TECHLINE®
IMPROVING FLEXIBILITY

Standard Interface

User Manual

LINAK®
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Preface

Dear User,

We are delighted that you have chosen a LINAK® product.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, lifting columns, desk frames, electric control boxes, controls, batteries, accessories and chargers.

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

We are convinced that your LINAK product/system will give you many years of problem-free operation.

Before our products leave the factory, they undergo both function and quality testing. Should you, nevertheless, experience problems with your product/system, you are always welcome to contact your supplier.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you. Locate your local contact information on the back page.

LINAK provides a warranty on all products. (See warranty section).

This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly, and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK systems can affect their operation and durability. The products may only be opened by authorised personnel.

This User Manual has been written based on the present technical knowledge. LINAK reserves the right to carry out technical modifications and keeps the associated information updated.

LINAK A/S

Terms of use

LINAK® takes great care in providing accurate and up-to-date information on its products. However, the user is responsible for determining the suitability of LINAK products for a specific application.

Due to continual development, LINAK products are subject to frequent modifications and changes. LINAK reserves the rights to conduct modifications, updates, and changes without any prior notice. For the same reason, LINAK cannot guarantee the correctness and actual status of imprinted information on its products.

LINAK uses its best efforts to fulfil orders. However, for the reasons mentioned above, LINAK cannot guarantee availability of any particular product at any given time. LINAK reserves the right to discontinue the sale of any product displayed on its website or listed in its catalogues or in other written material created and produced by LINAK, LINAK subsidiaries, or LINAK affiliates.

All sales are subject to the 'Standard Terms of Sale and Delivery for LINAK A/S' available on LINAK websites.

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Revision overview

Edition C

48 V for LA33 added	Page 13+19-29
Min. output voltage changed to 4 V	Page 17
‘(Special article numbers only)‘ removed	Page 36+37
‘Connection overview‘ section updated	Page 38
‘Power supply‘ table added	Page 39

Edition B

LA21 compatibility added	Page 9+38
Linear feedback on Analogue position feedback updated	Page 23
Analogue position feedback and Endstop reached I/O specifications updated	Page 25

Edition A

New document

Introduction

All actuators without Integrated Controller (IC) contain a standard interface. These are available with a variety of optional position feedback systems and an endstop reached signal output.

All Standard actuators are driven by powering the Brown and Blue wires in the following way:

- To extend actuator: Connect Brown to positive, connect Blue to negative
- To retract actuator: Connect Brown to negative, connect Blue to positive

The simplest method for controlling a permanent magnetic DC motor is via the use of a rocker switch, which allows for direction changes based on the activation of the switch. Rocker switches are commonly employed for basic forward and reverse control, eliminating the need for a PLC or power electronics.

In contrast, power electronics, often used in conjunction with various feedback options, are typically paired with PLCs for applications where smooth motor control and position feedback are essential.

There are several standard interfaces available for position feedback including Signal Hall, Dual Hall, and analogue feedback options such as 0-10 V, 4-20 mA and PWM. For additional details, please refer to the connection diagrams and I/O specifications.

Safety instructions

Please read this safety information carefully.

Be aware of the following three symbols throughout the document:

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 supply/transformer/battery with the correct voltage and which is dimensioned and adapted to the actuator in question.
- Ensure that the voltage applied matches the voltage specified on the actuator label.
- Ensure that the connection bolts can withstand the wear.
- Ensure that the connection bolts are secured safely.

During operation, 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.
- Only use the actuator within the specified working limits.
- Do not step on or kick the actuator.

When the equipment is not in use:

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

Classification

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

Warnings

- Do not side-load 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.
- The Standard actuator (without Integrated Controller) without clutch is not allowed to run into a mechanical block before reaching the end of stroke.

Recommendations

- Do not place load on the actuator housing.
- Prevent impact, blows or any other form of stress to the housing.
- Ensure that the cable cover is mounted correctly.
  For LA25: Use 1.5 +/- 0.5 Nm torque.
  For LA14: Use 3.6 +/- 0.2 Nm torque.
  For LA33, LA36 and LA37: Use 3.5 +/- 0.2 Nm torque.
- Ensure that the duty cycle and the usage temperatures for the actuators are respected.
- Ensure that the cable cannot be squeezed, pulled or subjected to any other stress.
- Furthermore, it is good practice to ensure that the actuator is fully retracted in the "rest" position. The reason is that there will be a negative pressure inside the actuator if it is extended which over time can lead to water entering the actuator.

Compatible actuators

The standard interface is offered for the following LINAK® actuators:

LA14

The actuator LA14 is a very tough actuator with a high IP degree and aluminium housing, making it ideal for use in harsh and demanding environments.

The LA14 offers top quality in every detail and ensures reliable performance in temperatures ranging from -40°C to +85°C. With its small size the LA14 is well suited to applications that require short linear movements.

- Max. load: 750 N
- Max. speed: 45 mm/s
- Stroke length: 75-130 mm
- Motor voltage: 12 or 24 V DC

LA25

With its robust design, high IP degree and aluminium housing, the actuator LA25 is ideal for harsh environments where operation under extreme conditions is required.

Furthermore, the compact dimensions of this actuator makes it applicable for confined spaces.

- Max. load: 2,500 N
- Max. speed: 25 mm/s
- Stroke length: 100-600 mm
- Motor voltage: 12 or 24 V DC

LA21

The LA21 is a small yet powerful industrial electric linear actuator designed for fast and precise positioning. Featuring an integrated controller, its compact form and broad customization options make it ideal for applications where space is limited but performance is critical.

Engineered to operate in harsh industrial environments – with vibrations, dust, and moisture – the LA21 delivers consistent accuracy and holds position reliably. Despite its size, it includes the same advanced features found in our larger actuators, making it a versatile solution for industries like agriculture, construction, and automation.

- Max. load: 3,500 N
- Max. speed: 75 mm/s
- Stroke length: 50-800 mm
- Motor voltage: 12 or 24 V DC

LA33

The actuator LA33 combines compact design and high power in a solution fit for use in industrial settings and for demanding applications that require customised interfaces, faster, or silent operation and to work in harsh and extreme environments.

A thorough and demanding testing programme is behind the maintenance-free and long-lasting performance of this solid and high-quality actuator.

- Max. load: 5,000 N
- Max. speed: 70 mm/s
- Stroke length: 100-600 mm
- Motor voltage: 12, 24 or 48 V DC

LA36

The actuator LA36 is one of the most solid and powerful LINAK® actuators, designed to operate under extreme conditions.

The LA36 is a maintenance-free product with a long service life and a high IP degree. It is also available with an extra-long service life.

This high-quality actuator offers a very strong alternative to hydraulic solutions.

- Max. load: 6,800 N
- Max. speed: 168 mm/s
- Stroke length: 100-1,200 mm
- Motor voltage: 12, 24 or 48 V DC

LA37

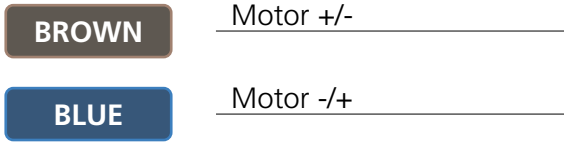
The actuator LA37 is specifically developed for heavy-duty applications in harsh environments, where there is a need for high lifting capacity and holding force.

The LA37 offers the well-known LINAK quality, guaranteeing you a maintenance-free product with a long lifetime.

- Max. load: 15,000 N
- Max. speed: 10 mm/s
- Stroke length: 100-600 mm
- Motor voltage: 12, 24 or 48 V DC

Without feedback

Connection diagram



I/O specifications

Input/Output	Specification	Comments
Description	Permanent magnetic DC motor.	
Brown	Nominal Voltage 12/24/48* V DC According to the Actuator label *48 V only for LA33, LA36 and LA37	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		

Endstop reached

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Endstop reached inwards
GREEN	Endstop reached outwards
VIOLET	Not to be connected
WHITE	Not to be connected

If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

Endstop reached

I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with electronically controlled Endstop reached out.	
Brown	Nominal Voltage 12/24/48* V DC According to the Actuator label *48 V only for LA33, LA36 and LA37	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Signal power supply 12/24 V DC	Active and standby current consumption: Max. 40 mA Higher peak currents due to the input capacitance of max. 3 mF
Black	Signal power supply GND	
Yellow	Endstop reached inwards	Min. output voltage: V_{IN} (Red wire) - 2 V Max. source current: 100 mA NOT potential free
Green	Endstop reached outwards	
Violet	Not to be connected	
White	Not to be connected	

Dual Hall - Relative positioning

Connection diagram

Applicable for: LA36 and LA37

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Hall A feedback
GREEN	Hall B feedback
VIOLET	Not to be connected
WHITE	Not to be connected

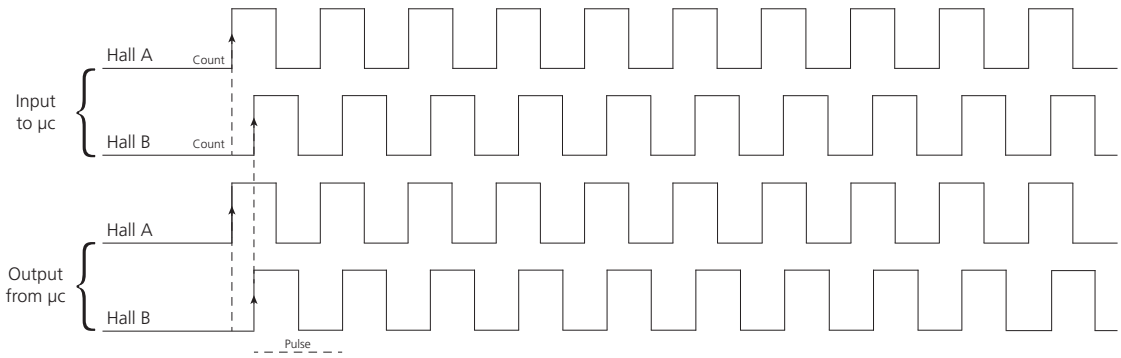
If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

Dual Hall - Relative positioning

I/O specifications

Applicable for: LA36 and LA37

<table>
<tr><th>Input/Output</th><th colspan="2">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="2">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves. The Dual Hall output is on two wires with a phase shift of 90° between the two quadrature signals.</td><td>Running outwards: Positive rising edge of Hall A will be first.
Running inwards: Positive rising edge of Hall B will be first.</td></tr>
<tr><td>Brown</td><td colspan="2" rowspan="2">Nominal Voltage 12/24/48 V DC
According to the Actuator label</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td colspan="2">Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 40 mA
Higher peak currents due to the input capacitance of max. 3 mF</td></tr>
<tr><td>Black</td><td colspan="2">Signal power supply GND</td></tr>
<tr><td>Yellow</td><td>Hall A feedback</td><td rowspan="2">For more info, see Technical specifications in the data sheet</td><td rowspan="2">The Hall sensor signals are generated by the turning of the actuator gearing. These signals can be fed into a PLC (Programmable Logic Controller). In the PLC the quadrature signals can be used to register the direction and position of the piston rod.
Min. output voltage: V_{IN} (Red wire) - 2 V
Max. current output: 12 mA
Increasing the voltage supplied to the motor (Brown and Blue) can lead to shorter pulse durations.</td></tr>
<tr><td>Green</td><td>Hall B feedback</td></tr>
<tr><td>Violet</td><td colspan="3">Not to be connected</td></tr>
<tr><td>White</td><td colspan="3">Not to be connected</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td colspan="4">A Hall pulse consists of two Hall counts.
A Hall count occurs every time the signal changes direction, either upwards or downwards.</td></tr>
</table>

Dual Hall and Endstop reached - Relative positioning

Connection diagram

Applicable for: LA36 and LA37

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Hall A feedback
GREEN	Hall B feedback
VIOLET	Endstop reached inwards
WHITE	Endstop reached outwards

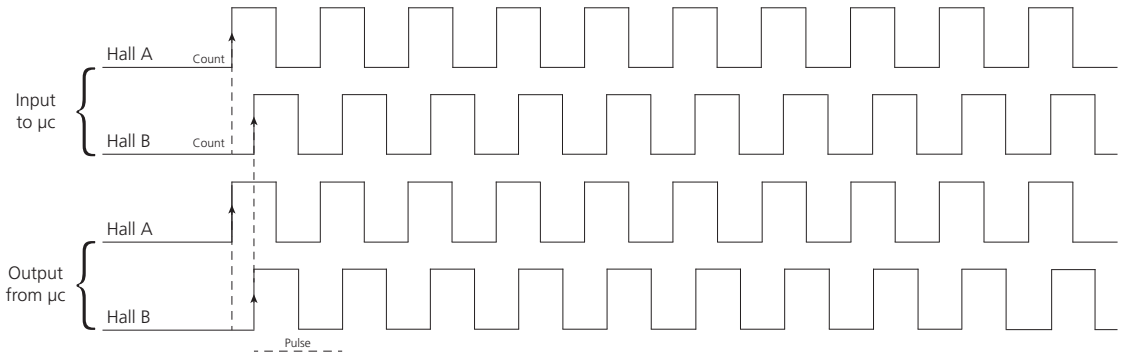
If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

Dual Hall and Endstop reached - Relative positioning

I/O specifications

Applicable for: LA36 and LA37

<table>
<tr><th>Input/Output</th><th colspan="2">Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td colspan="2">The actuator can be equipped with Dual Hall that gives a relative positioning feedback signal when the actuator moves. The Dual Hall output is on two wires with a phase shift of 90° between the two quadrature signals.</td><td>Running outwards - Positive rising edge of Hall A will be first.
Running inwards - Positive rising edge of Hall B will be first.</td></tr>
<tr><td>Brown</td><td colspan="2" rowspan="2">Nominal Voltage 12/24/48 V DC
According to the Actuator label</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td colspan="2">Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 40 mA
Higher peak currents due to the input capacitance of max. 3 mF</td></tr>
<tr><td>Black</td><td colspan="2">Signal power supply GND</td></tr>
<tr><td>Yellow</td><td>Hall A feedback</td><td rowspan="2">For more info, see Technical specifications in the data sheet</td><td rowspan="2">The Hall sensor signals are generated by the turning of the actuator gearing.
These signals can be fed into a PLC (Programmable Logic Controller). In the PLC the quadrature signals can be used to register the direction and position of the piston rod.
Min. output voltage: V_{IN} (Red wire) - 4 V
Max. current output: 12 mA
Increasing the voltage supplied to the motor (Brown and Blue) can lead to shorter pulse durations.</td></tr>
<tr><td>Green</td><td>Hall B feedback</td></tr>
<tr><td>Violet</td><td colspan="2">Endstop reached inwards</td><td rowspan="2">Min. output voltage: V_{IN} (Red wire) - 4 V
Max. source current: 30 mA
NOT potential free</td></tr>
<tr><td>White</td><td colspan="2">Endstop reached outwards</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td colspan="4">A Hall pulse consists of two Hall counts.
A Hall count occurs every time the signal changes direction, either upwards or downwards.</td></tr>
</table>

Single Hall - Relative positioning

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Not to be connected
GREEN	Not to be connected
VIOLET	Single Hall feedback
WHITE	Not to be connected

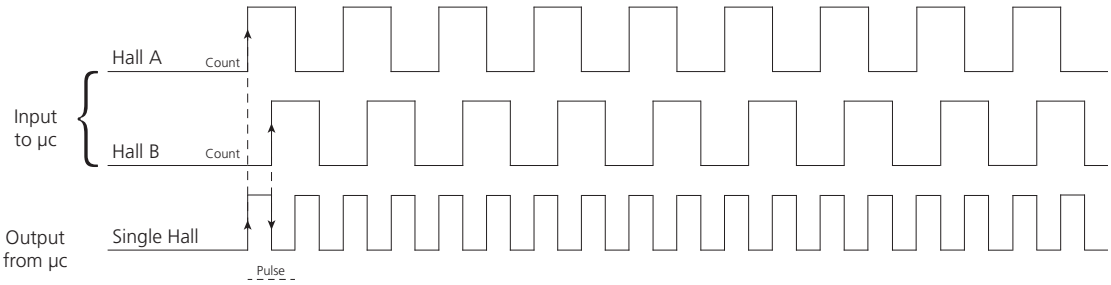
Single Hall - Relative positioning

I/O specifications

<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.</td><td></td></tr>
<tr><td>Brown</td><td rowspan="2">Nominal Voltage 12/24/48* V DC
According to the Actuator label

*48 V only for LA33, LA36 and LA37</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td>Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 40 mA
Higher peak currents due to the input capacitance of max. 3 mF</td></tr>
<tr><td>Black</td><td>Signal power supply GND</td></tr>
<tr><td>Yellow</td><td colspan="2">Not to be connected</td></tr>
<tr><td>Green</td><td colspan="2">Not to be connected</td></tr>
<tr><td rowspan="3">Violet</td><td>Single Hall feedback

For more info, see Technical specifications in the data sheet</td><td>Min. output voltage: V_{IN} (Red wire) - 2 V
Max. current output: 12 mA
Max. 680 nF
PNP output
Low frequency with a high load.
Higher frequency with no load.</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">A Hall pulse consists of two Hall counts.
A Hall count occurs every time the signal changes direction, either upwards or downwards.</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

Single Hall and Endstop reached - Relative positioning

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Endstop reached inwards
GREEN	Endstop reached outwards
VIOLET	Single Hall feedback
WHITE	Not to be connected

If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

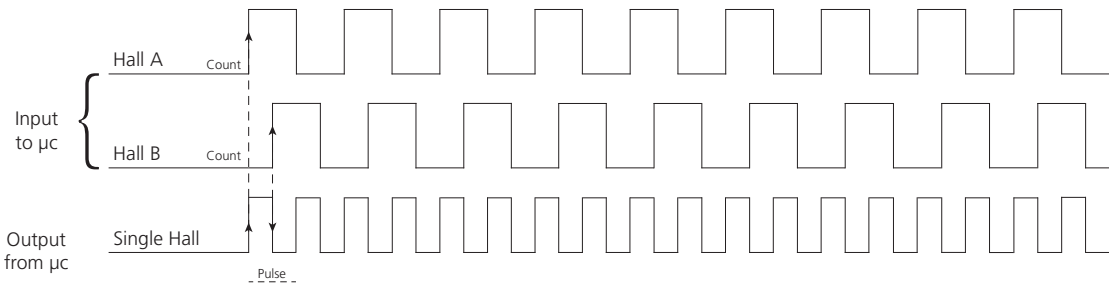
Single Hall and Endstop reached - Relative positioning

I/O specifications

<table>
<tr><th>Input/Output</th><th>Specification</th><th>Comments</th></tr>
<tr><td>Description</td><td>The actuator can be equipped with Single Hall that gives a relative positioning feedback signal when the actuator moves.</td><td></td></tr>
<tr><td>Brown</td><td rowspan="2">Nominal Voltage 12/24/48* V DC
According to the Actuator label

*48 V only for LA33, LA36 and LA37</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td>Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 40 mA
Higher peak currents due to the input capacitance of max. 3 mF</td></tr>
<tr><td>Black</td><td>Signal power supply GND</td></tr>
<tr><td>Yellow</td><td>Endstop reached inwards</td><td rowspan="2">Min. output voltage: V_{IN} (Red wire) - 2 V
Max. source current: 100 mA
NOT potential free</td></tr>
<tr><td>Green</td><td>Endstop reached outwards</td></tr>
<tr><td rowspan="4">Violet</td><td>Single Hall feedback

For more info, see Technical specifications in the data sheet</td><td rowspan="2">Min. output voltage: V_{IN} (Red wire) - 2 V
Max. current output: 12 mA
Max. 680 nF
PNP output
Low frequency with a high load.
Higher frequency with no load.</td></tr>
<tr><td>Increasing the voltage supplied to the motor (Brown and Blue) can lead to shorter pulse durations.</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">A Hall pulse consists of two Hall counts.
A Hall count occurs every time the signal changes direction, either upwards or downwards.</td></tr>
<tr><td>White</td><td>Not to be connected</td></tr>
</table>

Analogue position feedback

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Not to be connected
GREEN	Not to be connected
VIOLET	Analogue feedback
WHITE	Not to be connected

The signal power must be turned on at all times when the actuator is running, and minimum one second before it starts to run.

Analogue position 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 an electronic circuit that gives an analogue feedback signal when the actuator moves.</td><td></td></tr>
<tr><td>Brown</td><td rowspan="2">Nominal Voltage 12/24/48* V DC
According to the Actuator label

*48 V only for LA33, LA36 and LA37</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td>Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 60 mA
Higher peak currents due to the input capacitance of max. 3 mF</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 rowspan="2">Analogue feedback

Can be set in any interval within the range of:
0-10 V
4-20 mA

For example:
0.5-4.5 V
8-16 mA</td><td>Voltage feedback:
Tolerances: +/- 0.2 V
Max. current output: 1 mA
Ripple: max. 200 mV
Transaction delay: 100 ms
Linear feedback: 2%</td></tr>
<tr><td>Current feedback:
Tolerances: +/- 0.2 mA
Transaction delay: 20 ms
Linear feedback: 1%
Output: Source
Serial resistance:
12 V: max. 300 ohm
24 V: max. 900 ohm</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

For actuators with analogue feedback it is recommended to fully extract and retract the actuator on a regular basis (thereby activating the limit switches) in order to ensure precise positioning.

Analogue position feedback and Endstop reached

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Endstop reached inwards
GREEN	Endstop reached outwards
VIOLET	Analogue feedback
WHITE	Not to be connected

If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

Analogue position feedback and Endstop reached

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 an electronic circuit that gives an analogue feedback signal when the actuator moves.</td><td></td></tr>
<tr><td>Brown</td><td rowspan="2">Nominal Voltage 12/24/48* V DC
According to the Actuator label

*48 V only for LA33, LA36 and LA37</td><td rowspan="2">To extend actuator:
Connect Brown to V DC
Connect Blue to GND

To retract actuator:
Connect Brown to GND
Connect Blue to V DC</td></tr>
<tr><td>Blue</td></tr>
<tr><td>Red</td><td>Signal power supply 12/24 V DC</td><td rowspan="2">Active and standby current consumption:
Max. 60 mA
Higher peak currents due to the input capacitance of max. 3 mF</td></tr>
<tr><td>Black</td><td>Signal power supply GND</td></tr>
<tr><td>Yellow</td><td>Endstop reached inwards</td><td rowspan="2">Min. output voltage: V_{IN} (Red wire) - 2 V
Max. source current: 100 mA
NOT potential free</td></tr>
<tr><td>Green</td><td>Endstop reached outwards</td></tr>
<tr><td rowspan="2">Violet</td><td rowspan="2">Analogue feedback

Can be set in any interval within the range of
0-10 V
4-20 mA

For example:
0.5-4.5 V
8-16 mA</td><td>Voltage feedback:
Tolerances: +/- 0.2 V
Max. current output: 1 mA
Ripple: max. 200 mV
Transaction delay: 100 ms
Linear feedback: 0.5 %</td></tr>
<tr><td>Current feedback:
Tolerances: +/- 0.2 mA
Transaction delay: 20 ms
Linear feedback: 0.5%
Output: Source
Serial resistance:
12 V: max. 300 ohm
24 V: max. 900 ohm</td></tr>
<tr><td>White</td><td colspan="2">Not to be connected</td></tr>
</table>

For actuators with analogue feedback it is recommended to fully extract and retract the actuator on a regular basis (thereby activating the limit switches) in order to ensure precise positioning.

PWM position feedback

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Not to be connected
GREEN	Not to be connected
VIOLET	PWM feedback
WHITE	Not to be connected

The signal power must be turned on at all times when the actuator is running, and minimum one second before it starts to run.

PWM position feedback

I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with an electronic circuit that gives PWM feedback signal when the actuator moves.	
Brown	Nominal Voltage 12/24/48* V DC According to the Actuator label *48 V only for LA33, LA36 and LA37	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Signal power supply 12/24 V DC	Active and standby current consumption: Max. 60 mA Higher peak currents due to the input capacitance of max. 3 mF
Black	Signal power supply GND	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	PWM feedback Can be set in any interval within the range of 0-100% For example: 10-90% 20-80%	Min. output voltage: V_{IN} (Red wire) - 2 V Tolerances: +/- 2% Max. current output: 12 mA Frequency: 75 Hz PNP output
White	Not to be connected	

PWM position feedback and Endstop reached

Connection diagram

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Endstop reached inwards
GREEN	Endstop reached outwards
VIOLET	PWM feedback
WHITE	Not to be connected

If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run otherwise the signal will be lost.

PWM position feedback and Endstop reached

I/O specifications

Input/Output	Specification	Comments
Description	The actuator can be equipped with an electronic circuit that gives PWM feedback signal when the actuator moves.	
Brown	Nominal Voltage 12/24/48* V DC According to the Actuator label *48 V only for LA33, LA36 and LA37	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to V DC Connect Blue to GND
Blue		
Red	Signal power supply 12/24 V DC	Active and standby current consumption: Max. 60 mA Higher peak currents due to the input capacitance of max. 3 mF
Black	Signal power supply GND	
Yellow	Endstop reached inwards	Min. output voltage: V_{IN} (Red wire) - 2 V Max. source current: 100 mA NOT potential free
Green	Endstop reached outwards	
Violet	PWM feedback Can be set in any interval within the range of 0-100% For example: 10-90% 20-80%	Min. output voltage: V_{IN} (Red wire) - 2 V Tolerances: +/- 2% Max. current output: 12 mA Frequency: 75 Hz PNP output
White	Not to be connected	

For actuators with analogue feedback it is recommended to fully extract and retract the actuator on a regular basis (thereby activating the limit switches) in order to ensure precise positioning.

Mechanical potentiometer - Absolute positioning

Connection diagram

Applicable for: LA14

BROWN	Motor +/-
BLUE	Motor -/+
RED	Potentiometer power supply
BLACK	Potentiometer power supply GND
YELLOW	Not to be connected
GREEN	Not to be connected
VIOLET	Potentiometer feedback
WHITE	Not to be connected

Mechanical potentiometer - Absolute positioning

I/O specifications

Applicable for: LA14

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer, 10 kΩ. Max. stroke length: 100 mm	0 - 10 kΩ, 5%
Brown	Nominal voltage 12/24 V DC According to actuator label	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Potentiometer power supply	Recommended 10 V DC
Black	Potentiometer power supply GND	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Mechanical potentiometer feedback Slide potentiometer, 10 kΩ 1 kΩ = 0 mm stroke 11 kΩ = 100 mm stroke The maximum effect: 0.1 W	Linearity: ± 20% Min. lifetime: 15,000 cycles Average lifetime: 40,000 cycles Max. current output: 1 mA Output protection: 1 kΩ protection resistor in series with the potentiometer.
White	Not to be connected	

Mechanical potentiometer - Absolute positioning

Connection diagram

Applicable for: LA36

BROWN	Motor +/-
BLUE	Motor -/+
RED	Not to be connected
BLACK	Potentiometer power supply GND
YELLOW	Not to be connected
GREEN	Not to be connected
VIOLET	Potentiometer feedback
WHITE	Potentiometer power supply

Mechanical potentiometer - Absolute positioning

I/O specifications

Applicable for: LA36

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer, 10 kΩ.	0 - 10 kΩ, 5%, 10-turn
Brown	Nominal voltage 12/24/48 V DC According to actuator label	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Not to be connected	
Black	Potentiometer power supply GND	
Green	Not to be connected	
Yellow	Not to be connected	
Violet	Mechanical potentiometer feedback Output range with 12 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 500 mm stroke Output range with 16 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 666 mm stroke Output range with 20 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 833 mm stroke	Output protection: 1 kΩ protection resistor in series with the potentiometer Linearity: ± 0.25%
White	Potentiometer power supply	Recommended 10 V DC

Mechanical potentiometer and Endstop reached - Absolute positioning

Connection diagram

Applicable for: LA36

BROWN	Motor +/-
BLUE	Motor -/+
RED	Signal power supply
BLACK	Signal power supply GND
YELLOW	Endstop reached inwards
GREEN	Endstop reached outwards
VIOLET	Potentiometer feedback
WHITE	Potentiometer power supply

If you wish to use the endstop signals, you will have to keep power on the Brown, Blue, Red and Black wires at all times when the actuator is running, and minimum one second before it starts to run, otherwise the signal will be lost.

Mechanical potentiometer and Endstop reached - Absolute positioning

I/O specifications

Applicable for: LA36

Input/Output	Specification	Comments
Description	The actuator can be equipped with a mechanical potentiometer, 10 kΩ.	0 - 10 kΩ, 5%, 10-turn
Brown	Nominal voltage 12/24/48 V DC According to actuator label	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Signal power supply 12/24 V DC	For endstop signals
Black	Signal/Potentiometer power supply GND	
Yellow	Endstop reached inwards	Min. output voltage: V_{IN} - 2 V Max. source current: 100 mA NOT potential free
Green	Endstop reached outwards	
Violet	Mechanical potentiometer feedback Output range with 12 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 500 mm stroke Output range with 16 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 666 mm stroke Output range with 20 mm spindle pitch: 1 kΩ = 0 mm stroke 11 kΩ = 833 mm stroke	Output protection: 1 kΩ protection resistor in series with the potentiometer Linearity: ± 0.25%
White	Potentiometer power supply	Recommended 10 V DC

Potential-free endstop reached

Connection diagram

Applicable for: LA36

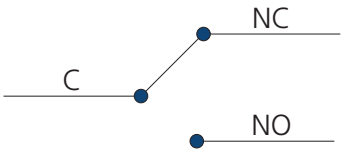
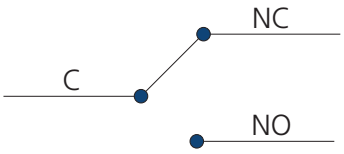
BROWN	Motor +/-
BLUE	Motor -/+
RED	Normally Closed Outwards (NC)
WHITE	Common Contact (C)
BLACK	Normally Open Outwards (NO)
YELLOW	Normally Closed Inwards (NC)
GREEN	Common Contact (C)
VIOLET	Normally Open Inwards (NO)

Please note that the actuator will move to the mechanical end of stroke when it reaches a potential-free endstop. Therefore, an external controller is essential for monitoring current consumption and ensuring that the actuator stops properly.

Potential-free endstop reached

I/O specifications

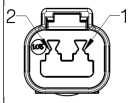
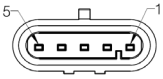
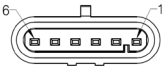
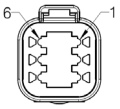
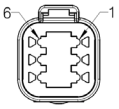
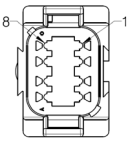
Applicable for: LA36

Input/Output	Specification	Comments
Description	The actuator can be equipped with potential-free endstop switches.	Please note that potential-free options cannot be combined with any other type of feedback.
Brown	Nominal voltage 12/24/48 V DC According to actuator label	To extend actuator: Connect Brown to V DC Connect Blue to GND To retract actuator: Connect Brown to GND Connect Blue to V DC
Blue		
Red	Normally Closed Outwards (NC)	
White	Common Contact (C)	
Black	Normally Open Outwards (NO)	
Yellow	Normally Closed Inwards (NC)	
Green	Common Contact (C)	
Violet	Normally Open Outwards (NO)	

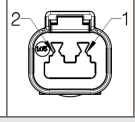
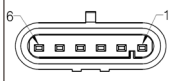
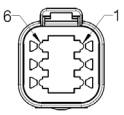
Please note that the actuator will move to the mechanical end of stroke when it reaches a potential-free endstop. Therefore, an external controller is essential for monitoring current consumption and ensuring that the actuator stops properly.

Connection overview

LA14 and LA25

	AMP 2-pin	Deutsch 2-pin	AMP 5-pin	AMP 6-pin	Deutsch 6-pin	Deutsch 6-pin	Deutsch 8-pin
	Power	Power	Feedback	Endstop reached	Endstop reached	Feedback	Feedback and Endstop reached
							
Wire colour	**Pin**						
BROWN	2	2	2	2	2	2	2
BLUE	1	1	1	1	1	1	1
RED	-	-	4	4	4	4	4
BLACK	-	-	3	3	3	3	3
YELLOW	-	-	-	5	5	-	7
GREEN	-	-	-	6	6	-	8
VIOLET	-	-	5	-	-	6	6
WHITE	-	-	-	-	-	-	-

LA21, LA33, LA36 and LA37

	AMP 2-pin	Deutsch 2-pin	AMP 6-pin	Deutsch 6-pin
	Power	Power	Endstop reached	Endstop reached
				
Wire colour	**Pin**			
BROWN	2		-	
BLUE	1		-	
RED	-		2	
BLACK	-		1	
YELLOW	-		5	
GREEN	-		6	
VIOLET	-		4	
WHITE	-		3	

Power supply

Standard actuators are available with the following supply voltage range: 12 V, 24 V, and 48 V DC.

Actuator specific voltage ranges are specified in the tables below:

Supply voltage	LA14	LA25	LA21	LA33	LA36	LA37
12 V	√	√	√	√	√	√
24 V	√	√	√	√	√	√
48 V				√	√	√

Contacts

FACTORIES

Denmark - Headquarters
LINAK A/S
Phone: +45 73 15 15 15
Fax: +45 74 45 80 48
Fax (Sales): +45 73 15 16 13
Web: www.linak.com

China
LINAK (Shenzhen) Actuator Systems, Ltd.
Phone: +86 755 8610 6656
Phone: +86 755 8610 6990
Web: www.linak.cn

Slovakia
LINAK Slovakia s.r.o.
Phone: +421 51 7563 444
Web: www.linak.sk

Thailand
LINAK APAC Ltd.
Phone: +66 33 265 400
Web: www.linak.com

USA
LINAK U.S. Inc.
Americas Headquarters
Phone: +1 502 253 5595
Fax: +1 502 253 5596
Web: www.linak-us.com
www.linak-latinamerica.com

SUBSIDIARIES

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

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

Belgium
LINAK Actuator-Systems NV/SA
(Belgium & Luxembourg)
Phone: +32 (0)9 230 01 09
E-mail: beinfo@linak.be
Web: www.linak.be - www.fr.linak.be

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

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

Czech Republic
LINAK C&S s.r.o.
Phone: +42 058 174 1814
Fax: +42 058 170 2452
E-mail: info@linak.cz
Web: www.linak.cz - www.linak.sk

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

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

Finland
LINAK OY
Phone: +358 10 841 8700
E-mail: linak@linak.fi
Web: www.linak.fi

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

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

India
LINAK A/S India Liaison Office
Phone: +91 120 4531797
Fax: +91 120 4786428
E-mail: info@linak.in
Web: www.linak.in

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

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

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

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

Netherlands
LINAK Actuator-Systems B.V.
Phone: +31 76 5 42 44 40 /
+31 76 200 11 10
E-mail: info@linak.nl
Web: www.linak.nl

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

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

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

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

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

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

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

Switzerland
LINAK AG
Phone: +41 43 388 31 88
E-mail: info@linak.ch
Web: www.linak.ch - www.fr.linak.ch
www.it.linak.ch

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

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

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

DISTRIBUTORS

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

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

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

Indonesia
PT. Himalaya Everest Jaya
Phone: +6 221 544 8956 /+6 221 544 8965
Fax: +6 221 619 1925
Fax (Sales): +6 221 619 4658
E-mail: hejplastic-div@centrin.net.id
Web: www.hej.co.id

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

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

South Africa
Industrial Specialised Applications CC
Phone: +27 011 466 0346
E-mail: gartht@isagroup.co.za
Web: www.isaza.co.za

United Arab Emirates
Mechatronics
Phone: +971 4 267 4311
Fax: +971 4 267 4312
E-mail: mechtron@emirates.net.ae

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