Actuator LA37
User manual
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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
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 a new customer application.

LINAK products as defined above are applicable for a wide range of applications within 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 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.
Chapter 1

⚠️ 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 or kick on 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.

⚠️ Warnings

- Do not sideload the actuator.
- When mounting the actuator in the application ensure that the bolts can withstand the wear and that they are secured safely.
- If irregularities are observed, the actuator must be replaced.
- For actuators with a stroke length below 130mm, the extended position of the mechanical endstop will always be at 130mm. That means, if an actuator has a stroke of 80mm and the endstop switch in outwards direction fails, the actuator will travel additional 50mm before reaching mechanical endstop.

👉 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 3.5 Nm 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 (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.
Chapter 2

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.

Please be aware that if the LA37 is used for solar applications the actuator must be mounted with the motor housing turned upwards and the wires pointing downwards.
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 2Nm (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.

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
- Explosive environments
- Aeroplanes and other aircraft
- Nuclear power generation
Mounting guidelines - Trunnion mounted

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

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

Please be aware that if the LA37 is used for solar applications the actuator must be mounted with the motor housing turned upwards and the wires pointing downwards.
Mounting guidelines - Trunnion mounted

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
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. Therefore, we recommend that such cables are discarded and replaced.

Also note that the cables should not be used for carrying the actuator.

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.
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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Spindle Pitch (mm)</th>
<th>Thrust max. Push/Pull (N)</th>
<th>Typical Amp. at full load (A)</th>
<th>Recommended fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>24V</td>
<td>12V</td>
</tr>
<tr>
<td>371Cxx1xxxx1xx</td>
<td>2.5</td>
<td>15000</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>371Cxx1xxxx2xx</td>
<td>2.5</td>
<td>15000</td>
<td>10.0</td>
<td>20.0</td>
</tr>
<tr>
<td>371CxxAxxxx2xx</td>
<td>2.5</td>
<td>10000</td>
<td>8.0</td>
<td>16.0</td>
</tr>
</tbody>
</table>

LA37 Trunnion mounted

<table>
<thead>
<tr>
<th>Type</th>
<th>Spindle Pitch (mm)</th>
<th>Thrust max. Push/Pull (N)</th>
<th>Typical Amp. at full load (A)</th>
<th>Recommended fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>24V</td>
<td>12V</td>
</tr>
<tr>
<td>371C0xxxxxxx1xx</td>
<td>2.5</td>
<td>15000</td>
<td>-</td>
<td>22.5</td>
</tr>
<tr>
<td>371C0xxAxxxx2xx</td>
<td>2.5</td>
<td>15000</td>
<td>10.0</td>
<td>16.0</td>
</tr>
</tbody>
</table>
Actuator without feedback

Connection diagram:
Fig. 1 : 37xxxx+10xxxxx

![Connection Diagram](image)

I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 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         | Not to be connected | 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:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The actuator can be equipped with electronically controlled endstop signals out.</td>
<td><img src="image" alt="IN OUT" /></td>
</tr>
<tr>
<td></td>
<td>See connection diagram, fig. 2, page 16</td>
<td></td>
</tr>
</tbody>
</table>
| **Brown**     | 12 or 24 VDC (+/-)  
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. 40mA, also when the actuator is not running |
| **Black**     | Signal power supply GND (-) |          |
| **Green**     | Endstop signal out |          |
| **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>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>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 18</td>
<td></td>
</tr>
</tbody>
</table>
| **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** | 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. 40mA, also when the actuator is not running |
| **Black** | Signal power supply GND (-) |  |
| **Green** | Hall B  
Movement per single hall pulse:  
LA371C Actuator = 0.4 mm per pulse | 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. |
| **Yellow** | Hall A |  |
**Actuator with relative positioning - Dual hall**

**I/O specifications:**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>Not to be connected</td>
<td></td>
</tr>
</tbody>
</table>

Diagram of Dual Hall:

```
Hall A

Hall B
```

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 17)

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>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>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 21</td>
<td></td>
</tr>
</tbody>
</table>
| **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** | Signal power supply (+)  
12-24VDC |  |
| **Red** | Signal power supply GND (-) |  |
| **Black** |  |  |
| **Green** | Hall B  
Movement per single hall pulse:  
LA371C Actuator = 0.4 mm per pulse | 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. |
| **Yellow** | Hall A |  |
Actuator with endstop signals and relative positioning - Dual hall

I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>Endstop signal in</td>
<td>Output voltage min. $V_{IN} - 2V$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Source current max. 30mA</td>
</tr>
<tr>
<td>White</td>
<td>Endstop signal out</td>
<td>NOT potential free</td>
</tr>
</tbody>
</table>

Diagram of Dual Hall:

```
Hall A

Hall B
```

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>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See connection diagram, fig. 5, page 24</td>
<td></td>
</tr>
<tr>
<td><strong>Brown</strong></td>
<td>12 or 24VDC (+/-)</td>
<td>To extend actuator: Connect Brown to positive</td>
</tr>
<tr>
<td></td>
<td>12V ± 20%</td>
<td>To retract actuator: Connect Brown to negative</td>
</tr>
<tr>
<td></td>
<td>24V ± 10%</td>
<td></td>
</tr>
<tr>
<td><strong>Blue</strong></td>
<td>Under normal conditions: 12V, max. 26A depending on load</td>
<td>To extend actuator: Connect Blue to negative</td>
</tr>
<tr>
<td></td>
<td>24V, max. 13A depending on load</td>
<td>To retract actuator: Connect Blue to positive</td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td>Signal power supply (+) 12-24VDC</td>
<td>Current consumption: Max. 40mA, also when the actuator is not running</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>Signal power supply GND (-)</td>
<td></td>
</tr>
<tr>
<td><strong>Green</strong></td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td><strong>Yellow</strong></td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td><strong>Violet</strong></td>
<td>Single Hall output (PNP)</td>
<td>Output voltage min. $V_{IN} - 2V$ Max. current output: 12mA Max. 680nF</td>
</tr>
<tr>
<td>Movement per Single Hall pulse: LA371C: Actuator = 0.1372 mm per count</td>
<td>N.B. For more precise measurements, please contact LINAK A/S.</td>
<td></td>
</tr>
<tr>
<td>Frequency: Frequency is 14-26 Hz on Single Hall output depending on load. Overvoltage on the motor can result in shorter pulses.</td>
<td>Low frequency with a high load. Higher frequency with no load.</td>
<td></td>
</tr>
<tr>
<td><strong>Diagram of Single Hall:</strong></td>
<td>Fig. 5.1</td>
<td></td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>Not to be connected</td>
<td></td>
</tr>
</tbody>
</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 17)

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.
### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.</td>
<td>See connection diagram, fig. 6, page 26</td>
</tr>
<tr>
<td><strong>Brown</strong></td>
<td>12 or 24VDC (+/-) 12V ± 20% 24V ± 10%</td>
<td>To extend actuator: Connect Brown to positive  To retract actuator: Connect Brown to negative</td>
</tr>
<tr>
<td><strong>Blue</strong></td>
<td>Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load</td>
<td>To extend actuator: Connect Blue to negative  To retract actuator: Connect Blue to positive</td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td>Signal power supply (+) 12-24VDC</td>
<td>Current consumption: Max. 40mA, also when the actuator is not running</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>Signal power supply GND (-)</td>
<td></td>
</tr>
<tr>
<td><strong>Green</strong></td>
<td>Endstop signal out</td>
<td>Output voltage min. ( V_{IN} - 2V )  Source current max. 100mA  NOT potential free</td>
</tr>
<tr>
<td><strong>Yellow</strong></td>
<td>Endstop signal in</td>
<td></td>
</tr>
<tr>
<td><strong>Violet</strong></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><strong>Diagram of Single Hall:</strong></td>
<td><img src="image" alt="Diagram of Single Hall" /></td>
<td></td>
</tr>
</tbody>
</table>
Actuator with absolute positioning - Analogue feedback

Connection diagrams:

Fig. 7: 37xxxx+1B/1Cxxxxxx
**Actuator with absolute positioning - Analogue feedback**

**I/O specifications:**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 7, page 28</td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>12 or 24VDC (+/-)</td>
<td>To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative</td>
</tr>
<tr>
<td></td>
<td>12V ± 20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24V ± 10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under normal conditions:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12V, max. 26A depending on load</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24V, max. 13A depending on load</td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>Signal power supply (+)</td>
<td>To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive</td>
</tr>
<tr>
<td></td>
<td>12-24VDC</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Signal power supply GND (-)</td>
<td>Current consumption: Max. 60mA, also when the actuator is not running</td>
</tr>
<tr>
<td>Black</td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td>Violet</td>
<td>Analogue feedback</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>0-10V (Option B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5-4.5V (Option C)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>Not to be connected</td>
<td></td>
</tr>
</tbody>
</table>
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 17)

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:**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves.</td>
<td><img src="image" alt="Signal" /></td>
</tr>
</tbody>
</table>
| **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 (-) | Output voltage min. V<sub>IN</sub> - 2V  
Source current max. 100mA  
NOT potential free |
| **Green** | Endstop signal out | |
| **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:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 9, page 32</td>
<td></td>
</tr>
</tbody>
</table>
| 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 17)

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.
### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 10, page 34</td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>12 or 24VDC (+/-) 12V ± 20% 24V ± 10%</td>
<td>To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative</td>
</tr>
<tr>
<td>Blue</td>
<td>Under normal conditions: 12V, max. 26A depending on load 24V, max. 13A depending on load</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>Current consumption: Max. 60mA, also when the actuator is not running</td>
</tr>
<tr>
<td>Black</td>
<td>Signal power supply GND (-)</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Endstop signal out</td>
<td>Output voltage min. $V_{IN} - 2V$ Source current max. 100mA NOT potential free</td>
</tr>
<tr>
<td>Yellow</td>
<td>Endstop signal in</td>
<td></td>
</tr>
<tr>
<td>Violet</td>
<td>Digital output feedback (PNP) 10-90% (Option 5) 20-80% (Option 6)</td>
<td>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</td>
</tr>
<tr>
<td>White</td>
<td>Not to be connected</td>
<td></td>
</tr>
</tbody>
</table>
Actuator with IC Basic

Connection diagram:

Please be aware that if the power supply is not properly connected, you might damage the actuator!
**Actuator with IC Basic**

**I/O specifications:**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>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 36</td>
<td></td>
</tr>
<tr>
<td><strong>Brown</strong></td>
<td>12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A</td>
<td>Note: Do not change the power supply polarity on the brown and blue wires! Power supply GND (-) is electrically connected to the housing</td>
</tr>
<tr>
<td><strong>Blue</strong></td>
<td>12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 25A 24V, current limit 13A</td>
<td>If the temperature drops below 0°C, all current limits will automatically increase to 30A</td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td>Extends the actuator</td>
<td>On/off voltages: &gt; 67% of V&lt;sub&gt;IN&lt;/sub&gt; = ON &lt; 33% of V&lt;sub&gt;IN&lt;/sub&gt; = OFF Input current: 10mA</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>Retracts the actuator</td>
<td></td>
</tr>
<tr>
<td><strong>Green</strong></td>
<td>Not to be connected</td>
<td></td>
</tr>
<tr>
<td><strong>Yellow</strong></td>
<td>Not to be connected</td>
<td></td>
</tr>
</tbody>
</table>

- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There are tolerances on the spindle, nut, gear wheels etc. and these tolerances will have an influence on the current consumption for the specific actuator.
# Actuator with IC Basic

## I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>Analogue feedback 0-10V (Option 7.2)</td>
<td>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</td>
</tr>
<tr>
<td>Single Hall output (PNP) (Option 7.1)</td>
<td>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</td>
</tr>
<tr>
<td>White</td>
<td>Signal GND</td>
<td>For correct wiring of power GND and Signal GND see page 42</td>
</tr>
</tbody>
</table>
Actuator with IC Advanced - with BusLink

Connection diagram:
Fig. 12: 37xxxx+8xxxxxxx

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

The BusLink software tool 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](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](http://www.linak.com/techline/?id3=2356)

Please note that the BusLink cables must be purchased separately from the actuator!
Item number for BusLink cable kit: 0367999 (adaptor + USB2Lin)
## Actuator with IC Advanced - with BusLink

### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>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 39</td>
<td></td>
</tr>
</tbody>
</table>
| 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 |
| Blue         | 12-24VDC - (GND)  
Connect Blue to negative  
12V ± 20%  
24V ± 10%  
12V, current limit 25A  
24V, current limit 13A | Current limit levels can be adjusted through BusLink  
If the temperature drops below 0°C, all current limits will automatically increase to 30A |
| Red          | Extends the actuator | On/off voltages:  
> 67% of V\text{IN} = ON  
< 33% of V\text{IN} = OFF  
Input current: 10mA |
| Black        | Retracts the actuator |  |
| Green        | Endstop signal out | Output voltage min. V\text{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 |
| Yellow       | Endstop signal in | When configuring virtual endstop, it is not necessary to choose the position feedback  
EOS and virtual endstop will work even when feedback is not chosen |
### Actuator with IC Advanced - with BusLink

#### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>Analogue feedback (0-10V): Configure any high/low combination between 0-10V</td>
<td>Ripple max. 200mV Transaction delay 20ms Linear feedback 0.5% Max. current output 1mA</td>
</tr>
<tr>
<td></td>
<td>Single Hall output (PNP) Movement per Single Hall pulse: LA371C: Actuator = 0.1372 mm per count</td>
<td>Output voltage min. V\text{\textsubscript{IN}} - 2V Max. current output: 12mA Max. 680nF</td>
</tr>
<tr>
<td></td>
<td>Frequency: Frequency is 14-26 Hz on Single Hall output depending on load. Overvoltage on the motor can result in shorter pulses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital output feedback PWM: Configure any high/low combination between 0-100%</td>
<td>Output voltage min. V\text{\textsubscript{IN}} - 2V Frequency: 75Hz ± 10Hz as standard, but this can be customised. Duty cycle: Any low/high combination between 0 and 100 percent. Open collector source current max. 12mA</td>
</tr>
<tr>
<td></td>
<td>Analogue feedback (4-20mA): Configure any high/low combination between 4-20mA</td>
<td>Tolerances +/- 0.2mA Transaction delay 20ms Linear feedback 0.5% Output: Source Serial resistance: 12V max. 300 ohm 24V max. 900 ohm</td>
</tr>
<tr>
<td></td>
<td>All absolute value feedbacks (0-10V, PWM and 4-20mA)</td>
<td>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</td>
</tr>
<tr>
<td>White</td>
<td>Signal GND</td>
<td>For correct wiring of power GND and Signal GND see page 42</td>
</tr>
</tbody>
</table>

- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There are tolerances on the spindle, nut, gear wheels etc. and these tolerances will have an influence on the current consumption for the specific actuator.
Correct wiring of Power GND and Signal 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.
## IC options overview

### Control

<table>
<thead>
<tr>
<th>Feature</th>
<th>Basic</th>
<th>Advanced</th>
<th>Parallel</th>
<th>LIN bus</th>
<th>CAN bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V, 24V supply</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>H-bridge</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Manual drive in/out</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>EOS in/out</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Soft start/stop</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

### Feedback

<table>
<thead>
<tr>
<th>Feature</th>
<th>Basic</th>
<th>Advanced</th>
<th>Parallel</th>
<th>LIN bus</th>
<th>CAN bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>√</td>
<td>√ *</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current</td>
<td>-</td>
<td>√ **</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Single Hall</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PWM</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Position (mm)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Custom feedback type</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Monitoring

<table>
<thead>
<tr>
<th>Feature</th>
<th>Basic</th>
<th>Advanced</th>
<th>Parallel</th>
<th>LIN bus</th>
<th>CAN bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature monitoring</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Current cut-off</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Ready signal</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### BusLink (•••)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Basic</th>
<th>Advanced</th>
<th>Parallel</th>
<th>LIN bus</th>
<th>CAN bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service counter</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Custom soft start/stop</td>
<td>-</td>
<td>√***</td>
<td>√***</td>
<td>√***</td>
<td>√***</td>
</tr>
<tr>
<td>Custom current limit</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Speed setting</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Virtual end stop</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

* Configure any high/low combination between 0 - 10V
** Configure any high/low combination between 4 - 20mA
*** Configure any value between 0 - 30s
Feedback configurations available for IC Basic, IC Advanced and Parallel

<table>
<thead>
<tr>
<th></th>
<th>Pre-configured</th>
<th>Customised range</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>PWM Feedback</td>
<td>10 – 90 % 75 Hz</td>
<td>0 – 100 % 75 – 150 Hz</td>
<td>Suitable for long distance transmission. Effectual immunity to electrical noise.</td>
<td>More complex processing required, compared to AFV and AFC.</td>
</tr>
<tr>
<td>Single Hall*</td>
<td>N/A</td>
<td>N/A</td>
<td>Suitable for long distance transmission.</td>
<td>No position indication.</td>
</tr>
<tr>
<td>Analogue Feedback Voltage (AFV)*</td>
<td>0 - 10V</td>
<td>Any combination, going negative or positive. E.g. 8.5 – 2.2V over a full stroke.</td>
<td>High resolution. Traditional type of feedback suitable for most PLCs. Easy faultfinding. Independent on stroke length, compared to a traditional mechanical potentiometer.</td>
<td>Not recommended for applications with long distance cables or environments exposed to electrical noise.</td>
</tr>
<tr>
<td>Analogue Feedback Current (AFC)</td>
<td>4 - 20mA</td>
<td>Any combination, going negative or positive. E.g. 5.5 – 18mA over a full stroke.</td>
<td>High resolution. Better immunity to long cables and differences in potentials than AFV. Provides inherent error condition detection. Independent on stroke length, compared to a traditional mechanical potentiometer.</td>
<td>Not suitable for signal isolation.</td>
</tr>
<tr>
<td>Endstop signal in/ out**</td>
<td>At physical end stops. Default for IC Advanced.</td>
<td>Any position.</td>
<td>Can be set at any position over the full stroke length.</td>
<td>Only one endstop can be customised.</td>
</tr>
</tbody>
</table>

All feedback configurations are available for IC Advanced.
* IC Basic feedback configurations available: Single Hall and 0-10V
** Parallel feedback configurations available: EOS
| Actuator configurations available for IC Basic, IC Advanced and Parallel |
|---|---|---|
| **Pre-configured** | **Customised range** | **Description** |
| Current limit inwards | 20A for both current limit directions. (When the current outputs are at zero, it means that they are at maximum value 20A).  
Be aware:  
When the actuator comes with current cut-off limits that are factory pre-configured for certain values, the pre-configured values will be the new maximum level of current cut-off.  
This means that if the current cut-off limits are pre-configured to 14A, it will not be possible to change the current limits through BusLink to go higher than 14A. | Recommended range: 4A to 20A  
If the temperature drops below 0°C, all current limits will automatically increase to approximately 30A, independent of the pre-configured value. | The actuator’s unloaded current consumption is very close to 4A, and if the current cut-off is customised below 4A there is a risk that the actuator will not start.  
The inwards and outwards current limits can be configured separately and do not have to have the same value. |
| Current limit outwards | Max. speed inwards/outwards | Lowest recommended speed at full load: 60%  
It is possible to reduce the speed below 60%, but this is dependable on load, power supply and the environment. | The speed is based on a PWM principle, meaning that 100% equals the voltage output of the power supply in use, and not the actual speed. |
| | 100% equal to full performance.  
Please note: for parallel actuators the full performance equals 80% of the max. speed. | | |
| Virtual endstop inwards | Virtual endstop outwards | It is only possible to run the actuator with one virtual endstop, either inwards or outwards. | The virtual endstop positions are based on hall sensor technology, meaning that the positioning needs to be initialised from time to time. One of the physical endstops must be available for initialisation. |
| 0mm for both virtual endstop directions.  
(When the virtual endstops are at zero, it means that they are not in use). | 0mm for both virtual endstop directions.  
(When the virtual endstops are at zero, it means that they are not in use). | | |
### Actuator configurations available for IC Basic, IC Advanced and Parallel

<table>
<thead>
<tr>
<th></th>
<th>Pre-configured</th>
<th>Customised range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft stop inwards</td>
<td>0.3 sec. for both soft stop directions.</td>
<td>0.3 sec. to 30 sec.</td>
<td>It is not possible to configure values between 0.01 sec. to 0.29 sec. This is due to the back-EMF from the motor (increasing the voltage). Be aware that the soft stop value equals the deacceleration time after stop command.</td>
</tr>
<tr>
<td>Soft stop outwards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft start inwards</td>
<td>0.3 sec. for both soft start directions.</td>
<td>0 sec. to 30 sec.</td>
<td>Be aware that the soft start value equals the acceleration time after start command. To avoid stress on the actuator, it is not recommended to use 0 sec. for soft start, due to higher inrush current.</td>
</tr>
<tr>
<td>Soft start outwards</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Actuator with Parallel

Connection diagram:

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

- The green and yellow wires from parallel connected actuators must NOT be interconnected.
### Actuator with Parallel

**I/O specifications:**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>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 45</td>
<td></td>
</tr>
</tbody>
</table>
| **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 |
| **Blue** | 12-24VDC - (GND)  
Connect Blue to negative  
12V ± 20%  
24V ± 10%  
12V, current limit 25A  
24V, current limit 13A | 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 |
| **Red** | Extends the actuator | On/off voltages:  
> 67% of $V_{IN}$ = ON  
< 33% of $V_{IN}$ = OFF  
Input current: 10mA |
| **Black** | Retracts the actuator | 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 |
### Actuator with Parallel

#### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Endstop signal out</td>
<td>Output voltage min. $V_{IN}$ - 2V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Source current max. 100mA</td>
</tr>
<tr>
<td>Yellow</td>
<td>Endstop signal in</td>
<td>Endstop signals are NOT potential free.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endstop signals can be configured with BusLink software according to any position needed</td>
</tr>
<tr>
<td>Violet</td>
<td>Parallel communication:</td>
<td>Standby power consumption:</td>
</tr>
<tr>
<td></td>
<td>Violet cords must be connected together</td>
<td>12V, 60mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24V, 45mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No feedback available during parallel drive</td>
</tr>
<tr>
<td>White</td>
<td>Signal GND:</td>
<td>For correct wiring of power GND and Signal GND see page 42</td>
</tr>
<tr>
<td></td>
<td>White cords must be connected together</td>
<td></td>
</tr>
</tbody>
</table>

- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There are tolerances on the spindle, nut, gear wheels etc. and these tolerances will have an influence on the current consumption for the specific actuator.
The parallel system

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

Only standard power and signal cables are available for parallel.

If separate power supplies are used, they must have the same potential, and the power supply GND (blue wires) must be connected together.
Buslink software tool and the parallel system

The BusLink software tool is available for parallel and can be used for:
Configuration, Manual run and Diagnostics (service counter)

The BusLink software can be downloaded on: 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/corporate/pdf/ENGLISH/BROCHURE/TECHLINE_BusLink%20Quick%20Guide_Brochure_Eng.pdf

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

Item number for BusLink cable kit: 0367999 (adaptor + USB2Lin)

Only through the BusLink software tool is it possible to state if the system is Parallel or Non-critical Parallel. Via this tool it is also possible to reconfigure the whole system from one system to the other.

The parallel system

- The system does not have to run on one main power supply only – it can be supplied by individual supplies corresponding to the number of actuators in the system. Please respect the actuator specifications regarding voltage level and current consumption!

- 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 an actuator drops off the line due to e.g. a damaged signal cable, the parallel system will stop immediately

- 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 or configured to a Non-critical Parallel system via the Buslink software tool
Only for Non-critical Parallel systems

- The Non-critical Parallel system offers auto-detection for every single power up if a new actuator is added to the line (system)

- To add or remove actuators from the system, the system needs to be shut down and powered up again. Please be aware, that after re-powering, the system will not detect if an actuator is missing!

- If adding a new actuator to the system, be aware that the actuator needs to have the same configuration (Non-critical Parallel) as the existing ones; this can be done via the Buslink software tool.
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:

Start position

Running outwards

When completely aligned, the parallel run continues outwards

Start position

Running inwards

When completely aligned, the parallel run continues inwards
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):

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First step</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnect the Purple and White wires between all actuators</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Hold</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put power on the Red and Black wires for 10-30 seconds</td>
<td>10 sec.</td>
<td>30 sec.</td>
</tr>
<tr>
<td><strong>Difference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Red and Black wires must all be connected to the power supply within 0.5 seconds</td>
<td>0 sec.</td>
<td>0.5 sec.</td>
</tr>
<tr>
<td><strong>Release</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnect all wires and wait 0.5-2 seconds before the next step</td>
<td>0.5 sec.</td>
<td>2 sec.</td>
</tr>
<tr>
<td><strong>Extend/Retract</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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, disconnect 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 | -      | -      |
Actuator with CAN bus:

Connection diagram:

Fig. 14 : 36xxxxCDxxxxxx

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

CAN bus actuators are produced and delivered in the inner endstop position.

In case the customer needs the CAN bus actuators to be delivered in another endstop position, this will be possible by generating a special item number.

The BusLink software tool (v2.0 or later versions) is available for CAN bus and can be used for:
Diagnostics, manual run and configuration.
BusLink LIN is only intended for BusLink service interface.

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: https://cdn.linak.com/-/media/files/brochure-source/en/techline-buslink-quick-guide-brochure-eng.ashx
### Actuator with CAN bus:

#### I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Compatible with the SAE J1939 standard. Uses CAN messages to command movement, setting parameters and to deliver feedback from the actuator. See the LINAK CAN bus user manual. Actuator identification is provided, using standard J1939 address claim or fixed addresses. See connection diagram, fig. 14, page 58.</td>
<td></td>
</tr>
</tbody>
</table>
| **Brown** | 12-24VDC + (VCC)  
Connect Brown to positive  
12V ± 20%  
24V ± 10%  
12V, current limit 25A  
24V, current limit 13A | Note: Do not swap 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 | If the temperature drops below 0°C, all current limits will automatically increase to 30A |
| **Red** | Extends the actuator | On/off voltages:  
> 67% of VIN = ON  
< 33% of VIN = OFF |
| **Black** | Retracts the actuator | |
| **Green** | CAN_L | LA37 with CAN bus does not contain the 120Ω terminal resistor. The physical layer is in accordance with J1939-15.*  
Speed:Baudrate: 250 kbps  
Max bus length: 40 meters  
Max stub length: 3 meters  
Max node count: 10  
(can be extended to 30 under certain circumstances)  
Wiring: Unshielded twisted pair  
Cable impedance: 120 Ω (±10%) |
| **Yellow** | CAN_H | |

* J1939-15 refers to Twisted Pair and Shielded cables. The standard/default cables delivered with LA37 CAN do not comply with this.
Actuator with CAN bus:

I/O specifications:

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Specification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet</td>
<td>Service interface</td>
<td>Only BusLink can be used as service interface. Use green adapter cable</td>
</tr>
<tr>
<td>White</td>
<td>Service interface GND</td>
<td></td>
</tr>
</tbody>
</table>

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

For more information about the usage of CAN bus, please see the LINAK TECHLINE CAN bus user manual.
**System combination possibilities for LA37 IC Advanced**

<table>
<thead>
<tr>
<th>Type:</th>
<th>Article No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Market (868.3MHz)</td>
<td>US market (916 MHz)</td>
</tr>
<tr>
<td>RF receiver</td>
<td>TR-TVPLRX868A02*</td>
</tr>
<tr>
<td>TXP transmitter</td>
<td>TR-TVTXP868A02*</td>
</tr>
<tr>
<td>EVO transmitter</td>
<td>TR-TVEVO868N03*</td>
</tr>
<tr>
<td>HB40</td>
<td>HB4X051-01</td>
</tr>
<tr>
<td>DP</td>
<td>DP042-00</td>
</tr>
<tr>
<td>Standard TECHLINE signal cables</td>
<td>See the table below</td>
</tr>
</tbody>
</table>

*For more information, please go to www.linakthirdparty.com*

**TECHLINE signal cables**

<table>
<thead>
<tr>
<th>Plug types</th>
<th>Article No.</th>
<th>Material</th>
<th># Wires</th>
<th>Size</th>
<th>Colour</th>
<th>Length (mm)</th>
<th>Cable type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flying leads*</td>
<td>0367049-1500</td>
<td>PVC</td>
<td>6</td>
<td>20AWG</td>
<td>Black</td>
<td>1500</td>
<td>Straight</td>
</tr>
<tr>
<td>Flying leads*</td>
<td>0367049-5000</td>
<td>PVC</td>
<td>6</td>
<td>20AWG</td>
<td>Black</td>
<td>5000</td>
<td>Straight</td>
</tr>
</tbody>
</table>

* The cable comes with an AMP connector that can be removed for flying leads
## Chapter 3
### Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor runs but spindle does not move</td>
<td>Gearing system or spindle damaged</td>
<td>Please contact LINAK</td>
</tr>
<tr>
<td>No motor sound or movement of piston rod</td>
<td>The actuator is not properly connected to the power supply</td>
<td>Check the connection to the power supply or the external control unit (if any)</td>
</tr>
<tr>
<td></td>
<td>Customer fuse burned</td>
<td>Check the fuse</td>
</tr>
<tr>
<td></td>
<td>Cable damaged</td>
<td>Change the cable</td>
</tr>
<tr>
<td></td>
<td>For IC Advanced only: Wrongly connected</td>
<td>For IC Advanced only: <strong>Please make sure that the power supply polarity is properly connected, otherwise you might damage the actuator</strong> Check the wire connection on the internal control unit</td>
</tr>
<tr>
<td>Excessive power consumption</td>
<td>Misalignment or overload in the application</td>
<td>Align or reduce the load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Try to run the actuator without load</td>
</tr>
<tr>
<td>Actuator cannot lift full load or motor runs too slowly</td>
<td>Misalignment or overload in the application</td>
<td>Align or reduce the load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Try to run the actuator without load</td>
</tr>
<tr>
<td></td>
<td>Insufficient power supply</td>
<td>Check the power supply</td>
</tr>
<tr>
<td></td>
<td>For IC Advanced only: Internal current limit reached</td>
<td>For IC Advanced only: Connect the actuator to BusLink and check the existing parameters</td>
</tr>
<tr>
<td></td>
<td>Actuator speed is too low</td>
<td></td>
</tr>
</tbody>
</table>
## Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No signal or incorrect feedback output</td>
<td>Cable damaged</td>
<td>Change the cable</td>
</tr>
<tr>
<td></td>
<td>Wrongly connected</td>
<td>Check the wiring</td>
</tr>
<tr>
<td></td>
<td>Signal is constantly high/low</td>
<td>Run the actuator to fully extended and retracted positions</td>
</tr>
<tr>
<td></td>
<td>Feedback output overloaded</td>
<td>Reduce the load according to your chosen feedback type</td>
</tr>
<tr>
<td>For IC Advanced only:</td>
<td>For IC Advanced only:</td>
<td>For IC Advanced only:</td>
</tr>
<tr>
<td>Incorrect feedback output/level</td>
<td>Connect the actuator to BusLink and check for correct feedback option</td>
<td></td>
</tr>
<tr>
<td>Actuator runs in smaller steps</td>
<td>Insufficient power supply</td>
<td>Check the power supply</td>
</tr>
<tr>
<td></td>
<td>Load is higher than specified</td>
<td>Reduce the load</td>
</tr>
<tr>
<td>For IC Advanced only:</td>
<td>For IC Advanced only:</td>
<td>For IC Advanced only:</td>
</tr>
<tr>
<td>Internal safety procedure activated</td>
<td>Connect the actuator to BusLink and check the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reason for last stop (page 60)</td>
<td>- Current cut-off levels in both directions</td>
</tr>
<tr>
<td>Actuator cannot hold the chosen load</td>
<td>Load is higher than specified</td>
<td>Reduce the load</td>
</tr>
</tbody>
</table>

For further assistance, please contact your local LINAK supplier.
## Troubleshooting for Parallel

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
</table>
| **Actuators do not move**              | The actuators are not properly connected to the power supply                  | Check the connection to the power supply or the external control unit (if any)  
Please make sure that the power supply polarity is properly connected, otherwise you might damage the actuator  
⚠️ Please see non-critical info below                                               |
| Wrong number of actuators in the system|                                                                                 | Check if the number of actuators in the system match the number that was ordered                                                   |
| Communication wires are not properly connected |                                                                                 | Check the parallel communication wires for all actuators                                                                        |
| Signals run in/run out are not properly connected |                                                                                 | Check the wire connection on the internal control unit                                                                          |
| Position lost                          | Disconnect all cables, connect the actuator(s) to BusLink one at a time and check the following:  
- Reason for last stop (page 60) | After everything is connected, put power on all actuators at the same time. Then wait 10 seconds before the Run In/Run Out signals are activated  
If this does not work, initiate the Parallel manual service mode (page 54) |
| **Actuators cannot lift full load**    | Insufficient power supply                                                     | Check the power supply while the actuator is running                                                                               |
|                                       | Overload in application                                                       | Reduce the load                                                                                                                    |
|                                       |                                                                                 | Connect actuator(s) to BusLink one at a time and check the following:  
- Type of chosen Parallel system  
- Reason for last stop (page 60)  
- Current cut-off levels in both directions  
⚠️ Please see non-critical info below                                               |
|                                       |                                                                                 | After everything is connected, put power on all actuators at the same time. Then wait 10 seconds before the Run In/Run Out signals are activated |

⚠️ Only for Non-critical Parallel:  
Even if all actuators are not connected, the connected actuators will run after re-powering.  
More information on page 52
## Troubleshooting for Parallel

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuators run in smaller steps before stop</td>
<td>Insufficient power supply</td>
<td>Check the power supply while the actuator is running</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connect the actuator(s) to BusLink one at a time and check the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reason for last stop (page 60)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Current cut-off levels in both directions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After everything is connected, put power on all actuators at the same time. Then wait 10 seconds before the Run In/Run Out signals are activated</td>
</tr>
</tbody>
</table>
| Signal cable damaged or removed under operation | All actuators stop at the same position | The signal and power cables MUST be re-connected to all actuators.  
**Ensure that no actuator is missing in the system. Otherwise, the system will not work, not even after re-powering**  
⚠️ Please see non-critical info below |
|                                              |                                    | After everything is connected, put power on all actuators at the same time. Then wait 10 seconds before the Run In/Run Out signals are activated |

⚠️ **Only for Non-critical Parallel:**  
Even if all actuators are not connected, the connected actuators will run after re-powering.  
More information on page 52

⚠️ For further assistance, please contact your local LINAK supplier
### BusLink service counter - Reason for last stop

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Action/Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-bridge error</td>
<td>• Please contact your local LINAK supplier for further instructions</td>
</tr>
<tr>
<td>Internal SMPS error</td>
<td></td>
</tr>
<tr>
<td>Overcurrent</td>
<td>• The actuator(s) cannot continue in the same direction</td>
</tr>
<tr>
<td></td>
<td>• Reactivation is needed in the opposite direction</td>
</tr>
<tr>
<td>EOS error</td>
<td>• Please contact your local LINAK supplier</td>
</tr>
<tr>
<td>Hall error</td>
<td>• The actuator(s) stop. When seeing hall error, the actuator goes into ‘position lost’, and the whole system will need initialisation. Find more info on the initialisation procedure below</td>
</tr>
<tr>
<td>Out of range temperature for ambient location</td>
<td>• The error causes the actuator(s) to stop. After elimination of the error (cooling down) and reactivation of the movement, the actuator(s) will move normally. <strong>This may not be used for stopping the actuator(s)</strong></td>
</tr>
<tr>
<td>Out of range temperature at FET location</td>
<td></td>
</tr>
<tr>
<td>The above can be due to high environment temperature or high duty cycle</td>
<td></td>
</tr>
<tr>
<td>Overvoltage</td>
<td>• When detecting overvoltage, the actuator(s) stop. The actuator(s) remain stopped until the error condition is removed. To remove the error condition, the voltage level must be below 38V and the Run In/Run Out signals must be removed before the next movement</td>
</tr>
<tr>
<td>Undervoltage</td>
<td>• When detecting undervoltage, the actuator(s) stop. The actuator(s) remain stopped until the error condition is removed. To remove the error condition, the voltage level must be above 8V and the Run In/Run Out signals must be removed before the next movement</td>
</tr>
</tbody>
</table>

#### Initialisation procedure:

To initialise the actuator(s), move each actuator into fully extended and fully retracted position. Either initialise the actuators one at a time through BusLink, or use the Parallel manual service mode (see page 54).

In case the initialisation does not solve the issue, please contact your local LINAK supplier.

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](http://www.linak.com/techline/?id3=2356).
Chapter 4

Specifications

Motor: Permanent magnet motor 12 or 24V *

Cable: Motor: 2 x 14 AWG PVC cable
Control: 6 x 20 AWG PVC cable **

Brake: Integrated brake ensures a high self-locking ability. The brake is deactivated when the actuator is powered to obtain a high efficiency

Hand crank: As a standard feature the actuator can be operated manually

Housing: The housing is made of casted aluminium, coated for outdoor use and in harsh conditions

Spindle part: Outer tube: Extruded aluminium anodised
Inner tube: Stainless steel AISI304/SS233
Acme spindle: Trapezoidal spindle with high efficiency

Temperature range: -30°C to +70°C
-22°F to +158°F
Full performance +5°C to +40°C

End play: 2 mm maximum

Weather protection: Rated IP66 for outdoor use. Furthermore, the actuator can be washed down with a high-pressure cleaner (IP69K)

Usage:

- Duty cycle is max. 10%
- Performance of LA37 with Modbus is limited to 10kN.
- Storage temperature: -55°C to +105°C
- Noise level: 73 dB (A) measuring method DS/EN ISO 8746 actuator not loaded

- **Safety device regarding functional failure:**
  Mechanical endstop
  LA37 is equipped with mechanical endstop

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

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

TECHLINE® LA37:

The above dimensions apply for all LA37 piston rod eyes and back fixtures.
The above dimensions apply for all piston rod eyes.

TECHLINE® LA37 - Trunnion mounted:

Actuator dimensions
### Built-in dimensions

The built-in dimension depends upon the chosen safety option and stroke length(s).

<table>
<thead>
<tr>
<th>Piston rod</th>
<th>“0” / to the centre of the hole</th>
<th>“1” / to the centre of the hole</th>
<th>“2” / to the centre of the hole</th>
<th>“3” / to the centre of the hole</th>
<th>“4” / from the surface</th>
<th>“5” / from the surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back fixture</td>
<td>Stroke from 100 to 600</td>
<td>Stroke from 100 to 600</td>
<td>Stroke from 100 to 600</td>
<td>Stroke from 100 to 600</td>
<td>Stroke from 100 to 600</td>
<td>Stroke from 100 to 600</td>
</tr>
<tr>
<td>&quot;0&quot; / from the surface</td>
<td>Trunnion mounting</td>
<td>Trunnion mounting</td>
<td>Trunnion mounting</td>
<td>Trunnion mounting</td>
<td>Trunnion mounting</td>
<td>Trunnion mounting</td>
</tr>
<tr>
<td>&quot;1&quot; and &quot;2&quot; / to the centre of the hole</td>
<td>316 + s</td>
<td>316 + s</td>
<td>300 + s</td>
<td>300 + s</td>
<td>287 + s</td>
<td>287 + s</td>
</tr>
<tr>
<td>&quot;3&quot; and &quot;4&quot; / to the centre of the hole</td>
<td>316 + s</td>
<td>316 + s</td>
<td>300 + s</td>
<td>300 + s</td>
<td>287 + s</td>
<td>287 + s</td>
</tr>
<tr>
<td>&quot;5&quot; / from the surface</td>
<td>296 + s</td>
<td>296 + s</td>
<td>281 + s</td>
<td>281 + s</td>
<td>267 + s *</td>
<td>267 + s *</td>
</tr>
</tbody>
</table>

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

The manual hand crank can be used in the case of power failure.

The cover over the Allen key socket must be unscrewed before the Allen key can be inserted and the hand crank operated.

**Hand Crank Torque:** Max. 16 Nm (at maximum load)

**Piston rod movement per turn:** Gear $C = 4.0 \text{ mm}$

- The power supply has to be disconnected during manual operation.
- If the actuator is operated as a Hand crank, it must only be operated by hand, otherwise there is a potential risk of overloading and hereby damaging the actuator.
- Actuators with absolute positioning must be initialised after use of the manual hand crank, because their positioning will be displaced when the power is disconnected.
Speed and current curves

The values below are typical values and made with a nominal power supply of 24V DC and an ambient temperature of 20˚ C.

![LA37 current vs. load (start)](image)

![LA37 current vs. load (operation)](image)

![LA37 speed vs. load](image)
Load and stroke curves - LA37 Trunnion mounted

LA37 static load stroke length 500mm

LA37 static load stroke length 750mm

LA37 static load stroke length 1000mm
1. **Type.: 371CXX+10200220**
   Describes the basic functionality of the product

2. **Item no.: 370008-00**
   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 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. 13A**
   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/O # 1234567-0001**
   The LINAK work order followed by a unique sequential identification number
Label for LA37 - Trunnion mounted

1. **Type.: 371CXX+1H700325**
   Describes the basic functionality of the product

2. **Item no.: 370002-00**
   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/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/O# 1234567-0001**
   The LINAK work order followed by a unique sequential identification number

---

**Fig. 1 (customer specific item)**

![Diagram of LA37 Trunnion mounted label]

---

**Table 1: Load N vs. Temp.°C**

<table>
<thead>
<tr>
<th>Load N</th>
<th>Temp.°C</th>
<th>Average</th>
<th>STD Dev</th>
<th>Average</th>
<th>STD Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20°</td>
<td>3.57</td>
<td>0.20</td>
<td>2.23</td>
<td>0.14</td>
</tr>
<tr>
<td>7.500</td>
<td>20°</td>
<td>6.93</td>
<td>0.22</td>
<td>6.07</td>
<td>0.30</td>
</tr>
<tr>
<td>15.000</td>
<td>20°</td>
<td>10.13</td>
<td>0.38</td>
<td>9.42</td>
<td>0.61</td>
</tr>
<tr>
<td>0</td>
<td>70°</td>
<td>3.05</td>
<td>0.38</td>
<td>1.70</td>
<td>0.09</td>
</tr>
<tr>
<td>7.500</td>
<td>70°</td>
<td>5.67</td>
<td>0.27</td>
<td>5.67</td>
<td>0.27</td>
</tr>
<tr>
<td>15.000</td>
<td>70°</td>
<td>9.87</td>
<td>0.63</td>
<td>9.80</td>
<td>0.54</td>
</tr>
<tr>
<td>0</td>
<td>-30°</td>
<td>7.03</td>
<td>2.19</td>
<td>4.17</td>
<td>0.37</td>
</tr>
<tr>
<td>7.500</td>
<td>-30°</td>
<td>13.50</td>
<td>0.53</td>
<td>9.73</td>
<td>0.26</td>
</tr>
<tr>
<td>15.000</td>
<td>-30°</td>
<td>17.85</td>
<td>1.55</td>
<td>13.18</td>
<td>0.48</td>
</tr>
</tbody>
</table>
# Key to symbols

The following symbols are used on the LA37 labels:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Norms</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>廃</td>
<td>WEEE Directive 2002/96/EC</td>
<td>Wheelie bin</td>
</tr>
<tr>
<td>CE</td>
<td>Compliance to all relevant EC directives</td>
<td>CE</td>
</tr>
<tr>
<td>⚠️</td>
<td>Regulatory Compliance Mark:</td>
<td>RCM</td>
</tr>
<tr>
<td></td>
<td>The Australian safety/EMC regulations</td>
<td></td>
</tr>
<tr>
<td>🚸</td>
<td>China Pollution control mark (also indicates recyclability)</td>
<td>China RoHS legislation</td>
</tr>
<tr>
<td>⚠️</td>
<td>ISO 7000- 0434A: Caution</td>
<td></td>
</tr>
<tr>
<td>📚</td>
<td>Operating instructions</td>
<td></td>
</tr>
</tbody>
</table>
**LA37 ordering example**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>UM-41-03-068</td>
<td>13-06-2013</td>
<td>LA37</td>
<td>Tra</td>
<td>B 13-06-2016</td>
</tr>
</tbody>
</table>

**CABLE:**
- 0 = No cable
- 1 = 1.5 m power cable (0367046-1500)
- 2 = 5 m power cable (0367046-5000)
- 3 = 0.2 m power cable with AMP connector (0367006)
- 4 = 1.5 m power and 1.5 signal (0367046-1500+0367049-1500)
- 5 = 5 m power and 5 m signal (0367046-5000+0367049-5000)
- 6 = 1.5 m Y-cable, power and signal in one (0367020)
- 7 = 5 m power cable + Data cable M12x1 (Only for Modbus) (0367072 + 0367071-A)
- 8 = 5 m power and 5 m signal-UV resistant (0367072)
- 9 = 5 m power Cable-UV resistant (0367072)
- A = 1.5m, angled connector
- B = 1.5m power + signal, angled connector
- C = 5m power, angled connector
- D = 5m power + signal, angled connector

**IP-DEGREE:**
- 2 = Standard (IP66)

**MOTOR TYPE:**
- 1 = 12 V DC without clutch
- 2 = 24 V DC without clutch

**STROKE LENGTH:**
| XXX = mm | 100 mm - 600 mm | Standard back fixture mounting 500 mm ; 750 mm ; 999 mm | Trunnion mounting on outer tube |

**FEEDBACK:**
- **Standard and IC:**
  - 0 = Standard (No feedback)
  - 5 = PWM 10-90% (With Magnet)
  - 6 = PWM 20-80% (With Magnet)
- **Only IC:**
  - D = Bus
  - 1 = Single Hall
  - 2 = Analogue feedback 0-10V
  - 3 = Analogue feedback 0.5-4.5V
  - 4 = Analogue feedback 4-20 mA

**END STOP:**
- 1 = With limit switches
- 2 = With limit switches and end-stop signals
- 6 = Not used
- 7 = IC Basic (Feedback Only 0,1,2)
- 8 = IC Advanced
- 9 = Parallel
- A = Modbus : See Chapter 5.12.2
- B = LINBUS
- C = CANBUS

**SAFETY NUT:**
- + = No Safety Nut

**PISTON ROD EYE:**
- 0 = Ball eye Ø 20H7 0361568
- 1 = Ball eye Ø 19,2 (3/4") 0361571
- 2 = Ø 16,2mm hole, for 16mm pin 0361393-A
- 3 = Ø 19,2mm hole, for 3/4" pin 0361393-A
- 4 = M16 X 1,5 male adapter (0361135-A LA36 ØJE) 0371044
- 5 = M20 X 1,5 male adapter 0371247-A

**BACK FIXTURE:**
- 0 = Ø30 mm (Trunnion mounting on outer tube) 0361559
- 1 = Ø 16.2 mm hole, for 16mm pin 0371019-A
- 2 = Ø 16.2 mm hole turned 90°, for 16mm pin 0371019-A
- 3 = Ø 19.2 mm hole, for 3/4" pin 0371040-A
- 4 = Ø 19.2 mm hole turned 90°, for 3/4" pin 0371040-A
- 5 = SPEC BACK FIXTURE Degar M20 0371247-A

**GEARBOX:**
- 2.5 mm pitch 8 mm pitch
  - C = Gear ratio 1 : 46 15.000 N 10.000 N

**SPINDLE TYPE:**
- 1 = 1-threaded acme spindle (2.5 mm pitch) 0361568
- 2 = 1-threaded acme spindle (8 mm pitch) 0361571

**ACTUATOR TYPE:**
- 37 = LA37
Chapter 5

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.

<table>
<thead>
<tr>
<th>Product</th>
<th>Metal scrap</th>
<th>Cable scrap</th>
<th>Electronic scrap</th>
<th>Plastic recycling or combustion</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA37</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

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

There is an 18 months’ warranty on 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.
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:

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

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

Original Declaration