Actuator LA36
User manual

LINAK®
WE IMPROVE YOUR LIFE

Contents

Contents

Chapter 3

Chapter 4

Chapter 5

Chapter 6

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 LA36 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.

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 LA36 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. Also, avoid applying a skew load on the actuator.

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 during 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 endstop system permanently.

Figure 1

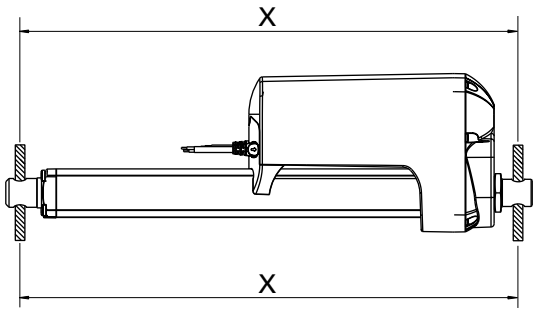
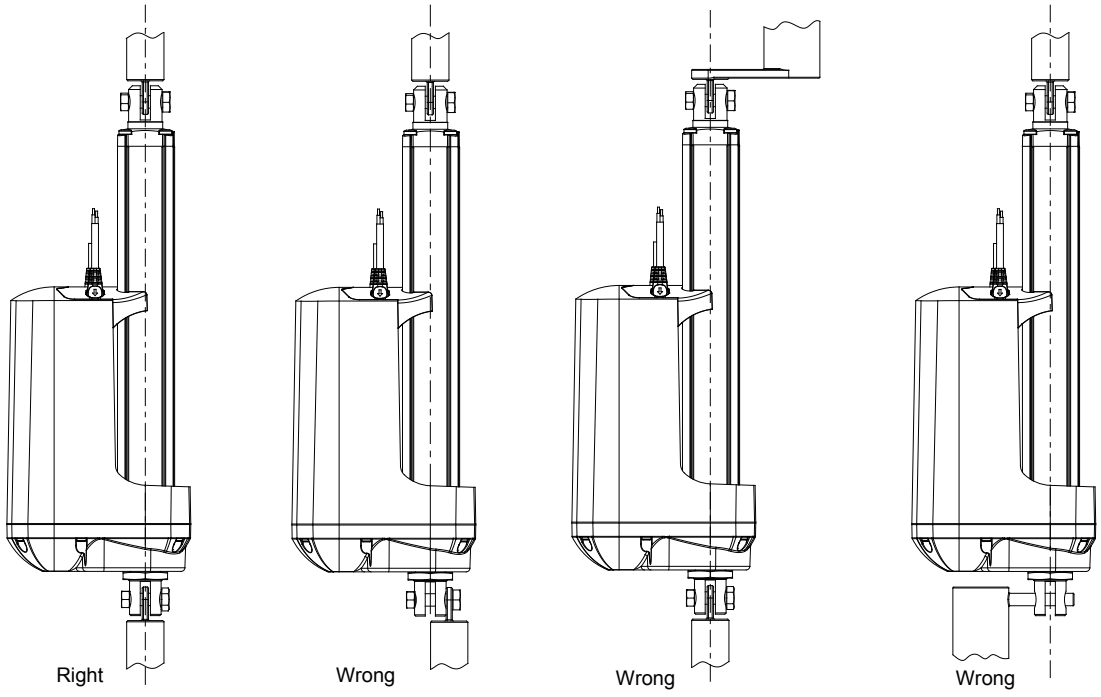


Figure 2



Please be aware that if the LA36 is used for solar applications the actuator must be mounted with the motor housing turned upwards and the wires pointing downwards.

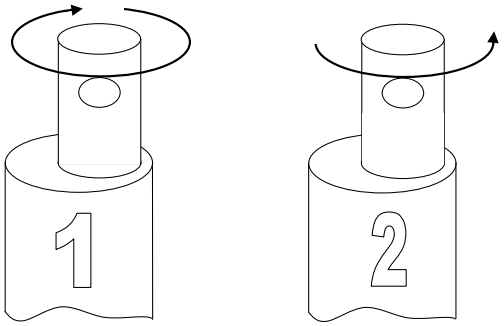
Mounting guidelines

- 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.

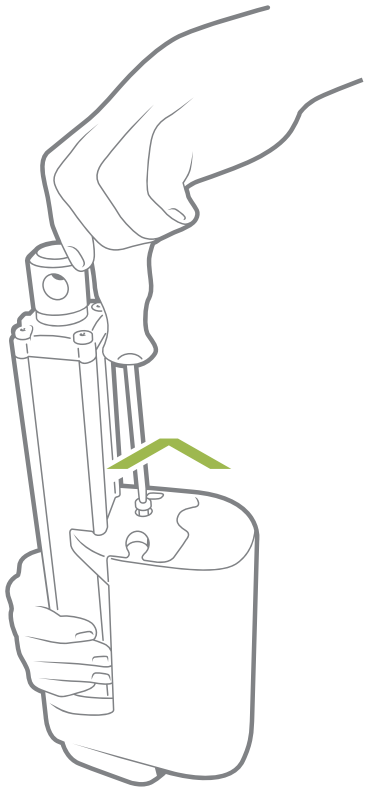


Warning!
If the actuator is used for pull in an application where personal injury can occur, the following is valid:
It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail.

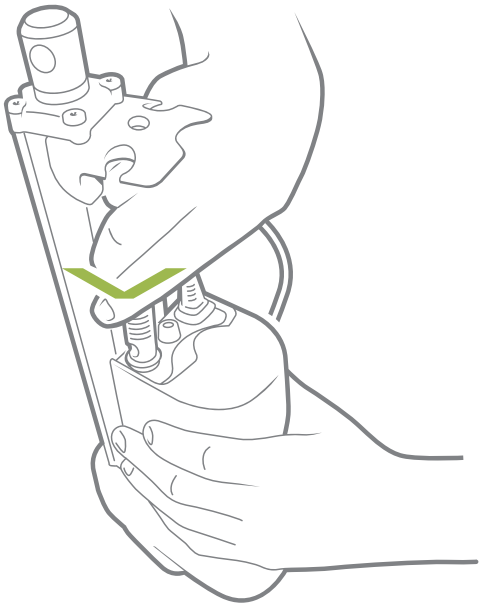
Warning!
LINAK's actuators are not designed for use within the following fields:

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

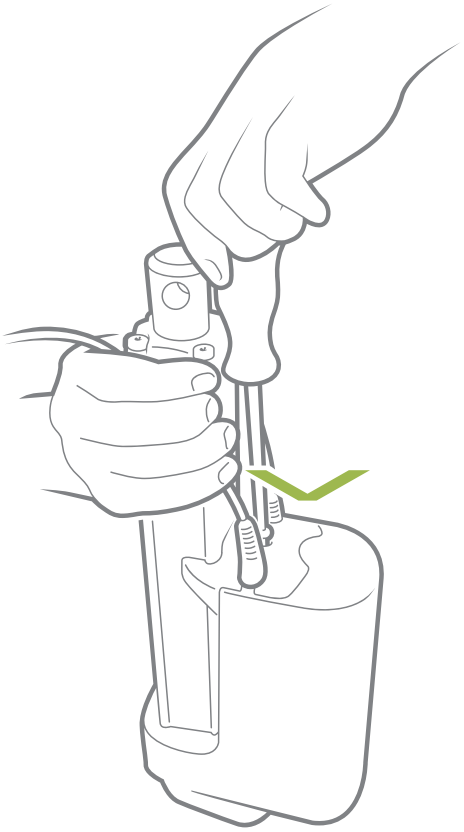
Mounting of cables



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. 3.5 ± 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.

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.

NOT VALID FOR ATEX CABLES, PLEASE REFERE TO CHAPTER 6

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 energy (EMF) occurs.

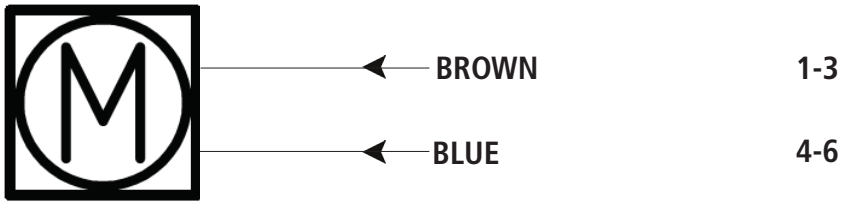
The power supply for actuators without integrated controller must be monitored externally and cut off in case of current overload.

Recommended fuse for actuators without integrated controller

Type	Spindle Pitch (mm)	Thrust max. Push/Pull (N)	Typical Amp. at full load (A)				Recommended fuse			
			48 V	36 V	24 V	12 V	48 V	36 V	24 V	12 V
36080xxxxxxAxxxxH...	8	6800				17.0				40.0
36120xxxxxxAxxxxF...	12	2600	-	-	-	21.0	-	-	-	40.0
36120xxxxxxAxxxxG...	12	4500	-	-	-	20.7	-	-	-	40.0
36120xxxxxxAxxxxH...	12	6800	-	-	-	21.0	-	-	-	40.0
36200xxxxxxAxxxxF...	20	1700	-	-	-	22.0	-	-	-	40.0
36200xxxxxxAxxxxE...	20	500	-	-	-	20.0	-	-	-	40.0
36080xxxxxxBxxxxH...	8	6800			8.0				20.0	
36120xxxxxxBxxxxF...	12	2600	-	-	10.4	-	-	-	20.0	-
36120xxxxxxBxxxxG...	12	4500	-	-	10.2	-	-	-	20.0	-
36120xxxxxxBxxxxH...	12	6800	-	-	10.3	-	-	-	20.0	-
36200xxxxxxBxxxxF...	20	1700	-	-	10.3	-	-	-	20.0	-
36200xxxxxxBxxxxE...	20	500	-	-	10.0	-	-	-	20.0	-
36080xxxxxxCxxxxH...	8	6800		6.5				16.0		
36120xxxxxxCxxxxF...	12	2600	-	8.0	-	-	-	16.0	-	-
36120xxxxxxCxxxxG...	12	4500	-	8.0	-	-	-	16.0	-	-
36120xxxxxxCxxxxH...	12	6800	-	8.0	-	-	-	16.0	-	-
36200xxxxxxCxxxxF...	20	1700	-	8.0	-	-	-	16.0	-	-
36200xxxxxxCxxxxE...	20	500	-	8.0	-	-	-	16.0	-	-
36080xxxxxxJxxxxH...	8	6800	5.5				10.0			
36120xxxxxxJxxxxF...	12	2600	7.0	-	-	-	10.0	-	-	-
36120xxxxxxJxxxxG...	12	4500	7.0	-	-	-	10.0	-	-	-
36120xxxxxxJxxxxH...	12	6800	7.0	-	-	-	10.0	-	-	-
36200xxxxxxJxxxxF...	20	1700	7.0	-	-	-	10.0	-	-	-
36200xxxxxxJxxxxE...	20	500	7.0	-	-	-	10.0	-	-	-

Actuator without feedback

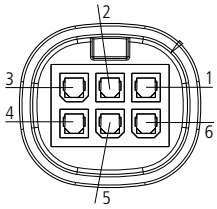
Connection diagram:



Compliant with:

PLUS 1
Powered by Danfoss

6P



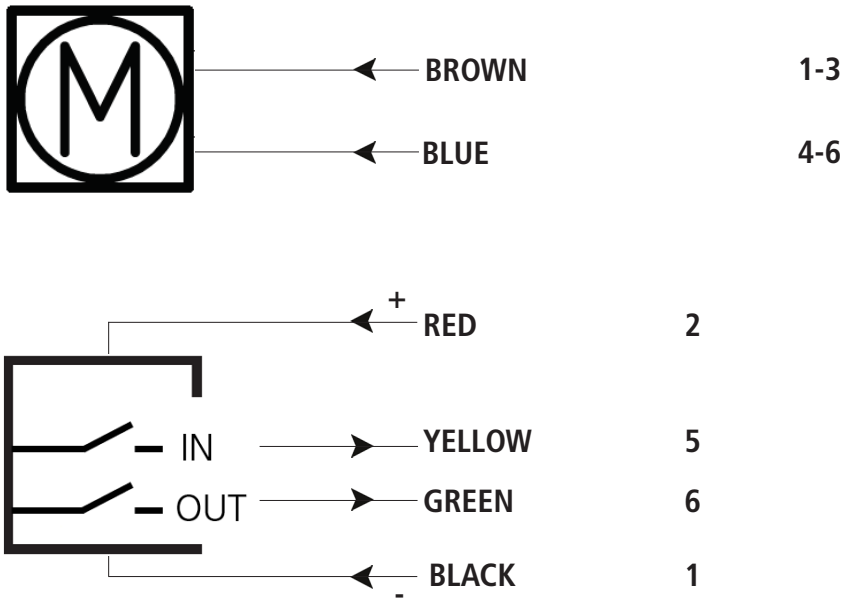
Actuator without feedback

I/O specifications:

Input/Output	Specification	Comments
Description	Permanent magnetic DC motor.	
Brown	12, 24, 36* or 48* VDC (+/-) **Only available on LA36* 12 V ± 20 % 24 V ± 10 % 36 V ± 10 %	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A depending on load	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	

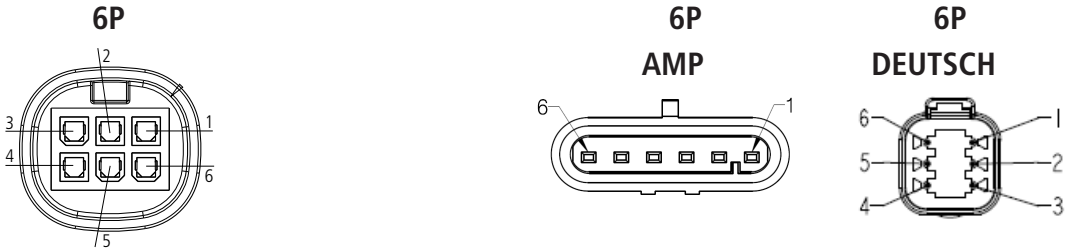
Actuator with endstop signal output

Connection diagram:



Compliant with:

PLUS 1
Powered by Danfoss

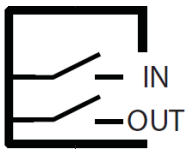


*YELLOW/GREEN: Endstop signals out are NOT potential free!

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.	
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A 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 - 48 VDC	Current consumption: Max. 40 mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. VIN - 2 V Source current max. 100 mA
Yellow	Endstop signal in	
Violet	Not to be connected	
White	Not to be connected	

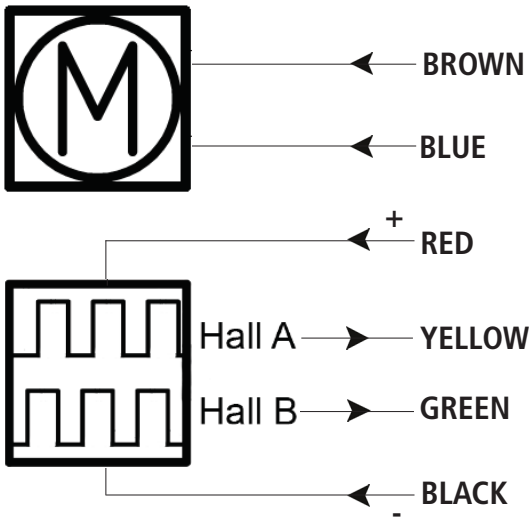
Tip: If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Actuator with relative positioning - Dual Hall

Connection diagram:

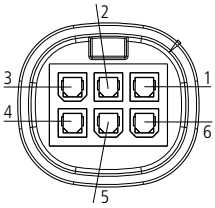
Compliant with:

PLUS 1 Powered by Danfoss

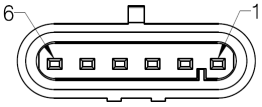


		1-3	
		4-6	
+	RED	2	2
Hall A	YELLOW	5	5
Hall B	GREEN	6	6
-	BLACK	1	1

6P



6P AMP



6P DEUTSCH

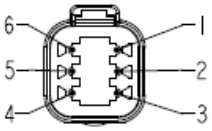
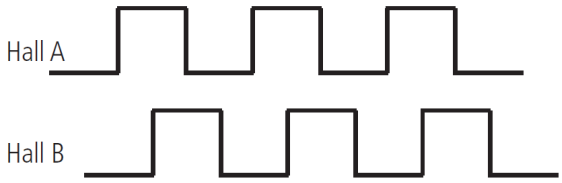
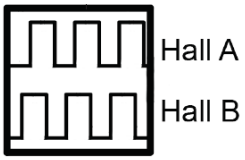


Diagram of Dual hall:



Actuator with relative positioning - Dual Hall

I/O specifications:

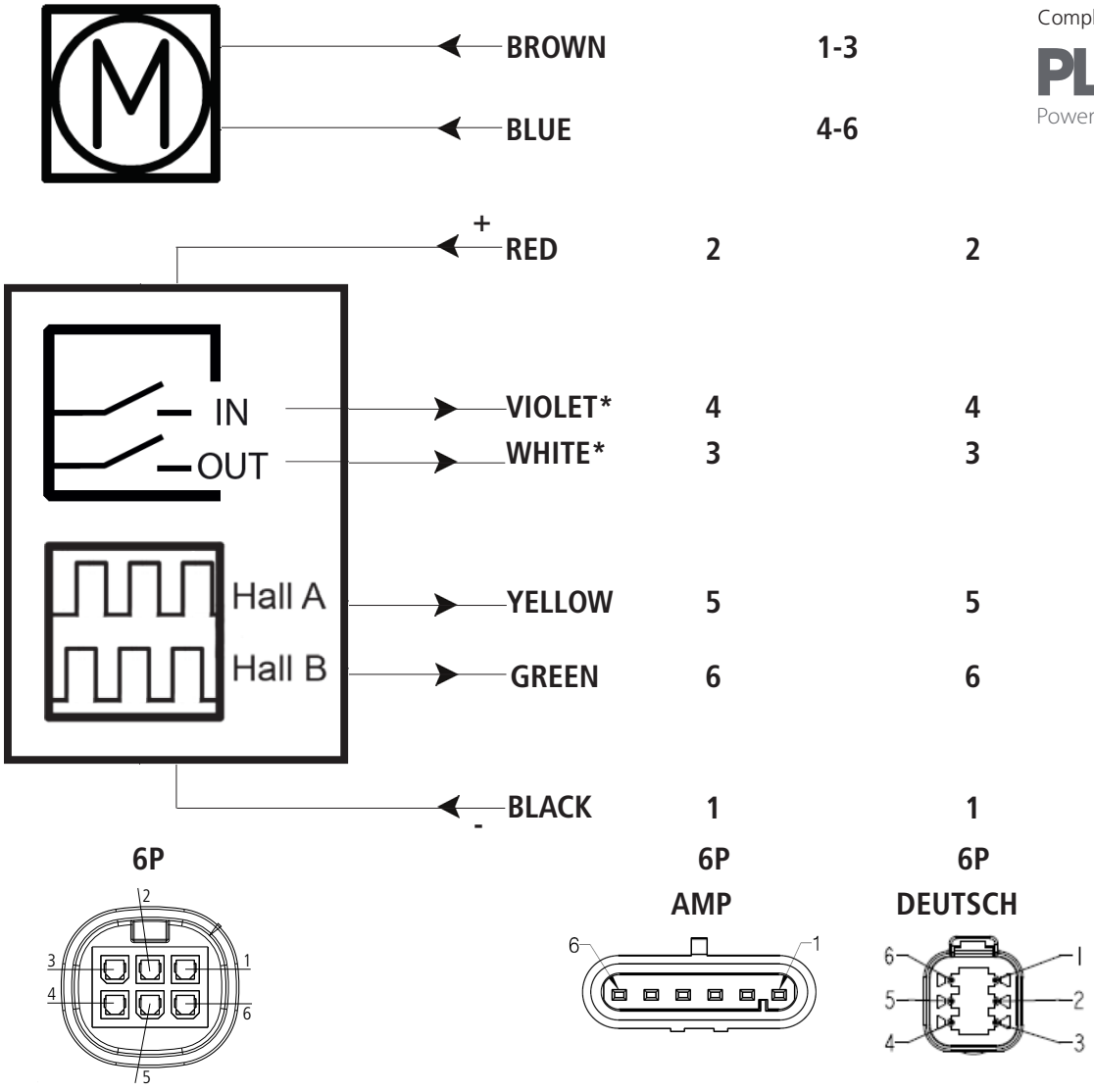
<table>
<tr><th>Input/Output</th><th colspan="5">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="5">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves.</td><td> 
</td></tr>
<tr><td>Brown</td><td colspan="5" rowspan="2">12, 24, 36* or 48* VDC (+/-)
*Only available on LA36
12 V ± 20 %
24 V ± 10 %
36 V ± 10 %
48 V ± 10 %
Under normal conditions:
12 V, max. 26 A depending on load
24 V, max. 13 A depending on load
36 V, max. 10 A depending on load
48 V, max. 8.0 A 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="5">Signal power supply (+) 12 - 36 VDC</td><td rowspan="2">Current consumption:
Max. 40 mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td colspan="5">Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td>Hall B</td><td colspan="4">Hall output (PNP)
Movement per each Hall pulse:</td><td rowspan="11">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. VIN - 2 V
Current output 12 mA
Overvoltage on the motor can result in shorter pulses.
N.B. For more precise measurements, please contact LINAK A/S.</td></tr>
<tr><td rowspan="10">Yellow</td><td rowspan="10">Hall A</td><td>Actuator</td><td>Gear:</td><td>Pitch:</td><td>mm/count</td></tr>
<tr><td>LA36</td><td>H</td><td>8 mm</td><td>0,442</td></tr>
<tr><td>LA36</td><td>H</td><td>12 mm</td><td>0,662</td></tr>
<tr><td>LA36</td><td>H</td><td>16 mm</td><td>0,883</td></tr>
<tr><td>LA36</td><td>G</td><td>16 mm</td><td>1,016</td></tr>
<tr><td>LA36</td><td>F</td><td>16 mm</td><td>2,309</td></tr>
<tr><td>LA36</td><td>F</td><td>20 mm</td><td>2,890</td></tr>
<tr><td>LA37</td><td>C</td><td>2,5 mm</td><td>0,138</td></tr>
<tr><td>LA37</td><td>C</td><td>8 mm</td><td>0,442</td></tr>
<tr><td colspan="4">The frequency is 14-26 Hz on Single Hall output depending on load.
Overvoltage on the motor can result in shorter pulses.</td></tr>
<tr><td>Violet</td><td colspan="6">Not to be connected</td></tr>
<tr><td>White</td><td colspan="6">Not to be connected</td></tr>
</table>

Actuator with endstop signals and relative positioning - Dual Hall

Connection diagram:

Compliant with:

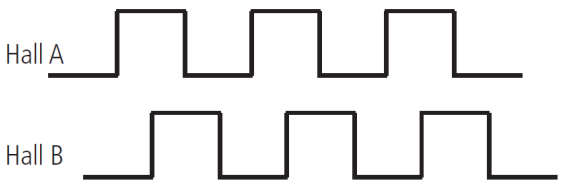
PLUS 1 Powered by Danfoss



*VIOLET/WHITE: Endstop signals out are NOT potential free

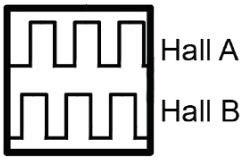
Tip: If you wish to use the endstop signals, you will have to keep power on the brown, blue, red and black wires, otherwise the signal will be lost.

Diagram of Dual hall:



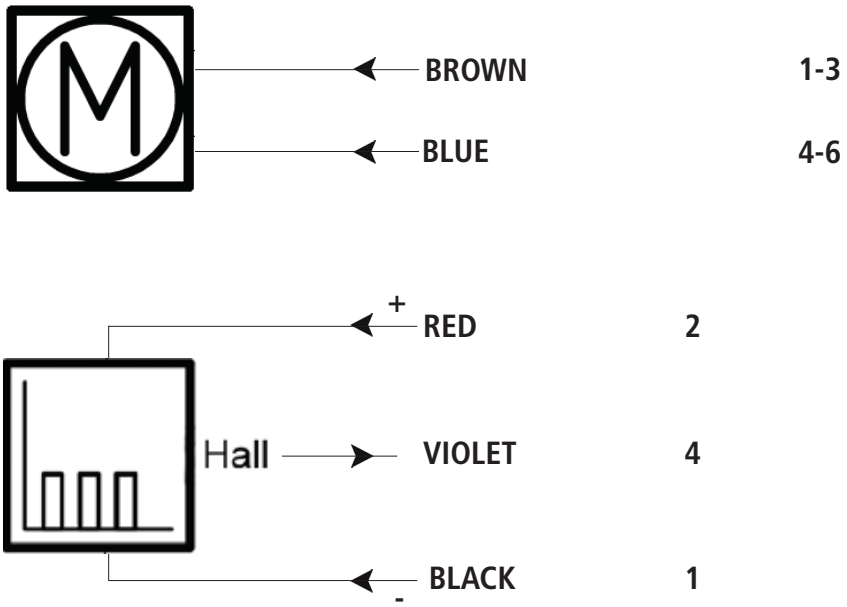
Actuator with endstop signals and relative positioning - Dual Hall

I/O specifications:

<table>
<tr><th>Input/Output</th><th colspan="5">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="5">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves.</td><td> 
</td></tr>
<tr><td>Brown</td><td colspan="5" rowspan="2">12, 24, 36* or 48* VDC (+/-)
*Only available on LA36
12 V ± 20 %
24 V ± 10 %
36 V ± 10 %
48 V ± 10 %
Under normal conditions:
12 V, max. 26 A depending on load
24 V, max. 13 A depending on load
36 V, max. 10 A depending on load
48 V, max. 8.0 A 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="5">Signal power supply (+) 12 - 36 VDC</td><td rowspan="2">Current consumption:
Max. 40 mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td colspan="5">Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td>Hall B</td><td colspan="4">Hall output (PNP)
Movement per each Hall pulse</td><td rowspan="11">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} - 2 V
Current output 12 mA
Overvoltage on the motor can result in shorter pulses.
N.B. For more precise measurements, please contact LINAK A/S.</td></tr>
<tr><td rowspan="10">Yellow</td><td rowspan="10">Hall A</td><td>Actuator</td><td>G:ear</td><td>Pitch:</td><td>mm/count</td></tr>
<tr><td>LA36</td><td>H</td><td>8 mm</td><td>0,442</td></tr>
<tr><td>LA36</td><td>H</td><td>12 mm</td><td>0,662</td></tr>
<tr><td>LA36</td><td>H</td><td>16 mm</td><td>0,883</td></tr>
<tr><td>LA36</td><td>G</td><td>16 mm</td><td>1,016</td></tr>
<tr><td>LA36</td><td>F</td><td>16 mm</td><td>2,309</td></tr>
<tr><td>LA36</td><td>F</td><td>20 mm</td><td>2,890</td></tr>
<tr><td>LA37</td><td>C</td><td>2,5 mm</td><td>0,138</td></tr>
<tr><td>LA37</td><td>C</td><td>8 mm</td><td>0,442</td></tr>
<tr><td colspan="4">The frequency is 14-26 Hz on Single Hall output depending on load.
Overvoltage on the motor can result in shorter pulses.</td></tr>
<tr><td>Violet</td><td>Endstop signal in</td><td colspan="4" rowspan="2">Output voltage min. V_{IN} - 2 V
Source current max. 30 mA
NOT potential free</td><td rowspan="2"></td></tr>
<tr><td>White</td><td>Endstop signal out</td></tr>
</table>

Actuator with relative positioning - Single Hall

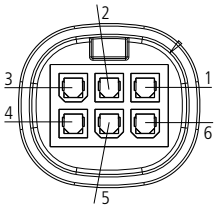
Connection diagram:



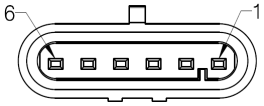
Compliant with:

PLUS 1 Powered by Danfoss

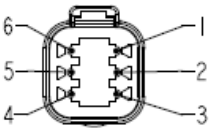
6P



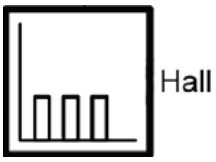
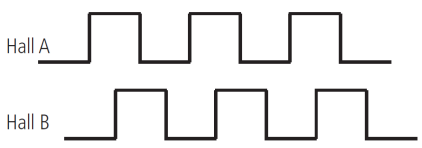
6P AMP



6P DEUTSCH



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.</td><td> 
</td></tr>
<tr><td>Brown</td><td rowspan="2">12, 24, 36* or 48* VDC (+/-)
*Only available on LA36
12 V ± 20 %
24 V ± 10 %
36 V ± 10 %
48 V ± 10 %
Under normal conditions:
12 V, max. 26 A depending on load
24 V, max. 13 A depending on load
36 V, max. 10 A depending on load
48 V, max. 8.0 A 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 - 36 VDC</td><td rowspan="2">Current consumption:
Max. 40 mA, 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>Violet</td><td>Single Hall output (PNP)
Movement per Single Hall pulse:
<table>
<tr><th>Actuator:</th><th>Gear:</th><th>Pitch:</th><th>mm / count:</th></tr>
<tr><td>LA36</td><td>H</td><td>8 mm</td><td>0,110</td></tr>
<tr><td>LA36</td><td>H</td><td>12 mm</td><td>0,166</td></tr>
<tr><td>LA36</td><td>H</td><td>16 mm</td><td>0,221</td></tr>
<tr><td>LA36</td><td>G</td><td>16 mm</td><td>0,254</td></tr>
<tr><td>LA36</td><td>F</td><td>16 mm</td><td>0,577</td></tr>
<tr><td>LA36</td><td>F</td><td>20 mm</td><td>0,721</td></tr>
<tr><td>LA37</td><td>C</td><td>2,5 mm</td><td>0,034</td></tr>
<tr><td>LA37</td><td>C</td><td>8 mm</td><td>0,110</td></tr>
</table>
The 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} - 2 V
Max. current output: 12 mA
Max. 680 nF
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></td><td colspan="2">Input:
 

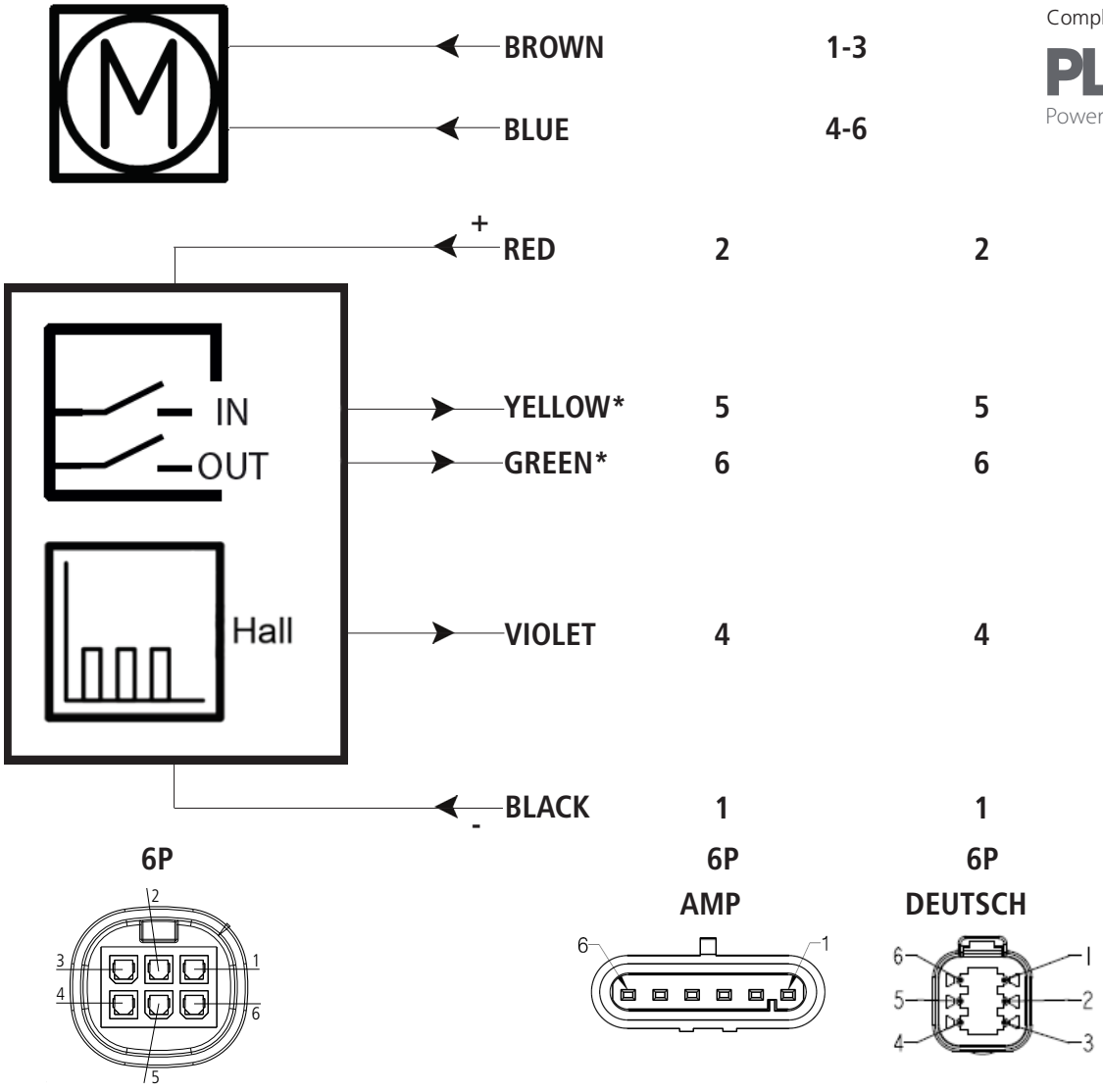
Single hall output:
 
</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

Actuator with endstop signals and relative positioning - Single Hall

Connection diagram:

Compliant with:

PLUS 1 Powered by Danfoss

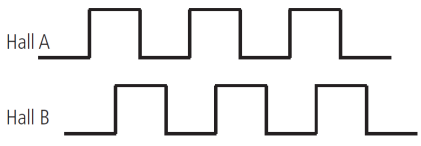


*YELLOW/GREEN: Endstop signals out are NOT potential free (see specifications on next page)

Tip: 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:

<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.</td><td> 
</td></tr>
<tr><td>Brown</td><td rowspan="2">12, 24, 36* or 48* VDC (+/-)
*Only available on LA36
12 V ± 20 %
24 V ± 10 %
36 V ± 10 %
48 V ± 10 %
Under normal conditions:
12 V, max. 26 A depending on load
24 V, max. 13 A depending on load
36 V, max. 10 A depending on load
48 V, max. 8.0 A 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 - 36 VDC</td><td rowspan="2">Current consumption:
Max. 40 mA, 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>Endstop signal out</td><td rowspan="2">Output voltage min. V_{IN} - 2 V
Source current max. 100 mA</td></tr>
<tr><td>Yellow</td><td>Endstop signal in</td></tr>
<tr><td rowspan="2">Violet</td><td>Single Hall output (PNP)
Movement per hall pulse:
<table>
<tr><th>Actuator:</th><th>Gear:</th><th>Pitch:</th><th>mm / count:</th></tr>
<tr><td>LA36</td><td>H</td><td>8 mm</td><td>0,110</td></tr>
<tr><td>LA36</td><td>H</td><td>12 mm</td><td>0,166</td></tr>
<tr><td>LA36</td><td>H</td><td>16 mm</td><td>0,221</td></tr>
<tr><td>LA36</td><td>G</td><td>16 mm</td><td>0,254</td></tr>
<tr><td>LA36</td><td>F</td><td>16 mm</td><td>0,577</td></tr>
<tr><td>LA36</td><td>F</td><td>20 mm</td><td>0,721</td></tr>
<tr><td>LA37</td><td>C</td><td>2,5 mm</td><td>0,034</td></tr>
<tr><td>LA37</td><td>C</td><td>8 mm</td><td>0,110</td></tr>
</table>
The frequency is 30-125 Hz on Single Hall output depending on load and spindle.
Overvoltage on the motor can result in shorter pulses.</td><td>Output voltage min. V_{IN} - 2 V
Max. current output: 12 mA
Max. 680 nF
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">Input:
 

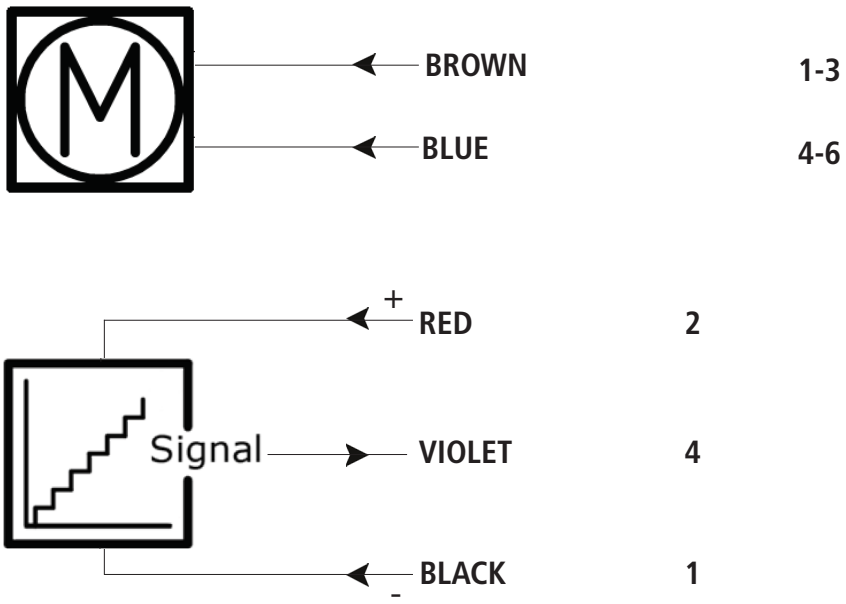
Single hall output:
 
</td></tr>
<tr><td>White</td><td>Not to be connected</td></tr>
</table>

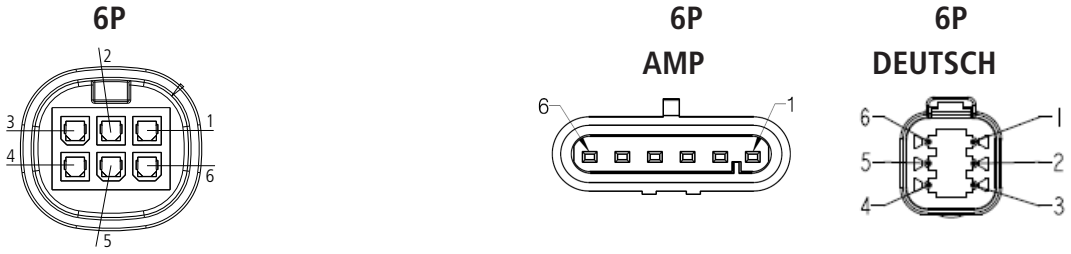
Actuator with absolute positioning - Analogue feedback

Connection diagram:

Compliant with:

PLUS 1 Powered by Danfoss





Actuator with absolute positioning - Analogue feedback

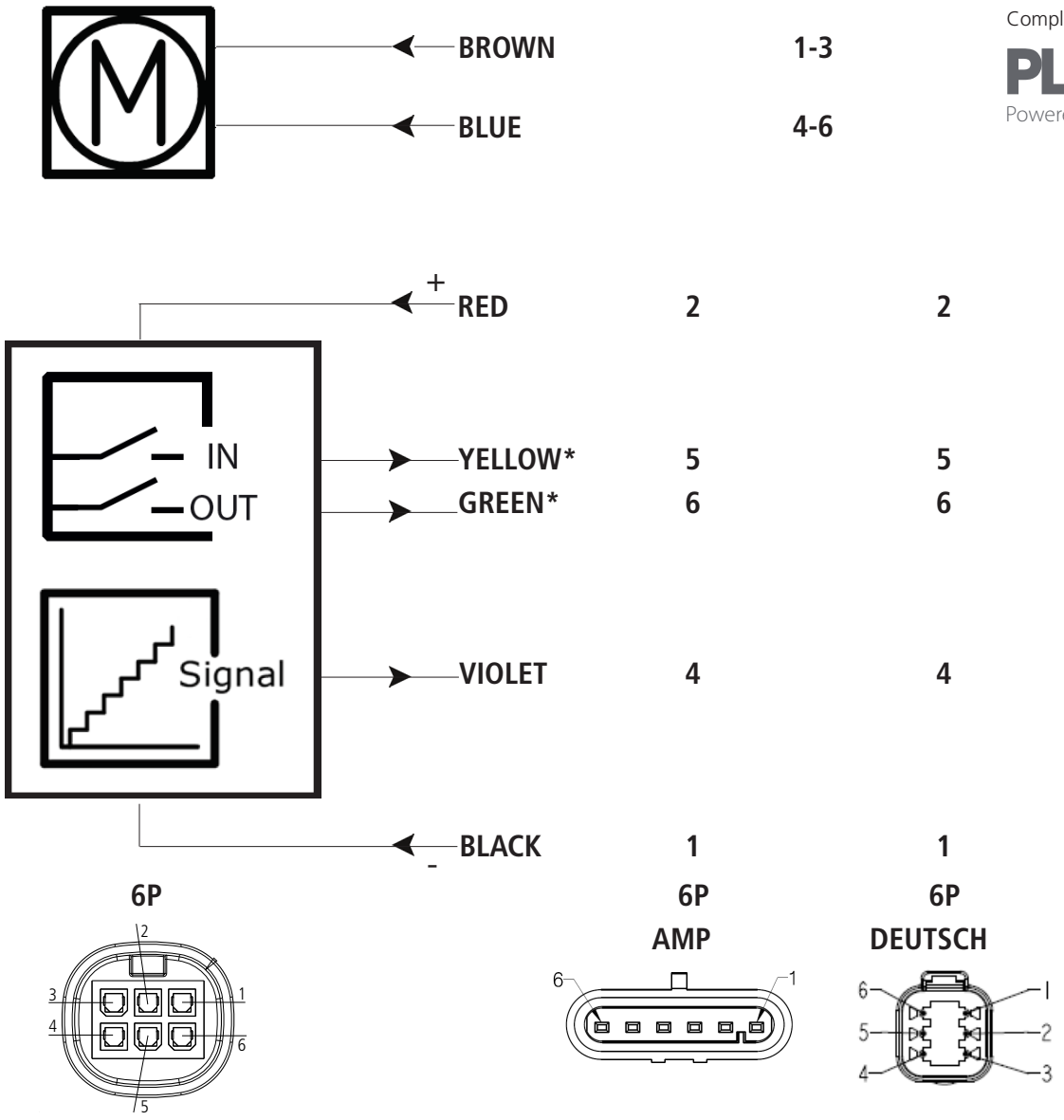
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves.	
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 %	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A depending on load	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12 - 36 VDC	Current consumption: Max. 60 mA, 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 0-10 V 0.5-4.5 V 4-20 mA	Tolerances +/- 0.2 V Max. current output: 1 mA Ripple max. 200 mV Transaction delay 100 ms 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	

It is recommended that the actuator activates its limit switches on a regular basis, to ensure more precise positioning. The actuator can also go into the position lost state. When the actuator goes in position lost state, the feedback level will remain the highest level until the actuator is initiated. For instance, if feedback is 0-10 V, the feedback level will remain 10V until the actuator is initialised. Both physical end stop switches need to be activated for correct initialisation of the feedback. There is no rule as to which one needs to be activated first.

Actuator with endstop signals and absolute positioning - Analogue feedback

Connection diagram:



Compliant with:

PLUS 1® Powered by Danfoss

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

Tip: 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.	
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A 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 - 36 VDC	Current consumption: Max. 60 mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA
Yellow	Endstop signal in	
Violet	Analogue feedback 0-10 V 0.5-4.5 V 4-20 mA	Tolerances +/- 0.2 V Max. current output: 1 mA Ripple max. 200 mV Transaction delay 20 ms 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	

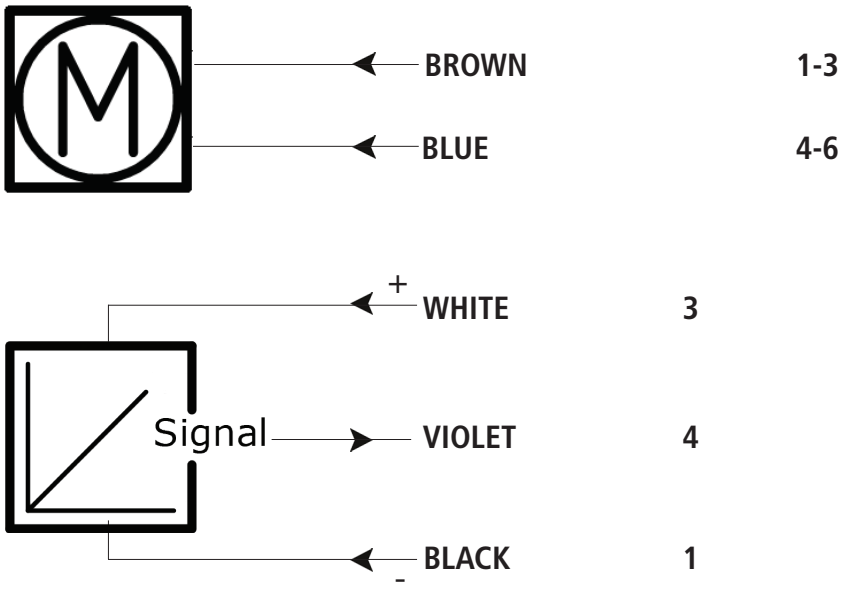
It is recommended that the actuator activates its limit switches on a regular basis, to ensure more precise positioning. The actuator can also go into the position lost state. When the actuator goes in position lost state, the feedback level will remain the highest level until the actuator is initiated. For instance, if feedback is 0-10 V, the feedback level will remain 10V until the actuator is initialised. Both physical end stop switches need to be activated for correct initialisation of the feedback. There is no rule as to which one needs to be activated first.

Actuator with absolute positioning - Mechanical potentiometer feedback

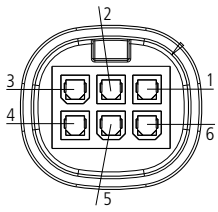
Connection diagram:

Compliant with:

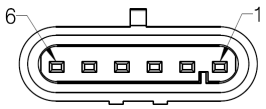
PLUS +1 Powered by Danfoss



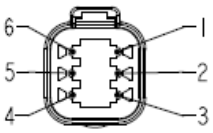
6P



6P AMP

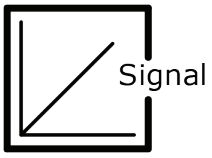


6P DEUTSCH



Actuator with absolute positioning - Mechanical potentiometer feedback

I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer, 10 kohm.	 Bourns 0-10 kohm, 5 %, 10-Turn
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A 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	Signal power supply GND (-)	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Mechanical potentiometer output Output range with 8 mm spindle pitch (LA37 only): 1 kohm = 0 mm stroke 11 kohm = 333 mm stroke Output range with 12 mm spindle pitch: 1 kohm = 0 mm stroke 11 kohm = 500 mm stroke Output range with 20 mm spindle pitch: 1 kohm = 0 mm stroke 11 kohm = 833 mm stroke	+10 V or other value Output protection: 1 kohm protection resistor in series with the potentiometer Linearity: ± 0.25 %
White	VCC+ to POT 10 VDC or other values	

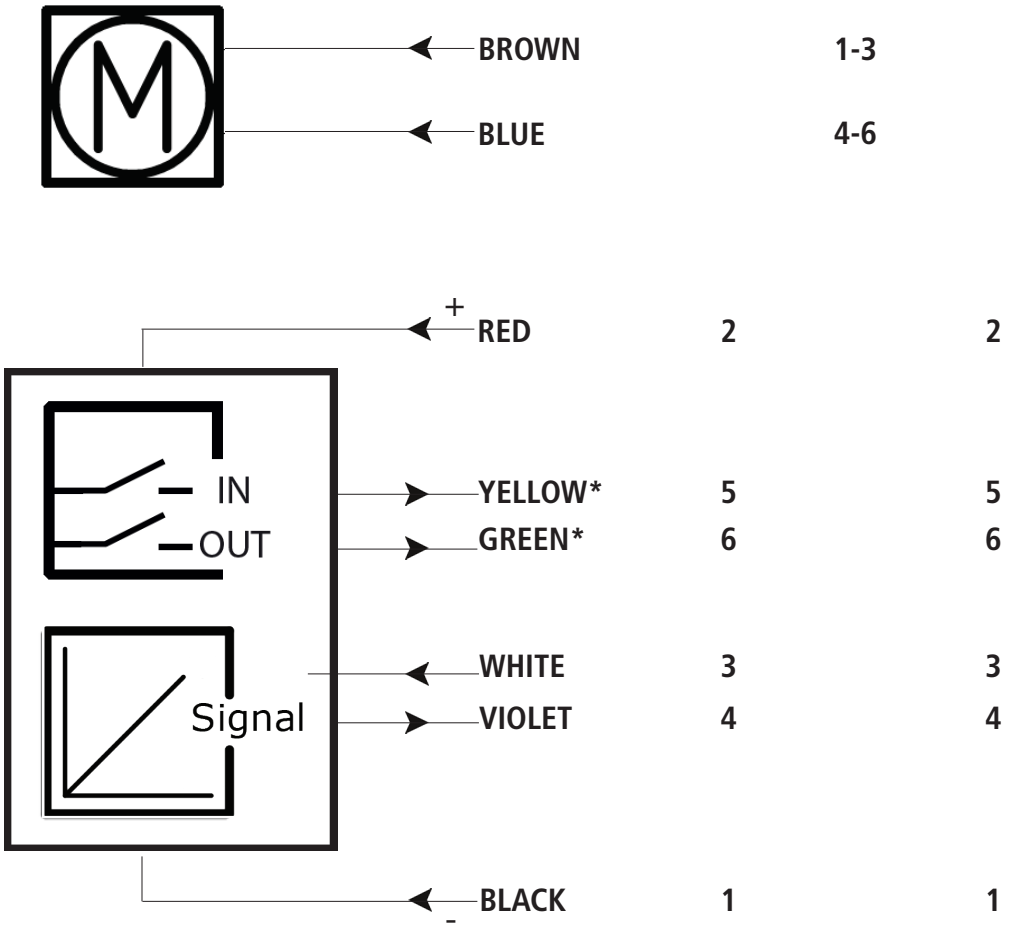
Please note that Potentiometer is not possible on variants with fast gear (Spindle pitch 20mm, H Gear).

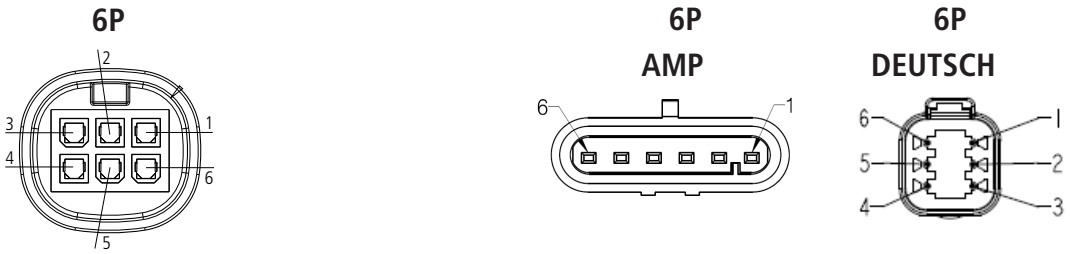
Actuator with endstop signals and absolute positioning - Mechanical potentiometer feedback

Connection diagram:

Compliant with:

PLUS 1® Powered by Danfoss



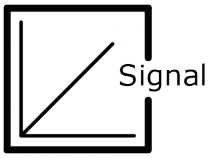


*YELLOW/GREEN: Endstop signals out are NOT potential free

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

Actuator with endstop signals and absolute positioning - Mechanical potentiometer feedback

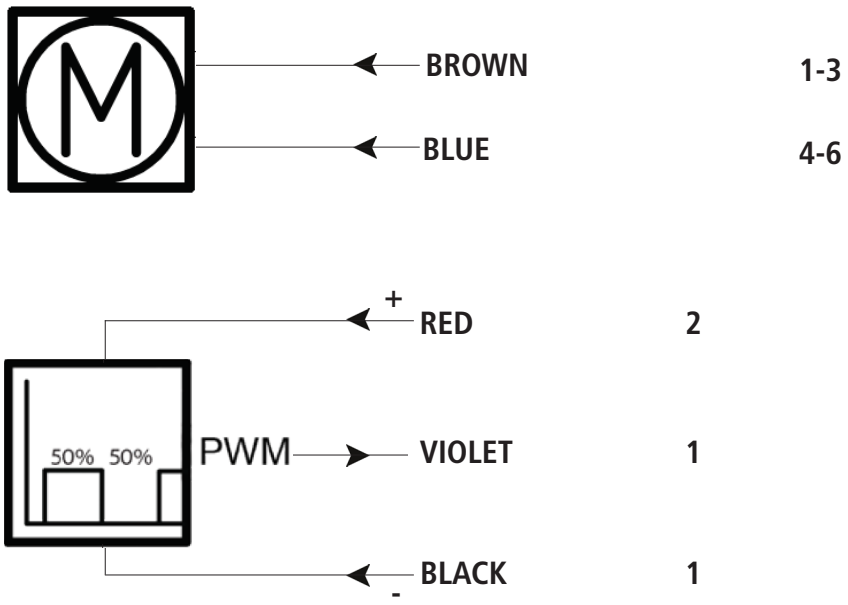
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer, 10 kohm.	 Bourns 0-10 kohm, 5 %, 10-Turn
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A 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 - 48 VDC	For endstop signals
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA NOT potential free
Yellow	Endstop signal in	
Violet	Mechanical potentiometer output Output range with 8 mm spindle pitch (LA37 only): 1 kohm = 0 mm stroke 11 kohm = 333 mm stroke Output range with 12 mm spindle pitch: 1 kohm = 0mm stroke 11 kohm = 500 mm stroke Output range with 20 mm spindle pitch: 1 kohm = 0mm stroke 11 kohm = 833 mm stroke	+10 V or other value Output protection: 1 kohm protection resistor in series with the potentiometer Linearity: ± 0.25 %
White	VCC+ to POT 10 VDC or other values	

Please note that Potentiometer is not possible on variants with fast gear (Spindle pitch 20mm, H Gear).

Actuator with absolute positioning - PWM

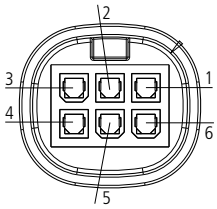
Connection diagram:



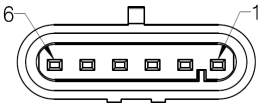
Compliant with:

PLUS+1 Powered by Danfoss

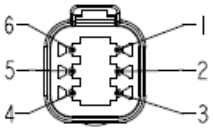
6P



6P AMP

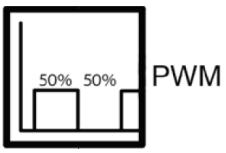


6P DEUTSCH



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.	
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 % Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A 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 - 36 VDC	Current consumption: Max. 60 mA, 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} - 2 V Tolerances +/- 2 % Max. current output: 12 mA Frequency: 75 Hz 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	

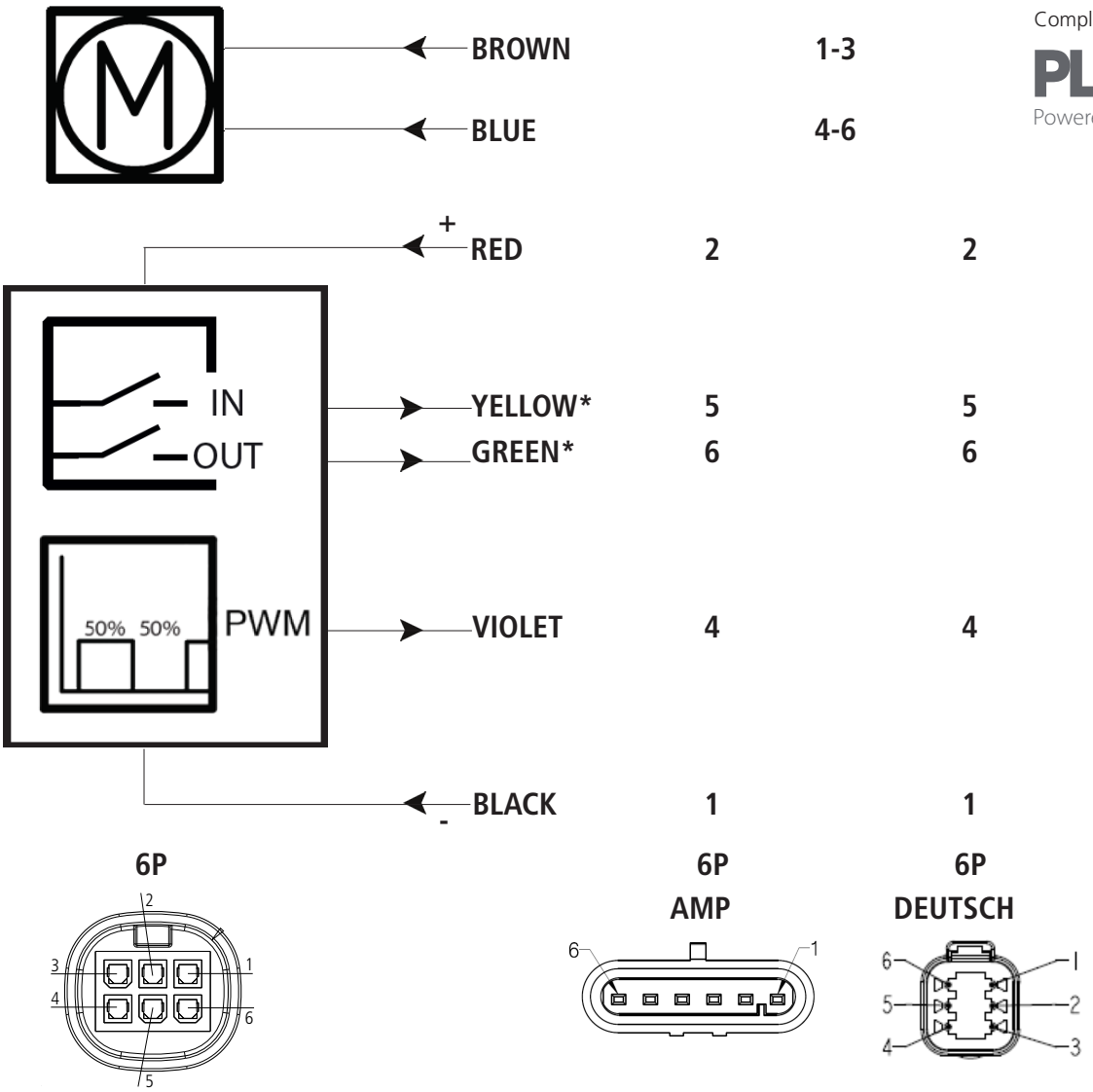
It is recommended that the actuator activates its limit switches on a regular basis, to ensure more precise positioning. The actuator can also go into the position lost state. When the actuator goes in position lost state, the feedback level will remain the highest level until the actuator is initiated. For instance, if feedback is 0-10 V, the feedback level will remain 10V until the actuator is initialised. Both physical end stop switches need to be activated for correct initialisation of the feedback. There is no rule as to which one needs to be activated first.

Actuator with endstop signals and absolute positioning - PWM

Connection diagram:

Compliant with:

PLUS 1® Powered by Danfoss

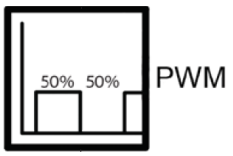


*YELLOW/GREEN: Endstop signals out are NOT potential free

Tip: 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

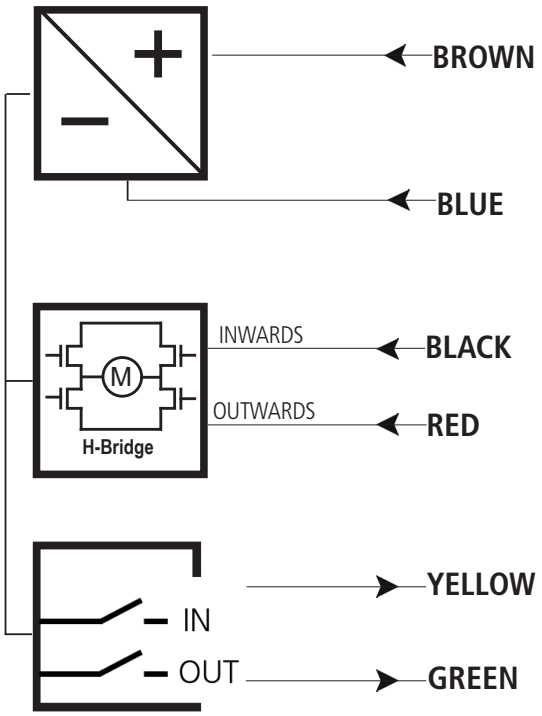
I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves.	
Brown	12, 24, 36* or 48* VDC (+/-) *Only available on LA36 12 V ± 20 % 24 V ± 10 % 36 V ± 10 % 48 V ± 10 %	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue	Under normal conditions: 12 V, max. 26 A depending on load 24 V, max. 13 A depending on load 36 V, max. 10 A depending on load 48 V, max. 8.0 A depending on load	To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12 - 36 VDC	Current consumption: Max. 60 mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA
Yellow	Endstop signal in	
Violet	Digital output feedback (PNP) 10-90 % (Option 5) 20-80 % (Option 6)	Output voltage min. V_{IN} - 2 V Tolerances +/- 2 % Max. current output: 12 mA Frequency: 75 Hz 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	

It is recommended that the actuator activates its limit switches on a regular basis, to ensure more precise positioning. The actuator can also go into the position lost state. When the actuator goes in position lost state, the feedback level will remain the highest level until the actuator is initiated. For instance, if feedback is 0-10 V, the feedback level will remain 10V until the actuator is initialised. Both physical end stop switches need to be activated for correct initialisation of the feedback. There is no rule as to which one needs to be activated first.

Actuator with IC Basic

Connection diagram:

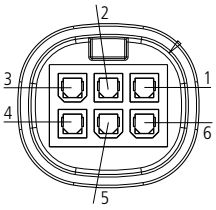


	1-3	
	4-6	
	1	1
	2	2
	5	5
	6	6

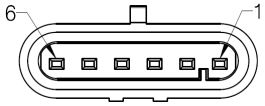
Compliant with:

PLUS 1
Powered by Danfoss

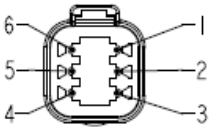
6P



6P AMP



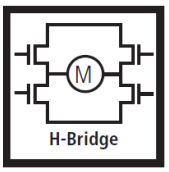
6P DEUTSCH



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

Actuator with IC Basic

I/O specifications:

Input/Output	Specification	Comments
Description	Easy to use interface with integrated power electronics (H-bridge). The version with "IC option" cannot be operated with PWM (power supply).	
Brown	12-24 VDC + (VCC) Connect Brown to positive 12 V ± 20 % 24 V ± 10 % 12 V, current limit 30 A 24 V, current limit 20 A	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 30 A for 12 V and 25 A for 24 V
Blue	12-24 VDC - (GND) Connect Blue to negative	
Red	Extends the actuator	On/off voltages: > 67 % of V_{IN} = ON < 33 % of V_{IN} = OFF Input current: 10 mA
Black	Retracts the actuator	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA Endstop signals are NOT potential free.
Yellow	Endstop signal in	
Violet	Not to be connected	
White	Not to be connected	

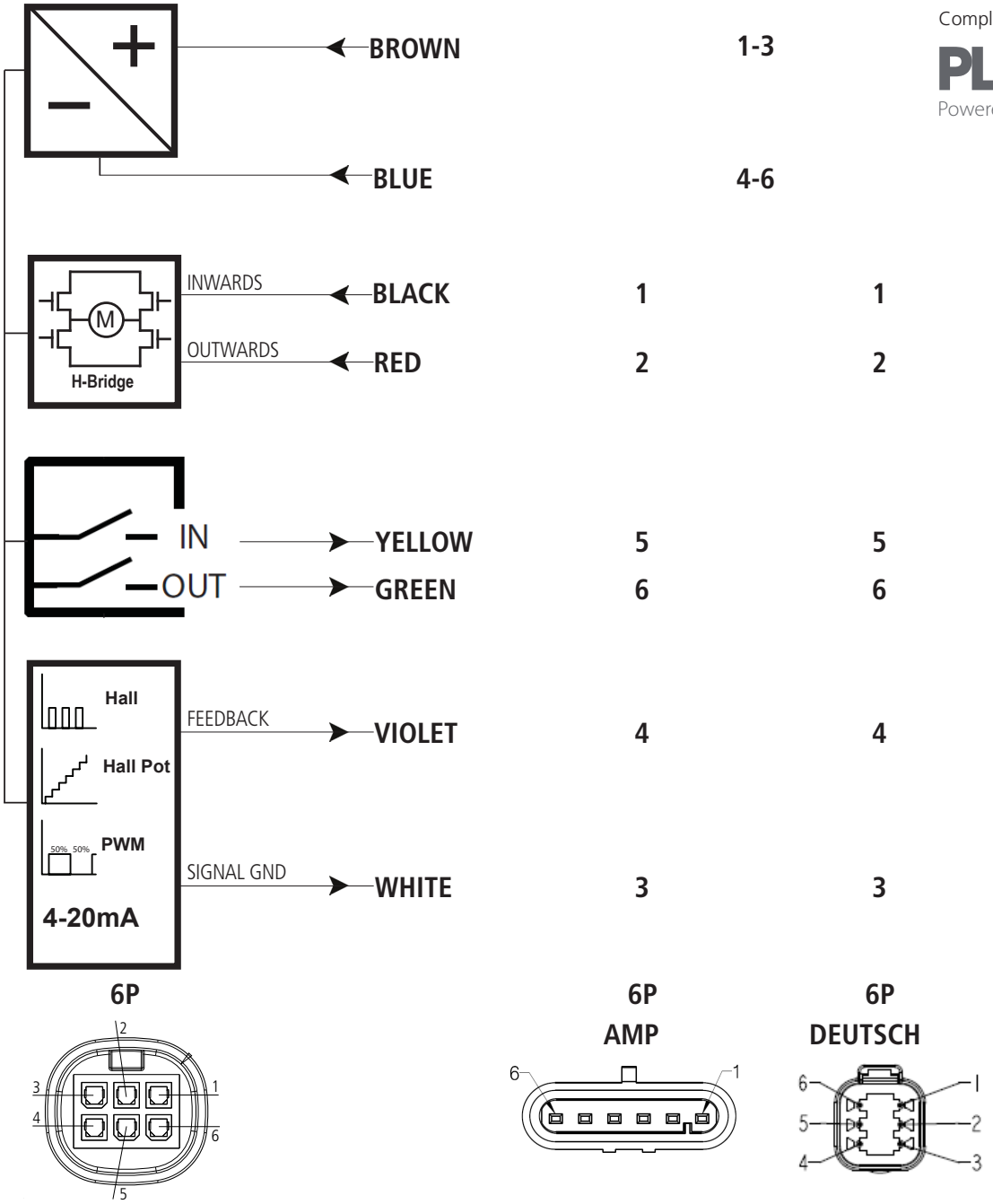
- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There 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 Advanced - with Feedback and End Stop Signal

Connection diagram:

Compliant with:

PLUS 1® Powered by Danfoss



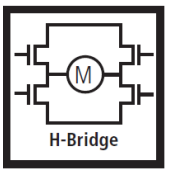
Please be aware that if the power supply is not properly connected, you might damage the actuator!

Configuration of IC Advanced is possible with the BusLink software for PC
The newest version is available online at **LINAK.COM/**TECHLINE

Please note: The BusLink configuration cable must be purchased seperately
Item number for BusLink cable kit: 0367999 (adapter + USB2Lin)

Actuator with IC Advanced - with Feedback and End Stop Signal

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).	
Brown	12-24 VDC + (VCC) Connect Brown to positive 12 V ± 20 % 24 V ± 10 % 12 V, current limit 30 A 24 V, current limit 20 A	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 30 A for 12 V and 25 A for 24 V
Blue	12-24 VDC - (GND) Connect Blue to negative	
Red	Extends the actuator	On/off voltages: > 67 % of V_{IN} = ON < 33 % of V_{IN} = OFF Input current: 10 mA
Black	Retracts the actuator	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed. 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.
Yellow	Endstop signal in	
Violet	Analogue feedback (0-10 V): Configure any high/low combination between 0-10 V	Ripple max. 200 mV Transaction delay 20 ms Linear feedback 0.5 % Max. current output. 1 mA
	Single Hall output (PNP) Movement per Single Hall pulse: LA371C only: Actuator = 0.1372 mm per count 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} - 2 V Max. current output: 12 mA Max. 680 nF
	Digital output feedback PWM: Configure any high/low combination between 0-100 %	Output voltage min. V_{IN} - 2 V Frequency: 75 Hz ± 10 Hz as standard, but this can be customised. Duty cycle: Any low/high combination between 0 and 100 percent. Open collector source current max. 12 mA

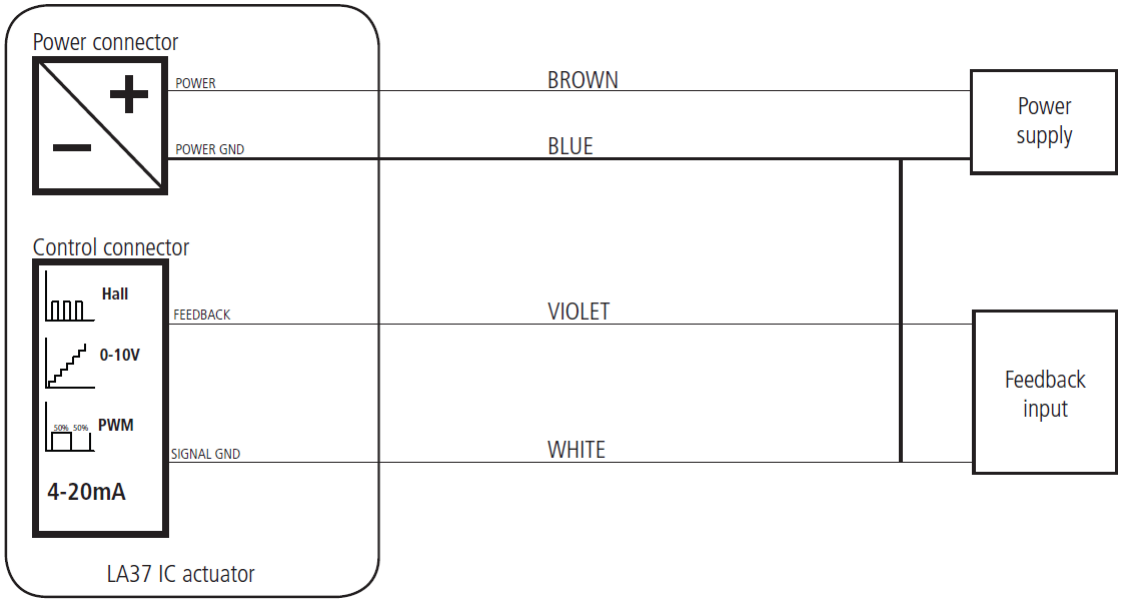
Actuator with IC Advanced - with Feedback and End Stop Signal

I/O specifications:

Input/Output	Specification	Comments
Violet (continued)	Analogue feedback (4-20 mA): Configure any high/low combination between 4-20 mA	Tolerances +/- 0.2 mA Transaction delay 20 ms Linear feedback 0.5 % Output: Source Serial resistance: 12 V max. 300 ohm 24 V max. 900 ohm
	All absolute value feedbacks (0-10 V, PWM and 4-20 mA)	Standby power consumption: 12 V, 60 mA 24 V, 45 mA 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 - please see figure below

- 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 Advanced:



Please note: This section only applies for 0-10 V, Hall and PWM feedback options.

IC options overview

	Basic	Advanced	Parallel	LIN bus	CANbus	CANopen
Control						
12V, 24V supply	√	√	√	√	√	-
24V, 48V supply	-	-	-	-	√	√
H-bridge	√	√	√	√	√	√
Manual drive in/out	√	√	√	√	√	√
ESS in/out	-	√	√	√	-	-
Soft start/stop	√	√	√	√	√	√
Feedback						
Voltage	-	√*	-	-	-	-
Current	-	√**	-	-	-	-
Single Hall	-	√	-***	-	-	-
PWM	-	√	-	-	-	-
Position (mm)	-	-	-	√	√	√
Custom feedback type	-	√	-	-	-	-
Monitoring						
Temperature monitoring	√	√	√	√	√	√
Current cut-off	√	√	√	√	√	√
Buslink						
Service counter	-	√	√	√	√	√
Custom soft start/stop	-	√ ****	√ ****	√ ****	√ ****	√ ****
Custom current limit	-	√	√	√	√	√
Speed setting	-	√	√	√	√	√
Virtual end stop	-	√	√	√	√	√

* Configure any high/low combination between 0 - 10V
** Configure any high/low combination between 4 - 20mA
*** Parallel with feedback -can be configureed with Single Hall
**** Configure any value between 0.3 - 30 s or "0" for no soft start/stop

Feedback configurations available for IC Basic, IC Advanced and Parallel

	Pre-configured	Customised range	Pros	Cons
None			N/A	N/A
PWM Feedback	10 – 90 % 75 Hz	0 – 100 % 75 – 150 Hz	Suitable for long distance transmission. Effectual immunity to electrical noise.	More complex processing required, compared to AFV and AFC.
Single Hall*	N/A	N/A	Suitable for long distance transmission.	No position indication.
Analogue Feedback Voltage (AFV)*	0 - 10 V	Any combination, going negative or positive. E.g. 8.5 – 2.2 V over a full stroke.	High resolution. Traditional type of feedback suitable for most PLCs. Easy faultfinding. Independent on stroke length, compared to a traditional mechanical potentiometer.	Not recommended for applications with long distance cables or environments exposed to electrical noise.
Analogue Feedback Current (AFC)	4 - 20 mA	Any combination, going negative or positive. E.g. 5.5 – 18 mA over a full stroke.	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.	Not suitable for signal isolation. Only to be used on differential input card. Do not use single ended input card. Do NOT connect or put the white wire anywhere near GND, as this will create ground loops, disturbing the mA-signal.
Endstop signal in/ out**	At physical end stops. Default for IC Advanced.	Any position. (Not IC Basic)	Can be set at any position over the full stroke length. (Not IC Basic)	Only one endstop can be customised. (Not IC Basic)

All feedback configurations are available for IC Advanced.

* IC Basic feedback configurations available: EOS

** Parallel feedback configurations available: EOS

Actuator configurations available for IC Basic, IC Advanced and Parallel

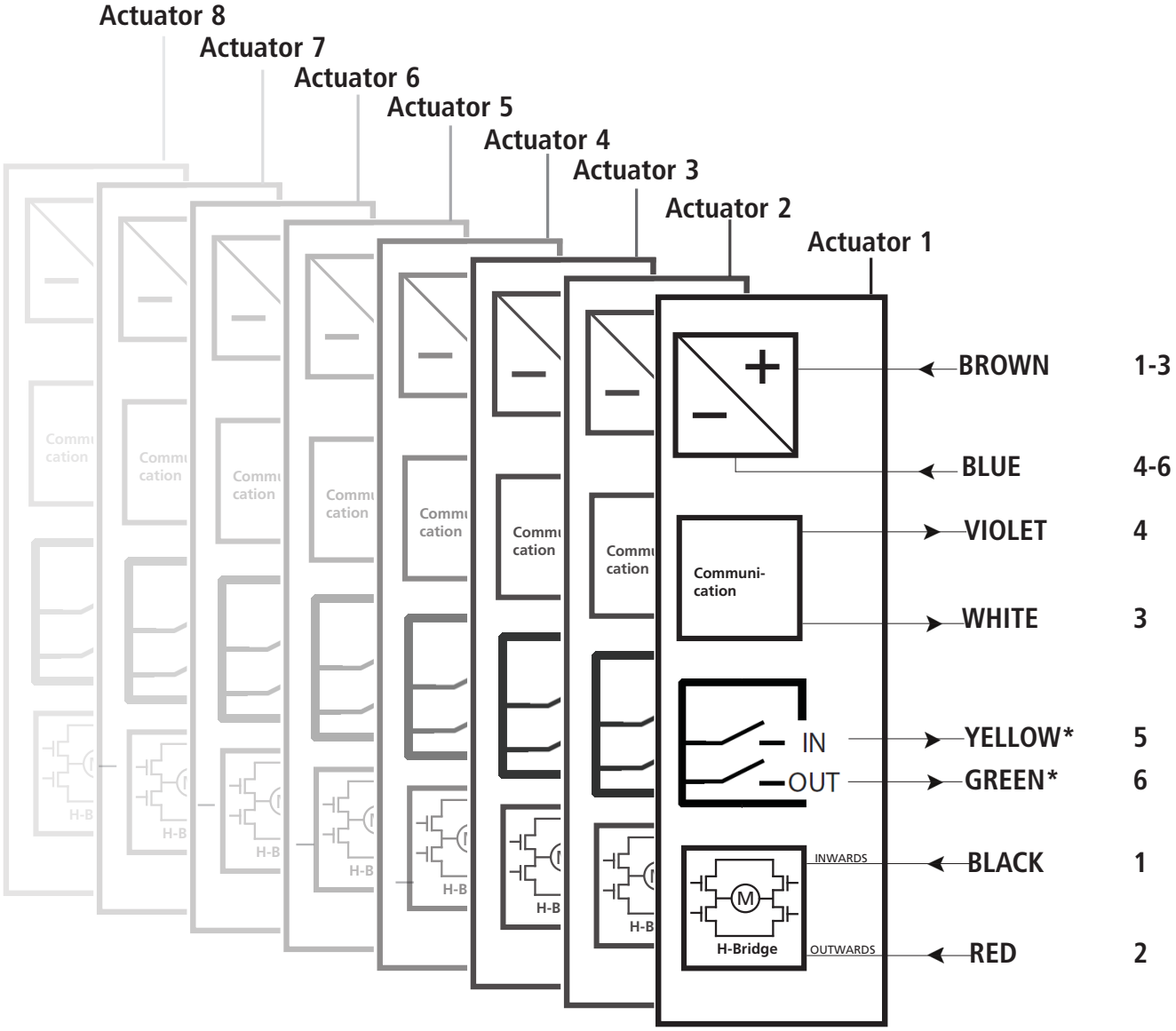
	Pre-configured	Customised range (Not IC Basic)	Description
Current limit inwards	Current limit for both directions. (When the current outputs are at zero, it means that they are at a maximum value of: 48 V = 6.5 A 36 V = 10 A 24 V = 20 A 12 V = 30 A Be aware: When the actuator comes with current cut-off 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 14 A, it will not be possible to change the current limits through BusLink to go higher than 14 A.	Recommended range: 4 A to 30 A If the temperature drops below 0°C, all current limits will automatically increase to approximately 30 A, for 12 V and 25 A for 24 V, indenpendent of the pre-configured value.	The actuator's unloaded current consumption is very close to 4 A, and if the current cut-off is customised below 4 A 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	100 % equal to full performance Please note that all actuators featuring 'IC Advanced with softstop towards end stop' or 'IC Parallel', 'LINBUS', 'CANbus', 'MODBUS' will run at a regulated speed, which is typically around 80% of the nominal speed.	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.
Virtual endstop inwards	0mm for both virtual enstop directions. (When the virtual endstops are at zero, it means that they are not in use).	It is only possible to run the actuator with one virtual endstop, either inwards or outwards. Scaling of feedback when choosing analogue feedback. All Absolute feedback levels must follow the chosen virtual end-stop, if any are set. When virtual end-stop is chosen through the bus link, the actuator will need initialisation and feedback will be adjusted accordingly to the virtual end-stop.	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.
Virtual endstop outwards			

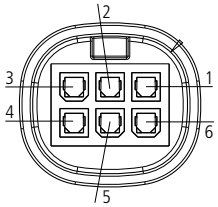
Actuator configurations available for IC Basic, IC Advanced and Parallel

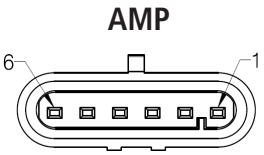
	Pre-configured	**Customised range (Not IC Basic)**	**Description**
Soft stop inwards	0.3 sec. for both soft stop directions.	0.3 sec. to 30 sec. 0 sec. can be chosen for hard stop.	It is not possible to configure values between 0.01 sec. to 0.29 sec. This is due to the back-EMF from the motor (increasing the voltage). Be aware that the soft stop value equals the deacceleration time after stop command.
Soft stop outwards			
Soft start inwards	0.3 sec. for both soft start directions.	0 sec. to 30 sec.	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.
Soft start outwards			

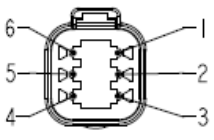
Actuator with Parallel

Connection diagram:







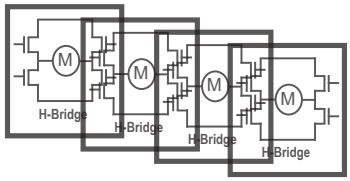


Please be aware that if the power supply is not properly connected, you might damage the actuator!
The green and yellow wires from parallel connected actuators must NOT be interconnected

Please be aware that the maximum cable length in a parallel system is 40 meters *in total.*
E.G: With 4 actuators -the cable between each actuator can be op to 10 meters. With 8 actuators -the cable between each actuator can be op to 5 meters

Actuator with Parallel

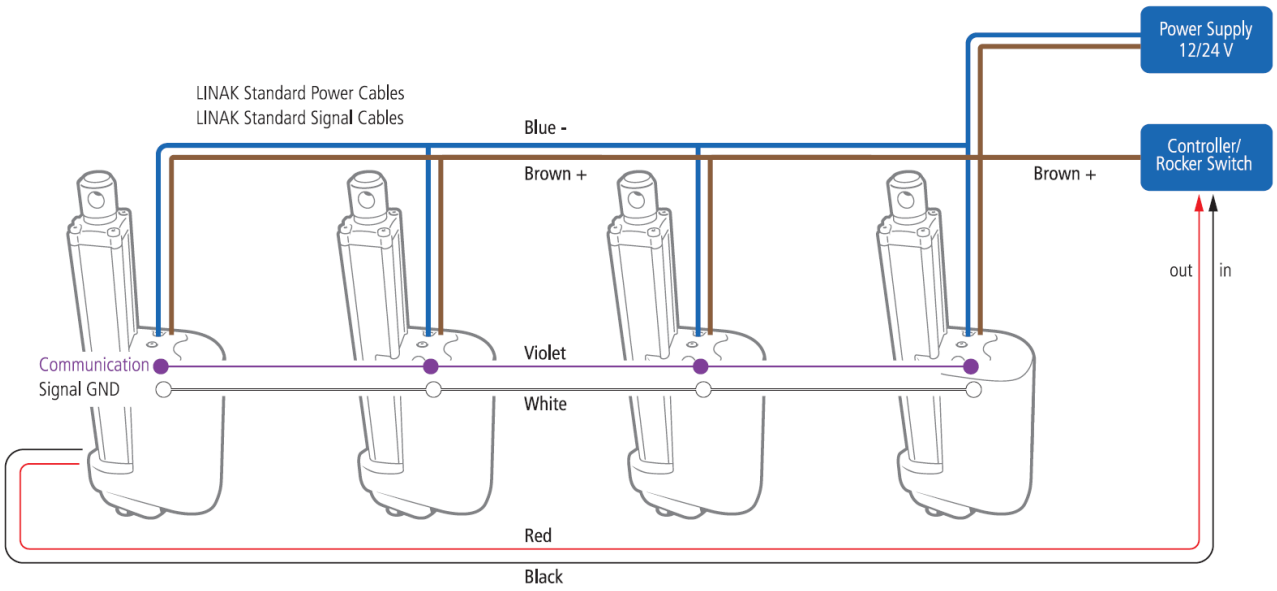
I/O specifications:

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 followers. The version with "IC option" cannot be operated with PWM (power supply).	
Brown	12-24 VDC + (VCC) Connect Brown to positive 12 V ± 20 % 24 V ± 10 % 12 V, current limit 30 A 24 V, current limit 20 A	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 30 A for 12 V and 25 A for 24 V
Blue	12-24 VDC - (GND) Connect Blue to negative	
Red	Extends the actuator	On/off voltages: > 67 % of V_{IN} = ON < 33 % of V_{IN} = OFF Input current: 10 mA 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	
Green	Endstop signal out	Output voltage min. V_{IN} - 2 V Source current max. 100 mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed.
Yellow	Endstop signal in	
Violet	Parallel communication: Violet cords must be connected together	Standby power consumption: 12 V, 60 mA 24 V, 45 mA 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 next page

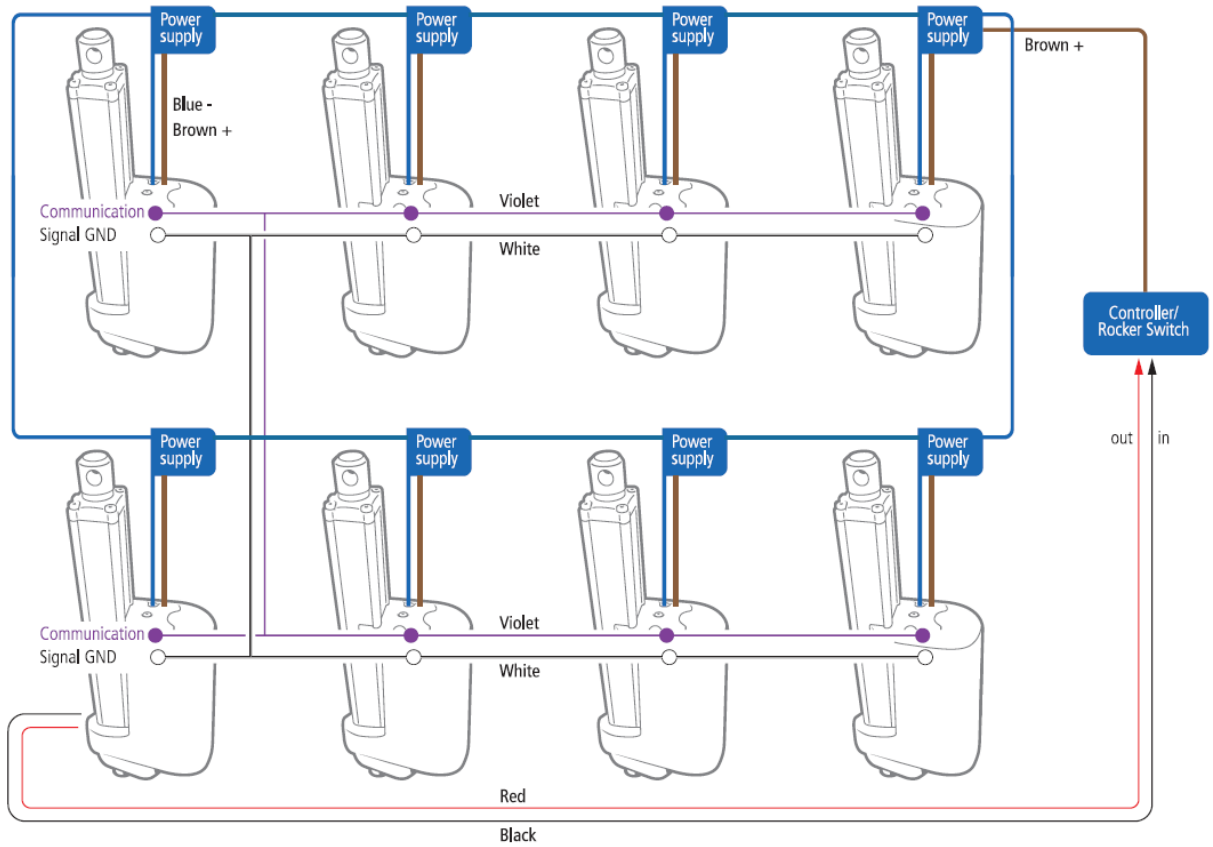
- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There 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.



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.

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: https://www.linak.com/products/accessories/buslink-software/

For more information and easy set-up of BusLink, please follow this link to view the BusLink User Guide: https://cdn.linak.com/-/media/files/data-sheet-source/en/accessory-buslink-data-sheet-eng.pdf

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

Item number for BusLink cable kit:
Blue interface: 0367999 (adaptor + USB2Lin)
Yellow interface: 0367998 (adaptor + USB2Lin)
Green interface: 0367997 (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 r econfigure 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. -Maximal total cable length is 40 meters
- When all actuators are connected, a Master will automatically be chosen. E.g. with 5 actuators in one system here will be 1 Master and 4 Followers. The Master can control up to 7 followers
- 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

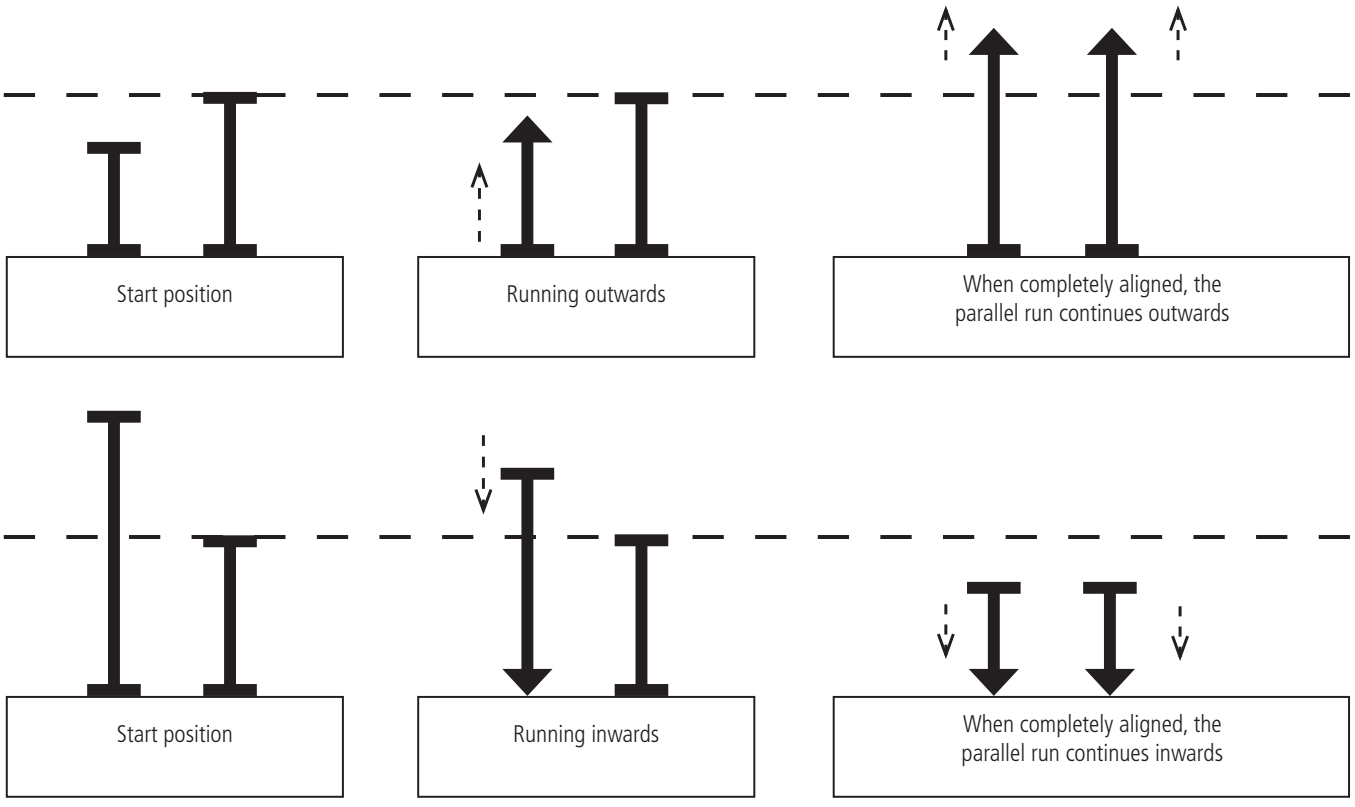
System Monitoring for Parallel

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:



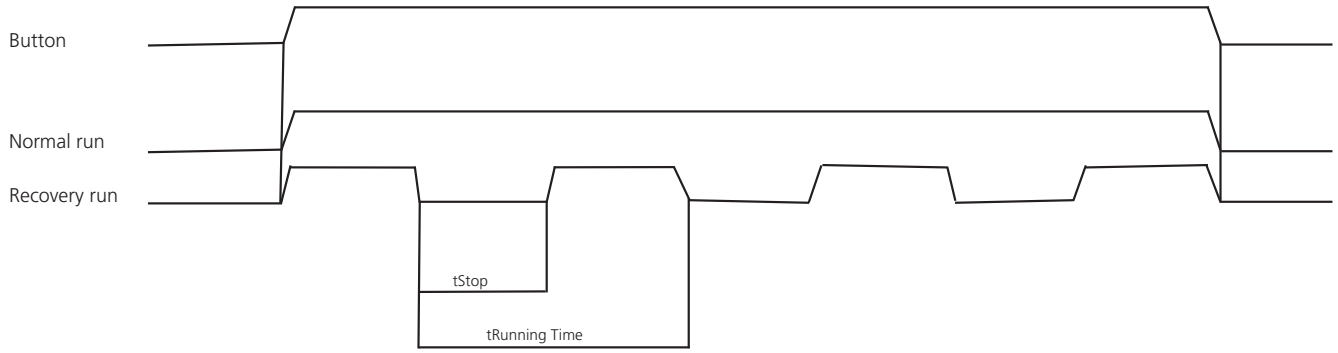
Recovery mode:

The purpose of recovery run mode is to have the ability to move the actuators at a reduced performance, even if one of the actuators in the system has lost its position (eg. due to failure with CRC, Hall or EOS). The movement in steps will indicate to the user that something is wrong.

Since the position is unknown to at least one actuator in the system, the parallel system wil move without synchronisation. This introduces the risk of unaligned movement if one of the actuators is physically unable to move.

Recovery run mode will not engage if a wrong number of actuators is connected in the system.

If recovery run mode is engaged, it will cause a movement as shown below:



Recovery run mode:

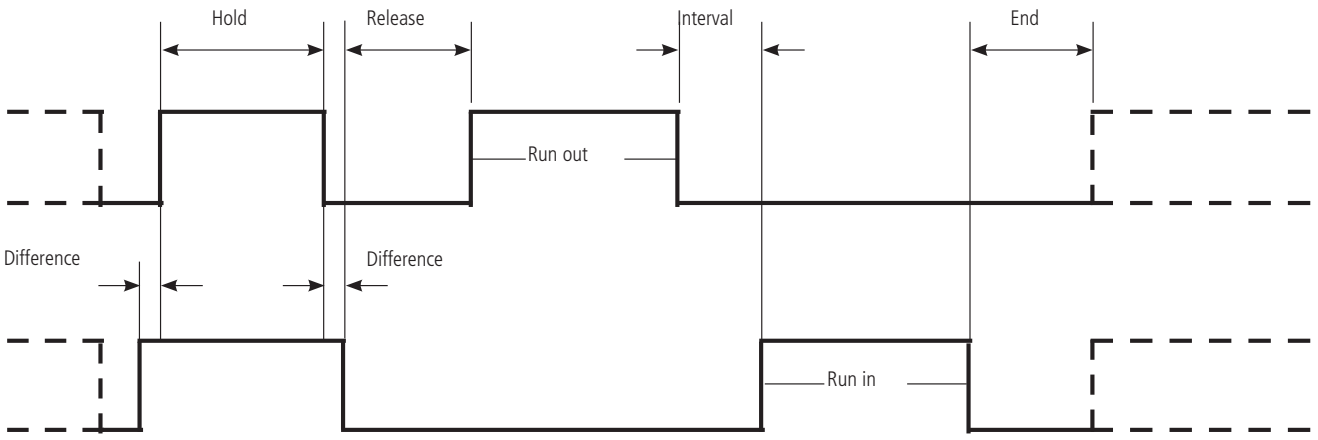
tStop	2000ms
tRunning Time	2000ms

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):

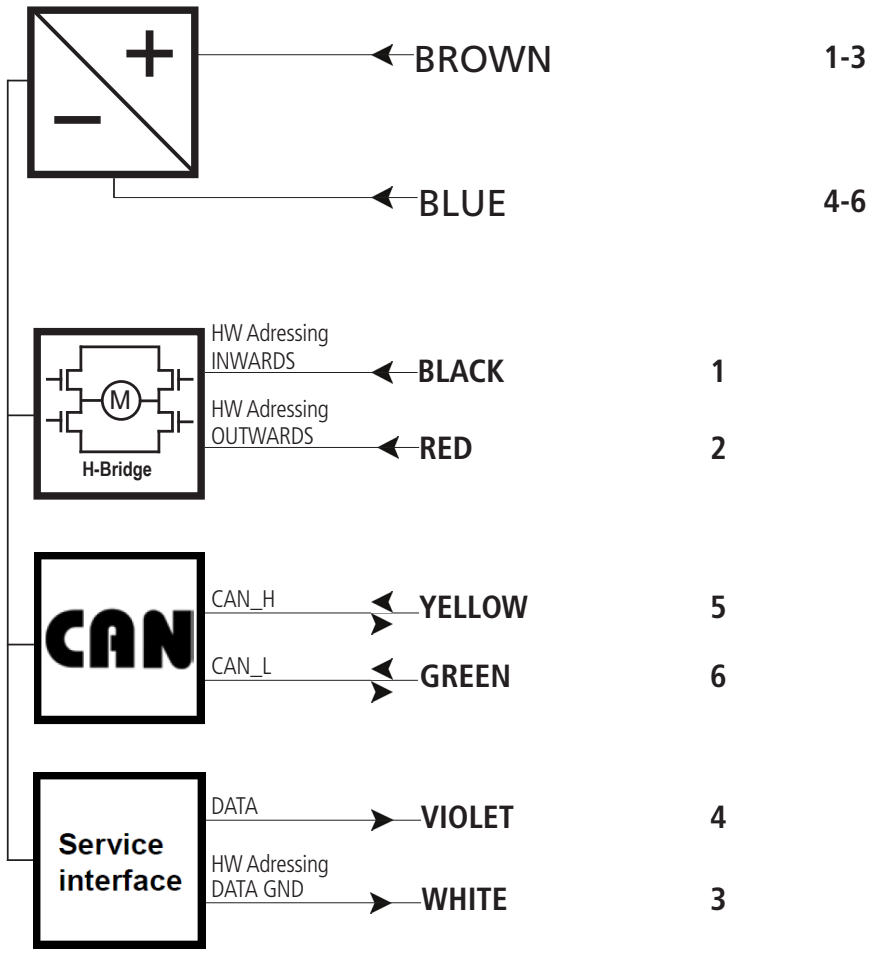
	Procedure	Min.	Max.
First step	Disconnect the Purple and White wires between all actuators	-	-
Hold	Put power on the Red and Black wires for 10-30 seconds	10 sec.	30 sec.
Difference	The Red and Black wires must all be connected to the power supply within 0.5 seconds	0 sec.	0.5 sec.
Release	Disconnect 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	-	-



Instead of manually disconnecting all signal cables from the actuators, you can integrate a switch or relay to easily turn off the signal on the violet wires.

Actuator with CANbus (J1939)

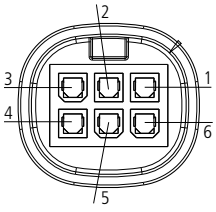
Connection diagram:



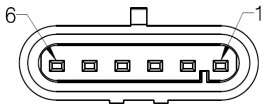
Compliant with:

PLUS 1 Powered by Danfoss

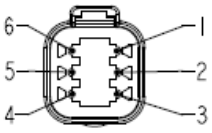
6P



6P AMP



6P DEUTSCH



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

The BusLink software tool is available for CAN bus actuators and can be used for:
Diagnostics, manual run and configuration
The newest version is available online at **LINAK.COM**/TECHLINE

Please note: The BusLink configuration cable must be purchased seperately
Item number for BusLink cable kit: 0367997 (adapter + USB2Lin)

Actuator with CANbus (J1939)

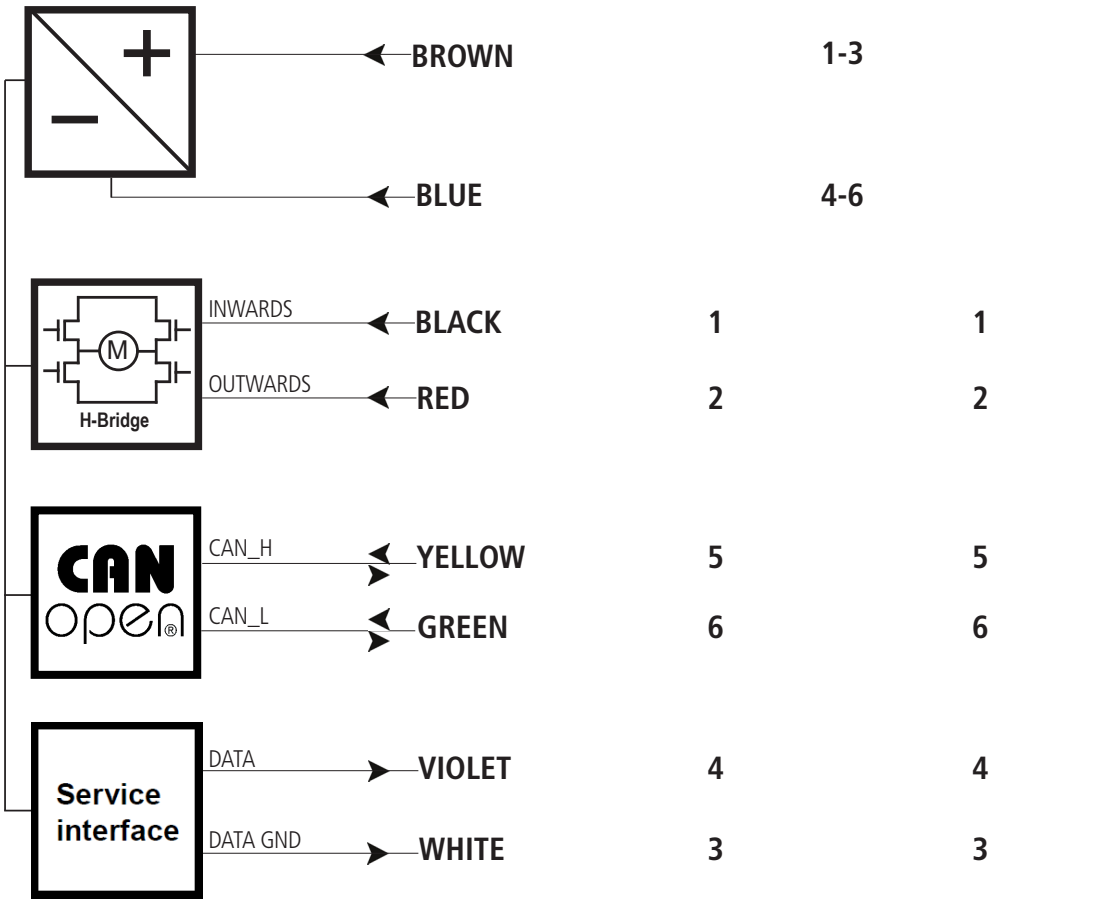
I/O specifications:

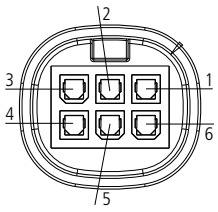
<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>Compatible with the SAE J1939 standard. Uses CAN messages to command movement, setting parameters and to deliver feedback from the actuator.
Actuator identification is provided,
using standard J1939 address claim or
fixed addresses.</td><td rowspan="2">  </td></tr>
<tr><td>Brown</td><td>12-48 VDC + (VCC)
Connect Brown to positive
<table><tr><td>Vsup</td><td>Vmin</td><td>Vmax</td><td>wtih:</td></tr><tr><td rowspan="2">12 V</td><td>10.5 V</td><td>16 V</td><td>Motor running</td></tr><tr><td>6 V</td><td>16 V</td><td>Motor not running
CAN communication possible</td></tr><tr><td rowspan="2">24 V</td><td>18 V</td><td>32 V</td><td>Motor running</td></tr><tr><td>10 V</td><td>32 V</td><td>Motor not running
CAN communication possible</td></tr><tr><td rowspan="2">48 V</td><td>34 V</td><td>58 V</td><td>Motor running</td></tr><tr><td>24 V</td><td>60 V</td><td>Motor not running
CAN communication possible</td></tr></table>12 V, current limit 30 A
24 V, current limit 20 A
48 V, current limit 8.0 A</td><td rowspan="2">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 30 A for 12 V and 25 A for 24 V</td></tr>
<tr><td>Blue</td><td>12-48 VDC - (GND)
Connect Blue to negative</td></tr>
<tr><td>Red</td><td>Extends the actuator</td><td rowspan="2">On/off voltages:
> 67% of V_{IN} = ON
< 33% of V_{IN} = OFF</td></tr>
<tr><td>Black</td><td>Retracts the actuator</td></tr>
<tr><td>Green</td><td>CAN_L</td><td rowspan="2">The LA37 with CAN bus does not contain the 120 Ω terminal resistor. The physical layer is in accordance with J1939-15.*
Speed: Autobaud up to 500 kbps
(Prototypes: 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%)</td></tr>
<tr><td>Yellow</td><td>CAN_H</td></tr>
<tr><td>Violet</td><td>Service interface</td><td rowspan="2">Only BusLink can be used as service interface.
Use green adapter cable</td></tr>
<tr><td>White</td><td>Service interface GND</td></tr>
</table>

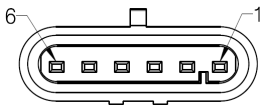
* J1939-15 refers to Twisted Pair and Shielded cables. The standard/default cables delivered with LA37 CANbus do not comply with this.
Find more information about the CANbus actuators in the CANbus user manual
The newest version is available online at **LINAK.COM/**TECHLINE

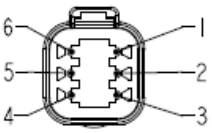
Actuator with CANopen:

Connection diagram:









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

The BusLink software tool is available for CAN bus actuators and can be used for:
Diagnostics, manual run and configuration
The newest version is available online at **LINAK.COM/**TECHLINE

Please note: The BusLink configuration cable must be purchased seperately
Item number for BusLink cable kit: 0367997 (adapter + USB2Lin)

Actuator with CANbus (CANopen):

I/O specifications:

Input/Output	Specification				Comments
Description	Compatible with the CiA 301 standard and parts of the CiA 402 standard. Uses CANopen messages to command movement, setting parameters and to deliver feedback from the actuator. Actuator identification is provided, using standard CiA 301 address claim or fixed addresses.				
Brown	12-24-48 VDC + (VCC) Connect Brown to positive				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 30 A for 12 V and 25 A for 24 V
	Vsup	V min	Vmax	with:	
	12 V	10.5 V	16 V	Motor running	
		6 V	16 V	Motor not running CAN communication possible	
	24 V	18 V	32 V	Motor running	
		10 V	32 V	Motor not running CAN communication possible	
	48 V	34 V	58 V	Motor running	
		24 V	60 V	Motor not running CAN communication possible	
	12 V, current limit 30 A 24 V, current limit 20 A 48 V, current limit 8 A				
Blue	VDC - (GND) Connect Blue to negative				
Red	Extends the actuator				On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF
Black	Retracts the actuator				
Green	CAN_L				CANopen assumes a physical layer according to ISO 11898-2. The pinning for various "CANopen connectors" is provided in CiA 303-1. Speed: Autobaud up to 250 kbps (Prototypes: 125 kbps) Max bus length @ 125 kbps: 500 meters Max bus length @ 250 kbps: 250 meters Max bus length @ 500 kbps: 100 meters Max stub length @ 125 kbps: 22 meters Max stub length @ 250 kbps: 11 meters Max stub length @ 500 kbps: 5,5 meters Max node count: 127 Wiring: Unshielded twisted pair. Cable impedance: 120 Ω (±10 %)
Yellow	CAN_H				
Violet	Service interface				Only BusLink can be used as service interface. Use green adapter cable
White	Service interface GND				

Find more information about the CANopen actuators in the CANopen user manual
The newest version is available online at **LINAK.COM/**TECHLINE

* CiA 301 refers to Twisted Pair and Shielded cables. The standard/default cables delivered with the CANopen enabled actuator do not comply with this. Please note that the BusLink cables (0149779) must be purchased separately from the actuator!
Find more information about the CANopen actuators in the CANopen user manual
The newest version is available online at LINAK.COM/TECHLINE

System combination possibilities for LA36 IC Advanced

LA36 IC

RF receiver

DP

Signal cable

Type:	Article No.	
	EU Market (868.3MHz)	**US market (916 MHz)**
RF receiver	TR-TVPLRX868A02*	TR-TVPLRX916A02*
TXP transmitter	TR-TVTXP868A02*	TR-TVTXP916A02*
EVO transmitter	TR-TVEVO868N03*	TR-TVEVO916S03*
DP	DP042-00	
Standard TECHLINE signal cables	See the table below	

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

TECHLINE signal cables

Plug types	Article No.	Material	# Wires	Size	Colour	Length (mm)	Cable type
Flying leads*	0367049-1500	PVC	6	20AWG	Black	1500	Straight
Flying leads*	0367049-5000	PVC	6	20AWG	Black	5000	Straight
Flying leads*	0367049-10000	PVC	6	20AWG	Black	10000	Straight

* The cable comes with an AMP connector that can be removed for flying leads

Chapter 3

Troubleshooting

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

Troubleshooting

Symptom	Possible cause	Action
No signal or incorrect feedback output	Cable damaged	Change the cable
	Wrongly connected	Check the wiring
	Signal is constantly high/low	Run the actuator to fully extended and retracted positions
	Feedback output overloaded	Reduce the load according to your chosen feedback type
	For IC Advanced only: Incorrect feedback output/level	For IC Advanced only: Connect the actuator to BusLink and check for correct feedback option
Actuator runs in smaller steps	Insufficient power supply	Check the power supply
	Load is higher than specified	Reduce the load
	For IC Advanced only: Internal safety procedure activated	For IC Advanced only: Connect the actuator to BusLink and check the following: - Reason for last stop (page 62) - Current cut-off levels in both directions
Actuator cannot hold the chosen load	Load is higher than specified	Reduce the load

For further assistance, please contact your local LINAK supplier.

Troubleshooting for Parallel

Symptom	Possible cause	Action
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 62)
		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 56)
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 54

Troubleshooting for Parallel

Symptom	Possible cause	Action
Actuators run in smaller steps before stop	Insufficient power supply	Check the power supply while the actuator is running
		Connect the actuator(s) to BusLink one at a time and check the following: - Reason for last stop (page 62) - Current cut-off levels in both directions
		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
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 54

For further assistance, please contact your local LINAK supplier

BusLink service counter - Reason for last stop

Possible cause	Action/Info
H-bridge error Internal SMPS error	• Please contact your local LINAK supplier for further instructions
Overcurrent	• The actuator(s) cannot continue in the same direction • Reactivation is needed in the opposite direction
EOS error	• Please contact your local LINAK supplier
Hall error	• 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
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 actuator(s) to stop. After elimination of the error (cooling down) and reactivation of the movement, the actuator(s) will move normally **• This may not be used for stopping the actuator(s)**
Overvoltage	• 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
Undervoltage	• 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

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 56).

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**

Chapter 4

Specifications

Motor:	Permanent magnet motor 12, 24, 36 and 48 V *
Cable:	Motor: 2 x 14 AWG PVC cable Control: 6 x 20 AWG PVC cable **
Gear ratio:	4 different gear ratios available in steel (500 N, 1,700/2,600 N, 4,500 N, and 6,800 N)
Slip clutch:	Mechanical overload protection through an integrated slip clutch
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/SS2333 Acme spindle: Trapezoidal spindle with high efficiency
Temperature range:	- 30° C to +65° C For IECEx/ATEX: - 25° C to +65° C - 22° F to +149° F - 13° F to +149° 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 at 600mm stroke is max. 20% (4 min. drive and 16 min. rest)
  Duty cycle at 601-999mm stroke is max. 15% (3 min. drive and 17 min. rest)
  Duty cycle at 6800 N with 8 mm pitch is max. 5%
- Storage temperature: -55° C to +105° C
- Noise level: 73 dB (A) measuring method DS/EN ISO 3743-1 actuator not loaded

- **Safety device regarding functional failure:**

  Safety nut

  The LA36 has a built-in safety nut in push as an option. Actuators with safety nut in push can only function when used in push applications. The safety nut comes into operation should the main nut fail. Afterwards it is only possible to drive the actuator into the innermost position. Thereafter, the actuator will not function any more and must be sent for service

  Mechanical endstop

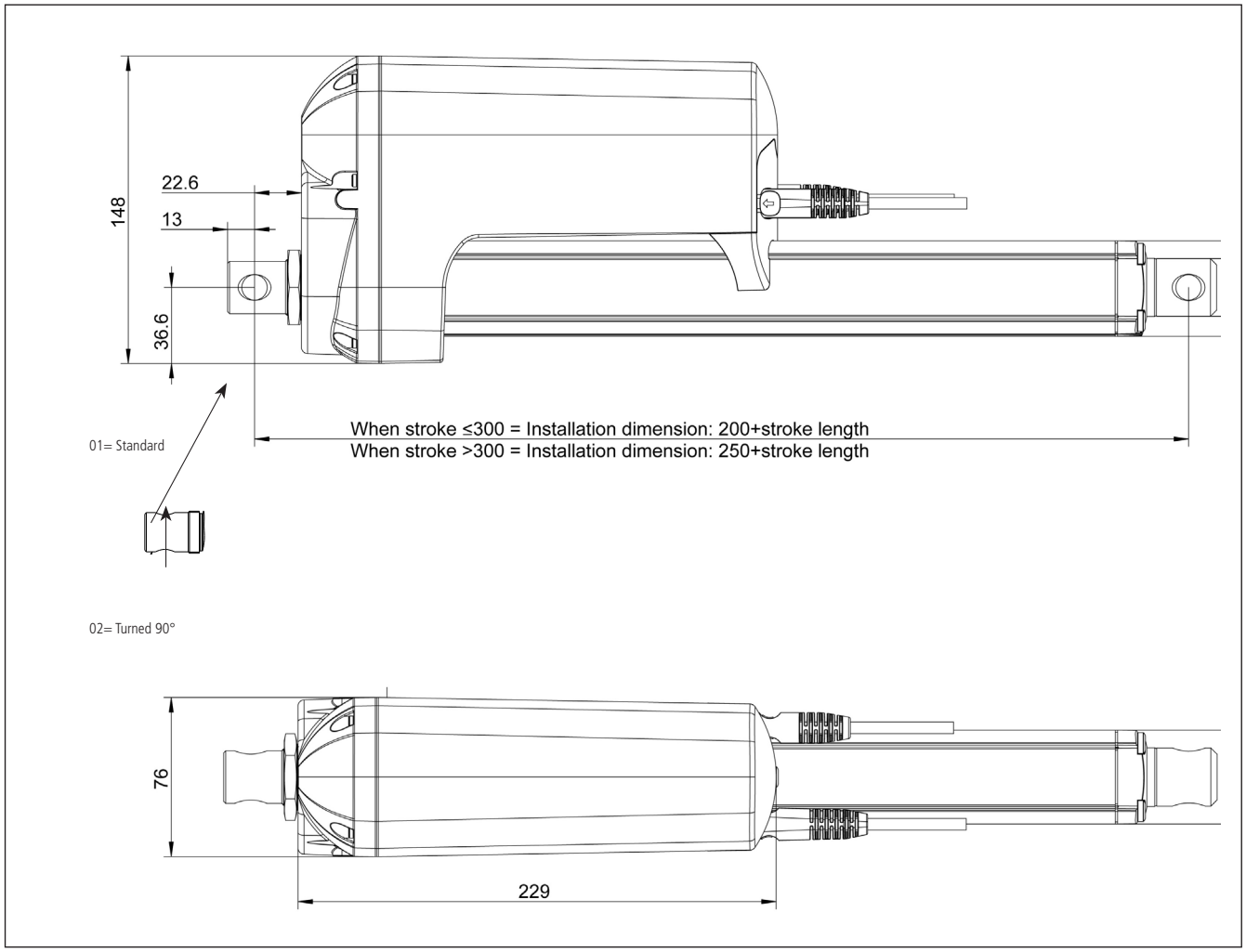
  LA36 is equipped with mechanical endstop

* 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

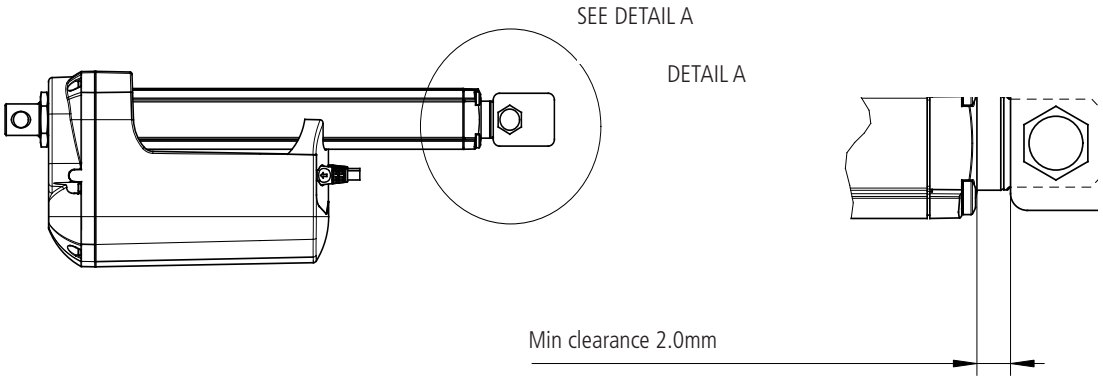
Actuator dimensions

TECHLINE® LA36:



Keep a clearance when mounting a bracket

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



With Zero point the minimum stroke is 70 mm
The Zero point initialisation zone is located between 35-70 mm going from the most inward position.
The movement passing the zone has to be stabile for the initialisation to succeed -also no virtual limits can be set in the initialisation zone.

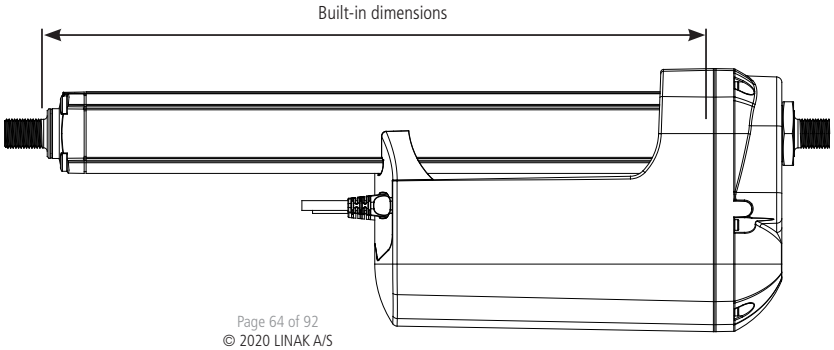
Built-in dimensions

Piston rod	"0" /from the surface		"1" / to the centre of the hole		"2A" / to the centre of the hole	
Back fixture	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
"0" / from the surface	189	239	194	244	194	244
"1" and "2" / to the centre of the hole	195	245	200	250	200	250
"4" / to the centre of the hole	195	245	200	250	200	250
"5" / from the surface	180	230	185	235	185	235
"6" / from the surface	180	230	185	235	185	235
"A" and "B" / to the centre of the hole	195	245	200	250	200	250
"C" and "D" / to the centre of the hole	195	245	200	250	200	250

Piston rod	"4" /from the surface		"5" / to the centre of the hole	
Back fixture	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
"0" / from the surface	181	231	194	244
"1" and "2" / to the centre of the hole	187	237	200	250
"4" / to the centre of the hole	187	237	200	250
"5" / from the surface	172	222	185	235
"6" / from the surface	172*	222*	185	235
"A" and "B" / to the centre of the hole	187	237	200	250
"C" and "D" / to the centre of the hole	187	237	200	250

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

Please be aware that the above built-in dimensions refer to the 15-digit item number!



Manual Hand Crank

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

6 mm 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: 6 - 8 Nm
Hand Crank rpm: Max. 65

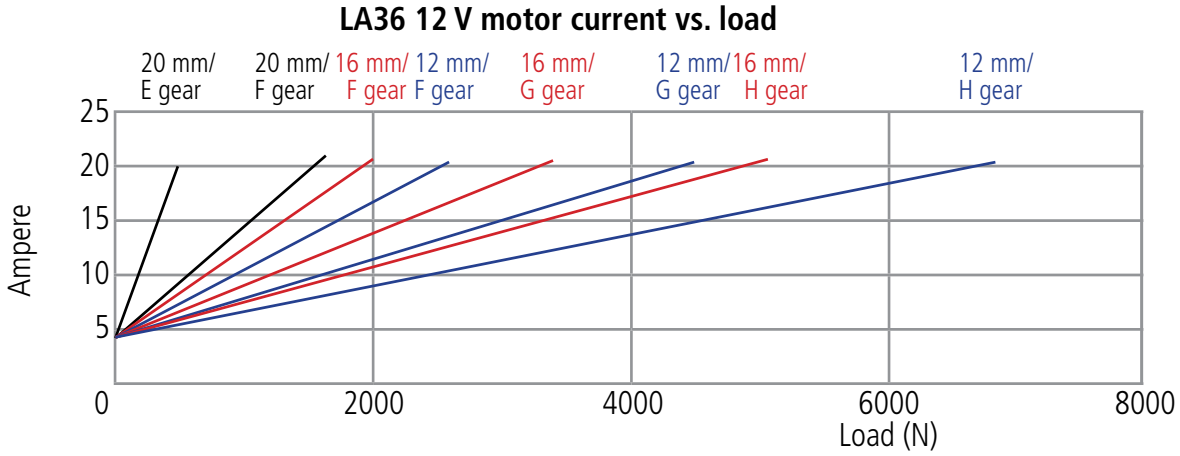
Piston rod movement per turn, app.:

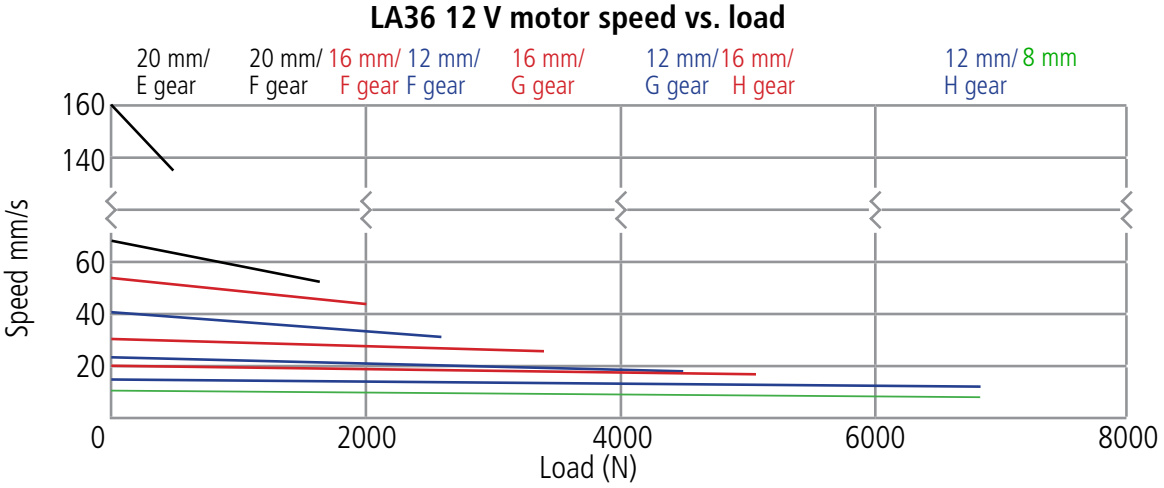
	8 mm	12 mm	16 mm	20 mm
Gear A	-	11 mm	14 mm	18 mm
Gear B	-	6 mm	8 mm	10 mm
Gear C	3 mm	4 mm	5 mm	7 mm
Gear F	-	-	-	27 mm

- 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.

Speed and current curves - 12V motor

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





When ordering LA36F

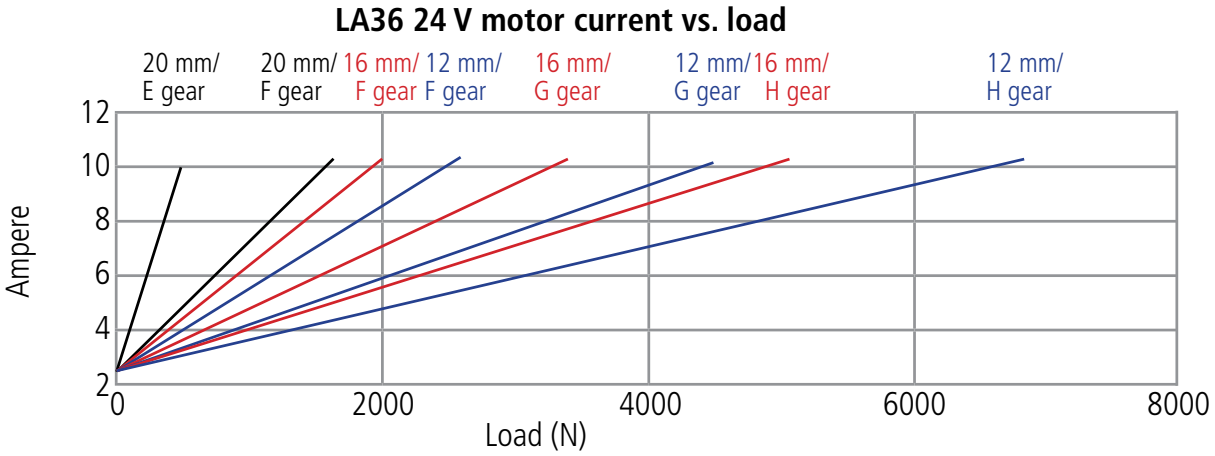
When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

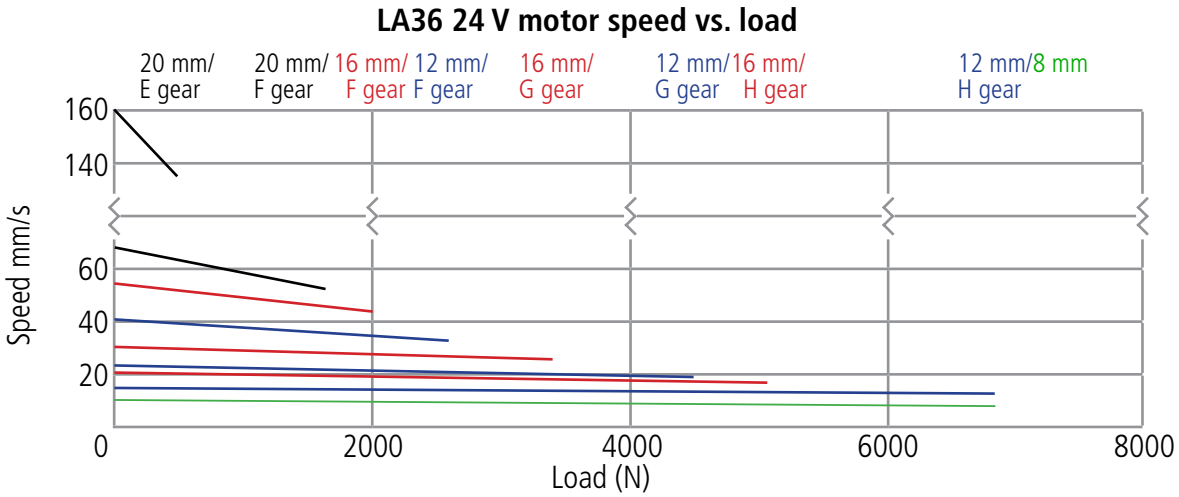
All measurements above describe the spindle pitch (e.g. 20mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 12, 24, 36, 48VDC.

Speed and current curves - 24V motor

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





When ordering LA36F

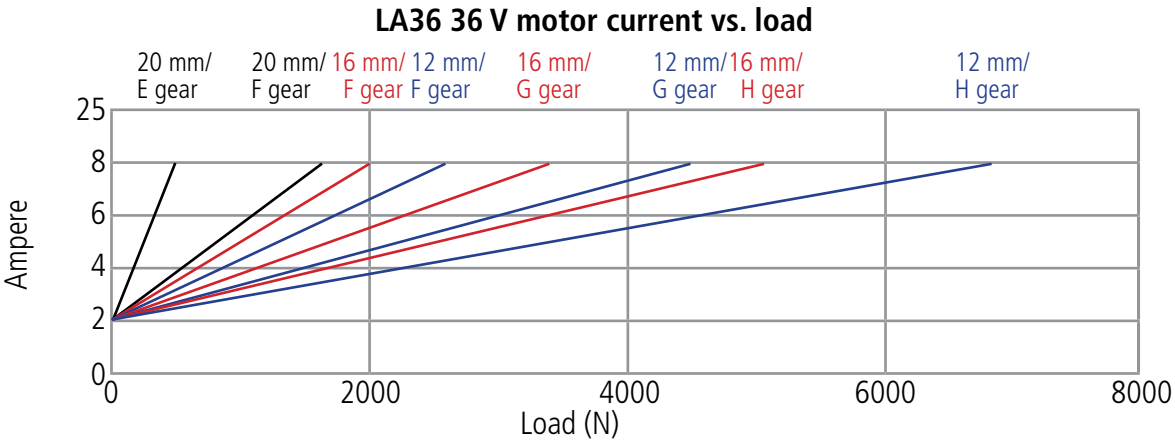
When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

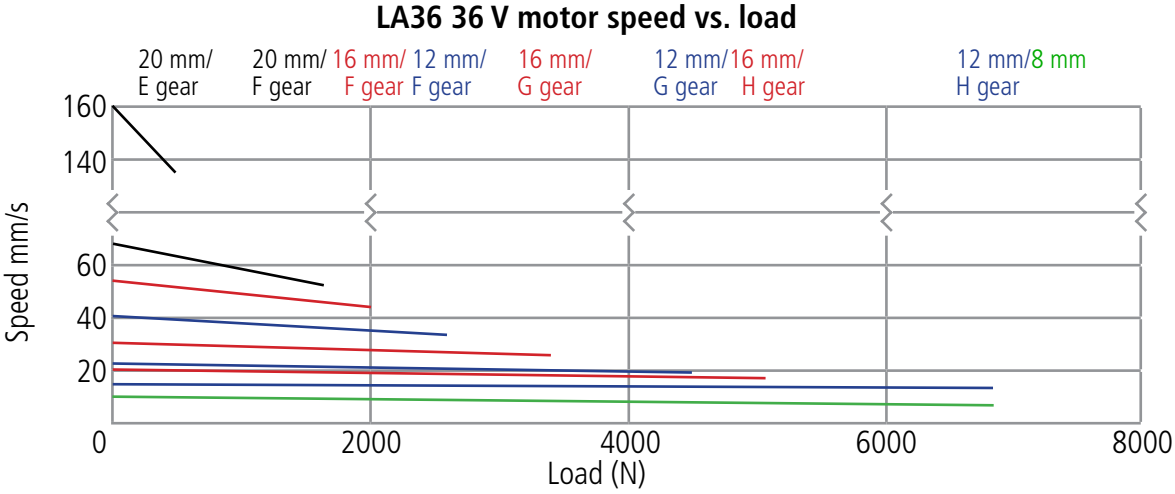
All measurements above describe the spindle pitch (e.g. 20mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 12, 24, 36, 48VDC.

Speed and current curves - 36V motor

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





When ordering LA36F

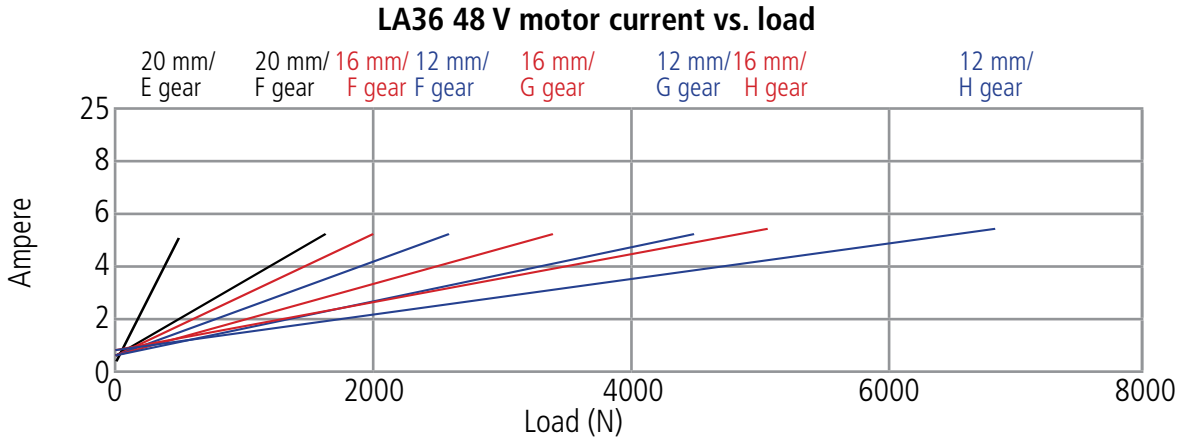
When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

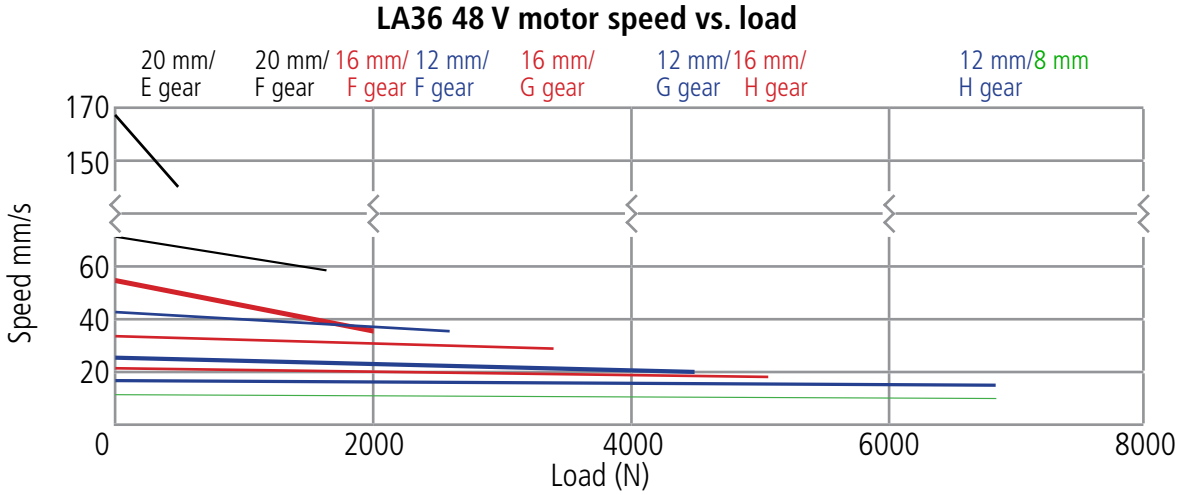
All measurements above describe the spindle pitch (e.g. 20mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 12, 24, 36, 48VDC.

Speed and current curves - 48V motor

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





When ordering LA36F

When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

All measurements above describe the spindle pitch (e.g. 20mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 12, 24, 36, 48VDC.

Label for LA36

1. **Type: 36120250A001BA-646G304500X0000**
   Describes the basic functionality of the product
2. **Item no.: J06292**
   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 4500N / Pull 4500N 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: 20%, Max. 4 min. / 16 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

Key to symbols

The following symbols are used on the LA36 labels:

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

LA36 Ordering example Econ

36 120 000 A Z 23 B A - 6 1 6 G 3 0300 B C S 0 0 0

Type:	**36**	= LA36		
Spindle type:	080	= 80 mm		
	120	= 12 mm		
	160	= 16 mm		
	200	= 20 mm		
Stroke length:	**XXX**	= mm (In steps of 5 mm)		
	Axx	= 10xx mm		
	Bxx	= 11xx mm Stroke > 999 mm		
	C00	= 1200 mm		
Safety nut:	0	= None		
	A	= Safety nut		
Feedback:	0	= None		
	A	= Hall Potentiometer (The J-number datasheet contains relevant data)		
	F	= PWM		
	H	= Dual Hall		
	K	= Single Hall		
	L	= Potential free end stop signals		
	P	= Potentiometer (Only with the platform: Standard)		
	Z	= Hall and potentiometer		
	X	= Special		
Platform:	00	= Standard (None) Without Limit Switches	01	= Standard (None) With Limit Switches
	13	= IC Basic	**23**	= IC Advanced
	33	= IC Parallel	43	= IC Parallel with feedback
	53	= IC GPO	63	= IC Selflearning stroke
	04	= MODbus	06	= LINbus Switch
	16	= LINbus Zero point	07	= CANbus (J1939) Switch
	17	= CANbus (J1939) Zero point	08	= CANbus (CANopen) Switch
	XX	= Special		
Motor type:	A	= 12 VDC Normal	1	= 12 VDC With dummy clutch
	B	= 24 VDC Normal	2	= 24 VDC With dummy clutch
	C	= 36 VDC Normal	3	= 36 VDC With dummy clutch
	J	= 48 VDC Normal	4	= 48 VDC With dummy clutch
	X	= Other		
IP degree / Housing	**A**	= IP66		
	6	= IP66 Reinforced house	8	= IP66 ATEX / IECEx approved
	9	= Harsh environment*		
Reed	**-**	= Without magnet for a customer-mounted Reed limit switch		
	+	= With magnet for a customer-mounted Reed limit switch		
Colour	**6**	= Dark Olivish gray NCS S7000-N*		
	X	= Special		
Back fixture:	**1**	= 0 degrees		
	2	= 90 degrees	4	= Outer thread
	A	= 30 degrees	5	= Inner thread
	B	= 60 degrees	6	= Rotated (30° Interval)
	C	= 120 degrees	X	= Special
	D	= 150 degrees		
Piston rod eye:	1	= With slot	5	= inner thread
	2	= Solid	**6**	= Ball eye
	4	= Outer thread	X	= Special

* With Harsh environment the housing is Black

*

Option Position:	E	= Gear ratio 1:7 (F-gear)	F	= Gear ratio 1:18 (A-gear)
	G	= Gear ratio 1:31 (B-gear)	H	= Gear ratio 1:46 (C-gear)
Brake:	1	= Push	2	= Pull
	3	= Push / Pull		
Install. diam.:	**0300**	= mm (min length)		
	XXXX	= mm		
End stop signal: (EOS in/EOS out)	A	= A_HIGH / A_HIGH	**B**	= A_LOW / A_HIGH
	C	= A_HIGH / A_LOW	D	= A_LOW / A_LOW
	E	= LOW / A_HIGH	F	= HIGH / A_HIGH
	G	= LOW / A_LOW	H	= HIGH / A_LOW
	J	= A_HIGH / LOW	K	= A_LOW / LOW
	L	= A_HIGH / HIGH	M	= A_LOW / HIGH
	N	= LOW / LOW	O	= HIGH / LOW
	P	= LOW / HIGH	Q	= HIGH / HIGH
	X	= Special *		
Plug type:	0	= None. - Is to be chosen, if cable and connectors is not wanted		
	7	= AMP super seal - Moulded		
	9	= Deutsch - Moulded		
	C	= Flying leads. - Chose this, if a connector is not wanted		
	H	= AMP		
	J	= Deutsch (DT4)		
	K	= AMP super seal		
	U	= Power cable UL1203 US		
	X	= Special		
Cable:	0	= None.	A	= 90° Angled connector
	S	= Straight	Y	= Y-Cable
	X	= Special		
Parallel mode:	**0**	= Non critical Parallel	2-8	= critical parallel (count of actuators)
SW Config:	**0**	= Standard	X	= Special Configuration
Not used:	**0**			

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

IC INTEGRATED CONTROLLER

IC options:	IC	LINbus	Modbus	Parallel	CANbus	CANopen
LA36 actuator:	✔	✔	✔	✔	✔	✔

LA36
Ordering example

TYPE

36 = LA36

SPINDLE TYPE

3 = 12mm
5 = 20mm
A = 8mm + magnet for adjustable reed switch
C = 12mm + magnet for adjustable reedswitch
E = 20mm + magnet for adjustable reed switch

GEAR BOX

		2.5 mm pitch	8 mm pitch	12 mm pitch	16 mm pitch	20 mm pitch
A	Gear ratio 1:18 / 2600N or 1700N	N.A.	N.A.	2.600 N	1950 N	1.700 N
B	Gear ratio 1:31 / 4500N	N.A.	N.A.	4.500 N	3375 N	N.A.
C	Gear ratio 1:46 / 6800N or 10000N	10.000 N	10.000 N	6.800 N	5100 N	N.A.
F	Gear ratio 1:7 / 500N	N.A.	N.A.	N.A.	N.A.	500 N

BACK FIXTURE

0 = M20 x 1 female adapter
1 = 12,9 mm hole (for 1/2" pin)
2 = 12,9 mm hole turned 90° (for 1/2" pin)
3 = 12,2 mm hole (for 12mm pin)
4 = 12,2 mm hole turned 90° (for 12mm pin)
5 = M12 x 1,75 male adapter
6 = M16 x 1,5 male adapter
7 = 12,2 mm hole with slot (like LA34)
8 = 12,2 mm hole with slot (like LA34) - turned 90°
A = 12,2 mm hole with slot - AISI 304
B = 12,2 mm hole with slot turned 90° in AISI 304
C = 12,9 mm hole with slot - AISI 304
D = 12,9 mm hole with slot turned 90° - AISI 304

PISTON ROD EYE

0 = M20 x 1 female adapter
1 = 12,9 mm hole (for 1/2" pin)
2 = 12,2 mm hole (for 12mm pin)
3 = M12 x 1,75 male adapter
4 = M16x1,5 male adapter
5 = 12,2 mm hole with slot (like LA34)
A = 12,2 mm hole with slot - AISI 304
B = 12,9 mm hole with slot - AISI 304
C = Ball eye Ø12,2
D = Ball eye Ø16

SAFETY NUT

+ = Standard
S = With safety nut

END STOP

0 = No limit switch
1 = Limit switch
2 = Limit switch and EOS

IC

7 = IC Basic
8 = IC Advanced
9 = IC Parallel
A = MODBUS
B = LINBUS
C = CAN bus (J1939)

FEEDBACK

0 = Standard (No feedback)
B = Analogue feedback 0-10V
C = Analogue feedback 0.5-4.5V
H = Dual Hall
K = Single Hall
P = Potentiometer
5 = PWM 10-90%
6 = PWM 20-80%

IC Feedback

D = Bus (LINbus; CAN bus or Modbus)
1 = Single Hall
2 = Analogue feedback 0-10V
3 = Analogue feedback 0.5-4.5V
4 = Analogue 4-20mA
5 = PWM 10-90%
6 = PWM 20-80%

STROKE LENGTH

100 = 100mm
150 = 150mm
200 = 200mm
250 = 250mm
300 = 300mm
350 = 350mm
400 = 400mm
450 = 450mm
500 = 500mm
550 = 550mm
600 = 600mm
650 = 650mm
700 = 700mm
750 = 750mm
800 = 800mm
850 = 850mm
900 = 900mm
950 = 950mm
999 = 999mm

MOTOR TYPE

A = 12 VDC
B = 24 VDC
C = 36 VDC
1 = 12 VDC without clutch
2 = 24 VDC without clutch
3 = 36 VDC without clutch

IP DEGREE

2 = IP66 Dynamic / IP69k Static
8 = IECEx / ATEX certified
9 = Harsh environment housing (IP66/IP69k)

CABLES

0 = No cable
1 = 1,5m cable (0367046-1500)
2 = 5 m cable (0367046-5000)
3 = 0,2 m power cable with AMP connector (0367006)
4 = 1,5 m power cable +1,5m signal cable
5 = 5 m power cable + 5 m signal cable
6 = Y-cable power and signal cable in one (0367020)
7 = 5 m powercable & datacable M12x1 (Bus)

When ordering standard stroke length with endstop 1, 2, 3 or 4 the stroke length will be up to 4 mm shorter.

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 personel there is a risk that it may malfunction at a later date.

Main groups of disposal

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

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

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.

Product	Metal scrap	Cable scrap	Electronic scrap	Plastic recycling or combustion
LA36	X	X	X	X

DECLARATION OF CONFORMITY

LINAK A/S
Smedevænget 8

DK - 6430 Nordborg

hereby declares that LINAK Actuators:
36xxxxx0xxxxxx, 36xxxxx1xxxxxx, 36xxxxx2xxxxxx, 36xxxxx5xxxxxx
(The 'X' s in the product description can either be a character or a number, thereby defining the variation of the product)

complies with the EMC Directive 2014/30/EU according to following standards:
EN 55016-2-1:2009, EN 55016-2-3:2010+A1+AC, EN 55022:2011+AC Class B, EN 55025:2008
EN 61000-4-2:2009, ISO 10605:2008, EN 61000-4-3:2006+A1, ISO 11452-2:2004, EN 61000-4-5:2006,
ISO 7637-2:2004

complies with the ATEX Directive 2014/34/EU according to following standards:
EN 60079-0:2012, EN 60079-31:2014

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

Additional information:
The system does also comply with the standard:
EN 55025:2008 Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers: Radiated disturbance

Nordborg, 2016-05-11

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

Original Declaration

DECLARATION OF CONFORMITY

LINAK A/S
Smedevænget 8

DK - 6430 Nordborg

hereby declares that

Actuator 36xxxxxADxxxBxx (LA36 BUS)

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

Additional information:
The system does also comply with the standard:
DS/EN ISO 14982:1998 Agricultural and forestry machines - Electromagnetic compatibility - Test methods and acceptance criteria
DS/EN 13309:2001 Construction machinery - Electromagnetic compatibility of machines with internal power supply
ISO 13766:2006 Earth-moving machinery - Electromagnetic compatibility
and EMC requirements of:
DS/EN 60204-1:2006 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
DS/EN 60204-32:2008 Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines

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 CONFORMITY

LINAK A/S

Smedevænget 8

DK - 6430 Nordborg

Hereby declares that

Actuator	LA36IC (36xxxxx7xxxxxxx, 36xxxxx8xxxxxxx, 36xxxxx9xxxxxxx, 36xxxxxBxxxxxxx) LA36IC (36xxxxxxxx03xxxxxxxxxxxxxxxxx)

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

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

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

Additional information:

The device does comply with the standards:
EN 61000-6-1:2007, Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
EN 61000-6-3:2007, Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2:2005, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007, Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

The device does also comply with the standards:
ISO 10605:2008, Road vehicles -- Test methods for electrical disturbances from electrostatic discharge
ISO 11452-4:2005, Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Harness excitation methods
ISO 11452-2:2004, Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Absorber-lined shielded enclosure
ISO 7637-2:2004, Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only

Nordborg, 2014-11-06

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

Original declaration

DECLARATION OF CONFORMITY

LINAK A/S

Smedevænget 8

DK - 6430 Nordborg

Hereby declares that

Actuator LA36CAN series
36xxxxxCDxxx1xx, 36xxxxxCDxxx2xx, 36xxxxxCDxxxAxx, 36xxxxxCDxxxBxx
(The 'X' s in the product description can either be a character or a number, thereby defining the variation of the product)

complies with the EMC Directive 2014/30/EU according to following standards:
EN 61000-4-2:2009, EN 61000-4-3:2006+A1+A2, EN 61000-4-4:2012, EN 61000-4-5:2014, EN 61000-4-6:2014, EN 61000-4-8:2010, EN 55016-2-3:2010+A1, EN 55016-2-1:2014, EN 55025:2008

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

Additional information:

The device does comply with the harmonized standards:
EN 61000-6-1:2007, Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
EN 61000-6-3:2007, Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2:2005, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007, Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

The device does also comply with the standards:
ISO 10605:2008, Road vehicles -- Test methods for electrical disturbances from electrostatic discharge
ISO 11452-4:2005, Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 4: Harness excitation methods
ISO 11452-2:2004, Road vehicles -- Component test methods for electrical disturbances from narrowband radiated electromagnetic energy -- Part 2: Absorber-lined shielded enclosure
ISO 7637-2:2004, Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only

Nordborg, 2016-09-08

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

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

Chapter 6
IECEx/ATEX

The IECEx/ATEX certified LA36 (optional) is designed for installation in dust filled atmospheres such as grain handling facilities, cement plants, saw mills or other dusty surroundings. Please note that the IECEx/ATEX approval is for dust only, and NOT for gas.

The IECEx/ATEX versions are suitable for applications in Group IIIC, Category 2D. E.g. Zone 21 and 22 with the following marking:

IECEx: EX tb IIIC T135°C Db
ATEX: II 2D Ex tb IIIC T135°C Db

Special conditions for safe use as stated in the certificates:
1 Duty cycle specified at an ambient of +25°C

Load 0-6800 [N]	
Stroke:	Duty cycle:
0-600 mm	20 % int. - Max. 2 [min.] continuous drive followed by 8 [min.] rest.
601-1000 mm	15 % int. - Max. 3 [min.] continuous drive followed by 17 [min.] rest.

2 Ambient temperature area are specified to: from -25 °C to + 65 °C

3 The power supply- and signal cable are of special design fulfilling IP 6X ingress protection. The cable can be delivered in different lengths. Only cables with Item no. 0367114-xxxx and 0367115-xxxx delivered by LINAK must be mounted (see table beneath).

4. The connection between the actuator and the fixing points must be conductive and furthermore the application must be grounded in order to remove any electrostatic charge.
This relates to both the fixing point on the motor housing and the fixing point on the piston rod.

Warnings
If the following is <u>not</u> complied with, the IECEx/ATEX certification will <u>not</u> be valid:

- Actuator use must be complied with specification.
- If the actuator has no built-in current cut-off, one must be mounted (Please see the Max current on the typeplate placed on the actuator)
- Only IECEx/ATEX approved cables are to be used *
- The power supply/signal cables for the actuator must be terminated in a safe location or alternatively by use of an Ex terminal box certified for special conditions for safe use
- When mounting or if changing cables in IECE/ATEX approved applications, the standard EN IEC 60079-19 must be respected to maintain the certification. It is crucial that a propper tightness is obtained after installing/replacing the cables, therefore the installation guideline below must be strictly followed.
- The actuator is not to be opened in areas with dust, and unauthorized personnel is never to produce, modify or repair actuators in order to sustain the approval.
- No changes are to be made to the actuator after delivery. This manual is part of the equipment. LINAK A/S keeps the right to modify specifications without advanced notice. Spare this manual for later use

Cable type	No of wires in cable	* LA36 IECEx/ATEX cable item no.	Length (mm) outside the actuator
Signal cable	6 x 20 AWG	0367114-xxxx	Customised length - up to 1500, 5000, 10000 mm
Power cable	2 x 14 AWG	0367115-xxxx	Customised length - up to 1500, 5000, 10000 mm

Operation of the device is only valid if:

- The product is used under the conditions described in the installation - and operation instruction
- Special conditions for safe use are obtained (see above)
- Ambient operating temperature is within -25°C to +65°C depending on duty cycle
- Atmospheric conditions: Pressure 80 kPa (0.8 bar) to 110 kPa (1.1 bar); and air with normal oxygen content, typically 21% v/v
- Since the signal and power cables are not UV resistant they need to be shielded against UV light, e.g. daylight or light from luminaries
- The connection between the actuator and the rest of the machine/device shall be conductive, and furthermore the application shall be grounded in order to remove any Electro Static Discharge. This counts for both of the actuator's fixation points (Back Fixture and Piston Rod Eye)
- Safety and operation instructions are accessible and followed
- The production of IECEx/ATEX actuators require quality management systems and auditing. Therefore, only LINAK A/S is allowed to produce, modify or repair actuators in order to sustain the certification.

IECEx/ATEX

General indication of risk:

Installation of the device shall be performed by trained staff only, familiar with the safety requirements and risks. The installation shall be according to EN IEC 60079-14 and all local safety regulations shall be followed.
Prevent failures and protect persons against injuries and the device against damage.

The person responsible for the system must secure that:

- Safety and operation instructions are accessible and followed
- Local safety regulations and standards are obeyed
- Performance data and installation specifications are complied with
- Safety devices are installed and recommended maintenance is performed
- National regulations for disposal of electrical equipment are obeyed

Maintenance and repair

- Repairs on the device must be carried out by LINAK© authorized persons only or by autorised repair shop fulfiled EN IEC 60079-19.
- Only perform mounting described in this manual

During maintenance regard all safety regulations and internal operation instructions.

Mounting and replacement of ATEX cables

When mounting the cables on an ATEX certified LINAK actuator, it is important that this is done carefully an by competend person, in order to protect the plugs and pins. Before the new cable is mounted, the socket shall be greased with Vaseline©, to keep the high IP protection and ensuring an easy mounting. The plug shall be in the right location and fully pressed in before the cable lid is mounted.

Please note that if the cables are mounted and dismounted more than 3 times the plugs can be damaged. Therefore, such cables shall be discarded and replaced.

Also note that the actuator must not be carried in the cables.

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.

Replacing an ATEX cable

Right side: Powerplug (0363106)
Middle: Screw (0002267)
Left side: Signal plug (0363105)'
The colour of the O-ring has to be **brown** (see picture) to be used in ATEX certified installations. O-rings with other colours, such as yellow, are not allowed.

Right side: Power cable (0367115-xxxx
Middle: Screw (0002267)
Left side: Signal cable (0367114-xxxx)
The colour of the O-ring has to be **brown** (see picture) to be used in ATEX certified installations. O-rings with other colours, such as yellow, are not allowed.

Fixate the actuator.

Loosen the screw
to disassemble the cable relief.

remove the cable relief by
pulling it in the actuators stroke direction.

Remove the plugs or cables.

Insert the cables (0367114-xxxx) and (0367115-xxxx) with ATEX approved O-ring.
The colour of the O-ring has to be **Brown**.

Replacing an ATEX cable

Correct mounting of cables,
The brown O-ring may not be visible.

Incorrect mounting
The brown O-ring is visible
The application is NOT tight

Incorrect mounting
The brown O-ring is visibl
The application is NOT tight

Place the cable relief at the top of the outer tube and slide it all the way down to the housing.

Place and tighten the screw (0002267).
Fasten it to 3 Nm ± 0,5 Nm

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx TUN 14.0021X issue No.:0

Certificate history:

Status: **Current**

Date of Issue: **2015-10-13**

Applicant: **Linak A/S**
Smedevænget 8, Guderup
6430 Nordborg
Denmark

Electrical Apparatus: **Actuator type LA 36**
Optional accessory:

Type of Protection: **Protection by enclosure "tb"**

Marking: EX tb IIIC T135 °C Db

Approved for issue on behalf of the IECEx Certification Body: Andreas Meyer

Position: Head of the Certification Body

Signature:
(for printed version)

Date: 2015-10-13

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

TÜV NORD CERT GmbH
Hanover Office
Am TÜV 1
30519 Hannover
Germany

TÜV NORD

IECEx Certificate of Conformity

Certificate No.: IECEx TUN 14.0021X

Date of Issue: **2015-10-13** Issue No.: **0**

Manufacturer: **Linak A/S**
Smedevænget 8, Guderup
DK-6430 Nordborg
Denmark

Additional Manufacturing location (s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition: 6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-31 : 2013 Edition: 2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:
DE/TUN/ExTR14.0044/00

Quality Assessment Report:

SE/SP/QAR14.0001/00

IECEx Certificate of Conformity

Certificate No.: IECEx TUN 14.0021X

Date of Issue: **2015-10-13** Issue No.: **0**

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The LA36 series of linear actuators creates motion in a straight line, as contrasted with circular motion of a conventional electric motor. The actuator consists of a motor, a gearbox and a spindle that causes the actuator to either extend or retract. The motor housing consists of a two part aluminium assembly with a cork gasket and an aluminium outer tube. The equipment is earthed externally through actuators fixation points: the piston rod eye and the back fixture. The actuators are rated for 12V, 24V or 36V DC with push / pull specifications in the range 500 N to 10.000 N.
Model LA36 can furthermore be delivered with an accessory, called "Rodent protection". This variant is mounted with an external cable gland for mechanical fixing of a cable conduit, to make the power and signal cable rodent protected. This external cable gland has no influence on the Ex-protection principle and the ingress protection is still kept IP6x.

CONDITIONS OF CERTIFICATION: YES as shown below:

1. The max. duty cycle is specified as follows at an ambient temperature of +25 °C:

LOAD 0-6800 [N]	
STROKE	**DUTY CYCLE**
0-600 [mm]	20% int. - Max. 2 [min.] continuous drive followed by 8 [min.] rest.
600-1000 [mm]	15% int. - Max. 3 [min.] continuous drive followed by 17 [min.] rest.

LOAD 10000 [N]	
STROKE	**DUTY CYCLE**
0-1000 [mm]	5% int. - Max. 1 [min.] continuous drive followed by 19 [min.] rest.

2. Ambient temperature area are specified to -25 °C to + 65 °C
3. The power supply cable is of special design fulfilling IP 6X ingress protection. The cable can be delivered in different lengths. Only cables delivered by Linak must be mounted.
4. The connection between the actuator and the fixing points must be conductive and furthermore the application must be grounded in order to remove any electrostatic charge. This relates to both the fixing point on the motor housing and the point on the piston rod.
5. The supply cable is not UV-resistant and must be protected from direct sunlight.

IECEx Certificate of Conformity

Certificate No.: IECEx TUN 14.0021X

Date of Issue: **2015-10-13** Issue No.: **0**

Additional information:

The electrical data are as follows:

Supply (brown and blue)

Type 1 U_n = 12 VDC ± 20%
I_{max} = 26 A

Type 2 U_n = 24 VDC ± 10%
I_{max} = 13

Type 3 U_n = 36 VDC ± 10%
I_{max} = 10 A

Signal Power suppy (red and black)

U_n = 12 - 24 VDC
I_n = 40 mA

The ambient temperature range is:
-25°C up to 65°C

(1) # EC-Type-Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**

(3)	**Certificate Number**	**TÜV 15 ATEX 143747 X**
(4)	for the equipment:	Linear Actuator Model: LA36 series
(5)	of the manufacturer:	**LINAK A/S**
(6)	Address:	Smedevænget 8, Guderup 6430 Nordborg
	Order number:	8000 436006
	Date of issue:	2015-10-13

(7) The design of this equipment or protective system and any acceptable variation thereto are specified in the schedule to this EC-Type-Examination Certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 15 203 143747.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2012 **EN 60079-31:2014**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:

II 2D Ex tb IIIC T135°C Db

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Meyer

Hanover office, Am TÜV 1, 30519 Hannover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

(13) SCHEDULE

(14) EC-Type-Examination Certificate No. TÜV 15 ATEX 143747 X

(15) Description of equipment

The LA36 series of linear actuators creates motion in a straight line, as contrasted with circular motion of a conventional electric motor. The actuator consists of a motor, a gearbox and a spindle that causes the actuator to either extend or retract. The motor housing consists of a two part aluminium assembly with a cork gasket and an aluminium outer tube. The equipment is earthed externally through actuators fixation points: the piston rod eye and the back fixture. The actuators are rated for 12V, 24V or 36V DC with push / pull specifications in the range 500 N to 10000 N.

Type variants:
The LA36 series of linear actuators can be delivered in different type variants in accordance with the manufacturers ordering nomenclature (below). The different type variants, which does not involve the design of the motor housing itself, has no influence on the Ex-protection principle Ex tb IIIC T135°C Db as long as the supplied power cable are delivered by the manufacturer.

Model LA36 can furthermore be delivered with an accessory, called "Rodent protection". This variant is mounted with an external cable gland for mechanical fixing of a cable conduit, to make the power and signal cable rodent protected. This external cable gland has no influence on the Ex-protection principle and the ingress protection is still kept IP6x.

Actuator type	Spindle Pitch	Stroke length	Safety	Feedback	Platform	Motortype	IP degree		Colour	Back fixture	Piston rod eye orientation	Gear	Brake	BID	Fire category	Plug type	Cable	Safety factor	Not specified	Not used
36	***	***	*	*	**	*	*	-	*	*	*	*	*	****	*	*	*	*	*	

The actuator are certified under the type LA36 including various type variants which has no influence on the ingress protection / Ex-protection principle. The manufacturers "Scheduled Drawings" specify the fixed part of the construction.

Supply (brown and blue)

Type 1	U_n	=	12	VDC	+ 20%
	I_{max}	=	26	A	
Type 2	U_n	=	24	VDC	+ 10%
	I_{max}	=	13	A	
Type 2	U_n	=	36	VDC	+ 10%
	I_{max}	=	10	A	

Signal Power suppy (red and black)

U_n	=	12 - 24	VDC
I_n	=	40	mA

Schedule EC-Type Examination Certificate No. TÜV 15 ATEX 143747 X

(16) Test documents are listed in the test report No. 15 203 143747

(17) Special conditions for safe use

1. The max duty cycle specified at an ambient of +25 °C.

LOAD 0-6800 [N]	
STROKE	**DUTY CYCLE**
0-600 [mm]	20% int. - Max. 2 [min.] continuous drive followed by 8 [min.] rest.
600-1000 [mm]	15% int. - Max. 3 [min.] continuous drive followed by 17 [min.] rest.

LOAD 10000 [N]	
STROKE	**DUTY CYCLE**
0-1000 [mm]	5% int. - Max. 1 [min.] continuous drive followed by 19 [min.] rest.

2. Ambient temperature area are specified to -25 °C to + 65 °C
3. The power supply cable is of special design fulfilling IP 6X ingress protection. The cable can be delivered in different lengths. Only cables delivered by Linak must be mounted.
4. The connection between the actuator and the fixing points must be conductive and furthermore the application must be grounded in order to remove any electrostatic charge. This relates to both the fixing point on the motor housing and the point on the piston rod.

(18) Essential Health and Safety Requirements

no additional ones

FACTORIES

CHINA
LINAK (SHENZHEN) ACTUATOR SYSTEMS, LTD.
PHONE: +86 755 8610 6656
PHONE: +86 755 8610 6990
WWW.LINAK.CN

DENMARK - HEADQUARTERS
LINAK A/S
PHONE: +45 73 15 15 15
FAX: +45 74 45 80 48
FAX (SALES): +45 73 15 16 13
WWW.LINAK.COM

SLOVAKIA
LINAK SLOVAKIA S.R.O.
PHONE: +421 51 7563 444
WWW.LINAK.SK

THAILAND
LINAK APAC LTD.
PHONE: +66 33 265 400
WWW.LINAK.COM

USA
LINAK U.S. INC.
AMERICAS HEADQUARTERS
PHONE: +1 502 253 5595
FAX: +1 502 253 5596
WWW.LINAK-US.COM
WWW.LINAK-LATINAMERICA.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 - www.linak.hu

Belgium
LINAK Actuator-Systems NV/SA
(Belgium & Luxembourg)
Phone: +32 (0)9 230 01 09
E-mail: beinfo@linak.be
www.linak.be - www.fr.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: +42 058 174 1814
Fax: +42 058 170 2452
E-mail: info@linak.cz
www.linak.cz - www.linak.sk

Denmark - International
LINAK International
Phone: +45 73 15 15 15
E-mail: info@linak.com
www.linak.com

Denmark - Sales
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
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 4531797
Fax: +91 120 4786428
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 /
+31 76 200 11 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.com.au

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

Poland
LINAK Polska
LINAK Danmark A/S (Spólka Akcyjna)
Phone: +48 22 295 09 70 /
+48 22 295 09 71
E-mail: info@linak.pl
www.linak.pl

Republic of Korea
LINAK Korea Ltd.
Phone: +82 2 6231 1515
Fax: +82 2 6231 1516
E-mail: info@linak.kr
www.linak.kr

Slovakia
LINAK SLOVAKIA S.R.O.
Phone: +421 51 7563 444
www.linak.sk

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 - www.fr.linak.ch
www.it.linak.ch

Taiwan
LINAK (Shenzhen) Actuator systems Ltd.
Taiwan Representative office
Phone: +886 2 272 90068
Fax: +886 2 272 90096
E-mail: sales@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

Argentina
NOVOTEC ARGENTINA SRL
Phone: 011-4303-8989 / 8900
Fax: 011-4032-0184
E-mail: info@novotecargentina.com
www.novotecargentina.com

Colombia
MEM Ltda
Phone: +[57] (1) 334-7666
Fax: +[57] (1) 282-1684
E-mail: servicioalcliente@memltda.com.co
www.mem.net.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,
+6 221 544 8965
Fax: +6 221 619 1925
Fax (Sales): +6 221 619 4658
E-mail: hejplastic-div@centrin.net.id
www.hej.co.id

Israel
NetivTech LTD
Phone: +972 55-2266-535
Fax: +972 2-9900-560
Email: info@NetivTech.com
www.netivtech.com

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

South Africa
Industrial Specialised Applications CC
Phone: +27 011 466 0346
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

LINAK®
WE IMPROVE YOUR LIFE