KL300 MultiWinch manual

DEGIER
D R I V E S Y S T E M S

Let's Gear Up!

Declaration of incorporation

Declaration of incorporation in accordance with the European Machinery Directive 2006/42/EC, Annex II, No. 1B

DE GIER B.V.
WESTLANDSEWEG 9
NL-2291 PG WATERINGEN
THE NETHERLANDS

We hereby declare that pursuant to article 2G the following partly completed machines are exclusively intended to be integrated into or mounted in another machine or piece of equipment:

Motor: KL300 MultiWinch

The specific technical documents pursuant to annex VII B have been drawn up and shall be sent on request by post to the national authorities.

This partly completed machine is compliant with the provisions of the following European directives:

Machinery Directive 2006/42/EC
Low Voltage Directive 2014/35/EC
EMC Directive 2014/30/EC

The following harmonised standards (or parts of these standards) have been applied:

EN ISO 12100:2010
Safety of machinery: Basic terms, general design principles
EN 60204-1:2018
Safety of machinery: Machinery electrical equipment
EN 60034-5:09/2007
Rotating electrical machines

This partly completed machine may only be commissioned if it has been established that the machine into which this partly completed machine needs to be built satisfies the provisions of the machinery directive.

Authorised compiler of the technical documents:

Wouter Heezen
General Manager De Gier B.V.
Wateringen, 15-05-2023

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Thank you

for choosing a gearbox from De Gier Drive Systems KL300 MultiWinch series.

Please pay careful attention to the information in the installation manual during installation and set-up. If you have any questions or come across problems, please do not hesitate to contact us.
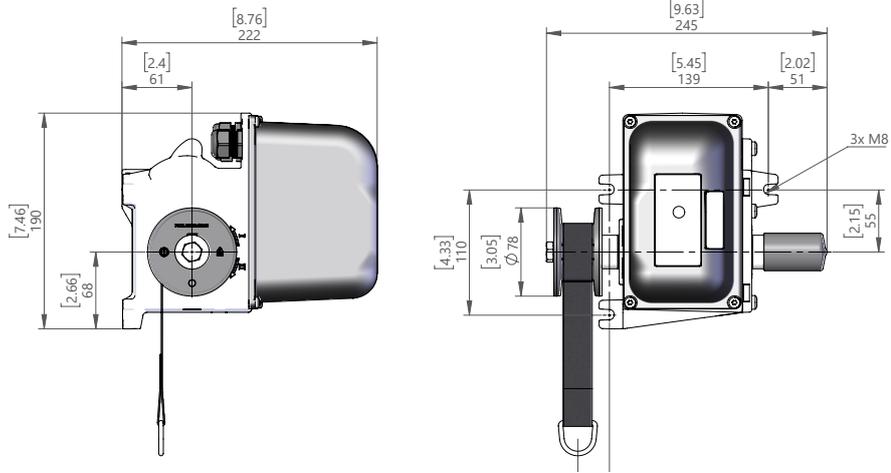
Our service number is: +31 174 29 20 89
Or by e-mail: sales@degierdrivesystems.com
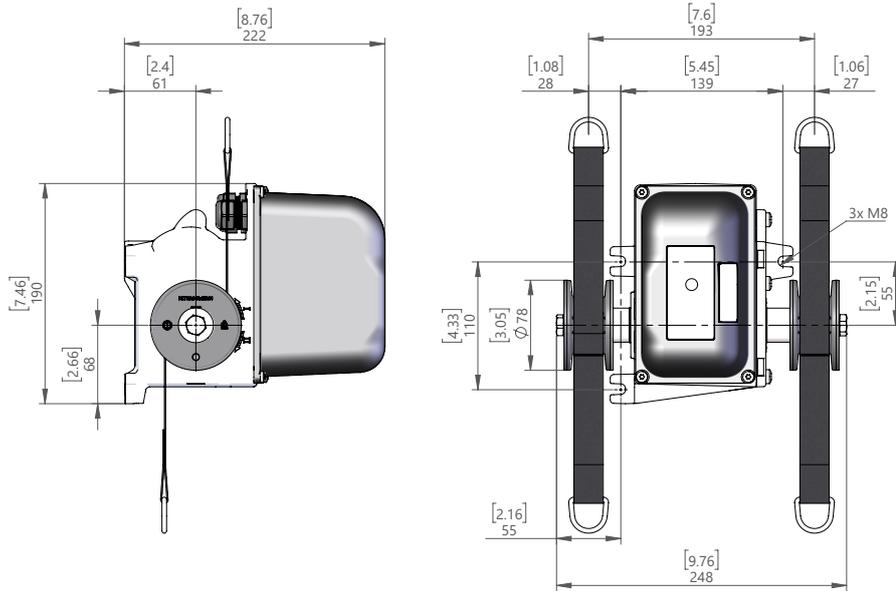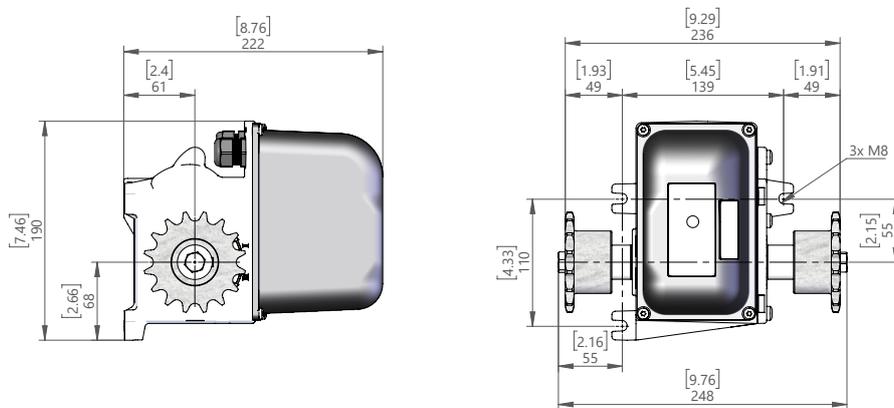
De Gier Drive Systems

Dimensions

P.KL300.1.024.08.1.LB1.10

P.KL300.1.024.08.2.LB2.10

P.KL300.1.024.08.KW

Technical specifications

		Metric. | Imperial
Maximum output torque	Nm | lbf-ft	90 | 66.38
Single winch drum maximum pulling force in reduced power	kg | lbs	340 | 750
Double winch drum maximum pulling force in reduced power (per belt)	kg | lbs	170 | 375
Winch drum diameter	mm / in	50 | 2.97
Roll-up speed	cm/min | in/min	12 … 18 (6 … 9) | 4.72 … 7.09 (2.36 … 3.54)
Standard speed (½ speed setting via DIP switch)	rpm	0,8 (0,4)
Number of rotations min./max.	revs.	0,25/100
Supply voltage	VDC	24 (± 10%)
Power consumption	VA	72
Power consumption in reduced power-mode (limited output torque)	VA	48
Maximum current	A	3
Maximum current in reduced power-mode (limited output torque)	A	2
Protection	-	Thermal overload 3A
Digital control: bus type	-	Modbus RTU / CAN-LOCAL
Analog control: signal (galvanically isolated)	VDC	0…10 / 10…0
Analog control: signal difference	VDC	> 2
Action of operating @ signal failure	-	To pre-set opening position
Weight	kg | lbs	6.2 … 10.0 | 13,67 … 22,05
Cable gland size	-	1 x M20x1,5 2 x M16x1,5
Housing material	-	Aluminium/High-grade plastic
Ambient temperature	°C | °F	-5 … +50 | 23 … 122
IP rating protection class	-	IP65

Technical specifications

The graphs below shows you the pulling force in relation to the length of the winch belt.
The graph lines show the following:

- Displays the graph line of the drum with 1 winch belt [kg]
- Displays the graph line of 2 drums with 1 winch belt each [kg]
- Displays the graph line of 1 drum with 2 winch belts [kg]

Pulling force vs Winch belt lenght [metric]

Pull force per winch belt [kg]

Winding length winch belt [mm]

Legend:
- 1 drum with 1 belt [kg]
- 2 drums, both with 1 belt [kg]
- 1 drum with 2 belts [kg]

Red (1 drum with 1 belt): 340, 340, 336, 323, 323, 311, 311, 299, 299, 289, 289, 279, 279, 270, 270, 261, 261, 253, 253, 245

Green (2 drums, both with 1 belt): 175, 175, 168, 161, 161, 155, 155, 150, 150, 144, 144, 139, 139, 135, 135, 130, 130, 126, 126, 123

Blue (1 drum with 2 belts): 168, 161, 155, 150, 144, 139, 135, 130, 126

Technical specifications

The graphs below shows you the pulling force in relation to the length of the winch belt.
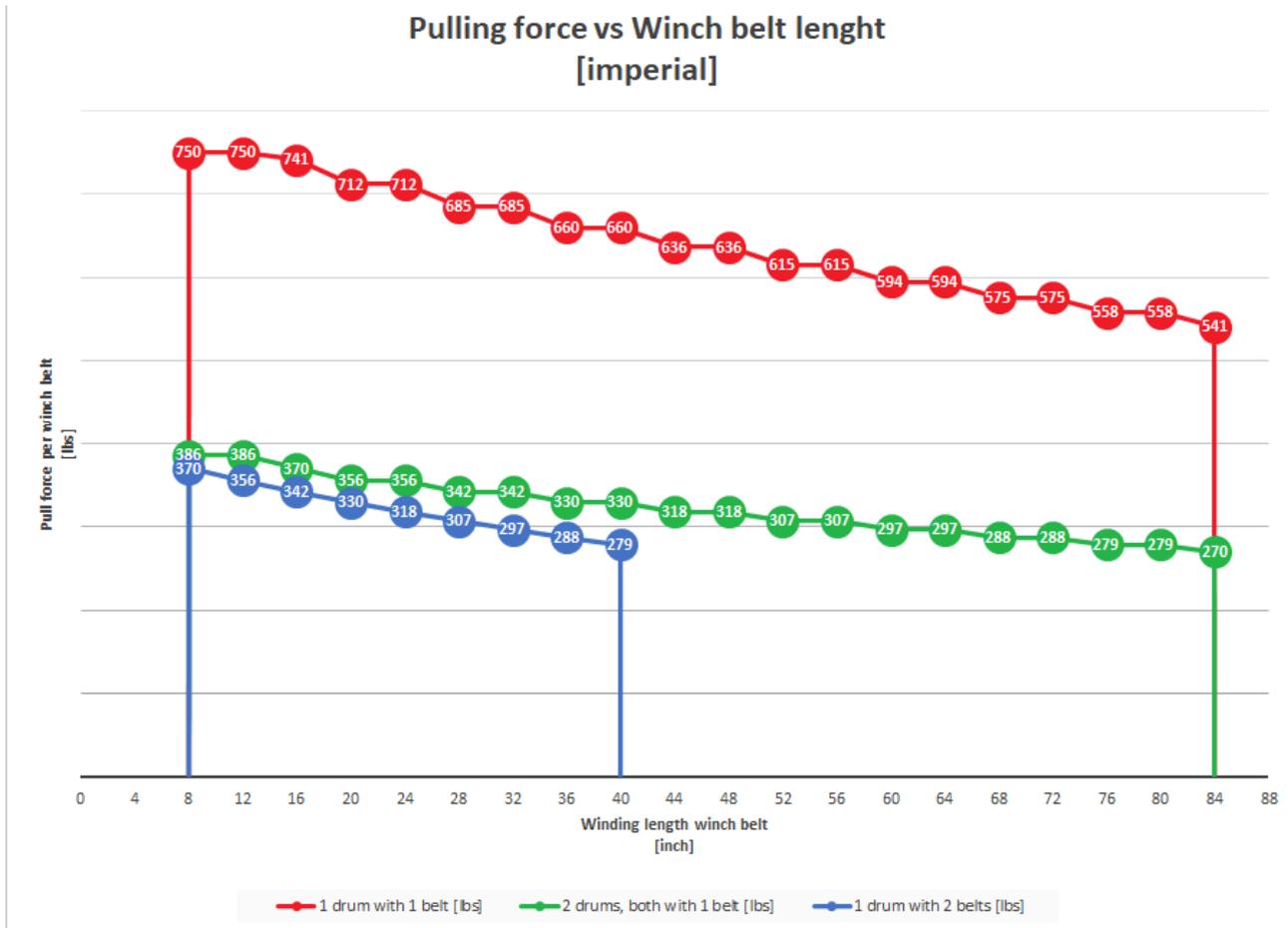The graph lines show the following:

— Displays the graph line of the drum with 1 winch belt [lbs]
— Displays the graph line of 2 drums with 1 winch belt each [lbs]
— Displays the graph line of 1 drum with 2 winch belts [lbs]

Pulling force vs Winch belt lenght [imperial]

Pull force per winch belt [lbs] vs Winding length winch belt [inch]

1 drum with 1 belt [lbs]: 750, 750, 741, 712, 712, 685, 685, 660, 660, 636, 636, 615, 615, 594, 594, 575, 575, 558, 558, 541

2 drums, both with 1 belt [lbs]: 386, 386, 370, 356, 356, 342, 342, 330, 330, 318, 318, 307, 307, 297, 297, 288, 288, 279, 279, 270

1 drum with 2 belts [lbs]: 370, 356, 342, 330, 318, 307, 297, 288, 279

Legend:
— 1 drum with 1 belt [lbs]
— 2 drums, both with 1 belt [lbs]
— 1 drum with 2 belts [lbs]

1 Explanation of symbols and safety instructions

Important procedures are emphasised in this user manual in a separate box with the initial lines printed in bold. See below for an explanation of the various instructions you will encounter in this manual.

Symbol	Meaning	Unit Metric | Imperial
T	Torque	Nm | lbf-ft
P	Power	kW | hp
U	Voltage	VDC
I	Current	A
	Tip	-
	Note	-

Symbol	Meaning	Unit Metric | Imperial
n	Rotational speed	rpm
L	Length	mm | inch
m	Mass	kg | lbs
v	Roll-up speed	cm/min. | inch/min
	Hazard	-
	Electrical	-

Instruction	Explanation
Tip	Gives the user suggestions and advice for carrying out specific tasks easily or more practically.
Attention!	Remarks with supplementary information for the user. These remarks draw the user's attention to potential problems.
Caution!	Material damage can occur when the procedures are not followed carefully.
Warning!	Serious injury to the user and/or serious damage to the product can occur if the procedures are not followed carefully.
Risk of injury or death!	The user's life is directly endangered.

Explanation of symbols on the motor gearbox

The following symbols are shown on the motor gearbox

Symbol	Meaning
	No pressure cleaning
	Electrically live parts

Symbol	Meaning
	Read the documentation
	PE connection (earth)

1 Explanation of symbols and safety instructions

Installation
- Read this installation manual carefully and in full.
- Check that the delivery is complete before starting to install the motor gearbox.
- Strictly observe the step-by-step procedures set out in the installation manual.
- Observe all of the information in the installation manual, in particular all information relating to safety, use, maintenance and servicing.
- Improper installation, commissioning, maintenance etc. of the motor gearbox can lead to personal injury and/or material damage due to the high torque of the motor gearbox.

General safety instructions
- With attached or driven components there is a risk of becoming trapped or injured. Amongst other things, the safety distances set out in EN 349 and EN 13857 must be observed and suitable precautions must be taken, such as safety devices or a dead-man vigilance system.
- Do not allow people to stand under or close to suspended loads.
- Attached or driven parts may have a shorter service life than the motor gearbox itself.
- De Gier supplies motor gearboxes that are self-braking, but this function may not be effective under certain conditions. We strongly recommend that for hoisting applications you use a motor gearbox equipped with a mechanical brake and mount a fall-arrest brake on the drive shaft.
- Never loosen screws, couplings or other parts while the drive train is loaded externally.
- Also observe national legislation and guidelines regarding working conditions and safety.
- Clean up the hazard area and leave it before switching the power back on.
- Despite careful planning and compliance with all regulations, some risks cannot be prevented.

Qualified staff
All activities described below must be performed by qualified staff. Qualified staff means persons who, based upon their training, experience and/or education, have obtained sufficient knowledge of the applicable standards, provisions, accident prevention regulations and operating conditions and are thus able to identify and avoid potential hazards during relevant activities (for instance, installers recommended by De Gier). Approval by the safety officer for the overall plant or system is always required before work may be carried out.
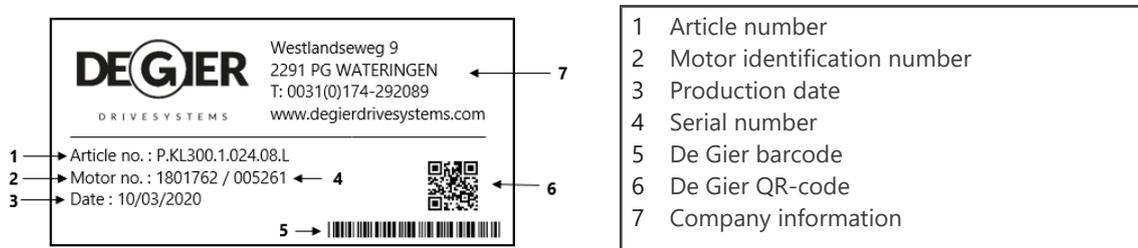
2 Product

The KL300 MultiWinch is a 24VDC winch motor controlled by a 0...10 VDC signal, Modbus RTU and CAN-LOCAL bus. One of these options can be chosen during installation. With a peak pulling force 340 kg | 749 lbs, it can easily control air inlet valve Three integrated buttons on the control board make it easy to set up the KL300 MultiWinch and accurately determine all necessary positions. A brushless motor operates according to the step motor principle: if the next position is not reached, an alarm relay will be activated.

Manufacturer

The address details of De Gier are set out below:

De Gier B.V.	I : www.degierdrivesystems.com
Westlandseweg 9	E : sales@degierdrivesystems.com
NL-2291 PG Wateringen	T : +31 174 – 292 089
The Netherlands	

Identification plate

1	Article number
2	Motor identification number
3	Production date
4	Serial number
5	De Gier barcode
6	De Gier QR-code
7	Company information

Example of an identification sticker which is fitted on every KL300 MultiWinch

Article number

The structure of the article number on the above rating plate is set out below with an explanation of the possible versions.

CODE	SERIES	Force [kg]	Force [lbs]	Version	Voltage [VDC]	Speed @ 50Hz [x 0,1 rpm]	Accessories
P	KL	300	661	1	24	8	L

Possible series

P.KL300.1.024.08.L	KL300 0.8 24VDC for winch drum / sprocket
P.KL300.1.024.08.1.LB1.10	KL300 0.8 24VDC for drum and/or KWL, incl. one drum with one 1.0m belt
P.KL300.1.024.08.1.LB2.10	KL300 0.8 24VDC for drum and/or KWL, incl. one drum with two 1.0m belts
P.KL300.1.024.08.KW	KL300 0.8 24VDC with KW+KT 10B z16

Materials and parts of the gearbox

Gearbox part	Materials
Gear wheels, shafts, bearings, retaining rings, ...	Steel
Gear unit housing, housing parts	Aluminium
Worm gears	Bronze
Shaft seals, sealing caps	Elastomer (with steel)
Gaskets	Paper based and plastic elastomer
Limit switch and protective cover	Plastic
Gear oil	Enriched mineral oil
Electronics	Various

3 Instructions for use

Intended use

KL300 MultiWinch motor gearboxes are intended for operating air inlets, ventilation curtains, mixing valves and vents for poultry and pig farms as well as storage facilities. The KL300 MultiWinch is set to the correct position depending of the incoming signal.

Conditions of use

The following conditions of use are applicable when using the motor gearbox.
- Operating ambient temperature range is -5°C to +50°C [23°F to 122°F].
- Max. force on output shaft radial 4000 N | 899.24 lbf, axial 400 N | 89.92 lbf.
- The service life of the motor gearbox increases significantly with low loads.

Control and maintenance

The KL300 MultiWinch itself is maintenance-free. Check the following points regularly:
- Steel cable and steel cable attachment; these must not show any mechanical damage.
- Safety: check whether the cover is placed on the KL300 MultiWinch.
- End positions: check whether the end positions are still correct.
- Emergency power supply: check, if present, whether the emergency power supply is still working correctly.
- Bolts and fasteners: check if bolts and screws are still firmly secured.

Restrictions on use

Structural modifications to the motor gearbox are not permitted. Any such modifications render the manufacturer's warranty null and void and relieve the manufacturer of liability for any consequences. In addition, the following restrictions are applicable with regard to the use of the motor gearbox:
- Do not load the motor gearbox or drive train with a torque higher than specified.
- Do not use the motor gearbox to operate parts located in the immediate vicinity (within easy reach) of people. Maintain safe distances in accordance with EN ISO 13857.
- Do not expose the motor gearbox to direct water spray, rain or snow (KL300 MultiWinch is IP65 rated).
- Do not use the motor gearbox to operate smoke and heat exhaust ventilation systems compliant with NEN 6093 or DIN 18232.
- Do not use the motor gearbox to operate automatic doors or gates used by people.
- Do not use the motor gearbox in explosion hazard areas if express permission has not been granted to do so.

Unintended Use

We expressly warn against the following types of unintended use:
- Do not use the motor gearbox for lifting suspended loads especially in areas in which people are present.
- Do not use the motor gearbox for transporting people (for example, for passenger lifts, etc.).

Transport

To safeguard the service life and correct functionality of our products, the following rules must be followed:
- Transport the gearbox carefully and avoid shocks.
- Force causes damage to the gearbox.

⚠ Risk of injury or death! Falling objects can present a danger to people!

3 Instructions for use

Storage

To safeguard the service life and correct functionality of our products, the following rules must be followed:
- Ensure that the motor gearboxes are stored in a dust-free and moisture-free environment.
- The relative air humidity of the storage location must be less than 60%.
- Store the motor gearboxes at temperatures between -15 and +60°C [5°F to 140°F].
- Avoid sudden changes in temperature to prevent the formation of condensation.

If you wish to store the motor gearboxes for a lengthy period of time, you can use preservatives to protect the unpainted surfaces, such as threaded holes and mounting surfaces for chain couplings, against corrosion.

Disposal

Drain used oil from the motor gearbox. Used oil must be collected, temporarily stored, transported and replaced properly. Observe national legislation. Collect waste oil and dispose of it in accordance with regulations. Clean up any spilled oil immediately using a suitable emulsifier or absorbent material.

| Caution!	
⚠️	Improper disposal of waste oil is hazardous to the environment and to health. Used oil must be taken to a collection point for waste oil. Avoid prolonged skin contact.

Dispose of housing parts, gear wheels, shafts and roller bearings of the transmission as scrap metal. The worm gears may contain black non-ferrous metal alloys and must be disposed of accordingly. Dispose of the packaging materials in accordance with regulations or bring them to a recycling station.

4 Installation and mounting instructions

Installation of the motor gearbox may only be carried out by qualified staff, see section 1.
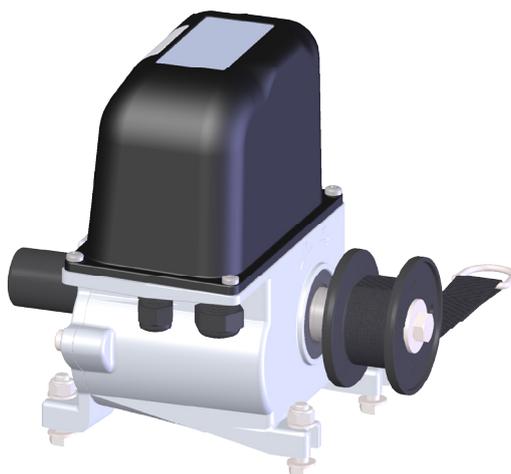
Installation positions

Maintain a clearance of approximately 500 mm | 19,685 inch above the protective cover for adjusting the limit switch. There are no further limitations in mounting positions of the KL300 MultiWinch.
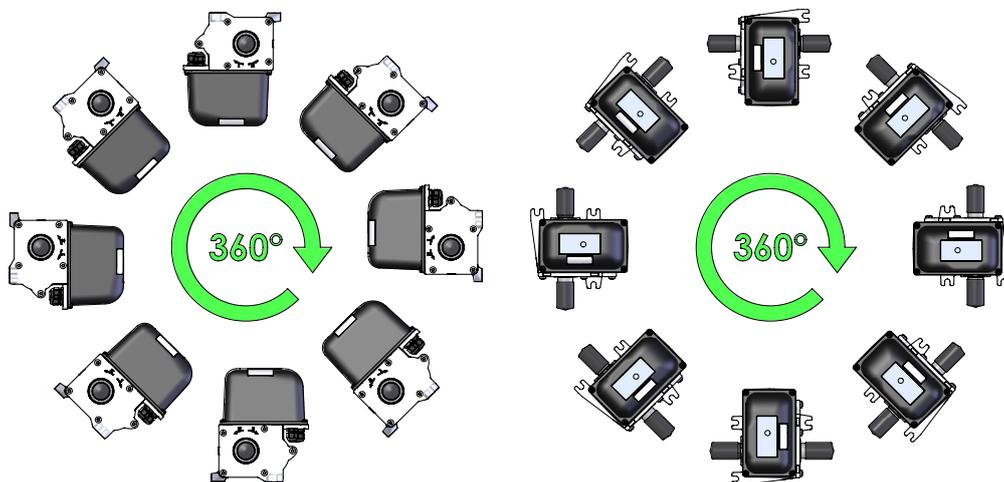
Mounting the motor gearbox

Secure the gearbox with three bolts and apply a torque of 20 … 25 Nm | 14.75 … 18.44 lbf to tighten the bolts. Use M8 bolts with a strength class of 8.8 according to ISO 4014 or better.

If wood screws or wall anchors are used for mounting, the right screws and tightening torques must be determined by the installer. These mounting materials must provide the same clamping force as the M8 bolts with a strength class of 8.8 according to ISO 4014, tightened at 20 … 25 Nm | 14.75 … 18.44 lbf of torque.

Warning
⚠️ Please ensure that the building structure can sufficiently absorb the forces applied by the KL300 MultiWinch.

4 Installation and mounting instructions

Mounting the belt/cable drum

The belt/cable drum can be mounted on both ends of the KL300 MultiWinch shaft as shown below. Use the key, M10 bolt and ring (included in delivery) and apply a torque of 40 ... 50 Nm | 29.50 ... 36.88 lbf to tighten the M10 bolt.
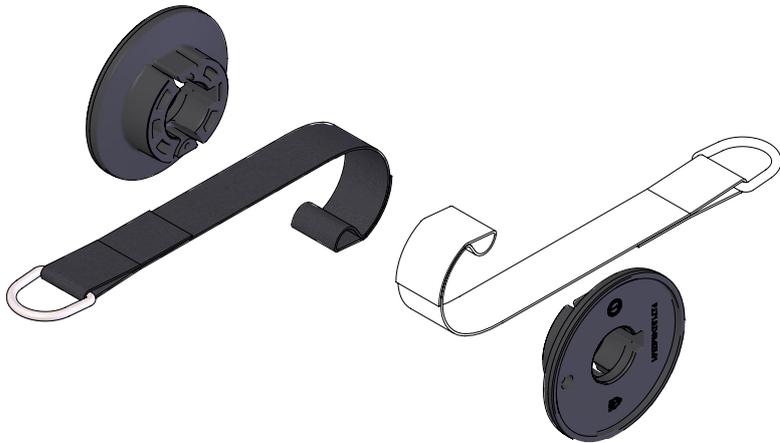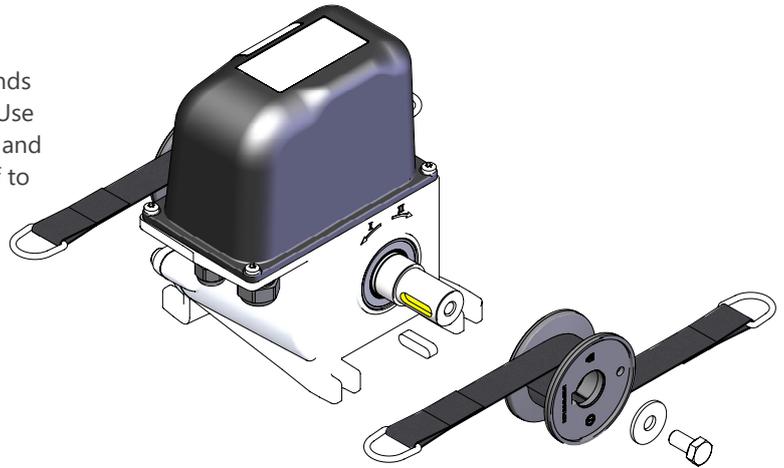
One or 2 belts can be mounted on each drum. Unscrew both bolts to take away the flanges. Slide the end of the belt over the bolt and refit the flanges and bolts. Apply a torque of approximately 6 Nm | 4.43 lbf to tighten the M5 bolts.

Also a cable (max. 3mm | 0,11 inch) can be mounted on the drum. The cable must be passed through the available hole in the flange. Mount a suitable cable clamp to secure the end of the cable.
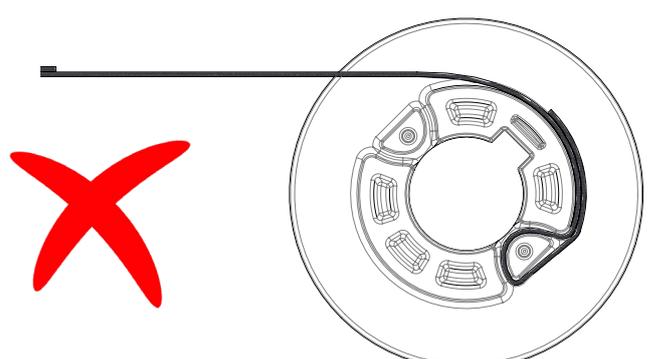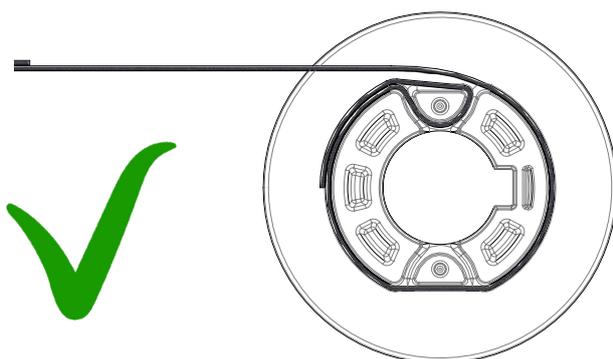
Pre-winding the drum

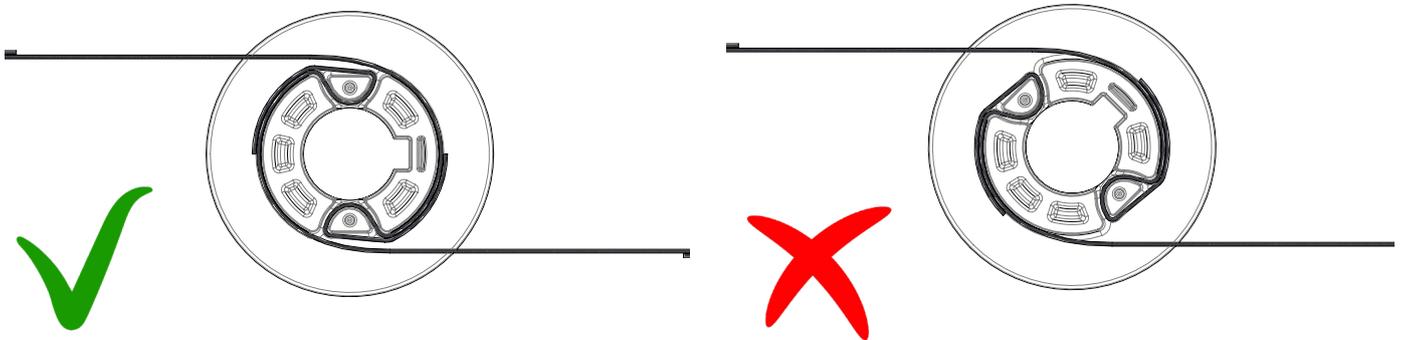Before the drum can be used, it is necessary to pre-wind the belt or cable on the drum.

Drum with a cable: At least 3 revolutions.

Drum with a single belt: At least one revolution.

4 Installation and mounting instructions

Drum with two belts: At least half a revolution.

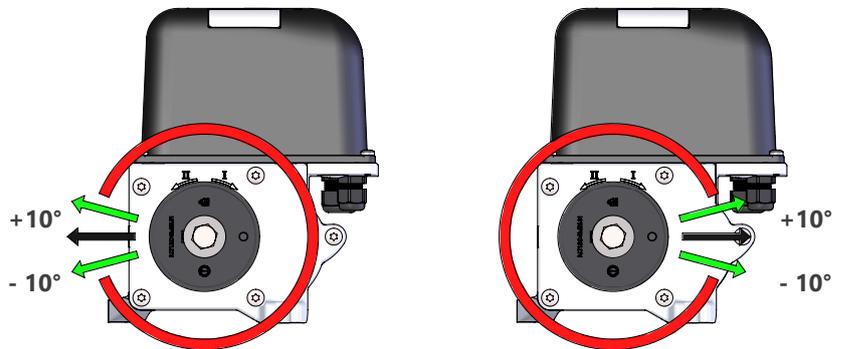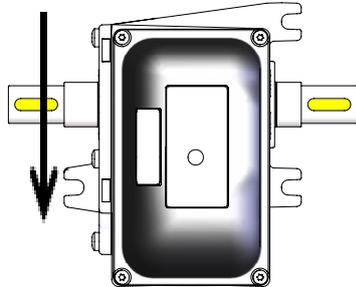| Caution! |
|---|
| ⚠️   Not pre-winding the belt or cable may result in failure and possible injury at high loads. |

Allowed angles belt & wire

When two belts are mounted opposite each other on 1 drum, there is no restriction in applied direction of the belts. If only one wire or belt is mounted on a drum, the allowed directions are limited, as stated below. All other angles are not allowed.
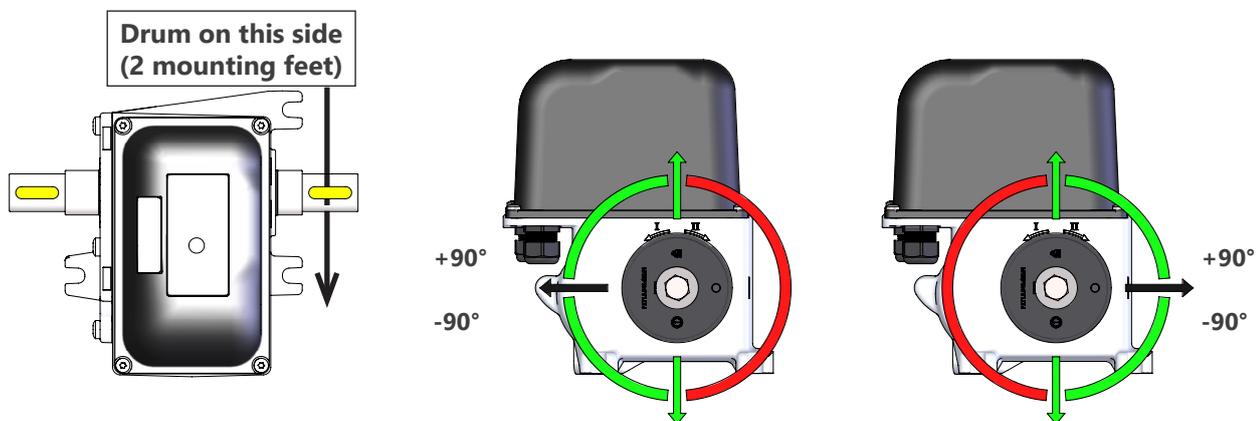
1. Single drum with one belt. The drum is mounted on the right side of the KL300 MultiWinch (the side with two mounting points on the housing). In this situation it is possible to pull 340 kg | 749 lbs in every direction, as shown in the picture above.
2. Single drum with two belts in opposite direction, it is always best to mount the drum on the right side of the KL300 MultiWinch (the side with two mounting points on the housing as shown in the picture above), but it is not required. In this situation it is possible to pull 170 kg | 374 lbs with each belt (340 kg | 749 lbs) in total because of the available torque of the KL300 MultiWinch).
3. Single drum with one belt. The drum is mounted on the left side of the KL300 MultiWinch (the side with one mounting point on the housing). This situation it is possible to pull 340 kg | 749 lbs in parallel direction to the mounting surface of the KL300 MultiWinch, as shown in the picture below. Option 1 is preferred over this situation.
4. Two drums, both fitted with one belt. In this situation it is possible to pull 170 kg | 374 lbs with each belt in parallel direction to the mounting surface of the KL300 MultiWinch, as shown in the picture on the next page.
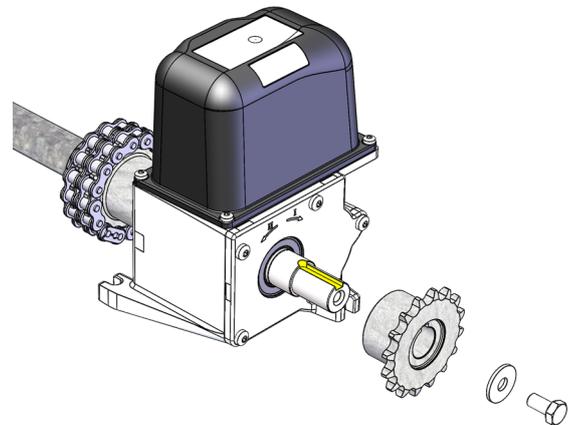
4 Installation and mounting instructions

Drum on this side (1 mounting feet)

+10°
- 10°

+10°
- 10°

Mounting the chain coupling

The chain coupling can be mounted on both ends of the KL300 MultiWinch shaft as shown below.
Use the key, M10 bolt and ring (included in delivery) and apply a torque of 40 ... 50 Nm | 29.50 ... 36.88 lbf to tighten the M10 bolt.

Attention! The drive-shaft and the driven system must be aligned.

Not pre-winding the belt or cable may result in failure and possible injury at high loads.

The KL300 MultiWinch winch can also be coupled to the load by means of chain coupling(s) to the drive shaft. See the details below for maximum torque and maximum alignment error.

Type of chain coupling	Max. angle	Max. torque
10B Z16 (5/8" x 3/8")	4"	420 Nm	309.78 lbf

4 Installation and mounting instructions

1. Mount both chain sprockets of the coupling on the KL300 MultiWinch shaft and the drive tube.
2. Turn the chain sprockets of the coupling until the teeth are aligned.
3. Wrap the duplex chain around the teeth of the sprockets, the ends of the chain should be on top of the coupling.
4. Mount the connecting link as shown in the diagram below.
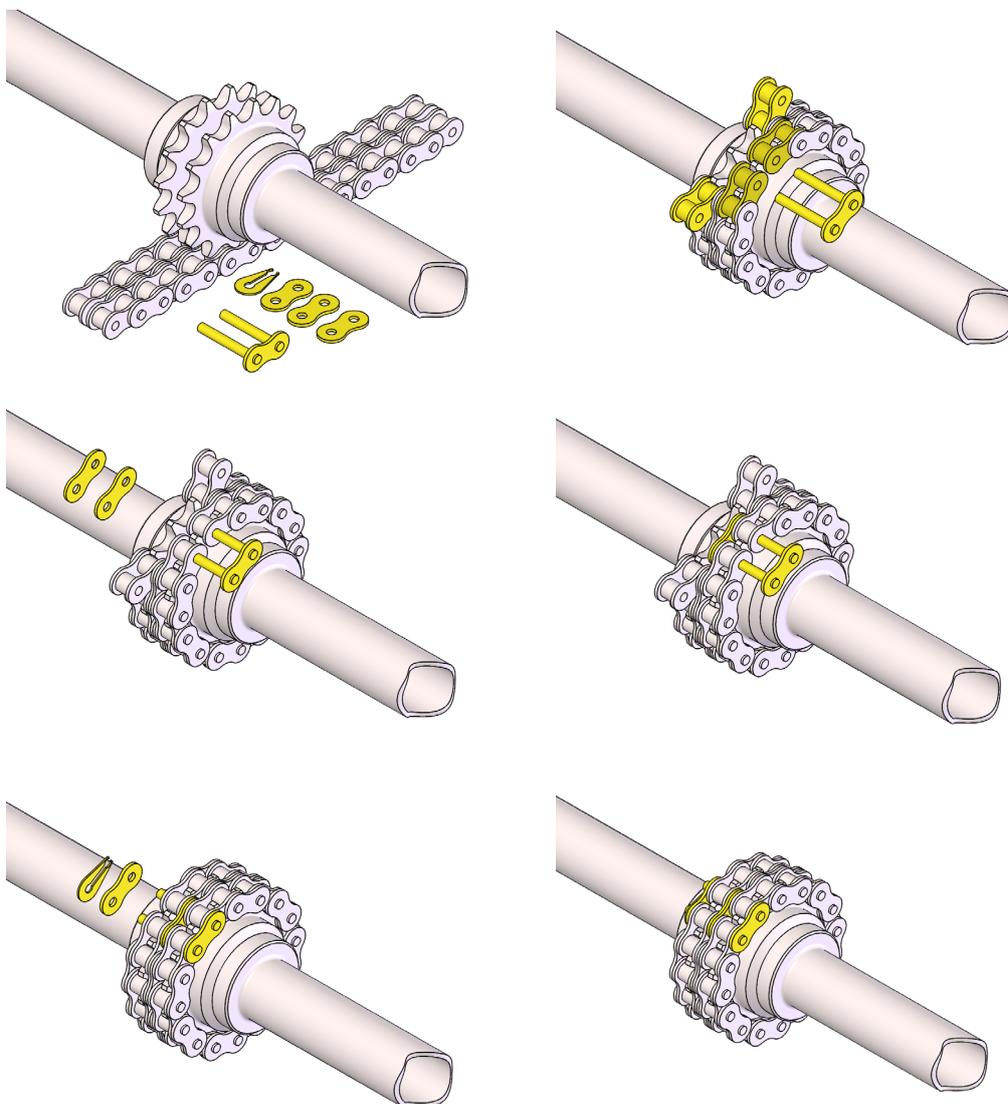
Warning

⚠

• Preferably fit the motor gearbox in the middle of the driven system.
• The maximum angle a chain coupling is allowed to make must remain below the specified value.

5 Electrical connection

Installation and connetion of the motor gearbox may only be carried by qualified staff, see section 1.

Connecting the cables

1. Remove the plastic protective cover from the gearbox.
2. Insert the cable through the cable glands.
   a. 24 VDC Supply cable through the M20 cable gland
   b. 0…10 VDC control cable or bus cable through the M16 cable gland
   c. The Optional M16 cable gland is for the second bus cable
3. Make sure that the cables are free before tightening the cable gland.
4. The earthing conductor of the 24 VDC cable can be connected to the designated earthing terminal on the PCB.
5. The shield of the bus cables or 0…10 VDC cable must be connected to the aluminium housing with the supplied cable clamps and M4 screws.
6. It is advisable to seal the cable glands with acid-free kit after cable installation.
7. If the endpositions are set at a later moment, re-fit the plastic plastic protective cover on the gearbox.
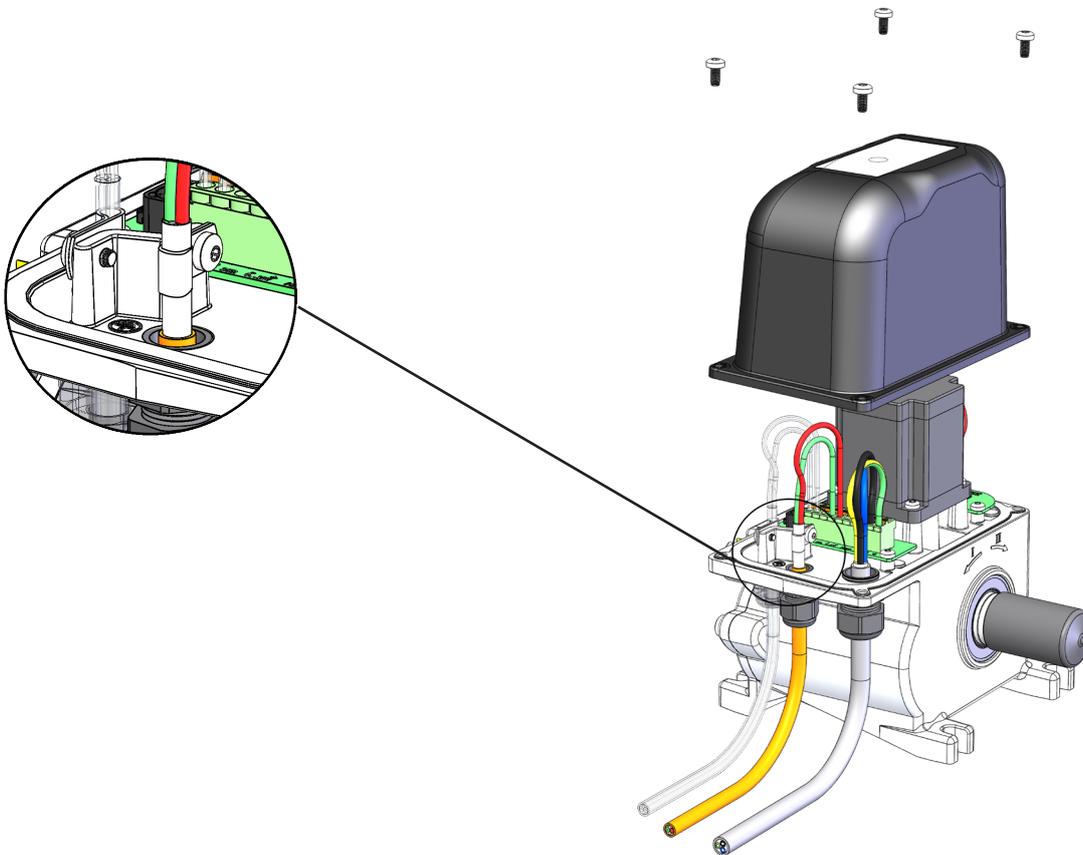
Attention!

Do not store loose parts or documents under the protective cover. This could damage and influence the functionality of the KL300 MultiWinch.

5 Electrical connection

Max cable length

Prior to installation, please determine the required cable conductor diameter. In the reduced power-mode the KL300 MultiWinch has a limited power and a limited torque. See section 9 to set KL300 MultiWinch in reduced power-mode. In the table below the maximal length of the 24VDC supply cable is set against the conductor diameter:

Conductor diameter	24 VDC (dipswitch 5 = OFF)	24 VDC reduced power mode (dipswitch 5 = ON)
1,5 mm^2	32 m | 105 ft	45 m | 147,64 ft
2,5 mm^2	55 m | 180 ft	75 m | 246,06 ft
4,0 mm^2	85 m | 279 ft	120 m | 393,70 ft

Example: When the power supply cable has a length of 35 meter | 114,82 inch, the KL300 MultiWinch is in standard setting (dipswitch 5 =OFF) and voltage is 24 VDC, the required cable is 2 x 2,5 mm2.

Note: If longer cable lengths are required, compensating for the voltage loss by increasing the supply voltage must be considered. A conductor diameter of 1.5 mm^2 requires a 1 VDC increase per 10 m of cable length and a diameter of 2.5 mm^2 requires a 1 VDC increase per 15 m | 49,21 ft of cable length (both in addition to the relevant value specified in the table).

> **Attention!**
>
> Supply voltage for the KL300 MultiWinch is 24 VDC ± 10%

Cable	Voltage	Min. conductor diameter
Power cable 24 VDC	24 VDC	see other table
Control cable 0...10 VDC	0 ... 10 VDC	0,75 mm^2
Modbus RTU (<1000 m @ max. 9600 baud	n.a.	1 x 2 x 0,64 mm^2
CAN-LOCAl (<500 m @ max 100.000 baud)	n.a.	1 x 2 x 0,64 mm^2

6 Settings

Installation and connection of the motor gearbox may only be carried out by qualified staff, see section 1. Remove the plastic protective cover from the gearbox. The control buttons are placed directly on the control board.

To endposition **"I"**

To endposition **"II"**
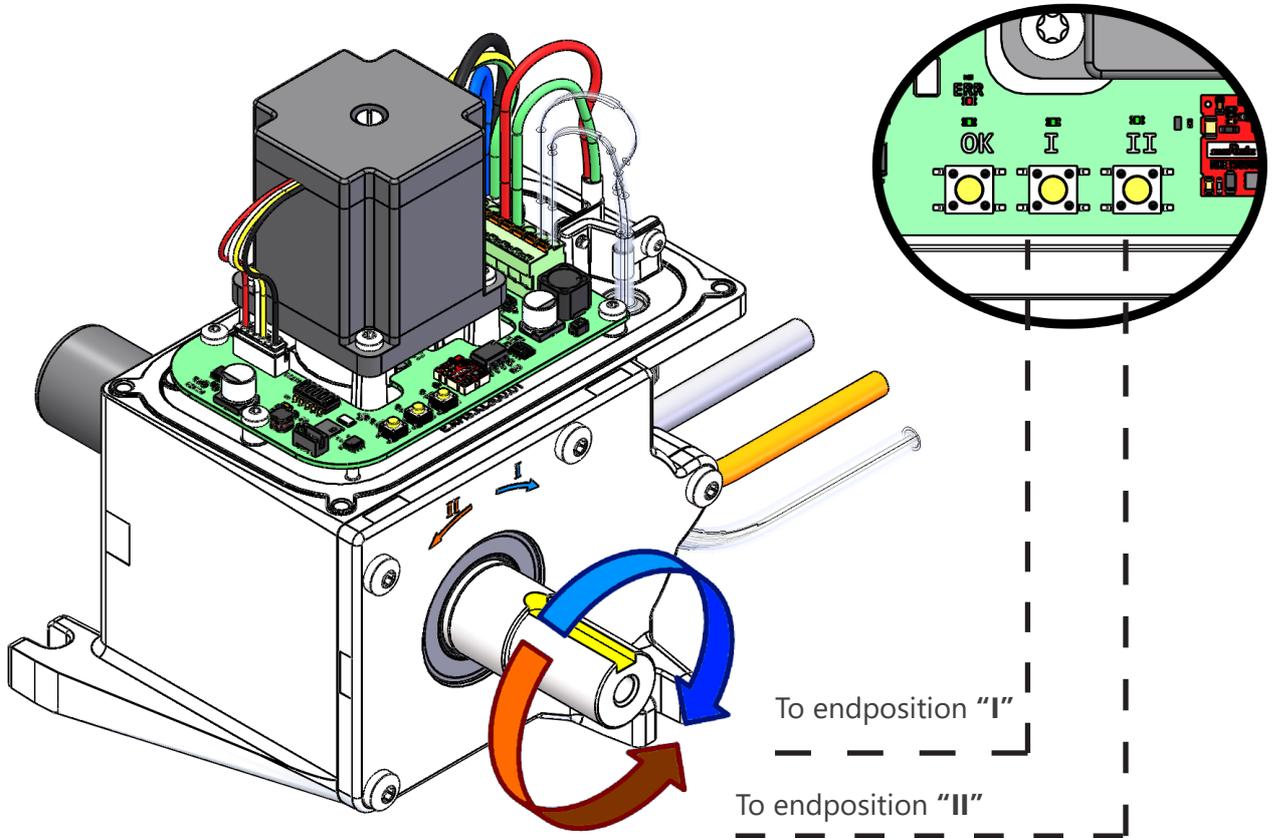
LED's on the control board

You can determine the status of the KL300 MultiWinch on the basis of the LED's on the control board. See section 9 for the location of the LED's on the board. See section 13 for explanation of the symbols of the LED flashing patterns.

OK	I	II	Description
(ON)	(ON)	(OFF)	Operating mode: KL300 MultiWinch is @ endposition **"I"**
(ON)	(OFF)	(ON)	Operating mode: KL300 MultiWinch is @ endposition **"II"**
(ON)	(flashing)	(OFF)	Operating mode: KL300 MultiWinch moves in direction **"I"**
(ON)	(OFF)	(flashing)	Operating mode: KL300 MultiWinch moves in direction **"II"**
(flashing)	(OFF)	(OFF)	Operating mode: no control signal detected
(flashing)	(flashing)	(flashing)	Endpositions have not been set
(OFF)	(flashing)	(OFF)	Programming mode: setting 1st endposition (100%)
(flashing)	(OFF)	(OFF)	Programming mode: waiting for correct control signal. Not applicable for endposition settings for bus
(OFF)	(OFF)	(flashing)	Programming mode: setting 2nd endposition (0%)
(OFF)	(flashing)	(flashing)	Programming mode: setting emergency position

6 Settings

Programming endpositions for 0...10 VDC control signal

Note: for troubleshooting and read-in problems please check section 8. It does not matter which end position is programmed first on position **"I"**. In the following description, the primary KL300 MultiWinch position is when the air inlet valve is open to the maximum. A control signal within the range of 0 ... 10 VDC can be applied. The difference between the minimum and maximum control voltage must be at least 2 V. If an emergency position is applied, the control signal must be within the range of 1 ... 10 VDC, see further in this section.

1. Press button **"OK"** for 5 seconds.. The green LED **"I"** will flash. The first position can now be set.
2. Adjust the climate controller to the maximum position (100%, e.g. inlet valve is completely open). The KL300 Multi Winch is now measuring the control signal that matches the maximum position (any voltage between 0...10 VDC)
3. Let the KL300 MultiWinch run to the maximum position by pressing the button **"I"** or **"II"**. The KL300 MultiWinch will run automatically if button "OK" is pressed shortly (pulse) simultaneously with button **"I"** or **"II"**. To stop the KL300 MultiWinch again, button **"I"** or **"II"** must be pressed shortly.

> **Caution!**
>
> ⚠️ The KL300 MultiWinch will not stop in automatic mode. If a maximum position is overrun, damage may occur to thesystem and/or construction.

4. Select the "OK" button to set the first position in the KL300 MultiWinch memory. When this position is correctly set, the LED **"OK"** will flash and both LED's **"I"** and **"II"** are off.
5. Adjust the climate controller to the minimum position (0%, e.g. inlet valve is closed). The KL300 MultiWinch is now measuring the control signal that matches the minimum position (any voltage between 0...10 VDC). As soon the control signal differs more than 2 VDC, LED **"II"** will start to flash and LED **"OK"** will turn off.
6. Let the KL300 MultiWinch run to the minimum position by pressing the button **"I"** or **"II"**. The KL300 MultiWinch will run automatically if button **"OK"** is pressed shortly (pulse) simultaneously with button **"I"** or **"II"**. To stop the KL300 MultiWinch again, button **"I"** or **"II"** must be pressed shortly.

> **Caution!**
>
> ⚠️ The KL300 MultiWinch will not stop in automatic mode. If a maximum position is overrun, damage may occur to thesystem and/or construction.

7. Select the **"OK"** button to set the second position in the KL300 MultiWinch memory. When this position is correctly set, the LED **"OK"** is on together with the LED of the last selected position **"I"** or **"II"**.
8. Both end positions of the KL300 MultiWinch are set. The KL300 MultiWinch will automatically run to the position that is set at the climate controller.

Previous steps are shown in the table on the next page.

> **Tip!**
>
> 💡 Verify if the KL300 MultiWinch is set at the correct positions before automatic operation.

6. Settings

LED indication for 0 … 10 VDC control

Step	Action	OK	I	II	Description
		⎍⎍⎍ (flashing)	⎍⎍⎍ (flashing)	⎍⎍⎍ (flashing)	Endposition have not been programmed
1	Press **"OK"** button for 5 sec				
		☐ (OFF)	⎍⎍⎍ (flashing)	☐ (OFF)	ready to set 1th endposition
2	Set climate controller to 1st endposition				
3	Press **"I"** or **"II"** to adjust the KL300 MultiWinch to the correct position				
4.	Press **"OK"** to set 1st position				
		🟩 (ON)	☐ (OFF)	☐ (OFF)	Programming mode: waiting on correct control signal
5	Set climate controller to 2nd endposition.				
		☐ (OFF)	☐ (OFF)	⎍⎍⎍ (flashing)	Ready to set 2nd endposition
6	Press **"I"** or **"II"** to adjust the KL300 MultiWinch to the correct position				
7	Press **"OK"** to set the 2nd position				
		🟩 (ON)	🟩 (ON)	☐ (OFF)	Programming ready, KL300 MultiWinch is in endposition direction **"I"**
	or				
		🟩 (ON)	☐ (OFF)	🟩 (ON)	Programming ready, KL300 MultiWinch is in endposition direction **"II"**
8	Set climate controller in automatic mode				
		🟩 (ON)	☐ (OFF)	☐ (OFF)	Operating mode: KL300 MultiWinch is between endpositions
		🟩 (ON)	⎍⎍⎍ (flashing)	☐ (OFF)	Operating mode: KL300 MultiWinch moves in direction **"I"**
		🟩 (ON)	☐ (OFF)	⎍⎍⎍ (flashing)	Operating mode: KL300 MultiWinch moves in direction **"II"**
		🟩 (ON)	🟩 (ON)	☐ (OFF)	Operating mode: KL300 MultiWinch is @ endposition **"I"**
		🟩 (ON)	☐ (OFF)	🟩 (ON)	Operating mode: KL300 MultiWinch is @ endposition **"II"**

See section 13 for explanation of the symbols of the LED flashing patterns.

6. Settings

Programming emergency position for 0...10 VDC control signal

When the 0...10 VDC control signal fails (= 0 VDC), the KL300 MultiWinch will automatically move to the emergency position. To apply the emergency position, next requirements need to be met:

• Control signal needs to be in the range of 1...10 VDC.
• The emergency position needs to be set.
• The control signal fails for at least 45 seconds (alarm delay).

To set the emergency position the following steps need to be taken:
1. Both endpositions of the KL300 MultiWinch must be set and the operating mode is active.
2. Set the climate controller to a position that meets the desired emergency position.
3. When the KL300 MultiWinch has reached the desired position LED's **"I"** or **"II"** stop flashing.
4. Press both buttons **"I"** and **"II"** simultaneously for minimal 5 seconds. The LED's **"I"** and **"II"** will flash.
5. Press button **"OK"** to set the emergency position.

> **Note**
>
> To remove the emergency position press both buttons **"I"** and **"II"** simultaneously for minimal 5 seconds again. Then switch off the 24 VDC power.

Led indication

Step	Action	OK	I	II	Description
1	Both endpositions have been programmed and the operating mode is active				
		(ON)	(OFF)	(OFF)	KL300 MultiWinch is between endpositions **"I"** and **"II"**
			Or		
		(ON)	(ON)	(OFF)	KL300 MultiWinch is in endposition direction **"I"**
			Or		
		(ON)	(OFF)	(ON)	KL300 MultiWinch is in endposition direction **"II"**
2	Set climate controller to emergency position				
		(ON)	⊓⊔⊓⊔	(OFF)	KL300 MultiWinch moves in direction **"I"** to emergency position
			Or		
		(ON)	(OFF)	⊓⊔⊓⊔	KL300 MultiWinch moves in direction **"II"** to emergency position
3	KL300 MultiWinch has reached desired emergency position	(ON)	(OFF)	(OFF)	Ready to set emergency position
4	Press **"I"** and **"II"** simultaneously for 5 sec.				
		(ON)	⊓⊔⊓⊔	⊓⊔⊓⊔	
5	Press **"OK"** to set emergency positon				

See section 13 for explanation of the symbols of the LED flashing patterns

6. Settings

Programming endpositions for Modbus RTU / CAN-LOCAL

Note: for status messages and troubleshooting read-in problems please check section 8.

1. Press button **"OK"** for 5 seconds.. The green LED **"I"** will flash. The first position can now be set.
2. Let the KL300 MultiWinch run to the maximum position by pressing the button **"I"** or **"II"**. The KL300 MultiWinch will run automatically if button **"OK"** is pressed shortly (pulse) simultaneously with button **"I"** or **"II"**. To stop the KL300 MultiWinch again, button **"I"** or **"II"** must be pressed shortly.

> **Caution!**
>
> ⚠️ The KL300 MultiWinch will not stop in automatic mode. If a maximum position is overrun, damage may occur to the system and/or construction.

3. Select the **"OK"** button to set the first position in the KL300 MultiWinch memory. When this position is correctly set, the LED **"OK"** will flash and both LED's **"I"** and **"II"** are off.
4. Press button **"OK"** for 5 seconds.
5. Let the KL300 MultiWinch run to the minimum position by pressing the button **"I"** or **"II"**. The KL300 MultiWinch will run automatically if button **"OK"** is pressed shortly (pulse) simultaneously with button **"I"** or **"II"**. To stop the KL300 MultiWinch again, button **"I"** or **"II"** must be pressed shortly.

> **Caution!**
>
> ⚠️ The KL300 MultiWinch will not stop in automatic mode. If a maximum position is overrun, damage may occur to the system and/or construction.

6. Select the **"OK"** button to set the second position in the KL300 MultiWinch memory. When this position is correctly set, the LED **"OK"** is on together with the LED of the last selected position **"I"** or **"II"**.
7. Both end positions of the KL300 MultiWinch are set. The KL300 MultiWinch will automatically run to the position that is set at the climate controller.

Previous steps are shown in the table on the next page.

> **Tip!**
>
> 💡 Verify if the KL300 MultiWinch is set at the correct positions before automatic operation.

6 Settings

Led indication for Modbus RTU/ CAN-LOCAL

Step	Action	OK	I	II	Description
		⊓⊔⊓⊔	⊓⊔⊓⊔	⊓⊔⊓⊔	Endposition have not been programmed
1	Press **"OK"** button for 5 sec				
		☐ (OFF)	⊓⊔⊓⊔	☐ (OFF)	ready to set 1th endposition
2	Press **"I"** or **"II"** to adjust the KL300 MultiWinch to the correct position				
3	Press **"OK"** to set the 1th position				
		■ (ON)	☐ (OFF)	☐ (OFF)	Programming mode: waiting on correct control signal
4	Press button **"OK"** for 5 sec.				
		☐ (OFF)	☐ (OFF)	⊓⊔⊓⊔	Ready to set 2nd endposition
5	Press **"I"** or **"II"** to adjust the KL300 MultiWinch to the correct position				
6	Press **"OK"** to set the 2nd position				
		■ (ON)	■ (ON)	☐ (OFF)	Programming ready, KL300 Multi-Winch is in endposition direction **"I"**
	or				
		■ (ON)	☐ (OFF)	■ (ON)	Programming ready, KL300 Multi-Winch is in endposition direction **"II"**
7	Set climate controller in automatic mode				
		■ (ON)	☐ (OFF)	☐ (OFF)	Operating mode: KL300 MultiWinch is between endpositions
		■ (ON)	⊔⊓⊔⊓	☐ (OFF)	Operating mode: KL300 MultiWinch moves in direction **"I"**
		■ (ON)	☐ (OFF)	⊔⊓⊔⊓	Operating mode: KL300 MultiWinch moves in direction **"II"**
		■ (ON)	■ (ON)	☐ (OFF)	Operating mode: KL300 MultiWinch is @ endposition **"I"**
		■ (ON)	☐ (OFF)	■ (ON)	Operating mode: KL300 MultiWinch is @ endposition **"II"**

7 Modbus RTU protocol - Register Implementation

Setting communication parameters:

The Modbus "baud-rate" can be changed through a Modbus command. The "Device address" can be changed through a Modbus command in combination with dipswitches 1...3 of the Address dipswitch (Address = dipswitch + Address Offset). See section 9 for the dipswitch positions.

Parameters:
- Device address   0 (Default)
- Baud-rate   9600
- Data Bits   8
- Parity   None
- Stop Bits   1

Modbus commands

The following Modbus commands are supported by this Modbus implementation:
- 0x06: "Write single register". This command can only be used to write a 16 bit value to a single Modbus register.
- 0x10: "Write multiple registers". Use this command e.g. to write a 32 bit value into two consecutive Modbus registers.
- 0x03: "Read holding registers". Use this command to read one or more "holding registers".

Variables

The variables can be accessed via the Modbus registers as stated below. For each variable two Modbus registers are used as the variables are 32 bit values. The least significant bits are stored in the first register and the most significant bits are stored in the second register (as defined by the Modbus standard). Use only the registers that are described in this document.

| Registers	Name	Description
0x390:0x391	Current position	0 ... 1000 = 0.0 ... 100.0%
0x392:0x393	Desired position	0 ... 1000 = 0.0 ... 100.0%
0x396:0x397	Motor voltage	e.g. 246 = 24.6V
0x398:0x399	Software version	e.g. 102 = Version 1.02
0x39C:0x39D	KL300 status	bit 1: Not used bit 2: Not used bit 3: Running towards 0% bit 4: Running towards 100% bit 5: Current in end position 0% bit 6: Current in end position 100% bit 7: Not used bit 8: Not used
0X3A0:0X3A1	Communication heartbeat	If Communication-failsafe is active in this register a ´1´ has to be written within the Communication-failsafe timeout time

7 Modbus RTU protocol - Register Implementation

Attention!

When too many commands are sent within a short time frame Modbus communication may fail. Spread messages within the longest possible time frame by selecting the lowest baud-rate.

Modbus wiring diagram

The diagram below shows how to wire, according to the RS-485 specification (TIA/EIA-485-A), an RTU Network.
In this example the master needs to have a termination resistor and last KL300 MultiWinch (Node 7) needs to have the termination resistor activated (dipswitch SW5 switched to "1", see section 9).
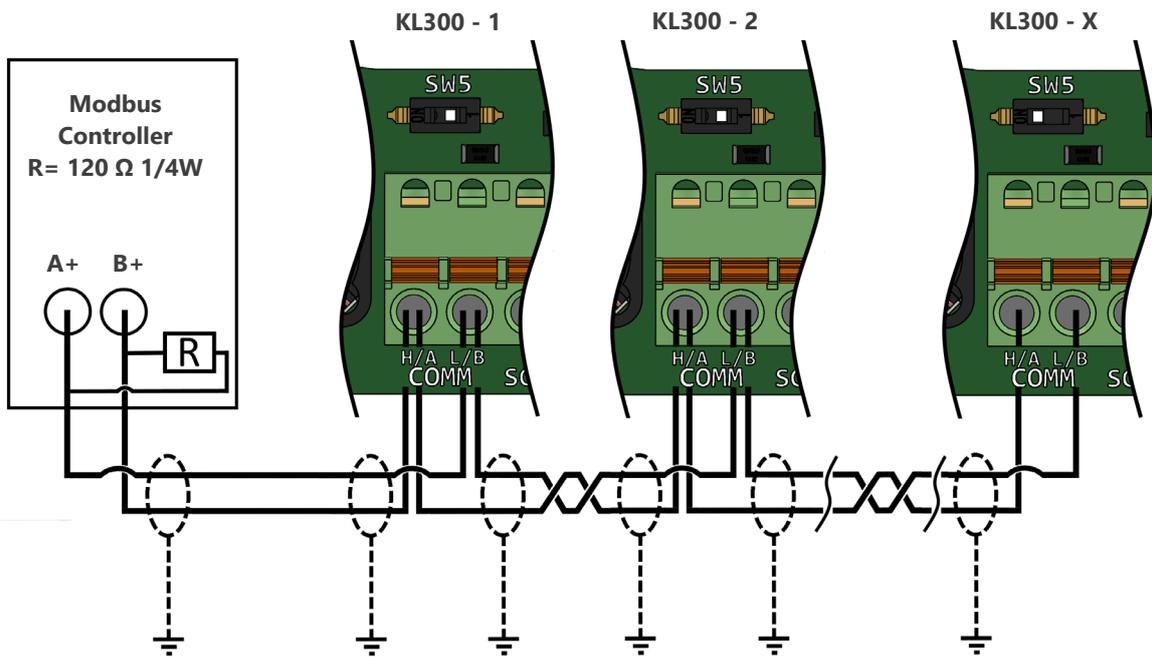
RTU Network

A maximum number of 256 modules can be connected. In theory this means one master and 255 KL300 MultiWinch can be connected on one RTU network. Please note: the distances and type of cable can limit this maximum number.

Termination resistors

In order to avoid reflections the use of termination resistors is necessary. These resistors (R) of 120 ohms must be connected in parallel between the data lines + and -. A termination resistor is only required at the first and the last module in the network. The KL300 MultiWinch is equipped with a built in termination resistor which can be activated with dipswitch SW5 to close the Modbus.

7 Modbus RTU protocol - Register Implementation

Modbus settings

Access to the settings is possible via the Modbus registers below. For each variable two Modbus registers are used as the variables are 32 bit values. The least important bits are stored in the first register and the most important bits are stored in the second register (as defined by the Modbus standard). Only use registers which are described in this document. Default settings are in bold.

Registers	Name	Description
0x3A6:0x3A7	Invert Modbus	**0 = Modbus 0-100%** 1 = Modbus 100-0%
0x3A8:0x3A9	Offset Modbus Device address	0...255 **(default 0)** Modbus address = Dipswitch + Offset
0x3AA:0x3AB	Modbus baud-rate	**0 = 9600 baud** 4 = 38400 baud 1 = 14400 baud 5 = 57600 baud 2 = 19200 baud 6 = 76800 baud 3 = 28800 baud 7 = 115200 baud
0x3CC:0x3CD	"Communication- failsafe ON/OFF"	**0 = Communication-failsafe OFF** 1 = Communication-failsafe ON
0x3CE:0x3CF	Communication- failsafe setpoint	When Communication-failsafe is active and communication is interrupted, the KL300 MultiWinch will run to this position. 0 ... 1000 = 0.0 ... 100.0 % **(default 0)**
0x3D0:0x3D1	Communication failsafe Timeout	If Communication-failsafe is active this is the maximum time within the heartbeat register has to be written with '1'. 0 ... 60000 (ms) **(default 0)**
0x3E0:0x3E1	Save settings	Write at least a '1' in this register to save the settings

Attention!

A new Modbus Device-address and/or baud-rate setting will only be active after a restart of the KL300 MultiWinch Modbus.

8 Troubleshooting

Troubleshooting may only be performed by qualified staff, see section 1. If you encounter a problem not listed below, please contact your supplier or the manufacturer.

Alarm relays

During normal operation of the KL300 MultiWinch the alarm contact is made, the green OK LED is ON and the red Error LED is OFF. During setting of the endpositions and emergency position, or at a failure the alarm contact is opened. At a failure the RED error LED will flash or be permanently ON. Details on the error LED flash patterns are shown in the table below.

Fault: no control signal
- Check the climate controller and control signal cables.
- Check the screen of the cable, possibly interference from other sources is blocking a correct control signal.

Fault: endpositions cannot be set
- The setting of the second endposition will be rejected if the difference between both endpositions is less than ¼ revolution of the main shaft.
- The setting of the second endposition will be rejected if the difference of the control signal between both endpositions is less than 2 VDC.

Fault: oil leak
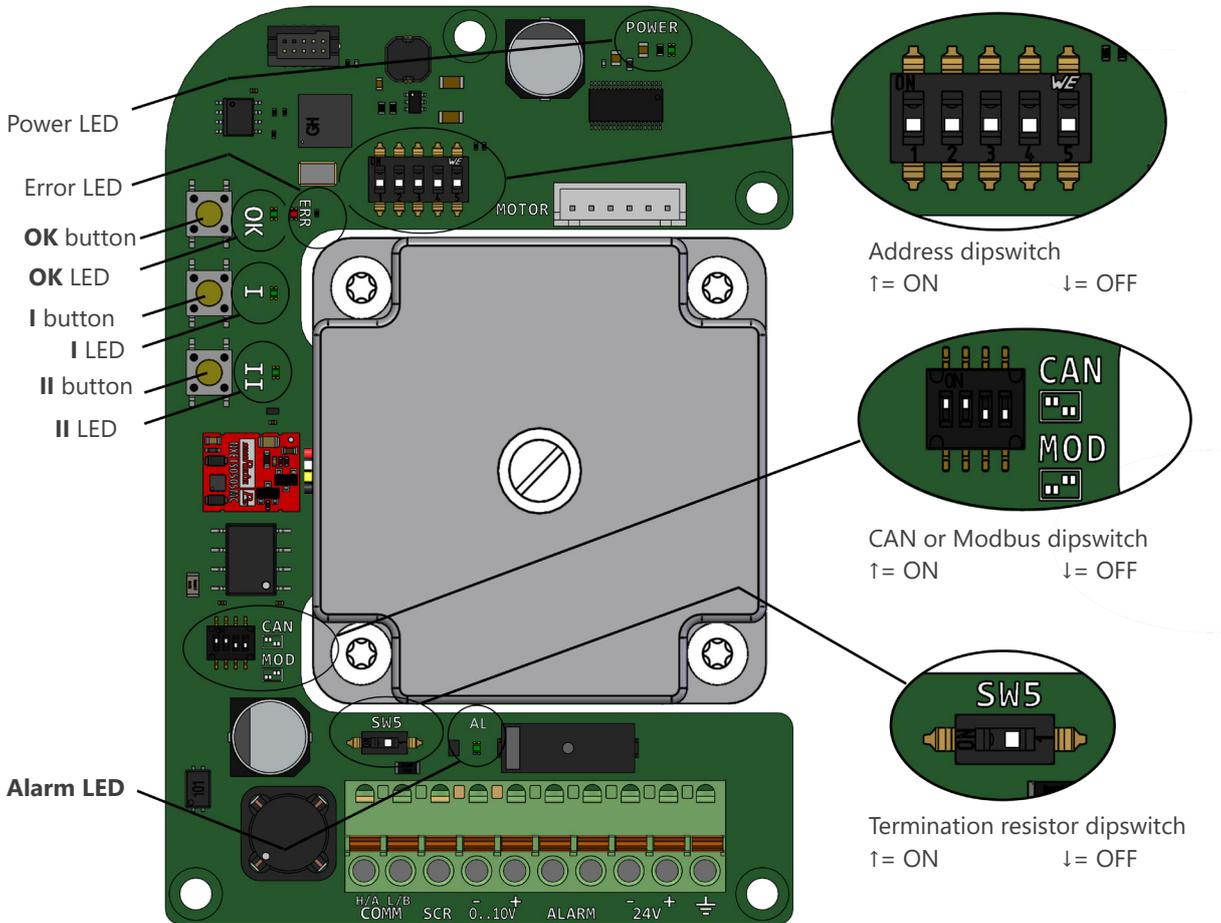- Contact the installer when the cause of oil leakage is not related to installation error.

Fault: voltage loss
- The power cables are too long or the conductor diameter is too small
- The power cable is used by multiple motors / consumers. Preferably use one cable for every KL300 MultiWinch.

Error Led	Alarm contact	Description
☐ (OFF)	Closed (no alarm)	No alarm
■ (ON)	Open (alarm)	System alarm
⎍⎍⎍	Open (alarm)	Jamming. KL300 MultiWinch is jammed in 1 direction. Alarm resets automatically if KL300 MultiWinch moves in the opposite direction.
⎍⎍⎍	Open (alarm)	Stuck. KL300 MultiWinch is jammed in 2 directions
⎍ ⎍ ⎍	Closed (no alarm)	Power voltage too low or has been too low. This alarm will be automatically be reset after 4 starts of the KL300 MultiWinch

See section 13 for explanation of the symbols of the LED flashing patterns.

9 Position of the buttons, LED's and dipswitches

Power LED

Error LED

OK button

OK LED

I button

I LED

II button

II LED

Alarm LED

Address dipswitch
↑= ON   ↓= OFF

CAN or Modbus dipswitch
↑= ON   ↓= OFF

Termination resistor dipswitch
↑= ON   ↓= OFF

Addres dipswitch

Dipswitch 1...3   Bus address setting.
Dipswitch 4   Speed setting; "off" 0,8 rpm (standard setting), "on" 0,4 rpm.
Dipswitch 5   Reduced power-modus. With setting 'ON' the KL300 MultiWinch is when set to "ON", the
          KL300 MultiWinch is limited to it's power.
          - maximum current is reduced to 2A
          - maximum pulling force is reduced to 160 kg | 352 lbs

Offset Device address = 0 (Default value register 0x3A8:0X3A9)			
Address 1	Address 2	Address 3	Address 4
Address 5	Address 6	Address 7	Address 8

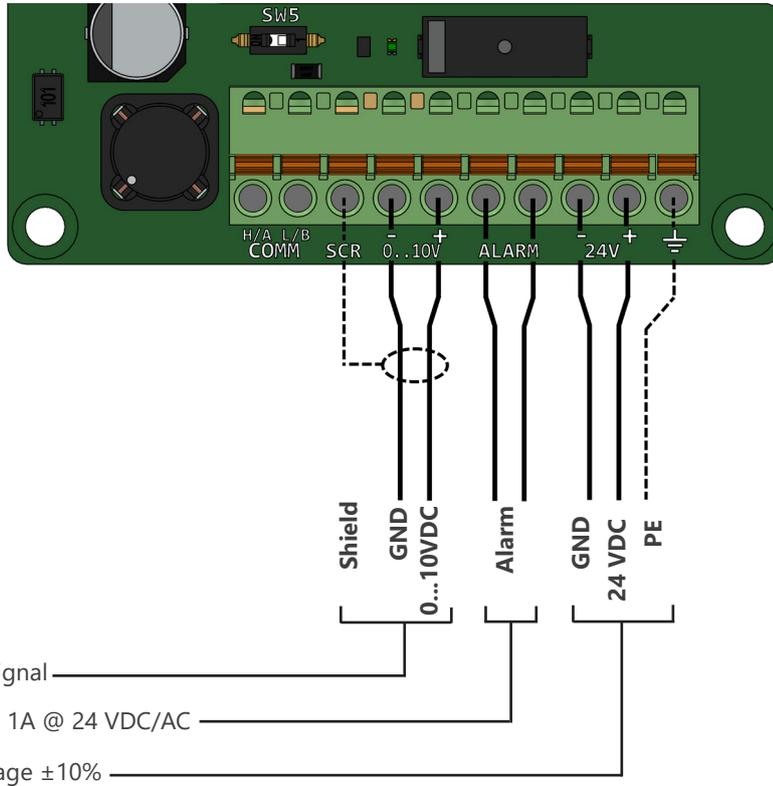## Modbus RTU or CAN-LOCAL bus selection dipswitch

In order to select the correct bus, set the dipswitches in the correct position. For CAN-LOCAL bus switches 1 & 2 must be set to "on", 3 & 4 is set to "off". For Modbus RTU switches 1 & 2 must be set to "off", 3 & 4 is set to "on". See picture for reference.
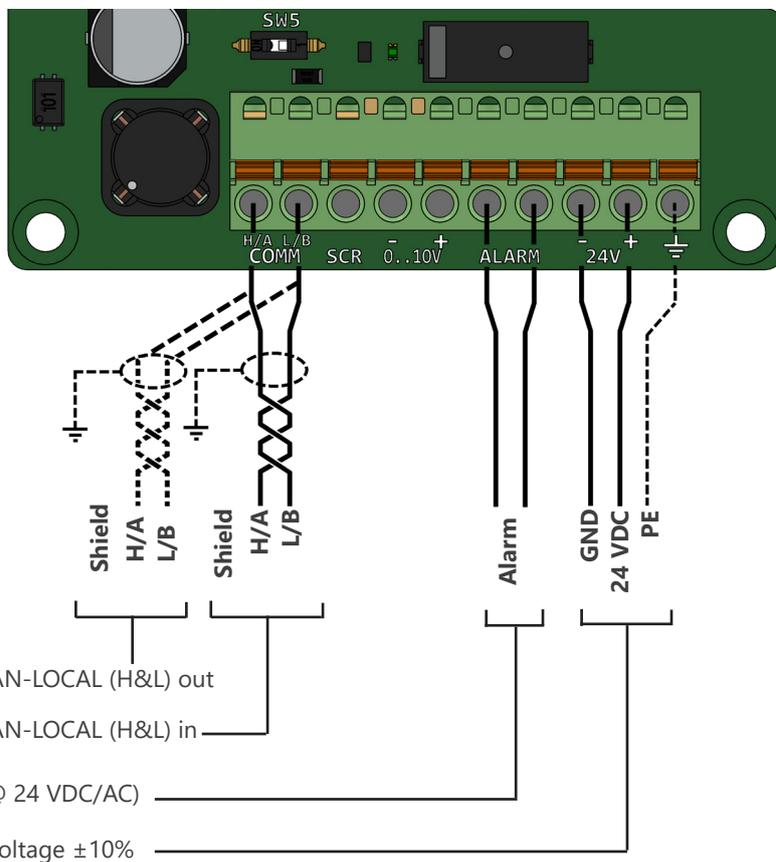
Termination resistor dipswitch

When a bus system is connected, the use of a termination resistor is necessary. This termination resistor is activated by switching the dipswitch to "1". This is only required at the last KL300 MultiWinch in the network.

10 Wiring diagram

Wiring diagram 0 ... 10 VDC control

0...10 VDC control signal

Alarm contact (max. 1A @ 24 VDC/AC

24 VDC Supply voltage ±10%

Wiring diagram Modbus RTU and/or CAN-LOCAL bus

Modbus RTU (A&B) or CAN-LOCAL (H&L) out

Modbus RTU (A&B) or CAN-LOCAL (H&L) in

Alarm contact (max. 1A @ 24 VDC/AC)

24 VDC Supply voltage ±10%

11 Inspection and maintenance

Inspection and maintenance tasks may only be carried out by qualified staff, see section 1. The KL300 MultiWinch itself is maintenance free. The gearbox has lifetime lubrication. Changing the gear oil is unnecessary.

Maintenance intervals

Every 6 months
- Check if the plastic protective cover is mounted correctly and is free of any damages.
- Check the steel cable and steel cable connections. These parts may have under no circumstances have any kind of mechanical damage.
- Check for increased noise level.

Every year
- Check and re-tighten mounting bolts.
- Check couplings for wear and corrosion.
- If present, lubricate chain couplings (oil viscosity 80 cST to 120 cST at 20°C).
- Backup power: check (if present) the functionality of the emergency backup power source.
- Check whether the endpositions are still correct. Adjust if necessary.

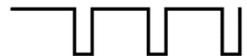| **Risk of injury or death due to electrical or mechanical forces!** |
|---|
| ⚠️ Before starting to work on the gearbox or related parts, always switch the power off at the master switch or operating switch and lock it out with a padlock to prevent switching on again. |

Spare parts and parts replacement

Parts may only be replaced by qualified staff. Always use original spare parts and original lubricants. For product safety reasons, De Gier only supplies gearboxes, motors, covers and PCB's as replacement parts. Gear unit parts may only be replaced or repaired by an authorised service representative of De Gier Drive Systems.

Image	Description	Article no.
	Shaft end cover	SP.DP.PVC.29.50
	Protective cover replacement including screws and seal.	SP.DL.KL300.01
	Replacement PCB including screws	SP.KL300.PCB.01
	Mounting set	SP.BVM.KL300.01

12 Warranty

We only accept liability for original spare parts supplied by us. The warranty terms and conditions are the same as the standard "Metaalunie" conditions. An additional copy of terms and conditions can be sent to you free of charge on request. We reserve the right to make modifications.

13 LED explanation

LED symbol	Description
(OFF)	LED is permanent off
(ON)	LED is permanent on
	LED flashes 10 times per second (10 Hz) E.g. KL300 MultiWinch runs
	LED switches off 10 times per second (10 Hz) E.g. KL300 MultiWinch is jammed in 2 directions
	LED flashes 2 times per second (2 Hz) E.g. KL300 MultiWinch is in programming mode
	LED flashes 1 time per second (1 Hz) E.g. voltage warning

14 Glossary

Name	Explanation
Axial	In the length direction of the shaft
Baud-rate	Communication transfer speed in bits per second
Dead-man vigilance system	Emergency switch actuated by a pull cord spanned along the entire length of the system
Fall-arrest protection brake	A protective device which stops descending loads if they are moving too fast
Flexible coupling	A coupling which is able to compensate for alignment errors, for instance a chain coupling, universal joint or cardan shaft
Gearbox	A gear unit that reduces the shaft speed of the input shaft
Hazard area	The area below or directly around the driven or moving parts
Linear	Straight line
Motor gearbox	A gear unit in combination with a motor
Protective cover	Cover to prevent direct contact between people, rain, dust and the motor gearbox electronics
Self-braking	The gear unit can only be driven by the motor the drive-shaft cannot be moved by the load
Tightening torque [Nm]	Torque to which a bolted joint has to be tightened in units of in Newton-metre
Torque [Nm]	A measure of the rotational effect of a force. The magnitude of the torque is equal to the force time the radius (arm) and is expressed in Newton-metres
PE	Protective Earth, electrical connection
Radial	Perpendicular to the shaft
Relay	A switch operated by an electromagnet
Residual risks	Risks which cannot reasonably be avoided (inherent in the product)
rpm	Revolutions per minute
VDC	Voltage Direct Current