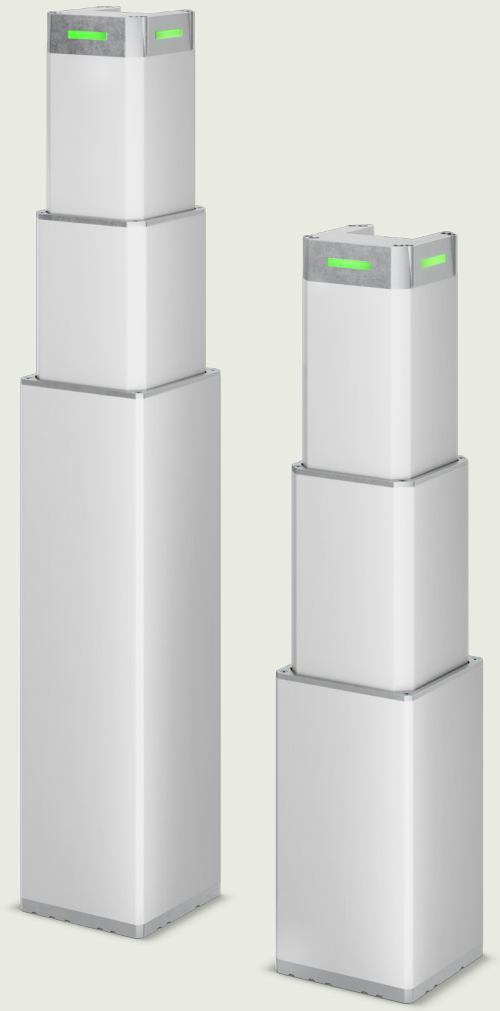
LC3 IC
Data Sheet



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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

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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.

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

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Introduction

The LC3 IC is a smart electric lifting column featuring an integrated controller that allows for seamless connectivity in industrial applications through a variety of interfaces. Designed and field-tested for robust, long-lasting performance, the LC3 IC is a reliable solution for your vertical lift applications.

The LC3 IC is an ideal choice for automation technology that streamlines processes between machines and improves the working environment. And if your application requires a strong foundation for managing high loads and enhancing stability, you can run several columns in parallel.

Speed up your development with these benefits:

- **Three-stage telescopic design**: High performance in a compact size – flexible mounting in both vertical directions
- **Many customisation options**: 200–1,100 mm stroke lengths, 24 or 48 V, up to 6,000 N loads and up to 100 mm/s
- **Integrated Controller**: Direct control over a wide range of industrial PLCs
- **Brushless DC motor**: Smooth movement and long service life
- **Status LED and diagnostics**: Easy troubleshooting to increase up-time

With its quiet operation, this discreet electric lifting column also enhances the work environment.

Safety information

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 product suffering damage or being ruined.

Additional information

Usage tips or additional information that is important in connection with the use of the product.

Furthermore, ensure that all staff who are to connect, mount, or use the lifting column are in possession of the necessary information and that they have access to a descriptive 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 application, 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, if children are to use the application - they must be under surveillance to ensure that they do not play with the application.

Warnings

- Always use a cable lock to ensure cables are fixed and not squeezed, pulled, or subjected to stress or damage.
- Make a proper cable installation and inspect regularly for wear, damage, and jarring sounds to avoid cable interruption and lifting column defects. Defective parts must be replaced.
- Damaged parts can cause moisture to gather and lead to dangerous electrical connections between metal parts and wires.
- Always check correct assembly after mounting or service and ensure the cable lock is fitted.
- Do not exceed the max. nominal pull or push load specified on the label.
- Do not add dynamic load when changing between pull and push.
- Do not manually adjust anything during movement or while connected to power supply unit, as this may cause personal injury.
- Cables must remain plugged in the column during cleaning to prevent water ingress.
- After service inspection, the application must be tested for correct functionality before use to avoid misalignment between two or more columns moving in parallel.
- If LC3 IC is used in ceiling-hang applications, consider if additional third-party safety devices are required to prevent personal injuries.
- Not to be used horizontally.
- The product is NOT to be opened by unauthorized personnel.
- LC3 IC is heavy (more than 20 kg). To avoid personal injury and product damage, DO NOT DROP!
- Do not loosen any screws on the LC3 IC, as this can cause collapse of the column!
- The lifting column can become a functional safety system compliant with EN ISO10218-2. To integrate the LC3 IC into a functional safety chain, external safety devices such as safety contactors/relays must be implemented.
- Because of the special sealing gasket on the power and signal cable, option ‘F600’ is rated with IP44. However, this protection level only applies when the column is installed up side right with the top plate facing upwards. If you are using options ‘F700’ with an RJ45 plug, it can only achieve an IP4X rating.
- Pinching Hazard Warning: Be aware of the risk of pinching during column movement. If a top plate larger than the smallest profile is mounted, it poses a pinching risk for objects higher than 4 cm. Additionally, mounting the column upside down at ground level creates a pinching hazard at the moving profile ends. Please implement appropriate safeguards to prevent injury.

Recommendations

- Always follow the important LC3 IC mounting guidelines and LINAK specifications to ensure correct functionality
- Self-designed mounting plates must cover the entire bottom plate and be strong enough to carry the load
- Do not use chemicals for cleaning nor remove sliders grease on profiles
- Intended for indoor use only and not for use in harsh environments like pool or marine environments and agriculture buildings with ammonia vapours
- Assure free space for movement of the application in both directions to avoid blockage
- Listen for unusual sounds and watch for uneven running during operation. Stop the lifting column immediately if anything unusual is observed
- When using Actuator Connect to modify parameters, please proceed at your own risk. Ensure that the soft start and soft stop times are set to no less than 500 milliseconds. (1500 ms for the 1000 N version)
- Avoid dynamic load changes while the column is operating, as moving loads can increase the total load beyond the column's specifications, potentially shortening its lifespan and causing stick-slip issues
- For applications with suitable built-in dimensions, we recommend heavy-duty profiles due to their enhanced resistance to side forces and bending moments, especially under off-center loads. Standard profiles are ideal for applications requiring compact dimensions without off-center loads
- Avoid clamping the column on the outer profile, as this can alter the system's internal friction and negatively affect the column's lifespan
- Avoid placing the column in dusty environments, as this can impact the sliders and reduce the column's lifespan. If a dusty environment is unavoidable, use a cover solution to protect the column

Features

- Maximum speed up to 100mm/s depending on spindle pitch
- Anodized aluminium profiles with zinc bottom and top plate
- Noise level below 58 dB(A)
- Highly efficient hollow and solid spindle with acme thread
- High self-lock ability due to integrated brake
- Incremental encoder with contact-less calibration (Zero-point)
- Position repeatability: +/- 0.3mm
- *Weight: 20.5 kg for 400 mm stroke; additional 1.7 kg for each additional 100mm stroke (Cable not included; weight varies by selected options)*

Options

- 24 or 48 V DC brushless motor
- Stroke length from 200 mm to 1,100 mm in steps of 100mm (2,000 - 6,000 N up to maximum 700 mm in push applications)
- Maximum nominal load from 1,000 - 6,000 N
- Rated for ingress protection up to IP44:
    - F600 IP44 (only if the column is mounted with the top plate upwards)
    - F700 IP4X
- Integrated controller with several interface options:
    - I/O
    - CANopen
    - CAN J1939
    - Modbus RTU
    - Modbus TCP/IP
    - EtherNet/IP
    - PROFINET
    - IO-Link

Usage

- Duty cycle: 20% at full load for 1,000 N *(4 min. run, 16 min. rest)*
  Duty cycle: 10% at full load for 2,000 N, 4,000 N, 6000 N (2 min. run, 18 min. rest)
- Operation temperature: +5°C to + 40°C
- Storage temperature: -40°C to + 70°C
- Atmospheric pressure: 700 to 1060 hPa
- Meters above sea level: *Tested to* 2000 meters
- Avoid dusty environments

Approvals:

- EN 61000-6-2:2019 – Part 6-2
- EN 61000-6-4:2019 – Part 6-4

Ordering example

LC3 200 A00 F600 A8 0780 6 2 3 1 B - 000

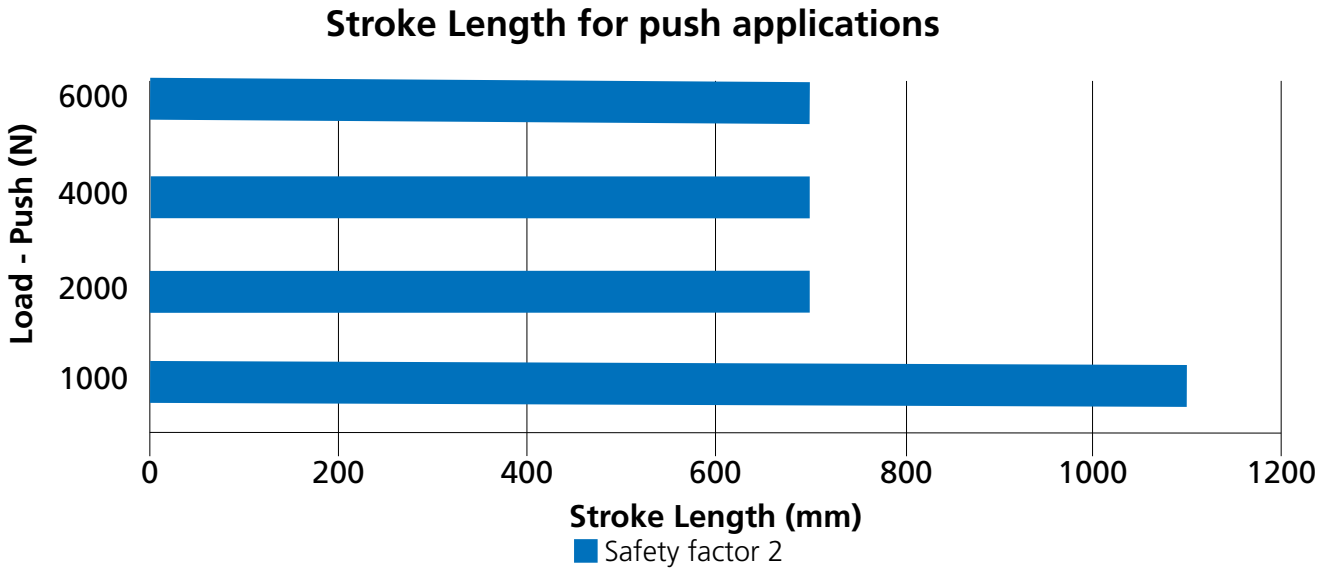
Type	**LC3**	=	Lifting column 3			
Spindle pitch	060	=	6 mm (for 6,000 N)	100	=	10 mm (for 4,000 N)
	200	=	20 mm (for 1,000 N and 2,000 N)			
Stroke length*	200 to 900	=	mm (in steps of 100mm) Min. 200 mm and Max. 900 mm	**A00**	=	1,000 mm
				B00	=	1,100 mm
Option	**F600**	=	Power and signal connector -Available with the platforms shown directly below:	F700	=	Power, signal and RJ45 connector -Available with the platforms shown directly below:
Platform	A7	=	CAN SAE J1939	2E	=	EtherNet/IP
	A8	=	CANopen	4E	=	PROFINET
	B3	=	I/O Basic	0E	=	MODBUS TCP/IP
	F3	=	I/O Full			
	0B	=	IO-Link			
	14	=	MODBUS RTU RS485			
Installation dimension	**0780**	=	mm (min. length: 360mm)			
Profiles	**6**	=	Heavy duty profiles for 3-part column with BID of ½ Stroke + 280 mm			
	7	=	Standard profiles for 3-part column with BID of ½ Stroke + 160 mm			
Motor type	**2**	=	24 V BLDC Fast**	3	=	24 V BLDC
				4	=	48 V BLDC
Endstop	**3**	=	Zero point			
Mounting direction	**1**	=	Right side up	2	=	Upside down
Ingress protection	**B**	=	IP44***	C	=	IP4X
Colour	**-**	=	Aluminium / Zinc			
Not used	**000**	=	Not used			

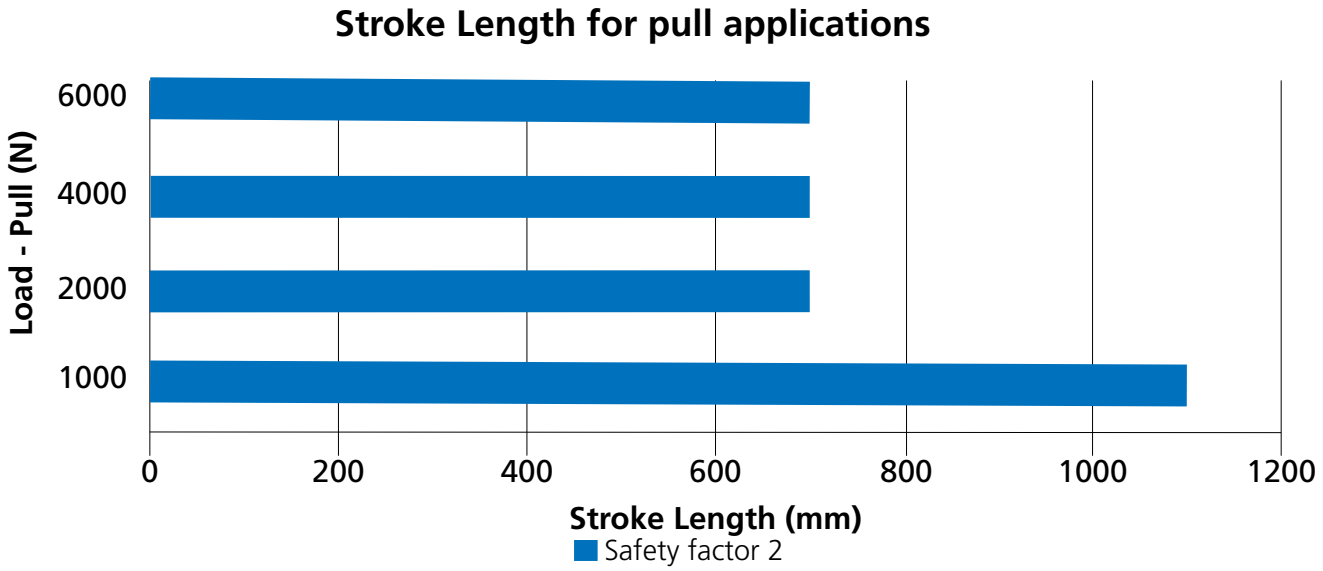
* 2,000 N, 4,000 N and 6,000 N lifting columns are available up to max. 700 mm Stroke length.
** Only available for 1,000 N lifting columns
*** Applies to Option F600 only -and only if the column is mounted with 'Right side up'.

See cable variants and mounting plates overview in the paragraph 'Accessories'

Load versus stroke length

LC3 IC is tested with the shown safety factor for static load. All columns have mechanical endstops, which will avoid that a column can run over its designed endstops and collapse.





Please Note: The safety factor applies to the static load capacity of the column when fully extended.

Technical specifications

24 V motor

Push max. (N)	Pull max. (N)	Self-lock min. (N)	Motor type	Pitch (mm/ spindle rev.)	Regulated speed (mm/s)	Standard stroke lengths (mm) in steps of 100 mm	Typical amp.* (A)	
							No load	Full load
6,000	6,000	12,000	3	6	16.7	200 - 700	4	12
4,000	4,000	8,000	3	10	25	200 - 700	4	12
2,000	2,000	4,000	3	20	50	200 - 700	4	12
1,000	1,000	2,000	2	20	100	200 - 1,100	6	20

48 V motor

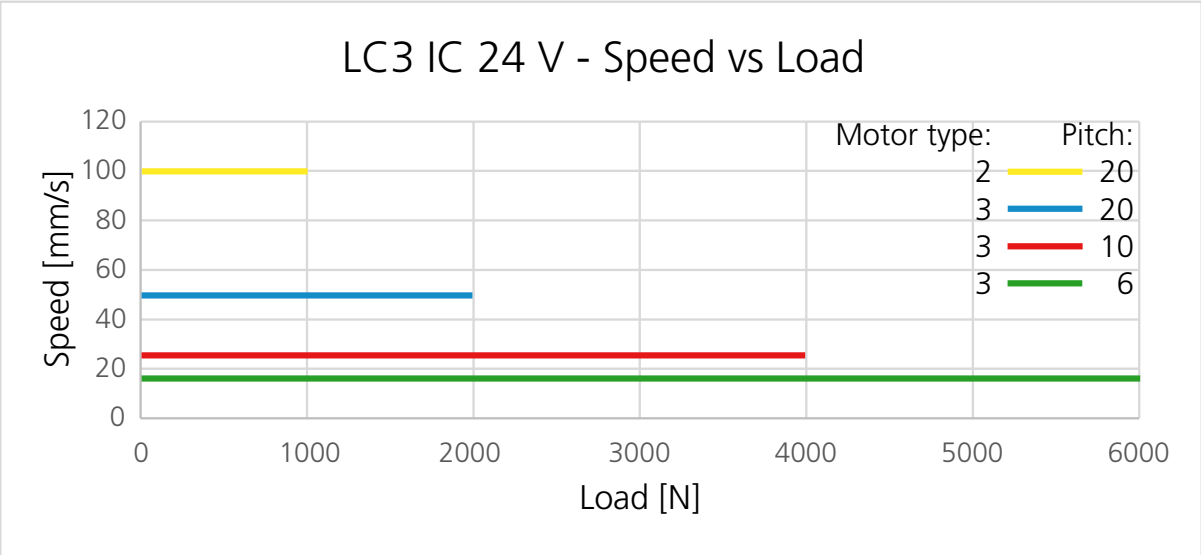
Push max. (N)	Pull max. (N)	Self-lock min. (N)	Motor type	Pitch (mm/ spindle rev.)	Regulated speed (mm/s)	Standard stroke lengths (mm) in steps of 100 mm	Typical amp.* (A)	
							No load	Full load
6,000	6,000	12,000	4	6	16.7	200 - 700	2	6
4,000	4,000	8,000	4	10	25	200 - 700	2	6
2,000	2,000	4,000	4	20	50	200 - 700	2	6

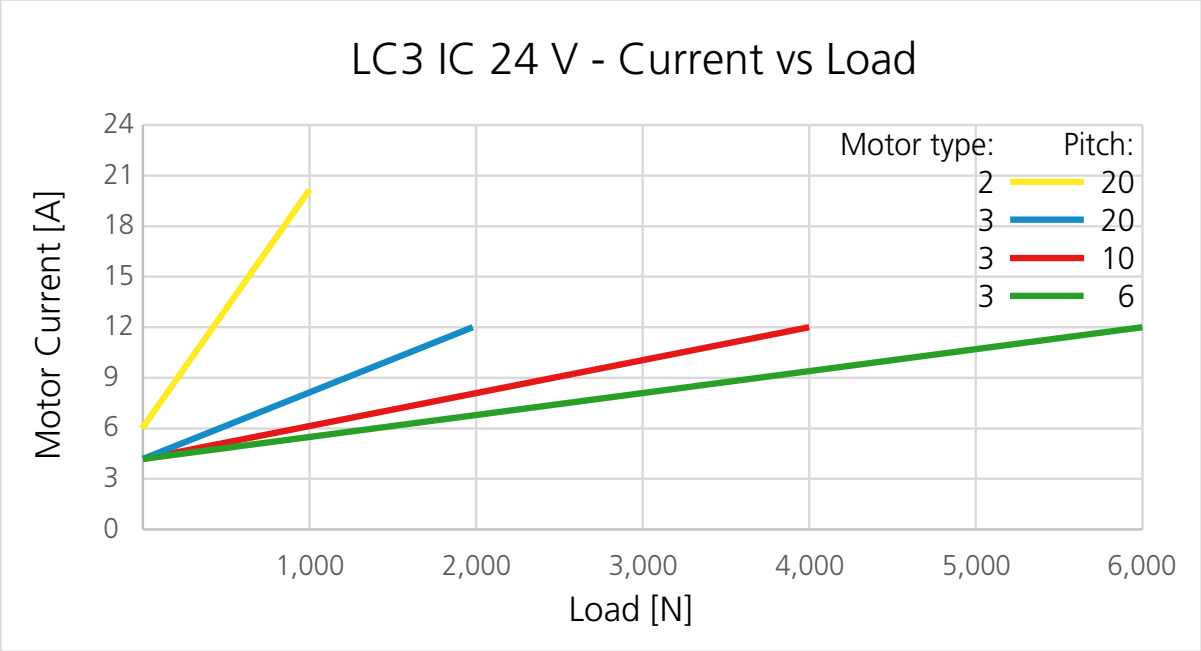
* Depending on temperature (detailed information on current curves)

The default soft stop on the column will send a short peak of higher voltage 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.

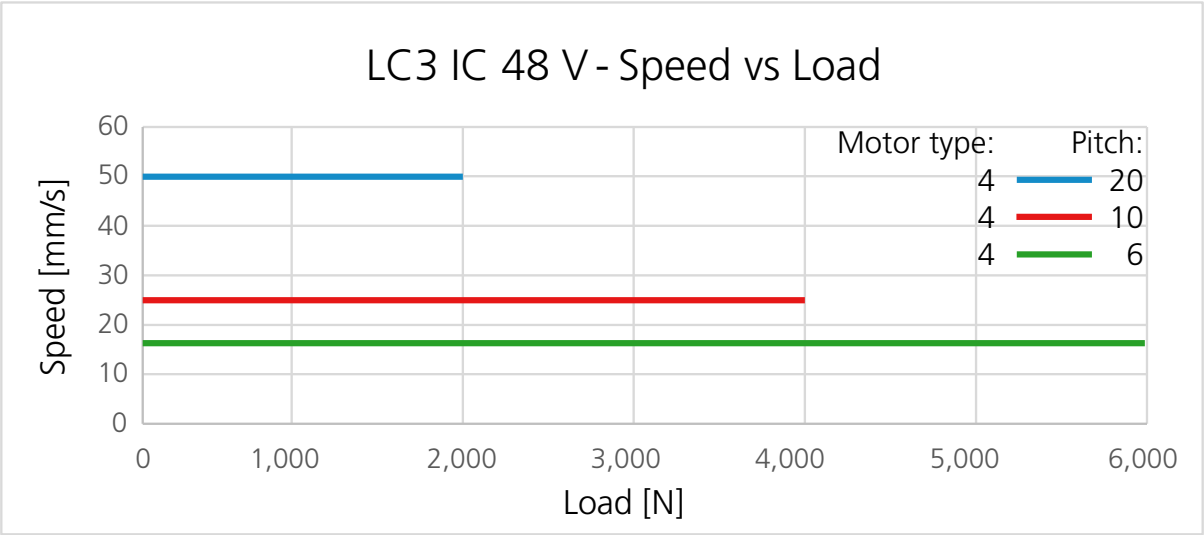
Speed, load and current curves

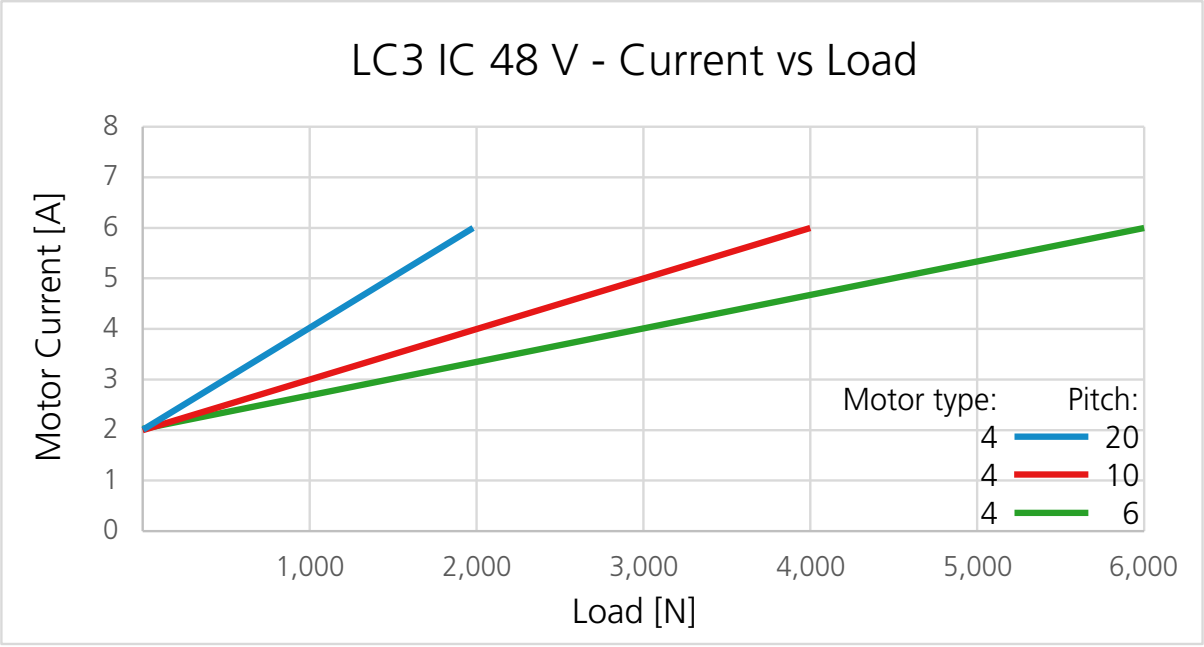
The values provided below represent typical measurements obtained under controlled conditions, with a stable power supply and an ambient temperature of 20°C. Please note that the current consumption figures are recorded without any off-center load. Introducing an off-center load will result in increased current consumption.



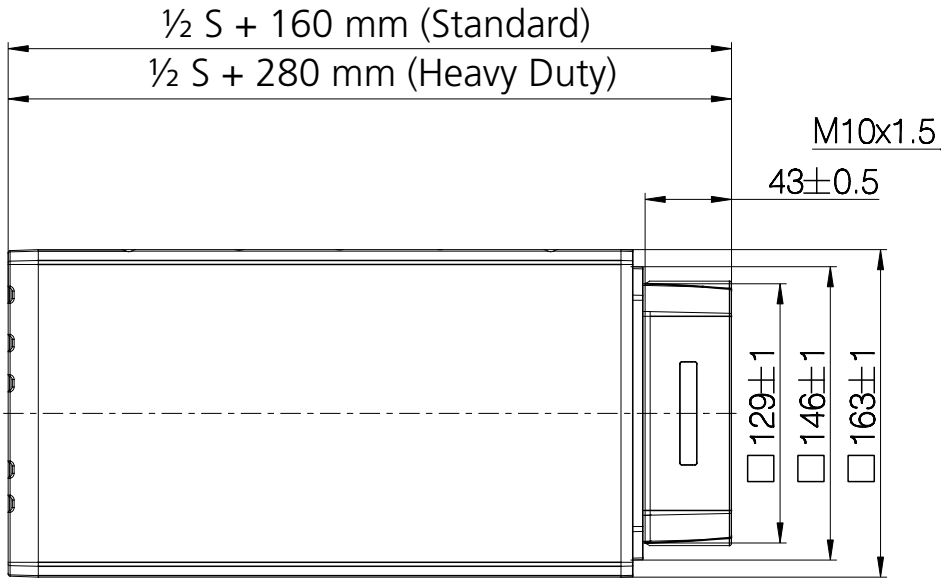


Speed, load and current curves





Built-in dimensions



Built-in dimensions [mm]										
Stroke [mm]	200	300	400	500	600	700	800*	900*	1,000*	1,100*
Standard profile	360	360	360	410	460	-	-	-	-	-
Heavy Duty profile	480	480	480	530	580	630	680	730	780	830

* Only for 1,000 N and heavy-duty profile option available.

Bending

Profile Options:

The LC3 IC lifting columns are available in two profile options: standard profiles and heavy-duty profiles.

Recommendations:

- **Heavy-Duty Profiles**: We generally recommend using heavy-duty profiles for applications where the built-in dimensions are suitable. These profiles offer increased overlap, resulting in sliders that are positioned further apart. This design enhances resistance against side forces and bending moments, making heavy-duty profiles ideal for applications involving off-center loads on the column.
- **Standard Profiles**: For applications where there is no off-center load and where minimal built-in dimensions are required, standard profiles are suitable. These profiles provide a compact solution without compromising on performance only for central load applications.

Accessories

LC3 IC comes with different accessories to simplify the integration of the column.
-Please note that the accessory needs to be separately ordered.

Service cable for Actuator Connect

Article number: 0367996

Enhance your lifting column experience with the intuitive PC tool Actuator Connect.
- The cable works with all interfaces.

Cable set - 5 meter Flying leads

Article number: 1002W8194

The set includes a 5 m power cable and a 5 m signal cable with 9 wires. The power cable comes with flying leads and the signal cable comes with a molex mini-fit 12-pin connector. This cable works with all interfaces.

Info: The internal bending radius of the cables must be bigger than 3 times the outer dimension of the cable. For instance, if the outer cable dimension is Ø7, the internal radius of the maximum cable bending is 21 mm.

You need an additional ethernet cable with RJ45 connectors for all ethernet interfaces.

Description	Quantity
Power cable, 5 m, 6-pin minifit (CAB0367046-5000)	1
Signal cable, 5 m, 9-pin microfit (CAB0368543-5000)	1
Cable lock with mounting screw T15	1

IO-Link cable set

Article number: 1002W8193

The set includes a 5m power cable and a signal cable for IO-Link with a M12 connector.
This set is an alternative if flying leads are not desired.

Description	Quantity
Power cable; 5 m, 6-pin minifit (CAB0367046-5000)	1
IO-link M12 cable; 0.6 m, 9-pin microfit (CAB0367299)	1
Cable lock with mounting screw T15	1

Modbus RTU cable set

Article number: 1002W8197

The set includes a 5m power cable and a signal cable for Modbus RTU with a M12 connector.
This set is an alternative if flying leads are not desired.

Description	Quantity
Power cable; 5 m, 6-pin minifit (CAB0367046-5000)	1
RS485 M12 cable; 0.6 m, 9-pin microfit CAB0965633-1000	1
Cable lock with mounting screw T15	1

Mounting plate with top screws

Article number: *1002W8195*

Drawings can be downloaded from LINAK.com.

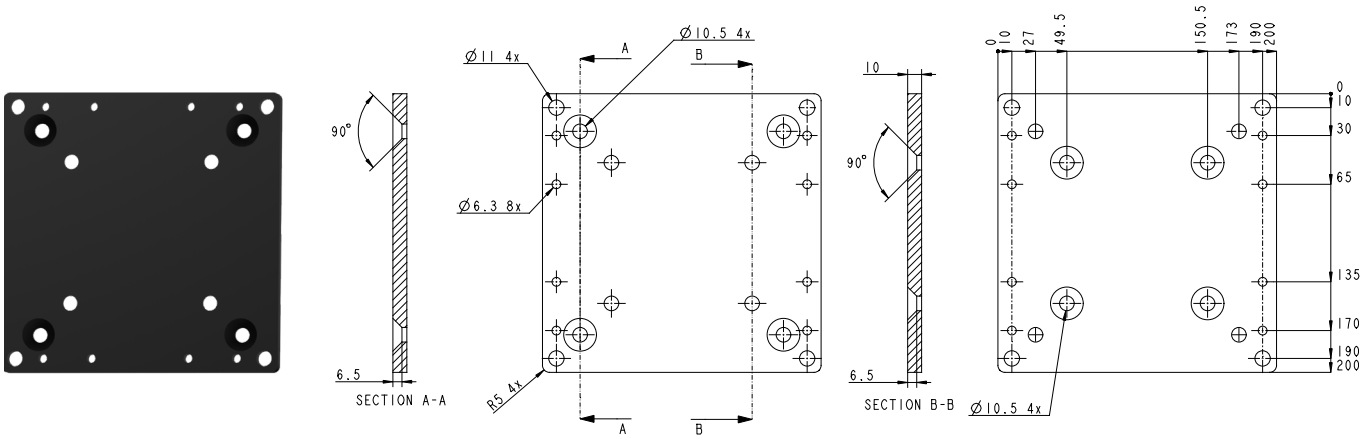
Description	Quantity
Base plate	1
Top screw M10 x 80 A2 ISO 10642	4

Mounting plate with bottom screws

Article number: *1002W8196*

Drawings can be downloaded from LINAK.com.

Description	Quantity
Base plate	1
Bottum screw M10 x 45 A2 ISO 10642	4



Environmental test - Electrical EMC

Standard	Specification	Focus on
EN/IEC 61000-6-2	Electromagnetic compatibility (EMC)- Part 6-2: Generic standards - Immunity for industrial automation	Industrial automation
EN/IEC 61000-6-4	Electromagnetic compatibility (EMC)- Part 6: Generic standards - Section 4: Emission standards for industrial environments	Industrial automation

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