**
	Signal connections	• Check parallel communications: Violet = Communication Violet cords must be connected together White = Signal GND White cords must be connected together
	Signal required for moving outwards: + VCC (Red wire) Signal required for moving inwards: + VCC (Black wire)	• Check wire connection (Red/ Black) on control unit
	• Put power on all actuators at the same time, after everything is connected. Then wait 10 seconds before signals for moving In/Out are activated	
Actuator(s) cannot lift full load	Load is higher than specified	• Reduce load • Check for sufficient power supply current • Connect actuator via BusLink one at the time and check monitoring for each actuator (reason for last stop)
Short movements before stops	Actuator NOT connected properly Violet = Parallel communication White = Signal GND	• Check wire connection (Violet/ White) • If OK - Connect actuators via BusLink one at the time and check monitoring for each actuator (reason for last stop). For more info, please see page 57

Troubleshooting for Parallel

Symptom	Possible cause	Action
Signal cable damaged or removed under operation	All actuators stop at the same position	• When seeing a communication error, the system goes into 'position lost' • The signal and power cables MUST be connected to all actuators again • Afterwards, the Parallel system needs re-powering • If one actuator is missing, the system will not work, not even after re-powering
BusLink monitoring: Reason for last stop	H-bridge fault SMPS fault	• Please contact your local supplier for further instructions
	Overcurrent	• The Parallel system cannot continue in the same direction • Reactivation is needed in the opposite direction
	EOS OUT error EOS IN error	• The Parallel system stops at the same time. When seeing an EOS error, the actuator goes into 'position lost', and the system will need initialisation (to initialise, move the actuators into fully retracted position)
	Hall error	• The system stops at the same position. When seeing hall error, the actuator goes into 'position lost', and the system will need initialisation (to initialise, move the actuators into fully retracted position)
	Out of range temperature for ambient location Out of range temperature at FET location The above can be due to high environment temperature or high duty cycle	• The error causes the actuators to stop. After elimination of the error (cooling down) and reactivation of the movement, the actuators will move normally • This may not be used for stop of the system

Troubleshooting for Parallel

Symptom	Possible cause	Action
BusLink monitoring: Reason for last stop	Overvoltage	• When seeing overvoltage, the system stops at the same time. The system needs re-powering and In/Out signals must be removed before next movement
	Undervoltage	• When seeing undervoltage, the system stops at the same time. The system needs re-powering and In/Out signals must be removed before next movement

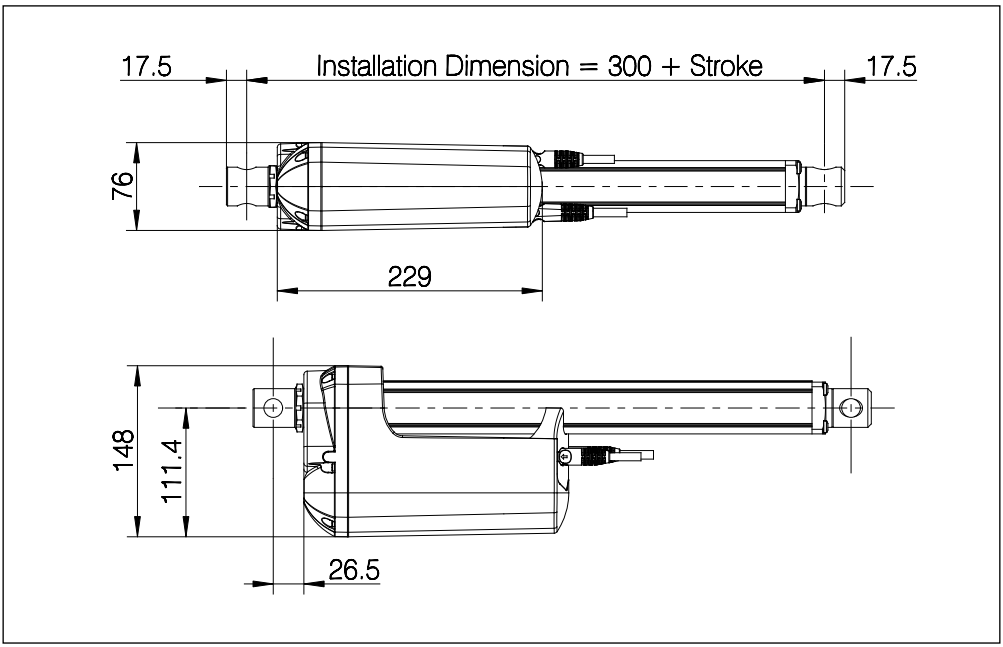
For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: **http://www.linak.com/techline/?id3=2356**

Be aware of Modbus actuator - please see the Modbus installation guide.
http://www.linak.com/techline/?id3=2363

DRAWING APPENDIX

TECHLINE® LA37:

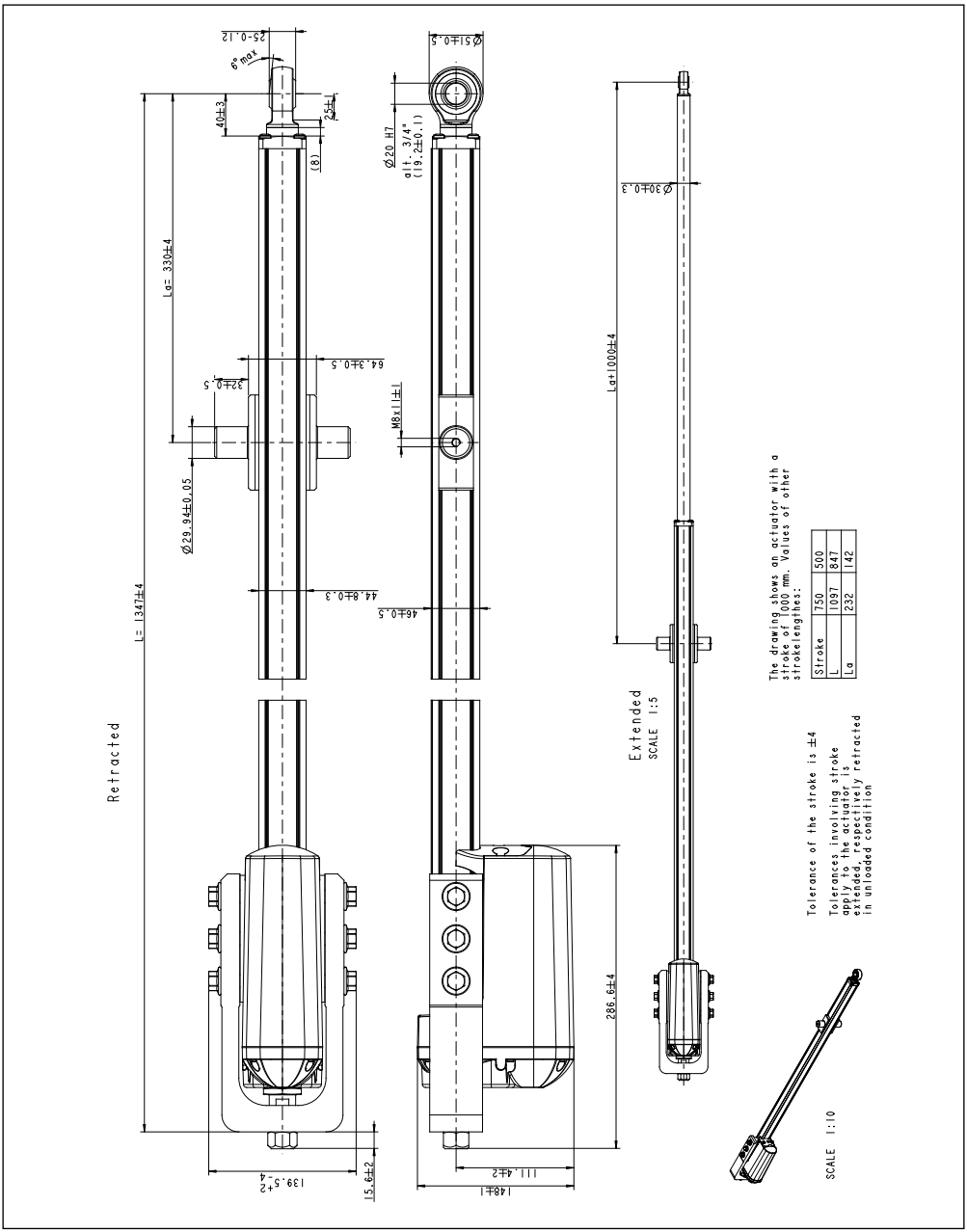
LA37



NOTE: The above dimensions apply for all LA37 Piston rod eyes and back fixtures.

TECHLINE® LA37 - Trunnion mounted:

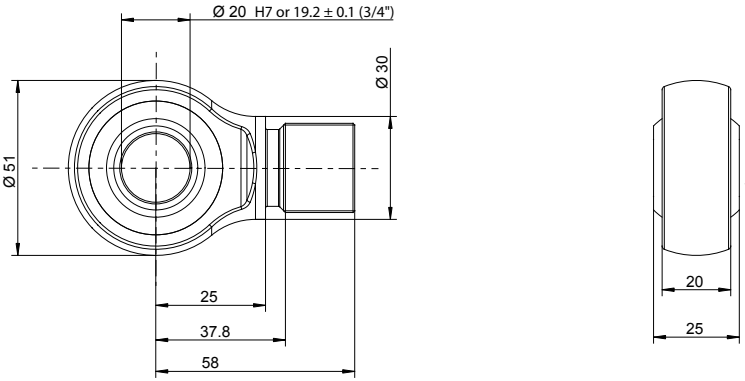
LA37



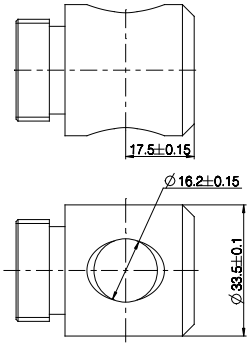
NOTE: The above dimensions apply for all piston rod eyes.

LA37 Piston Rod Eyes:

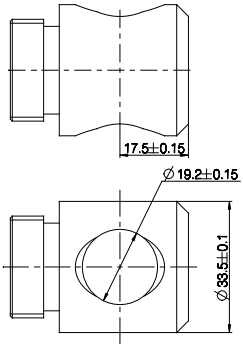
Option "0&1"
LINAK P/N: 0361568
AISI 304



Option "2"
LINAK P/N: 0361387
Free cutting steel galvanised surface

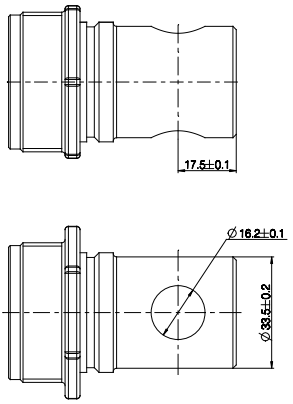


Option "3"
LINAK P/N: 0361393
Free cutting steel galvanised surface

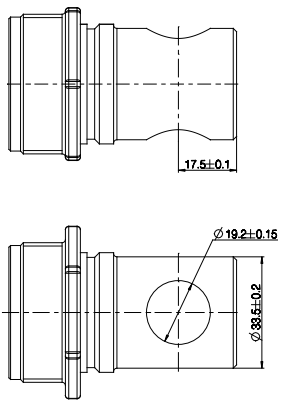


LA37 Back fixtures:

Option "1&2"
LINAK P/N: 0371019
Free cutting steel galvanised surface



Option "3&4"
LINAK P/N: 0371040
Free cutting steel galvanised surface



Label for LA37

1. **Type.: 371CXX+10200220**
   Describes the basic functionality of the product.
2. **Item no.: 370008-00**
   Sales and ordering code (please use this code when contacting LINAK)
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 10.000N / Pull 10.000N IP66**
   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.: 24VDC / Max. 13 Amp**
   Input voltage for the product and maximum current consumption
6. **Duty Cycle.: 5%, Max. 1 min. /19 min.**
   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/0# 1234567-0001**
   The LINAK work order followed by a unique sequential identification number

Label for LA37 - Trunnion mounted

Fig. 1 (customer specific item):

		Amp. Start		Amp. Operation	
Load N	Temp. °C	Average	STD Dev	Average	STD Dev
0	20°	3,57	0,20	2,23	0,14
7.500	20°	6,93	0,22	6,07	0,30
15.000	20°	10,13	0,38	9,42	0,61
	Temp. °C				
0	70°	3,03	0,38	1,70	0,09
7.500	70°	5,67	0,27	5,67	0,27
15.000	70°	9,87	0,63	9,80	0,54
	Temp. °C				
0	-30°	7,03	2,19	4,17	0,37
7.500	-30°	13,50	0,53	9,73	0,26
15.000	-30°	17,85	1,55	13,18	0,48

1. **Type.: 371CXX+1H700325**
   Describes the basic functionality of the product.
2. **Item no.: 370002-00**
   Sales and ordering code (please use this code when contacting LINAK)
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/Pull See table IP66**
   Refers to the scheme at the bottom of the label that 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.: 36VDC / Max. Amp See Table**
   Input voltage for the product and maximum current consumption which can be seen in the scheme at the bottom of the label
6. **Duty Cycle.: 5%, Max. 1 min. /19 min.**
   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/0# 1234567-0001**
   The LINAK work order followed by a unique sequential identification number

Key to symbols

The following symbols are used on the LA37 labels.

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

Main groups of disposal

Product	Metal scrap	Cable scrap	Electronic scrap	Plastic recycling or combustion
LA37	X	X	X	X

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. As examples of main groups within sorting of waste we can mention the following:

Metal scrap
Plastic scrap
Cable scrap
Electronic scrap

Combustible material and collection for recoverable resources.

Some of these main groups can be sub-divided into groups e.g. metal can be divided into steel and aluminium or plastic can be divided into ABS and PP.

LINAK APPLICATION POLICY

The purpose of the application policy is to define areas of responsibilities in relation to applying a LINAK product defined as hardware, software, technical advice, etc. related to an existing or new customer application.

LINAK products as defined above are applicable for a wide range of applications within the Medical, Furniture, Desk, and Industry areas. Yet, LINAK cannot know all the conditions under which LINAK products will be installed, used, and operated, as each individual application is unique.

The suitability and functionality of the LINAK product and its performance under varying conditions (application, vibration, load, humidity, temperature, frequency, etc.) can only be verified by testing, and shall ultimately be the responsibility of the LINAK customer using any LINAK product.

LINAK shall be responsible solely that the LINAK products comply with the specifications set out by LINAK and it shall be the responsibility of the LINAK customer to ensure that the specific LINAK product can be used for the application in question.

FACTORIES

CHINA
LINAK (Shenzhen) Actuator Systems, Ltd.
Phone: +86 755 8610 6656
Fax: +86 755 8610 6990
E-mail: sales@linak.cn
www.linak.cn

DENMARK
LINAK A/S - Group Headquarters, Guderup
Phone: +45 73 15 15 15
Fax: +45 74 45 80 48
Fax: +45 73 15 16 13 (Sales)
E-mail: info@linak.com
www.linak.com

SLOVAKIA
LINAK Slovakia s.r.o.
Phone: +421 51 75 63 414
Fax: +421 51 75 63 410
E-mail: jp@linak.sk
www.linak.com

USA
LINAK U.S. Inc.
North and South American Headquarters
Phone: +1 502 253 5595
Fax: +1 502 253 5596
E-mail: info@linak-us.com
www.linak-us.com

SUBSIDIARIES

AUSTRALIA
LINAK Australia Pty. Ltd
Phone: +61 3 8796 9777
Fax: +61 3 8796 9778
E-mail: sales@linak.com.au
www.linak.com.au

AUSTRIA
LINAK Repräsentanz Österreich (Wien)
Phone: +43 (1) 890 7446
Fax: +43 (1) 890 744615
E-mail: info@linak.de
www.linak.at

BELGIUM & LUXEMBOURG
LINAK Actuator-Systems NV/SA
Phone: +32 (0)9 230 01 09
Fax: +32 (0)9 230 88 80
E-mail: beinfo@linak.be
www.linak.be

BRAZIL
LINAK Do Brasil Comércio De Atuadores Ltda.
Phone: +55 (11) 2832 – 7070
Fax: +55 (11) 2832 – 7060
E-mail: info@linak.com.br
www.linak.com.br

CANADA
LINAK Canada Inc.
Phone: +1 502 253 5595
Fax: +1 416-255-7720
E-mail: info@linak.ca
www.linak-us.com

CZECH REPUBLIC
LINAK C&S S.R.O.
Phone: +420581741814
Fax: +420581702452
E-mail: ponizil@linak.cz
www.linak.cz

DENMARK
LINAK Danmark A/S
Phone: +45 86 80 36 11
Fax: +45 86 82 90 51
E-mail: linak@linak-silkeborg.dk
www.linak.dk

FINLAND
LINAK OY
Phone: +358 10 841 8700
Fax: +358 10 841 8729
E-mail: linak@linak.fi
www.linak.fi

FRANCE
LINAK France E.U.R.L
Phone: +33 (0) 2 41 36 34 34
Fax: +33 (0) 2 41 36 35 00
E-mail: linak@linak.fr
www.linak.fr

GERMANY
LINAK GmbH
Phone: +49 6043 9655 0
Fax: +49 6043 9655 60
E-mail: info@linak.de
www.linak.de

INDIA
LINAK A/S India Liaison Office
Phone: +91 120 4393335
Fax: +91 120 4273708
E-mail: info@linak.in
www.linak.in

IRELAND
LINAK UK Limited - Ireland
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
+44 (0)796 855 1606 (UK Mobile)
+35 387 634 6554 (Republic Of Ireland Mobile)
E-mail: sales@linak.co.uk
www.linak.co.uk

ITALY
LINAK Italia S.r.l.
Phone: +39 02 48 46 33 66
Fax: +39 02 48 46 82 52
E-mail: info@linak.it
www.linak.it

JAPAN
LINAK K.K.
Phone: 81-45-533-0802
Fax: 81-45-533-0803
E-mail: linak@linak.jp
www.linak.jp

MALAYSIA
LINAK Actuators Sdn. Bhd.
Phone: +60 4 210 6500
Fax: +60 4 226 8901
E-mail: info@linak-asia.com
www.linak.my

NETHERLANDS
LINAK Actuator-Systems B.V.
Phone: +31 76 5 42 44 40
Fax: +31 76 5 42 61 10
E-mail: info@linak.nl
www.linak.nl

NEW ZEALAND
LINAK New Zealand Ltd.
Phone: +64 9580 2071
Fax: +64 9580 2072
E-mail: nzsales@linak.com.au
www.linak.co.nz

NORWAY
LINAK Norge AS
Phone: +47 32 82 90 90
Fax: +47 32 82 90 98
E-mail: info@linak.no
www.linak.no

POLAND
LINAK Polska
Phone: +48 (22) 500 28 74
Fax: +48 (22) 500 28 75
E-mail: dkreh@linak.dk
www.linak.pl

REPUBLIC OF KOREA
LINAK Korea Ltd.
Phone: +82-(0)2-6231-1515
Fax: +82-(0)2-6231-1516
E-mail: scully@linak.kr
www.linak.kr

RUSSIAN FEDERATION
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Phone: +7 495 280 14 26
Fax: +7 495 687 14 26
E-mail: info@linak.ru
www.linak.ru

SPAIN
LINAK Actuadores, S.L.u
Phone: +34 93 588 27 77
Fax: +34 93 588 27 85
E-mail: esma@linak.es
www.linak.es

SWEDEN
LINAK Scandinavia AB
Phone: +46 8 732 20 00
Fax: +46 8 732 20 50
E-mail: info@linak.se
www.linak.se

SWITZERLAND
LINAK AG
Phone: +41 43 388 31 88
Fax: +41 43 388 31 87
E-mail: info@linak.ch
www.linak.ch

TAIWAN
LINAK A/S Taiwan Representative Office
Phone: +886 2 27290068
Fax: +886 2 27290096
Mobile: +886 989292100
E-mail: michael.chen@linak.com.tw
www.linak.com.tw

TURKEY
LINAK İth. İhr. San. ve Tic. A.Ş.
Phone: + 90 312 4726338
Fax: + 90 312 4726635
E-mail: info@linak.com.tr
www.linak.com.tr

UNITED KINGDOM
LINAK UK Limited
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
E-mail: sales@linak.co.uk
www.linak.co.uk

DISTRIBUTORS

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COLOMBIA
MEM Ltda
Phone: +[57] (1) 334-7666
Fax: +[57] (1) 282-1684
E-mail: servicioalcliente@memltda.com.co
www.memltda.com.co

INDIA
Mechatronics Control Equipments India Pvt Ltd
Phone: +91-44-28558484/85,
E-mail: bala@mechatronicscontrol.com
www.mechatronicscontrol.com

INDONESIA
Pt. Himalaya Everest Jaya
Phone: +6 221 544 8956/8965,
Fax: +6 221 619 4658/1925
E-mail: hejplastic-div@centrin.net.id
www.hej.co.id

IRAN
Bod Inc.
Phone: +98 2188998635-6
Fax: +98 2188954481
E-mail: info@bod.ir
www.bod.ir

RUSSIAN FEDERATION
000 FAM
Phone: +7 812 3319333
Fax: +7 812 3271454
E-mail: purchase@fam-drive.ru
www.fam-drive.ru

SINGAPORE
Servo Dynamics Pte. Ltd.
Phone: +65 6844 0288
Fax: +65 6844 0070
E-mail: servodynamics@servo.com.sg
www.servo.com.sg

SOUTH AFRICA
Industrial Specialised Applications CC
Phone: +27 11 312 2292 or
+27 11 2077600 (Switch Board)
Fax: +27 11 315 6999
E-mail: gartht@isagroup.co.za
www.isaza.co.za

UNITED ARAB EMIRATES
Mechatronics
Phone: +971 4 267 4311
Fax: +971 4 267 4312
E-mail: mechtron@emirates.net.ae
www.mechatronics.ae

For contact details on other countries please visit *www.linak.com* or contact:

LINAK INTERNATIONAL
Phone: +45 73 15 15 15
Fax: +45 74 45 90 10
Fax: +45 73 15 16 13 (Sales)
E-mail: info@linak.com
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