

Contents

Symbols, safety	3
General safety information	3
Safety instructions / recommendations	5
Correct use	6
Improper use	7
Personnel qualifications	7
Product description	7
Accessories	8
Technical data	9
Operating data	9
..... Operating data – Bending	11
..... Operating data – Stopping time	12
Preparations for installation	13
..... Assembly – Plug-And-Play Set	14
..... Assembly – Integrator Set	16
..... Assembly – Interfaces	18
..... Assembly – Additional peripherals	21
Electrical installation	22
I/O specifications of Lifting Column TCP/IP	23
Electrical installation – Connection example	24
Service operation Lifting Column TCP/IP	25
..... Service Cable Set – Connection instructions	25
..... Service Software – Actuator Connect™	26
Environmental EMC performance	32
Modbus TCP/IP actuators	33
Commands	33
Speed regulation	34
Input state	34
Internal monitoring	35
Current-limiting algorithm	36
Register overview	37
Power supply	44
Commissioning process	44
Troubleshooting	45
Maintenance	46
Disposal	46
Product development and documentation	46
Appendix – AST circuit diagram	47

Symbols, safety



Important information



Observe directions for disposal



Observe directions for disposal



Important: Risk of cable break.

Failure to observe this safety instruction can result in serious injury or death



Caution! Risk of crushing. Failure to observe this safety instruction can result in serious injury or death



Maintenance



Note! Failure to observe this safety instruction can result in material damage



Warning! Failure to observe this safety instruction is likely to result in material damage, serious injury or death



Danger! Failure to observe this safety instruction can result in material damage, serious injury or death



Caution! Failure to observe this safety instruction can result in material damage or injury

General safety information

The details and information in this installation guide are provided exclusively for the purposes of describing the product and its assembly or installation. This information does not relieve users of the obligation to carry out their own assessments and checks. It is also important to bear in mind that our products are subject to a natural process of wear and ageing.

This guide contains important information that will enable you to use the product safely and appropriately. When selling, renting out or otherwise passing this product to another party, this product must be handed over with the installation guide supplied with it.

When installing, operating and maintaining Lifting Column TCP/IP 24V, it is important to ensure that all moving elements are secured so that they cannot be unintentionally switched on and moved. Rotating and moving parts can cause serious injuries! You must therefore read and follow the safety instructions set out below.

- All work on and with Lifting Column TCP/IP 24V must be performed with “safety first” in mind.
- Switch off the power to Lifting Column TCP/IP 24V before carrying out any work on the Lifting Column.

- Ensure the Lifting Column cannot be switched on unintentionally, e.g. by affixing warning notices at the activation point or by removing the fuse from the power supply.
- Observe the regulations pertaining to accident prevention and environmental protection that are applicable in the country and at the workplace where the product is being used.
- Use only articles that are in perfect working order.
- Failure to use original spare parts will invalidate the product warranty!
- Check the product for obvious defects.
- Use the product only within the performance range described in the technical data.
- Ensure all the safety equipment connected to the product is present, properly installed and in full working order.
- Do not alter the position of safety equipment, circumvent it or render it ineffective.

Lifting Column TCP/IP 24V as described here corresponds to the state of the art and takes into account the general principles of safety as they apply at the publication date of this installation guide. Nevertheless, failure to observe the safety instructions and warning notices in this guide can lead to personal injury and damage to property.

We will assume no liability for any resulting damage or injury. We reserve the right to make changes that contribute to technical advances.

Keep this guide in a place where it can be easily accessed by all users. Observe the directions contained in the higher-ranking user guide for a system. The general safety instructions apply throughout the entire lifecycle of Lifting Column TCP/IP 24V.

1. During transportation

Observe the handling instructions on the packaging. Until it is assembled, the product must be stored in its original packaging, protected from moisture, soiling and damage. Always transport the product in its original packaging. Use lifting and transport equipment intended for this purpose. Avoid shocks and impacts. On receipt, immediately inspect all boxes and packaging for visible damage and check the delivery against the carrier's delivery note to ensure it is complete. Notify the supplier of any defects without delay. Avoid exposure to extreme heat or cold. Also avoid excessive storage periods (we recommend a maximum of one year under climate-controlled conditions) and check prior to installation that the product is in working order.

2. During installation

Before installing or uninstalling the product, always ensure that the relevant part of the overall system is not live. Make certain that the system cannot be inadvertently switched back on. Lay cables and lines in such a way that they cannot be damaged and do not represent a trip hazard. Avoid areas that pose a slip, trip or fall hazard.

3. During commissioning

Allow the product to acclimatise for a few hours before you take it into operation.

Ensure Lifting Column TCP/IP 24V is integrated securely and safely into the finished application. Only take into service a product that is safe and has been installed in full. To ensure the product can be operated safely under the ultimately applicable conditions of use, it is the user's responsibility to check the solution as a whole for electrical and mechanical safety (and, if appropriate, for ESD safety) at the place of use, to check it in line with technical standards, and to repeat these checks at appropriate intervals.

4. During operation

Ensure that only persons who have been authorised by the operator have access to Lifting Column TCP/IP 24V. This also applies when the system is not in operation. It must not be possible to inadvertently actuate moving parts. In the event of emergencies, faults or other irregularities, deactivate the Lifting Column and ensure it cannot be switched back on. Ensure that nobody can access the area below suspended loads and prevent access below the Lifting Column. Lifting Column TCP/IP 24V is not suitable for lifting people.

5. During cleaning

Close all openings with suitable protective equipment to ensure that cleaning agents cannot penetrate into the system. Do not use aggressive cleaning agents. Do not use a high-pressure cleaner.

6. During maintenance and servicing work

Carry out the prescribed maintenance work at the intervals indicated in the installation guide. Ensure that no cables, connections or components are disengaged or removed while they are live. Also ensure that Lifting Column TCP/IP 24V cannot be switched back on.

7. During disposal

Dispose of the product in accordance with the national and international regulations that apply in your country.

Safety instructions / recommendations



DANGER!

- Do not use horizontally.
- Sharp edges may be present – wear safety gloves during assembly and installation work.
- After carrying out installation and maintenance work, always check that cable strain relief fittings have been correctly fitted.
- Ensure that the cable cannot be trapped, pulled or in any other way stressed or damaged.
- Lifting Column TCP/IP 24V is heavy (over 20 kg). To prevent injuries and product damage, DO NOT ALLOW IT TO FALL!
- Do not place anything inside the working area when movement is ongoing or while the device is connected to the power grid, as doing so can lead to injuries.
- To avoid cable breakages and faults on the Lifting Column, you should lay the cables in good order and regularly check for wear, damage and noises. It is also important to bear in mind that components exposed to mechanical loads are subject to a natural process of wear and ageing.
- Faulty parts must be replaced. Following inspection, check the application to assess its functionality before taking it into operation. In the case of parallel applications, it is essential to prevent misalignment between two or more Lifting Columns.
- Do not remove any screws on the Lifting Column, as doing so can result in the Lifting Column collapsing!
- All cables must remain plugged in during cleaning to prevent fluids from penetrating to the inside.
- The Lifting Column can be integrated into functional safety systems pursuant to EN ISO10218-2. To integrate Lifting Column TCP/IP 24V into a functional safety chain, external safety devices such as safety contactors/relays must be implemented.
- Lifting Column TCP/IP 24V is suitable for both push and pull applications, cable exit from the smallest profile. See the dimensions of the top and bottom column plates. The Lifting Column can be mounted on its head.
- It is advisable to carry out a functional test on the application with all accessories connected before taking it into operation.
- Intended for indoor use only.
- Not suitable for use in harsh environments such as areas with high atmospheric humidity, maritime environments and agricultural buildings where there are ammonia fumes.
- Do not set up the Lifting Column in very dusty environments as this can have a detrimental impact on the sliding function.
- Listen out for unusual noises and watch out for uneven running during operation. Also watch out for wear. If you notice something unusual, bring the Lifting Column to a stop immediately.

Correct use

Lifting Column TCP/IP 24V must only be used in accordance with the technical data and safety requirements set out in this document. Lifting Column TCP/IP 24V is a technical item of work equipment and is not intended for private use.

If significant changes are made to Lifting Column TCP/IP 24V, this documentation must be updated and supplemented accordingly.

Lifting Column TCP/IP 24V is a moving device for raising and lowering compatible robot types and accessories. Internal company requirements and the regulations of the country where the product is being used must be followed. You must not make any design alterations to Lifting Column TCP/IP 24V yourself. We will assume no liability for any resulting damage or injury.

You may only install, operate and maintain Lifting Column TCP/IP 24V if:

- Lifting Column TCP/IP 24V is being used only at a fixed, stationary location
- Lifting Column TCP/IP 24V has been integrated into its surroundings in a proper and safe manner. The operator is responsible for proper and safe installation
- You have carefully read and understood this installation guide
- You are appropriately qualified to do so
- You are mentally and physically capable of doing so
- You are authorised to do so by your company
- You are using only original devices from the manufacturer

The unsafe or improper use of Lifting Column TCP/IP 24V poses a risk of serious injuries caused by crushing and cutting.

The Lifting Column is a partly completed machine as defined in the Machinery Directive (2006/42/EC). If major alterations are made to the Lifting Column, compliance with the Machinery Directive will need to be renewed and the documentation supplemented accordingly.

The declaration of incorporation pursuant to Machinery Directive 2006/42/EC Annex II B for partly completed machinery can be found on the relevant product page in our Online Shop.

The basic safety provisions of the following rules and regulations have been met:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- RoHS Directive 2011/65/EU, including the amendment to this Directive (EU 2015/863) pursuant to technical standard EN IEC 63000:2018
- EN 55016-2-3:2017+A1, EN 55016-2-1:2014
- EN 61000-4-2:2009, EN IEC 61000-4-3:2020, EN 61000-4-4:2012
- EN 61000-4-5:2014+A1, EN 61000-4-6:2014, EN 61000-4-8:2010
- EN 61000-6-2:2019 – Part 6-2
- EN 61000-6-4:2019 – Part 6-4
- EN 60204-1, Safety of machinery. Electrical equipment of machines – Part 1: General requirements.
- EN ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- EN ISO 13849-2, Safety of machinery – Safety-related parts of control systems – Part 2: Validation

Improper use

Improper use is defined as any use of the product for purposes other than those permitted in the installation guide and under the definition of correct use. We assume no liability for any resulting damage or injury.

Lifting Column TCP/IP 24V is not suitable for lifting and transporting people.

Personnel qualifications

Installation, commissioning, operation, dismantling and servicing work (including maintenance and care) require adequate knowledge of electrical engineering and mechanical engineering as well as an understanding of the relevant specialist terminology. To ensure operational safety, these activities must therefore be carried out only by a qualified person or by trained personnel under the direction of a qualified person.

Qualified persons are individuals who – by virtue of their specialist training, know-how, experience and knowledge of pertinent provisions – are able to assess the work that is assigned to them, identify potential hazards and put in place appropriate safety measures. Competent persons must abide by the applicable technical rules and regulations.

Product description

Lifting Column TCP/IP 24V is a 3-stage vertical electric lifting column equipped with an integrated controller that enables on-board control and diagnostics of the Lifting Column. It features a maximum travel distance of 900 mm. The industrial communication interfaces of Lifting Column TCP/IP 24V make it the ideal lifting column for applications such as cobot palletisers and height-adjustable conveyor belts, or for industrial ergonomics.

The Lifting Column has been specially developed for cobot applications and comprises specific interfaces, software drivers (obtained from www.linak.com) and accessories.

The electric Lifting Column features an integrated controller that enables simple integration into industrial applications. The integrated controller makes it possible to choose between digital signals and Ethernet Modbus TCP/IP. These interfaces offer various feedback options such as position, speed, present temperature, status and error codes.

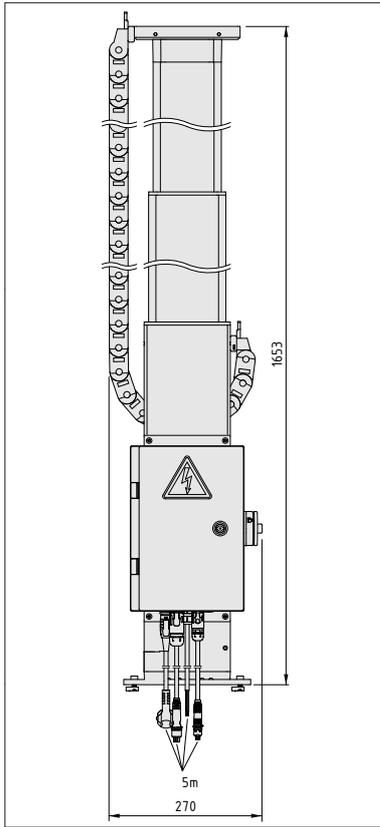
The brushless direct-current motor enables improved motor control and precise positioning, which results in even acceleration and a longer service life.

The Lifting Column can push or pull loads of up to 1000 N at a speed of up to 100 mm/s. Speed can be set and is independent of the load.

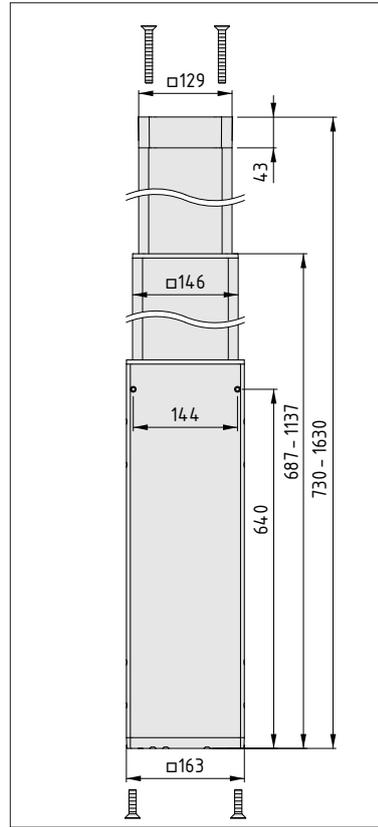
The Lifting Column is ideal for applications in areas such as material handling, industrial automation and ergonomics thanks to the following features:

- Integrated controller – simple integration due to compact size and industrial interfaces
- BLDC motor – for precise control and a longer service life
- Speeds of up to 100 mm/s – which can be set as required and are independent of the load

The Lifting Column can accommodate high bending moments (both dynamic and static), is installed vertically and can be fixed either to a floor surface or overhead surface. The integrated controller eliminates the need for an external control unit, which means the Lifting Column can also be used in tight spaces. This unobtrusive and quiet-running electric lifting column also has a positive impact on the working environment. Two variants are available.



Plug-And-Play Set – Article No.: 0.0.724.86



Integrator Set – Article No.: 0.0.724.90

Accessories

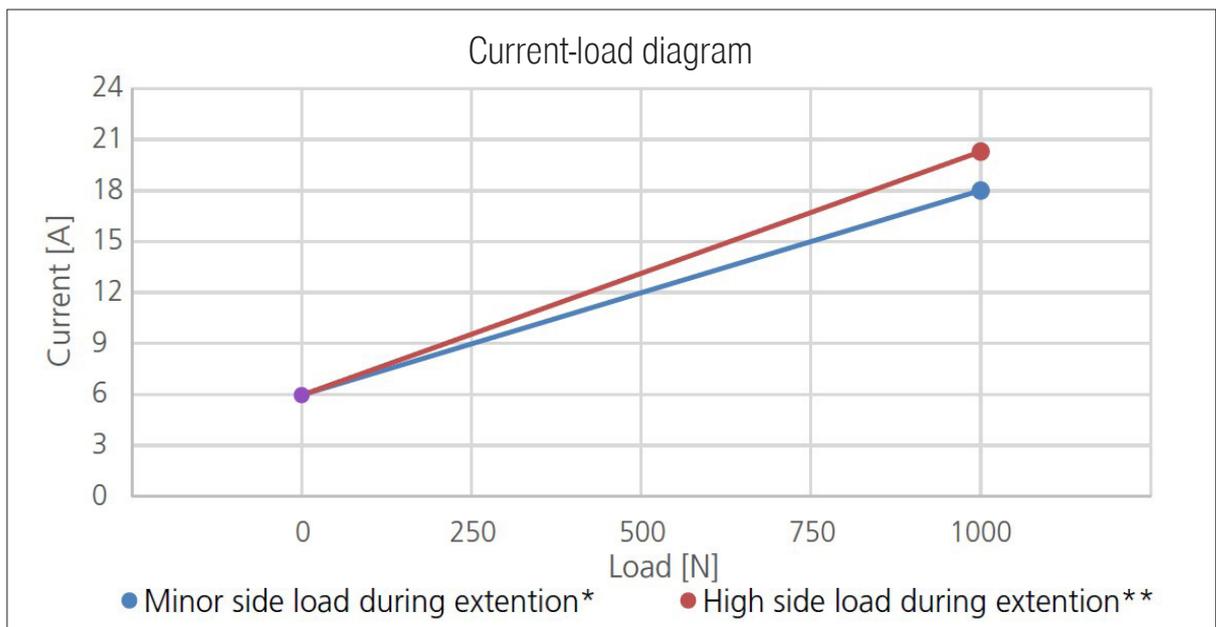
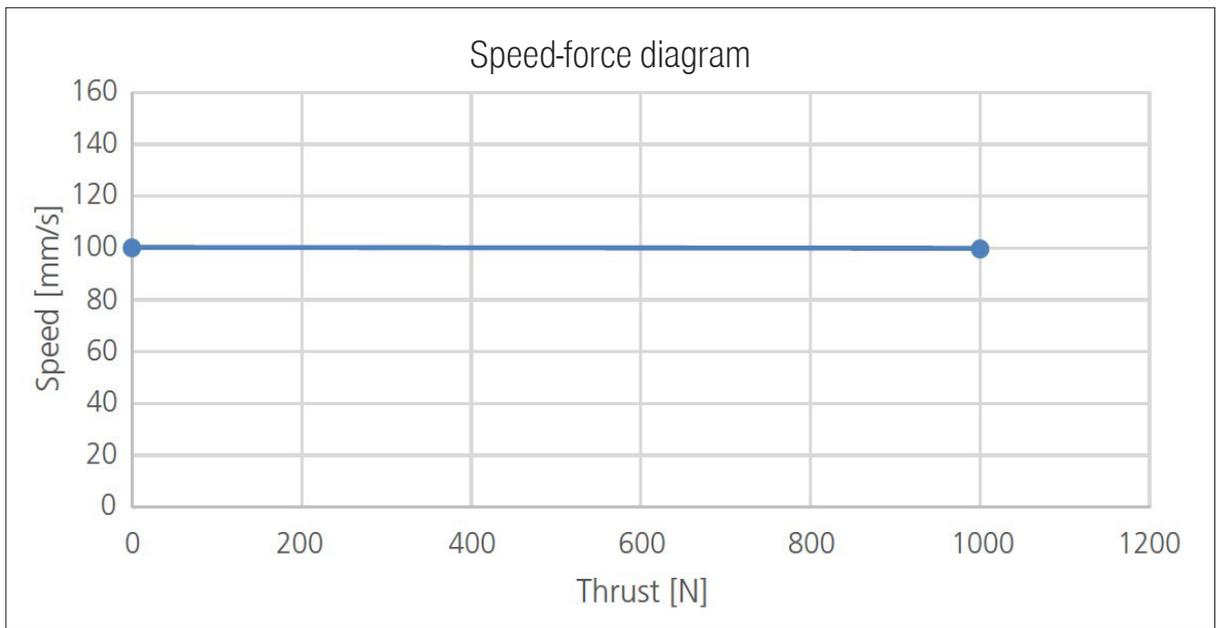
Article number	Article name
0.0.724.90	Lifting Column TCP/IP 24V Integrator Set
0.0.724.86	Lifting Column TCP/IP 24V Plug-And-Play Set
0.0.720.65	Lifting Column Mounting Plate 8 240x200 St
0.0.723.70	Lifting Column Adapter Plate 8 200x200
0.0.709.31	Ethernet Cable, S/FTP, 5m

Technical data

Load-carrying capacity	1000 N (tension/compression)
Max. speed	100 mm/s (settable and independent of load)
Travel distance	900 mm
Positioning accuracy	+/- 1.5 mm
Profile colour	Anodized aluminium
Protection class	IP44
Motor	24 V DC brushless
Noise level	53 dB (A)
Weight (Lifting Column)	29 kg
Weight (Integrator Set)	30.1 kg
Weight (Plug and Play Set)	44.73 kg
Dynamic bending moment	Up to 1400 Nm (permissible bending moment between cobot and Lifting Column while Lifting Column is extending or retracting)
Static bending moment	Up to 3000 Nm (permissible bending moment between cobot and Lifting Column when Lifting Column is not in motion)
Installation orientations	The Lifting Column is installed vertically, either standing upright or suspended
Cobot compatibility	Mechanical compatibility with various cobot manufacturers can be adapted by using item Robot Mounting Plates (search for "Mounting Plate" in the item Online Shop at www.item24.com). Furthermore, software compatibility can also be extended via LINAK (see the LINAK website at www.linak.de).
IC interfaces	Digital I/Os Modbus TCP/IP

Operating data

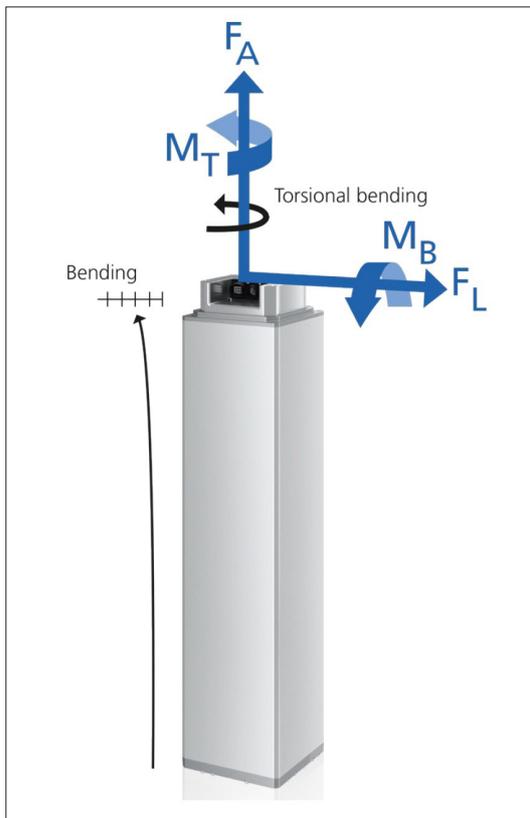
Duty cycle	10% at full load (2 minutes in operation, 18 minutes at rest) 20% at half load (4 minutes in operation, 16 minutes at rest)
Current consumption	6-20 A at 24 V operation 2.2 to 5.4 A at 100-240 V operation (via power supply unit)
Operating temperature	+5°C to +40°C
Storage temperature	-40°C to +70°C
Relative humidity	20% to 80% – non-condensing
Air pressure	700 to 1060 hPa
Metres above sea level	Max. 3000 metres



* The cobot and the load are positioned over the centre of the Lifting Column during extension.

** The cobot and the load can be positioned or moved freely during extension.

Operating data – Bending



Bending moment – static

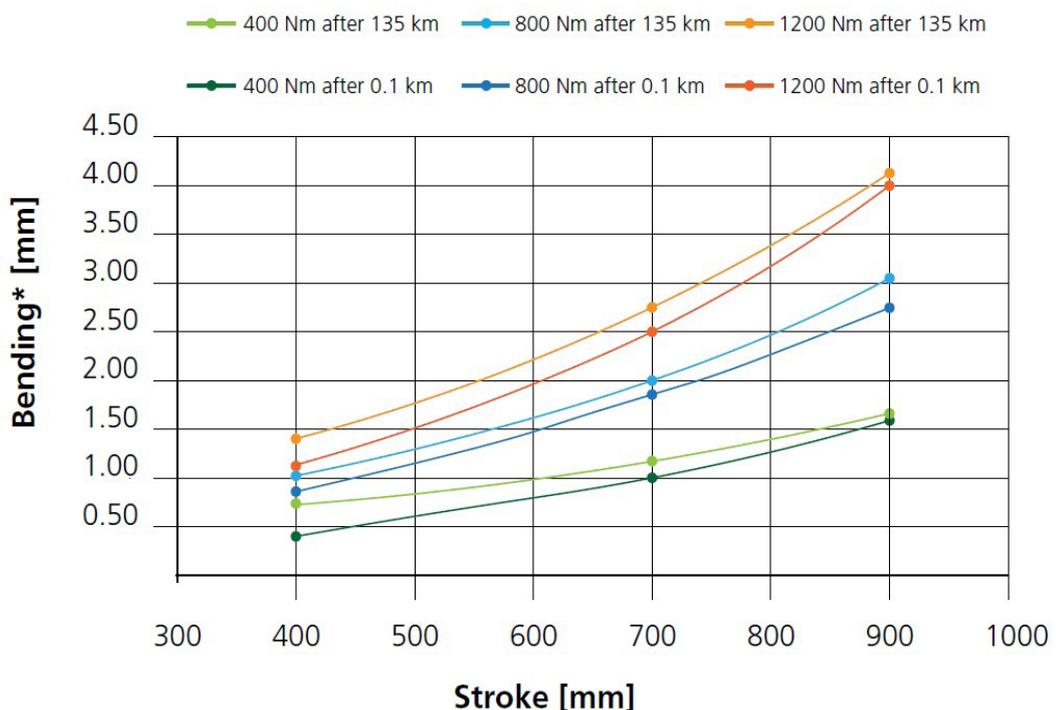
The maximum bending moment during static use of the Lifting Column is 3000 Nm. The Lifting Column is considered static when it is not moving and e.g. the cobot is generating a bending moment. High eccentric loads exert bending moments on the Lifting Column and cause it to bend.

The following diagram depicts anticipated bending under various bending moments (M_B , M_T) and travel distances. Runtime has an influence on the degree of bending on the Lifting Column. The diagrams below illustrate the bending on a new Lifting Column (0.1 km runtime) and representative values for a used Lifting Column (135 km runtime). The used Lifting Column has been run over 135 km with a constant eccentric load of 100 kg and a bending moment of 350 Nm.

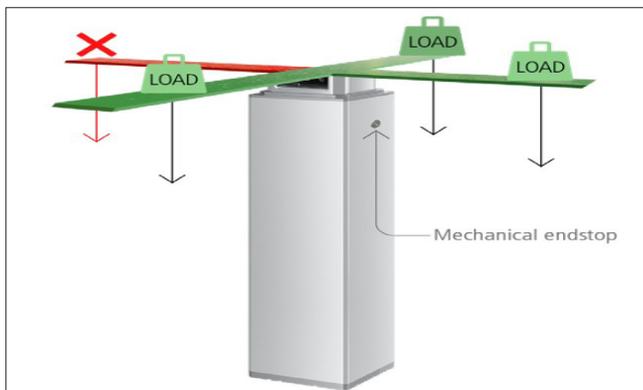
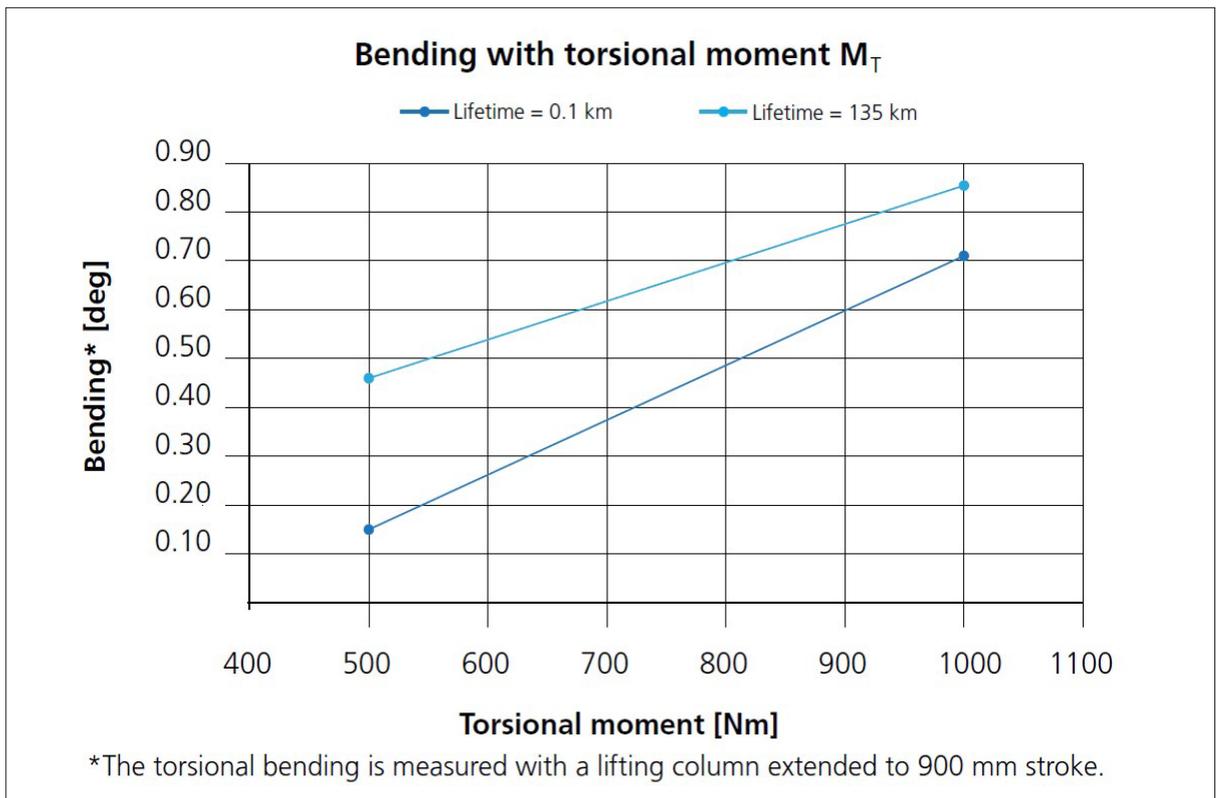
Bending moment – dynamic

The maximum bending moment during dynamic use of the Lifting Column is 1400 Nm. This value must not be exceeded when the Lifting Column is being extended or retracted. If the centre of gravity on the load is more than 400 mm from the centre of the Lifting Column, stick-slip motion may occur. Stick-slip motion can be prevented by increasing the load at the centre or moving the load closer to the centre of the Lifting Column.

Bending with bending moment M_B



*The bending is measured at the top of the column in horizontal direction.



Constant eccentric load

If the Lifting Column is to be used with a high and constant eccentric load, we recommend that this constant load is located in one of the three directions depicted by the green symbols. It is not advisable to install the load in the direction opposite the mechanical end stop, as depicted by the red symbol. Arranging the load in this way can result in uneven movement and noise when the Lifting Column reaches its end position.

Operating data – Stopping time

When the speed of the Lifting Column drops during operation or the motor output is interrupted, the brake is applied, brings the Lifting Column to a stop and locks it in place independently. The following tables shows the stopping time when a stop signal is sent or the motor output is interrupted.

Soft stop, when a stop signal is sent	Stopping time during a power failure
1500 ms	500 ms

Preparations for installation

Before installing/removing the Lifting Column, ensure that the following conditions have been met:

- The Lifting Column is not in operation.
- The Lifting Column is free from any loads that could become detached.

Before taking the Lifting Column into service, check that the following conditions have been met:

- Connected cables can move freely and are not kinked and/or trapped.
- When using the Plug-And-Play Set: The internal safety cutoff of the power supply unit is correctly connected and working.
- The Lifting Column is correctly installed, as set out in this installation guide.
- The device mounted on the Lifting Column can be moved freely throughout the full working area of the Lifting Column.
- The Lifting Column is connected to a power grid/transformer that supplies the correct voltage and has been dimensioned and modified for the Lifting Column in question.
- The connected voltage matches the voltage stated on the label attached to the Lifting Column.
- The fastening screws have been securely tightened.

Lifting Column TCP/IP 24V has been designed for push and pull applications and can be installed in two orientations – with the largest profile either at the top or bottom. The Lifting Column can only be used for vertical motion – not for horizontal motion.



Figure showing Lifting Column TCP/IP 24V installed suspended



Figure showing Lifting Column TCP/IP 24V installed upright

Environmental considerations

The Lifting Column is intended for use in an area that is protected from the weather.

- The area should be free from mould and fungus and show no traces of rodents or other pests.
- Do not set up or use in close proximity to industrial plants that produce chemical emissions.
- Do not set up or use near sources of sand or dust.
- Do not set up or use in an area that is regularly exposed to high-energy surges such as those caused by presses or heavy machinery, for example.
- The system is resistant to many of the substances usually encountered in the production area, such as water, mineral oil, grease and detergents. If you are in any doubt regarding resistance to certain chemicals such as test oil, alloyed oils, aggressive cleaning substances, solvents or brake fluid, we advise that you consult your specialist representative.
- Avoid long periods of contact with highly acidic or alkaline substances.
- Do not use in very salty air.

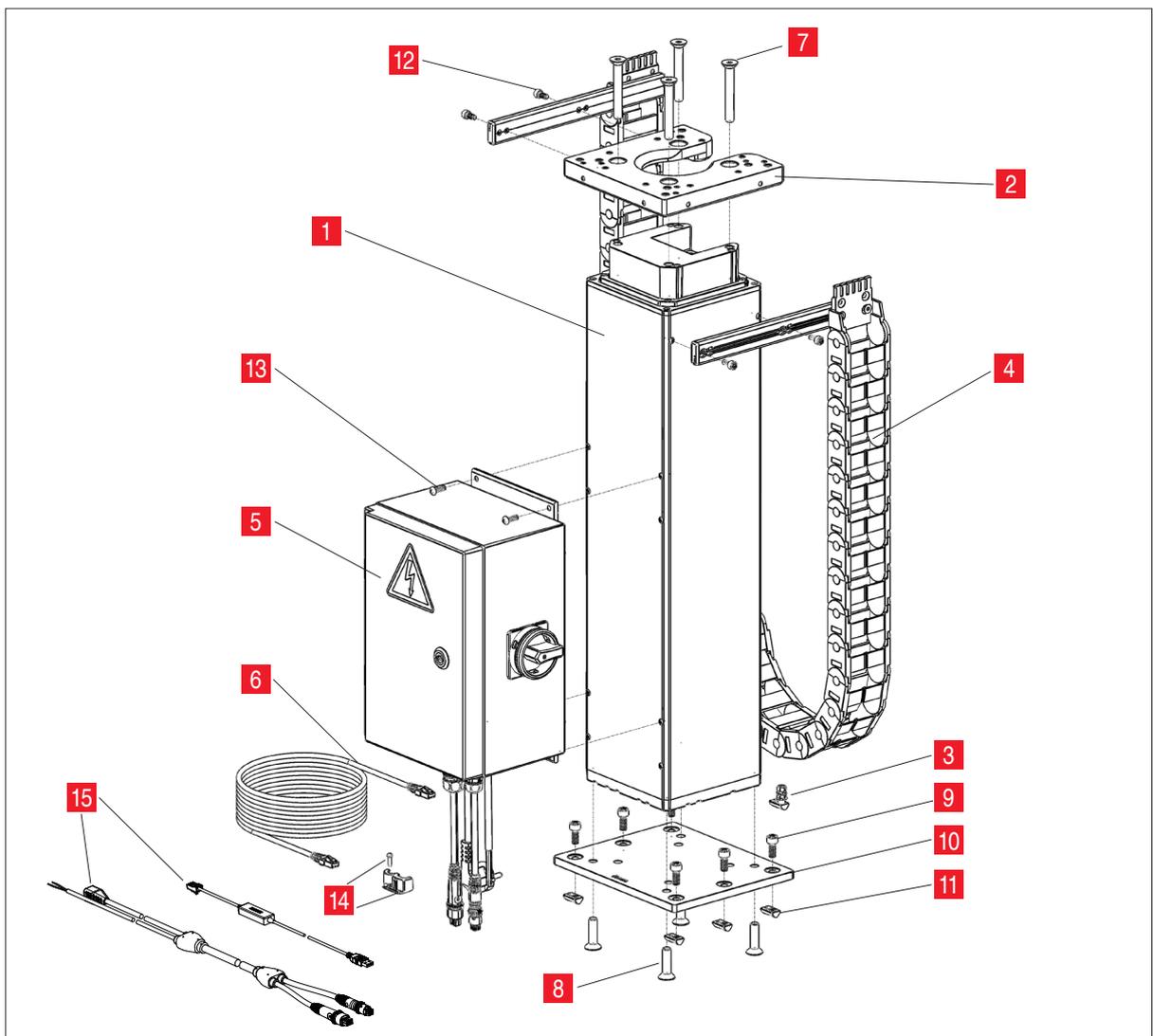
To install the Lifting Column correctly, you will need a spirit level.

Incorrect set-up and/or commissioning causes malfunctions. The height-adjustable construction may be damaged and its service life may be shortened.

- When setting up the Lifting Column on uneven ground, use the spirit level to ensure they are square and axially parallel.
- Do not connect the Lifting Column to other guides (forced guidance).

Assembly – Plug-And-Play Set

Lifting Column TCP/IP 24V Plug-And-Play Set provides all the equipment required for a cobot application (e.g. end-of-line palletising). All you need to get your solution up and running is the cobot itself and its controls. Information on wiring the system is set out in the “Electrical installation” section.

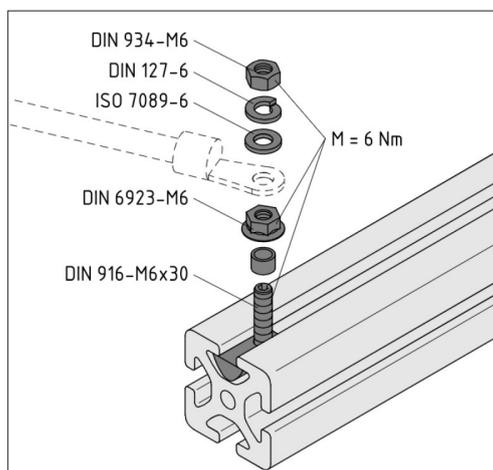


This set is supplied as a construction kit and must be assembled before it can be used in the system. Recommended assembly sequence:

1. Fit the Mounting Plate **10** and Adapter Plate **2** to the Lifting Column **1** using the screws supplied **7** and **8**. Please note the non-standard tightening torque: 35 Nm
2. Integrate the Lifting Column into an existing item frame using the screws **9** and T-Slot Nuts **11** supplied.

3. Fit the power supply unit **5** using the screws supplied **13** to the desired point on the Lifting Column (two heights can be chosen on each side). Please note the non-standard tightening torque: 7 Nm
4. Fit the cable chain **4** in the desired orientation using the screws supplied **12**. Please note the non-standard tightening torque: 7 Nm
5. Install the cobot, if necessary by using the corresponding Mounting Plate (see “Interfaces” section).
6. Run all lines/cables through the cable chain, including cobot-specific cables, the Ethernet cable **6** and power and data cables to the Lifting Column. Use the strain relief fittings **14** to secure everything. Ensure that there are no points where the cables are jammed or kinked and make sure all cables can move freely.
7. Use the supplied earth connection **3** to earth the installation.

No.	Article number	Article name
1	0.0.723.60	Lifting Column TCP/IP 24V
2	0.0.723.70	Lifting Column Adapter Plate 8 200x200
3	0.3.001.81	Earthing Terminal 8
4	0.0.724.88	Cable guide for Lifting Column TCP/IP
5	0.0.723.71	Power supply unit 100-240V for Lifting Column TCP/IP 24V
6	0.0.723.80	Ethernet Cable, S/FTP, 5m
7	-	ISO 10642 M10x80, St, stainless (4x) Scope of Supply for Lifting Column
8	-	ISO 10642 M10x45, St, stainless (4x) Scope of Supply for Lifting Column
9	8.0.004.41	Hexagon Socket Head Cap Screw DIN 912 M8x20
10	0.0.720.65	Lifting Column Mounting Plate 8 240x200 St
11	0.0.026.18	T-Slot Nut 8 St M8
12	0.0.655.08	Hexagon Socket Head Cap Screw DIN 912 M6x14
13	8.0.002.45	Button-Head Screw ISO 7380 M6x18 (ULS)
14	-	Cable strain relief fitting and TORX screw 3.6x14
15	-	Service Cable Set, Lifting Column TCP/IP 24V (see chapter “Service mode for Lifting Column TCP/IP”)

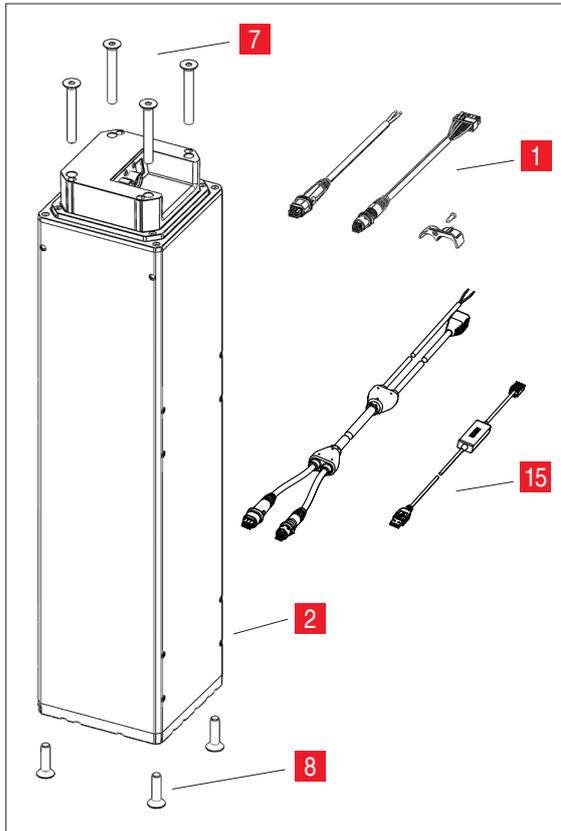


Earthing Terminal 8 **3** is supplied so you can safely earth the entire Plug-And-Play Set.

These terminals are used for earthing profile constructions and for interconnecting the profiles when they are being incorporated into a protective conductor system. Permanent contact is made by partially destroying the anodized layer in the base of the groove and on the groove flanks.

Assembly – Integrator Set

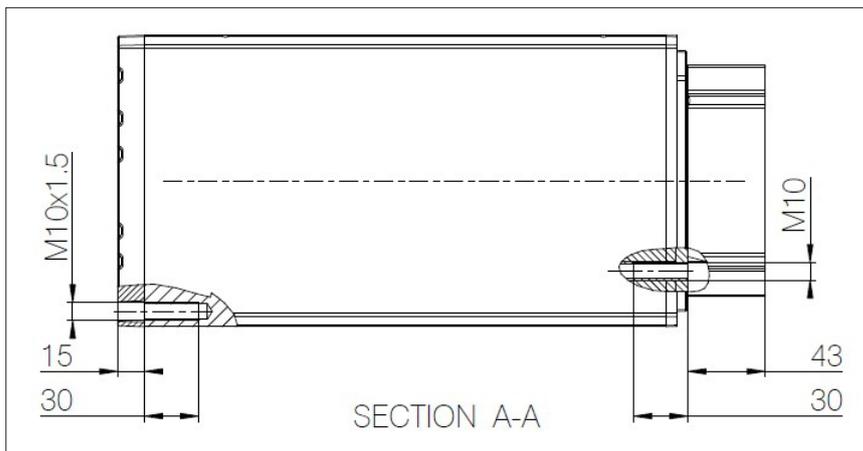
Lifting Column TCP/IP 24V Integrator Set provides the basic components for a custom lifting application (e.g. in automation technology). Additional components are required to adapt and control the Lifting Column. The Cable Set is supplied with open wire ends and can be easily integrated into any application.



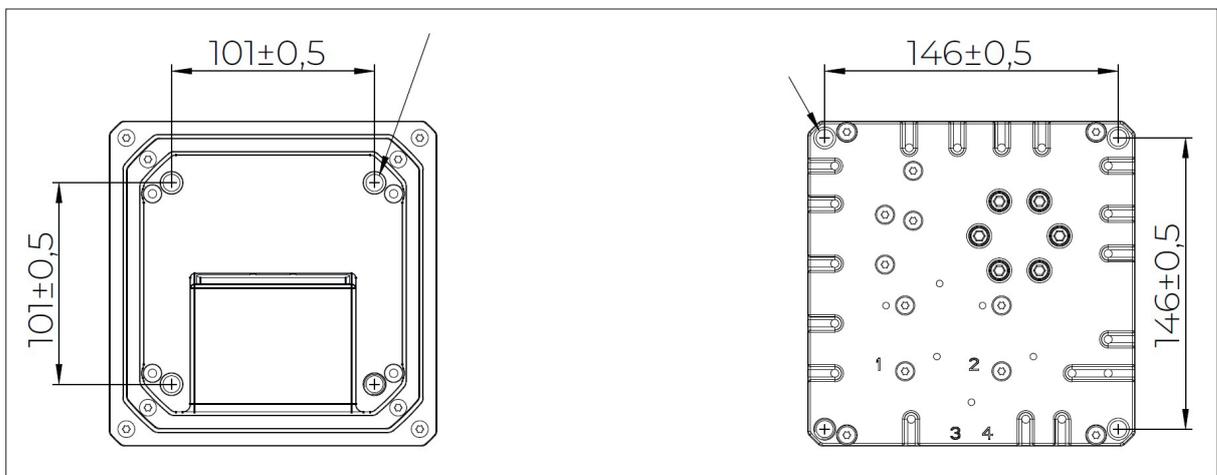
NOTE!

The internal bending radius of both cables **1** must be greater than three times the external cable diameter. Both cables have an external diameter of approx. \varnothing 7 mm and the inner radius of the maximum bend on the cable is 21 mm.

No.	Article number	Article name
7	-	ISO 10642 M10x80, St, stainless (4x) Scope of Supply for Lifting Column
8	-	ISO 10642 M10x45, St, stainless (4x) Scope of Supply for Lifting Column
2	0.0.723.60	Lifting Column TCP/IP 24V
1	0.0.723.72	Cable Set for Lifting Column TCP/IP 24V
15	-	Service Cable Set, Lifting Column TCP/IP 24V (see chapter "Service mode for Lifting Column TCP/IP")



If screws other than those supplied with the Integrator Set **7** and **8** are used, the screw depth in the aluminium profile must be at least 20 mm and no more than 30 mm (see drawing).

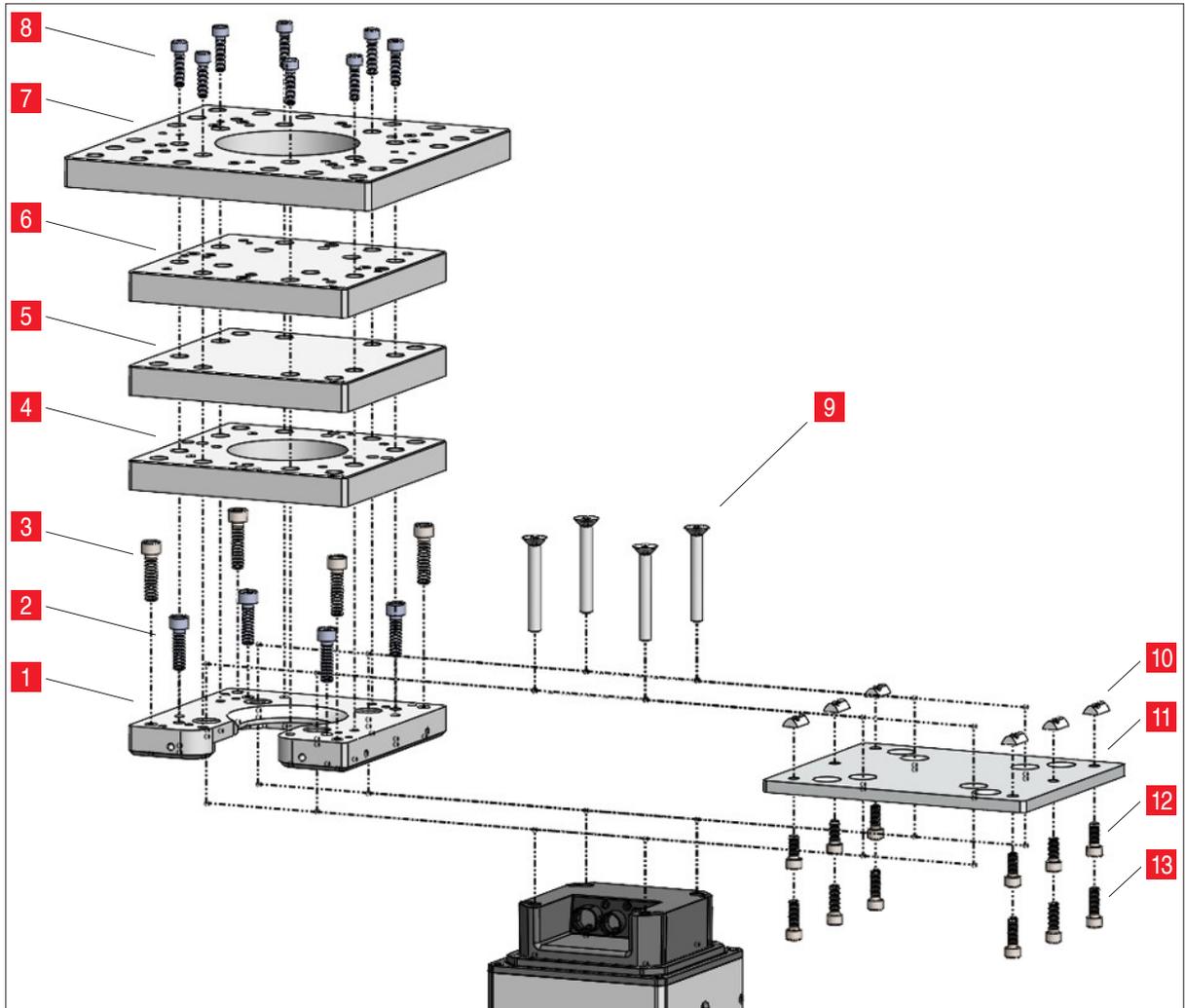


NOTE!

- It is advisable to use screws with screw fixing agent.
- To ensure the Lifting Column is securely attached to the application, screws made of high-grade 8.8 or 10.9 steel must be used.
- Non-standard tightening torque: 35 Nm

Assembly – Interfaces

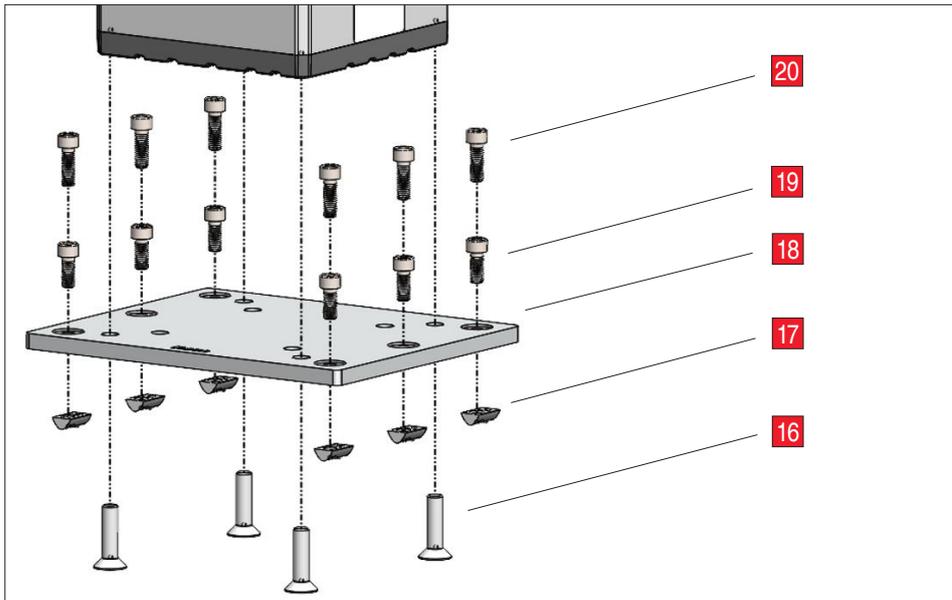
To ensure Lifting Column TCP/IP 24V can be combined with popular robot models, the item Building Kit System offers the adaptation options shown in the table. Lifting Column Adapter Plate 8 200x200 **1** is used to ensure compatibility with the item Robot Mounting Plates that are already available. Lifting Column Mounting Plate 8 240x200 **11** enables connection to the item Line 8 modular dimension. As an alternative, Lifting Column Mounting Plate 8 240x200 **11** can also be fitted to the slimmer end of the Lifting Column using the screws included **9**.



Lifting Column Adapter Plate		Art.-No.	ABB	Doosan	Fanuc	Kassow	KUKA	Omron	UR
	8 200x200 1	0.0.723.70	CRB 15000-5 CRB 15000-10 CRB 15000-12	–	–	–	–	–	–
Robot Mounting Plate*		Art.-No.	ABB	Doosan	Fanuc	Kassow	KUKA	Omron	UR
	8 200x200 4	0.0.709.31	–	–	CRX-10iA CRX-10iA/L CRX-20iA/L	–	–	TM5 TM12 TM14 TM16 TM20	UR10e UR16e
	8 200x200 T1 6	0.0.719.07	–	A-Serie M-Serie	–	KR810 KR1018 KR1205 KR1410 KR1805	–	–	–
	8 280x280 7	0.0.709.45	–	–	–	–	LBR iiwa-Serie LBR iisy-Serie	–	UR20 UR30
Universal Mounting Plate*		Art.-No.							
	8 200x200 5	0.0.709.32	Flange dimensions ≤ 200x200						

*All Mounting Plates shown are compatible with the Lifting Column Adapter Plate and are mounted to the Adapter Plate with 8 Hexagon Socket Head Cap Screws DIN 912-M8x30.

No.	Article number	Article name
1	0.0.723.70	Lifting Column Adapter Plate 8 200x200
2	0.0.655.59	DIN 912 M10x35 (4x) for ABB CRB 15000-5
3	0.0.655.60	DIN 912 M10x40 (4x) for ABB CRB 15000-10 or -12
4	0.0.709.31	Robot Mounting Plate 8 200x200
5	0.0.709.32	Universal Mounting Plate 8 200x200
6	0.0.719.07	Robot Mounting Plate 8 200x200 T1
7	0.0.709.45	Robot Mounting Plate 8 280x280
8	8.0.009.25	DIN 912 M8x30 (8x)
9	-	ISO 10642 M10x80, St, stainless (4x) Scope of Supply for Lifting Column
10	0.0.026.18	T-Slot Nut 8 St M8 (6x) for use in a Line 8 groove
11	0.0.720.65	Lifting Column Mounting Plate 8 240x200 St
12	8.0.004.41	DIN 912 M8x20 (6x) for use in a Line 8 groove
13	0.0.610.71	DIN 912 M8x25 (6x) for use in a core bore

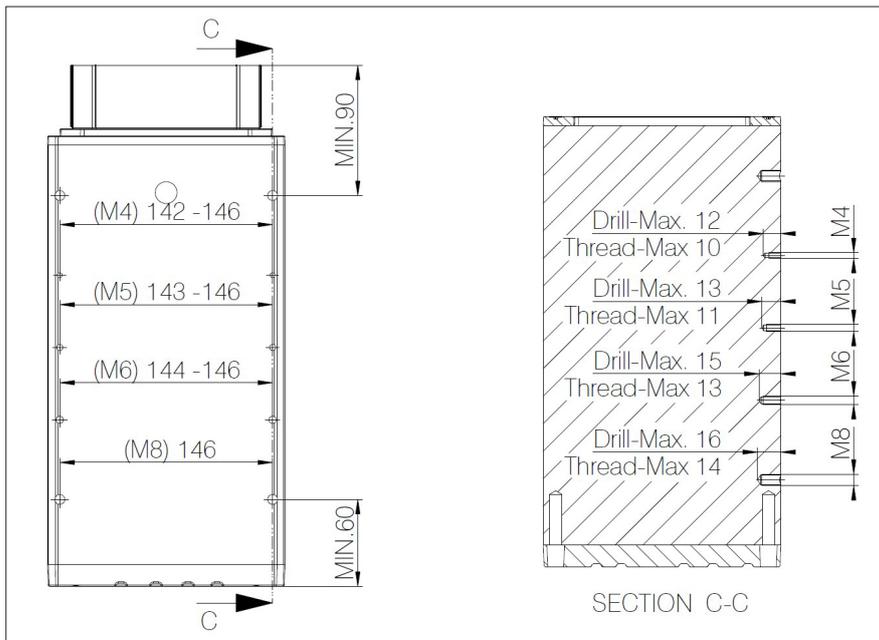


Compatibility of the Lifting Column with the item Building Kit System – based on Mounting Plates

No.	Article number	Article name
16	-	ISO 10642 M10x45, St, stainless (4x) Scope of Supply for Lifting Column
17	0.0.026.18	T-Slot Nut 8 St M8 (6x) for use in a Line 8 groove
18	0.0.720.65	Lifting Column Mounting Plate 8 240x200 St
19	8.0.004.41	DIN 912 M8x20 (6x) for use in a Line 8 groove
20	0.0.610.71	DIN 912 M8x25 (6x) for use in a core bore

Assembly – Additional peripherals

In addition to the pre-drilled fastening holes (for the power supply unit and cable chain), it is also possible to add custom threaded bores on all four sides of the Lifting Column. However, this requires that the installation holes are drilled at different spacings to the those of the top and/or bottom column plates, otherwise the fastening screws would clash with each other. The minimum clearance from the top and bottom column plates must be maintained.



It is essential to comply with the following non-standard tightening torques in this area:

Screw type	M8	M6	M5	M4
Screw torque Nm	17	7	4	2

Electrical installation

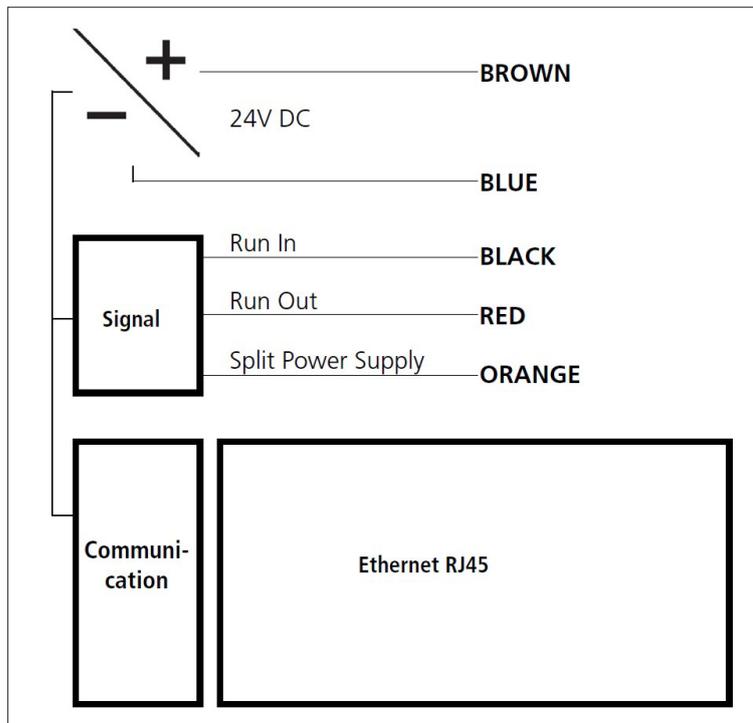
The three connections for the power supply and controller are located at the upper end of Lifting Column TCP/IP 24V.



- On the far left is the 6-pin power connection for a 24 V DC power supply. The power cable from cable set 0.0.723.72 or power supply unit 0.0.723.71 fits this connection.
- In the centre is the 9-pin signal connector for the I/O controller of the Lifting Column and/or for capturing data about positions and end stop signals. The data cable from Cable Set 0.0.723.72 or power supply unit 0.0.723.71 fits this connection.
- On the far right is the RJ45 connection for Modbus TCP/IP communication. This connection can be used for Ethernet Cable, S/FTP, 5m 0.0.723.80 or a similar shielded (STP) category 6 Ethernet cable with the necessary transfer speed.

As described above, the signal connection also offers the options of data capture and programming for the controller, via the **Actuator Connect™** tool from LINAK.

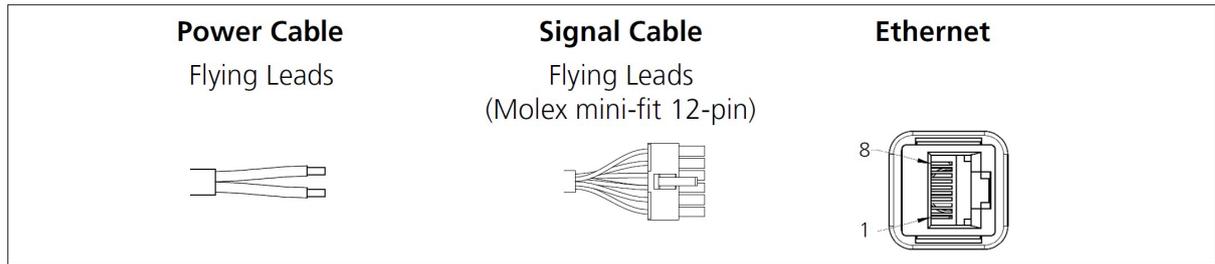
The figure below is a simplified circuit diagram for the three connections described:



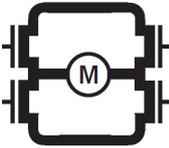
NOTE!

When the TCP/IP connection is disconnected (not plugged in), the Lifting Column can be moved manually by switching +24 V to either BLACK or RED.

The figure below shows the cable design of Cable Set 0.0.723.72, which is included in the Integrator Set and the pin assignment of the RJ45 connection:



I/O specifications of Lifting Column TCP/IP

Input/Output	Specification	Comments
Description	User-friendly interface with integrated power electronics (H-bridge). Uses Modbus TCP/IP messages to control motion, set parameters and for Lifting Column feedback.	 H-bridge
Brown	24 V DC + (VCC) Connect brown to positive 24 V ± 10% 24 V, max. 20 A – power is cut off at 20 A	Note: Do not change the polarity of the power supply at the brown and blue wires! Power supply GND (-) is electrically connected to the housing.
Blue	24 V DC - (GND) Connect blue to negative.	
Red	Extends the Lifting Column	The signal is activated at: > 67% of VIN The signal is deactivated at: < 33% of VIN Input current: 10 mA The Lifting Column is equipped with a 1500 ms soft stop and start.
Black	Retracts the Lifting Column	
Green	TX -	
Yellow	RX +	
Orange	Split power supply: 24 V DC with ≈ 28 mA current consumption. Connection to positive. The split power supply uses the common GND of the power supply.	The split power supply is used only to power the communication of the controller.
Light blue	RX -	
Purple	Service interface	
White	TX +	
Grey	Service interface GND	



DANGER! Please note that the Lifting Column can be damaged if the power supply is not correctly connected! Always use the supplied strain relief fitting to secure the power and data cables.



NOTE!

- When using the soft stop on a direct-current motor, a brief high-voltage peak is sent back to the power supply. When selecting a power supply unit, ensure that it does not switch off the output when this reverse peak load occurs
- Power cutoffs must not be used as a stop function! This could damage the Lifting Column.
- Power cutoffs should only be used in emergencies!
- The power cutoff limits are not proportional to the load curves of the Lifting Column. This means that the power cutoff limits cannot be used as a load indicator.
- There are tolerances on the spindle, nut, gearwheels, etc. and these tolerances influence the current consumption of each Lifting Column.
- The transfer of information between a Modbus client and a server (actuator) is initiated when the client sends a query to the server requesting the transfer of information so that a command can be executed. Once the server has received the query, it executes the command or retrieves the necessary data from its memory. The server then replies to the client either by confirming that the command has been completed or by providing the requested data. Modbus TCP/IP actuators have been developed primarily for industrial automation and are explained in the “Modbus TCP/IP actuators” section.

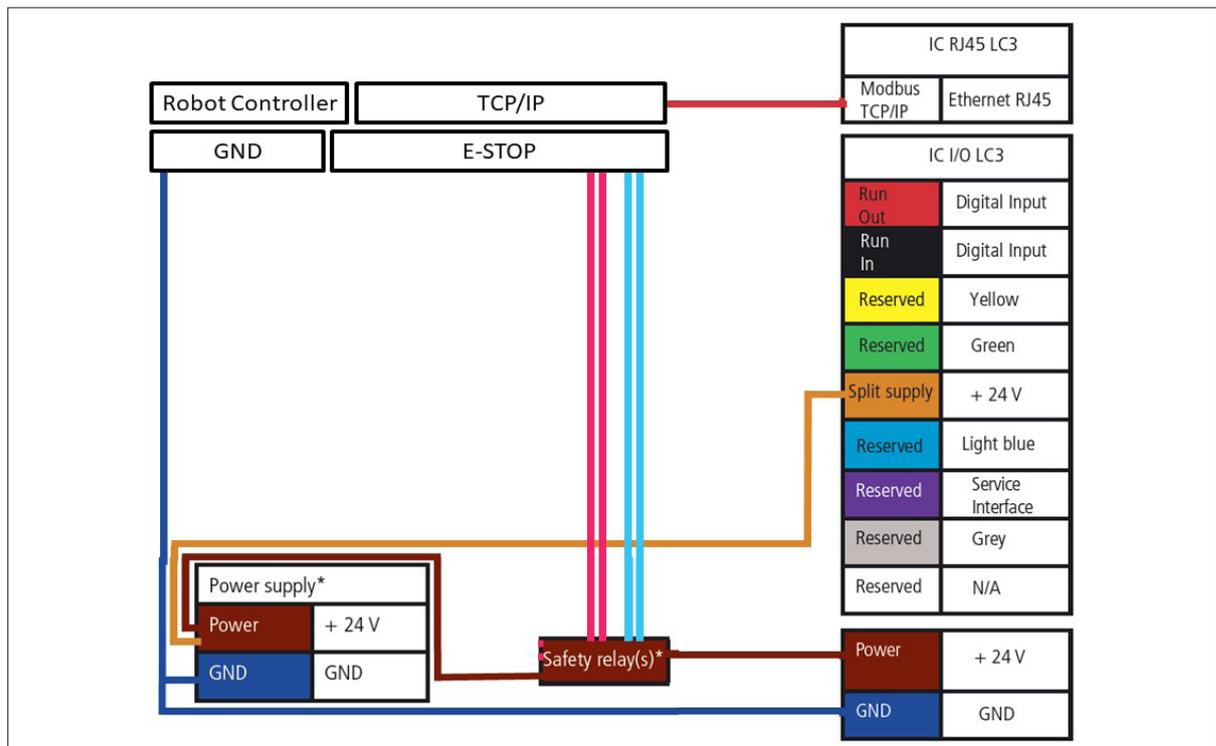
Electrical installation – Connection example

Integrating Lifting Column TCP/IP 24V into a cobot controller with a safety function is the responsibility of the consumer. A simplified circuit plan is shown below as a suggestion for how to handle integration into this type of safe shutdown system. Besides communication between the controller and Lifting Column via the Modbus TCP/IP connection and the earthing of both systems, a safety relay for shutting down the Lifting Column when the cobot’s emergency stop is actuated must also be connected.

The power supply unit of Lifting Column TCP/IP 24V Plug-And-Play Set features the necessary safety system with safety relay and circuit breakers. The connection is made as per the wiring diagram, which is attached as an appendix.

Specific cobot driver software for directly controlling the Lifting Column can be obtained for free from LINAK.

www.linak.com/business-areas/material-handling/cobot-palletiser/



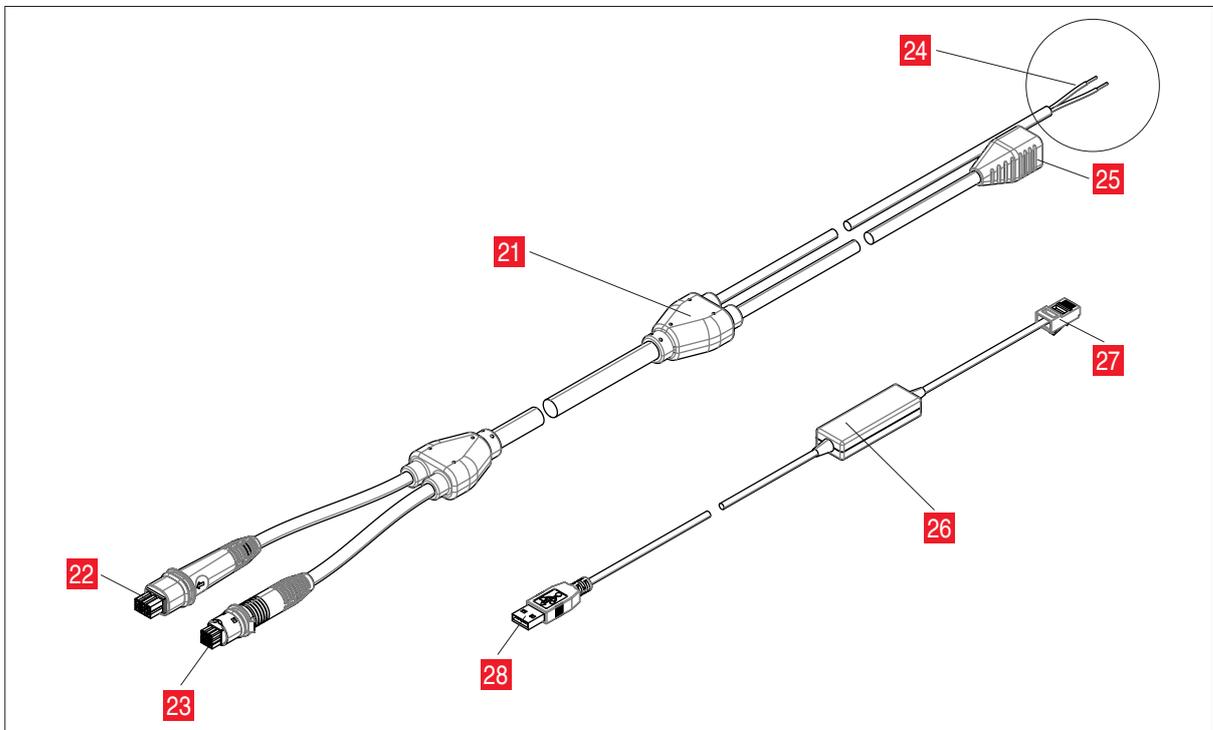
Service operation Lifting Column TCP/IP

In the service mode of the Lifting Column, you can easily adjust the parameters and reconfigure the drive to meet your requirements. It is also possible to access historical usage data that can be used to analyse the performance of both the drive and the application in which it is installed.

Operate the drive directly from the PC software and get real-time data on position, power consumption and temperature.

Service Cable Set – Connection instructions

The Lifting Column must be operated using a separate power source via TCP/IP 24V for service purposes. Work on electrical systems must only be carried out by trained and qualified personnel.



No.	Article name
21	Split connection cable, length approx. 2.6m
22	Power connector (Lifting Column)
23	Signal connector (Lifting Column)
24	Open cable end for Power Supply (brown +24V, blue -24V)
25	RJ45 socket
26	USB RJ45 adapter cable, length approx. 2m
27	RJ45 connector
28	USB connector

Connection instructions

- Connect the split connection cable **21** to the hub column using the power **22** and signal connection plugs **23** and secure with the strain relief (see also the „Electrical installation' chapter“).
- Connect the open cable end **24** to a suitable 24V DC / 20A power source (brown +24V, blue -24V).
- Connect the USB RJ45 adapter cable **26** with the RJ45 connector plug **27** to the RJ45 connection socket **25** of the split connection cable. **21**
- Connect the TCP/IP 24V hub column to the PC for service operations via the USB connector plug. **28**

Service Software – Actuator Connect™

Actuator Connect™ is an intuitive PC tool that supports the entire process from prototyping to after-sales service. A PC with a Windows 10 operating system (version 16299 or higher) with a USB interface is required for installation. Actuator Connect™ is free and can be downloaded here:

www.linak.de/produkte/digital-solutions/actuator-connect-konfigurator/

Start the software and make sure that the Lifting Column is connected to the power supply and that everything is connected correctly. Select the wired USB connection and start personalising the Lifting Column.

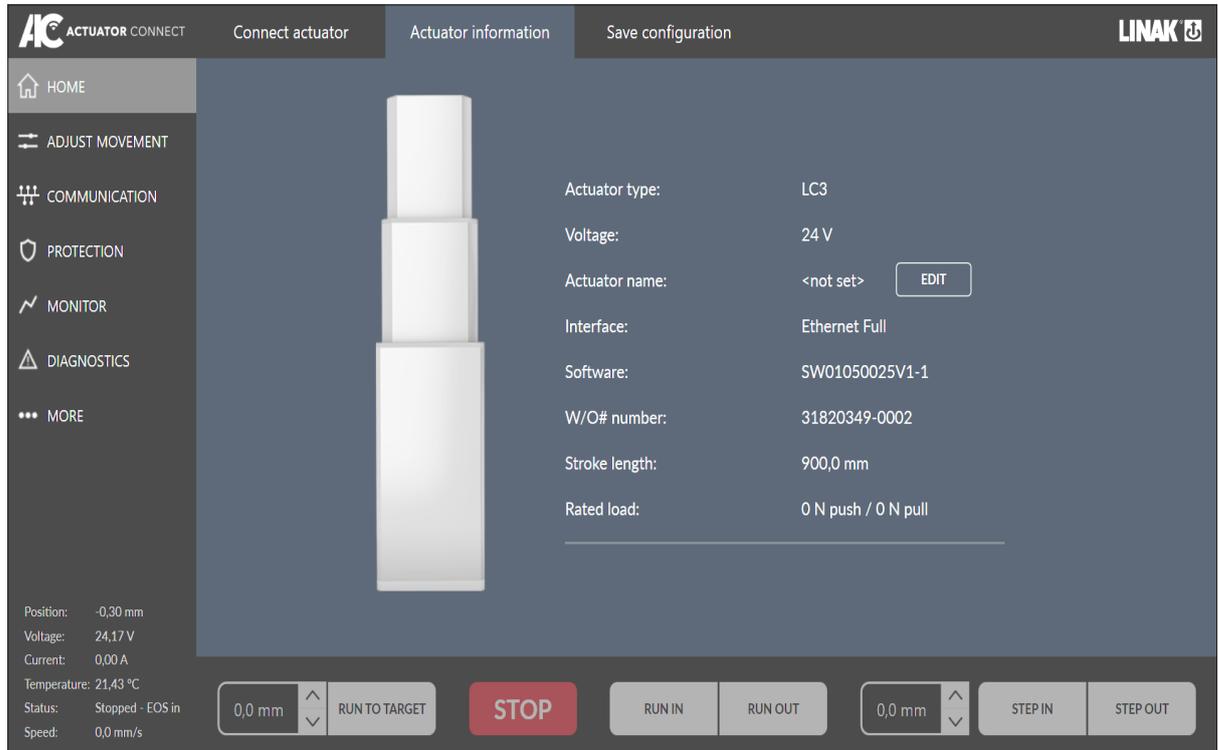
Home screen

Establishing the USB connection

The screenshot displays the Actuator Connect software interface. The top navigation bar includes 'Connect actuator', 'Actuator information', and 'Save configuration'. The left sidebar contains menu items: HOME, ADJUST MOVEMENT, COMMUNICATION, PROTECTION, MONITOR, DIAGNOSTICS, and MORE. The main area shows 'Choose which actuator you want to connect to.' and 'Devices found:' with a table listing 'USB adapter cable #1' and a connection icon. Below the table are buttons for 'CONNECT', 'DISCONNECT', and 'REFRESH'. The bottom control panel features buttons for '0,0 mm', 'RUN TO TARGET', 'STOP', 'RUN IN', 'RUN OUT', '0,0 mm', 'STEP IN', and 'STEP OUT'. The status bar at the bottom left displays: Position: -0,30 mm, Voltage: 24,17 V, Current: 0,00 A, Temperature: 19,44 °C, Status: Stopped - EOS in, Speed: 0,0 mm/s.

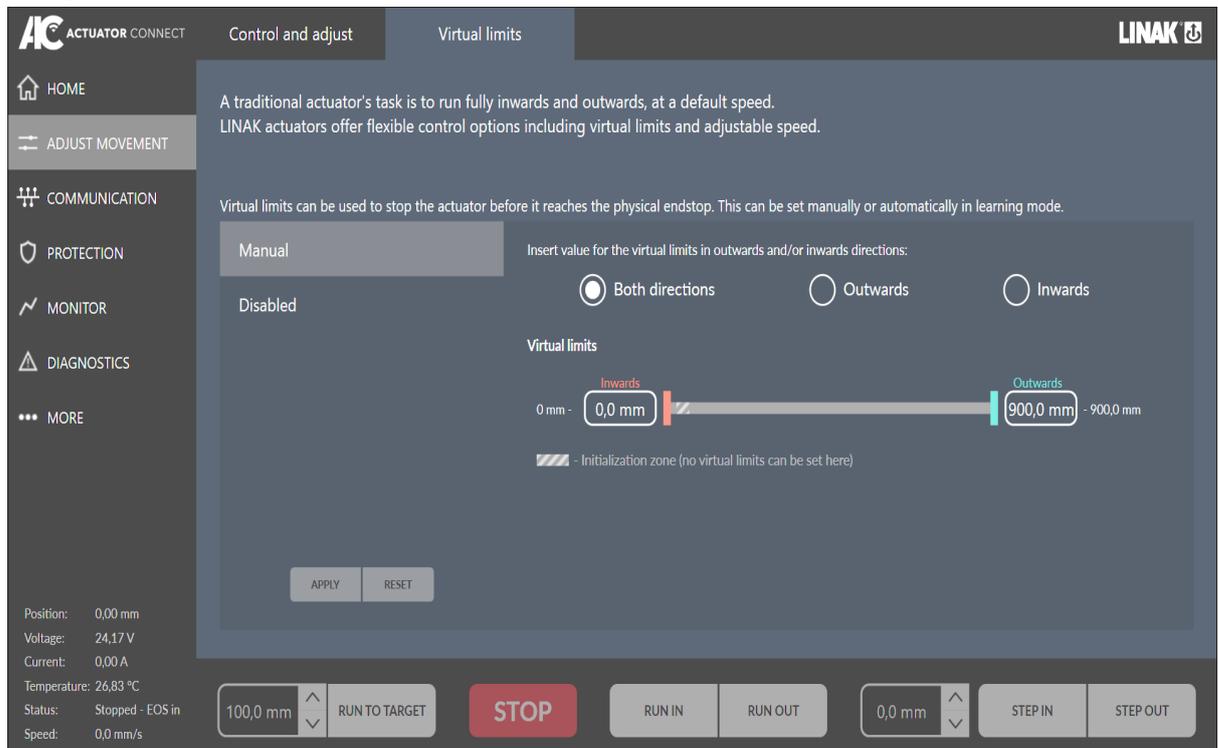
Home screen

Once the connection has been established, information on the hub column is available and individual configurations are possible.



Motion settings

Setting screen for the stroke limits



Motion settings

Speed settings screen

AC ACTUATOR CONNECT Control and adjust Virtual limits **LINAK**

HOME
ADJUST MOVEMENT
COMMUNICATION
PROTECTION
MONITOR
DIAGNOSTICS
MORE

A traditional actuator's task is to run fully inwards and outwards, at a default speed. LINAK actuators offer flexible control options including virtual limits and adjustable speed.

The actuator offers various input wiring possibilities and speed settings.

Standard run

Choose between same speed in both directions - or individual speed settings for each direction:

The same speed Individual speed

Outwards and inwards:

Slow Fast 100 %

APPLY RESET

Position: 0,00 mm
Voltage: 24,14 V
Current: 0,00 A
Temperature: 26,91 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

100,0 mm RUN TO TARGET STOP RUN IN RUN OUT 0,0 mm STEP IN STEP OUT

Communication settings

Setting for the communication protocol – For individual applications, it may be necessary to assign a new TCP/IP address, e.g. if a higher-level network takes over the control communication.

AC ACTUATOR CONNECT Protocol **LINAK**

HOME
ADJUST MOVEMENT
COMMUNICATION
PROTECTION
MONITOR
DIAGNOSTICS
MORE

Choose your communication protocol and set it up.

The actuator supports MODBUS TCP/IP, ETHERNET/IP and PROFINET communication protocols.

Modbus TCP/IP

DHCP

IP address:
192.168.1.10

Subnet mask:
255.255.255.0

Gateway:
192.168.1.1

APPLY RESET

Position: 0,00 mm
Voltage: 24,12 V
Current: 0,00 A
Temperature: 26,83 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

100,0 mm RUN TO TARGET STOP RUN IN RUN OUT 0,0 mm STEP IN STEP OUT

Safety settings

Setting screen for the cut-off current limiter

AC ACTUATOR CONNECT Current limited Start/stop settings **LINAK**

HOME
ADJUST MOVEMENT
COMMUNICATION
PROTECTION
MONITOR
DIAGNOSTICS
MORE

Prevent damage and breakdowns by protecting your application from improper use. Several features can help you achieve the optimal performance of your application.

Standard
Adjust current limits in both directions with fixed values

Advanced
Full control of the actuator with 10 variable current limits in both directions

Insert current limits for standard run:

Outwards → 25,0 A Above reference temp.
Inwards ← 25,0 A

Reference temperature: 0 °C

Insert current limits for position lost mode:

Outwards → 25,0 A Above reference temp.
Inwards ← 25,0 A

Reference temperature: 0 °C

Outwards → 25,0 A Below reference temp.
Inwards ← 25,0 A

APPLY RESET

Position: 0,00 mm
Voltage: 24,12 V
Current: 0,00 A
Temperature: 26,83 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

100,0 mm RUN TO TARGET **STOP** RUN IN RUN OUT 0,0 mm STEP IN STEP OUT

Safety settings

Setting screen for the cut-off current limiter

AC ACTUATOR CONNECT Current limited Start/stop settings **LINAK**

HOME
ADJUST MOVEMENT
COMMUNICATION
PROTECTION
MONITOR
DIAGNOSTICS
MORE

Prevent damage and breakdowns by protecting your application from improper use. Several features can help you achieve the optimal performance of your application.

Avoid bouncing and enhance smooth operation with ramp-up and ramp-down speed settings.

Start settings
Choose the preferred start settings:

Stop settings

Start settings
Ramp-up time, outwards: 1500 ms
Ramp-up time, inwards: 1500 ms

APPLY RESET

Position: 0,00 mm
Voltage: 24,14 V
Current: 0,00 A
Temperature: 26,91 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

100,0 mm RUN TO TARGET **STOP** RUN IN RUN OUT 0,0 mm STEP IN STEP OUT

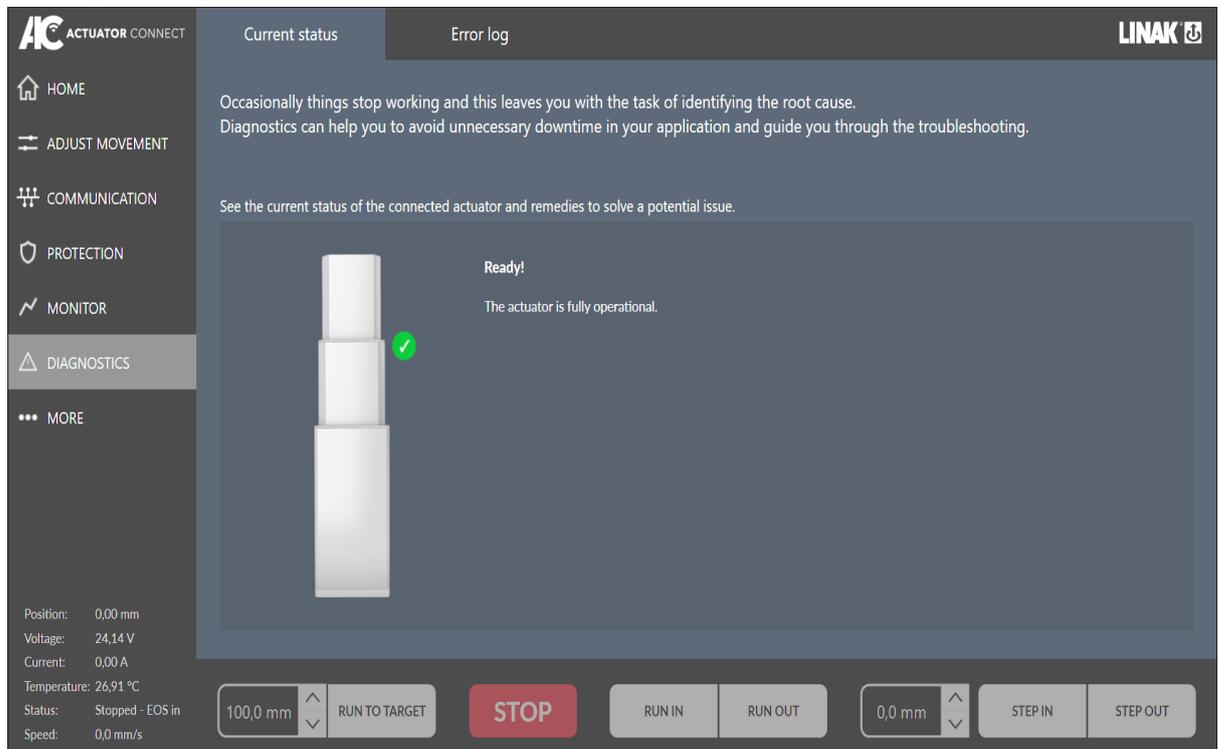
Monitoring the Lifting Column

Visualised and logged real-time data



Diagnosis of the Lifting Column

Error diagnosis and protocol



Advanced menu

Firmware updates and manufacturer support

AC ACTUATOR CONNECT Firmware update Remote support Enable expert LINAK

HOME
ADJUST MOVEMENT
COMMUNICATION
PROTECTION
MONITOR
DIAGNOSTICS
MORE

Position: 0,00 mm
Voltage: 24,14 V
Current: 0,00 A
Temperature: 26,98 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

100,0 mm RUN TO TARGET STOP RUN IN RUN OUT 0,0 mm STEP IN STEP OUT

There is no need for additional hardware/programming tools to perform a firmware update.

To update the firmware, you need a file specifically generated for this actuator.
For more information about this, please contact your local LINAK office.

UPDATE NOW

Controllers and monitors

Position: 0,00 mm
Voltage: 24,14 V
Current: 0,00 A
Temperature: 26,98 °C
Status: Stopped - EOS in
Speed: 0,0 mm/s

Continuously displayed real-time data

100,0 mm RUN TO TARGET STOP

Procedure at set value
(STOP command can be executed at any time)

RUN IN RUN OUT

Fully extend or retract to the set limit values

0,0 mm STEP IN STEP OUT

Procedure for setting the step size
(values can be set in 0.3mm increments)

Environmental EMC performance

The electromagnetic compatibility of the product is tested in line with the following technical standards:

Technical standard	Test description
BS EN 55016-2-3:2017+A1, EN 55016-2-1:2014 BS EN 55016-2-3:2017+A1, BS EN 55016-2-1:2014	Radiated emission
EN 61000-4-2:2009, EN IEC 61000-4-3:2020, EN 61000-4-4:2012 EN 61000-4-5:2014+A1, EN 61000-4-6:2014, EN 61000-4-8:2010 BS EN 61000-4-2:2009, BS EN IEC 61000-4- 3:2020, BS EN 61000-4-4:2012 BS EN 61000-4-5:2014+A1, BS EN 61000-4- 6:2014, BS EN 61000-4-8:2010	ESD interference resistance
EN 61000-6-2:2019 – Part 6-2 BS EN 61000-6-2:2019 – Part 6-2	Power line frequency magnetic field
EN 61000-6-4:2019 – Part 6-4 BS EN 61000-6-4:2019 – Part 6-4	Surge transients

The electromagnetic compatibility tests carried out with the LINAK® Modbus TCP/IP actuator correspond to the TECHLINE® electronic testing specification:

Technical standard	Test description
IEC 61000-6-4:2019	Conducted emission
IEC 61000-6-4:2019	Radiated emission
IEC 61000-6-2:2019	ESD interference resistance
IEC 61000-6-2:2019	Interference field immunity test
IEC 61000-6-2:2019	Power frequency magnetic field
IEC 61000-6-2:2019	Burst transients
IEC 61000-6-2:2019	Surge transients

Modbus TCP/IP actuators

This section describes the functions of the Modbus TCP/IP components and the requirements for their controller, insofar as Lifting Column TCP/IP 24V is not to be controlled via a cobot-specific controller. It presents the technologies that are involved, the specification of the environmental data and the functional description. In addition to full position control, the Modbus TCP/IP actuator can also provide information about the position, service data and full diagnostics. It also supplies system identification data and information about the present current at runtime.

The transfer of information between a Modbus client and a server (actuator) is initiated when the client sends a query to the server requesting the transfer of information so that a command can be executed. Once the server has received the query, it executes the command or retrieves the necessary data from its memory. The server then replies to the client either by confirming that the command has been completed or by providing the requested data.

Modbus TCP/IP actuators have been designed primarily for industrial automation and correspond to the following documents:

- Modbus Messaging on TCP/IP Implementation Guide V 1.0b
- Modbus Application Protocol V 1.1b3

The communication protocol is based on Ethernet standard IEEE 802.3-2018. The content of this section assumes that the reader is familiar with this standard.

Commands

Retract/extend

Retraction and extension movements are executed when the right signals are sent. In service mode, these movements are achieved through the use of LINAK® Actuator Connect™ PC software (www.linak.com/products/digital-solutions/actuator-connect-configurator/) or by applying the correct signals to the wires for manual operation. In the case of manual operation, a start delay of up to 200 ms must be allowed during the first motion for safety reasons.

Position

Max./min. position: 0-900 mm travel distance

Setting increments: 0.1 mm

- Load, ramp and the specific drive spindle and transmission types should be taken into account with regard to precision
- The target value for position can be set dynamically, i.e. while the actuator is in motion
- If the new target value incorporates a change in direction of travel, the ramps follow a preset ramp time

Maximum current on/off

The use of a current limit results in a certain mechanical overload protection for the system.

Max. current limit: Set limit value*

Setting increments: 0.25 A

* A current limit set by the user cannot override the fixed factory setting, which ensures partial protection for the electronics and mechanics. Further details can be found in the “Internal monitoring” section.

Speed regulation

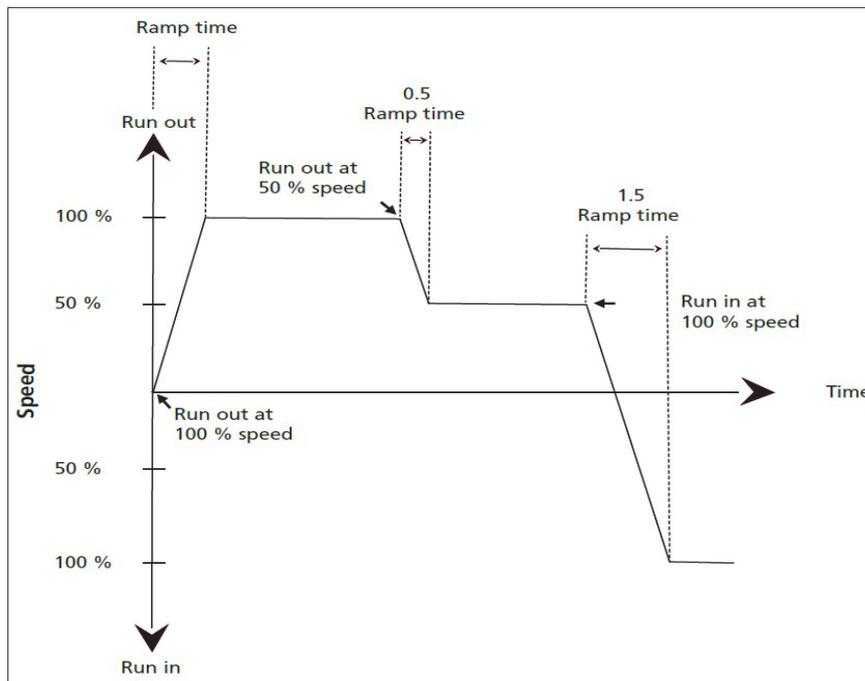
Speed is controlled via pulse width modulation (PWM).

Min. PWM duty cycle: 0%

Max. PWM duty cycle: 100%

Setting increments: 0.5%

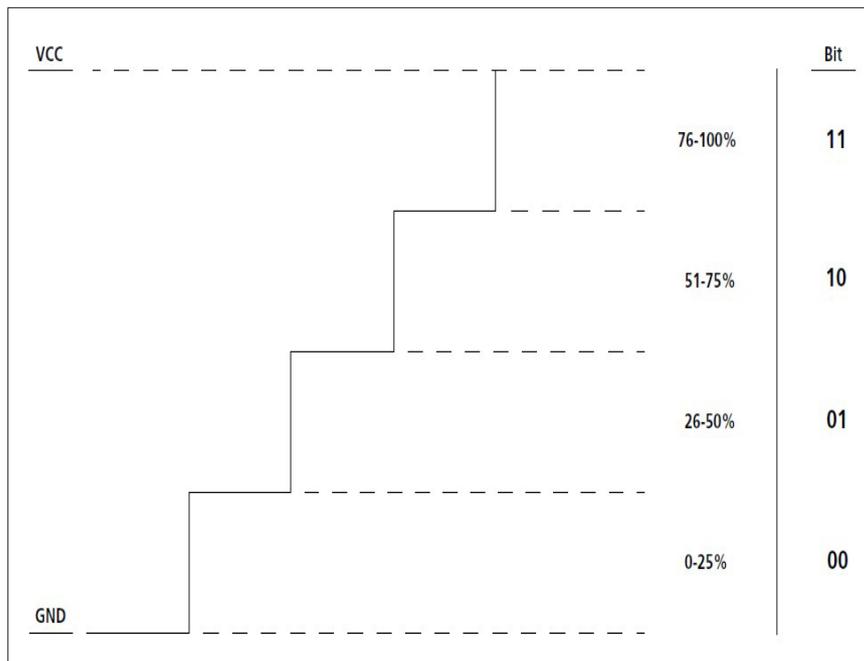
The ramp times ensure smoother operation. Their duration depends on the speed at which the actuator is running. For example, if the actuator is running at 50% speed, the ramp time is 50% of the ramp time at full speed, as depicted in the figure. The speed setting can be changed dynamically during operation.



Input state

The input state can be used to monitor external signals from e.g. Sensors and buttons. As soon as the right bit has been identified, the input level can be found.

The two bits per input pin are divided into increments of four and the input voltage level determines the value of both bits. For example, if the voltage is between 26% and 50% of the supply voltage, the value of both bits is 01. For further details, see the figure below.



Internal monitoring

A series of parameters are monitored during operation to prevent the electronics from being overloaded and to minimise the risk of mechanical damage.

Voltage

The level of supply voltage is monitored to ensure safe operation and protect the circuits.

Overvoltage

If the voltage exceeds the set upper limit, the system enters overvoltage protection mode and switches itself off.

Temperature

There are two temperature monitoring circuits to measure the absolute temperature of the circuit boards and the average temperature of the motor control circuit.

Motor control circuit

The conditions of the circuit are continuously monitored. Several conditions must be met to enable operation. These include:

- Correct current supply
- Security signal heartbeat
- Correct temperatures
- No errors

Parameters

In addition to direct monitoring, a series of parameters is also saved for long-term analysis purposes. These include:

- Number of starts in both directions
- Cause of the last stop
- Total runtime
- Under and overvoltage
- Maximum current
- Number of current overloads in both directions

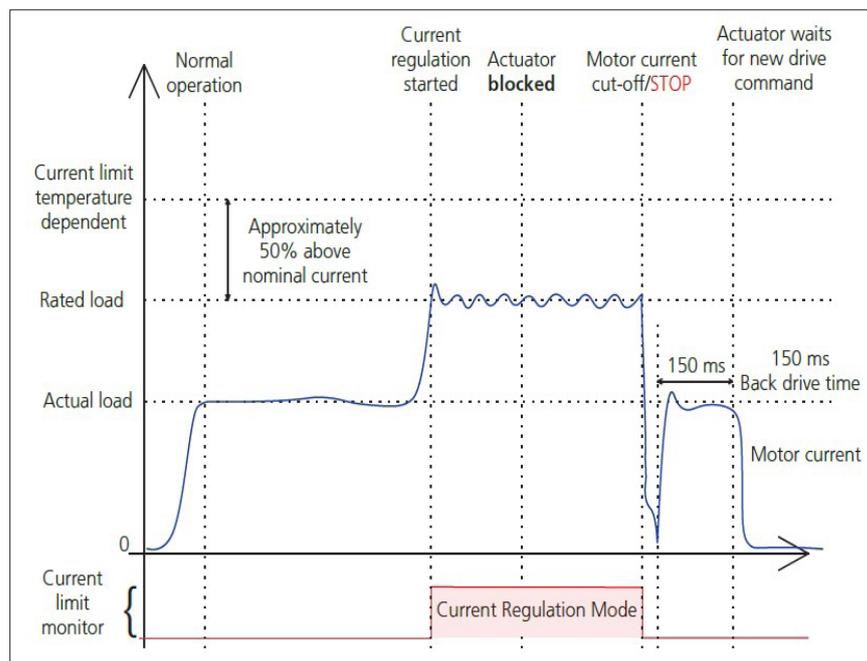
These parameters will help a technician to identify potential problems. By factoring in a combination of parameter values, the lifetime load can point to a potential failure before it happens and thus prevent downtime.

Current-limiting algorithm

The process of current control involves limiting a device's current consumption to a specific value. During this process, the motor supply voltage is controlled via the PWM controller, which also controls the current flowing through the motor. The current is thus held at the limit value set either by the customer for a certain application or by the manufacturer.

If the actuator's current consumption rises above the set limit value, the actuator regulates its consumption and attempts to hold it below the limit value by reducing the PWM, which also causes speed to be reduced correspondingly. The actuator continuously regulates until it is mechanically locked and stops moving. This locking action is controlled based on monitoring of the hall feedback signal. If the hall feedback signal does not change within the set period of time, the integrated controller switches off the current supply to the H-bridge motor circuit.

If the actuator is stopped due to the above criteria, it automatically travels a short distance in the opposite direction to reduce the torque in a locking scenario. This is illustrated in the following figure:



In cold temperatures (below -20°C), the internal friction in the actuator increases considerably due to the lower grease viscosity, which necessitates the use of a higher current limit. To keep current consumption close to this limit value, PWM is increased or reduced in increments. If the PWM controller is active, it reports as "control mode". This information is used by the current-limit monitoring system.

Register overview

Holding register methods are used to issue read and write commands. Access to all read/write data is achieved via holding registers.

Command details

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x2001	8193	UINT8	RW	Communication heartbeat counter	0-255		Without regular updates, the actuator will stop*
0x2002	8194	UINT16	RW	No.	0-64255	0.1 mm/bit	Move to position
					64256	Command	Clear error register
					64257	Command	Extend
					64258	Command	Retract
					64259	Command	Stop
					64260	Command	Restore extend
					64261	Command	Restore retract
					64262-65535	Reserved	Invalid value, the actuator will not move
0x2003	8195	UINT8	RW	Current	0-250	0.25 A/bit	Maximum current limit
					251	Command	Use default current value
					252-255	Reserved	Invalid value, the actuator will not move
0x2004	8196	UINT8	RW	Speed	0-200	0.5 %/bit	Speed
					201-250		Use 100% speed
					251	Command	Use default speed value
					252-255	Reserved	Invalid value, the actuator will not move
0x2005	8197	UINT8	RW	Soft start	0-250	0.05 s/bit	Start ramping time
					251	Command	Use default soft start value
					252-255	Reserved	Invalid value, the actuator will not move

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x2006	8198	UINT8	RW	Soft stop	0-250	0.05 s/bit	Stop ramping time
					251	Command	Use default soft stop value
					252-255	Reserved	Invalid value, the actuator will not move

* These should be updated at least every 2000 ms.

Configuration parameters

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x4001	16385	UINT8	RW	Current limit extend		0.25 A/bit	
0x4002	16386	UINT8	RW	Current limit retract		0.25 A/bit	
0x4003	16387	UINT16	RW	Soft start time extend		1 ms/bit	
0x4004	16388	UINT16	RW	Soft start time retract		1 ms/bit	
0x4005	16389	UINT16	RW	Soft stop time extend		1 ms/bit	
0x4006	16390	UINT16	RW	Soft stop time retract		1 ms/bit	
0x4007	16391	UINT8	RW	Maximum speed	0-200	0.5 %/bit	
					201-255	100%	
0x4008	16392	UINT16	RW	Extend to virtual EOS position		0.1 mm/bit	
0x4009	16393	UINT16	RW	Retract to virtual EOS position		0.1 mm/bit	

Standard product parameter

Lifting Column TCP/IP 24V

Overcurrent	25 A
Soft stop / soft start time	1500 ms

Details about feedback status

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x2101	16385	UINT16	R	No.	0-64255	0.1 mm/bit	Position of the actuator piston
					64256-65023	Reserved	
					65024		Position lost
					65025-65535	Reserved	
0x2102	8450	UINT8	R	Current	0		Not moving
					1-250	0.25 A/bit	Measured motor current
					251-253	Reserved	
					254		
					255	Reserved	Fault in current-measuring circuit
0x2103	8451	UINT8	R	Status indicator			8-bit independent status bit-indicators
					b0		EOS on
					b1		EOS off
					b2		Overcurrent
					b3		Extend
					b4		Retract
					b5		Heartbeat needed
					b6-b7	Reserved	

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x2104	8452	UINT8	R	Error code			8-bit error code that indicates the currently active error with the highest priority
					0		No error
					1		Stop command needed
					2		Hall error
					3		Overvoltage
					4		Undervoltage
					5		Heartbeat was not sustained
					7		Temperature error
					8		Heartbeat error (internal)
					9		SMPS error (internal)
					10		Current measurement (internal)
					11		Parallel arbitration underway
					254		Internal error (not specified)
					255		External error (not stated)
0x2105	8453	UINT16	R	Speed	0-65535	0.1 mm/s/bit	
0x2106	8454	UINT8	R	Input state	b0-b1	25 %/bit	Input level 1
					b2-b3	25 %/bit	Input level 2
					b4-b5	25 %/bit	Input level 3
					b6-b7	Reserved	Always set

Service data

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x400A	16394	UINT32	R	UIN		8 number format	
0x400C	16396	UINT32	R	SW variant		SWxxxxxxVx-x	Software number (e.g. 1050000)
0x400E	16398	UINT32	R	SW version major		SWxxxxxxVx-x	

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x4010	16400	UINT32	R	SW version minor		SWxxxxxxVx-x	
0x4012	16402	UINT32	R	Config. production order number			
0x4014	16404	UINT32	R	Production date		yyyymmdd	
0x4016	16406	UINT8	R	Maximum current consumption		0.25 A/bit	
0x4017	16407	UINT8	R	Maximum FET temperature		1°C/bit - 40	
0x4018	16408	UINT8	R	Maximum ambient temperature		1°C/bit - 40	
0x4019	16409	UINT8	R	Minimum ambient temperature		1°C/bit - 40	
0x401A	16410	UINT32	R	Current consumption over period of time		1 As/bit	
0x401C	16412	UINT32	R	Runtime		1 s/bit	
0x401E	16414	UINT8	R	Number of stops due to overvoltage			
0x401F	16415	UINT8	R	Number of stops due to FET over-temperature			
0x4020	16416	UINT8	R	Number of stops due to ambient temperature			
0x4021	16417	UINT8	R	Number of stops due to under-voltage			
0x4022	16418	UINT8	R	Number of stops due to hall errors			
0x4023	16419	UINT8	R	Number of stops due to EOS switch errors			
0x4024	16420	UINT8	R	Current-overload stops during extension			
0x4025	16421	UINT8	R	Current-overload stops during retraction			

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x4026	16422	UINT8	R	Resettable user-defined current-overload stops during extension			
0x4027	16423	UINT8	R	Resettable user-defined current-overload stops during retraction			
0x4028	16424	UINT16	R	Communication errors			
0x4029	16425	UINT32	R	Number of EOS during extension			
0x402B	16427	UINT32	R	Number of EOS during retraction			
0x402D	16429	UINT32	R	Number of starts during extension			
0x402F	16431	UINT32	R	Number of starts during retraction			
0x4031	16433	UINT32	R	Total runtime in metres		5 m/bit	
0x4033	16435	UINT16	R	Last stop reason ID 0			Stop reason ID
0x4034	16436	UINT8	R	Last stop count ID 0			Number of consecutive stop reasons of the same type
0x4035	16437	UINT32	R	Last stop with power supply time ID 0		1 s/bit	Powered time when the last stop occurred
0x4037	16439	UINT16	R	Last stop reason ID 1			Stop reason ID
0x4038	16440	UINT8	R	Last stop count ID 1			Number of consecutive stop reasons of the same type
0x4039	16441	UINT32	R	Last stop with power supply time ID 1		1 s/bit	Powered time when the last stop occurred
0x403B	16443	UINT16	R	Last stop reason ID 2			Stop reason ID

Index		Data type	Access	Name	Details	Unit	Description
Hex	Decimal						
0x403C	16444	UINT8	R	Last stop count ID 2			Number of consecutive stop reasons of the same type
0x403D	16445	UINT32	R	Last stop count with power supply time ID		1 s/bit	Powered time when the last stop occurred
0x403F	16447	UINT16	R	Last stop reason ID 3			Stop reason ID
0x4040	16448	UINT8	R	Last stop count ID 3			Number of consecutive stop reasons of the same type
0x4041	16449	UINT32	R	Last stop with power supply time ID 3		1 s/bit	Powered time when the last stop occurred
0x4043	16451	UINT16	R	Last stop reason ID 4			Stop reason ID
0x4044	16452	UINT8	R	Last stop count ID 4			Number of consecutive stop reasons of the same type
0x4045	16453	UINT32	R	Last stop with power supply time ID 4		1 s/bit	Powered time when the last stop occurred
0x4047	16455	UINT32	R	Corrected total distance		1 mm/bit	
0x4049	16457	UINT8	R	FET temperature		1°C/bit - 40	
0x404A	16458	UINT8	R	Ambient temperature		1°C/bit - 40	
0x404B	16459	UINT32	R	Stroke length		0.1 mm/bit	
0x404D	16461	UINT32	R	Zero point offset		0.1 mm/bit	
0x404F	16463	UINT32	R	Actuator PO number			

Power supply

Supply voltage (permissible supply voltage range)

Supply voltage	V _{MIN}	V _{TYP}	V _{MAX}	Reference	Comment
24 V	18 V	24 V	32 V	ISO 16750-2:2012 - Code H	Motor running
	10 V	24 V	39 V	ISO 16750-2:2012 - Code E	Motor not running TCP/IP communication possible

Split power supply

The split power supply consists of a common GND, a control supply and a motor supply. This approach is used to maintain the power supply to the intelligent part of the actuator. In the event that the main power supply is disconnected, the split power supply enables the processor to identify the current position of the actuator and communicate with an external control unit. The main power supply can be disconnected for safety reasons, maintenance or installation.

Power failure

In the event of power failure, the position of the actuator and other key data are saved by the integrated microcontroller.

Commissioning process

If Lifting Column TCP/IP 24V is to be controlled via TCP/IP communication and not via a cobot-specific controller, follow the procedure outlined below to initiate communication:

1. Supply power to the actuator using the blue (common GND), brown (motor supply, VCC) and orange (controller supply, VCC) wires.
2. Increase the value of the "Communication Heartbeat Counter" register in regular increments.
 - 2.1. The value of the register ranges from 0 to 255.
 - 2.2. The value must be updated at time intervals of no more than 2000 ms.
 - 2.3. If the value is not updated within 500 ms, the actuator stops and the "Error code" register shows the value 5.
3. Set the command register "Current".
4. Set the command register "Speed".
5. Set the command register "Soft start".
6. Set the command register "Soft stop".
7. Send a stop command.
 - 7.1. To send a stop command, set the "Position" register.
8. Read the "Error code" register. It must be 0.
 - 8.1. If there is an error, check the error source by reading off the value of the register.
 - 8.2. As soon as the error is rectified, send a command to clear the error.
9. Send a retract or extend command.
 - 9.1. To retract and extend, set the "Position" register.
10. If a change in the direction of travel is desired, first send a stop command before moving in the opposite direction.



NOTE! If the actuator does not run, consult the "Troubleshooting" table for potential solutions.

Troubleshooting

(Details on error messages in terms of feedback status)

Error		Description
0	No error	Normal operation
1	Stop command needed	Reason: For safety reasons, a “stop” command needs to be sent once the actuator has been switched on. Solution: Send a “stop” command. 0xFB03 in index 0x2002.
2	Hall error	Reason: The positioning of the hall sensor is not responding as expected. Solution: Send the “Clear error” command or alternatively restart the actuator.
3	Overvoltage	Reason: The supply voltage for the actuator is above the permissible upper limit. Solution: Reduce the voltage in order to resume operation (see “Power supply” section).
4	Undervoltage	Reason: The supply voltage for the actuator is below the permissible lower limit. Solution: Increase the voltage in order to resume operation (see “Power supply” section).
5	Heartbeat was not sustained	Reason: For safety reasons, the value of the heartbeat counter needs to be updated regularly. Solution: Send an increased value to 0x2001 at least every 2000 ms.
7	Temperature error	Reason: The actuator has reached a temperature that is above the upper limit for protecting the device. Solution: Allow the actuator to cool down to a suitable temperature.
8	Heartbeat error (internal)	Reason: The internal self-check has produced an unexpected result. Solution: Switch the actuator back on to resume normal operation. If the error persists, contact your local item branch.
9	SMPS error (internal)	
10	Current measurement (internal)	
11	Parallel arbitration underway	
254	Internal error (not stated)	
255	External malfunction (not stated)	

Maintenance



- The Lifting Column is a self-contained unit and therefore does not require any internal maintenance
- To ensure the pre-greased internal and centre profiles remain lubricated, the drive must only be cleaned when the Lifting Column is fully retracted
- Check the fastening points, cables, slides, housing and connectors and check whether the Lifting Column is working correctly.

Disposal



The materials used are environmentally friendly. They can be recycled or reused (after essential reworking and the replacement of parts). The use of suitable materials and the simple dismantling procedure ensure that this product can be recycled. Improper disposal of the Lifting Column can pose an environmental hazard.



You should therefore dispose of the product in accordance with the regulations that apply in your country.

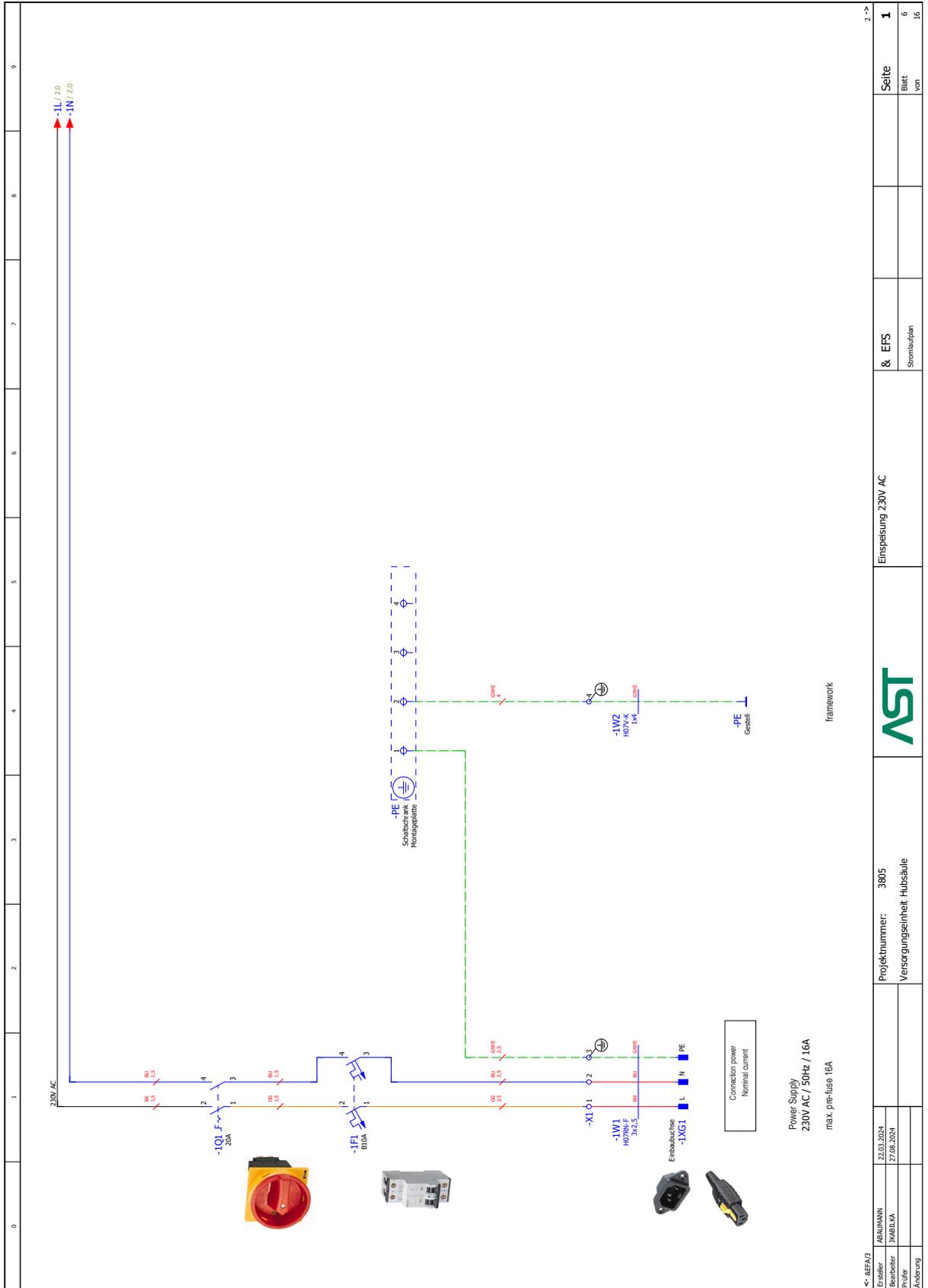
Product development and documentation

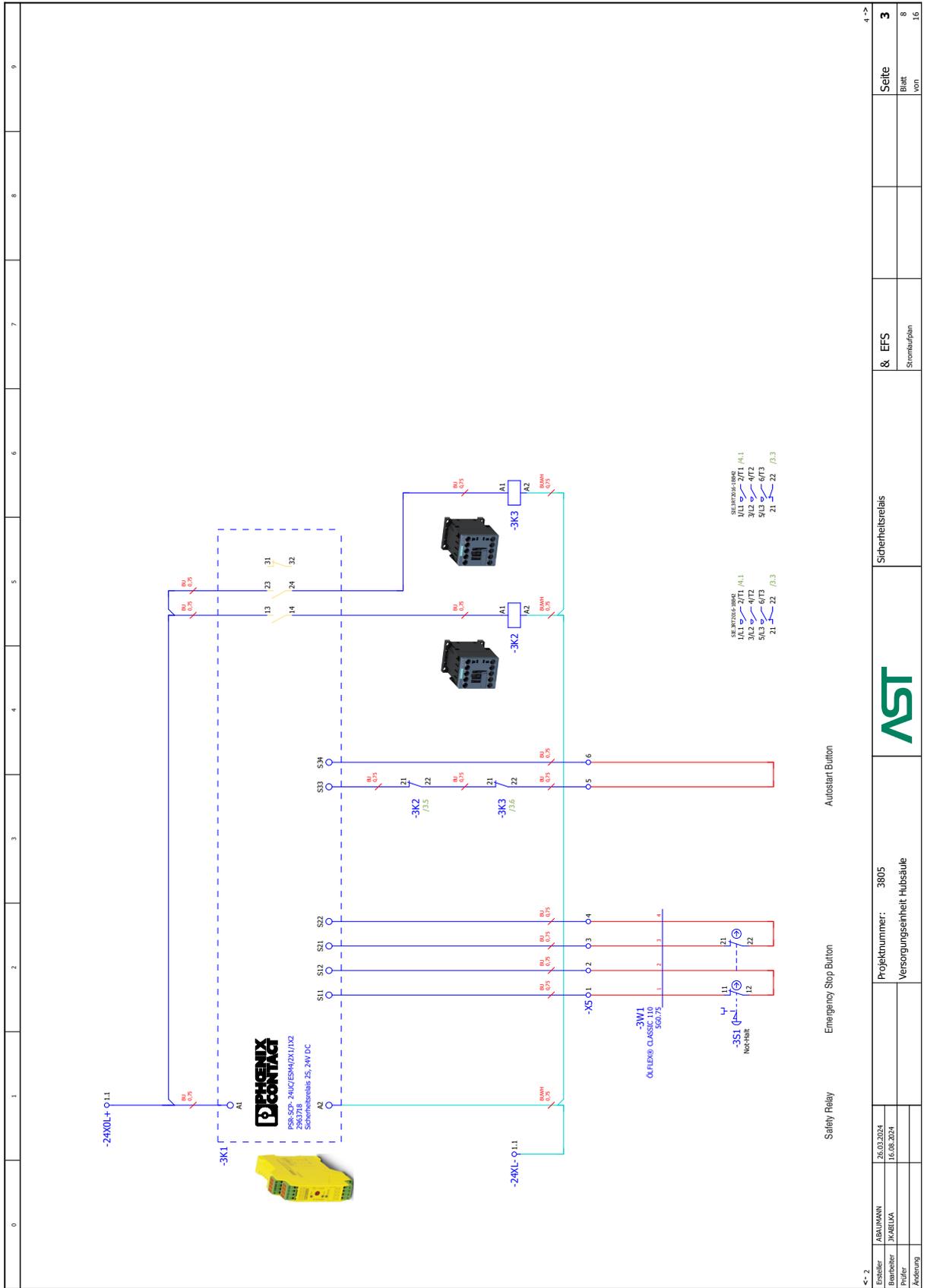
A process of continuous product development ensures that products from item Industrietechnik GmbH always exhibit a high standard of innovation.

Consequently, there could be inconsistencies between this guide and the product you have acquired. item Industrietechnik GmbH can also not exclude the possibility of errors. We therefore ask for your understanding that the information, illustrations and descriptions provided here cannot constitute an entitlement to any claims.

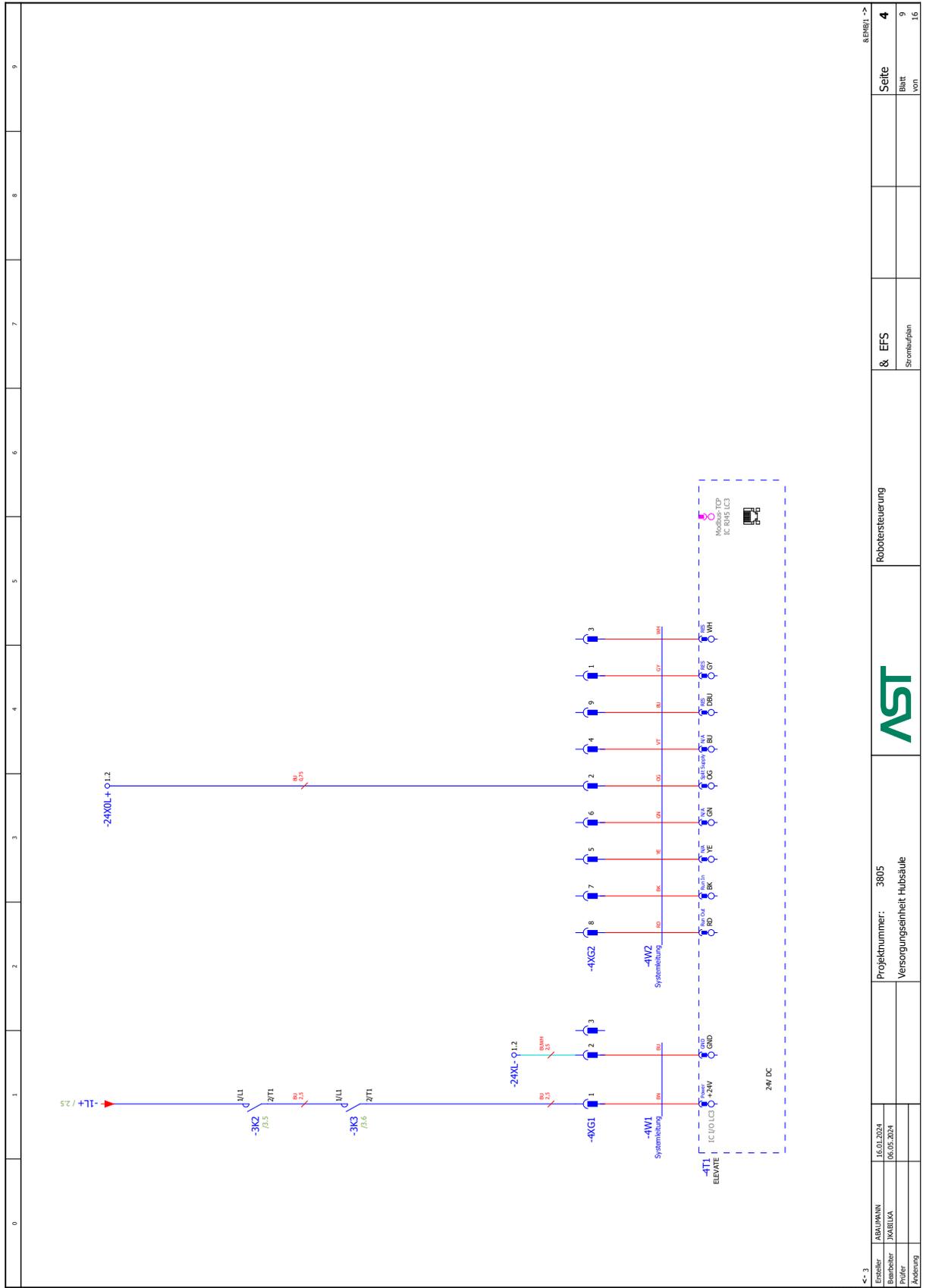
You can find the latest version of this installation guide at www.item24.com

Appendix – AST circuit diagram





0	1	2	3	4	5	6	7	8	9
4 ->									
3									
Blatt									
8									
von									
16									
Safety Relay Emergency Stop Button Autostart Button									
& EFS Sicherheitsrelais Stromlaufplan									
Hersteller: ABAMANN 26.03.2014 Projektnummer: 3805 Bearbeiter: J.KABILLA 15.08.2014 Versorgungseinheit Hubstule Anfertigung:									



0	1	2	3	4	5	6	7	8	9
8 EMBU ->									
& EFS									
Stromaufplan									
Robotersteuerung									
AST									
Projektnummer: 3805									
Versorgungseinheit- Hubst�ule									
Ersteller: ASAJUMANN Bearbeiter: JAKUBIWA Profiler: Modierung:									
16.01.2024 06.05.2024									
Seite 4									
Blatt 9									
von 16									

0		1		2		3		4		5		6		7		8		9	
Cable Overview																			
Kabelbezeichnung	von	bis	Kabeltyp	Adern	∅	Länge	Funktionstext												
-1W1	-1XG1	-X1	H07RN-F	3	2,5		Einspeisung												
-1W2	-X1	-PE	H07V-K	1	4		PE Gestell												
-3W1	-X5	-3S1	ÖLFLEX® CLASSIC 110	5G	0,75		Not-Halt Taster												
-4W1	-4XG1	-4T1	Systemleitung				Robotersteuerung												
-4W2	-4XG2	-4T1	Systemleitung				=												
																		8EMW1 ->	
																		Seite 1	
																		Blatt 10	
																		von 16	
																		& EMB	
																		Kabelübersicht	
																		Kabelübersicht	
																		AST	
																		Projektnummer: 3805	
																		Versorgungseinheit Hubsäule	
-<- REF/S4		ABAU/MANN		26.03.2024		26.03.2024													
Ersteller		ABAU/MANN																	
Bearbeiter																			
Prüfer																			
Abkennung																			

Klemmenleiste		Funktionstext		Klemmen				Seite des Klemmenplans	
erste	letzte	Summe PE	Summe N	Gesamtanzahl					
-X1	4	2	1	4	&EMA/3				
-X5	6	0	0	6	&EMA/4				
-24X0L+	1.2	0	0	4					
-24XL-	1.2	0	0	4					
-2XTR.1	2	1	0	2					

0	1	2	3	4	5	6	7	8	9
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AST

Projektnummer: 3805
Versorgungseinheit- Hubstule

Klemmenleiterbersicht

& EMA
Klemmenplan

Seite 1
Blatt 11
von 16

0	1	2	3	4	5	6	7	8	9
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Terminal Arrangement Diagram

Klemmenleiste -X1

Klemme	Typnummer	Artikelnummer	Brücke
1	PT 2,5	PKC.3.2095.0	•
2	PT 2,5 BU	PKC.3.2095.23	•
3	PT 2,5 PE	PKC.3.2095.36	•
4	PT 6-PE	PKC.3.2118.22	•

Klemmenleiste -X5

Klemme	Typnummer	Artikelnummer	Brücke
1	PTTBS 2,5	PKC.3.2096.04	•
2	PTTBS 2,5	PKC.3.2096.04	•
3	PTTBS 2,5	PKC.3.2096.04	•
4	PTTBS 2,5	PKC.3.2096.04	•
5	PTTBS 2,5	PKC.3.2096.04	•
6	PTTBS 2,5	PKC.3.2096.04	•

Klemmenleiste -ZXTR1

Klemme	Typnummer	Artikelnummer	Brücke
1	PT 2,5	PKC.3.2095.0	•
2	PT 2,5 PE	PKC.3.2095.36	•

← 1

Ersteller: ASAJIMANN
 Bearbeiter: ASAJIMANN
 Prüfer:
 Änderung:

Projektnummer: 3805
 Versorgungseinheit: Hubstühle

Klemmenaufreihplan

& EMA
 Klemmenplan

Seite 2
 Blatt 12
 von 16

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