USER MANUAL

3arm®

SPIDER

Electronic cable balancer

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ISO 9001
BUREAU VERITAS Certification

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Contents

1 Preface

This user manual is intended to help the user to use the unit described safely and correctly. Anyone performing work with or on the unit is required to familiarise themselves with this user manual and to observe and apply all instructions, particularly safety instructions.
The user manual should be retained for future use and should be available to operating personnel at all times.

2 Copyright

3 Disclaimer

3arm assumes no responsibility for the accuracy and completeness of the information contained in this translation of the original user manual, and reserves the right to make changes at any time.
Therefore, no claim can come about as a consequence of the content of this translation of the original user manual.
3arm is not responsible for damage caused by handling errors, failure to comply with this translation of the original user manual or incorrect installation.
This disclaimer is also valid if original spare parts are not used.
We will not assume claims that occur in case of failure of the unit.

4 Warranty

Warranty claims must be made to 3arm immediately after detection of the defect, indicating the order number.

3arm cannot be held liable for damages arising from failure to observe this translation of the user manual.

3arm grants a 24 month warranty for new standard products, unless otherwise agreed in the purchase contract.
The warranty for new spare parts is 12 months.
The wear of parts are not included in the warranty.

The guarantee expires:

- If the unit has been damaged in the opening of the packaging.
- In the case of inadequate (including internal) transport.
- In the event of non-observance of the user manual and consequent application or improper operation of the unit.
- In the case of improper use or use not in accordance with the intended use.
- In the case of improper fitting or attachment of components not included within the scope of our supply.
- In the case of incorrect or inappropriate installation.
- If original spare parts or accessories are not used.
- In the case of unauthorised modifications to the unit.

The lifting device contains many safety critical components which are sensitive to electrostatic discharge, so maintenance work should only be done with the proper knowledge.

5 Identification of the unit

The specification of your Spider cable balancer is shown on the rating plate.
The rating plate is attached to the the casing.

5.1 Variants of the Spider arm and the Spider rail

This translation of the original user manual describes the Spider arm and the Spider rail
Both are available in different weight classes and arm lengths.

You can determine which Spider you have in *Chapter 5 Identifying the Unit and 5.2 Summary of Performance of Spider Variants*.

Max. load capacity.	Spider Arm + Column	Length of arm Spider arm	Spider rail
75 kg (incl. clamp)	75 C	2.5 m	75 R
		3.0 m	
		3.5 m	
		4.0 m	
150 kg (incl. clamp)	150 C	2.5 m	150 R
		3.0 m	
		3.5 m	
		4.0 m	
225 kg (incl. clamp)	225 C	2.5 m	225 R
		3.0 m	
		3.5 m	
300 kg (incl. clamp)	300 C	2.5 m	300 R
		3.0 m	
600 kg (incl. clamp)	-		600 R

Table 5.1 / Spider Summary

5.2 Summary of performance of Spider variants

Delivery date (year / week)	

(Entry made by 3arm)

Spider Arm				
	Order number	Type	Equipment	Order number
1.		Spider Arm 75 C Maximum load limit: 75 kg Arm length 2.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
2.		Spider Arm 75 C Maximum load limit: 75 kg Arm length 3.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
3.		Spider Arm 75 C Maximum load limit: 75 kg Arm length 3.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
4.		Spider Arm 75 C Maximum load limit: 75 kg Arm length 4.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
5.		Spider Arm 150 C Maximum load limit: 150 kg Arm length 2.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
6.		Spider Arm 150 C Maximum load limit: 150 kg Arm length 3.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
7.		Spider Arm 150 C Maximum load limit: 150 kg Arm length 3.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
8.		Spider Arm 150 C Maximum load limit: 150 kg Arm length 4.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
9.		Spider Arm 225 C Maximum load limit: 225 kg Arm length 2.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		

10.		Spider Arm 225 C Maximum load limit: 225 kg Arm length 3.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
11.		Spider Arm 225 C Maximum load limit: 225 kg Arm length 3.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
12.		Spider Arm 300 C Maximum load limit: 300 kg Arm length 2.5 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
13.		Spider Arm 300 C Maximum load limit: 300 kg Arm length 3.0 m	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
Spider Rail				
14.		Spider rail 75 R Maximum load limit: 75 kg	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
15.		Spider Rail 150 R Maximum load limit: 150 kg	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
16.		Spider Rail 225 R Maximum load limit: 225 kg	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
17.		Spider Rail 300 R Maximum load limit: 300 kg	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		
18.		Spider Rail 600 R Maximum load limit: 600 kg	Steel cable	
			Spiral cable	
			Spiral hose, compressed air	
		with difference from standard measures (Entry made by 3arm)		

Table 5.2
Summary of features

6 Definitions of terms

Service user
A service user is a person who manages the unit and uses it as intended, or allows authorised persons to operate it.

Operator (operational staff)
An operator is anyone the service user has appointed to operate the machine.

Expert
An expert is a person who, because of their technical training, technical knowledge and experience, has the necessary knowledge of standards, regulations, accident prevention rules and relevant operating conditions, in order to be able to carry out work correctly and assess possible hazardous situations.

Appraiser
An appraiser is a person who, on the basis of their training and professional experience, has sufficient knowledge of the machinery safety regulations applicable to the equipment.

7 Spider cable balancer safety instructions

7.1 Intended use:

- Picking up, lifting and displacement of loads.
- For indoor use only.
- Environment free of flammable or explosive materials.
- Operation only in technically perfect conditions by operational personnel trained in compliance with safety and accident prevention regulations.
- Use only in clean rooms with an ambient temperature of +5 °C to 35 °C and a non-condensed atmospheric humidity.
- All connected modules must have sufficient load capacity.
- The maximum load capacity of the cable balancer must not be exceeded; the maximum load capacity of the balancer refers to the weight of the load collected, including the weight of the load lifting device.
- Use only for the purposes agreed with 3arm in the purchase contract .

7.2 Incorrect use

Some things involving the cable balancer are dangerous and therefore not permitted, such as:

- transport of persons;
- picking up or dragging loads at an angle;
- guiding loads above people;
- picking up stuck or loose loads;
- exceeding the maximum permissible load capacity;
- leaving suspended loads hanging unsupervised;
- use in humid, wet or outdoor areas, or in areas with a risk of fire or explosion;
- lifting loads when the cable is not in vertical position;
- operation of the cable balancer on sharp objects which may rub, wear or damage the suspension cable;

- use of load lifting devices that displace the centre of gravity of the load away from the vertical, causing the control unit to tilt. The higher the inclination, the greater the resulting deviation from the measuring cell and the resulting measured value for control. This means that the correct balancer function is no longer performed.

7.3 General safety rules

The Spider electronic cable balancer has been built in accordance with German and European standards and regulations, applying current state-of-the-art technology, while complying with the Machinery Directive CE 2006/42/EC, Annex 2A.

Prior to storing, installing or operating the lifting device, the user should become familiar with and comply with the following safety instructions.

1. Warning: Failure to comply with safety regulations can result in damage to the unit or serious or even fatal personal injury.
2. Attention: Before starting the lifting device for the first time, the operator must be instructed by a qualified expert who is familiar with the unit.
3. The lifting device is designed for indoor use.
4. Warning: Do not use the lifting device if you do not feel well.
5. The lifting device should not be used for lifting people.
6. Safety shoes should be worn.
7. The floor in the unit's work area should be free of objects to avoid the risk of tripping.
8. Do not lift weights that exceed the maximum load capacity of the lifting device.
9. The lifting device should not be moved towards other people, as this poses a risk of injury.
10. Pulling or dragging loads horizontally using the lifting device is not permitted.
11. There should be no people or body parts under the suspended load, nor in the area where the suspended load could fall.
12. Do not let the load hang freely for an extended period of time, as prolonged suspension shortens the service life of the metal cable and increases the risk of injury.
13. Never leave the lifting device with a suspended load unattended.
14. No part of the body should be between the metal cable, cable run, or compressed air hose. In addition, they should not be coiled around any part of the body.
15. Avoid bumps/impact against raised loads.
16. The lifting device should not be used where falling loads may damage/destroy pipes or ducts, and thus cause the leakage of flammable, toxic, hot or corrosive gases or liquids.
17. The lifting device should not be used to lift molten or hot liquid loads.
18. Do not clean the unit with corrosive agents.
19. Do not disconnect the unit from the power supply frequently.
20. End-position switches are devices that prevent the unit from moving above or below the end position and cannot be used as end-of-run switches, i.e. end-position switches are safety devices and should not be used to limit the run during normal operations.
21. Modifications and attachments to the handle can only be made by 3arm, as any changes may affect the unit.
22. Do not use a damaged metal cable. The metal cable must be replaced with an original cable supplied by the manufacturer.

23. Dismantling or repairs to the unit may only be performed by authorised, qualified maintenance personnel.

The arms of the lifting equipment should not be dented or damaged. In case of major damage, you should contact 3arm for advice on whether the arm needs to be replaced or repaired in order to ensure safe operation.

7.4 Safety instructions for operation

- The unit should only be used when all safety devices are adequate for full operation.
- The unit must be disconnected immediately or not put into operation if a defect related to operating safety is detected.
- Once a defect has been corrected, the new start up can only be performed by an appraiser who has determined that the unit is working safely.
- If there are third parties in a hazardous area, the operator must stop the unit immediately.
- Due to particular local conditions, which as a result cannot be discussed here, the operator may need to take special measures to ensure safety.
- The operator must check the unit's functions without a load, prior to starting work.

7.5 Safety instructions for repair

- Danger of electric shock
  Disconnect the unit from the mains before starting repair work. The main switch or fuse must be protected to prevent accidental reconnection.
- Danger of injury
  Connect the depressurised unit before starting repair work. The state of depressurisation should be checked.
- Moving parts must be immobilized prior to repair work and their immobilisation during work on the unit must be ensured.
- Maintenance and repair work should only be performed on the unit without any load.
- If there are objects that could fall, the danger zone must be secured.
- The service user or the person authorised by them must always check, before starting, that the work can be carried out without endangering third parties.
- Repair work must be carried out exclusively by technical personnel (appraisers).
- The intervals prescribed or specified in this instruction manual for periodic testing and inspections must be respected.
- Accident prevention rules and official regulations must be respected.
- For repairs, all documents and technical drawings pertaining to the unit must be consulted.
- Only original spare parts should be used.
- New commissioning can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.

8 Spider Cable Balancer safety devices

Several components on the Spider cable balancer are safety devices intended to prevent accidents:
- End circuit breakers that prevent the unit from moving above or below the final run position.
- Weight sensor in the control unit that indicates overloading or loss of load.
- Tilt sensor in the control unit to determine the position of the handle in order to prevent the cable from unrolling during operation if the handle deviates too much.
- Emergency stop, which stops the movement of the unit immediately, while only the menu display remains active.

8.1 End circuit breakers

All units are equipped with end circuit breakers (see fig. 2) to ensure safe and reliable operation. The end-of-run switch is divided into a lower end circuit breaker and an upper one. If the equipment activates the upper end circuit breaker during start-up, the servo drive switches off and the equipment stops. In this case, the equipment must be turned off and restarted. To do this, you can press the emergency stop and, subsequently, unblock it. This allows the servo drive to be restarted. The equipment can only move downwards following this action.
The same is true if the equipment activates the lower end circuit breaker when moving downwards. The servo drive is also deactivated and must be re-activated (see above). The equipment can only move upwards following this action.

Fig. 8.1
End circuit breakers

8.2 Overloading / loss of load

The lifting equipment is equipped with a weight sensor in the control unit (fig. 3). If the load picked up by the lifting equipment exceeds the maximum set value, the device stops moving and lifting the load is not possible. The “Overload” warning message appears on the monitor and the illuminated push-button on the main switch flashes (top left, green light).

If the load lifted falls below the differential value set in balancer mode, the equipment will stop moving. The “Load loss” warning message appears on the monitor and the illuminated push-button on the main switch flashes (top left, green light).

8.3 Determination of the position of the handle

A tilt sensor in the control unit determines the position of the handle to prevent the cable from unrolling during operation if the handle deviates too much.
The deviation angle is an adjustable value, and can therefore be pre-set.
If this value is exceeded by pulling the equipment on the arm or on the rail, the equipment stops moving and the monitor displays the “Deviation” warning.
The illuminated push-button on the main switch flashes (top left, green light).

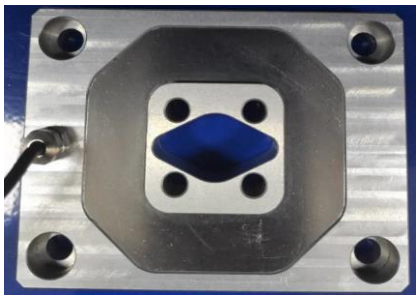


Fig. 8.2
Weight sensor

8.4 Emergency stop

When activating the emergency stop, all movements of the equipment are halted and the motor brake is activated. Only the menu display and the possibility to programme remain active.
If the emergency stop has been activated, the monitor displays an active stop signal and illuminated push-button on the main switch flashes (top left, green light).
The equipment is activated by unblocking the emergency stop and then activating the main switch (top left).

Fig. 8.3
Emergency stop

9 Description of Spider Balancer

9.1 Base structure: general description

The lifting equipment is composed of a lifting unit and a control head, which is connected to the lifting unit via a steel cable. A control handle, which can be installed on the control head or on a load lifting device, controls the upward and downward movement.
A measuring cell within the control head serves to control the unit and leads to optimal trackability. The weight of the load is accurately determined and displayed.
As standard, rotary joints are installed on the control handle and, in the case of the Spider arm, also on the column, allowing for endless rotation and movement of the loading or extension arm.

9.2 Spider arm

The Spider arm consists of an articulated arm mounted on a column (suspension). The suspension cable is connected to the motor, which drives the upward and downward movement.
The standard built-in central joint connects the segments of the articulated arm. This means that any point within the radius of the arm can be accessed.

Fig. 9.1
Representation of Spider arm

9.3 Spider Rail

The Spider runner is suspended from a rail system, which is not included within the scope of the provision. The suspension cable is connected to the motor, which drives the upward and downward movement. Design requirements enable the use of a single chassis.

Fig. 9.2
Representation of a Spider rail

10 Description of functions

10.1 Control unit

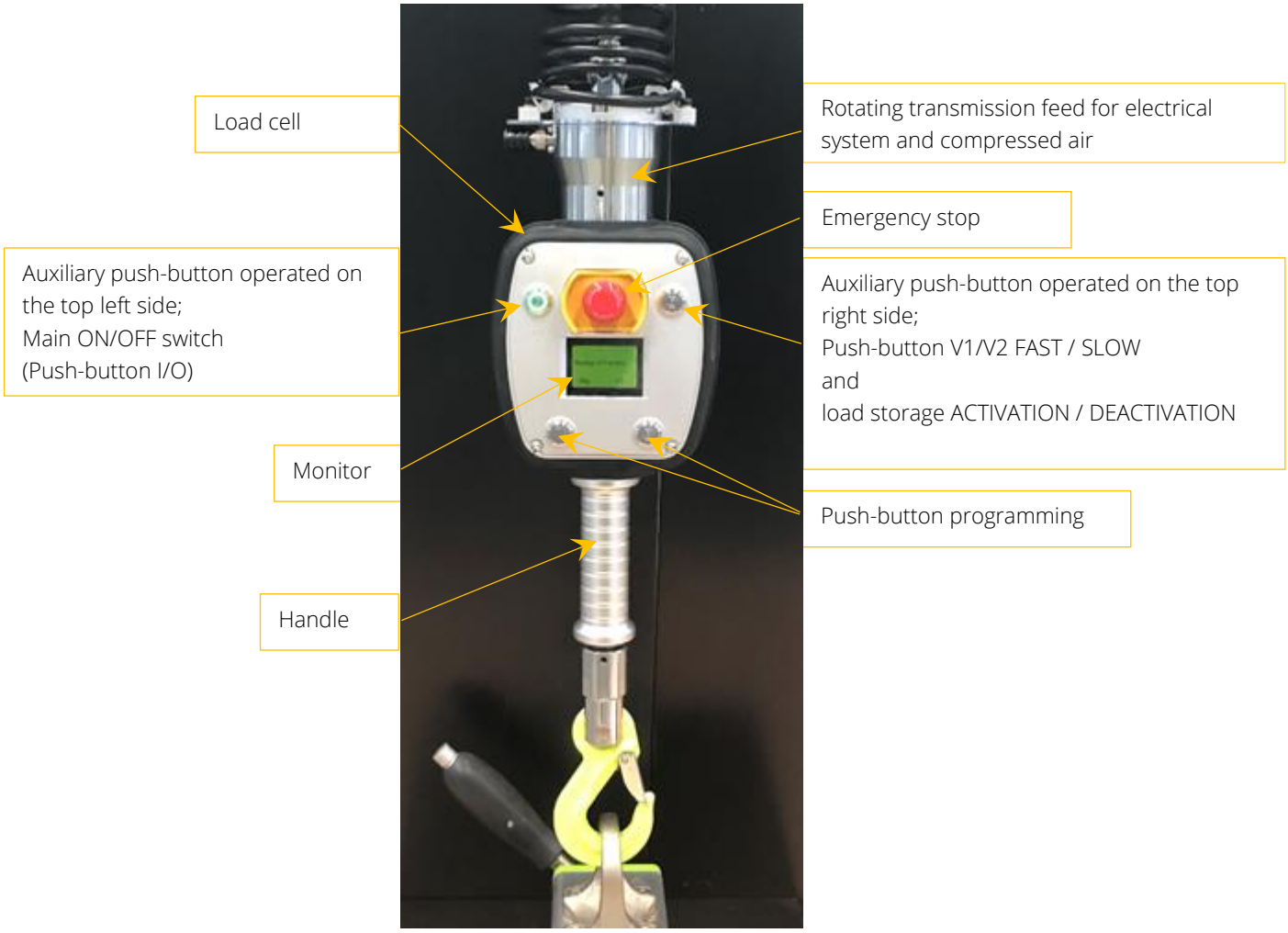


Fig. 10.1
Control unit with hook

10.2 Emergency stop

In order to immediately stop the lifting equipment in a hazardous situation, the operator must press the emergency stop button on the control unit.
When pressing the emergency stop, all movements of the equipment are halted, with only the menu display and possibility to programme remaining activated. The monitor displays an active stop signal and the illuminated push-button on the main switch flashes (top left, green light).
Possible external movements, e.g. turning or tilting functions, must be stopped by a dead man's function ("hold function") in accordance with regulation DIN EN 13155 + A2:2009.
The equipment is reactivated by unblocking the emergency stop (turning the emergency stop push-button) and then activating the main switch (top left). The lifting equipment then performs a brake test before returning to normal mode.

10.3 Function in handle mode

The control unit detects the operator's force and converts it into a lifting movement via the metal cable. Only a minimum operating force is required, regardless of the size of the load.
When the control handle is released, the lifting equipment stops the vertical movement. The horizontal movement slows down. Abrupt movements should be avoided.
The unit provides three different modes. To understand them, see *operating modes*, Chapter 11.2, page 17.

10.4 Function in self-balancing mode

The lifting equipment can operate in the so-called self-balancing mode. Both hands can be used to manoeuvre the load vertically and horizontally.
In self-balancing mode, the load cell of the lifting equipment detects the weight of the load. If the operator lifts the load using their hands, the lifting equipment interprets it as a sign of upwards movement and lifts the load and conversely, the load is moved downwards when the operator pushes the load downwards.
The self-balancing function can be activated or deactivated by holding down the top right push-button for two seconds (adjustable via the software) or automatically, depending on the software pre-set. The monitor on the control unit shows when the self-balancing mode is active.
During weight measurement it is important not to touch the load. The load cell of the lifting equipment must detect a stable weight (adjusted weight value) for about one second in order to activate the self-balancing mode.

10.5 Before start-up

The lifting equipment should be checked once a day, ideally at the beginning of the shift (start of work), to ensure the correct operation and safety of the lifting device.

The following points should be checked:

- The metal cable must be intact;
- the load cell and/or control unit must be intact externally;
- the spiral cable must be intact;
- the unit can only operate if all safety relevant components are in a position to do so; if necessary, an expert should be consulted for inspection;
- there are no strange noises when moving upwards and downwards; in particular, the drive must operate quietly and without any mechanical noise;
- horizontal and vertical movements can be performed with little effort.

If no error is found, then the lifting equipment is ready for use. However, if there is a fault or a suspected fault, it should be reported to whoever is responsible (repair, lift expert).

In addition, the following should be taken into account:

- in the working area there should be no people other than the operator;
- any sling and/or auxiliary sling which has been used for installation work must have been completely removed.

10.6 Start / operation

- After disconnecting the power supply from the lifting equipment, wait at least 10 seconds before reconnecting it.
- The start time following an emergency stop is about 10 seconds.
- Activate the lifting equipment by pressing the main switch (auxiliary push-button on top left side activated). The unit brake is off. The LED on the main switch becomes lit continuously.
- The start time following power saving mode is about 3 seconds.
- The start time following a power outage is about 25 seconds.
- When the supply is connected, the system initialisation is displayed on the monitor and a brake test is performed.

Fig. 10.2
Completion of the initialisation process

10.7 Lifting process

- The metal cable should not sag.
- The control unit should never be lifted by hand because the metal cable will then sag.
- Make sure the load is picked up correctly.
- Slowly lift the load from its position.
- Move the load to the intended position. Perform movement at a speed at which control over the lifting equipment and the loading object can be guaranteed.
- Avoid fast, sudden movements during the entire lifting process.

10.8 End of work

Once the work is completed, it is recommended that the control unit be removed from the work area, press the STOP push-button (located at top left) and finally position the control unit in a parking position.
In addition, during the work shift, it is recommended to always operate the STOP push-button when leaving the unit.

11 Handling

11.1 User interface

The user interface of the control unit (fig. 9) includes the emergency stop, the main ON/OFF switch. (I/O push-button), push-button V1/V2 or push-buttons for load storage, two push-buttons for programming and the monitor (see consecutive numbering 1 to 6 in fig. 9).

Fig. 11.1
User interface

The functions of the push-buttons are described in the following table.

No.	Function	Description
1	Emergency stop	In case of danger or to prevent it, press the emergency stop to halt movement.
2	I/O Push-button	On and off, i.e. start and stop status: In stop status, the unit can no longer be operated; return push-button (to navigate through the menu).
3	V1/V2 Push-button	Switch from handle mode to balancer mode by pressing and holding (approx. 2 s) (only if activated in the software) Change speed in handle mode
4	Bottom left push-button	Function push-button for menu settings
5	Bottom right push-button	Function setting (function values)
6	Monitor	Visualisation

Table 11.1
Functions of the push-buttons with description

11.2 Operating menu

11.2.1 Handle mode

11.2.1.1 Operational sequence

1. Press the I/O push-button (green push-button on top left).
   If you are in balancer mode and want to return to handle mode, press the V1/V2 push-button.
2. Move the control unit upwards and downwards using the control handle. The speed increases proportionally to the force applied.
3. To return from handle mode to stop status, the I/O push-button must be activated once again.

Fig. 11.2
Handle mode

11.2.1.2 Lifting speeds

In handle mode, it is possible to switch between the two speeds V1/V2, that is, the speed can be increased or reduced.

V1 and V2 are displayed on the screen.

Fig. 11.3
Switching speed in handle mode

11.2.2 Balancer mode

11.2.2.1 Operational sequence

1. In handle mode, press and hold V1/V2 for 2 seconds. The unit moves into balancer mode. The unit weighs the current load and allows direct manipulation of the held part.
   On the control unit, the balancing mode is indicated by the green LED (top left) being lit, and the yellow LED (top right) being lit.
   Alternatively, Balancer mode can be turned off or activated automatically via settings.
2. After activating Balancer mode, it is possible to move the picked up load upwards or downwards directly.
3. Return to handle mode:
   - Push the V1/V2 push-button once again, or
   - move directly using the handle, or begin direct movement with the handle.

Here it is possible to implement an individual, alternative programming. To do this, see the quick guide.

NOTE:

1. When switching to balancer mode, no additional force should be applied to the load.
   The unit weighs the current load; placing a hand on the load will lead to incorrect measurement of the value, and cause the unit to behave incorrectly.
   If, for example, a hand is on the load during weighing, the unit takes the highest value. If the unit is at the time in balancer mode, but the hand is no longer on the load, then the unit will move upwards automatically.
   Warning: Danger of injury.
2. In balancer mode, manoeuvres should be performed directly on the load. They should not be performed from the control unit.

Fig. 11.4
Balancer mode

11.2.3 Deposit mode (stop status)

In balancer mode, touching the ground during downward movement eliminates the weight of the load. This activates deposit mode. There are three different setting options:

1. Not deposited
2. Deposited
3. Return to balancer mode

The desired setting is made using the top right push-button. To do this, see the quick guide.

11.2.4 Selecting the type of operation (mode)

As explained in chapter 11.2, Operating modes, the unit can switch between three modes: Handle mode, balancer mode and stop status
(see Figure 11.5).

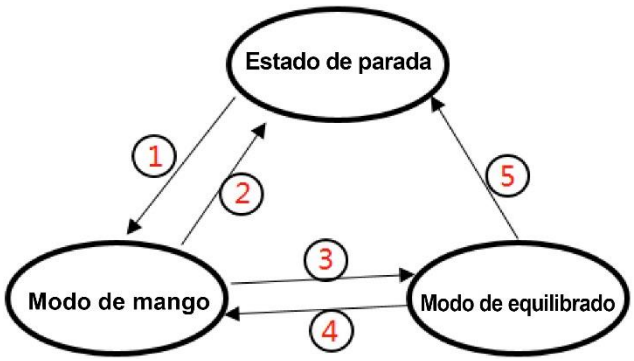


Fig. 11.5
Selection of the type of operation

1. Switching from stop status to handle mode. Press the I/O push-button.
2. Switching from handle mode to stop status. Press the I/O push-button.
3. Switching from handle mode to balancer mode. Press and hold the V1/V2 push-button for a few seconds.
4. Switching from balancer mode to handle mode. Press the V1/V2 push-button .
5. Switching from balancer mode to stop status. Press the I/O push-button.

11.3 Push-button for change of steel cable.

The push-buttons are used to operate the drive during a cable change.

1. Unscrew and remove the metal cable cover and guide block.
2. ENR push-button (metal cable retraction): The metal cable is wound into the drum when the green push-button is activated.
   The drive stops when the push-button is released.
3. DES push-button (metal cable extension): The metal cable is unwound from the drum when the red push-button is activated.

The drive stops when the push-button is released.

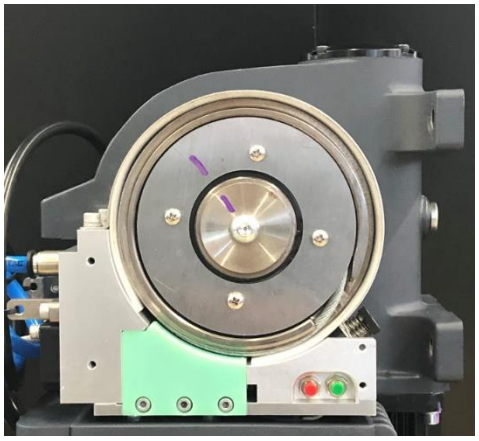


Fig. 11.6
Push-button for cable change

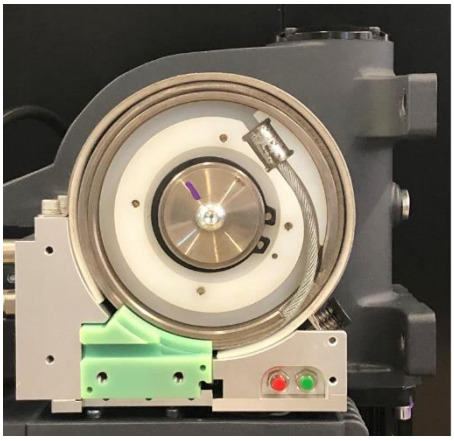


Fig. 11.7
Cable change

12 Menu settings

12.1 User interface

On the user interface of the control unit, the operator can set the menu using push-buttons, and immediately view all the information on the monitor.
The essential functions controlled by the push-buttons are described in the following table.

(See consecutive numbering 1 to 6 in Figure 12.1.)

Fig. 12.1
User interface

No.	Function	Description
1	Emergency stop	In case of danger or to prevent it, press the emergency stop to halt movement.
2	I/O Push-button	On and off, i.e. start and stop status: In stop status, the unit can no longer be operated; return push-button (to navigate menu).
3	V1/V2 push-button	Switch from handle mode to balancer mode by pressing and holding (approx. 2 s); (only if activated in the software) Change speed in handle mode
4	Bottom left push-button	Function push-button for menu settings
5	Bottom right push-button	Function setting (function values)
6	Monitor	Visualisation

12.2 Summary of description of menu functions

(English) Menu 1	Menu 2	(Spanish) First level menu	Second level menu
Load zero		Carga cero	
Sleep Set		Modo de espera	
Gear Set		Vel. de arranque	
Password Set		Contraseña	
Pos Set	PosStop P	Posición	PositionStopP
	PosStop N		PositionStopN
Handle zero		Mango 0	
Count Reset		Restablecer contador	
SwitchBalance		Equilibrado actual	
MaxSpeed Set	V1MaxSpeedUP	Velocidad máx.	V1MaxSpeedUP
	V1MaxSpeedDN		V1MaxSpeedDN
	V2MaxSpeedUP		V2MaxSpeedUP
	V2MaxSpeedDN		V2MaxSpeedDN
	BalanceSpeedU		BalanceSpeedU
	BalanceSpeedD		BalanceSpeedD
Sensitivity	Handle_V1	Sensibilidad	Handle_V1 (1- 4)
	Handle_V2		Handle_V2 (1- 4)
	Balance		Balance (1- 3)
Version		Versión	

Table 12.2
Menu functions

13 Operational Level quick guide (for operators)

13.1 Basic setting of the unit on the monitor following connection (power supply) with the emergency stop button pressed

When the unit is turned on, the system is initialised. This is indicated by “Initialising” on the monitor.
When the unit is ready, the monitor displays “Stop Status”.

Fig. 13.1
Stop Status

13.2 Handle mode

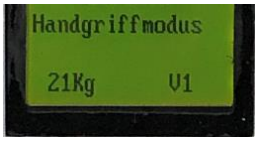


Fig. 13.2
Handgriffmodus V1 (handle mode V1)

1. Unblock the emergency stop button.
2. Press the push-button at top left (the push-button lights up green continuously).

The unit is ready to operate in handle mode. The unit can now be moved upwards and downwards using the control handle.

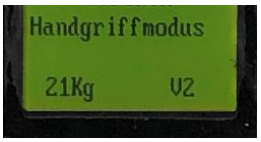


Fig. 13.3
Handgriffmodus V2 (Handle mode V2)

13.3 Balancer mode

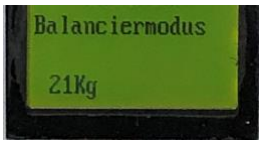


Fig. 13.4
Balanciermodus (Balancer Mode)

Activate Balancer Mode on connecting the unit:

1. Press and hold the top right push-button for more than two seconds (the push-button flashes during this time).
   The unit can now be connected to and disconnected from the load.
   You can also turn off balancer mode in the software, or pre-set an automatic activation.

⚠ Warning
The unit weighs the true weight. This means that if, for example, the operator's hand is on the load during weighing, the unit will register an incorrect value. This means that when the operator removes his hand from the load, the unit will move upwards by itself.

⚠ Safety warning
There is a risk of crushing in balancer mode.

13.4 Manipulation in the parametrisation-level menus

In general:
You can scroll through the menu using the buttons at the bottom right or top right.

By pressing the top left hand push-button once: Return to the previous menu.

To leave the parametrisation level: Press the top left push-button several times.

13.5 Parametrisation level

Fig. 13.5
Passwort 111 (password 111)

Fig. 13.6
Passwort 223 (password 223)

To reach the parametrisation level, the following steps must be taken:

1. Press and hold the bottom left push-button until the word Password and three identical numbers (111) appear in the bottom right corner of the monitor.
2. The bottom right push-button is used to move the cursor (one press moves the cursor to the right).
3. If the cursor is on a number, it can be increased by pressing the top right push-button (counting upwards only).
4. The first password level has the password: **223**.

After setting the password, it is confirmed using the bottom left push-button.

13.6 First parameter: 1 Lastnull (Zero load)

Fig. 13.7
Param. Setzen (Set parameters) /
1 Lastnull (Zero load)

Fig. 13.8
Zero load

Calibration of the load lifting device or hook without picking up load

To calibrate:

1. Press the bottom left push-button, a null value (three digits) will appear.
   The bottom right is the current measured value and the bottom left is the stored value.
   The values should be close to each other: ± 3.

To confirm the setting, press the bottom left push-button once. The determined value is set, and the monitor returns to the **1 Lastnull** (Zero load) home screen.

13.7 Second parameter: 2 Stand-by mode

Fig. 13.9
Param. Setzen (Set parameters) /
2 Schlafmodus (Stand-by Mode)

Fig. 13.10
Stand-by mode

The unit goes into energy-saving mode after the set period of time.

To set:

1. Press the bottom left push-button and the initial setting *2 min* will be displayed bottom right.
   Here you can enter a maximum value of 60 min.
2. The bottom right push-button is used to move the cursor (one press moves the cursor to the right).
3. If the cursor is on a number, it can be increased by pressing the top right push-button (counting upwards only).

To confirm the setting, press the bottom left push-button once. The set value is accepted and the monitor returns to the **2 Schlafmodus** (Stand-by mode) start screen.

13.8 Third parameter: 3 Starting speed

Fig. 13.11
Param. Setzen (Set parameters) /
3 Startgeschwindigkeit (Start speed)

Fig. 13.12
Startgeschwindigkeit V1 (Start speed V1)

The unit has two standard speeds, V1 (slow) and V2 (fast).
These values can be precision set at a higher value. This is only the basic setting at which the equipment starts up after being switched on.

To set:

1. Press the bottom left push-button and the initial setting *1* will be displayed at the bottom right.
2. If the cursor is at number *1*, which corresponds to the speed V1 (standard setting), it can be increased by pressing the top right push-button (it always increases the value).
   The number *2* corresponds to the speed V2.

To confirm the setting, press the bottom left push-button once. The setting value is accepted and the monitor returns to the **3 Startgeschwindigkeit** (Start speed) start screen.

13.9 Fourth parameter: 4 Password

Fig. 13.13
Param. Setzen (Set parameters) / 4 Passwort (Password)

Fig. 13.14
Passwort (password)

Change the standard 223 password for a personalised password

To set:

1. Press the bottom left push-button and the initial setting *111* will be displayed at the bottom right. This is simply the initial view.
2. The bottom right push-button is used to move the cursor (one press moves the cursor to the right).
3. If the cursor is on a number, it can be increased by pressing the top right push-button (it always increases the value).
   You can select any number between 1 and 9 for each digit.
4. To confirm the setting, press the bottom left push-button once. The setting value is accepted and the monitor returns to the **4 Password** home screen.

Warning:
Write down your new password.

13.10 Fifth parameter: Position

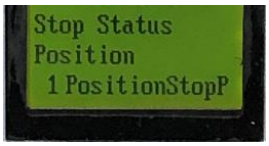


Fig. 13.15
Position (Position) / 1
PositionStopP (Position Stop P)

Fig. 13.16
PositionStopP (Position Stop P)

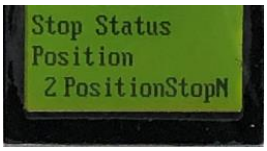


Fig. 13.17
Position (Position) / 2
PositionStopN (Position Stop N)

Fig. 13.18
PositionStopN (Position Stop N)

These are the top and bottom stops for the unit, represented by a fictitious value on the monitor. These stops must be entered manually.

Setting of the *upper* stop point:

1. Press the bottom left push-button to access the *1 PositionStopP* sub-menu (Position Stop P).
   This serves to set the upper stop point.
2. Press the bottom left push-button again and a fictitious value (five digits) will appear.
   The LED ring of the top left push-button lights up when this menu option is selected.
   You can now move the unit manually to the desired height at low speed using the control handle.
   Bottom left you can see the current saved stop point (upper).
   The bottom right is the current position.
3. To confirm the setting, press the bottom left push-button once. The set value is accepted and the monitor returns to the PositionStopP (Position Stop P) start screen.

The bottom right or top right push-buttons can be used to move through the menu to reach the *2 PositionStopN* (Position Stop N).

Setting the *lower stop point*:

1. Sub-menu *2 PositionStopN* (Stop Position N) has been opened (see Setting the upper stop point, page 10).
2. Press the bottom left push-button again and a fictitious value (five digits) will appear.
   The LED ring on the top left push-button lights up when this menu option is open (figure 18).
   You can now move the unit manually to the desired height at low speed using the control handle.
   The bottom left shows the current (lower) stop point.
   The bottom right shows the current position.
3. To confirm the setting, press the bottom left push-button once. The set value is accepted and the monitor returns to the PositionStopN (Stop position N) home screen.

Press the push-button at the top left once to exit the sub-menu.
The monitor once again displays Position.

On the Position menu level, you can also adjust the so-called Zero point (= stop point).
This Zero point should also be set manually.

To set *Zero point*:

1. Press the bottom left push-button to access the *Pos Zero (zero point) sub-menu* .
   This is used to set the *Zero point*.
2. Press the lower left push-button again and a fictitious value (five digits) will appear.
   The LED ring of the top left push-button lights up when this menu option is selected.
   You can now move the unit manually to the desired height at low speed using the control handle.
   The bottom left is the current stored zero point.
   The bottom right is the current position.
3. To confirm the setting, press the bottom left push-button once. The set value is accepted and the monitor returns to the Pos Zero (zero position) home screen.

The bottom right or top right buttons can be used to move through the menu to reach the *1 Position P or 2 PositionStopN* (Position P or Stop position N).

13.11 Sixth parameter: Handle 0

Fig. 13.19
Param. Setzen (Set parameters) / 6 Handgriff 0 (Handle 0)

Fig. 13.20
Handgriff 0 (Handle 0)

Calibration of the load cell on the handle

To calibrate:

1. Press the bottom left push-button, and a fictitious value (four digits) will appear.
   The bottom left is the current measured value.
   The bottom right is the stored value.
   The values should be close to each other: ± 3.
2. To confirm the setting, press the bottom left push-button once. The set value is accepted and the monitor returns to the 6 Handgriff 0 (Handle 0) home screen.

⚠ Warning

During calibration, there no hands should be placed on the control handle. This would lead to false readings and, depending on the direction of the applied force (upwards or downwards), the unit would then move independently in the corresponding direction.

The handle can also be calibrated using the following procedure:

Step 1

The monitor shows “Stop Status / Handlesensor” (Stop Status / Handle sensor). It is no longer possible to operate the unit.
The I/O push-button starts flashing orange (top left push-button on the load cell).

Step 2

Now press the bottom right push-button on the load cell. The push-button begins to flash in blue. When the push-button stops flashing, the unit is once again fully operational.
The control handle should not be touched while the push-button is pressed.

13.12 Seventh parameter: Reset counter

Fig. 13.21
Param. Setzen (Set parameters) /
7 Lastnull (Reset counter)

Fig. 13.22
Reset counter

Reset (zero-setting) for the cycle counter

To reset:

1. Press the bottom left push-button, and a fictitious value (four digits) will appear.
   The bottom left is the current cycle reading.
   The bottom right is the value that is reset following confirmation.
2. To confirm the setting, press the bottom left push-button once. The value is reset to zero. The monitor returns to the 8 Zähler Reset (Reset counter) home screen.

i NOTE
The total value for the unit counter is not reset by this action.

13.13 Eighth parameter: Balancer mode

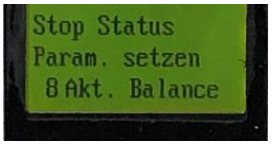


Fig. 13.23
Param. Setzen (Set parameters) /
8 Akt. Balance (Current balance)

Fig. 13.24
2 Taster (Push-button)

Fig. 13.25
Param. Setzen (Set parameters) /
1 kein Balance (Not balanced)

Fig. 13.26
3 Automatisch (Automatic)

The behaviour of the unit using the control handle, taking into account the balancer mode

To set:

1. Press the bottom left push-button and the initial setting *1* will be displayed at the bottom right.
2. If the cursor is set to number 1 (standard setting), this corresponds with *"Control handle disables balancer mode".*
   If the unit is in balancer mode and the operator takes the control handle and moves upwards or downwards, then load storage is turned off. This setting can be changed by pressing the top right push-button (it always increases the value).
   The following possible values are included: 0, 1 and 2

   0: Unbalanced, corresponds to the "*Balancer mode off*"
   and the operator can only manipulate using the control handle.
   1: Push-button, corresponds to *"Control handle disables balancer mode".*
   By pressing the top right push-button for a longer period, the unit moves into balancer mode.
   If the unit is in balancer mode and the operator takes the control handle and moves upwards or downwards, then load storage is turned off.
   2: Automatic, "*Balancer mode is activated automatically*"
   Balancer mode is activated automatically. However, it is possible to manipulate using the handle.

NOTE
ndle = Control handle

Safety warning
The unit should remain in standard mode 1, as the other two values affect the behaviour of the unit. Before switching to the other two values, we recommend you consult 3arm.

13.14 Ninth parameter: Maximum speeds

Here, the maximum speeds V1, V2 and balancer speed can be adjusted independently for upward and downward movement.

Fig. 13.27
Param. Setzen (Set parameters) /
9 max. Geschw. (Maximum speed)

13.14.1 Max. speed V1 ascending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.28
max. Geschw. (Max. speed) / 1 V1MaxSpeedUP (Max. speed V1 ascending)

Fig. 13.29
V1MaxSpeedUP (Max. speed V1 ascending)

13.14.2 Max. speed V1 descending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.30
max. Geschw. (Max. speed) / 2 V1MaxSpeedDN (Max. speed V1 descending)

Fig. 13.31
V1MaxSpeedDN (Max. speed V1 descending)

13.14.3 Max. speed V2 ascending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.32
max. Geschw. (Max. speed) / 3 V2MaxSpeedUP (Max. speed V2 ascending)

Fig. 13.33
V2MaxSpeedUP (Max. speed V2 ascending)

13.14.4 Max. speed V2 descending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.34
max. Geschw. (Max. speed) / 4 V2MaxSpeedDN (Max. speed V2 descending)

Fig. 13.35
V2MaxSpeedDN (Max. speed V2 descending)

13.14.5 Max. balance speed ascending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.36
max. Geschw. (Max. speed) / 5 BalanceSpeedU (Balancing speed ascending)

Fig. 13.37
BalanceSpeedU (Balancing Speed ascending)

13.14.6 Max. balance speed descending

To set:

1. Press the bottom left push-button and the current speed setting will be displayed.
2. Use the top right key to adjust the numerical values; use the bottom right key to move the cursor.
3. After setting the desired value, confirm it by pressing the bottom left key.

Fig. 13.38
max. Geschw. (Max. speed) / 6 BalanceSpeedD (Balance speed descending)

Fig. 13.39
BalanceSpeedD (Balance speed descending)

13.15 Tenth parameter: Sensitivity

With this function you can set the behaviour of the unit's response.

Fig. 13.40
Param. Setzen (Set parameters)/ 10 Empfindlichkeit (sensitivity)

Fig. 13.41
1 Eins (one)

Fig. 13.42
2 Zwei (two)

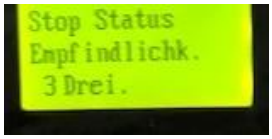


Fig. 13.43
3 Drei (three)

Fig. 13.44
4 Vier (four)

For the three sub-menus (Handle_V1 (Mango_V1), Handle_V2 (Mango_V2) and Balance) at the *Sensitivity menu level* you can define the reaction speed or response behaviour of the handle.

Handle_V1 (Mango_V1) and Handle_V2 (Mango_V2) define response behaviour in relation to speeds.
Here you can find setting options from 1 to 4. The “4” setting is the factory setting for the unit.

In the balancer the behaviour of the response is defined in relation to the balancer mode. Here you can find setting options from 1 to 3. The “2” setting is the factory setting for the unit.

13.16 Eleventh parameter: Version

Here on the menu you can view the current loaded software version.

Fig. 13.45
Param. Setzen (Adjust parameters) / 11 Version (Versión)

Fig. 13.46
Version-Nummer (Version number)

Explanation of the display on the monitor in fig. 13.46:

V132-SN: 000000 200409-0409-150	→	Hardware version: Serial number Software version-Load limit

14 Technical data

14.1 Technical data for Spider rail

Parameter	Spider 75 R	Spider 150 R	Spider 225 R	Spider 300 R	Spider 600 R
Load capacity	75 kg	150 kg	225 kg	300 kg	600 kg
Power supply	1700 VA	1700 VA	2300 VA	2300 VA	2300 VA
Supply voltage	230 V single-phase	230 V single-phase	230 V single-phase	230 V single-phase	230 V single-phase
Total weight	31 kg	31 kg	41 kg	41 kg	55 kg
Max. lifting speed (no load)	650 mm/s	420 mm/s	392 mm/s	327 mm/s	163 mm/s
Protection classification	IP 54	IP 54	IP 54	IP 54	IP 54
Cable breaking force (in accordance with DIN EN 12385-4)	16.1 kN	16.1 kN	16.1 kN	16.1 kN	16.1 kN
Colour (standard)	RAL 7024	RAL 7024	RAL 7024	RAL 7024	RAL 7024
Mechanical connection (adapter for type 0021124 / others on request)	Rail adapter	Rail adapter	Rail adapter	Rail adapter	Rail adapter
Number of chassis	1	1	1	1	1
Max. elevation	2500 mm	2500 mm	2500 mm	2500 mm	1250 mm
Load detection	Load cell	Load cell	Load cell	Load cell	Load cell
Self-balancing mode (two variants)	Yes	Yes	Yes	Yes	Yes
Programmable lifting position	2	2	2	2	2
Mark	CE mark in accordance with Machinery Directive 2006/42/CE				
Noise level (dB)	<70 dB	<70 dB	<70 dB	<70 dB	<70 dB
Ambient operating temperature	0 °C to +40 °C.	0 °C to +40 °C.	0 °C to +40 °C.	0 °C to +40 °C.	0 °C to +40 °C.
Atmospheric humidity during operation	20-80 %	20-80 %	20-80 %	20-80 %	20-80 %
Transport and storage temperature	-20 °C to +55 °C.				
Safety features	Emergency stop at the control unit				
	Automatic stop when handle is released				
	Immediate stop in case of power outage				
	Hardware end circuit breaker for elevation limit				
Transmission group (in accordance with finite element method (FEM) 9,511)	2 m				

Table 14.1
Technical data for Spider rail

14.2 Technical data for Spider arm

Parameter	Spider 75 C				Spider 150 C			
Arm lengths (other lengths on request)	2.5 m	3.0 m	3.5 m	4.0 m	2.5 m	3.0 m	3.5 m	4.0 m
Structure	M/S	M/S	M/S	M/S	M/S	M/S.	L/M	L/M
Horizontal working range (ø)	5 m	6 m	7 m	8 m	5 m	6 m	7 m	8 m
	360° endless				360° endless			
Load capacity	75 kg				150 kg			
Lifting force	736 N				1472 N			
Power consumption	1700 VA				1700 VA			
Supply voltage	230 V single-phase				230 V single-phase			
Total weight (arm, column, drive)	337 kg	343 kg	350 kg	356 kg	337 kg	343 kg	350 kg	356 kg
Max. lifting speed (no load)	650 mm/s				420 mm/s			
Cable breaking force (in accordance with DIN EN 12385-4)	16.1 kN				16.1 kN			
Colour	RAL 7024				RAL 7024			
Protection classification	IP 54				IP 54			
Main fuse	10 A type C							
Max. elevation	2500 mm				2500 mm			
Load detection	Load cell				Load cell			
Self-balancing mode	Yes				Yes			
Programmable lifting position	2				2			
Mark	CE mark in accordance with Machinery Directive 2006/42/CE							
Noise level (dB)	<70 dB							
Ambient operating temperature	0 °C to +40 °C.							
Atmospheric humidity during operation	20-80 %							
Transport and storage temperature	-20 °C to +55 °C.							
Safety features	Emergency stop at the control unit							
	Automatic stop when handle is released							
	Immediate stop in case of power outage							
	Hardware end circuit breaker for elevation limit							
Transmission group (in accordance with finite element method (FEM) 9.511)	2 m							

Table 14.2
Technical data for Spider arm (75 C and 150 C)

Parameter	Spider 225 C			Spider 300 C		
Arm lengths	2.5 m	3.0 m	3.5 m	2.5 m	3.0 m	
Structure	L/M	L/M	L/M	L/M	L/M	
Horizontal working range	5 m	6 m	7 m	5 m	6 m	
	360° endless			360° endless		
Load capacity	225 kg			300 kg		
Lifting force	2207 N			2943 N		
Power consumption	2300 VA			2300 VA		
Supply voltage	230 V single-phase			230 V single-phase		
Total weight (arm, column, drive)	447 kg	497 kg	547 kg	447 kg	497 kg	547 kg
Max. lifting speed (no load/full load)	392 mm/s			392 mm/s		
Cable breaking force (in accordance with DIN EN 12385-4)	16.1 kN			16.1 kN		
Colour	RAL 7024			RAL 7024		
Protection classification	IP 54			IP 54		
Main fuse	10 A type C					
Max. elevation	2500 mm			2500 mm		
Load detection	Load cell			Load cell		
Self-balancing mode	Yes			Yes		
Programmable lifting position	2			2		
Mark	CE mark in accordance with Machinery Directive 2006/42/CE					
Noise level (dB)	<70 dB					
Ambient operating temperature	0 °C to +40 °C.					
Atmospheric humidity during operation	20-80 %					
Transport and storage temperature	-20 °C to +55 °C.					
Safety features	Emergency stop at the control unit					
	Automatic stop when handle is released					
	Immediate stop in case of power outage					
	Hardware end circuit breaker for elevation limit					
Group of machines in accordance with finite element method (FEM) 9.511	2 m					

Table 14.3
Technical data for Spider arm (225 C and 300 C)

15 Transport and storage

Before transportation, all moving parts must be secured.

All power and supply connections must be disconnected by technical personnel only.
During all transport, lifting or moving operations, all relevant safety standards (e.g. accident rules and local rules of the destination) must be respected. This also means that only the proper, tested lifting equipment can be used.

Please note that, in general, it is never permitted to touch a suspended load from below.

Only suitable, undamaged and fully functional means of transport with sufficient load capacity can be used. The necessary blocks and transport devices should be fitted in such a way as to secure the components of the unit, so that they cannot slide or slip.

The components of the unit can be transported upright or horizontally.
Ensure that stable components which ensure a firm fit and stability of the components of the unit are used. In addition, hoses and cables should not be trapped.
Avoid any sudden setting down of the unit's components.

During transport and storage, the following environmental conditions and prerequisites apply, just as for machine operation:

- dry
- frost-free
- protected from dust
- clean
- Ambient temperature from +5 °C to +35 °C.
- protected against corrosion (e.g. from salt water)
- level, horizontal storage or transport

If you have any questions or concerns, please contact 3arm before moving.
In case of doubt, refrain from making your own attempts, as they could pose a risk to both people and the equipment.

16 Installation of the Spider arm and the Spider rail

16.1 General information

Balancers are supplied in appropriate packaging. The delivery route and the packaging material depend on the country of destination and the mode of transport. In any case, care must be taken not to damage the unit during unpacking.
After unpacking, check that the unit does not show any visible sign of damage resulting from improper transport or unpacking.

16.2 Mechanical installation

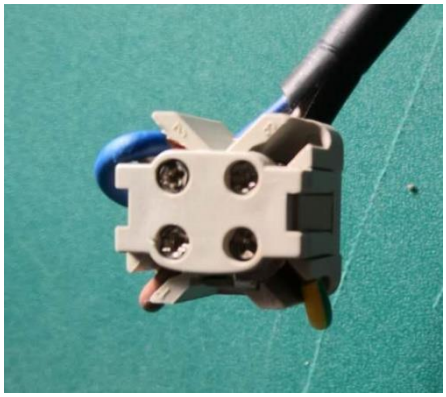
The mechanical installation must be performed, coordinated or supervised by an expert or appraiser.
It must be ensured that all mechanical connections are both complete and firmly fitted.

16.3 Electrical connection

The electrical connection must be performed, coordinated or supervised by an expert or appraiser.

In addition:
1. All electrical connections must be checked to be both complete and firmly fitted.
2. Make sure the spiral cable is connected to the drive unit.
3. Make sure the spiral cable is connected to the control unit.
4. Connect the Harting male connector to the 220 V/AC single-phase power supply.
The unit has a single-phase 220 V/AC (50 Hz) power supply and is connected as follows:

1 = Phase L1 (220 V/ AC, (50 Hz)
2 = Neutral conductor N (neutral wire)
3 = Protective conductor (PE)



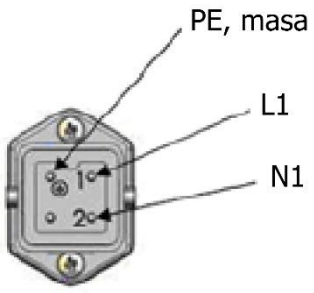


Fig. 16.1
Harting male connector wiring

Fig. 16.2
Connection cable

Warning: Danger of electric shock

During work on electrical equipment, the unit must be disconnected from the power supply. In addition, you must ensure that accidental reconnection is not possible.

NOTE:

The unit must be earthed.
Operation under voltage can cause damage to the unit or personal injury.

17 Commissioning

Commissioning can only be carried out by an appraiser.

Before commissioning, all parts of the unit must be fully assembled and connected mechanically and electrically.

The correct connection of all connection cables must be established and checked by an expert.

17.1 Switching on

It is assumed that all preparations have been made in accordance with this user manual.

The current supply must be connected to the corresponding main switch.

17.2 Operating the unit

Only one person can operate the unit.
The presence of other people within the unit's radius of action is not permitted.

18 Care: Inspection, maintenance and repair

Care includes basic inspection, maintenance and repair measures.
Chapter 23.3 (Annex) lists the points to be checked, the required frequency, a description of the maintenance work to be performed and the material/tools required. It also includes the corresponding protocols, which must be completed in accordance with the established periods.

18.1 Safety instructions

- Warning: Danger of electric shock
  Disconnect the unit from the mains supply before starting repair work. The main switch or fuse must be protected to prevent accidental reconnection.
- Proper safety precautions should be taken when working at height. To that end, an elevating work platform is recommended.
- Warning: Danger of injury
  Before starting the repair work, the lifting device must be depressurised. The depressurisation status should be checked.
- Moving parts must be immobilised in advance and it must be ensured that they cannot begin to move during repair work.
- Carry out repair work only when the lifting device is not loaded.
- If there is a possibility of falling objects, the danger zone must be secured.
- The service user or person authorised by them must check on a case by case basis whether the necessary work can be carried out without causing danger to third parties.
- Repair work should only be carried out by technical personnel (appraisers).
- The intervals prescribed or specified in the user manual for periodic tests or inspections must be respected.
- Accident prevention rules and official regulations must be respected.
- Only original spare parts should be used.
- Only suitable tools should be used.
- Further starting up can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.
- For repairs, all instruction manuals pertaining to the lifting device should be followed.
- If damage or wear is detected during inspection or maintenance, it should first be assessed by technical or maintenance personnel and, if necessary, the corresponding parts should be replaced immediately.
- For all maintenance, inspection and repair work, the corresponding protocol must be completed and signed. See Annex.

18.2 Required experience for repair staff

18.2.1 Electricity and electronics

Work on the electrical and electronic components of the lifting device must be performed, coordinated or supervised by an expert or appraiser. All applicable, relevant safety standards, including those in this translation of the original user manual, must be respected.
As this also involves repairing safety relevant and electrostatic discharge sensitive components, it is imperative that technical personnel be properly qualified.

18.2.2 Mechanics

Work on the mechanical components of the lifting device must be performed, coordinated or supervised by an expert or appraiser. All applicable, relevant safety standards, including those in this translation of the original user manual, must be respected.

18.3 Testing rules

Test before commissioning:
The operator must ensure that the lifting device is only put into operation when it has been inspected by an appraiser and any defects found have been remedied.

Periodic testing in accordance with accident prevention regulations:
Testing of the lifting device should be performed at least once a year by an appraiser.
Recurring testing, in accordance with Compulsory Accident Insurance (DGUV) is both visual and functional.
The condition of components is to be checked for wear, damage, corrosion and safety functions.

Periodic testing must be carried out in accordance with the accident prevention regulations applicable to the lifting device, and the results must be recorded in the relevant protocols.

19 Problem solving

Before calling customer services, you should check to see if you can solve any possible fault.

Warning
Only technical personnel qualified and authorised by the service user can take charge of the corresponding breakdown, while taking into account all safety instructions and precautions. All safety warnings in this translation of the original user manual and the corresponding VDE standards must be respected.

20 Spare parts

When ordering spare parts from 3arm, always indicate the serial number of the lifting device, and the name and/or the part number of the desired spare part. The serial number can be found in chapter 1 *Identification of the unit*.

Packets of spare parts can also be ordered. To do this, please contact a 3arm representative*.

20.1 Spare parts and consumables for lifting device

Position	Name	Article number	R/D	Remarks
1	Motor unit (incl. plug-in connector) Not included: - Cover for cable drum - Complete cable guide - Complete cable drum - Guide pins		R.	
2	Cable (with end cap)		D	
3	Cover for cable drum		R	
4	Complete cable guide (3 plastic pieces included [S verde®])		R/D	
5	Cable drum		R	
6	Guide pins		R	
7	Spiral cable		D	
8	Spiral compressed air hose (if present), including the nozzle		D	
9	Complete set of pulley blocks (composed of two pulley wheels + support)		R	
10	Complete arm wiring (Signal cable, runs through the protection hose, incl. screw connector welded to motor and screw sleeve welded to arm)		R	
11	Rubber buffer		R	
12	Emergency stop button		R	
13	Push-button, green		R	
14	Push-button, orange		R	
15	Push-button, blue		R	
16	Push-button, red		R	
17	Handle cuff		R	
18	Load Cell (handle)		R	
19	Load cell (head)		R	
20	Rotating transmission feed		R	
21	PC USB cable		R	

Table 20.1
Spare parts and consumables

21 Fitting of spare parts

21.1 Safety warnings about fitting spare parts

- The fitting of spare parts must be carried out, coordinated or supervised by an expert or appraiser.
- Warning: Danger of electric shock
  Disconnect the unit from the mains supply before starting work. The main switch or fuse must be protected to prevent accidentally reconnection.
- Proper safety precautions should be taken when working at height. To that end, an elevating work platform is recommended.
- Warning: Danger of injury
  Before starting the work, the lifting device must be depressurised. The depressurisation status should be checked.
- Moving parts must be immobilised beforehand and it must be ensured that they cannot start moving during the work.
- Perform the work only when the lifting device is not loaded.
- If there is a possibility of falling objects, the danger zone must be secured.
- The service user or person authorised by them must check on a case by case basis whether the necessary work can be carried out without causing danger to third parties.
- The work should only be carried out by technical personnel (appraisers).
- Accident prevention rules and official regulations must be respected.
- When working on electrical equipment, the Electrical, Electronic and Information Technologies Association (VDE) standards must be respected.
- Only original spare parts should be used.
- Only suitable tools should be used.
- Further starting up can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.
- For the fitting of spare parts, all instruction manuals pertaining to the lifting device should be followed.
- After replacement of the spare parts, the corresponding protocol must be completed and signed. See the protocol in the Annex.

21.2 Change of cable

A cable change must be made, coordinated or supervised by a trained expert or appraiser. The commissioning below can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.

21.2.1 Tools needed to change the cable

- Allen key, sizes 2 / 2.5 / 4 and 5
- Ring spanners, sizes 13 and 17
- Angled mounting pliers for for retaining rings, size 2 mm
- Pliers to cut ø 5 mm steel cable.

21.2.2 Removing the cable

1.	**Disconnect the unit from the power supply.** The main switch or fuse must be protected to prevent accidentally reconnection.
2.	**Disconnect the compressed air supply.** The state of depressurisation should be checked. Compressed air hoses must be depressurised.
3.	**Release the load lifting device or the hook on the control handle.**
4.	**Disconnect the cable from the control unit**. The spiral cable must remain connected in order to subsequently wind or unwind the cable.  Fig. 21.1 The coupling (red arrow) should be loosened and the cable then separated from the control

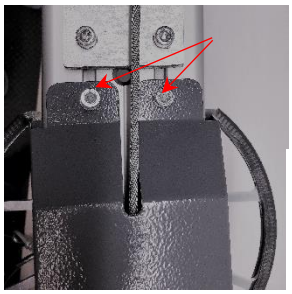
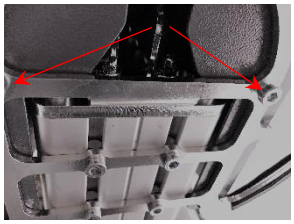
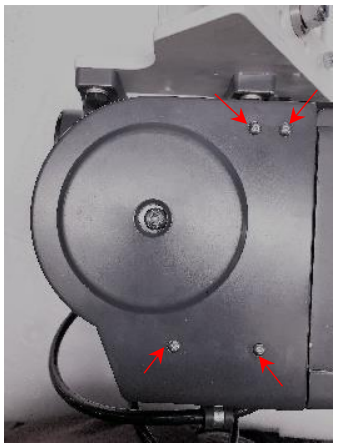
Spider arm		Spider Rail	
5.	**Unbolt the cover.**  Fig. 21.2 Remove the cover.  Fig. 21.3 Loosen the cover bolts at the top.  Fig. 21.4 Loosen the cover bolts at the bottom.	5.	—not applicable—

Fig. 21.5 / The cover is then removed.

6. Cutting the cable.
In order to be able to remove the cable completely, it must first be cut.
That is to say, it should be cut above the end cap.

7. Access the cable drum.



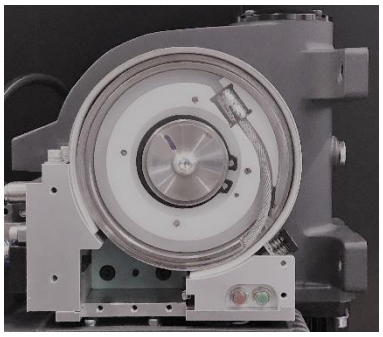


Fig. 21.6
Loosen and remove the bolts. Remove the plastic sheathing.

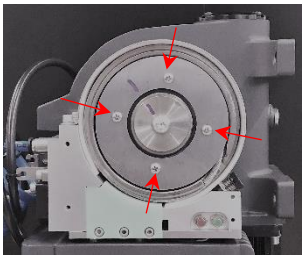


Fig. 21.7
Remove the four bolts from the lid.

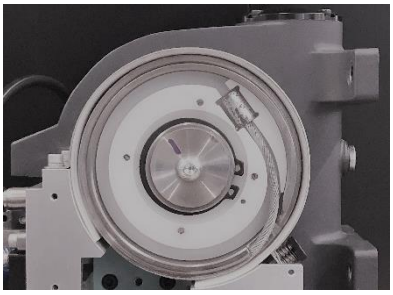


Fig. 21.8
Remove the lid.

Fig. 21.9
Remove the retaining rings and remove the plastic part.

Fig. 21.10
The plastic part is then removed.

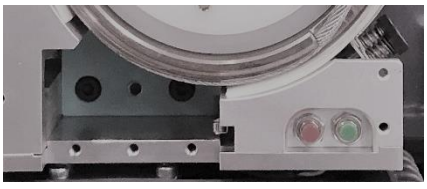


Fig. 21.11
The mould serves as a guide for the plastic part.

8. Remove the Allen screws.

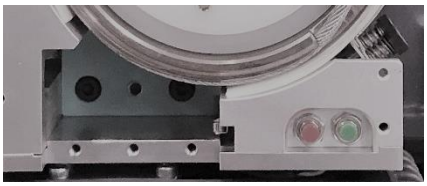


Fig. 21.12
Remove the Allen screws.

9. Re-connect the main switch and power up the unit.

10. Press the red push-button to unwind the cable
To perform this action, the spiral cable must be connected to the control head.
To unwind the cable, press and hold the red push-button.

Fig. 21.13
Press the red push-button.

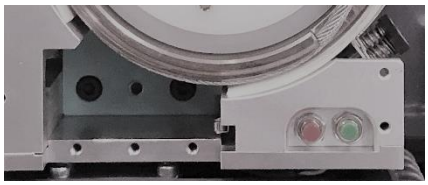


Fig. 21.14
Push-buttons for winding and unwinding.

11. Unwind the cable slowly.
Unwind the cable to the outermost winding. Keep the red push-button pressed (see point 10).

NOTE:
Always keep the cable under tension during unwinding.

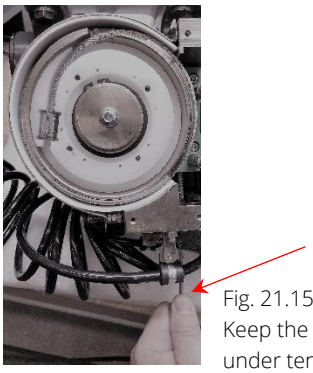


Fig. 21.15
Keep the cable under tension.

Fig. 21.16
The outermost winding.

12. Remove the plastic piece.

Before you can remove the cable completely, the plastic piece must be removed.

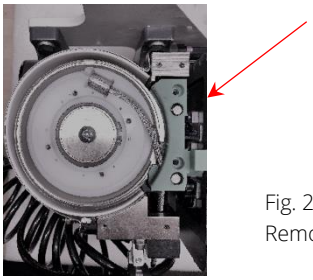


Fig. 21.17
Remove the plastic piece.

13. Loosen the end piece and remove the cable.

Release the pressed end piece from the mould by hand. Then draw the cable out to a defined point.

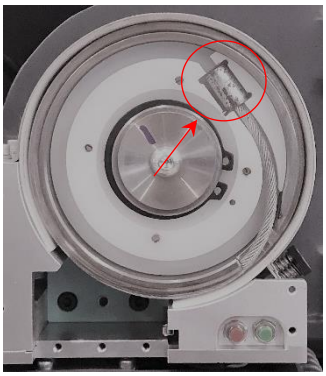


Fig. 21.18
Remove the end piece from the mould.

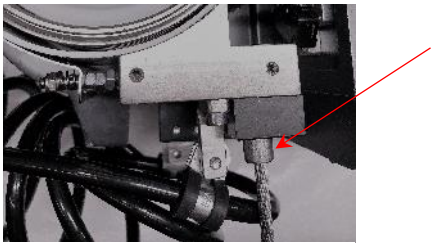


Fig. 21.19
Draw the cable outwards.

NOTE:
When drawing the cable out, make sure that the surface of the green plastic and roller are at the same level, and that there is no difference in height between the two surfaces.
Otherwise, it will not be possible to draw the cable outwards.

21.2.3 Fitting the new cable

The new cable must be an original 3arm replacement. This cable is prefabricated accordingly for this application.

1. Insert the cable and press in order to shape it.

Insert the cable at a defined point and press the end piece into the mould with your hand.
Make sure the cable is also in the guide on the plastic part.

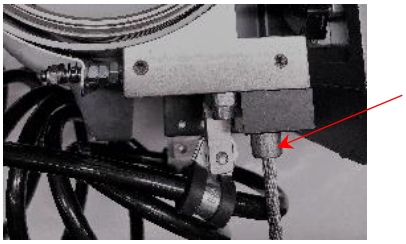


Fig. 21.20
Draw the cable.

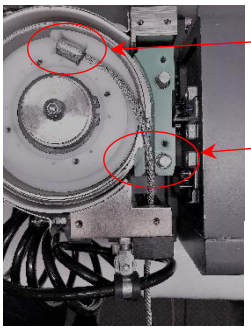


Fig. 21.21
Press the end piece to shape it.

2. Fit the plastic part.

Before winding the cable, the plastic part should be fitted.

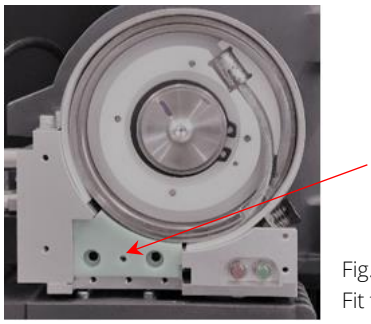


Fig. 21.22
Fit the plastic part.

3. Wind the cable slowly.

The cable is wound slowly. To do this, press and hold the green push-button (see fig. 21.25).

NOTE:
Always keep the cable under tension during winding.

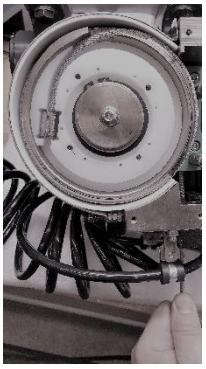


Fig. 21.23
Keep the cable under tension.

4. Press the green push-button to wind the cable.

To perform this action, the spiral cable must be connected to the control head.
To wind the cable, press and hold the green push-button.

Fig. 21.24
Press the right push-button.

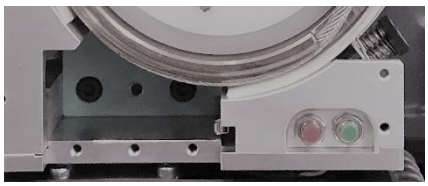


Fig. 21.25
Push-buttons for winding and unwinding.

5. Close the cable drum.

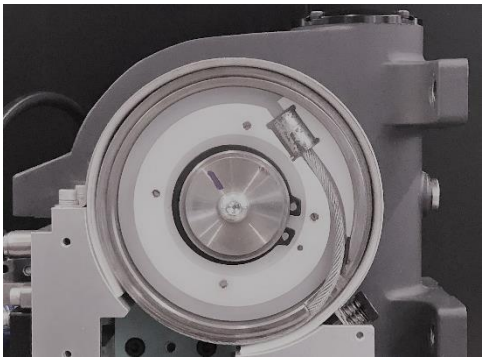


Fig. 21.26
Place the lid on the rope drum and...

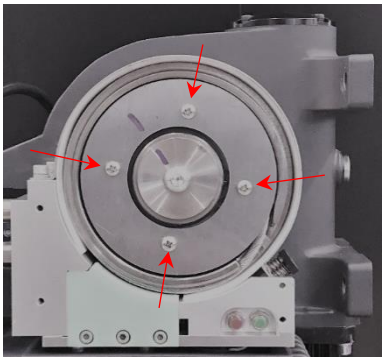


Fig. 21.27
...fix in place with the four screws.

Fig. 21.28
Fit the plastic piece and the retaining rings.

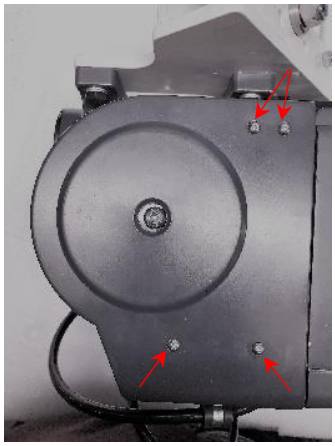
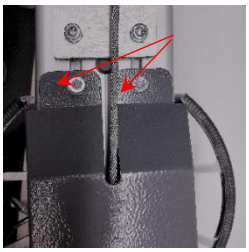
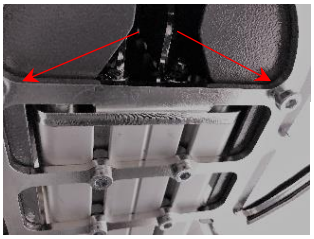
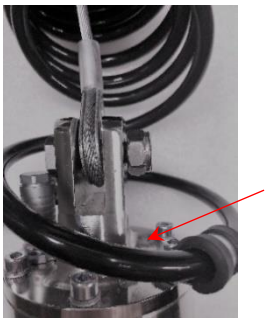


Fig. 21.29
Fit the plastic sheathing and fix it with four screws.

<table>
<tr><th colspan="2">Spider arm</th><th colspan="2">Spider Rail</th></tr>
<tr><td>7.</td><td>Pull the cable downwards.
 
Pulley block
Fig. 21.30
Insert the cable through the pulley block</td><td>7.</td><td>—not applicable—</td></tr>
<tr><td>8.</td><td>Fit the cover.
 
Fig. 21.31
Put cover in place.
 
Fig. 21.32
Tighten the cover screws at the top.
 
Fig. 21.33
Tighten the cover screws at the bottom.</td><td>8.</td><td>—not applicable—</td></tr>
<tr><td>9.</td><td colspan="3">Disconnect the unit from the power supply.
The main switch or fuse must be protected to prevent accidental reconnection.</td></tr>
<tr><td>10.</td><td colspan="3">The compressed air supply must remain disconnected.
The state of depressurisation should be checked. Compressed air hoses must be depressurised.</td></tr>
<tr><td>11.</td><td colspan="3">There is still no load lifting device or hooks on the control handle.</td></tr>
<tr><td>12.</td><td colspan="3">Connect the steel cable to the control unit. The spiral cable is still connected.
 
Fig. 21.34
Connect the cable to the control unit as shown in the picture.</td></tr>
</table>

21.3 Changing the spiral cable

A cable change must be performed, coordinated or supervised by a trained expert or appraiser. The commissioning below can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.

21.3.1 Tools needed to change the spiral cable

- Allen keys, sizes 4 and 5
- Socket spanner, 13 and 17

21.3.2 Removal of the spiral cable

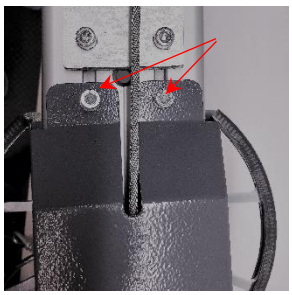
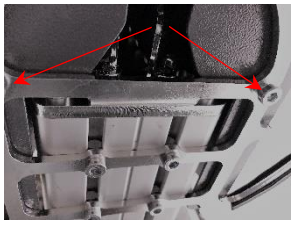
1.	**Disconnect the unit from the power supply.** The main switch or fuse must be protected to prevent accidental reconnection.		
2.	**Disconnect the compressed air supply.** The state of depressurisation should be checked. Compressed air hoses must be depressurised.		
3.	**Release the load lifting device or the hook on the control handle.**		
Spider arm		Spider Rail	
4.	**Unscrew the cover.**  Fig. 21.35 Remove the cover.  Fig. 21.36 Loosen the cover screws at the top.  Fig. 21.37 Loosen the cover screws at the bottom.	4.	—not applicable—

Fig. 21.38
The cover is removed.

5. Loosening of the spiral cable on the arm

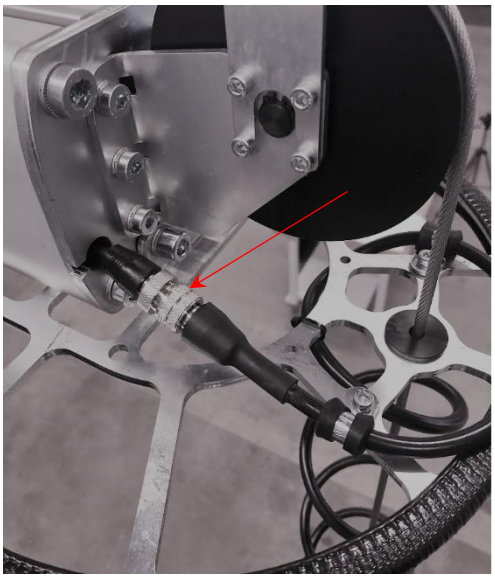


Fig. 21.39
Loosen the spiral cable on the arm, and while doing so, loosen the thread and disconnect the cable (red arrow).

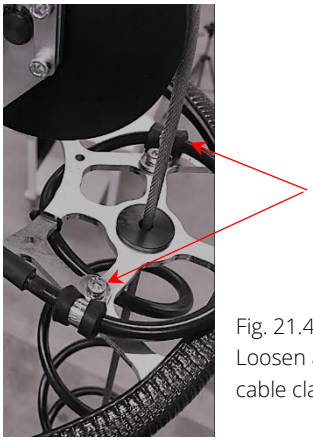


Fig. 21.40
Loosen and remove the cable clamps (red arrows).

NOTE:
After loosening the screw, the spiral cable slides downwards in the direction of the control unit.

5. Loosening of the spiral cable on rail unit

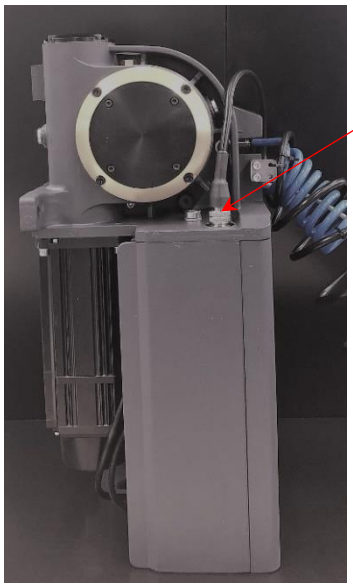


Fig. 21.41
Loosen the spiral cable on the rail unit, and while doing so, loosen the thread and disconnect the cable (red arrow).

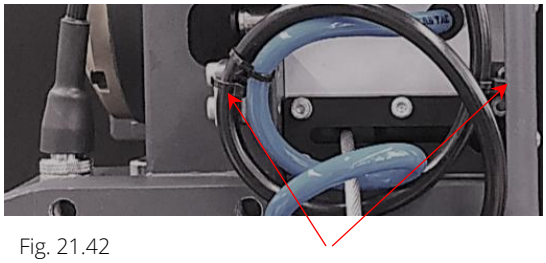


Fig. 21.42
Loosen and remove the cable clamps (red arrows).

NOTE:
After loosening the screw, the spiral cable slides downwards.

6. Loosen the spiral cable on the control unit.

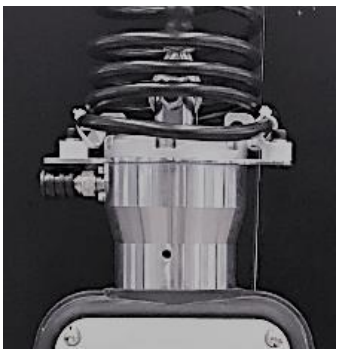


Fig. 21.43
Loosen the spiral cable on the control unit.

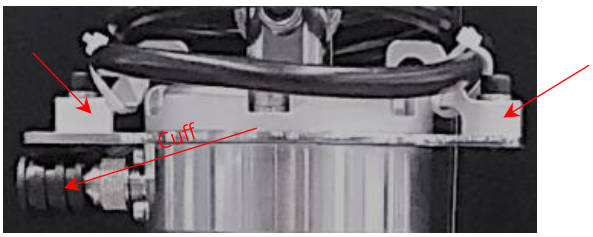


Fig. 21.44
Loosen and remove the cable clamps (red arrows).
Push the cuff back and remove it.

7. Release the cable from the control head.

Disconnect the cable from the control unit so that the spiral cable can be removed.

Safety warning

Before releasing the connection between the cable and the control unit, the control unit must be lowered/supported to prevent it from falling.

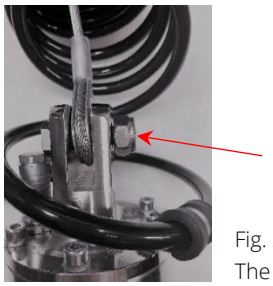
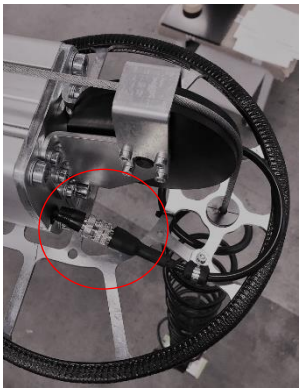
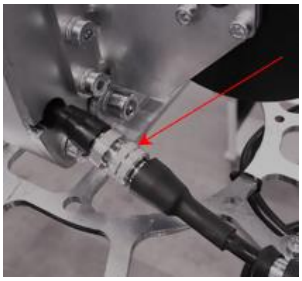
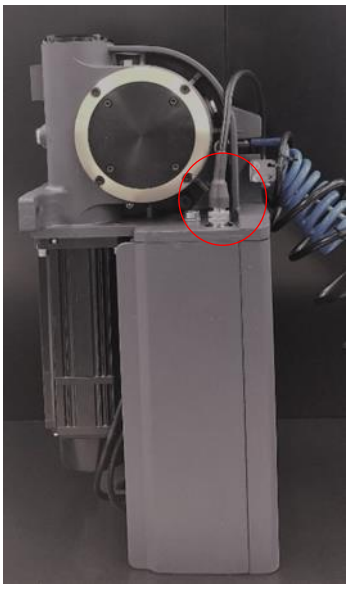
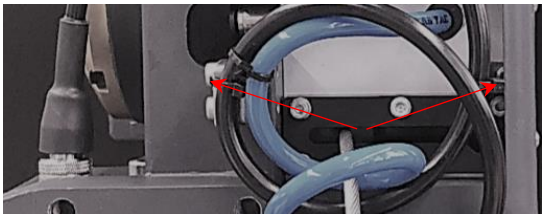
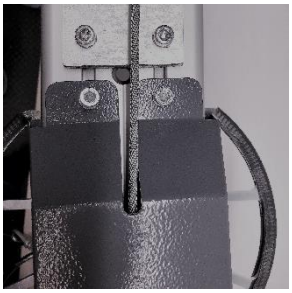


Fig. 21.45
The coupling (red arrow) should be loosened and the cable separated from the control unit.

21.3.3 Fitting the spiral cable

The new spiral cable must be an original 3arm spare. This spiral cable is pre-assembled accordingly for this application.

1.	**The unit must remain disconnected from the power supply.** The main switch or fuse must be protected to prevent accidental reconnection.
2.	**The compressed air supply must remain disconnected.** The state of depressurisation should be checked. Compressed air hoses must be depressurised.
3.	**There is still no load lifting device or hooks on the control handle.**
4.	**Pull the spiral cable over the steel cable.** Then, the spiral cable is fixed first at the top of the arm unit or rail unit, and then at the bottom of the control unit.
5.	**Attach the spiral cable to the arm.**  Fig. 21.46 Attach the spiral cable to the arm.  Fig. 21.47 Tighten the thread.  Fit the cuff. Fig. 21.48 Secure the spiral cable in the positions indicated (red arrows) using cable clamps.
5.	**Fit the spiral cable to the rail unit.**  Fig. 21.49 Fit the spiral cable to the rail unit - to do this, tighten the thread.  Fig. 21.50 Secure the spiral cable in the positions indicated (red arrows) using cable clamps.

6.	Fit the cover.  Fig. 21.51 Put cover in place.  Fig. 21.52 Tighten the cover screws at the top.  Fig. 21.53 Tighten the cover screws at the bottom.	6.	—not applicable—

EU Declaration of Conformity

We: Liftkon GmbH
Adress: Kanakstraße 25
D – 73061 Ebersbach/Fils
Telephone +49 (0) 7163 99883-00
Fax +49 (0) 7163 99883-01
info@liftkon.de www.liftkon.de

Declare under our sole responsibility that the unit consisting of the assemblies:

Wizard Arm / W75C
Wizard Arm / W150C
Wizard Arm / W225C
Wizard Arm / W300C

Wizard Rail / W75R
Wizard Rail / W150R
Wizard Rail / W225R
Wizard Rail / W300R
Wizard Rail / W600R
Name / Type

Is according to directive 2006/42/EC, Appendix 2A.

Applied harmonized standards:

DIN EN 13155 Cranes – Non-fixed load lifting attachment

DIN EN 14238 Cranes – Manually controlled load manipulating devices

DIN EN ISO12100 Safety of machines

DGUV Rule 100-500, Chapter 2.8

The current declaration is invalidated by every modification on the delivered parts that is not authorized in writing by Liftkon GmbH.

The relevant technical documents in accordance with Annex VII Part A of directive 2006/42/EC have been created and will made available to authorized national bodies by the designated authorized representative upon justified request.

The undersigned is authorized for the technical documentation: Markus Schleeh | Liftkon GmbH

Ebersbach, February 2024

Markus Schleeh

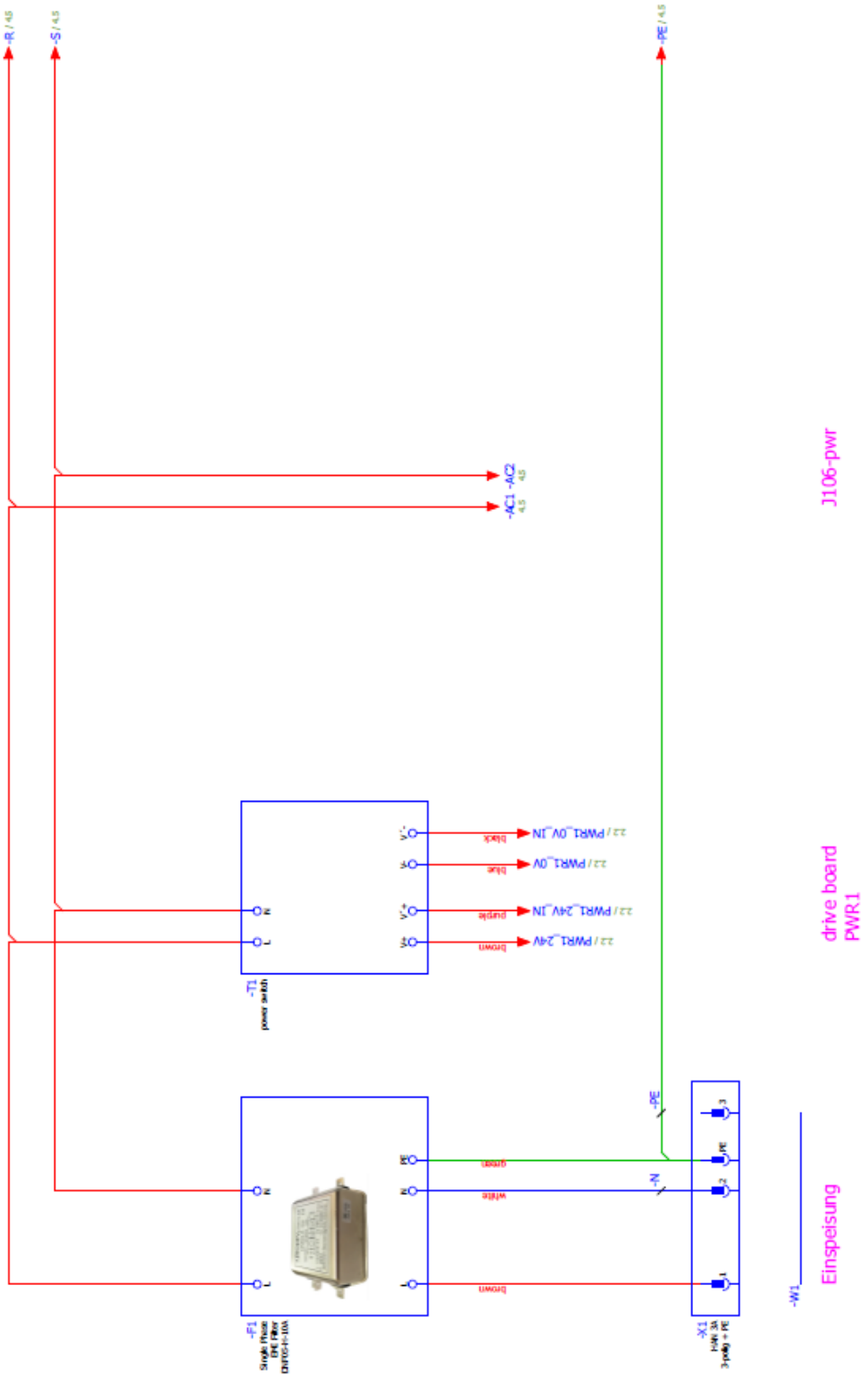
General Manager Liftkon GmbH

22 Annex

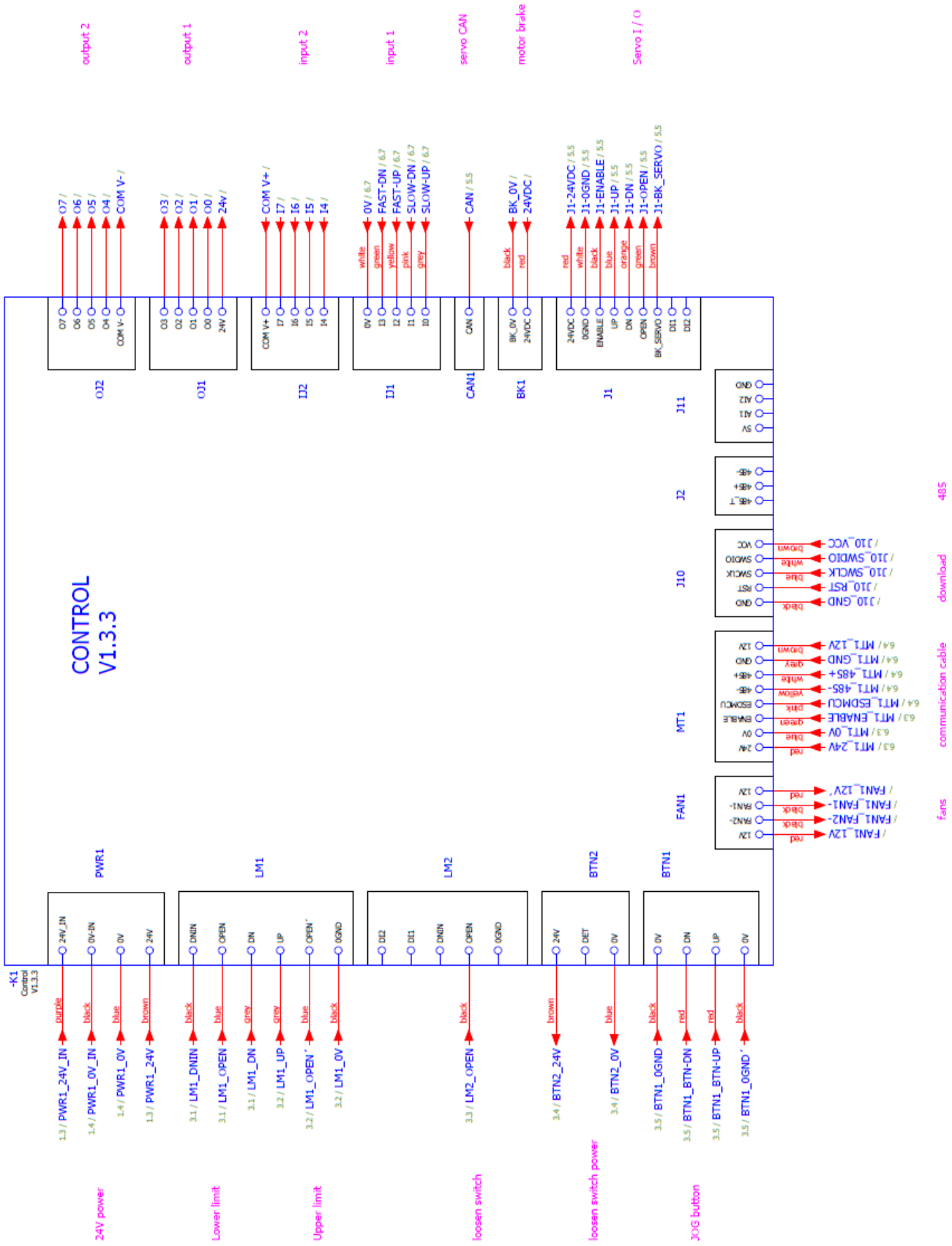
22.1 Connection diagram

(EPLAN-No. 2003121775 / status: 07.055.2023)

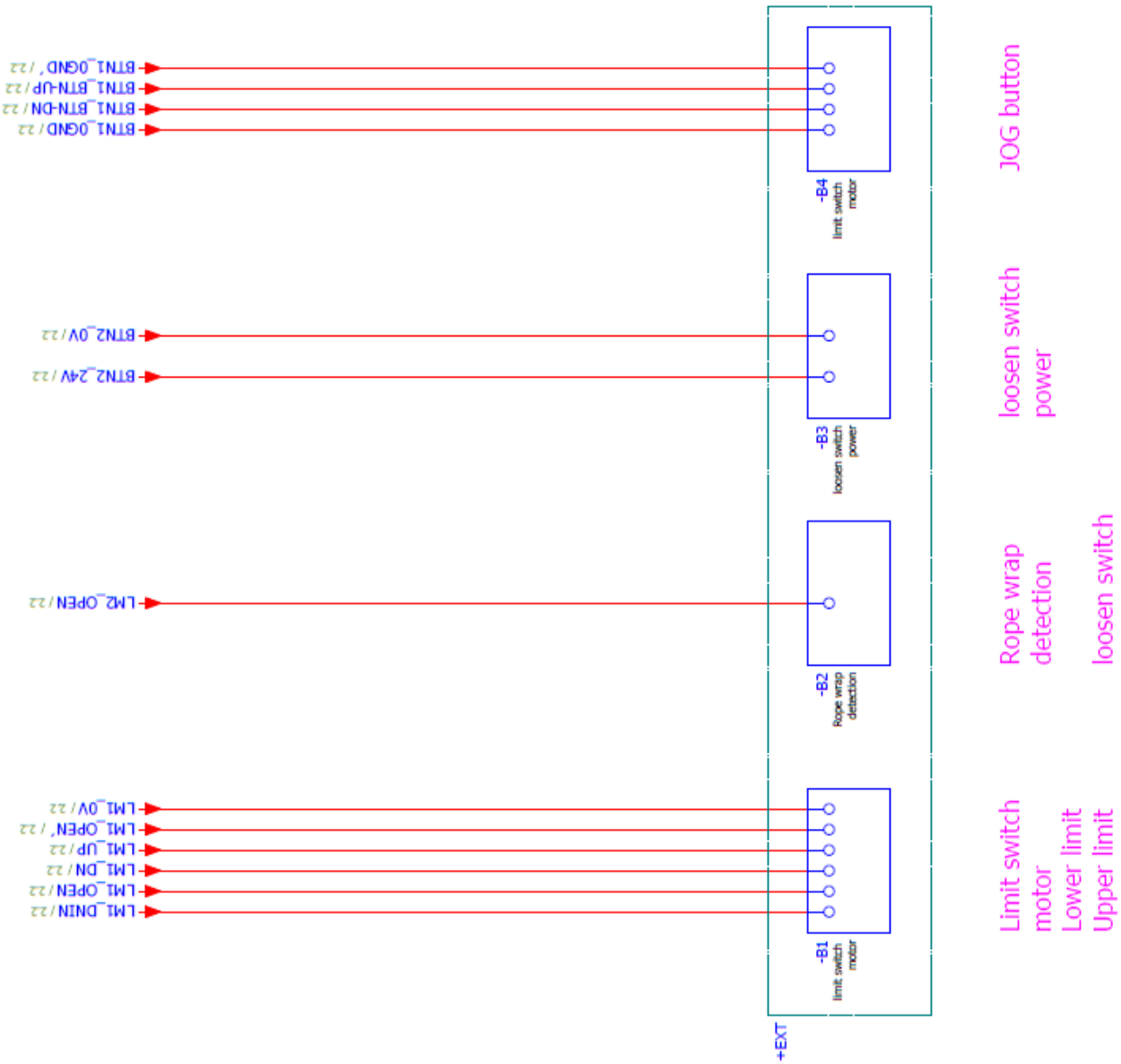
22.1.1 Power Supply



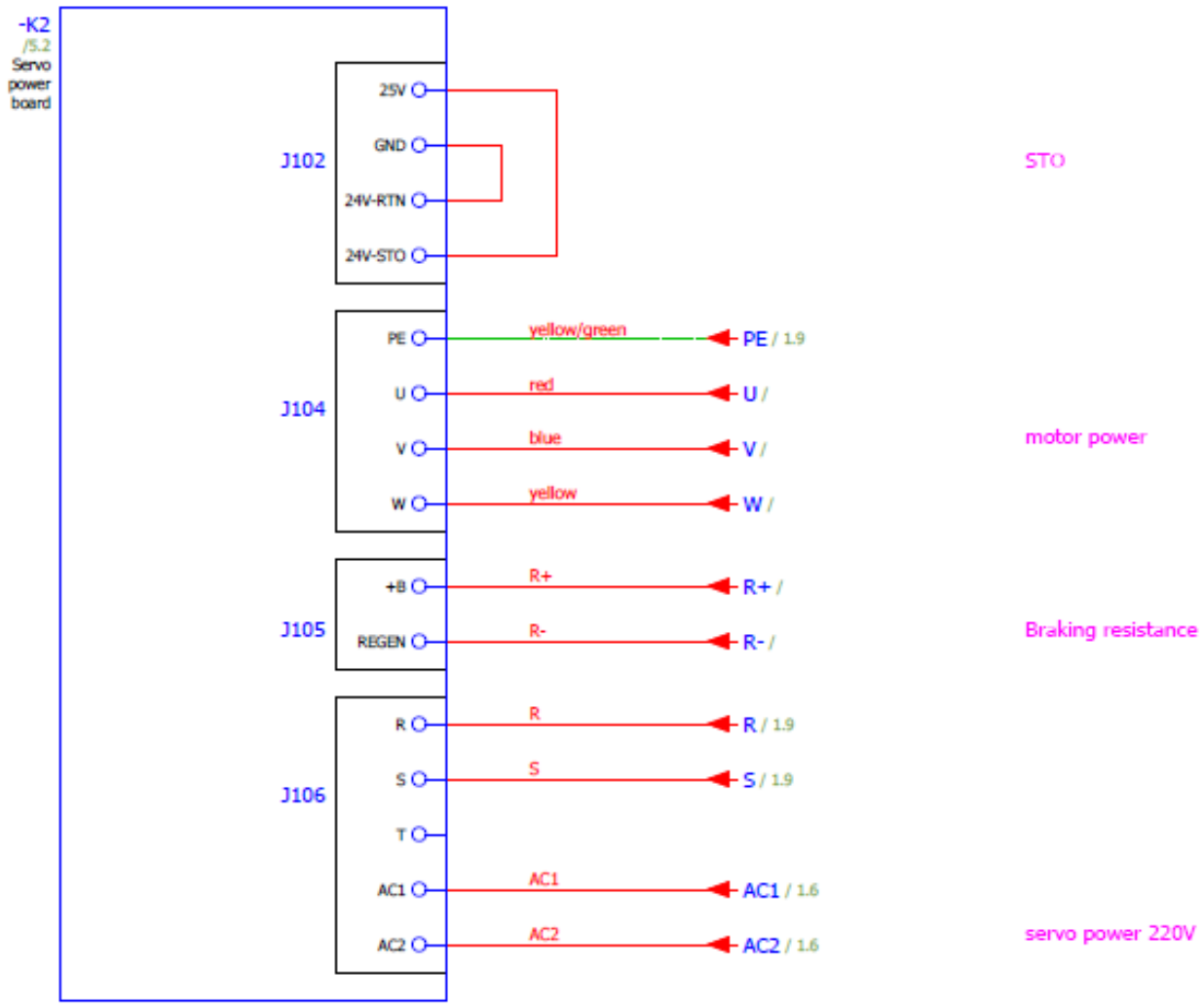
22.1.2 Control



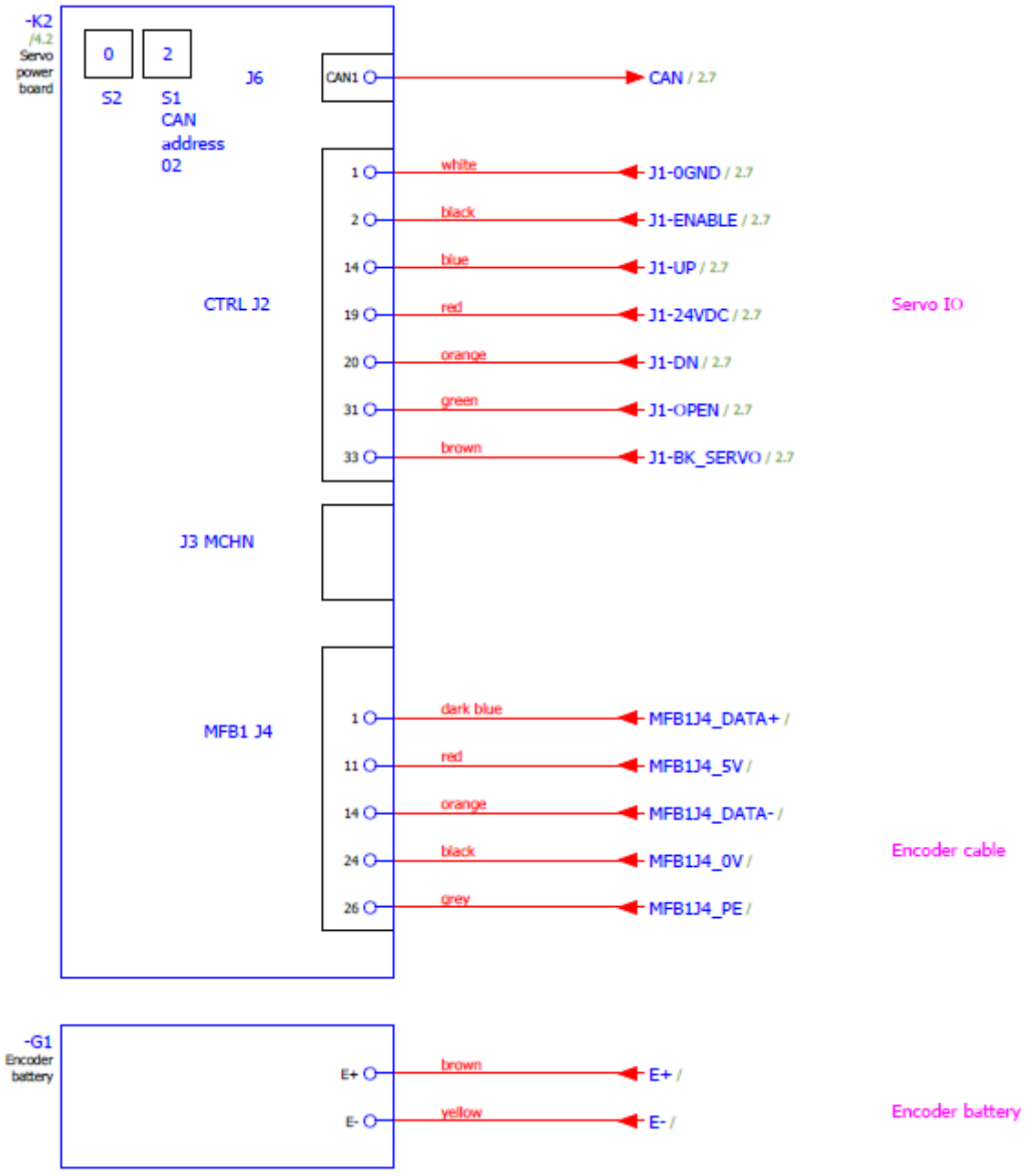
22.1.3 Sensors



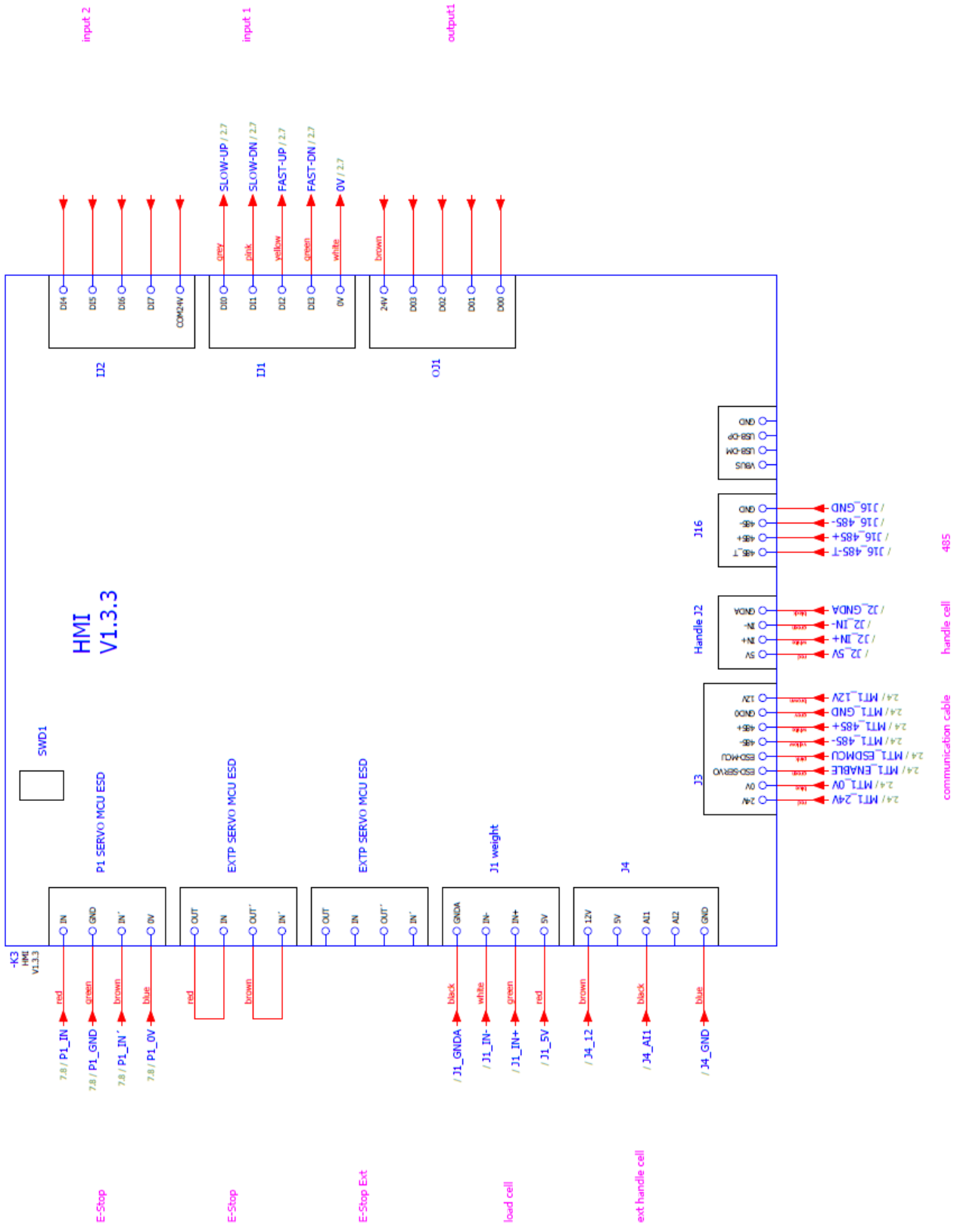
22.1.4 Control – Servo power board



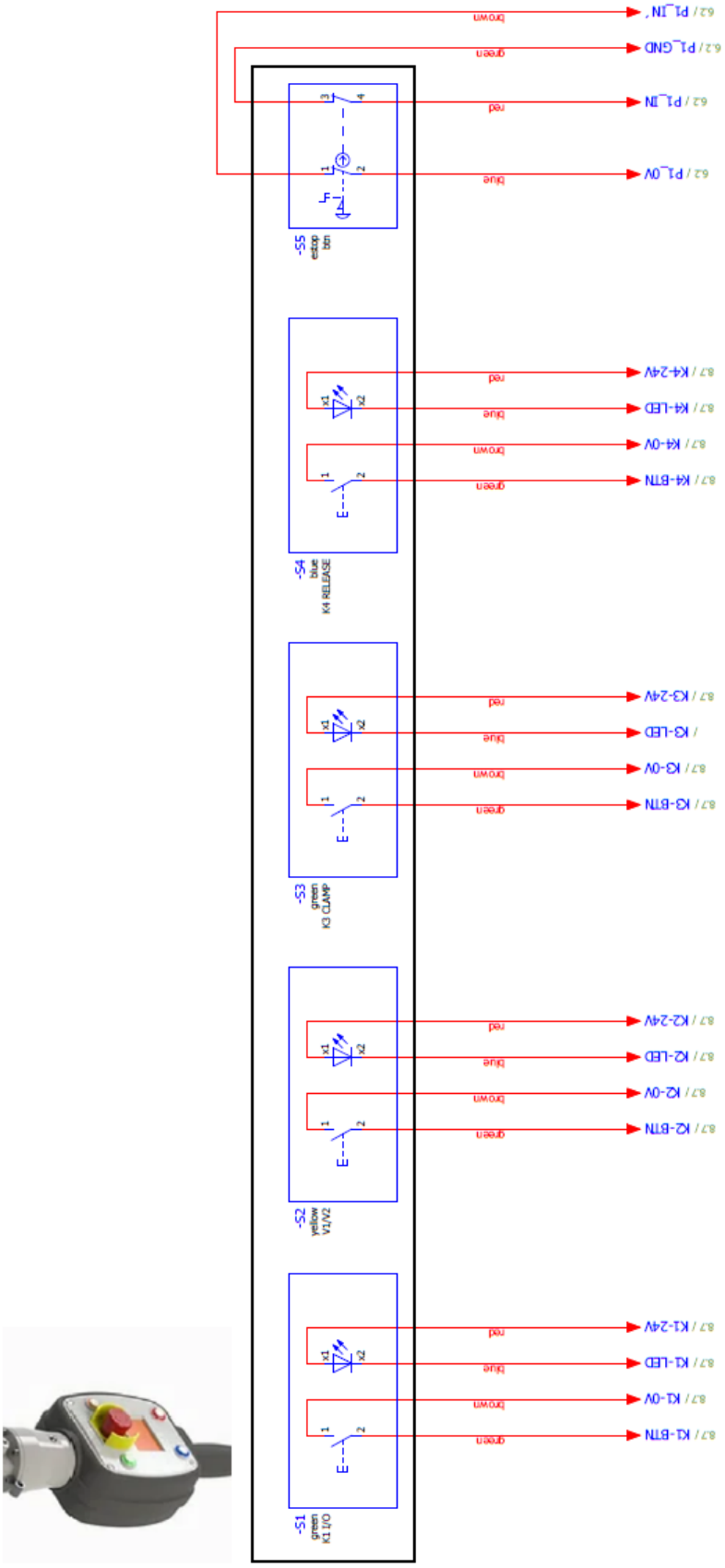
22.1.5 Control Servo power board



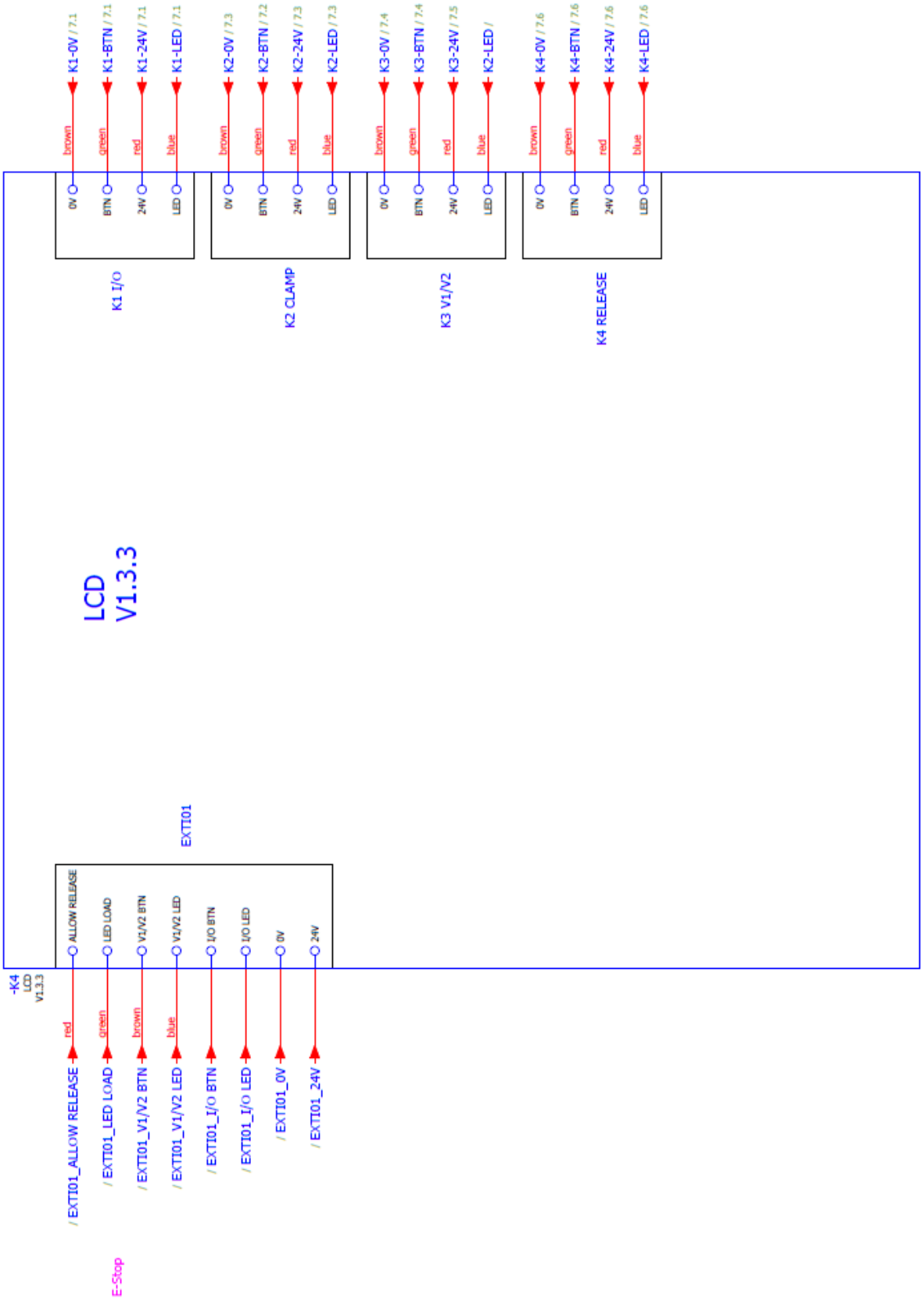
22.1.6 Control – HMI V1.3.3



22.1.7 Button


-S5
estop
btn
-S4
blue
K4 RELEASE
-S3
green
K3 CLAMP
-S2
yellow
V1/V2
-S1
green
K1 I/O
brown
green
red
blue
6.2 / P1_IN'
6.2 / P1_GND
6.2 / P1_IN
6.2 / P1_0V
8.7 / K4+24V
8.7 / K4-LED
8.7 / K4-0V
8.7 / K4-BTN
8.7 / K3-24V
/ K3-LED
8.7 / K3-0V
8.7 / K3-BTN
8.7 / K2-24V
8.7 / K2-LED
8.7 / K2-0V
8.7 / K2-BTN
8.7 / K1-24V
8.7 / K1-LED
8.7 / K1-0V
8.7 / K1-BTN

22.1.8 LCD control V1.3.3



22.1.9 List of materials of the Article

Betriebsmittelkennzeichen	Menge	Bezeichnung	Typnummer	Hersteller	Artikelnummer
=BA Liftkon -F1	1	Single Phase EMI Filter	DNF05	AERODEV ELECTROMAGENTIC TECH.INC	AET.DNF05-H-10A
=BA Liftkon -G1	1	Encoder battery			Encoder battery
=BA Liftkon -K1	1	Circuit board	V1.3.3	Liftkon	Control V1.3.3
=BA Liftkon -K3	1	Circuit board	V1.3.3	Liftkon	HMI V1.3.3
=BA Liftkon -K4	1	Circuit board	V1.3.3	Liftkon	LCD V1.3.3
=BA Liftkon -S1	1	Vandalproof Pushbutton	CMI10	Metzler GmbH	CMI10 green
=BA Liftkon -S2	1	Vandalproof Pushbutton	CMI10	Metzler GmbH	CMI10 yellow
=BA Liftkon -S3	1	Vandalproof Pushbutton	CMI10	Metzler GmbH	CMI10 green
=BA Liftkon -S4	1	Vandalproof Pushbutton	CMI10	Metzler GmbH	CMI10 blue
=BA Liftkon -S5	1	Emergency stop button		Metzler GmbH	estop
=BA Liftkon -T1	1	power switch		Mean Well	power switch

22.2 Load hook

22.2.1 EU declaration for load hook

GUNNEBO Industries

EU Declaration of incorporation:
EG-Deklaration gällande:
EY-vaatimustenmukaisuusilmoitus tuotteille:
Samsvarserklæring:

- **Lifting Components**
- **Lyftkomponenter**
- **Nostokomponentit**
- **Løftekomponenter**

EN: This product can be used as part of CE-marked lifting assembly. It must not be put into service until the full assembly into which it is incorporated has been declared in conformity with the provisions of 2006/42/EC.

SV: Levererade lyftkomponenter kan användas som ingående detaljer i ett CE-märkt lyftredskap. Komponenterna får inte tas i bruk förrän hela det sammansatta lyftredskapet försäkrats vara i enlighet med bestämmelserna i maskindirektivet 2006/42/EG.

SF: Toimitettuja nostokomponentteja voidaan käyttää osana CE-merkittyä nostolaitetta. Komponentteja ei saa ottaa käyttöön ennen kuin täydellisesti kootun nostolaitteen on todettu vastaavan konedirektiivin 2006/42/EY vaatimuksia.

NO: De leverte løftekomponenter kan anvendes som bestanddeler i et CE-merket løfteredskap. Komponentene kan ikke taes i bruk før hele det sammensatte løfteredskapet attesteres å være i samsvar med bestemmelsene i den norske maskinforskriften (FOR 2009-05-20 nr 544) og EUs maskindirektiv (2006/42/EC).

EU Declaration of conformity:
EG-Försäkran gällande:
EY-vaatimustenmukaisuusvakuutus tuotteille:
Samsvarserklæring:

- **CE-marked Lifting equipment**
- **Sammansatta lyftredskap**
- **Valmiiksi kootut nostolaitteet**
- **Sammensatte løfteredskap**

EN: We declare that the delivered CE-marked lifting equipment follows the provision of the Machinery Directive 2006/42/EC.

SV: Vi försäkrar att levererade CE-märkta lyftredskap följer maskindirektivet 2006/42/EG.

SF: Vakuutamme, että toimitetut CE-merkityt nostolaitteet noudattavat konedirektiivin 2006/42/EY vaatimuksia.

NO: Vi attesterer at det leverte CE-merkede løfteredskapet er i samsvar med den norske maskinforskriften (FOR 2009-05-20 nr 544) og EUs maskindirektiv (2006/42/EC).

22.2.2 Load hook EKN

N.º de art.	Denominación	Capacidad de carga en toneladas*	L	B	R	F	G	H	Peso kg
Z101128	EKN-6-10	1,5	93	25	23	10	17	20	0,4

Table 9 - Load hook specification

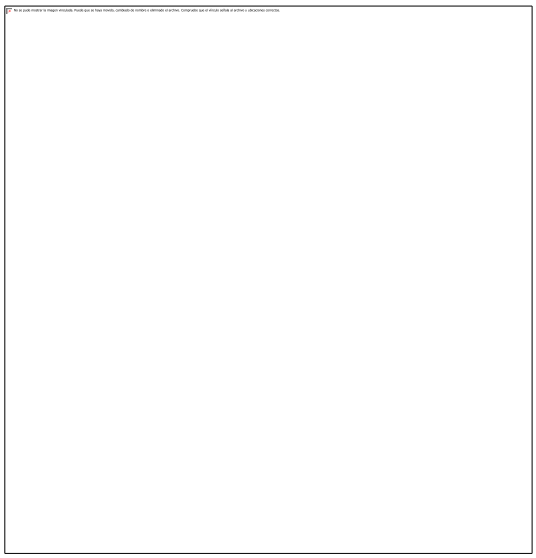


Fig. 23.1
Eyelet hook with adapter part

22.3 Certification of steel cable

TÜV NORD

ZERTIFIKAT

für das Managementsystem nach
DIN EN ISO 9001 : 2015

Der Nachweis der regelwerkskonformen Anwendung wurde erbracht und wird gemäß
TÜV NORD CERT-Verfahren bescheinigt für

Engelmann Drahtseilfabrik GmbH
Eckenerstraße 7
30179 Hannover
Deutschland

ENGELMANN
Vom Hofe Group

Geltungsbereich

Herstellung und Vertrieb von Feinseilen, Stahldrahtseilen und Lastaufnahmemitteln, Prüfen von Lastaufnahmemitteln

Zertifikat-Registrier-Nr. 04 100 011773-005
Auditbericht-Nr. 3522 8090

Gültig von 2019-02-15
Gültig bis 2022-02-14

Zertifizierungsstelle
der TÜV NORD CERT GmbH

Essen, 2019-01-25

Diese Zertifizierung wurde gemäß TÜV NORD CERT-Verfahren zur Auditierung und Zertifizierung durchgeführt und wird regelmäßig überwacht. Dieses Zertifikat ist gültig in Verbindung mit dem Hauptzertifikat.

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de

IAF

DAkkS
Deutsche
Akkreditierungsstelle
D-ZM-12007-01-01

22.4 Protocol

22.4.1 Commissioning / testing protocol (2 pages)

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Service user of the unit (company): _____

Headquarters (street/floor/hall/building): _____

_____

_____

o Statement of Conformity present

Test before commissioning

The acceptance test has been performed. [1)]

Commissioning is possible
- o No objections.
- o Objections (see inspection report).

The check is
- o necessary.
- o unnecessary.

_____

Place / date Signature of appraiser executing company / inspection authority

[1)] If necessary, indicate defects found on the 'Commissioning Inspection Report' page.

Verification

The check has been carried out. [1)]

Commissioning is possible
- o No objections.
- o Objections (see inspection report).

A further check is
- o necessary.
- o unnecessary.

_____

Place / date Signature of the auditor executing company / inspection authority

[1)] If necessary, indicate defects found on the 'Commissioning Inspection Report' page.

If deficiencies are detected during commissioning or post-commissioning inspection, they should be indicated here.

Order no. 3

Serial number:		Type:		Year of manufacture:	

Inspection report	The defect has been corrected	
	on (date)	manager (signature)

O The unit service user has taken this into consideration.

Place / date signature of service user

22.4.2 Assembly protocol (2 pages)

The assembly protocol must be completed when a column unit is installed.

3arm order no.

Serial number:		Type:		Year of manufacture:	

Service user of the unit (company): _____

Headquarters (street/floor/hall/building): _____

Installation management:

Installation company
Street / town:

Installer:

Anchor bolt

Code: (e.g. BZ 10-10/90 A4 or VMU-A 10-10/110 + VMU-SH 16 × 100 + VMU 345)

Registration number:

Trackability Number

Anchor bolt / bar: _____ Injection mortar / cartridge: _____

Anchor surface

Concrete C _____ / _____ B _____ / _____

Masonry: _____ Thickness: _____

Drilling

Drilling ø: _____ Drilling depth: _____

Drill tested (test mark). ☐ Yes ☐ No Impact Drilling: ☐ yes ☐ no

Depth stop: ☐ Yes ☐ No Wet drilling: ☐ yes ☐ no

Cleaning of drill hole

Sequence (blowing, brushing): _____ Type of brush / brush ø: _____

Checked with brush calibrator: ☐ yes ☐ no brushed: ☐ by hand ☐ by machine

Air spray: ☐ 500 ml ☐ 750 ml

Depth setting

Projection of the anchor bolt above surface of the floor: _____ mm

Non-supporting layers (plaster, flooring, etc.): _____ mm

Attached piece

Feed hole ø: _____ Mm Thickness: _____ mm

Installation location (possibly with sketch)

Distance from edge

specified by the structural engineer / on the plan: ☐ yes ☐ no on site: ☐ yes ☐ no

Distances between axes

specified by the structural engineer / on the plan: ☐ yes ☐ no on site: ☐ yes ☐ no

Sketch)

Chemical fittings

Expiry date: _____

Temperature of the cartridge / tape cartridge _____ °C.

Temperature in the floor: _____ °C.

Cartridge system with percussion drill: ☐ yes ☐ no

Excess mortar in the mouth of the drill hole: ☐ yes ☐ no

Time until delivery at the time of installation: _____ min.

Date: _____

Signature of installer: _____

Signature by site management: _____

22.4.3 Electrical testing protocol

An electrical testing protocol should be drafted for commissioning, as a repeat test, following repair and after significant modifications.

Serial number:		Type:		Year of manufacture:	

3arm order no.: _____

Client / service user (address):	Contractor/auditor (address):
Contact:	Auditor:

Testing in accordance with:
VDE 0701-0702

Visual inspection, measurement and checking:
Measuring instruments used in accordance with DIN VDE 0404 or DIN EN 61557 Part 2, Part 4, or DIN EN 61010 Part 1: BENNING ST 725

No.	Test object	ID number	Test procedure	Test date	Visual inspection approved. Yes / no	RPE protective conductor resistance [Ω]	Insulation resistance RISO [MΩ]	Leakage Current Replaced (IEA), direct, differential measurement IPE [mA] IBer [mA]		Cable test approved Yes/No.	FI/RCD test t[ms] a = approved na = not approved	Functional Test approved Yes / No.	Electrical Test approved Yes/No.	Complete test approved Yes/No.	Next test date
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

22.4.4 Operational staff instruction protocol (2 pages)

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Unit service user (company address):

_____

_____

_____

Place of training (company / address):

_____

_____

_____

Content of training

A demonstration of the above-mentioned lifting equipment was made and operational personnel were trained in the following:

O Description of Spider functions

O Description of menu functions

O Instruction in basic settings, operator level

O Others:

_____

_____

_____

_____

Duration of training

Date (Day 1 – DD/MM/YY): _____ schedule (from-to): _____

Date (Day 2 – DD/MM/YY): _____ schedule (from-to): _____

Date (Day 3 – DD/MM/YY): _____ schedule (from-to): _____

3arm Manager* (write in capital letters): _____

Participants*: (please note / block capitals)	Signature: (signature)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Place / date

Signature of 3arm supervisor*

22.5 Inspection and maintenance protocols

22.5.1 Protocol for daily inspection of lifting device

The lifting device should be checked daily, if possible, at the start of the working shift.

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Daily inspection

Week (natural) / year: _____

(please note)

Kontrollpunkt	Beschreibung der Maßnahme	Montag	Dienstag	Mittwoch	Donnerstag	Freitag	Samstag	Sonntag
Sichtkontrolle Gesamtzustand								
Seil	Auf Beschädigungen prüfen.							
Bedieneinheit	Handgriff auf Funktion und Leichtgängigkeit prüfen.							
Spiralkabel	Prüfen, ob Spiralkabel intakt.							
Druckluftschlauch (falls vorhanden)	Prüfen, ob Druckluftschlauch intakt.							
Auf- und Abwärtsbewegung	Keine auffälligen Geräusche.							
Antrieb	Ohne mechanische Geräusche.							
Horizontale und vertikale Bewegungen	Mit geringem Kraftaufwand durchführbar.							
Funktionstest								
	Unterschrift							

The protocol is to be completed as follows:

OK: The lifting device meets the corresponding functional requirement.

X: The lifting device does not meet the corresponding functional requirement.
In this case, the equipment is not able to be used. The supervisor and/or repair staff should be notified.

After the inspection and the corresponding annotations in the protocol, the person doing the inspection must sign on the corresponding days.

22.5.2 Inspection protocol for lifting device one month after installation

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Inspection one month after installation
Date of installation: _____
Date of inspection: _____
(please note)

Control point	one month after installation
Tighten floor, ceiling or wall anchor points.	
Signature:	

The protocol is to be completed as follows:

OK: The lifting device meets the corresponding functional requirement.

X: The lifting device does not meet the corresponding functional requirement.
In this case, the equipment is not able to be used. The supervisor and/or repair staff should be notified.

After the inspection and the corresponding annotations in the protocol, the person doing the inspection must sign.

22.5.3 Maintenance protocol for lifting device every three months

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Maintenance work every 3 months

Year: _____

(please note)

Kontrollpunkt	Beschreibung der Maßnahme	Jan	Feb	März	Apr	Mai	Juni	Juli	Aug	Sept	Okt	Nov	Dez
Motoreinheit	Getriebegehäuse auf Ölaustritt prüfen. Bei Ölaustritt sofort Liftkon GmbH informieren.												
Arme	Optische Prüfung der Arme auf Risse, Beulen oder sonstige Beschädigungen.												
Seil	Komplettes Seil auf Verschleiß, wie Drahtbruch, Rost, Formveränderungen, Beschädigungen prüfen.												
Kabel	Anschluss der Kabel (Kopfstecker) muss unbeschädigt sein.												
Spiralkabel	Prüfen, ob Spiralkabel unbeschädigt ist. Bei auftretenden Beschädigungen muss es ausgetauscht werden.												
Drehgelenke	Alle Drehgelenke (Säule, Lastaufnahmemittel) sind in beide Richtungen problemlos drehbar.												
Druckluftschlauch (falss vorhanden)	Druckluftschlauch ist unbeschädigt und nicht eingeklemmt.												
Not-Halt	Not-Halt darf keine Beschädigungen aufweisen. Not-Halt betätigen. Das Hebegerät darf keine Bewegung durchführen. Not-Halt muss anschließend wieder zurückgesetzt werden.												
Verschraubungen	Prüfen der systemrelevanten Verschraubungen auf Festsitz und Vorhandensein an Lastaufnahmen (wie z.B. Haken, Anschlaggelemente) oder Greifmitteln.												
	Unterschrift												

The protocol is to be completed as follows:

OK: The lifting device meets the corresponding functional requirement.

X: The lifting device does not meet the corresponding functional requirement.
In this case, the equipment is not able to be used. The supervisor and/or repair staff should be notified.

After the inspection and the corresponding annotations in the protocol, the performer of the inspection must sign in the corresponding month.

22.5.4 Maintenance protocol for lifting device every year

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Annual maintenance work (12 months)

From year _____ to year _____

(please note)

Kontrollpunkt	Beschreibung der Maßnahme	1. Jahr	2. Jahr	3. Jahr	4. Jahr	5. Jahr	6. Jahr	7. Jahr	8. Jahr	9. Jahr	10. Jahr	11. Jahr	12. Jahr
Motoreinheit	Kontrollieren der Kühlrippen auf Sauberkeit und Funktion.												
Säulengerät: Befestigung am Boden	Kontrollieren der Befestigungen am Boden auf Festsitz und Beschädigungen.												
Schienengerät: Befestigung in Schiene	Kontrollieren der Befestigung des Arms.												
Aufhängungen	Es liegen keine Beschädigungen vor.												
Arm	Sämtliche Teile sind unbeschädigt. Kontrollieren, ob Umlenkrollen unbeschädigt sind und leicht laufen.												
Druckluft	Anschlüsse der Druckluftversorgung und Schlauch sind dicht.												
Allgemein	Eingestellte Werte, wie z.B. oberer und unterer Stopp sind korrekt.												
Sachkundigenprüfung	Die Prüfung ist gemäß der aufgeführten Beschreibung durchzuführen.												
	Unterschrift												

The protocol will be completed as follows:

OK: The lifting device meets the corresponding functional requirement.

X: The lifting device does not meet the corresponding functional requirement.
In this case, the equipment is not able to be used. The supervisor and/or repair staff should be notified.

After the inspection and the corresponding annotations in the protocol, the person doing the inspection must sign in the corresponding month.

22.5.5 Protocol for maintenance work: Change of steel cable

Changing the steel cable must be carried out, coordinated or supervised by a trained expert or appraiser. The commissioning below can only be carried out by an appraiser who has ascertained that the unit is in optimum working order.

The frequency with which a cable must be replaced is defined by the number of hours of use and the height of the load. The data shown in table 8 are recommendations.
The steel cable should be checked regularly as described in the protocols above in this chapter, and replaced immediately if worn or damaged.

To do that, see the fitting instructions in chapter 21, Fitting of spare parts.

Use in hours Load	40 hours/week	80 hours/week	168 hours/week
up to 50 kg (incl. load lifting device)	1 every 48 months*	1 every 24 months*	1 every 12 months*
up to 100 kg (incl. load lifting device)	1 every 24 months*	1 every 12 months*	1 every 6 months*
up to 200 kg (incl. load lifting device)	1 every 16 months**	1 every 8 months**	1 every 4 months**
up to 300 kg (incl. load lifting device)	1 every 24 months***	1 every 12 months***	1 every 6 months***

Fig. 23.2
Recommendations for change of cable

* based on a cycle time of 1 min. (i.e. 60 ascent movements/hour)

** based on a cycle time of 2 min. (i.e. 30 ascent movements/hour)

*** based on a cycle time of 5 min. (i.e. 12 ascent movements/hour)

NOTE:
If the steel cable is replaced at times in addition to the recommended times, then this must be recorded in the protocol.

The person responsible for the cable change signs under the corresponding month once the cable change has been made.

3arm order no.: _____

Serial number:		Type:		Year of manufacture:	

Year: _____
(please note)

	January	February	March	April
Signature:				
	May	June	July	August
Signature:				
	September	October	November	December
Signature:				

Year: _____
(please note)

	January	February	March	April
Signature:				
	May	June	July	August
Signature:				
	September	October	November	December
Signature:				

Year: _____
(please note)

	January	February	March	April
Signature:				
	May	June	July	August
Signature:				
	September	October	November	December
Signature:				

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