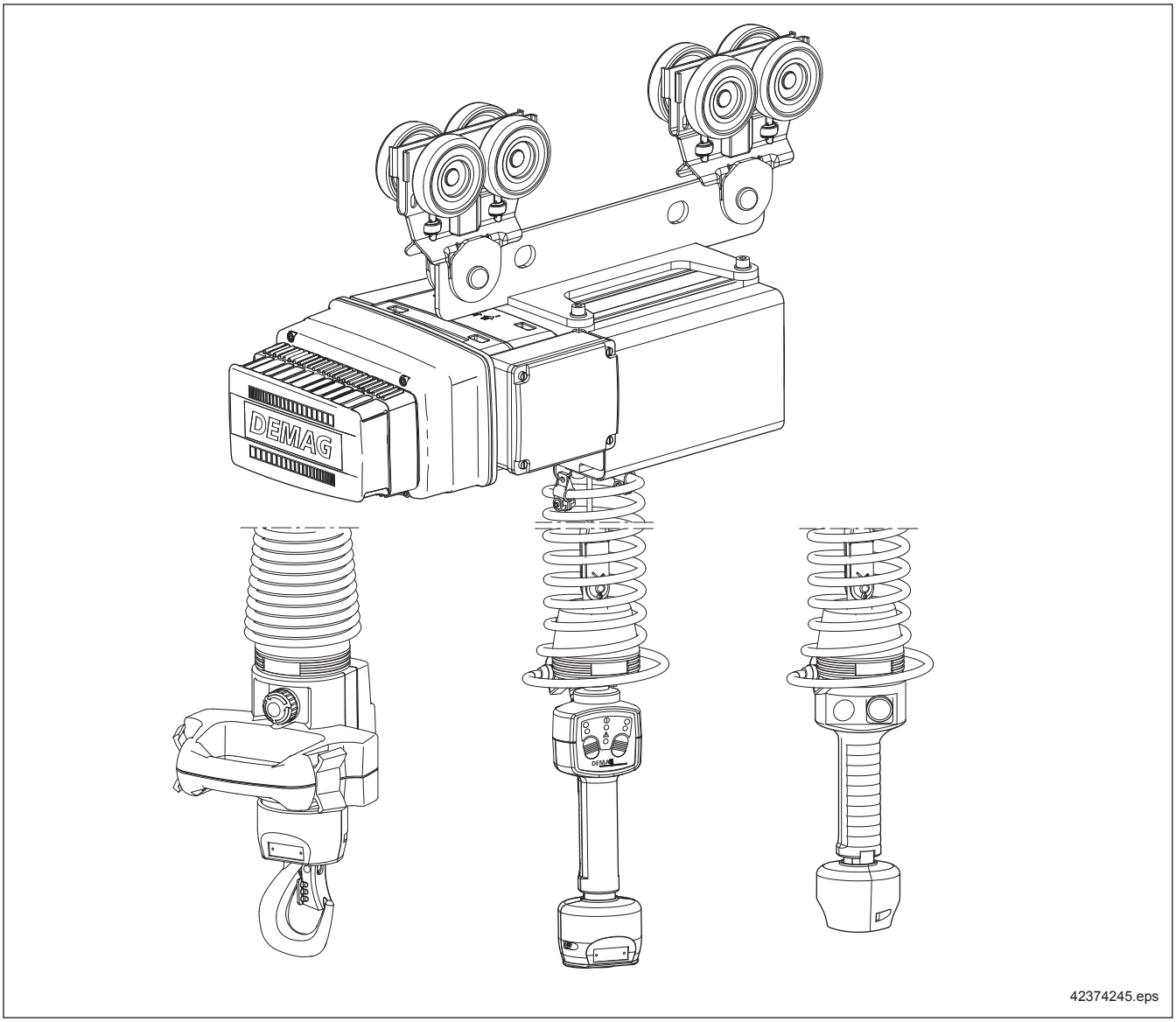
DEMAG
Cranes & Components

Operating instructions

Demag SpeedHoist D-SH



Translation of original operating instructions

Manufacturer
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Please fill in the following table before first putting the unit into service.
This provides you with a definitive documentation of your manipulator and important information if you ever have to contact the manufacturer or his representative.

Owner	
Where in use	
Size	
Serial number	
Ident. no.	

Contents

1 General

1.1 Information on the Demag Speedhoist D-SH

You have purchased a Demag product.

This Demag SpeedHoist D-SH was manufactured in accordance with the relevant European standards and regulations.

The Demag SpeedHoist D-SH complies with the statutory regulations e.g. EC machinery directive 2006/42/EC.

The D-SH is of modular design.

The main assemblies include:

- Gearbox
- Hoist motor
- Integrated electrics
- Rope reeving components
- D-Grip/rocker switch/DSM Manulift

These operating instructions are designed to provide the operator with appropriate instructions for safe and correct operation and for maintenance.

Every individual given the task of transporting, installing, commissioning, operating, maintaining and repairing the D-SH hoist and its additional equipment must have read and understood

- the operating instructions
- the safety regulations and
- the safety instructions in the individual chapters and sections.

The operating instructions must be available to the operating personnel at all times in order to prevent operating errors and to ensure smooth and trouble-free operation of our products.

With the D-SH hoist you have purchased a product which offers various benefits:

- Infinitely variable speed control,
- Precise positioning,
- Rocker switch and DSM Manulift with progressive characteristic,
- Smooth load pick-up and deposit,
- Smooth starting and braking,
- Low-vibration operation,
- Acceleration and braking ramps ensure low load sway,
- Direction of rotation monitoring via integrated speed feedback,
- Overload cut-off,
- Automatic switching-over to creep lifting speed before the upper / lower limit position is reached,
- Frequency-inverter control with 24 V control voltage integrated into the D-SH hoist electrical enclosure,
- Temperature monitoring,
- Phase insulation,
- Optimized guiding of load handling attachments with the D-Grip, rocker switch or Manulift handle,
- The D-Grip and the rocker switch can be fitted in a load handling attachment at a favourable ergonomic position,
- Further benefits, e.g.:
  - Elapsed operating time counter can be read from the outside,
  - Operating limit switch for highest and lowest hook position,
  - Slipping clutch with automatic cut-out by means of speed monitoring,
  - Diagnosis interface for service purposes.

D-SH hoists are supplied ready for operation.

In addition hoist speed, acceleration and braking ramp can be programmed to meet specific application requirements.

1.2 Information on the operating instructions

These operating instructions are designed to provide the owner with appropriate instructions for safe and correct operation and for maintenance. These operating instructions are an integral part of the D-SH hoist.

Every individual given the task of transporting, installing, commissioning, operating, maintaining and repairing D-SH hoists and their additional equipment must have read and understood the items listed in the following:

- the operating instructions
- the safety regulations
- the safety instructions in the individual chapters and sections.

The operating instructions must be available to the operating personnel at all times in order to prevent operating errors and to ensure smooth and trouble-free operation of our products. They must be kept available in the immediate vicinity at all times.

The D-SH hoist may only be operated by personnel who are fully familiar with the operating instructions.

If special designs or additional options are ordered or the latest technical modifications are incorporated, the actual scope of supply may deviate from the data and information as well as from the illustrations described here. If you have any questions, please contact the manufacturer.

NOTE

Based on EC Machinery Directive 2006/42/EC, the D-SH hoist is also designated as a machine in the following in the sense of completed machinery. This always refers to all possible types of the D-SH hoist.

For a D-SH hoist delivered ready for operation in the sense of a complete machine, we confirm conformity with the requirements of the EC Machinery Directive 2006/42/EC by means of the attached EC declaration of conformity.

A declaration of incorporation is attached for partly completed D-SH hoists which are assembled with additional parts to create a machine ready for operation.

The declaration of incorporation refers to the scope of delivery of the partly completed or non-assembled machinery. Before putting the unit into operation, the user must take additional measures in order to fulfill the safety requirements for the machine and issue the declaration of conformity for the machine that is ready for operation.

1.3 Symbol/signal words

Important safety information and instructions are marked by corresponding symbols and signal words.

The safety instructions must be followed. Please exercise particular caution to ensure that accidents, injuries and damage are avoided in such cases.

The relevant local accident prevention regulations for the application and general safety instructions must also be complied with.

The following symbols and instructions warn against possible personal injuries or damage to property and are intended to assist you in your work.

DANGER

This symbol indicates an immediate danger which results in serious injury or death.

WARNING

This symbol indicates a potentially dangerous situation which may result in serious injury or death.

CAUTION

This symbol indicates a possibly hazardous situation which might result in medium to light injury.

NOTE

Operating hazard for the machine

- This symbol indicates information on the appropriate use of the machine.
- Non-compliance may result in malfunctions, damage or pollution of the environment.

1.4 Liability and warranty

All information included in these operating instructions has been compiled on the basis of the relevant regulations, state-of-the-art engineering principles and our many years of experience.

NOTE

These operating instructions must be read carefully before starting any work on and with the machine, especially before the machine is put into service for the first time. The manufacturer assumes no liability for any damage which results from the following:

- Non-compliance with the operating instructions
- Inappropriate use of the machine
- Operation by insufficiently trained personnel
- Unauthorized conversions
- Any technical modifications

Wearing parts are not subject to liability for defects.

We reserve the right to incorporate technical modifications within the scope of improving the operating characteristics and further development of the machine.

1.5 Copyright

These operating instructions must be treated confidentially. They are only intended to be used by people who work with or on the machine.

Any and all content, texts, drawings, images and any other information are protected within the sense of copyright law and are subject to further industrial rights. Any misuse is an offence.

No part of this documentation, in whole or in part, may be reproduced, distributed, shown in public or used in any other way without specific prior consent. Infringements are an offence resulting in obligatory compensatory damages. Further rights reserved.

All industrial rights reserved.

1.6 Spare parts

Only genuine Demag spare parts may be used.

CAUTION
Defective spare parts

Incorrect or defective spare parts may cause damage, malfunctions or complete failure of the machine.

Only use genuine spare parts or parts approved by Demag.

For safety-relevant wear parts, genuine Demag spare parts must always be used.

Safety-relevant wear parts are, for example, brake linings, ropes, etc.

The use of spare parts which have not been approved renders any claims for guarantee, service, damages or liability against the manufacturer or his appointed personnel, dealers and representatives null and void.

1.7 Terms and definitions

Owner

Owners (employer, company) are defined as persons who own D-SH hoists and who use them appropriately or allow them to be operated by suitable persons.

Operating personnel/operator

Operating personnel or operators are defined as persons entrusted by the owner of the D-SH with operation and/or transportation of the equipment.

Specialist personnel

Specialist personnel are defined as persons assigned by the owner to carry out special tasks such as installation, setting-up, maintenance and fault elimination.

Qualified electrician

Qualified electricians are defined as persons who, owing to their technical training, knowledge and experience of electrical installations as well as knowledge of the relevant standards, codes of practice and regulations, are able to assess the tasks given to them and to identify and eliminate potential hazards.

Trained person

Trained persons are defined as persons who have been instructed and trained for the tasks assigned to them and on the possible hazards resulting from incorrect handling and who have been informed about the required protective devices, protective measures, relevant regulations, codes of practice, accident prevention regulations and operating conditions and who have proven their qualifications.

Experienced technician

Experienced technicians are defined as persons, who, owing to their technical training and experience, have sufficient knowledge of D-SH hoists and are familiar with the relevant national industrial safety regulations, codes of practice, accident prevention regulations, directives and generally accepted engineering standards enabling them to judge the safe operating condition of D-SH hoists.

Assigned expert engineer (in the Federal Republic of Germany according to BGV 8, § 23, for determining the S.W.P.)

An assigned expert engineer is defined as an experienced technician specifically assigned by the manufacturer to determine the remaining duration of service (service life) of the D-SH hoist (S.W.P. = safe working period) and to carry out a general overhaul of the D-SH hoist.

Authorized expert engineer (according to BGV D6, § 28 in Germany)

In addition to the expert engineers of the Technical Supervisory and Inspection Board, an authorized expert engineer for the inspection of the D-SH hoist is defined as an expert engineer authorized by the Industrial Employers' Mutual Insurance Association.

Demag SpeedHoist D-SH

D-SH hoists are systems used for lifting, lowering and moving loads. They can also be used in cranes, crabs and travelling hoist units, rail systems and other installations.

1.8 Test and inspection booklet

A test and inspection booklet filled in with all details must be available for every D-SH hoist. The results of the regular tests and inspections must be entered into the test and inspection booklet and must be certified by the inspector. Test and inspection booklet order no.: see page 5 “Accompanying documents”.

1.9 After-sales service

Our after-sales service will provide you with technical information on the D-SH hoist, etc.

Please keep the serial or order number (see test and inspection booklet, load capacity plate on the crane) for any correspondence or spare part orders. Specifying this data ensures that you receive the correct information or the required spare parts.

The relevant after-sales service station of Demag is specified for example on the back page of the D-SH hoist test and inspection booklet.

Manufacturer’s address:

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www.demagcranes.com

1.10 Disposal of machine parts

Unless a return or disposal agreement has been concluded, recycle separated components after proper removal:

- Scrap any remaining metallic material
- Dispose of plastic elements for recycling
- Separate and dispose of any other components by material type

NOTE

Electric scrap, electronic components, lubricants and other auxiliary materials are subject to special disposal regulations and may only be disposed of by certified companies.

National disposal regulations must be considered regarding environmentally friendly disposal of the machine. Further information can be obtained from corresponding local authorities.

2 Safety

2.1 General

The “Safety” chapter provides an overview of all important safety aspects for optimum protection of personnel as well as safe and trouble-free operation of the machine.

At the time of its development and manufacture, the machine was built according to generally accepted engineering standards and is considered to be safe to operate. The machine may still be a cause of danger if it is not used correctly or appropriately by trained personnel.

Knowledge of the contents of the operating instructions is one of the requirements necessary to protect personnel from hazards and to avoid malfunctions and, therefore, to operate the machine safely and reliably.

Any conversions, modifications and additions to the machine are prohibited unless approved in writing by Demag.

2.2 Appropriate use

D-SH hoists may only be used as intended and in compliance with the requirements for the owner resulting from these operating instructions and the following limitations. Any other use may result in a danger to life and limb and/or cause damage.

- D-SH hoists are only intended for lifting, lowering and moving loads and may be used as stationary or travelling units. The maximum safe working load is the load capacity specified on the capacity plate. This must not be exceeded. The maximum safe working load includes the lifted load and dead load (e.g. load handling attachments).
- D-SH hoists may only be installed, operated, maintained and removed when in perfect working order by trained personnel in accordance with the relevant safety and accident prevention regulations. The personnel must meet the requirements according to section 2.5 “Operating personnel requirements”.
- Appropriate use also includes compliance with the safety instructions as well as any other instructions for assembly/disassembly, putting into service, function/operation, maintenance/fault elimination. Furthermore, the instructions on safety devices, protection against hazards and any possible remaining hazards must be complied with.
- The D-SH must only be used in compliance with the permissible technical data, chapter 3 “Technical data”. In particular, the permissible useful load in accordance with these operating instructions must not be exceeded.
- The D-SH must be regularly maintained and inspected in accordance with section 8.3 “Maintenance schedule” in line with the deadlines and appropriately by adequately trained personnel. Wear parts must be replaced in good time in accordance with the frequency and intensity of use.
- Pulling loads at an angle, pulling or dragging loads or pulling free fixed loads is prohibited.
- Transporting people with or people riding on the machine is always prohibited, this does not apply to equipment specially designed for transporting people (see appropriate use of lifting equipment).
- The directives UVV/BGV D8 § 23 (2) and BGV D6 § (1) must not be ignored.

DANGER
By electrical current.

Electrical energy may cause very severe injuries.

- Before carrying out maintenance, cleaning and repair work, switch off the unit and secure it against switching on again.
- Do not remove any safety equipment or render it inoperative by modifications.

The D-SH is industrial equipment to be used with a rated voltage (see type plate).

Power is fed via power supply lines (mobile cables, open or enclosed power conductor systems, cable drums). These systems are live up to the terminals of the main switch (mains connection switch, isolating switch).

The relevant main switches must be switched off and secured when carrying out maintenance/repair work. During operation or when the main switch is not switched off, electrical components inside enclosures, motors, switchgear cabinets, load handling attachments, terminal boxes, etc., carry dangerous voltages. This voltage may cause fatal injuries.

D-SH hoists with D-Grip, rocker switch or DSM Manulift must only be operated if a protective earth conductor is connected. In the event of damage to or interruption of the protective earth conductor connection, the D-SH hoist must be disconnected from the power supply without delay.

Fault-free operation with a current-operated e.l.c.b. (earth-leakage circuit-breaker) is ensured with a tripping current ≥ 30 mA, if residual-current-operated circuit breakers (type B to EN 50178, e.g. Siemens 5SZ3...G00) are used.

Serious personal injury or damage to property may occur in the event of:

- unauthorized removal of covers,
- inappropriate use of the D-SH hoist,
- incorrect operation,
- insufficient maintenance,
- exceeding the maximum permitted load. The rated safe working load is the maximum permitted load. Pay attention to the sum of the load to be lifted and the load handling attachment.
- working on live parts.

No liability for inappropriate use

The manufacturer is exempt from any liability for use other than the purpose which is technically possible and acceptable according to these operating instructions. In particular, the manufacturer assumes no liability for damage due to inappropriate or any other prohibited use of the machine in the sense of section 2.2 “Appropriate use”.

No liability for structural modifications

The manufacturer is not liable for unauthorized structural modifications of the owner which have not been agreed with Demag. This includes incorrect connection of the D-SH hoist to devices or equipment that do not belong to our scope of delivery, or the installation or use of accessories, equipment, sub-assemblies or third-party spare parts that are not approved by the manufacturer.

Depending on the type and scope of the D-SH hoist, it may be necessary to have an inspection carried out by an expert engineer prior to hand-over to the owner.

The D-SH hoist is designed for operation indoors and at temperatures ranging from – 10° to + 40° C. At extreme temperatures and in aggressive atmospheres, the owner must implement special measures after consulting Demag.

Use of the control unit

Lifting and lowering motions are controlled by means of the corresponding control elements on the control unit. The slow speeds are intended for attaching the load, lifting it free and depositing it. Loads can be precisely positioned at slow speeds.

Short transport times can be achieved at higher speeds. They are suitable for motion sequences with a safely suspended load if no hazard can be caused by the faster motion sequences.

NOTE

Inching must be avoided at fast speeds, as it causes increased wear and load sway.

2.3 Hazards that can be caused by the D-SH hoist

The D-SH hoist has been subject to a risk analysis. The design and execution based on this analysis correspond to state-of-the-art engineering principles. However, residual risks remain.

The machine is operated with high electrical voltage.

DANGER
Live components

Danger to life and limb.

Electrical energy may cause very severe injuries. If the insulation or individual components are damaged, there is a danger to life caused by electrical current.

- Before carrying out maintenance, cleaning and repair work, switch off the machine and secure it against switching on again.
- Switch off the power supply before carrying out any work on the electrical equipment. Check to ensure that the components to be replaced are de-energized.
- Do not remove any safety equipment or render it inoperative by modifications.

WARNING
Crushing hazard

During lifting or lowering of loads, there is the danger of crushing parts of the body.

When working on the unit, make sure

- that during lifting or lowering no limbs are drawn-in between rope and rope guide.
- that there are no persons in the immediate danger zone.

WARNING
Suspended load. Falling parts.

Danger to life and limb, if lifted loads are dropped.

It is prohibited for persons to stay in the danger zone.

- Keep a sufficient safety distance.
- Never step under a suspended load.

Certain work and practices are prohibited when using the D-SH hoist as they may involve danger to life and limb and result in lasting damage to the D-SH hoist, e.g.:

- Do not handle the load in an unsafe manner (e.g. swinging the load).
- Do not handle suspended loads above people.
- Do not pull or drag suspended loads at an angle.
- Do not pull free any fixed or obstructed loads.
- Do not exceed the maximum permitted load and permitted load dimensions.
- Do not leave suspended loads unsupervised.
- Do not allow ropes to run over edges.
- Do not use the rope as a load bearing sling.
- Only move a D-SH hoist fitted with push travel trolley by pushing on the D-grip, rocker switch or DSM Manulift – never pull on the helical cable.
- Do not allow loads to drop when the rope is in a slack condition.
- Do not subject the D-Grip to inappropriate mechanical loads.
- Transporting persons is not permissible.
- Do not tamper with or manipulate electrical equipment.

2.4 Responsibility of the owner

Information on safety at work refers to the regulations of the European Union that apply when the D-SH hoist is manufactured. The owner is obliged to ensure that the specified industrial safety measures comply with the latest rules and regulations and to observe new regulations during the entire service life of the D-SH hoist. Local industrial safety legislation and regional regulations and codes of practice applicable at the site of operation of the D-SH hoist must be observed outside the European Union.

General safety, accident prevention and environmental protection regulations that apply where the D-SH hoist is in operation must be observed and complied with in addition to the safety instructions contained in these operating instructions.

The owner and any personnel authorised by him are responsible for correct operation of the D-SH hoist and for clearly defining responsibilities for installation, operation, maintenance and cleaning.

The operating instructions must be followed in full and without any limitations.

Special local conditions or applications can lead to situations which are not considered in these operating instructions. In such cases, the required safety measures must be defined and implemented by the owner. Necessary measures may also relate, for example, to the handling of hazardous materials or tools and the provision/wearing of personal protection equipment. The operating instructions must, if required, be supplemented by the owner with instructions relating to the organization of work, working procedures, authorized personnel, supervising and reporting obligations, etc. Further information, see section 8.1 “Safety instruction”.

Furthermore, the owner must ensure that

- any further working and safety instructions resulting from the risk analysis of the D-SH hoist workplaces are specified in operating procedures.
- personnel who work with or on the D-SH hoist are provided with appropriate first-aid equipment. The personnel must be trained in the use of the first-aid equipment.
- the operating instructions are always kept available in the immediate vicinity of the D-SH hoist for installation, operating, maintenance and cleaning personnel.
- the personnel are trained in accordance with the work to be performed.
- the D-SH hoist is only operated when in safe and proper working order.

- the safety devices are always kept freely accessible and are checked regularly.
- the national regulations for the use of the D-SH hoist are observed.
- the specified regular checks and inspections are carried out on time and are documented.
- the operating/travel area is adequately illuminated.
- suitable and tested load handling attachments are provided and used.

The owner is urged to develop procedures and guidelines to cover malfunction situations, to instruct users and to apply these instructions at a suitable place in a readily legible manner.

2.5 Operating personnel requirements

Only authorised and trained personnel may work on the D-SH hoist. The personnel must have received instruction on the D-SH hoist functions and any hazards that may occur.

Every individual given the task of working on or with the D-SH hoist must have read and understood the operating instructions before any work is started.

Persons under the influence of drugs, alcohol or medicines which affect their reactions must not work on or with the D-SH hoist.

Age and job-specific regulations relevant at the place where the D-SH hoist is operated must be observed for the selection of any personnel.

Personnel are obliged to report to the owner without delay any changes to the D-SH hoist that impair safety.

For independent operation (machine operator) or maintenance (maintenance fitter) of the D-SH hoist, the owner may only employ persons

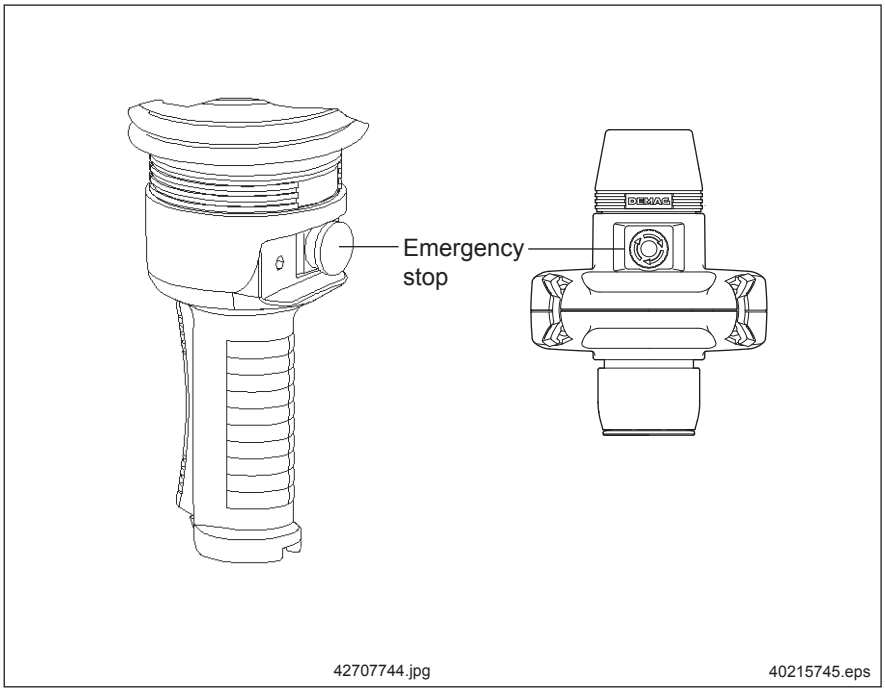
- who are at least 18 years of age,
- who are mentally and physically suitable,
- who have been instructed in operation and maintenance of the D-SH hoist and who have proven their qualification to the owner in this respect.

2.6 Personal protection equipment

When work is carried out on or with the D-SH hoist, the following must always be worn:

- Protective clothing, closely-fitting working clothes (low tear strength, no loose sleeves, no rings or any other jewellery, etc.).
- Safety shoes to protect against falling parts and against slipping on slippery ground.
- Gloves for handling the wire rope.
- Safety helmet to be worn by everybody in the danger zone.

2.7 Emergency stop device



WARNING
Unauthorised, negligent or accidental switching-on.

Danger to life and limb.

Check to ensure that the reason for the emergency stop has been eliminated before the D-SH hoist is switched on again.

The emergency-stop device must not be used to switch the D-SH hoist off in normal operation.

To prevent damage and injuries, the D-SH hoist is fitted with an emergency-stop device. This is located on the control unit. The emergency-stop operating function must be checked regularly.

2.8 Regular inspections

The owner of the D-SH hoist may be obliged to carry out regular inspections by national industrial safety legislation and regional regulations. In Germany, this is specified by the accident prevention regulations for winches, hoists and towing devices (BGV D8) and the accident prevention regulations for cranes (BGV D6), for example. These specify that

- the D-SH hoist must be inspected before it is put into operation,
- the D-SH hoist must be inspected regularly,
- the elapsed share of the theoretical safe working period must be calculated,
- a record of tests and inspections must be kept.

The owner is obliged to ensure that the D-SH hoist complies with the latest rules and regulations and to observe new regulations at all times.

If no comparable inspection regulations or requirements apply at the place where the D-SH hoist is operated, we recommend compliance with the above-mentioned regulations.

2.9 Inspection regulations

Notes on inspections in accordance with

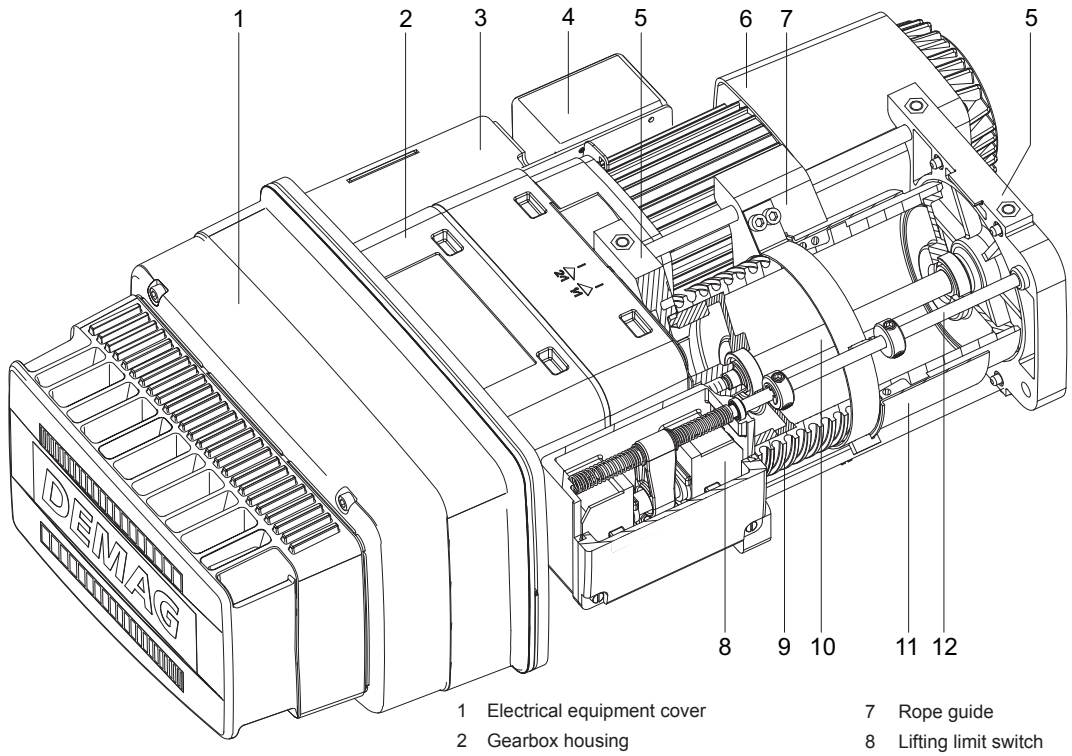
UVV Winches, lifting and towing devices	BGV D8
UVV Cranes	BGV D6

The EC machinery directive requirements are therefore also fulfilled.

3 Technical data

3.1 Mechanical equipment

3.1.1 Design overview



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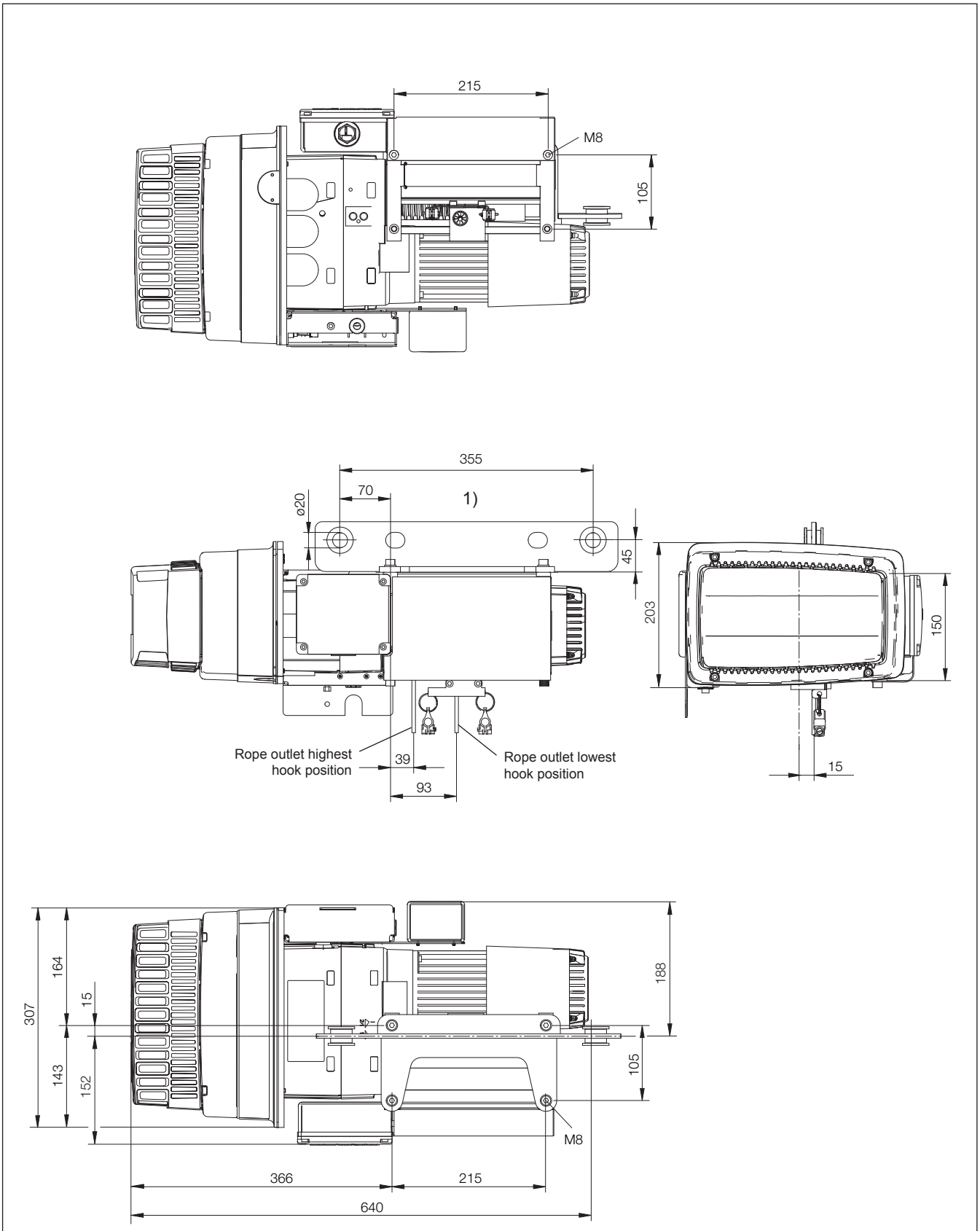
1	Electrical equipment cover	7	Rope guide
2	Gearbox housing	8	Lifting limit switch
3	Bracket	9	Rope drum
4	Analogue PWM converter	10	Drum axle
5	Frame	11	Cover plate
6	Fan cover	12	Switching rod

3.1.2 Explanation of size designation

D-SH 80

- 80 — SWL 80 kg or 160 kg
- D-SH — Size: D-SH 80, D-SH 160
- D-SH — Demag SpeedHoist

3.1.3 Dimensions



1) Load bar, optional, part no.: 851 195 44

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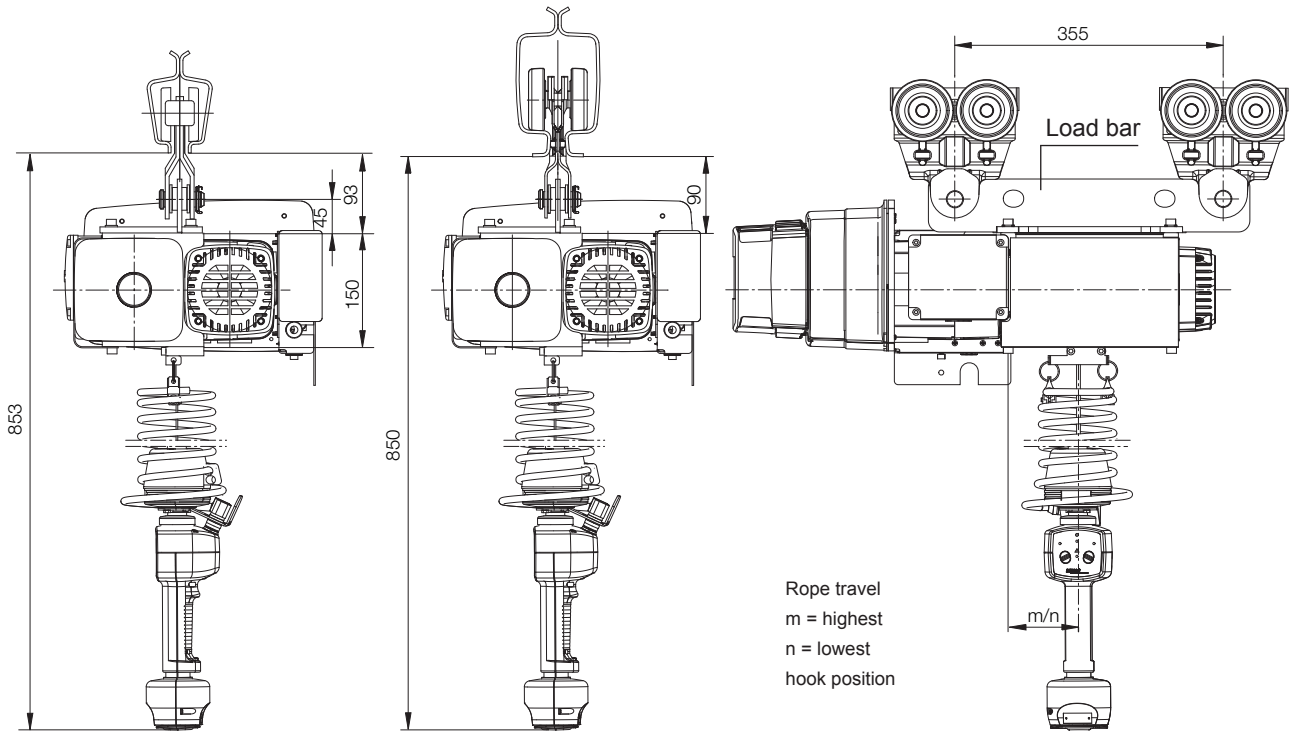
D-SH hoist with two KBK I or KBK II trolleys and manual force control
1/1 reeving
SWL 80 kg KBK I

Load bar, part no.: 851 195 44

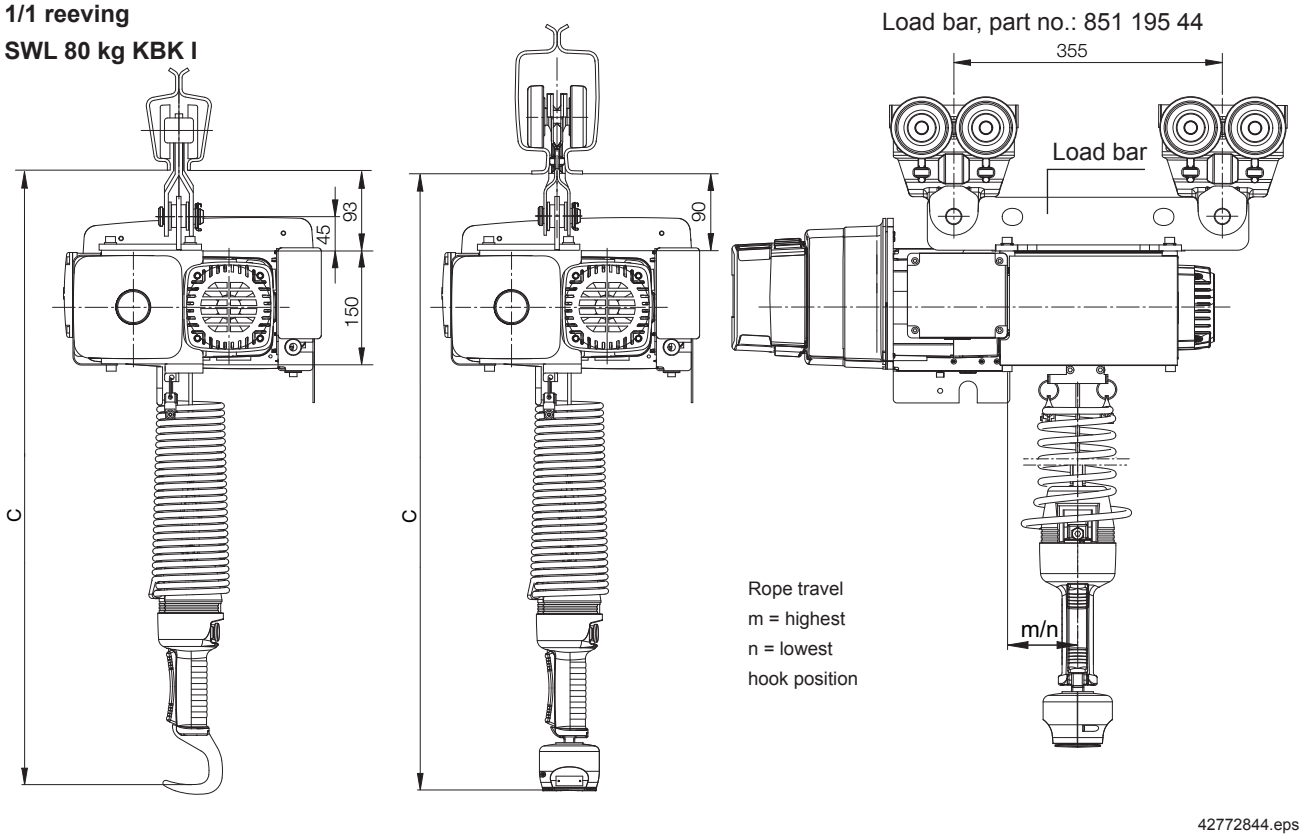


Size	Reeving	Hook path	Foot hole distance	
			Highest hook position	Lowest hook position
		m	m	n
D-SH 80	1/1	2,2	39	93
D-SH 160				

Note:

The D-SH hoist with D-Grip should not be used in connection with a conductor line integrated in the KBK rail, since the manual force required for the D-SH hoist with D-Grip is lower than the force required for displacing the current collector.

D-SH hoist with two KBK I or KBK II trolleys and rocker switch
1/1 reeving
SWL 80 kg KBK I



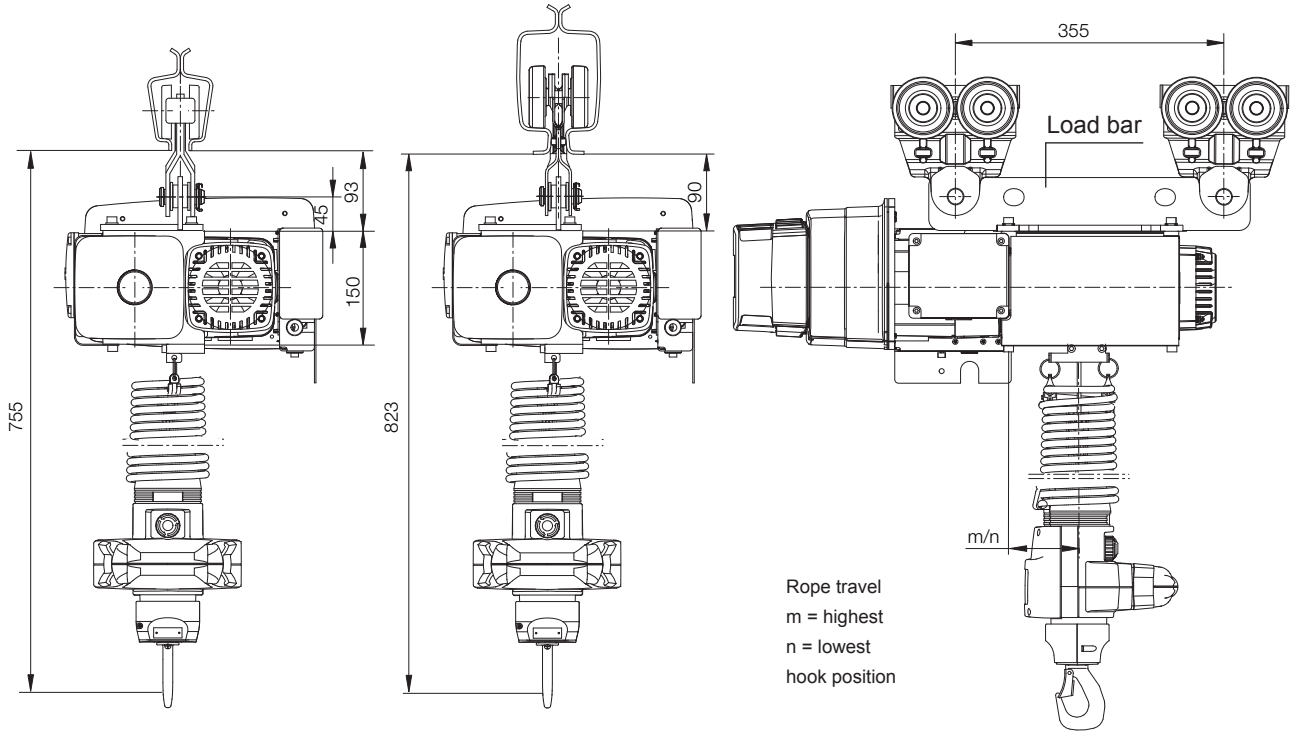
Helical cable	C (with C hook)
2,8 m	745 mm
4,3 m (Standard)	795 mm

Helical cable	C (with quick-change coupling)
2,8 m	770 mm
4,3 m (Standard)	820 mm

Size	Reeving	Hook path		Distance to foot hole	
		with helical cable 4,3 m	with helical cable 2,8 m	Highest hook position m	Lowest hook position n
D-SH 80	1/1	2,2 m	2,2 m	39	93
D-SH 160					

D-SH hoist with two KBK I or KBK II trolleys and DSM Manulift handle
1/1 reeving
SWL 80 kg KBK I

Load bar, part no.: 851 195 44



Size	Reeving	Hook path	Foot hole distance	
			Highest hook position	Lowest hook position
		m	m	n
D-SH 80	1/1	2,2	39	93
D-SH 160				

3.1.4 Selection table

Size	SWL	FEM	Hoist speed m/min	Motor size	Weight
	kg		V1		kg
D-SH 80	80	1 Am	max. 70	KDP 63 B 2	30
D-SH 160	160	1 Am	max. 35		

3.1.5 Hoist motor data

Required supply cable conductor cross sections and fuse links

Motor size	Group of mechanisms to FEM	Voltage CE/CSA 50/60 Hz	P kW	CDF %	n rpm	cos φ N
KDP 63 B 2	1 Am	380 - 480 V	0,94	30	4750	0,67

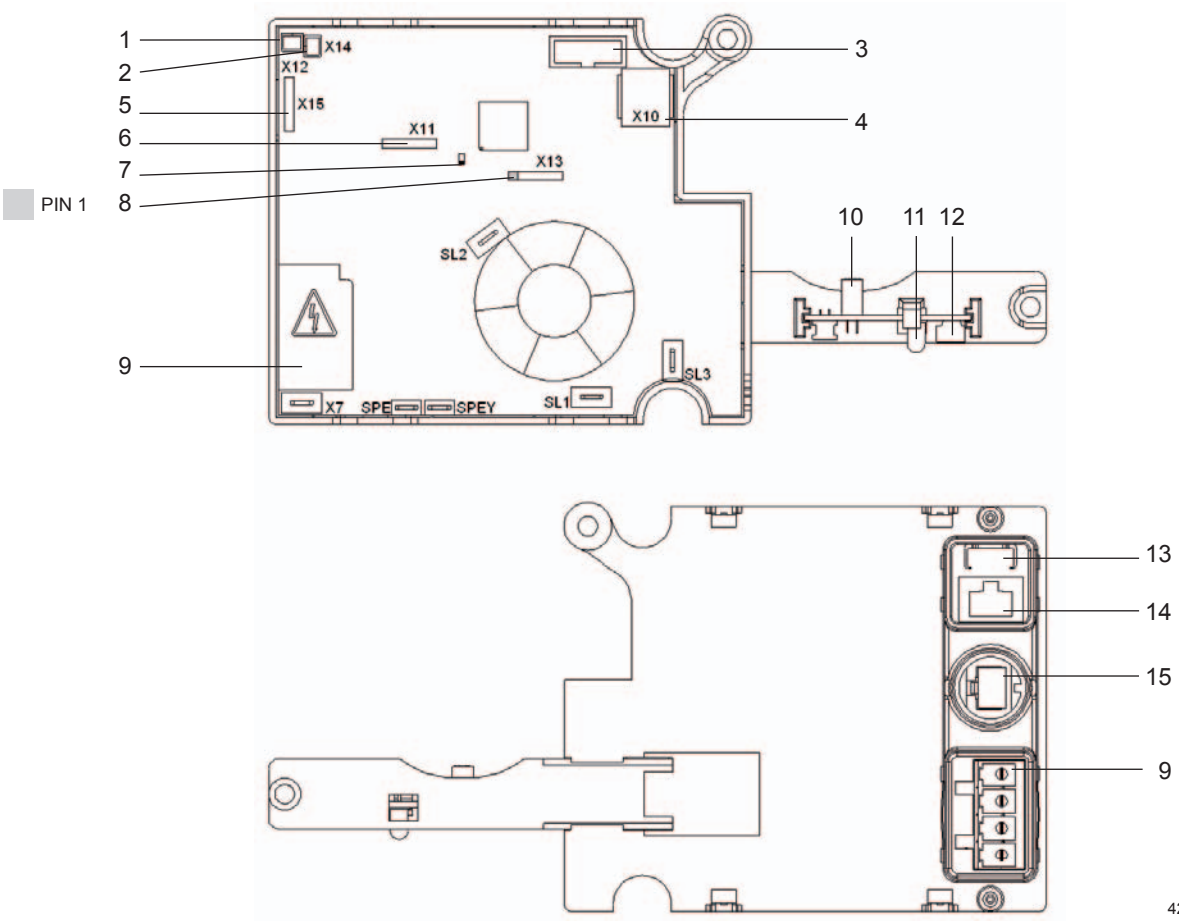
Rated current I_N and start-up current I_A for 50 Hz		cos	Mains connection delay fuse for 50 Hz	Supply cables for 5% voltage drop and start-up current I_A for 50 Hz 1)	
400 V DP		φ	400 V DP	400 V (ΔU 20 V)	
I_N (A)	I_A (A)		A	mm^2	m
4,2	up to 1,5 x I_N	0,67	10	1,5	153

1) The lengths of the supply lines are calculated on the basis of an earth-loop impedance of 200 mΩ.

3.2 Electronic components

3.2.1 Control board

Multiple connector X13 (8)	
Operating LED (7)	
Steady flashing	Unit ready for operation
Unsteady flashing	Unit fault
LED dark	1. No voltage
	2. Electronics defective



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Note

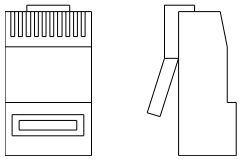
For any changes of the jumper position, the unit must be de-energized.

Item	Designation	Function
1	Plug-and-socket connector	Digital output status (X12)
2	Plug-and-socket connector	Fan (X14)
3	Plug-and-socket connector	Inverter interface
4	Plug-and-socket connector	Terminal connection RS232 (X10)
5	Plug-and-socket connector	Lead out dialogue output
6	Plug-and-socket connector	Protection against re-initializing
7	Light emitting diode	Operating LED, see table above
8	Jumper strip	Not used
9	Plug-and-socket connector	Mains connection
10	Fork light barrier	Pulse generator
11	IR transmitter diode	IR interface
12	7-segment LED	Multi-function display, e.g.: Elapsed operating time counter, status indicator, error code display
13	Plug-and-socket connector	Connection of hoist limit switch
14	Plug-and-socket connector	Trolley / crane control cable connection
15	Plug-and-socket connector	Control cable connection

RJ45 connector

Pin assignment

10 9 8 7 6 5 4 3 2 1



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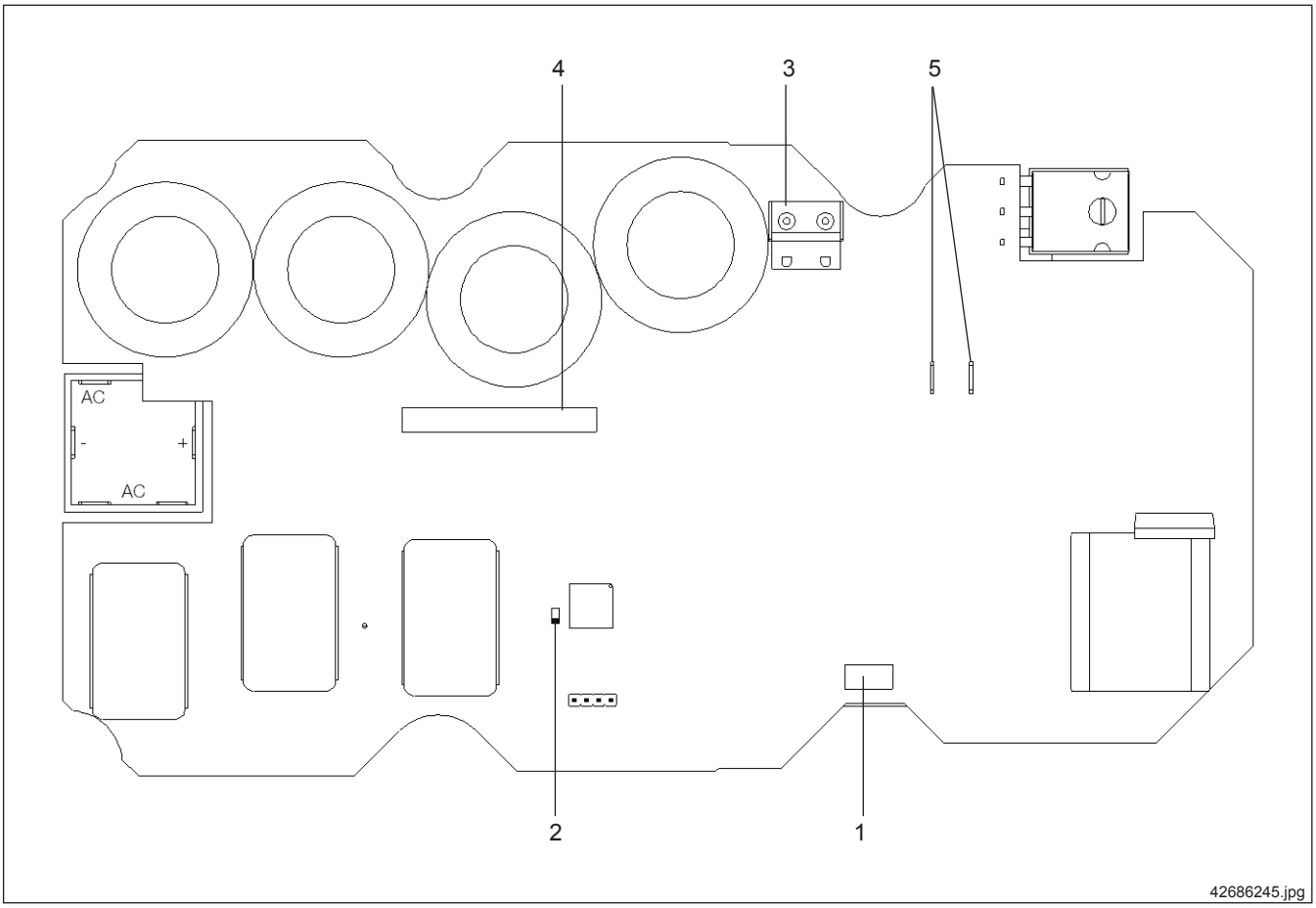
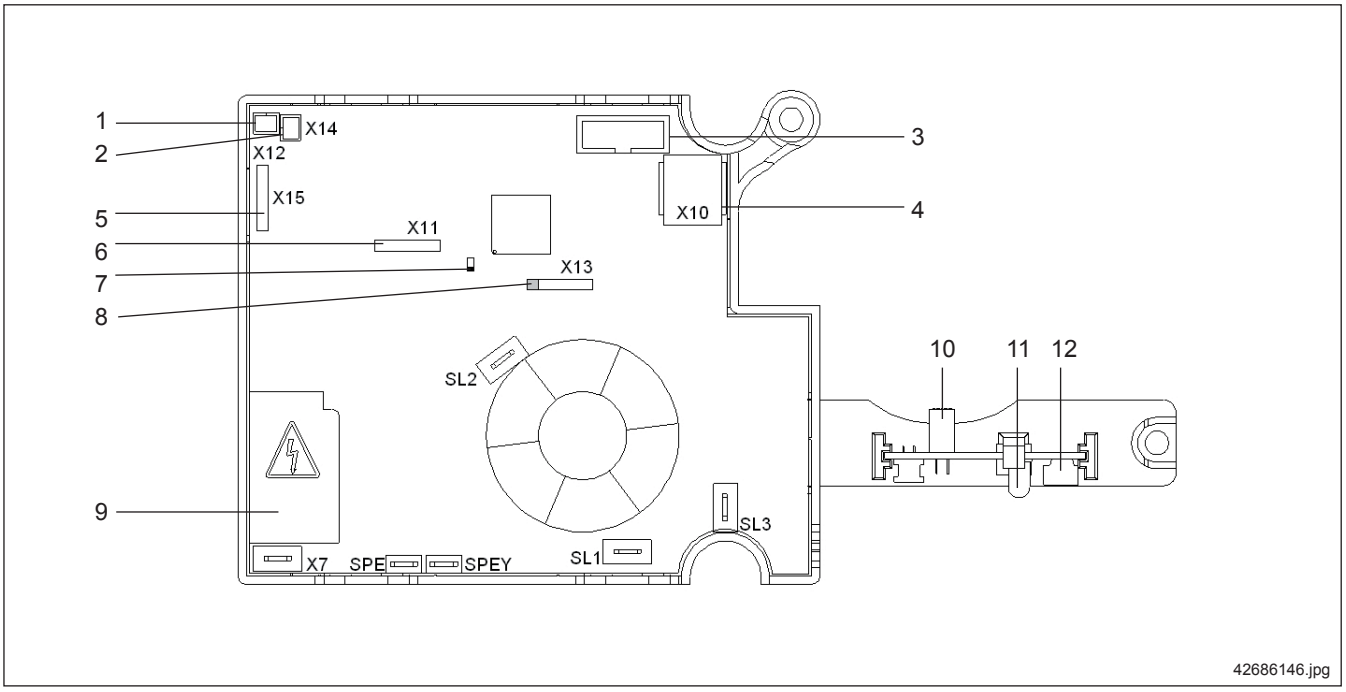
RJ45 connector	
Control pendant connection (15)	
Pin	**Function assignment**
1	Control pendant 24 V supply =
2	-
3	-
4	Emergency stop
5	Control pendant 24 V~ supply
6	Lift (PWM)
7	Lower (PWM)
8	-
9	-
10	GND 24 V=

3.2.1.1 D-SH with frequency inverter



Item	Designation	Function
1	Plug-and-socket connector	Control board connection
2	Light emitting diode	Operating LED (GN)
3	Plug-and-socket connector	Brake connection (X6)
4	Plug-and-socket connector	Motor connection (X8)
5	Plug-and-socket connector	Braking resistor

3.2.2 EEPROM hardware protection



Jumper strip X11 is used for this purpose. The jumper strip is structured as follows.

6	5	4	3	2	1

Pin 1 is located on the right-hand side at the micro-controller.

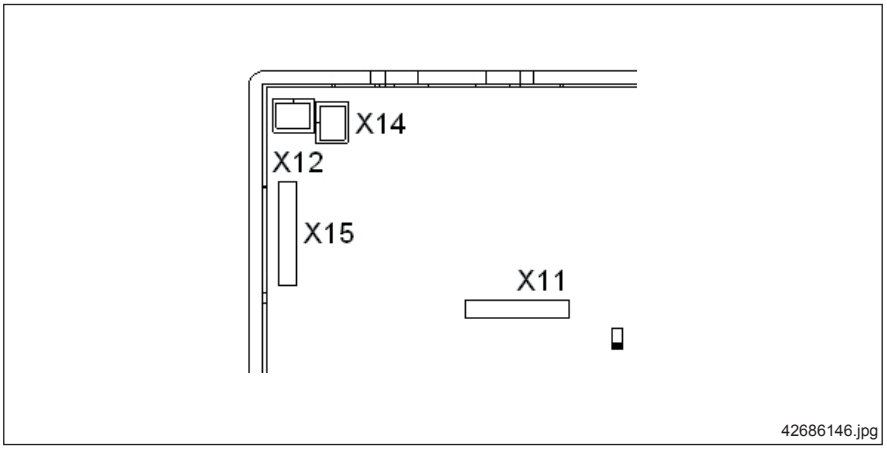
As a protection against re-initializing, a jumper must be applied between pins 5 and 4. The bridge of X13 can be used.

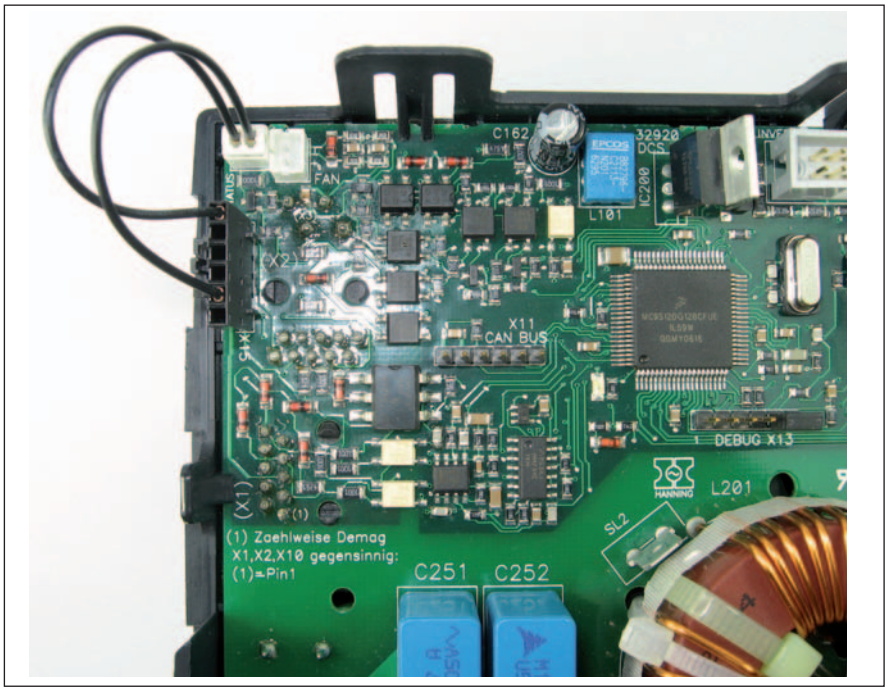
If re-initializing is now tripped, for example, by a detected EEPROM error, this is displayed by error E22 in the 7-segment display. In this case, neither lifting nor lowering is possible.

When the bridge is removed and the emergency stop is actuated for min. 5 seconds, a re-initializing process is performed (parameters are reset to factory setting), the error is reset. Any previously set installation-specific parameters are overwritten and must be entered once again.

3.2.3 Digital output status

Plug connector DCS DA-ext (720 145 45) is required to bring the digital output out of the D-SH hoist. It is applied on X12 and X15 (see fig.).





The “Digital output” signal can be brought out by means of the 10-pole control cable, 1,5 m (part no.: 772 069 45) on the trolley / crane control cable connection (see table in section 4.1, item 14). The open conductors are indicated by colours.

No.	Colour	Signal
1	Bk, black	Digital output GND
2	Br, brown	Forward
3	Bu, blue	Backward
4	Ye, yellow	Emergency stop
5	Or, orange	AC supply
6	Wh, white	24 V DC ext.
7	Vt, violet	GND ext.
8	Rd, red	Right
9	Gn, green	Left
10	Gr, grey	Digital output signal, 0 / 24 VDC

Conductors 5 and 6 must be connected with each other, as well as 7 and 9. The output signal can be tapped at conductors 1 and 10. The remaining conductors must be isolated from each other, as otherwise a short circuit is caused.

NOTE

It is urgently recommended that coupling relays be used since the internal power supply unit is limited in its capacity.

For the digital output, the following max. current is available:

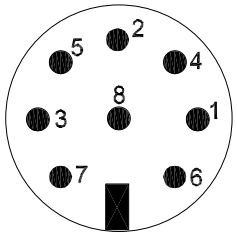
		Current
D-SH unit with	D-Grip	10 mA
	Rocker switch	80 mA
	Manulift	80 mA

The meaning of the digital output can be programmed by means of parameters, see section 7.7.2.7 “Operating parameters”

3.2.4 D-Grip connection assignment

The following diagram shows the right-angle plug socket assignment, viewed from the soldering side and the plug assignment in the grip viewed in the direction of the pins.

Connection assignment of the right-angle plug



Pin no.	Colour	Assignment
1	BN	24 V DC
2	BU	GND
3	WH	Manual force analogue
4	PK	Button left
5	YE	Switch right
6	GY	Grip occupied
7	GN	Status LED (not used)
8	---	---

Power consumption
Max. approx. 70 mA
No load: approx. 50 mA

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Technical data

Supply:	24 V DC
Current consumption:	Max. approx. 70 mA, at rest: approx. 50 mA
Digital signals:	0/24 V DC
Manual force analogue:	0...10 V DC not standardized

3.2.4.1 Emergency stop

The D-Grip is not provided with its own emergency-stop device. An external emergency-stop device is connected to terminals X2.1 and X2.2 of the analogue PWM converter.

3.2.4.2 D-Grip interface

Terminal X2 of the analogue PWM converter

The helical cable of the D-Grip is connected to terminal X2.

Terminal	Designation	Conductor colour helical cable
X2.1	Emergency stop -	If no emergency-stop switch is used, a bridge must be fitted between X2.1 and X2.2.
X2.1	Emergency stop +	
X2.1	Manual force analogue	Wh, white
X2.1	Grip occupied	Gy, grey
X2.5	n.c.	The right button (ye, yellow) is applied on X1.2
X2.6	Left button	Pk, pink
X2.7	GND	Bu, blue
X2.8	24 V DC supply	Br, brown

For further details on the analogue PWM converter, see section 7.6.

3.2.5 Rocker switch connection assignment

DANGER by electrical current

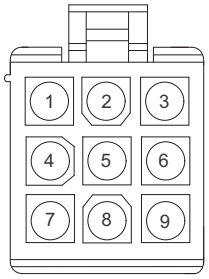
Electrical energy may cause very severe injuries.

Work on the electrical equipment may only be carried out by specialists or by trained personnel.

The rocker switch is supplied with the helical cable connected.

The diagram below shows the connector assignment in the rocker switch.

Connection assignment of plug on helical cable



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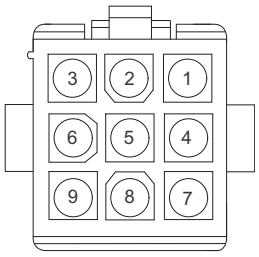
Pin no.	Colour	Assignment
1	-	Not assigned
2	-	Not assigned
3	-	Not assigned
4	GY	PWM lifting
5	YE	Emergency stop
6	-	Not assigned
7	PK	PWM lowering
8	RD	GND
9	GN	24 V DC

Connection assignment of socket on switch



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Pin no.	Colour	Assignment
1	-	Not assigned
2	-	Not assigned
3	-	Not assigned
4	**PK**	PWM lifting
5	YE	Emergency stop
6	-	Not assigned
7	**GY**	PWM lowering
8	**BU**	GND
9	**BN**	24 V DC

Technical data

Supply:	24 V DC
Current:	150 mA
Max. power consumption:	3,6 W
PWM signal:	Basic frequency 1 kHz, amplitude 24 V, Mark-to-space ratio 10 - 90 %
Weight:	Approx. 1600 g
Type of enclosure:	IP34

3.2.5.1 Emergency stop

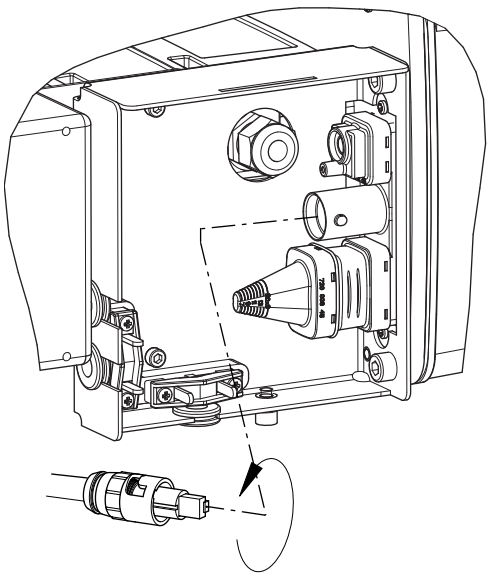
The emergency-stop button is integrated in the rocker switch and is connected via the helical cable.

Switching voltage: 24 V DC

Contacts: 2 NC (positive opening)

3.2.5.2 Rocker switch interface

The helical cable is connected in the bracket by means of the plug connector.



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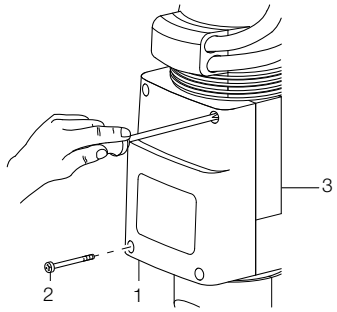
3.2.6 Manulift handle connection assignment

DANGER by electrical current

Electrical energy may cause very severe injuries.

Work on the electrical equipment may only be carried out by specialists or by trained personnel.

The DSM Manulift is supplied with the helical cable connected. If a helical cable has to be replaced, the 8 or 9 conductors must be connected as shown in the circuit diagram.



Undo the four screws (2) to remove cover (1). Tighten diagonal pairs of screws when re-fitting the cover.

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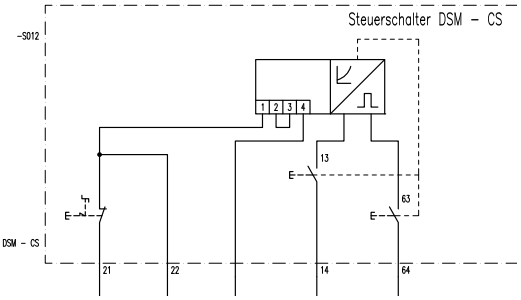
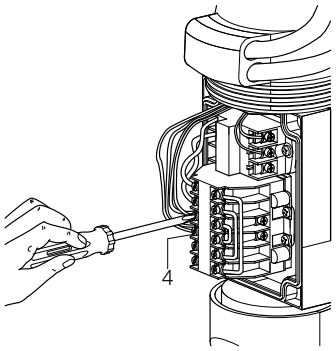


See circuit diagram page 52.



Disconnect the electrical connections (4).

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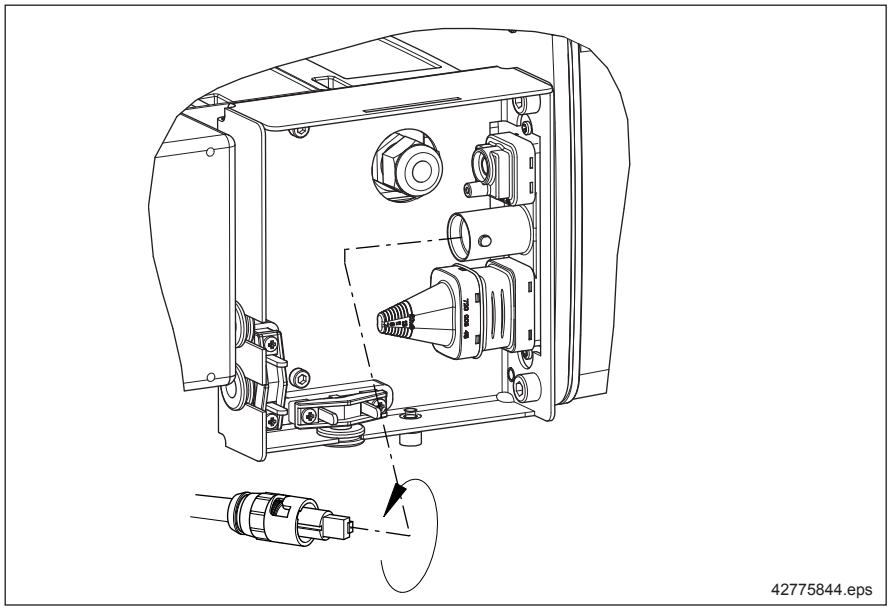
3.2.6.1 Emergency stop

The emergency-stop device is integrated in the control handle of the DSM Manulift and is connected via the helical cable.

3.2.6.2 Interface of the DSM Manulift handle

The helical cable is connected in the bracket by means of the plug connector.



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3.3 Oil and grease filling of gearbox

Oil grades

Gear oil with a viscosity of 220 mm²/s at 40 °C with mild high-pressure additives should be used for ambient temperatures of approx. -10 °C to +50 °C.

DIN 51 502 CLP 220, e.g. BP ENERGOL GR–XP 220, Esso Spartan EP 220, SHELL Omala Oil 220, Mobilgear 630 or Aral Degol BG 220.

At higher or lower ambient temperatures, the type of oil used should be adapted to the specific conditions.

Grease lubrication of the third gearbox stage

The third gearbox stage of the D-SH hoist is lubricated with grease (approx. 60 g). We recommend that the grease filling be replaced every 4 years at the latest.

Quantity of oil in litres

Range	D-SH
Litre	0,2 l

Part no. 472 902 44, 1 litre

Grease quantity in grams

Range	D-SH
Gram	60 g

Part no.: 011 058 44, 60 g

NOTE

Dispose of waste oil and grease in accordance with environmental protection requirements.

If required, a waste management company must be charged with the disposal.

3.4 Operating conditions

D-SH hoists can be operated at:

- -10° to +40° C ambient temperature
- Air humidity up to 80%
- Air pressure up to 1000 m above sea level

Other operating conditions are also possible.

Please refer to the manufacturer for information on any modifications that may be necessary. See page 2 for the address.

CAUTION

Safe operation is only possible with the specified conditions.

Please contact the manufacturer for any other operating conditions.

CAUTION

The specified hoist may be damaged if it is operated outdoors in poor weather.

The D-SH hoist may only be used inside buildings and enclosed areas.

3.5 Noise emission

The sound pressure level of the machine is max. 79 dB (A).

3.6 Paint finish

D-SH hoists are supplied in the following standard colours:

D-SH	RAL 5009	Azure blue
D-Grip	RAL 7035	Light grey
DSM Manulift handle	RAL 1007	Daffodil yellow
Rocker switch	RAL 1007	Daffodil yellow