TECHLINE®
IMPROVING FLEXIBILITY



Actuator LA25
User manual

LINAK®
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Preface

Dear User,

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

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

We are sure that your LINAK product/system will give you many years of problem-free operation. Before our products leave the factory they undergo full function and quality testing. Should you nevertheless experience problems with your LINAK product/system, you are always welcome to contact your local dealer. LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you.

LINAK provides a warranty on all its products. This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly and any repairs being carried out at a service centre, which is authorised to repair LINAK products.
Changes in installation and use of LINAK products/systems can affect their operation and durability. The products are not to be opened by unauthorised personnel.

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

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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.

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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.

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During operation, please be aware of the following:

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

When the equipment is not in use:

- Switch off the mains supply in order to prevent unintentional operation.
- Check regularly for extraordinary wear.

Classification

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



Warnings

- Do not sideload the actuator.
- When mounting the actuator in the application ensure that the bolts can withstand the wear and that they are secured safely.
- If irregularities are observed, the actuator must be replaced.
- For actuators with a stroke length below 50mm, the extended position of the mechanical endstop will always be at 50mm. That means, if an actuator has a stroke of 20mm and the endstop switch in outwards direction fails, the actuator will travel additional 30mm before reaching mechanical endstop.



Recommendations

- Do not place load on the actuator housing and do prevent impact or blows, or any other form of stress to the housing.
- Ensure that the cable cover is mounted correctly. Use 1.5Nm torque.
- Ensure that the duty cycle and the usage temperatures for LA25 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.

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IECEx/ATEX

The IECEx/ATEX certified LA25 (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 only for dust, and NOT for gas.

The IECEx/ATEX versions are suitable for applications in Group IIIC, Category 2D. Zone 21 and 22.

Warnings

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

- Actuator specifications must be complied with
- If the actuator has no built-in current cut-off, one must be mounted
- 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
- Only special educated LINAK employees is allowed to change or mount IECE/ATEX approved cables.
- Afterwards It is crucial that the tightness is verified before the actuator is powered up.

Operation of the device is only valid if:

- The product is used under the conditions described in the installation - and operation instruction
- Ambient operating temperature -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
- Not to be opened in areas with dust, and never by unauthorized personnel
- 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 approval. No changes are to be made on the actuator after delivery

This manual is part of the equipment. The manufacturer keeps the right to modify specifications without advanced notice. Keep this manual for later use.

* LA25 IECEx/ATEX cable item no.	Length (mm) outside the actuator
0147006 - 850	790
0147006 - 1600	1540
0147006 - 5100	5040

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IECEx/ATEX

General indication of risk:

Installation of the device shall be performed by trained staff only, familiar with the safety requirements and risks. Check all relevant safety regulations and technical indications for the specific installation place.
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 regarded
- 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 authorised persons only
- Only perform mounting described in this manual

During maintenance regard all safety regulations and internal operation instructions.

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Chapter 2

Mounting guidelines

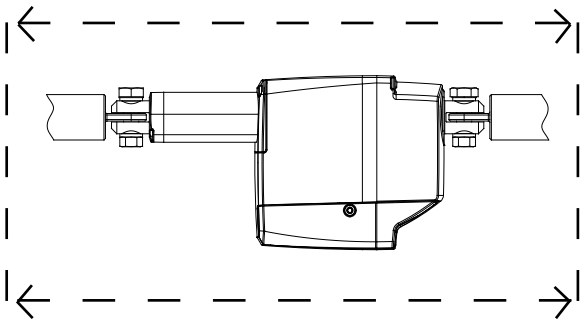
LINAK® linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the units and into brackets on the machine frame and the load.

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 as off-centre loads may cause bending and lead to premature failure. See Figure 2.

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

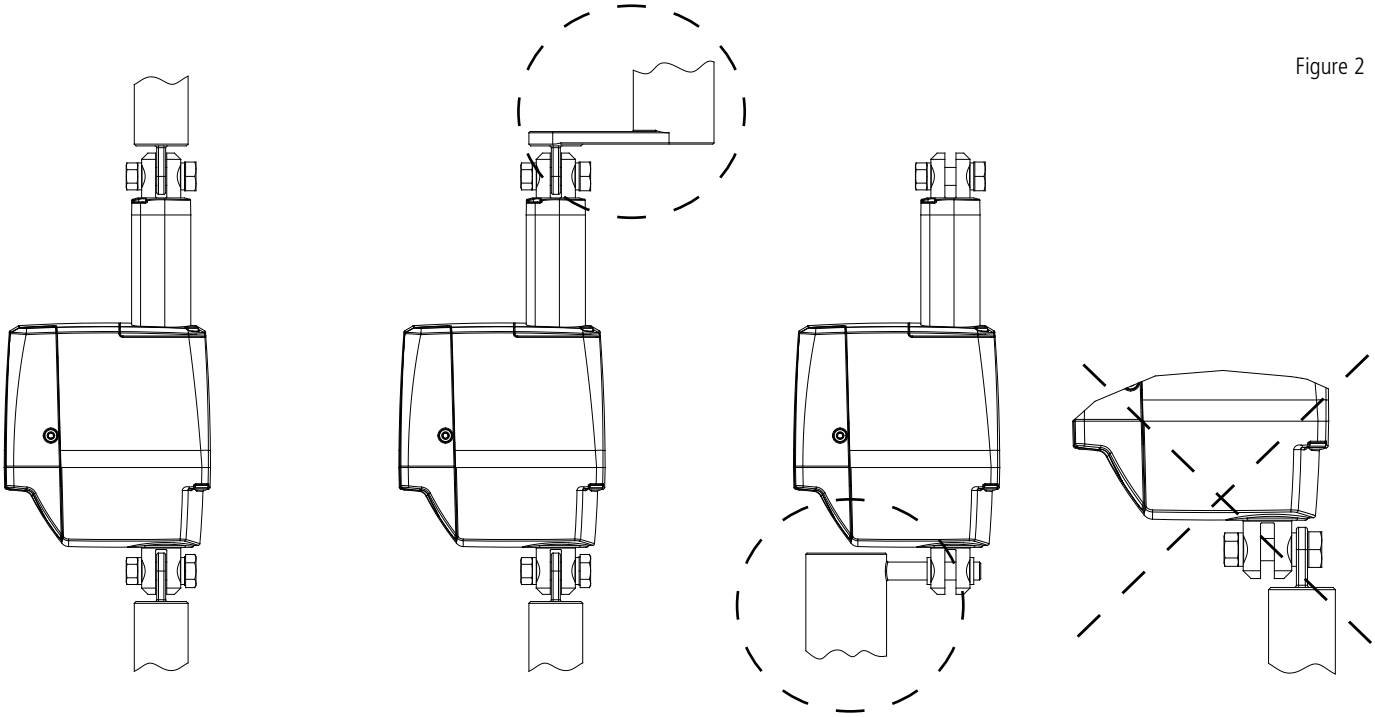
Figure 1



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

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

Figure 2



Right **Wrong** **Wrong** **Wrong**

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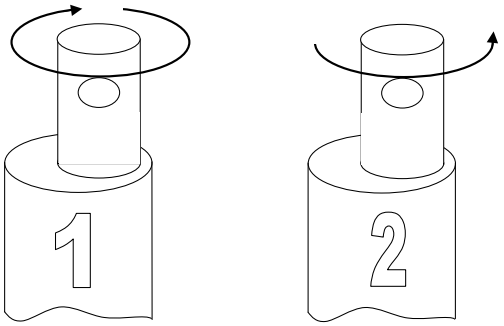
Mounting guidelines

- 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.



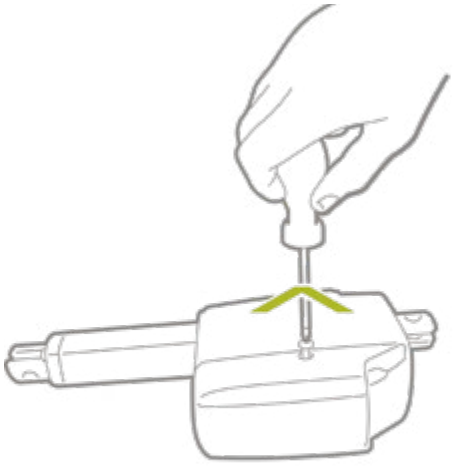
Warning!
If the actuator is used for pull in an application where personal injury can occur, the following is valid:
It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail

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

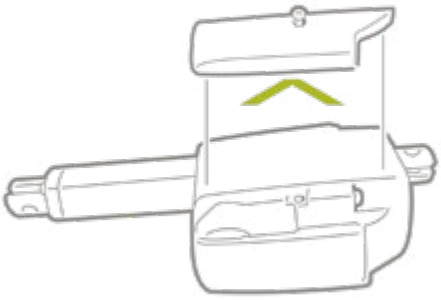
- Offshore installations
- Nuclear power generation
- Aeroplanes and other aircraft

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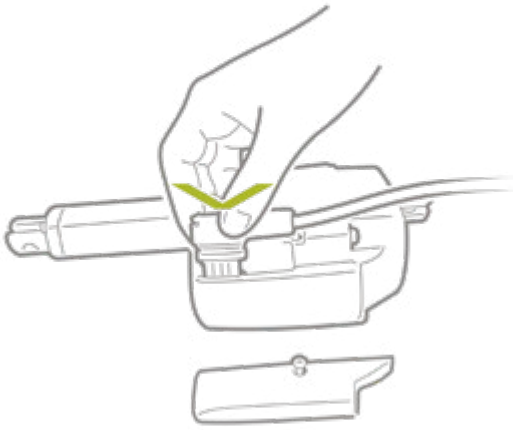
Mounting of cables



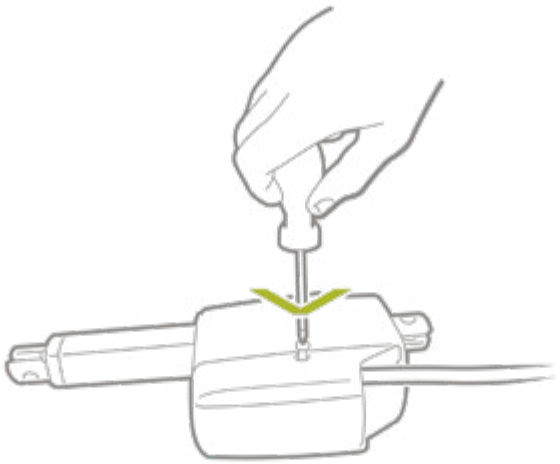
1. Unscrew the cover



2. Remove the cover



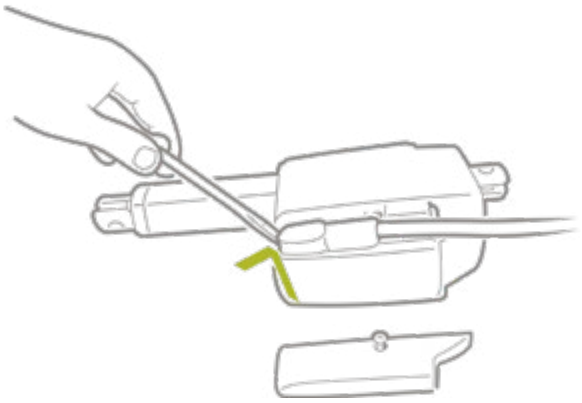
3. Plug in the cable gently without using any tools



4. Screw the cover back onto the actuator

   The torque of the cover screw is approx. 1.5 Nm

Removing cables



5. Use a screwdriver to pull up the cable

- 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.
  Note that the cable 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.

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Electrical installation

- To ensure maximum self-locking ability, please be sure that the motor is shorted when stopped. Actuators with integrated controller provide this feature, as long as the actuator is powered.
- When using soft stop on a DC-motor, a short peak of higher voltage will be sent back towards the power supply. It is important when selecting the power supply that it does not turn off the output, when this backwards load dump occurs.

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

Recommended fuse for actuators without integrated controller

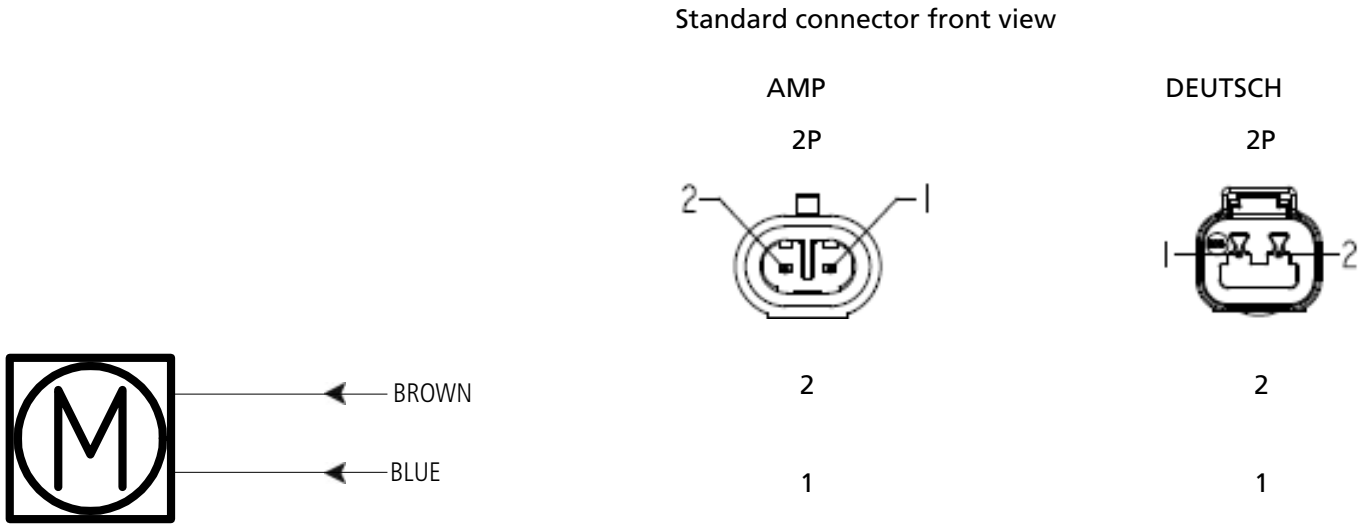
Type	Spindle Pitch (mm)	Thrust max. Push/Pull (N)	Typical Amp. at full load (A) 24V - 12V		Recommended fuse 24V - 12V	
25030xxxxxxxxA...	3	2500	-	3.8	-	10A
25060xxxxxxxxA...	6	1500	-	3.8	-	10A
25090xxxxxxxxA...	9	1200	-	4.0	-	10A
25120xxxxxxxxA...	12	900	-	3.8	-	10A
25200xxxxxxxxA...	20	600	-	4.0	-	10A
25030xxxxxxxxB...	3	2500	1.9	-	6A	-
25060xxxxxxxxB...	6	1500	1.9	-	6A	-
25090xxxxxxxxB...	9	1200	2.0	-	6A	-
25120xxxxxxxxB...	12	900	1.9	-	6A	-
25200xxxxxxxxB...	20	600	2.0	-	6A	-

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Actuator without feedback

Connection diagram:

Fig. 1 : 25xxxxxxxx000x0x=xxxxx00xxxxxx



I/O specifications:

Input/Output	Specification	Comments
Description	Permanent magnetic DC motor. See connection diagram, fig. 1 above	
Brown	12-24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 5A depending on load 24V, max. 2.5A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Not to be connected	
Black	Not to be connected	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Not to be connected	
White	Not to be connected	

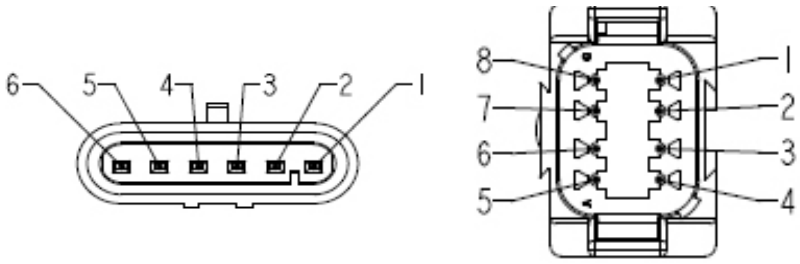
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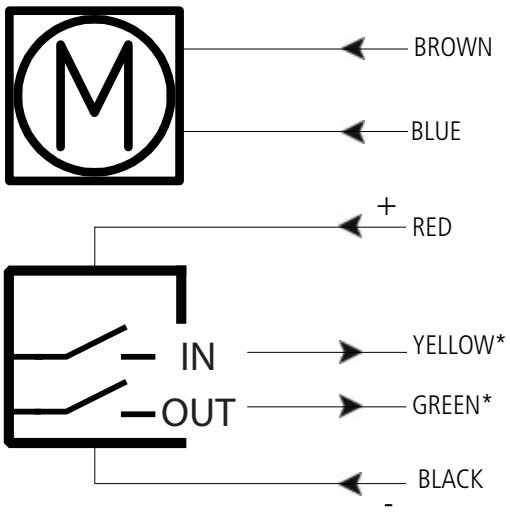
Actuator with endstop signal output

Connection diagram:

Fig. 2 : 25xxxxxxxx000x0x=xxxxx10xxxxxx

Standard connector front view





	AMP 6P	DEUTSCH 8P
BROWN	2	2
BLUE	1	1
RED	4	4
YELLOW*	5	7
GREEN*	6	8
BLACK	3	3

*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.

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Actuator with endstop signal output

I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronically controlled endstop signals out. See connection diagram, fig. 2, page 16	
Brown	12-24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 5A depending on load 24V, max. 2.5A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 40mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Not to be connected	
White	Not to be connected	

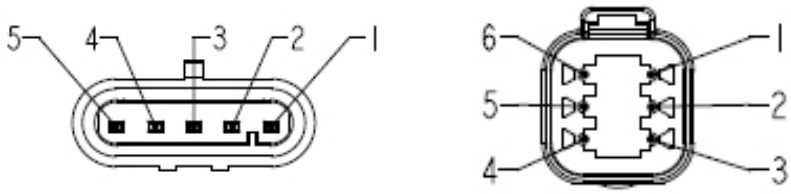
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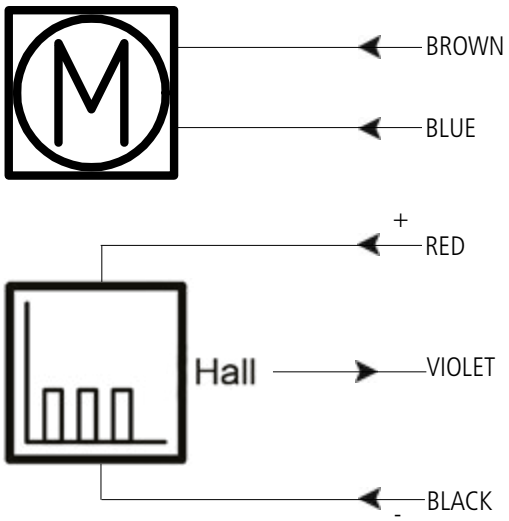
Actuator with relative positioning - Single Hall

Connection diagram:

Fig. 3 : 25xxxxxxxx0K0x0x=xxxxx00xxxxxx

Standard connector front view





	AMP 5P	DEUTSCH 6P
BROWN	2	2
BLUE	1	1
RED	4	4
VIOLET	5	6
BLACK	3	3

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Actuator with relative positioning - Single Hall

I/O specifications:

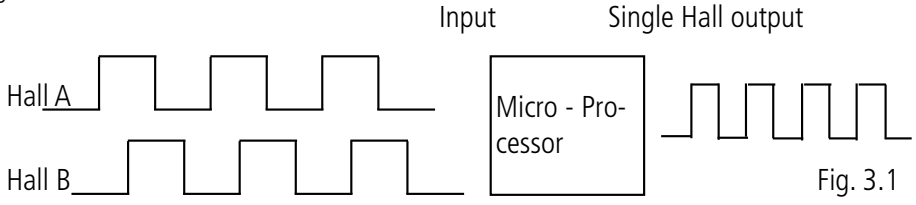
<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.
See connection diagram, fig. 3, page 18</td><td>
</td></tr>
<tr><td>Brown</td><td rowspan="2">12-24VDC (+/-)
12V ± 20%
24V ± 10%
Under normal conditions:
12V, max. 5A depending on load
24V, max. 2.5A depending on load</td><td>To extend actuator:
Connect Brown to positive
To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative
To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td>Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 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 rowspan="2">Violet</td><td>Single Hall output (PNP)
Movement per single Hall pulse:
LA25030 Actuator = 0.25 mm per pulse
LA25060 Actuator = 0.5 mm per pulse
LA25090 Actuator = 0.75 mm per pulse
LA25120 Actuator = 1.0 mm per pulse
LA25200 Actuator = 1.7 mm per pulse
Frequency:
Frequency is 10-20Hz on Single Hall output depending on load.
Pulse ON time is minimum 8ms.OFF time between two ON pulses is minimum 8ms.
Overvoltage on the motor can result in shorter pulses.</td><td>Output voltage min. V_{IN} - 2V
Max. current output: 12mA
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">Diagram of Single Hall:


Fig. 3.1</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

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Actuator with endstop signals and relative positioning - Single Hall

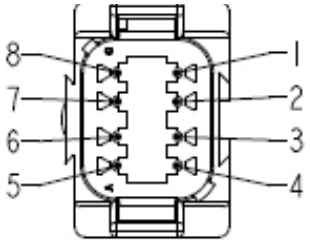
Connection diagram:

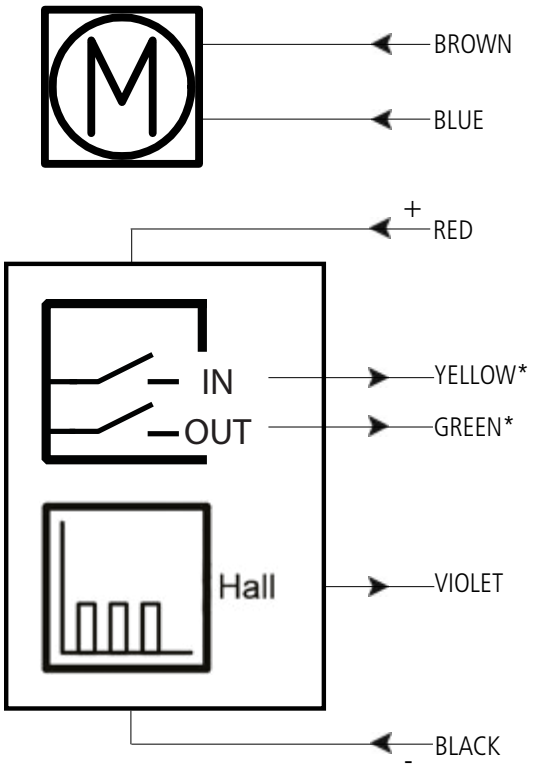
Fig. 4 : 25xxxxxxxx0K0x0x=xxxxx10xxxxxx

Standard connector front view

DEUTSCH

8P





2	
1	
4	
7	
8	
6	
3	

*YELLOW/GREEN: Endstop signals out are NOT potential free! (See I/O Specifications, page 17)

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

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Actuator with endstop signals and relative positioning - Single Hall

I/O specifications:

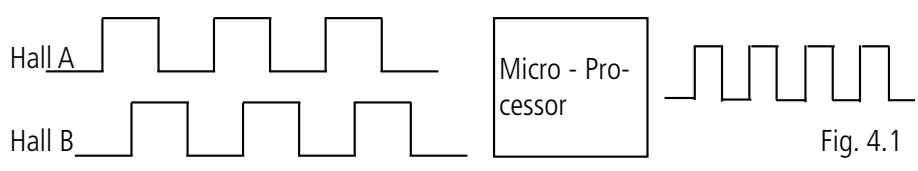
<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.
See connection diagram,
fig. 4, page 20</td><td>
</td></tr>
<tr><td>Brown</td><td rowspan="2">12-24VDC (+/-)
12V ± 20%
24V ± 10%
Under normal conditions:
12V, max. 5A depending on load
24V, max. 2.5A depending on load</td><td>To extend actuator:
Connect Brown to positive
To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative
To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td>Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 40mA, also when the actuator is not running</td></tr>
<tr><td>Black</td><td>Signal power supply GND (-)</td></tr>
<tr><td>Green</td><td>Endstop signal out</td><td rowspan="2">Output voltage min. V_{IN} - 2V
Source current max. 100mA
NOT potential free</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 single Hall pulse:
LA25030 Actuator = 0.25 mm per pulse
LA25060 Actuator = 0.5 mm per pulse
LA25090 Actuator = 0.75 mm per pulse
LA25120 Actuator = 1.0 mm per pulse
LA25200 Actuator = 1.7 mm per pulse
Frequency:
Frequency is 10-20Hz on Single Hall output depending on load.
Pulse ON time is minimum 8ms.OFF time between two ON pulses is minimum 8ms.
Overvoltage on the motor can result in shorter pulses.</td><td>Output voltage min. V_{IN} - 2V
Max. current output: 12mA
Max. 680nF
N.B. For more precise measurements, please contact LINAK A/S.
Low frequency with a high load.Higher frequency with no load.</td></tr>
<tr><td>Diagram of Single Hall:


Fig. 4.1</td><td></td></tr>
<tr><td>White</td><td>Not to be connected</td><td></td></tr>
</table>

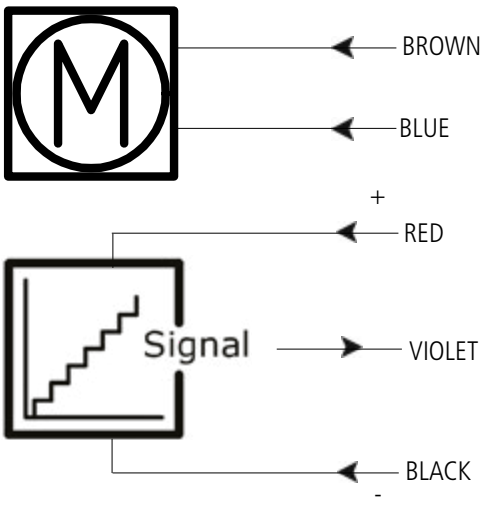
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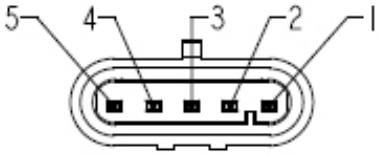
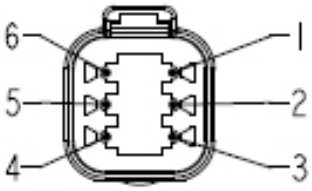
Actuator with absolute positioning - Analogue feedback

Connection diagram:

Fig. 5 : 25xxxxxxxx0A0x0x=xxxxx0xxxxxxx

Standard connector front view



	AMP	DEUTSCH
	5P	6P
		
	2	2
	1	1
	4	4
	5	6
	3	3

© 2020 LINAK A/S

Actuator with absolute positioning - Analogue feedback

I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 5, page 22	
Brown	12 - 24 V DC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 5A depending on load 24V, max. 2.5A 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 - 24 V DC	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 0-10V (Feedback level 1) 0.5-4.5V (Feedback level 2)	Tolerances +/- 0.2 V Max. current output: 1 mA Ripple max. 200 mV Transaction delay max. 20 ms Linear feedback 0.5% Source current max. 1 mA
	4-20mA (Feedback level 3) Special (Feedback level 9)	Tolerances +/- 0.2 mA Transaction delay 20ms Linear feedback 0.5% Output: Source Serial resistance: 12V max 300 ohm 24V max. 900 ohm
	For all analogue feedbacks 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	

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Actuator with endstop signals and absolute positioning - Analogue feedback

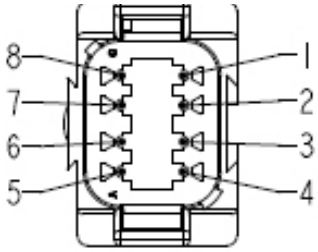
Connection diagram:

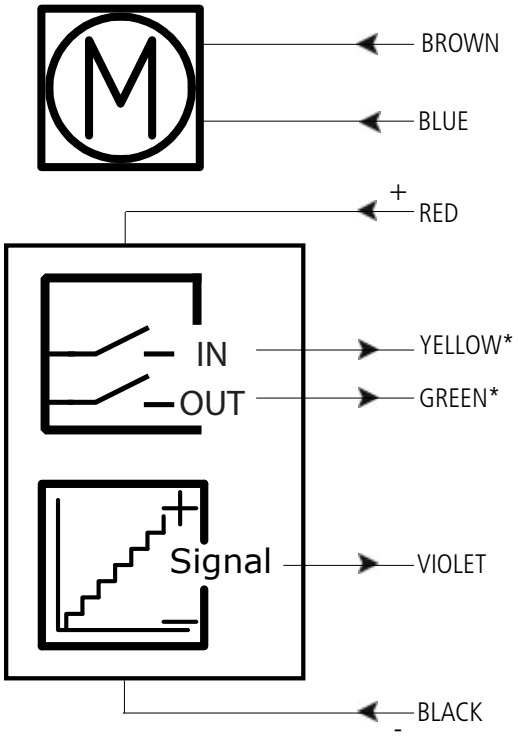
Fig. 6 : 25xxxxxxxx0A0x0x=xxxxx1xxxxxxx

Standard connector front view

DEUTSCH

8P





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*YELLOW/GREEN: Endstop signals out are NOT potential free! (See I/O Specifications, page 17)

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

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Actuator with endstop signals and absolute positioning - Analogue feedback

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 electronic circuit that gives an analogue feedback signal when the actuator moves.
See connection diagram,
fig. 6, page 24</td><td>
</td></tr>
<tr><td>Brown</td><td rowspan="2">12-24VDC (+/-)
12V ± 20%
24V ± 10%
Under normal conditions:
12V, max. 5A depending on load
24V, max. 2.5A depending on load</td><td>To extend actuator:
Connect Brown to positive
To retract actuator:
Connect Brown to negative</td></tr>
<tr><td>Blue</td><td>To extend actuator:
Connect Blue to negative
To retract actuator:
Connect Blue to positive</td></tr>
<tr><td>Red</td><td>Signal power supply (+)
12-24VDC</td><td rowspan="2">Current consumption:
Max. 60mA, 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} - 2V
Source current max. 100mA
NOT potential free</td></tr>
<tr><td>Yellow</td><td>Endstop signal in</td></tr>
<tr><td rowspan="3">Violet</td><td>Analogue feedback
0-10V (Feedback level 1)
0.5-4.5V (Feedback level 2)</td><td>Tolerances +/- 0.2V
Max. current output: 1mA
Ripple max. 200mV
Transaction delay max. 20ms
Linear feedback 0.5%
Source current max. 1mA</td></tr>
<tr><td>4-20mA (Feedback level 3)
Special (Feedback level 9)</td><td>Tolerances +/- 0.2mA
Transaction delay 20ms
Linear feedback 0.5%
Output: Source
Serial resistance:
12V max 300 ohm
24V max. 900 ohm</td></tr>
<tr><td colspan="2">For all analogue feedbacks it is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

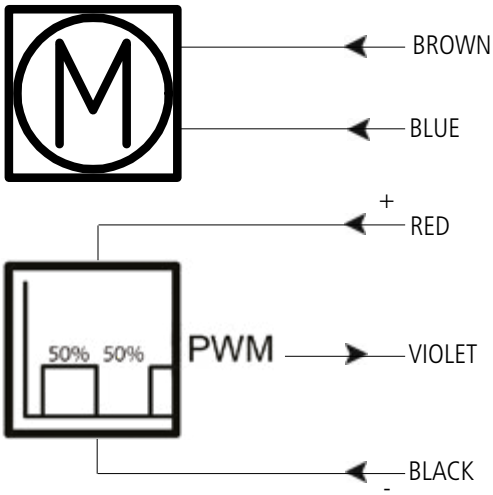
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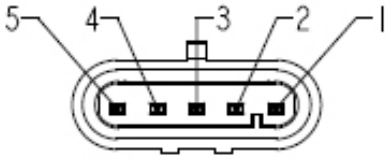
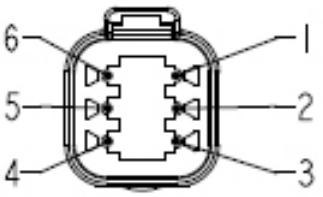
Actuator with absolute positioning - PWM

Connection diagram:

Fig. 7 : 25xxxxxxxx0F0x0x=xxxxx0xxxxxxx

Standard connector front view



	AMP 5P	DEUTSCH 6P
		
	2	2
	1	1
	4	4
	5	6
	3	3

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Actuator with absolute positioning - PWM

I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 7, page 26	
Brown	12-24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 5A depending on load 24V, max. 2.5A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 40 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 10-90% (Feedback level 4) 20-80% (Feedback level 5) Special (Feedback level 9)	Output voltage min. V_{IN} - 2V Tolerances +/- 2% Max. current output: 12mA 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	

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Actuator with endstop signals and absolute positioning - PWM

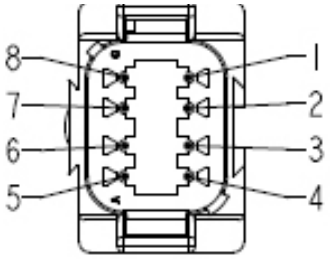
Connection diagram:

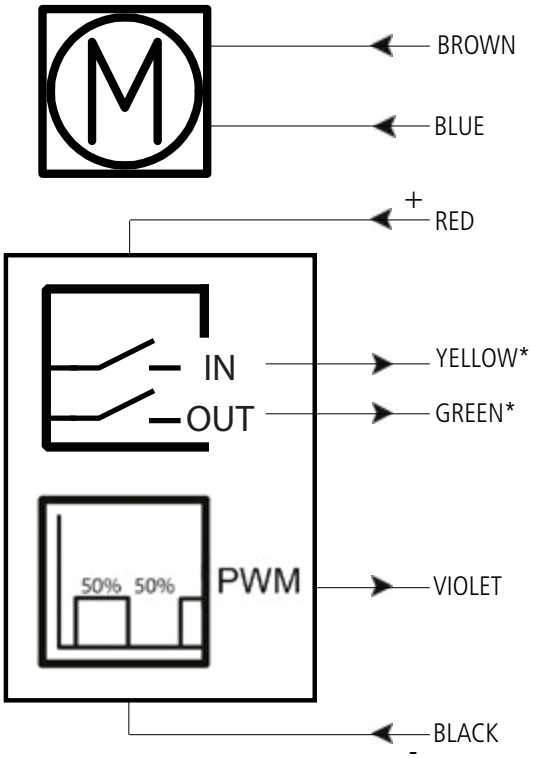
Fig. 8 : 25xxxxxxxx0F0x0x=xxxxx1xxxxxxx

Standard connector front view

DEUTSCH

8P





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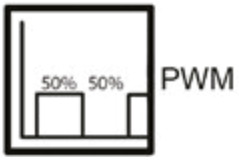
*YELLOW/GREEN: Endstop signals out are NOT potential free! (See I/O Specifications, page 17)

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

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Actuator with endstop signals and absolute positioning - PWM

I/O specifications:

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronic circuit that gives an analogue feedback signal when the actuator moves. See connection diagram, fig. 8, page 28	
Brown	12-24VDC (+/-) 12V ± 20% 24V ± 10% Under normal conditions: 12V, max. 5A depending on load 24V, max. 2.5A depending on load	To extend actuator: Connect Brown to positive To retract actuator: Connect Brown to negative
Blue		To extend actuator: Connect Blue to negative To retract actuator: Connect Blue to positive
Red	Signal power supply (+) 12-24VDC	Current consumption: Max. 40mA, also when the actuator is not running
Black	Signal power supply GND (-)	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA NOT potential free
Yellow	Endstop signal in	
Violet	Digital output feedback 10-90% (Feedback level 4) 20-80% (Feedback level 5) Special (Feedback level 9)	Output voltage min. V_{IN} - 2V Tolerances +/- 2% Max. current output: 12mA 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	

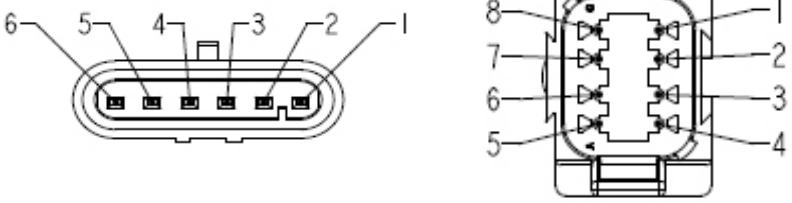
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Actuator with IC Basic

Connection diagram:

Fig. 9 : 25xxxxxxxxxx3x1x=xxxxx18xxxxxx

Standard connector front view



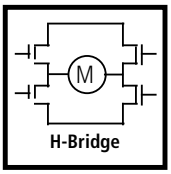
		AMP 6P	DEUTSCH 8P
+	BROWN	2	2
12/24V DC			
M	BLUE	1	1
INWARDS	BLACK	3	3
H-Bridge			
OUTWARDS	RED	4	4
IN	YELLOW	5	7
OUT	GREEN	6	8

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

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Actuator with IC Basic

I/O specifications:

Input/Output	Specification	Comments
Description	Easy to use interface with integrated power electronics (H-bridge). The actuator can also be equipped with electronic circuit that gives an absolute or relative feedback signal. IC Advanced also provides a wide range of possibilities for customisation. The version with "IC option" cannot be operated with PWM (power supply). See connection diagram, fig. 10, page 39	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	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 -10°C, all current limits will automatically increase to 9A for 12V, and 6A for 24V
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA
Black	Retracts the actuator	

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Actuator with IC Basic

I/O specifications:

Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed 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	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.

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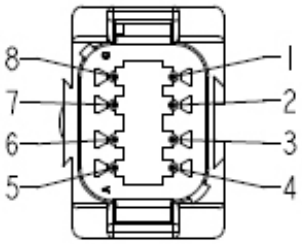
Connection diagram:

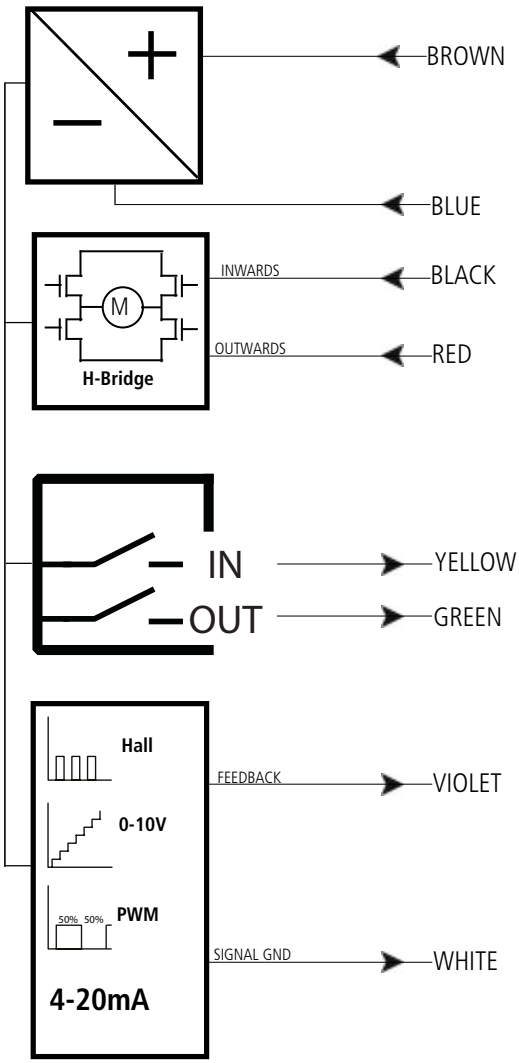
Fig. 10 : 25xxxxxxxxxx3x1x=xxxxx1xxxxxxx

Standard connector front view

DEUTSCH

8P





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

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

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

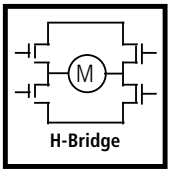
For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: **https://www.linak.com/products/accessories/buslink-software/#/brochuresmanuals**

Please note that the BusLink cables must be purchased separately from the actuator!
Item number for BusLink cable kit: 0147999 (adaptor + USB2Lin)

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Actuator with IC Advanced - with BusLink

I/O specifications:

Input/Output	Specification	Comments
Description	Easy to use interface with integrated power electronics (H-bridge). The actuator can also be equipped with electronic circuit that gives an absolute or relative feedback signal. IC Advanced provides a wide range of possibilities for customisation. The version with "IC option" cannot be operated with PWM (power supply). See connection diagram, fig. 10, page 33	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	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 -10°C, all current limits will automatically increase to 9A for 12V, and 6A for 24V
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA
Black	Retracts the actuator	
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed. 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	

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Actuator with IC Advanced - with BusLink

I/O specifications:

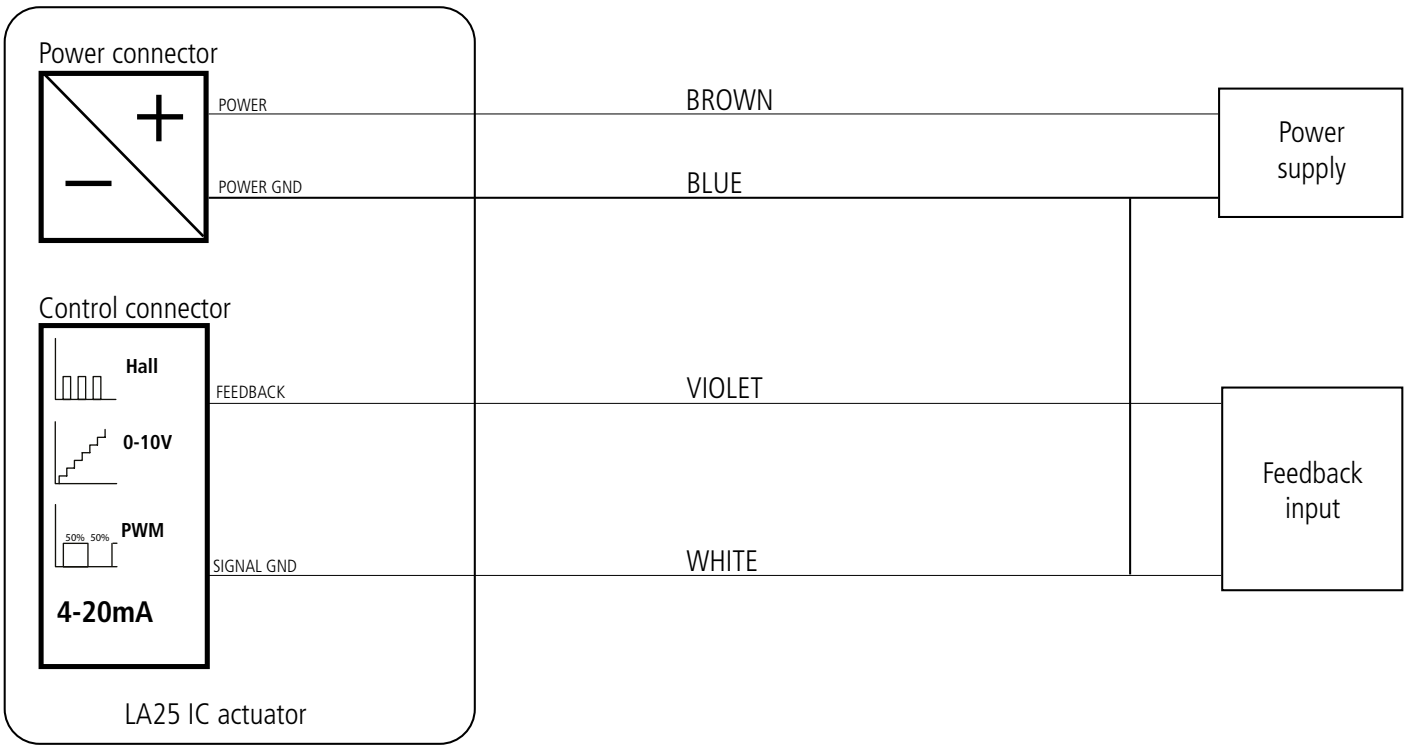
Input/Output	Specification	Comment
Violet	Analogue feedback (0-10V): Configure any high/low combination between 0-10V	Ripple max. 200mV Transaction delay 20ms Linear feedback 0.5% Max. current output. 1mA
	Single Hall output (PNP) Movement per Single Hall pulse: LA25030 Actuator = 0.25 mm per pulse LA25060 Actuator = 0.5 mm per pulse LA25090 Actuator = 0.75 mm per pulse LA25120 Actuator = 1.0 mm per pulse LA25200 Actuator = 1.7 mm per pulse Frequency: Frequency is 10-20 Hz on Single Hall output depending on load. Pulse ON time is minimum 8ms.OFF time between two ON pulses is minimum 8ms. Overvoltage on the motor can result in shorter pulses.	Output voltage min. V_{IN} - 2V Max. current output: 12mA Max. 680nF
	Digital output feedback PWM: Configure any high/low combination between 0-100%	Output voltage min. V_{IN} - 2V Frequency: 75Hz ± 10Hz as standard, but this can be customised. Duty cycle: Any low/high combination between 0 and 100 percent. Open collector source current max. 12mA
	Analogue feedback (4-20mA): Configure any high/low combination between 4-20mA	Tolerances +/- 0.2mA Transaction delay 20ms Linear feedback 0.5% Output: Source Serial resistance: 12V max. 300 ohm 24V max. 900 ohm
	All absolute value feedbacks (0-10V, PWM and 4-20mA)	Standby power consumption: 12V, 60mA 24V, 45mA It is recommendable to have the actuator to activate its limit switches on a regular basis, to ensure more precise positioning
White	Signal GND	For correct wiring of power GND and Signal GND see page 36

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

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

When using the feedback output, it is important to use the right connection setup. Attention should be paid to the two ground connections. Power GND in the Power connector and Signal GND in the Control connector. When using either 0-10V, Hall or PWM feedback, the Signal GND must be used. For optimal accuracy, the Signal GND is connected to the Power GND as close as possible to the feedback input equipment.



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

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IC options overview

	Basic	Advanced	Parallel	LIN bus	CAN Bus	CANopen	IO-Link
Control							
12V, 24V supply	√	√	√	√	√	√	√
H-bridge	√	√	√	√	√	√	√
Manual drive in/out	√	√	√	√	√	√	√
End Stop Signal in/out	√	√	√	√	√	√	-
Soft start/stop	√	√	√	√	√	√	√
Feedback							
Voltage	-	√ *	-	-	-	-	-
Current	-	√ **	-	-	-	-	-
Single Hall	-	√	-	-	-	-	-
PWM	-	√	-	-	-	-	-
Position (mm)	-	-	-	√	√	√	√
Custom feedback type	-	√	-	-	-	-	-
Monitoring							
Temperature monitoring	√	√	√	√	√	√	√
Current cut-off	√	√	√	√	√	√	√
Ready signal	-	-	-	-	-	-	-
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

*** Configure any value between 300ms - 30s

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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 - 10V	Any combination, going negative or positive. E.g. 8.5 – 2.2V 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 - 20mA	Any combination, going negative or positive. E.g. 5.5 – 18mA 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.
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: Single Hall and 0-10V
** Parallel feedback configurations available: EOS

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Actuator configurations available for IC Basic, IC Advanced and Parallel

	Pre-configured	**Customised range** (Not IC Basic)	**Description**
Current limit inwards Current limit outwards	20A for both current limit directions. (When the current outputs are at zero, it means that they are at maximum value 20A). Be aware: When the actuator comes with current cut-off limits that are factory pre-configured for certain values, the pre-configured values will be the new maximum level of current cut-off. This means that if the current cut-off limits are pre-configured to 14A, it will not be possible to change the current limits through BusLink to go higher than 14A.	Recommended range: 4A to 20A If the temperature drops below 0°C, all current limits will automatically increase to approximately 30A, indenpendent of the pre-configured value.	The actuator's unloaded current consumption is very close to 4A, and if the current cut-off is customised below 4A there is a risk that the actuator will not start. The inwards and outwards current limits can be configured separately and do not have to have the same value.
Max. speed inwards/outwards	100% equal to full performance. Please note: for parallel actuators the full performance equals 80% of the max. 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 Virtual endstop outwards	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.	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.

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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			

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Actuator with Parallel

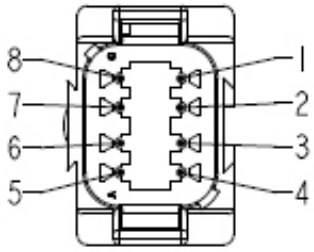
Connection diagram:

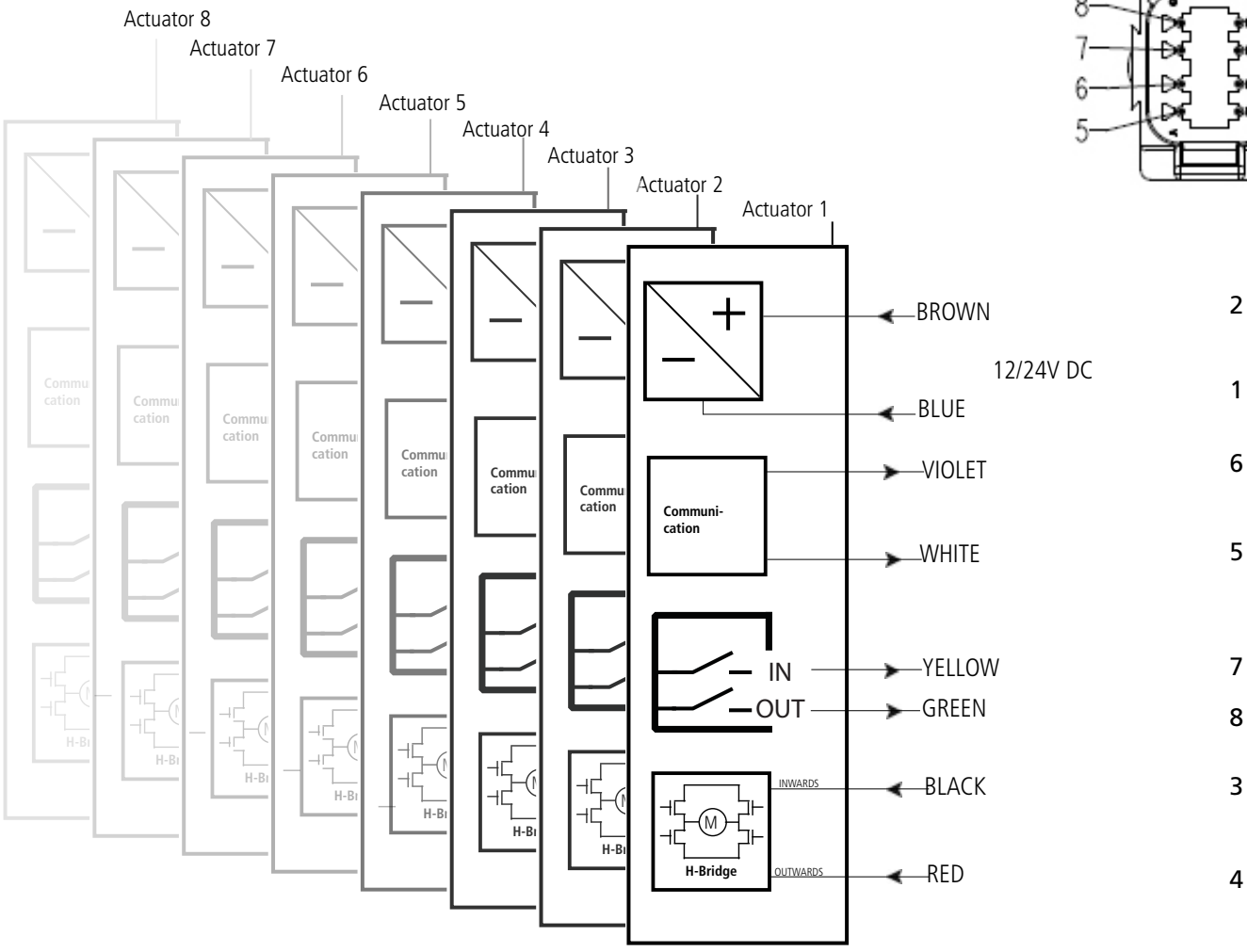
Fig. 11 : 25xxxxxxxxxx3x1x=xxxxx1Zxxxxxx

Standard connector front view

DEUTSCH

8P



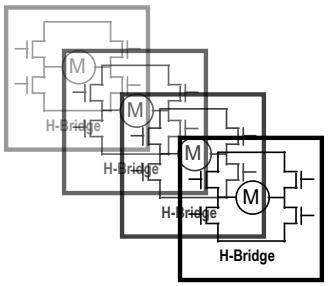


- Please be aware that if the power supply is not properly connected, you might damage the actuator!
- The green and yellow wires from parallel connected actuators must NOT be interconnected.

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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). See connection diagram, fig. 11, page 41	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	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 -10°C, all current limits will automatically increase to 9A for 12V, and 6A for 24V
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	
Red	Extends the actuator	On/off voltages: > 67% of V_{IN} = ON < 33% of V_{IN} = OFF Input current: 10mA It does not matter where the in/out signals are applied. You can either choose to connect the signal cable to one actuator OR you can choose to connect the signal cable to each actuator on the line. Either way this will ensure parallel drive
Black	Retracts the actuator	

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Actuator with Parallel

I/O specifications:

Input/Output	Specification	Comment
Green	Endstop signal out	Output voltage min. V_{IN} - 2V Source current max. 100mA Endstop signals are NOT potential free. Endstop signals can be configured with BusLink software according to any position needed
Yellow	Endstop signal in	
Violet	Parallel communication: Violet cords must be connected together	Standby power consumption: 12V, 60mA 24V, 45mA No feedback available during parallel drive
White	Signal GND: White cords must be connected together	For correct wiring of power GND and Signal GND see page 36

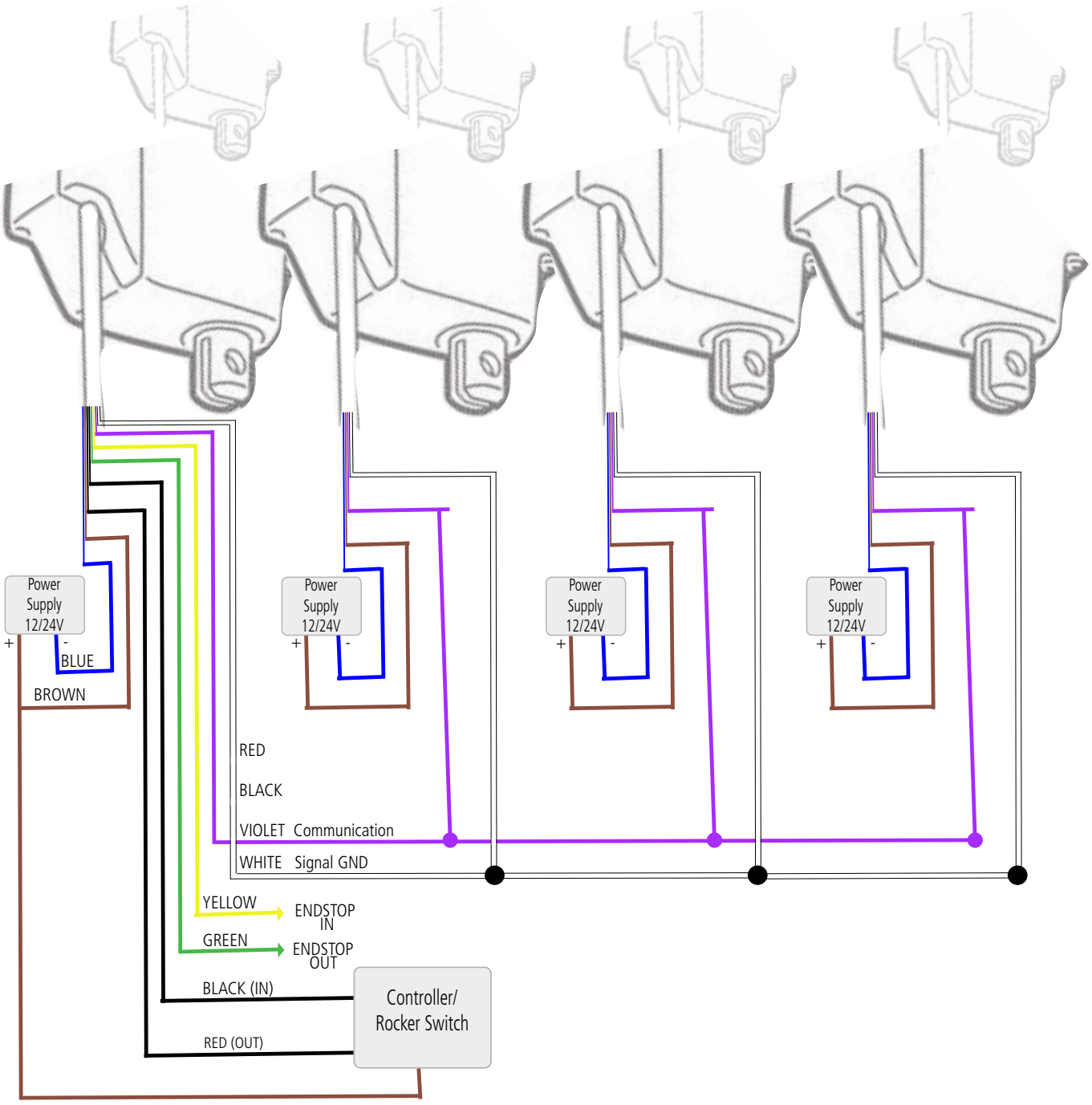


- Current cut-offs should not be used as stop function! This might damage the actuator. Current cut-offs should only be used in emergencies!
- Current cut-off limits are not proportional with the load curves of the actuator. This means that the current cut-offs cannot be used as load indicator.
- There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

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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.

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Buslink software tool and the parallel system

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

The BusLink software can be downloaded on: http://www.linak.com/techline/?id3=2363

For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: https://www.linak.com/products/accessories/buslink-software/#/brochuresmanualsf

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

Item number for BusLink cable kit: 0147999 (adaptor + USB2Lin)



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



The parallel system

- The system does not have to run on one main power supply only – it can be supplied by individual supplies corresponding to the number of actuators in the system. Please respect the actuator specifications regarding voltage level and current consumption!
- It does not matter where the IN/OUT signal is applied. The signals of all actuators can be connected together
- When all actuators are connected, a Master will automatically be chosen. E.g. with 5 actuators in one system there will be 1 Master and 4 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

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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.

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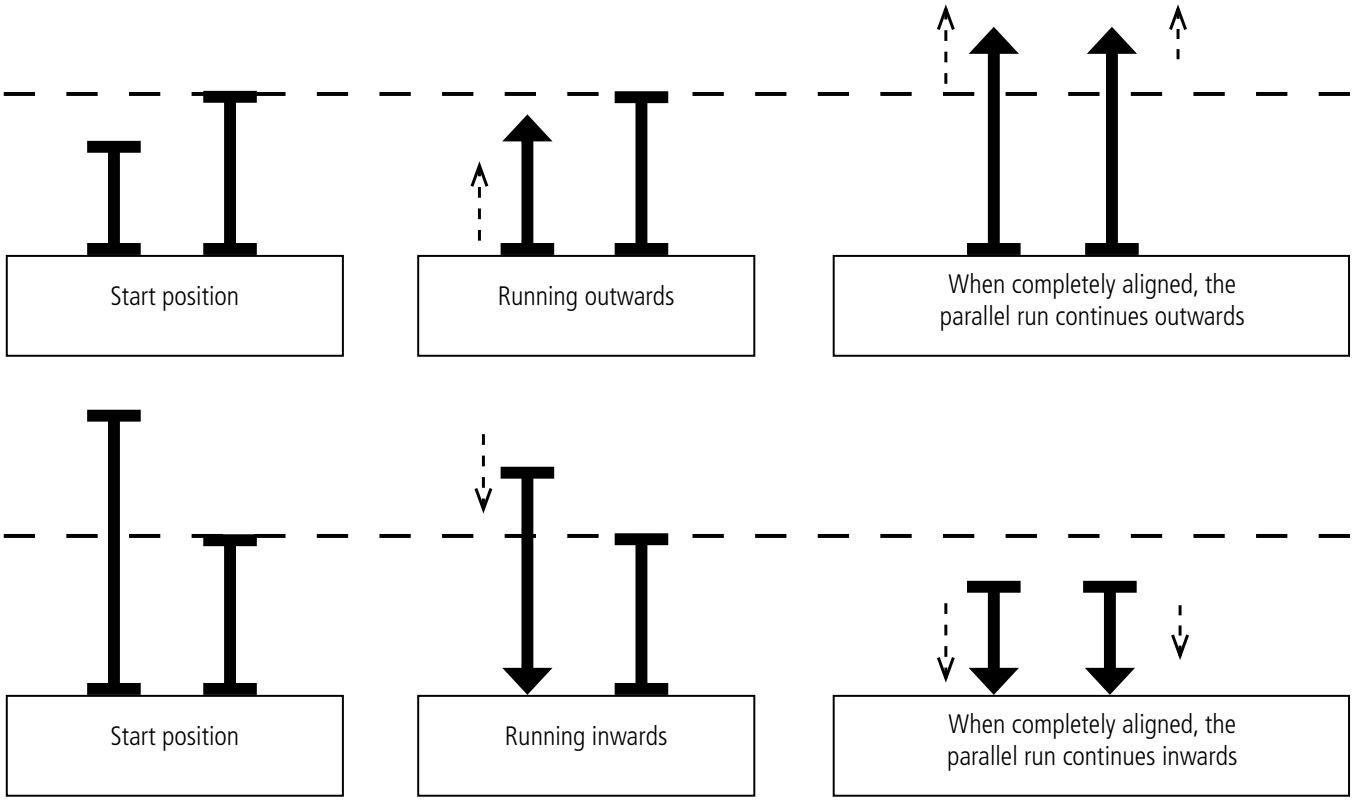
System Monitoring for Parallel

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:



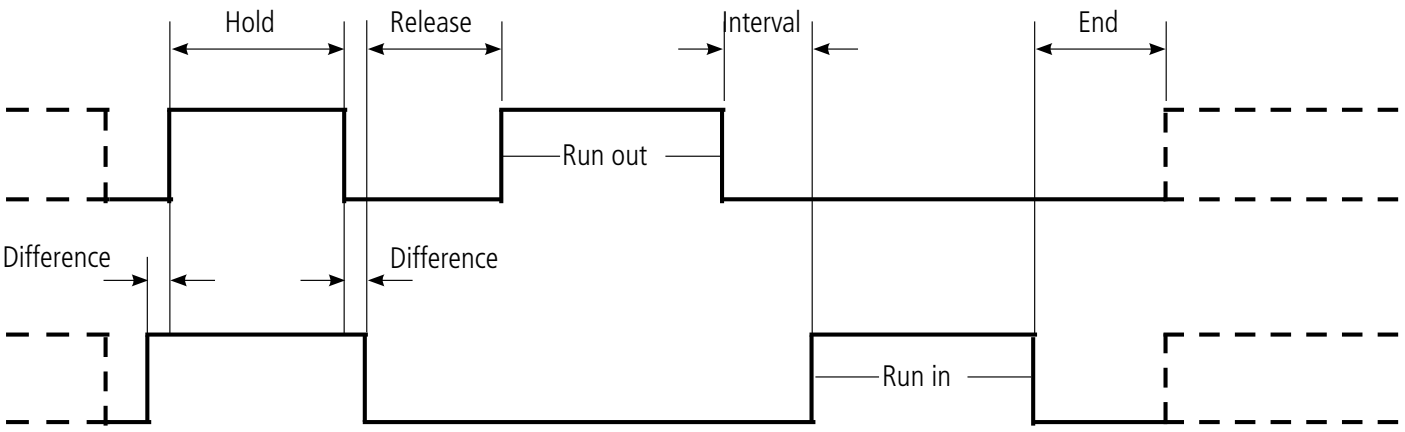
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Parallel manual service mode

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	-	-



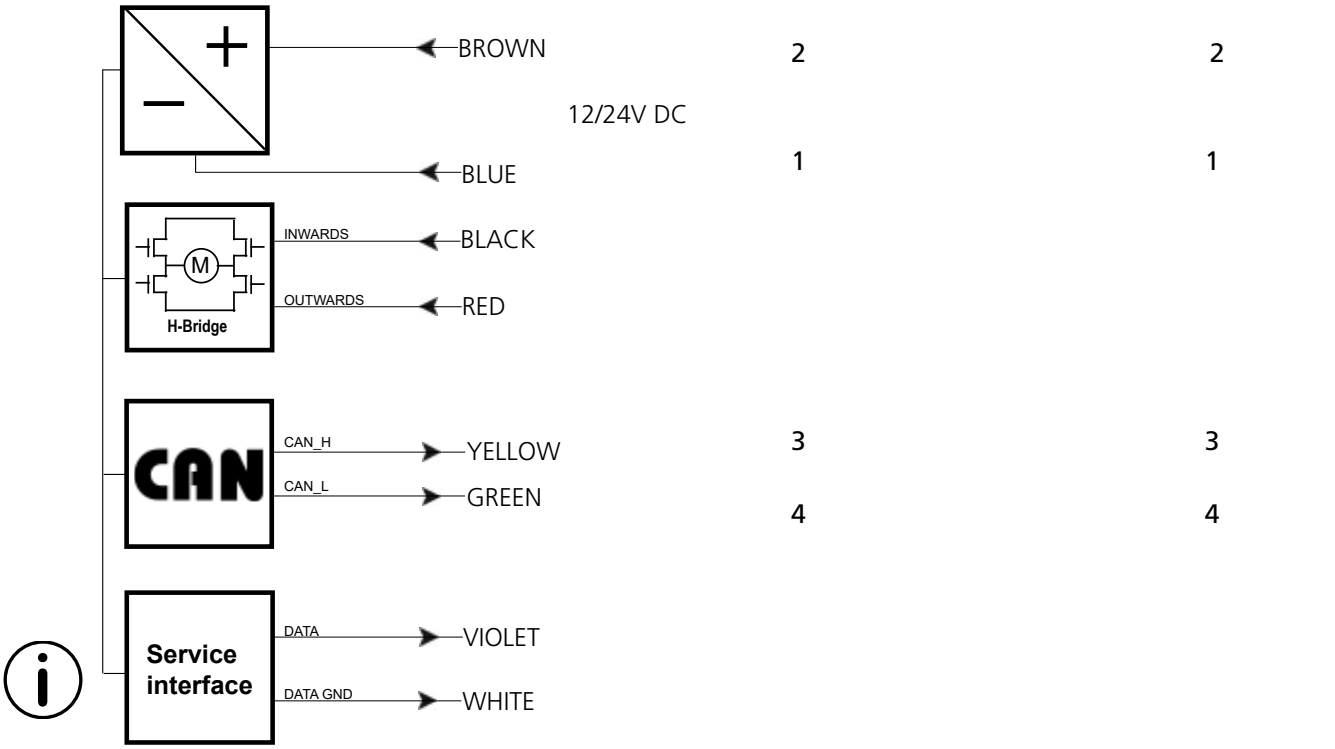
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Actuator with CAN bus:

Connection diagram:

Fig. 12 : 25xxxxxxxxxx7x1x=xxxxx0xxxxxxx

Standard connector front view



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

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

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

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

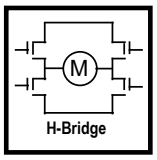
Download BusLink software here: http://www.linak.com/techline/?id3=2363

For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: https://www.linak.com/products/accessories/buslink-software/#/brochuresmanuals

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Actuator with CAN bus:

I/O specifications:

Input/Output	Specification	Comments
Description	Compatible with the SAE J1939 standard. Uses CAN messages to command movement, setting parameters and to deliver feedback from the actuator. See the LINAK CAN bus user manual. Actuator identification is provided, using standard J1939 address claim or fixed addresses. See connection diagram, fig. 12, page 56	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% 24V ± 10% 12V, current limit 8A 24V, current limit 5A	Note: Do not swap the power supply polarity on the brown and blue wires! Power supply GND (-) is electrically connected to the housing Current limit levels can be adjusted through BusLink If the temperature drops below 0°C, all current limits will automatically increase to 9A for 12V and 6A for 24V.
Blue	12-24VDC - (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	LA25 with CAN bus does not contain the 120Ω terminal resistor. The physical layer is in accordance with J1939-15.* Speed: Baudrate: 250 kbps Max bus length: 40 meters Max stub length: 3 meters Max node count: 10 (can be extended to 30 under certain circumstances) Wiring: Unshielded twisted pair Cable impedance: 120 Ω (±10%)
Yellow	CAN_H	

* J1939-15 refers to Twisted Pair and Shielded cables. The standard/default cables delivered with LA25 CAN do not comply with this.

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Actuator with CAN bus:

I/O specifications:

Input/Output	Specification	Comments
Violet	Service interface	Only BusLink can be used as service interface. Use green adapter cable
White	Service interface GND	

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

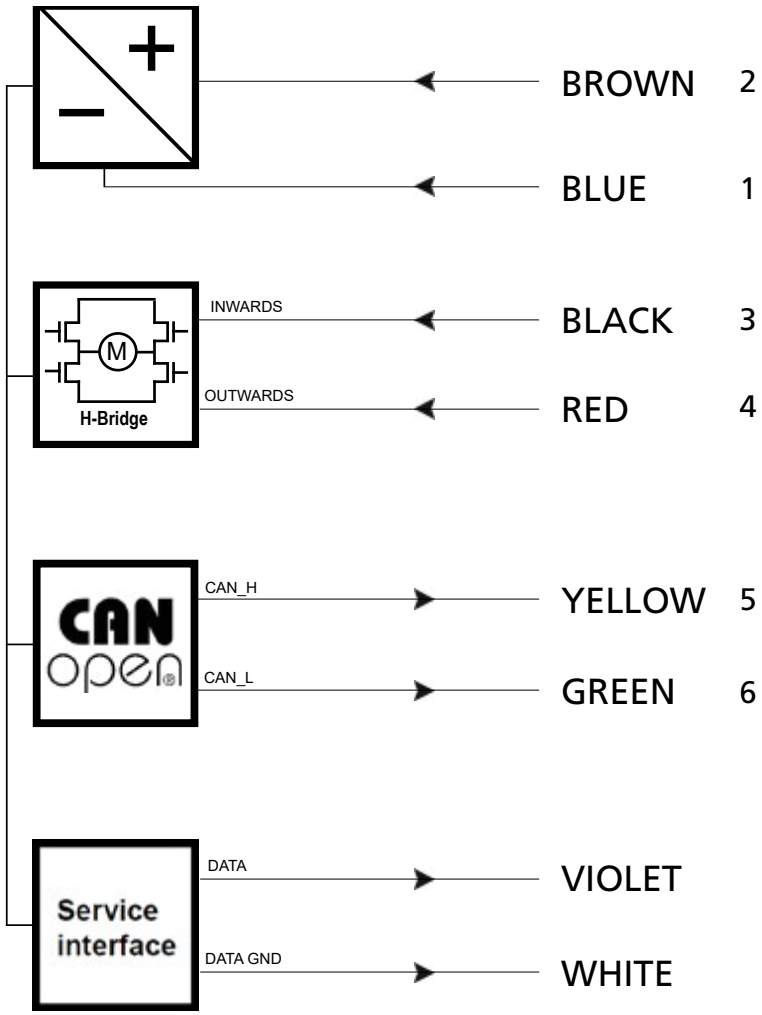
For more information about the usage of CAN bus, please see the LINAK TECHLINE CAN bus user manual.

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Actuator with CANopen

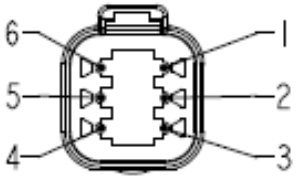
Connection diagram:

Fig. 12 : 25xxxxxxxxxx9B1x=xxxxx00xxxxxx

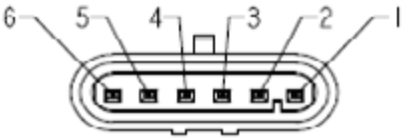


Standard connector front view

DEUTSCH
6P



AMP
6P



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: 0147997 (adapter + USB2Lin)

CANopen actuators are produced and delivered at a postion of 5 mm out.

In case the customer needs the CANopen actuators to be delivered in another endstop position, it can be configured in eCon.

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

Download BusLink software here: http://www.linak.com/techline/?id3=2363
For more information and easy set-up of BusLink, please follow this link to view the Quick Guide for BusLink: https://www.linak.com/products/accessories/buslink-software/#/brochures-manuals

Actuator with CANopen

I/O specifications:

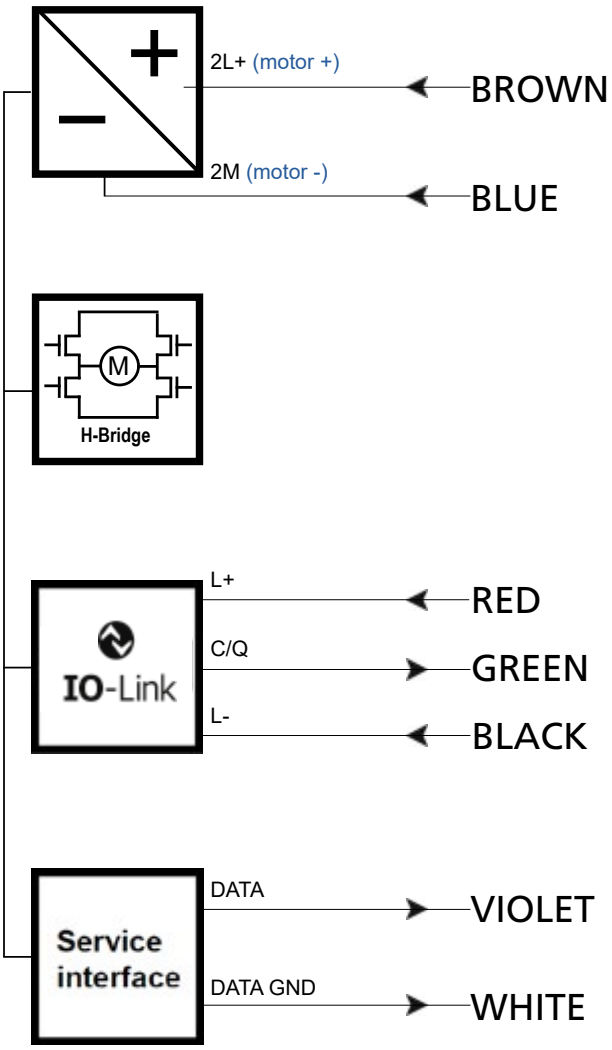
Input/Output	Specification	Comments
Description	Compatible with the CiA 301 standard. Using CANopen messages to command movement, setting parameters and to deliver feedback from the actuator. Actuator identification is provided, using standard CiA 301 address claim or fixed addresses.	
Brown	12-24VDC + (VCC) Connect Brown to positive 12V ± 20% - max. 5A depending on load 24V ± 10% - max. 2.5A depending on load 12V, current limit 8A 24V, current limit 5A	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 9A for 12V and 6A for 24V.
Blue	12-24VDC - (GND) Connect Blue to negative 12V ± 20% - max. 5A depending on load 24V ± 10% - max. 2.5A depending on load 12V, current limit 8A 24V, current limit 5A	
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. 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	

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Actuator with IO-Link

Connection diagram:

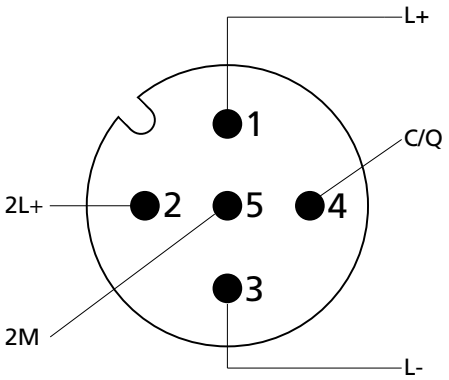
25XXXXXXXXXXAB1X=XXXXXXXXXXXXX



M12 CONNECTOR

The LA25 with IO-Link and M12 connector is a plug-and-play solution.
If flying leads is the preferred option, please be aware that the LINAK cable colours differ from the IO-Link standard.
The cable colours from the actuator and the M12 port numbers are specified in the table below.
In a setup where the violet and white wires are not used, we strongly recommend insulating these to avoid short circuits and eventually damaging the actuator.

Connects to:	Actuator Flying leads:	M12 Port Class B
2L+	Brown	2
2M	Blue	5
L+	Red	1
C/Q	Green	4
L-	Black	3



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

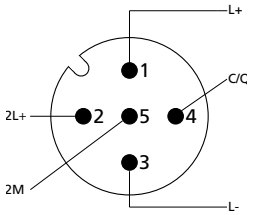
An IODD file describes the IO-Link parameters for easy PLC configuration.
The newest version is available online at the official IO-Link IODDfinder.

We offer a service interface called **BusLink** with features like e.g. 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: 0147996 (adapter + USB2Lin)

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Actuator with IO-Link

I/O specifications:

Input/Output	Specification	Comments
Description	IO-Link is standardised IO technology (IEC 61131-9) for the communication with actuators. The point-to-point communication is based on the long established actuator connection without additional requirements regarding the cable material. IO-Link is no fieldbus but the further development of the existing, tried-and-tested connection technology for actuators.	IO-Link
Brown (M12 port 2) 2L+	Power supply motor + 24 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 6A for 24V. 24V ± 10% - max. 2.5A depending on load 24V, current limit 5A
Blue (M12 port 5) 2M	Power supply motor - 24 VDC - (GND) Connect Blue to negative	
Red (M12 port 1) L+	IO-Link supply + 18 - 30 VDC +	On voltage: 18 to 30 V  M12 plug on device - pin numbering and connections.
Black (M12 port 3) L-	IO-Link supply - 18 - 30 VDC - (GND)	
Green (M12 port 4) C/Q	IO-Link C/Q (data communication)	IO-Link is fieldbus independent and can be integrated into all fieldbus systems worldwide. Transmission rate: 38.4 kbaud (COM 2) Max cable length: 15 meters The IODD file describes the parameters, find it here: https://ioddfinder.io-link.com
Violet	Service interface	Only BusLink can be used as service interface. Make sure that the violet and white wires are not short-circuited
White	Service interface GND	
Yellow	Not used	

Please note that version 1.0 of IO-Link does not support data storage. Therefore, it is recommended to disable the data storage feature on the PLC/IO-Link master.

Data storage is a recommended feature in IO-Link, which makes it easy to replace an existing device with a substitute. Data storage will be released in a later software version.

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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

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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 53) - 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.

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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 53)
		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 48)
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 53) - 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 46

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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 53) - 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 46



For further assistance, please contact your local LINAK supplier

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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 48).

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**

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Chapter 4

Specifications

Motor:	Permanent magnet motor 12 or 24V
Cable:	Motor: 8 x 18 AWG PVC cable
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:	- 40° C to +85° C For IECEx/ATEX: - 25° C to +65° C - 40° F to +185° 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)
Compatibility:	The LA25 IC is compatible with SMPS-T160 (For combination possibilities, please see the User Manual for SMPS-T160)

Usage:

- Duty cycle is max. 20% (4 min. drive and 16 min. rest)
  The duty cycles are valid for operation within an ambient temperature of +5°C to +40°C
- Storage temperature: -55°C to + 105°C
- Noise level: With standard motor: Max. 58.5 dB (A)
  Measuring method DS/EN ISO 3743-1 actuator not loaded
- **Safety device regarding functional failure:**

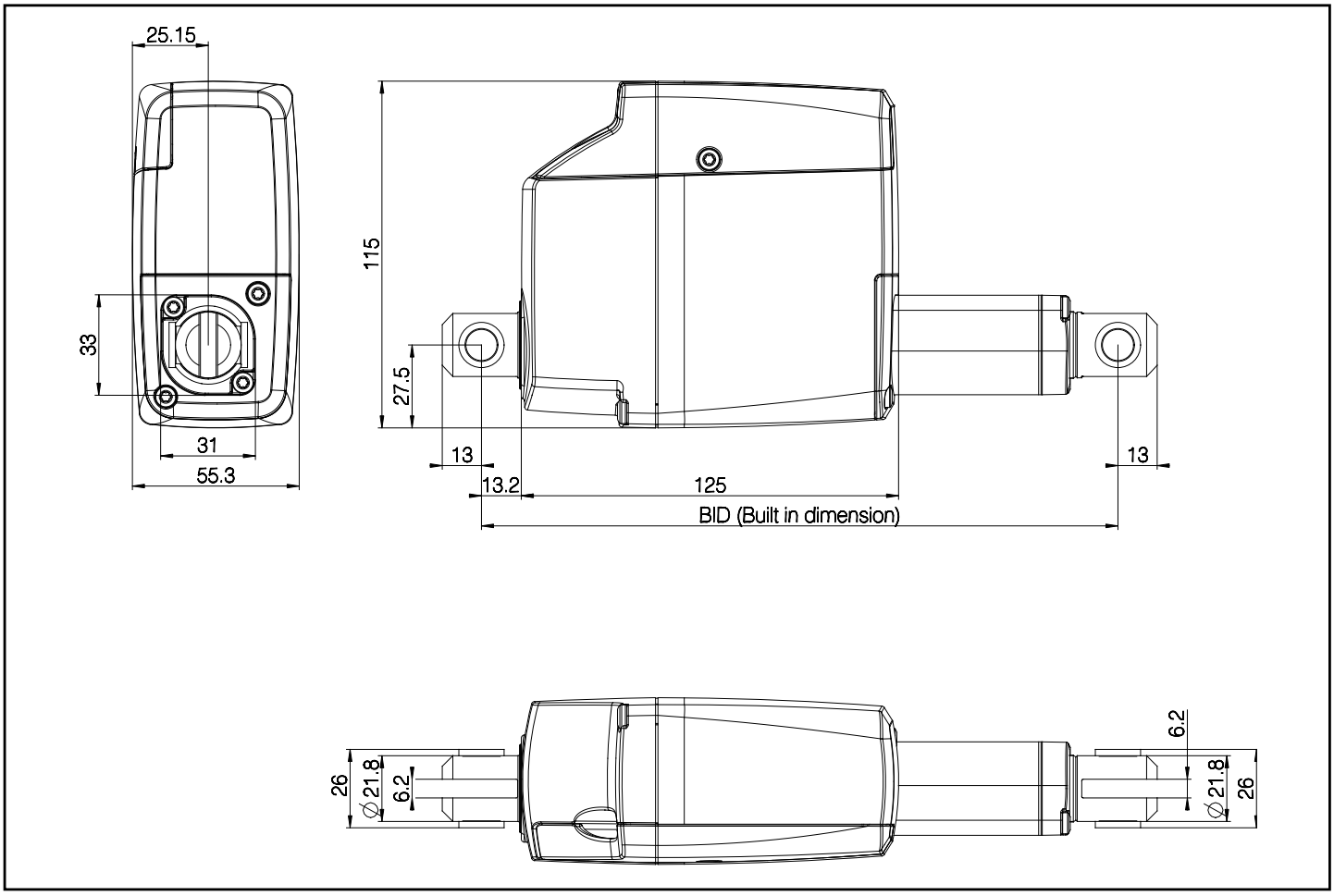
  Safety nut
  The LA25 has a built-in safety nut in push as an option.
  Actuators with a safety nut in push can only function when used in push applications. The safety nut comes into operation should the main nut fail. Afterwards, it is only possible to drive the actuator into the innermost position. Then, the actuator will not function anymore and it must be sent for service. The same functionality, but in the opposite direction, goes for actuators with a safety nut in pull

  Mechanical endstop
  LA25 is equipped with mechanical endstop

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Actuator dimensions

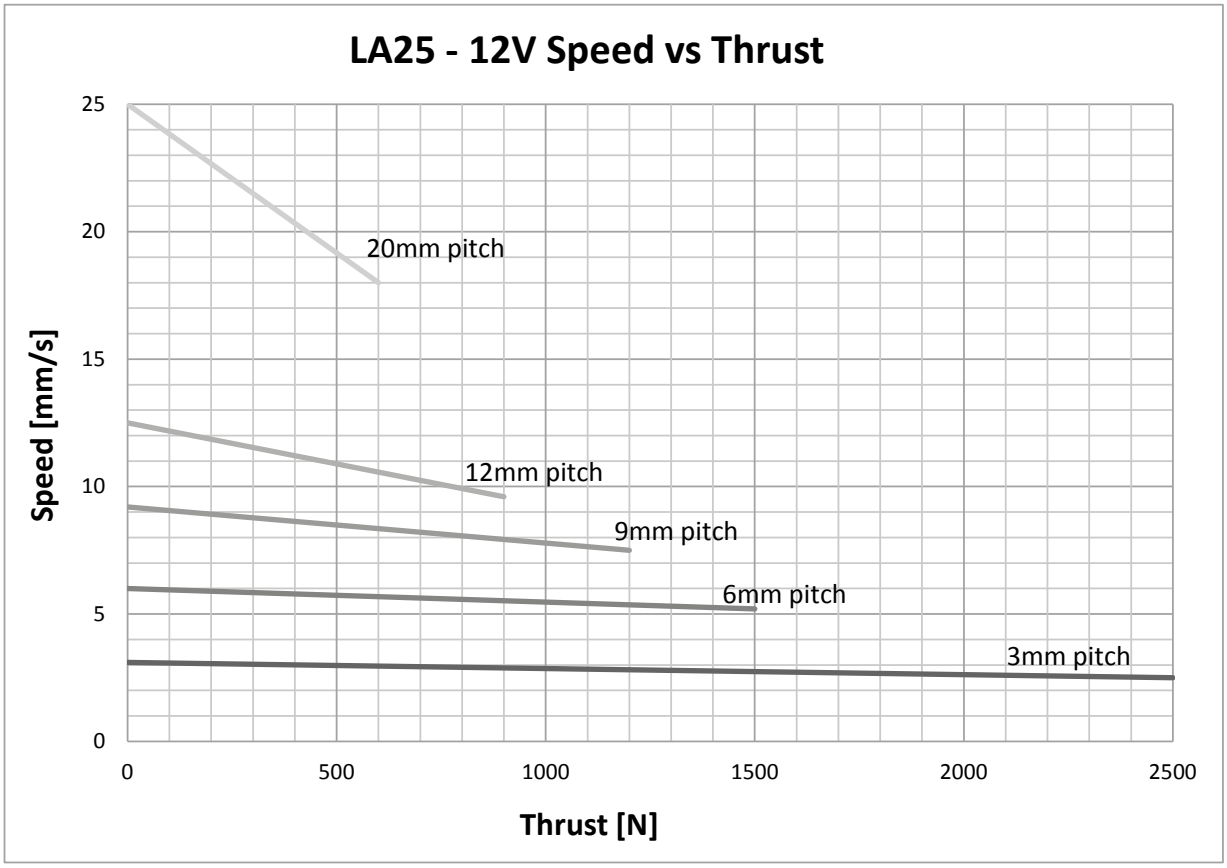
TECHLINE® LA25:

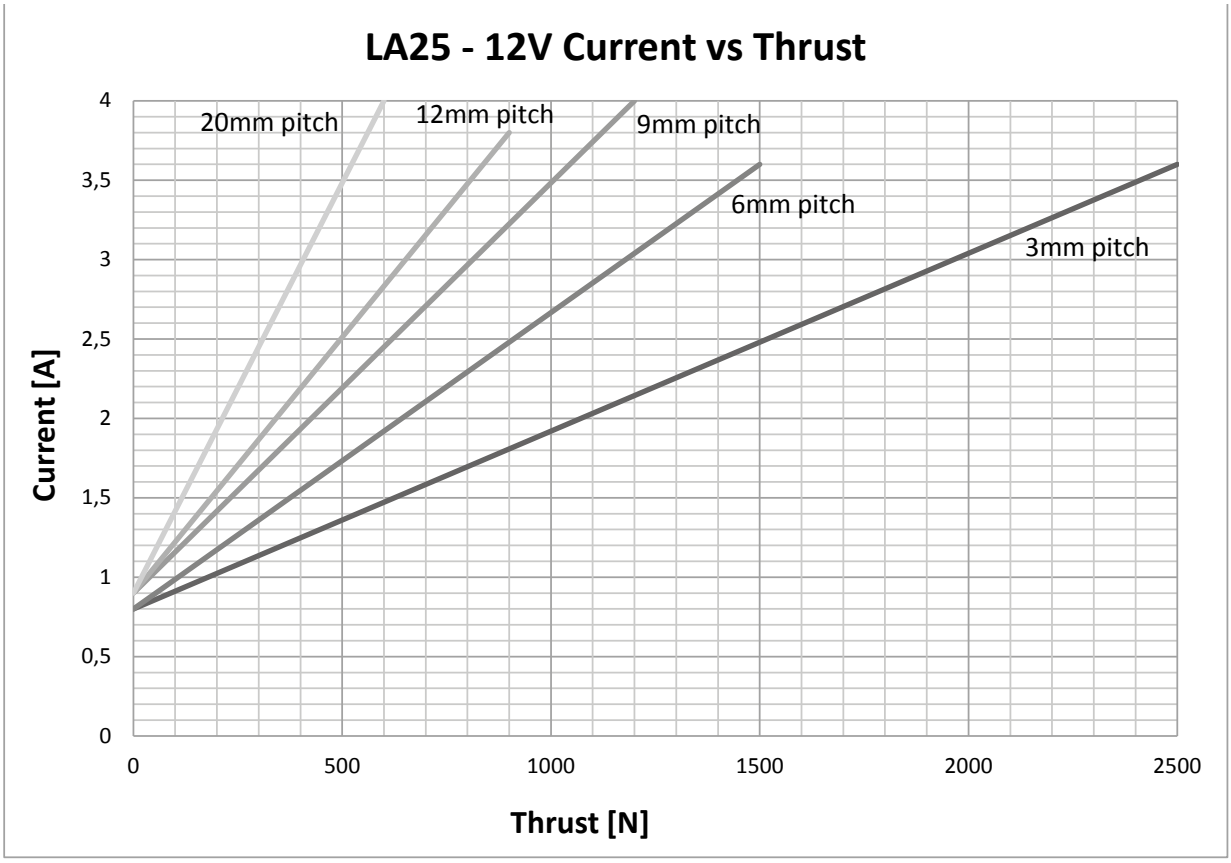


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Speed and current curves - 12V motor

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

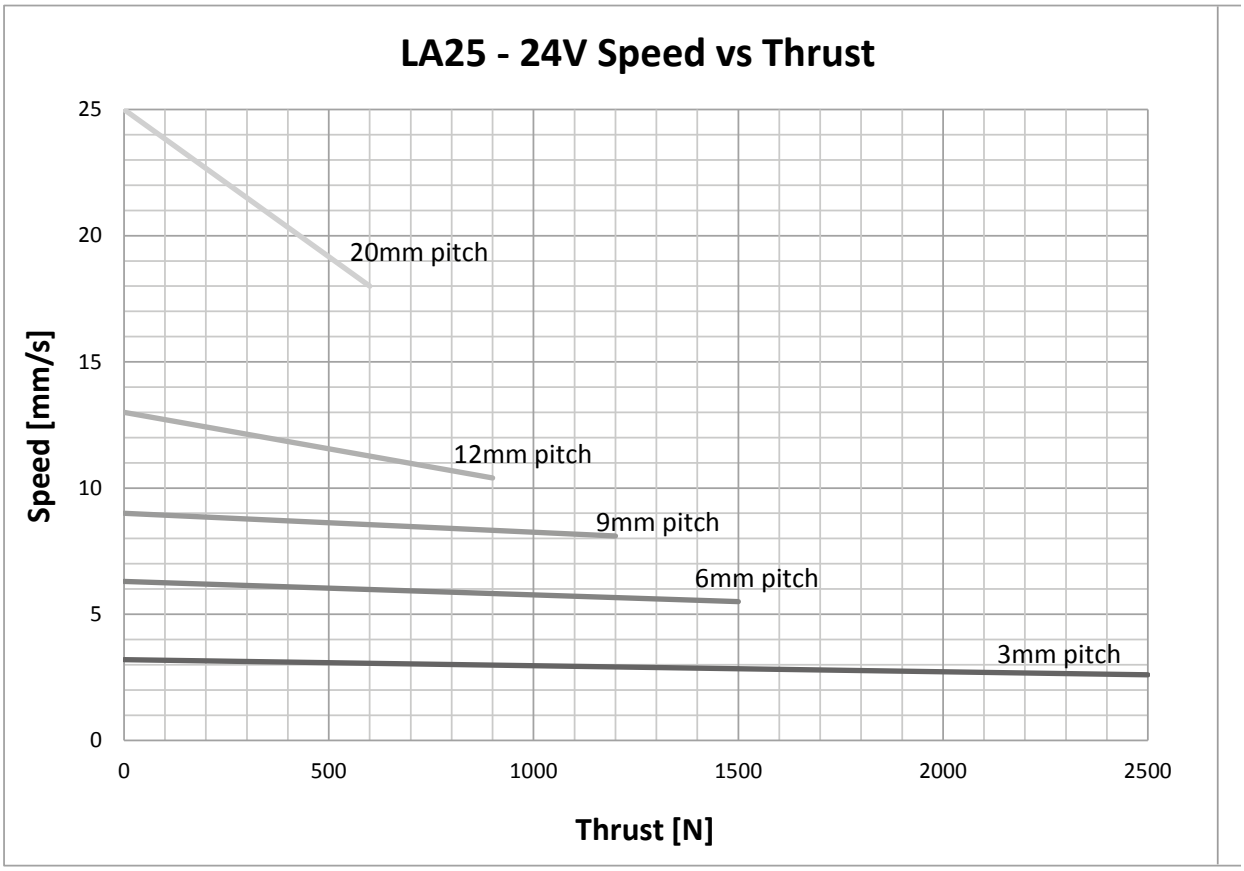


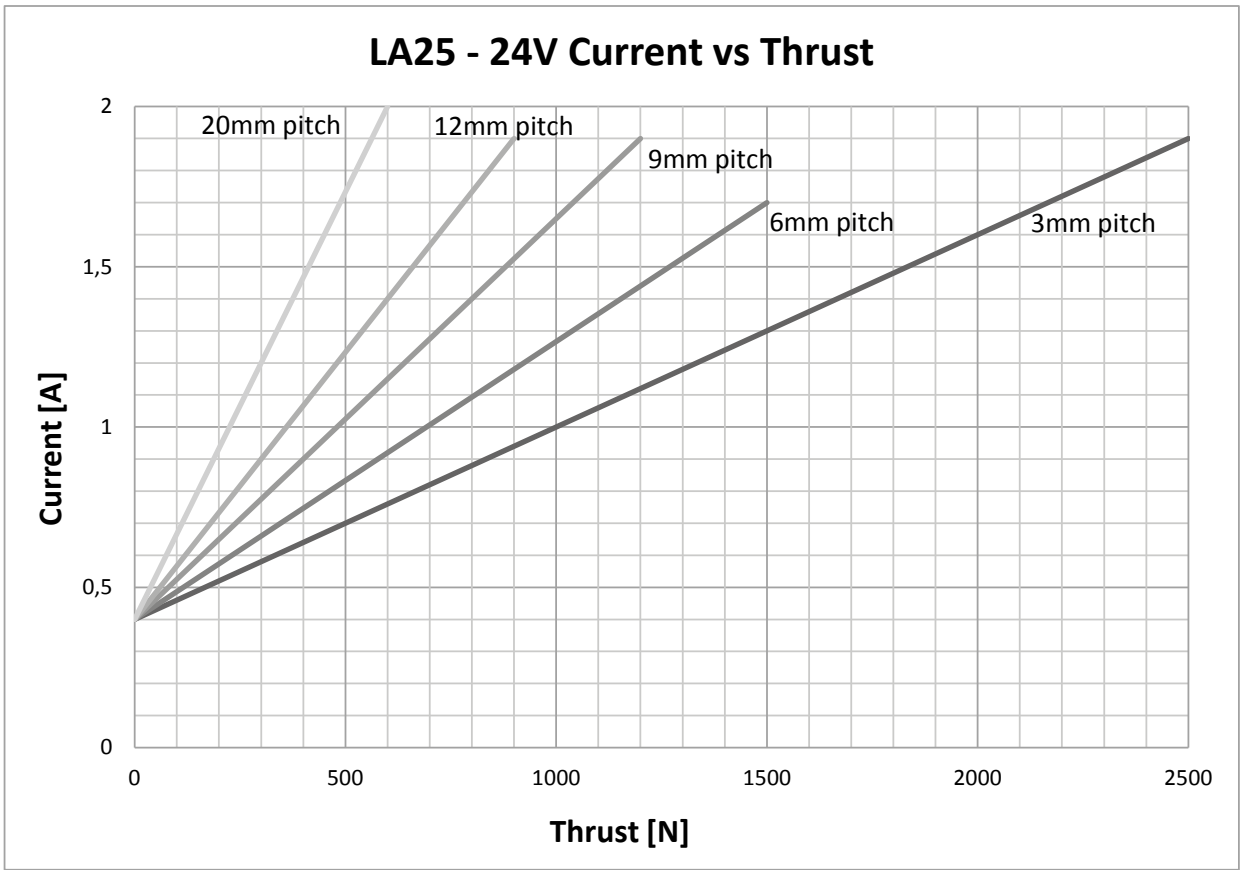


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Speed and current curves - 24V motor

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





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Test of conducted and radiated emission (EMC)

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

Actuator without H-bridge

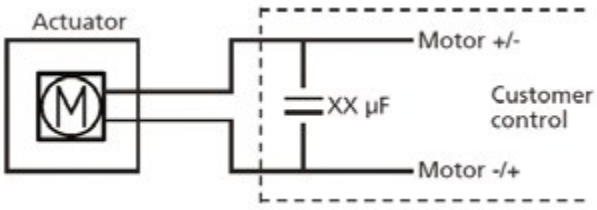
1) For normal operation the following is valid:

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

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

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

Product	Capacitor value
LA25	1 µF



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

Actuator with H-bridge

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

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

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

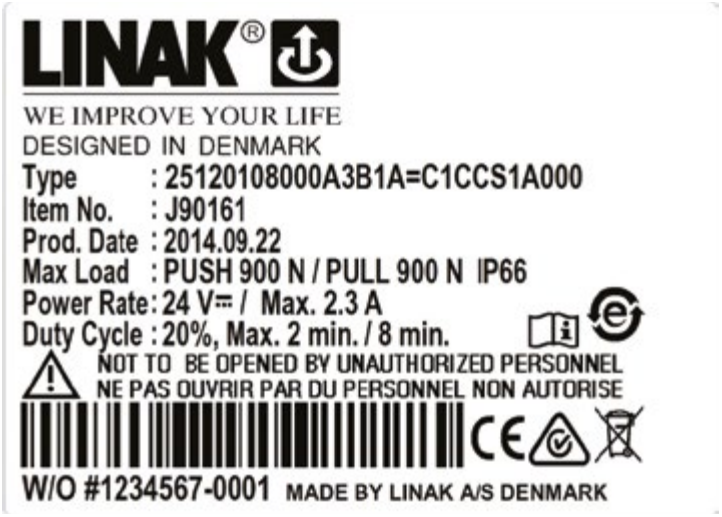
- Radiated emission requirements are met.
- Conducted emission requirements are met.

3) Speed regulation:

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

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Label for LA25



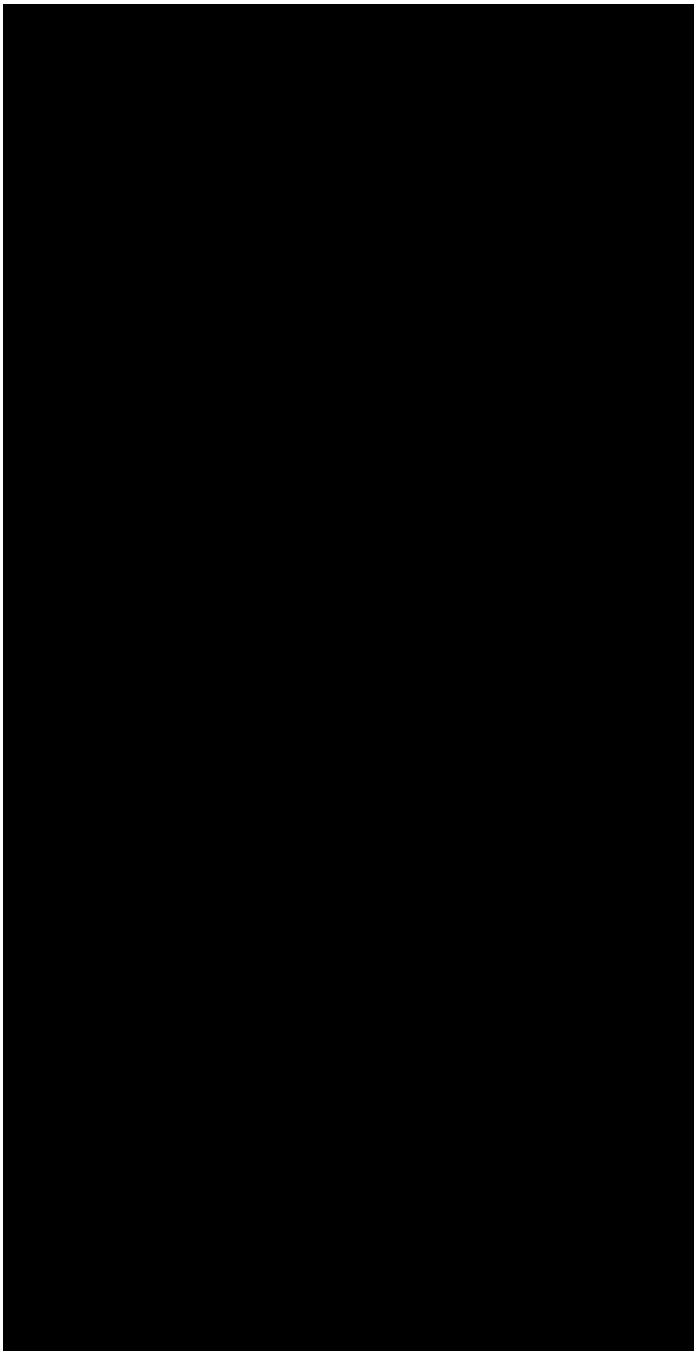
1. **Type: 25120108000A3B1A=C1CCS1A000**
   Describes the basic functionality of the product
2. **Item no.: J90161**
   Sales and ordering code
3. **Prod. Date: YYYY.MM.DD**
   Production date describes when the product has been produced. This date is the reference for warranty claims

4. **Max Load: Push 900N / Pull 900N 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. 2.3 Amp**
   Input voltage for the product and maximum current consumption
6. **Duty Cycle: 20%, Max. 2 min. / 8 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

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Label for LA25 IECEx/ATEX





CE 0402 II 2D Ex tb IIIC T135°C Db **Tamb -25°C to +65°C**

- Quality assurance notification body
- Equipment for hazardous areas
- Non mining
- Category 2 equipment for dust
- Explosion protection
- Protection by Enclosure
- Combustible dust - conductive *
- Temperature class
- Enclosure Zone 21
- Ambient temperature of operation

* Not a source of ignition in normal operation or when subjected to faults that may be expected, though not on a regular basis.

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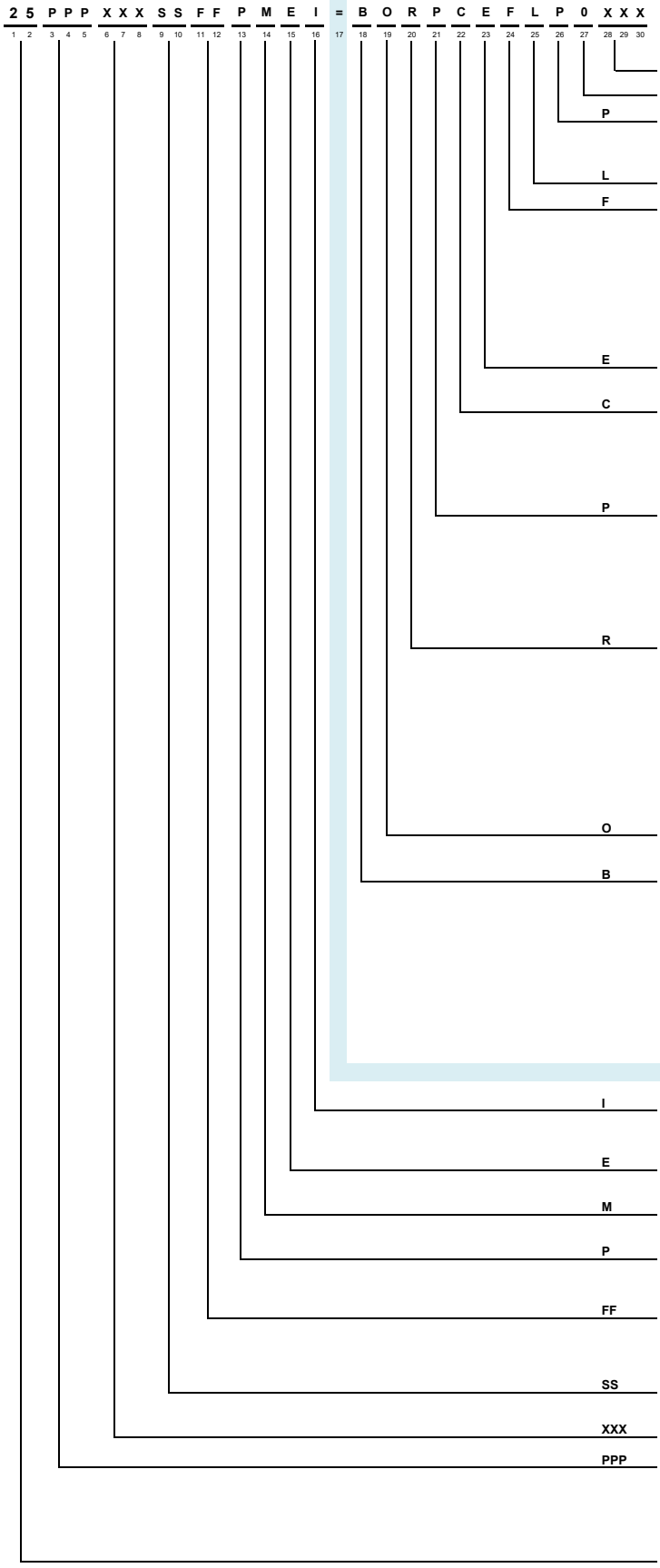
Key to symbols

The following symbols are used on the LA25 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	

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LA25 ordering example



XXX = BID (mm)

0 = Not specified

P **Parallelmode** 0 = Non critical Parallel
2-8 = critical parallel (count of actuators)

L **Loadtype** 0 = Push/Pull 1 = Push 2 = Pull

F **Feedback level** by platform type

None	**IC type Basic**	**IC type Advanced**	**IC type Parallel**	**LIN BUS**
0 = none	8 = none	0 = none	Z = Parallel	0 = LIN adress 0
1 = 0 - 10 V		A = 0 - 10 V		1 = LIN adress 1
2 = 0,5 - 4,5 V		B = 0,5 - 4,5 V		:
3 = 4 - 20 mA		C = 4 - 20 mA		:
4 = 10 - 90 %		D = 10 - 90 %		E = LIN adress E
5 = 20 - 80 %		E = 20 - 80 %		F = LIN adress F
9 = Special feedback		X = Special feedback		X = Special LIN software

E **EOS output** 0 = No (Only IC Basic)
1 = Yes (Only IC Advanced)

C **Cable:** 0 = None
S = Straight 0,75m
T = Straight 1,5m (8-core, Note: If AMP is chosen = 6-core)
R = Straight 5,0m (8-core, Note: If AMP is chosen = 6-core)
U = Straight 0,3 m (Only SMPS)
X = Special

P **Plug Type:** 0 = None Is to be chosen, if cable and connectors is not wanted
C = Flying leads Is to be chosen, if connector is not wanted
I = Moulded Deutsch (DT4)
J = Deutsch (DT4)
K= AMP superseal
L= Moulded AMP superseal
S = SMPS (Only cable length 0,3 and 1,5 m)
X = Special

R **Piston Rod Eye:**

1 = Zink coated steel ø10,2 (0231033)
2 = Zink coated steel + bushings ø10,2
3 = Zink coated steel ø 12,3 (0231016)
4 = Zinc coated steel + bushings ø 8,2
A = Stainless ø10,2 (0231096)
B = Stainless + bushings ø10,2
C = Stainless ø 12,3 (0231095)
D = Stainless steel + bushings ø 8,2
K = Ball Eye ø10H7 stainless (0351043)
L = Ball Eye ø12H7 stainless (0351035)
F = Female Adapter M8 stainless (0251039)
M = Male Adapter M12 Stainless (231094)

O **Backfixture orientation** 1 : 0 degrees
2 = 90 degrees

B **Back fixture type:**

1 = Zink coated steel ø10,2 (0251011)
2 = Zink coated steel + bushings ø10,2
3 = Zink coated steel ø12,3 (0251010)
4 = Zinc coated steel + bushings ø 8,2
5 = Zink coated steel ø10,2 + Nut (0251032)
6 = Zink coated steel + bushings ø 10,2+Nut
7 = Zink coated steel ø12,3 + Nut (0251026)
8 = Zink coated steel + bushings ø8,2 + Nut
A = Stainless ø10,2 (0251015)
B = Stainless + bushings ø10,2
C = Stainless ø 12,3 (0251014)
D = Stainless steel + bushings ø 8,2
F = Stainless steel ø10,2 + Nut (0251034)
G = Stainless steel + bushings ø 10,2+Nut
H = Stainless steel ø12,3 + Nut (0251033)
I = Stainless steel + bushings ø8,2 + Nut
M = Male adapter M12 Stainless steel (0251021)

X = special

Colour : = = DarkGrey

I **IP:** A= IP66
T = ATEX
9 = Harsh environments.

E **Endstop :** 0 = Power switch (Platform none)
1 = Signalswitch (Platform IC)

M **Motor Type:** A = 12VDC normal
B = 24VDC. Normal

P **Platform** 0 = None
3 = IC Integrated Control Not for Openbus
6 = LINBUS
7 = CANBUS

FF **Feedback** 00 = none
0K = Single Hall
0A = Hall Potentiometer (Analogue feedback)
0F = PWM

SS **Safety :** 00 = None
0A = Safety nut

XXX **Stroke Length:** **XXX = mm**

PPP **Spindle Pitch:** 030 = 3 mm
060 = 6 mm
090 = 9 mm
120 = 12 mm
200 = 20 mm

Actuator Type: **25 = LA25**

* INTEGRATED CONTROLLER

IC options:	IC	LINbus	Parallel
LA25 actuator:	☐	☐	☐

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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.

Product	Metal scrap	Cable scrap	Electronic scrap	Plastic recycling or combustion
LA25	X	X	X	X

Warranty

There is an 18 months' warranty on TECHLINE products against manufacturing faults calculated from the production date of the individual products (see label). 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.

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DECLARATION OF CONFORMITY

LINAK A/S

Smedevænget 8

DK - 6430 Nordborg

Hereby declares that

Actuator 25XXXXXXXXXXXXXXXXXXXXXXXXXXXX
(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 harmonized standards:
EN 61000-6-1:2007, EN 61000-6-3:2007, EN 61000-6-2:2005, EN 61000-6-4:2007

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

complies with RoHS2 Directive 2011/65/EU according to the harmonized standard:
EN 55581:2012

Additional information:
The device does also comply with the UN ECE Regulation No. 10, Ed. 3, Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility.

Comply with standard:
EN 13309:2010, Construction machinery - Electromagnetic compatibility of machines with internal power supply
EN ISO 14982:2009, Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria
ISO 13766:2006, Earth-moving machinery -- Electromagnetic compatibility
ISO 7637-2:2004, Road vehicles -- Electrical disturbances from conduction and coupling -- Part 2: Electrical transient conduction along supply lines only

Nordborg, 2016-10-12

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

Original declaration

© 2020 LINAK A/S

DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

LINAK A/S
Smedevænget 8
DK - 6430 Nordborg

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

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

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

1.5.1 Electricity supply

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

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

Nordborg, 2014-10-20



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

Original Declaration

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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 14.0020X issue No.:0

Certificate history:

Status: **Current**

Date of Issue: **2015-10-13** Page 1 of 3

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

Electrical Apparatus: **Actuator type LA 25**
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

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IECEx Certificate of Conformity

Certificate No.: IECEx TUN 14.0020X

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/ExTR14.0043/00

Quality Assessment Report:

SE/SP/QAR14.0001/00

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IECEx Certificate of Conformity

Certificate No.: IECEx TUN 14.0020X

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

Schedule

EQUIPMENT:
Equipment and systems covered by this certificate are as follows:

The LA25 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 or 24V DC with push / pull specifications in the range 900 to 2500 N. The actuator are certified under the model name LA25 including various type variants which has no influence on the ingress protection / Ex-protection principle.

The electrical data are as follows:

Supply (brown and blue)

Type 1 U_n = 12 VDC ± 20% Type 2 U_n = 24 VDC ± 10%

I_{Fuse} = 8 A I_{Fuse} = 4 A

Signal Power suppy (red and black)

U_n = 12 - 24 VDC

I_n = 40 mA

The ambient temperature range is: T_{amb} = -25°C up to 65°C

CONDITIONS OF CERTIFICATION: YES as shown below:

1. The duty cycle is max. 20% (2 min continuous drive followed by 8 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.

5. The supply cable is not UV-resistant and must be protected from direct sunlight.

6. The supply has to be protected by a fuse according to the electrical data.

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(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 143744 X**
(4)	for the equipment:	Linear Actuator Model: LA25 series
(5)	of the manufacturer:	**LINAK A/S**
(6)	Address:	Smedevænget 8, Guderup 6430 Nordborg
	Order number:	8000 436004
	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 143744.

(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

**This certificate may only be reproduced without any change, schedule included.
Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH**

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(13) **S C H E D U L E**

(14) EC-Type-Examination Certificate No. TÜV 15 ATEX 143744 X

(15) Description of equipment

The LA25 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 or 24V DC with push / pull specifications in the range 900 to 2500 N.

Type variants:

The LA25 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.

Actuator type		Spindle Pitch			Stroke length			Safety		Feedback		Platform	Motortype	Endstop	IP degree	Colour	Back fixture	Back fixture	Piston rod eye	Plug tytpe	Cable	EOS	Feedback level	Load type	Not specified	Not specified	BID
2	5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	■	•	•	•	•	•	•	•	•	•	•	•••

The actuator are certified under the type LA25 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.

The electrical data are as follows:

Supply (brown and blue)

Type 1	U_n	=	12	VDC	± 20%
	I_{Fuse}	=	8	A	

Type 2	U_n	=	24	VDC	± 10%
	I_{Fuse}	=	4	A	

Signal Power suppy (red and black)

	U_n	=	12 - 24	VDC
	I_n	=	40	mA

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

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Schedule EC-Type Examination Certificate No. TÜV 15 ATEX 143744 X

(16) Test documents are listed in the test report No. 15 203 143744

(17) Special conditions for safe use

1. The duty cycle is max. 20% (2 min continuous drive followed by 8 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.
6. The supply has to be protected by a fuse according to the electrical data.

(18) Essential Health and Safety Requirements

no additional ones

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