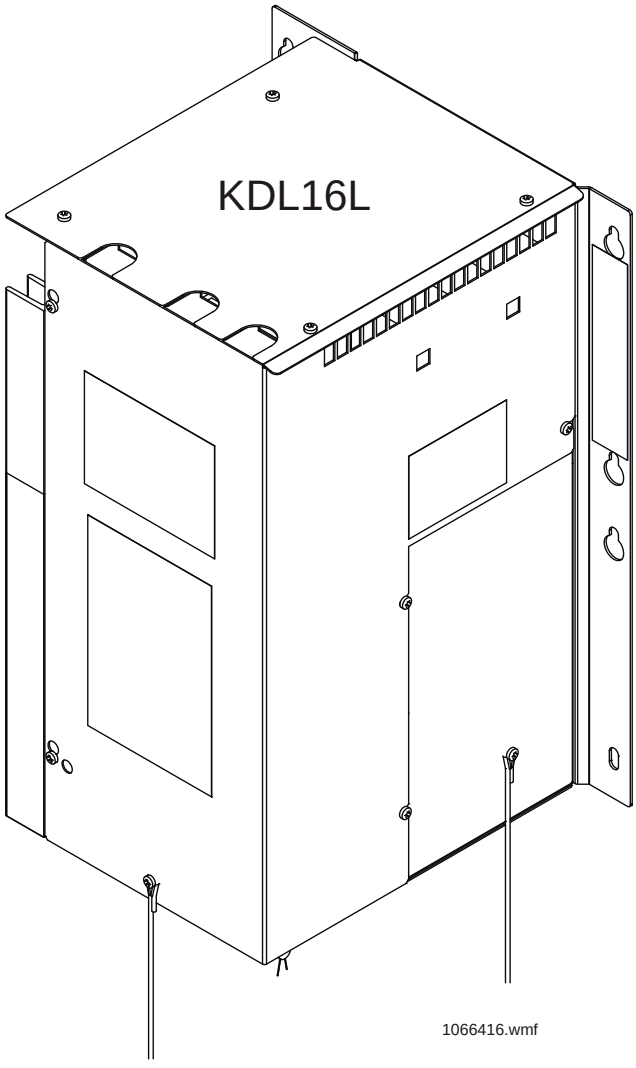
REPAIR INSTRUCTION FOR KDL16L DRIVE MODULE

This document is intended to be used by people who are familiar with elevator maintenance and installation and have received proper training on methods and safety as specified by KONE.



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CONTENTS

1 INTRODUCTION

This instruction describes the corrective actions for the KDL16L drive module.

The following tasks are described in the document:

- Replacing KDL16L drive module
- Replacing KDL16L drive module components
- Replacing braking resistor module
- Updating of the drive software

The repair and replacement tasks with KDL16L drive module require special training and technical expertise. The environment where the tasks are executed requires special attention to guarantee safety on the work.

1.1 Related documents

The following documents are related with maintenance of KDL16L drive module:

- AM-01.03.002 Take 5 - Electrical safety when working on elevators, escalators and autowalks
- AM-11.65.031 Machineroomless elevators commissioning with KDL16L drive and safety inspection
- AR-11.65.034 Spare parts for KDL16
- AS-01.01.004 Take care, end user safety focal points in elevator maintenance
- AS-01.03.101 On-site Maintenance Safety Manual
- AS-01.05.001 Instruction manual for counterweight lifting device
- AS-11.65.035 Replacement instruction for single-phase ECB-1 for KDL16 drive systems
- AS-12.02.001 Instruction for handling electrostatic-discharge-sensitive-devices on site
- ASG-11.65.034 Maintenance guidelines for KDL16
- Elevator specific MBM-2 manuals
- 972483D01 KDL16 parameter table
- 972484D01 KDL16 parameter guide
- 972485D01 Diagnostic codes for KDL16

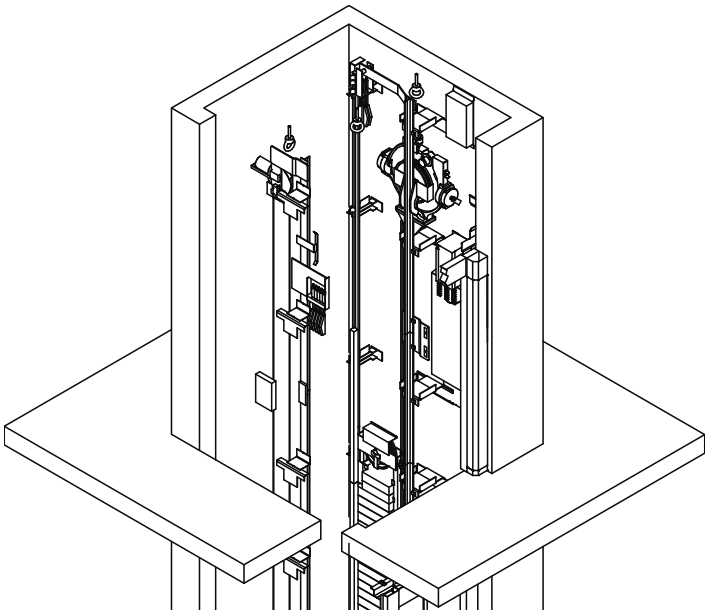
1.2 Abbreviations

The following abbreviations are used in this instruction

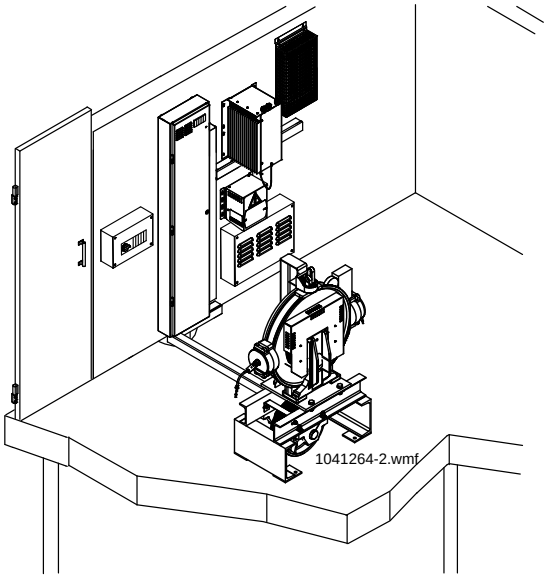
CWT = Counterweight	MR = Machine Room elevator
ESD = Electrostatic Discharge	MRL = Machineroomless elevator
IMAP = Integrated Maintenance Access Panel	PCB = Printed Circuit Board
LCE = Lift Controller Electrification	RDF = Recall Drive Feature
LWD = Load Weighing Device	SEP = Shaft Electrification Panel
MAP = Maintenance Access Panel	

1.3 Scope of the document

The KDL16L drive module can be installed to the KONE MonoSpace® and KONE ReGenerate™ with MX type elevators. The drive module is located in the shaft (KONE MonoSpace®) or in the machine room (KONE ReGenerate™ with MX).



KONE MonoSpace®

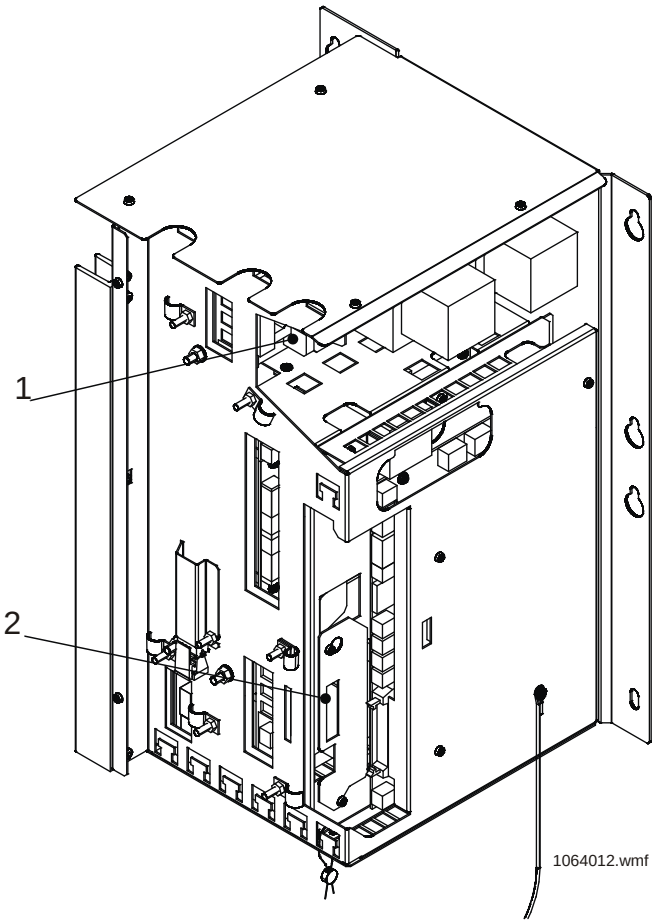


KONE ReGenerate™ with MX

1.4 Main parts of KDL16L drive system

1.4.1 KDL16L drive module

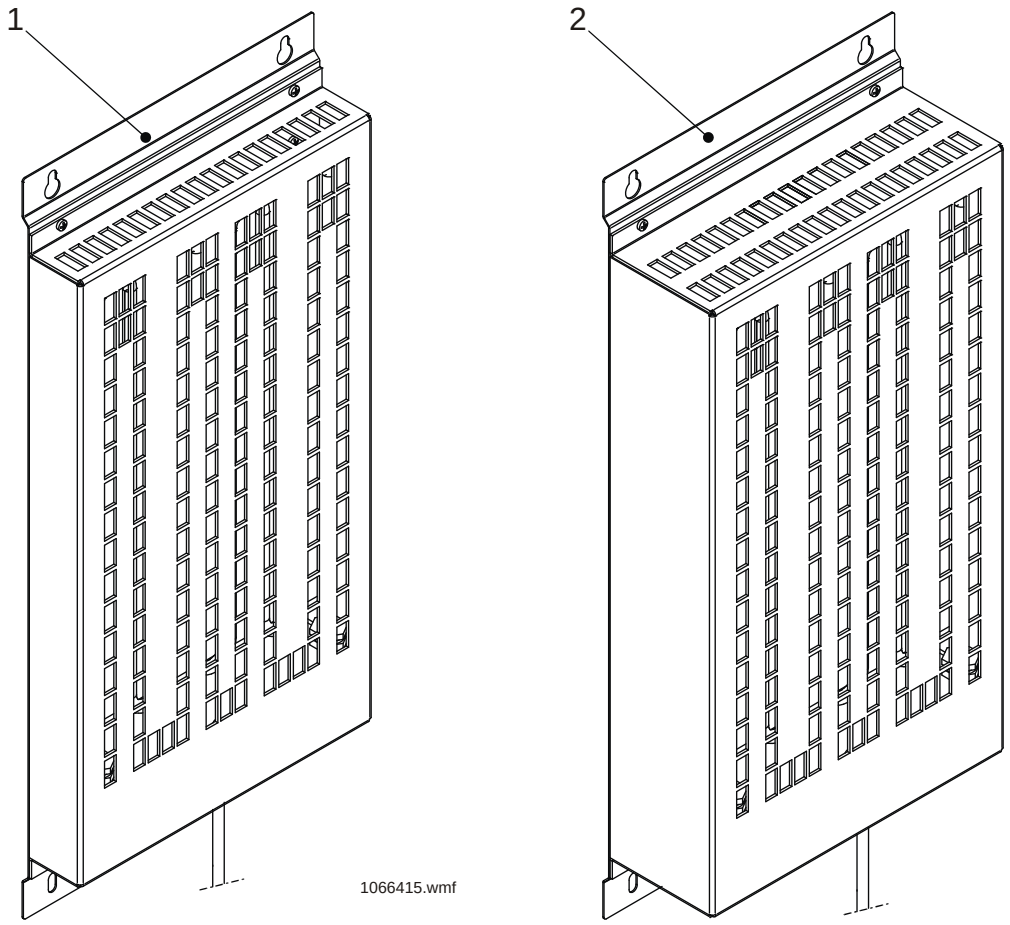
The KDL16L drive module weighs approximately 13 kg.



Pos	Name	Part number
1	Contactor board (CO16)	Check the correct KM numbers from AR-11.65.034
2	Varistor board (VRB)	

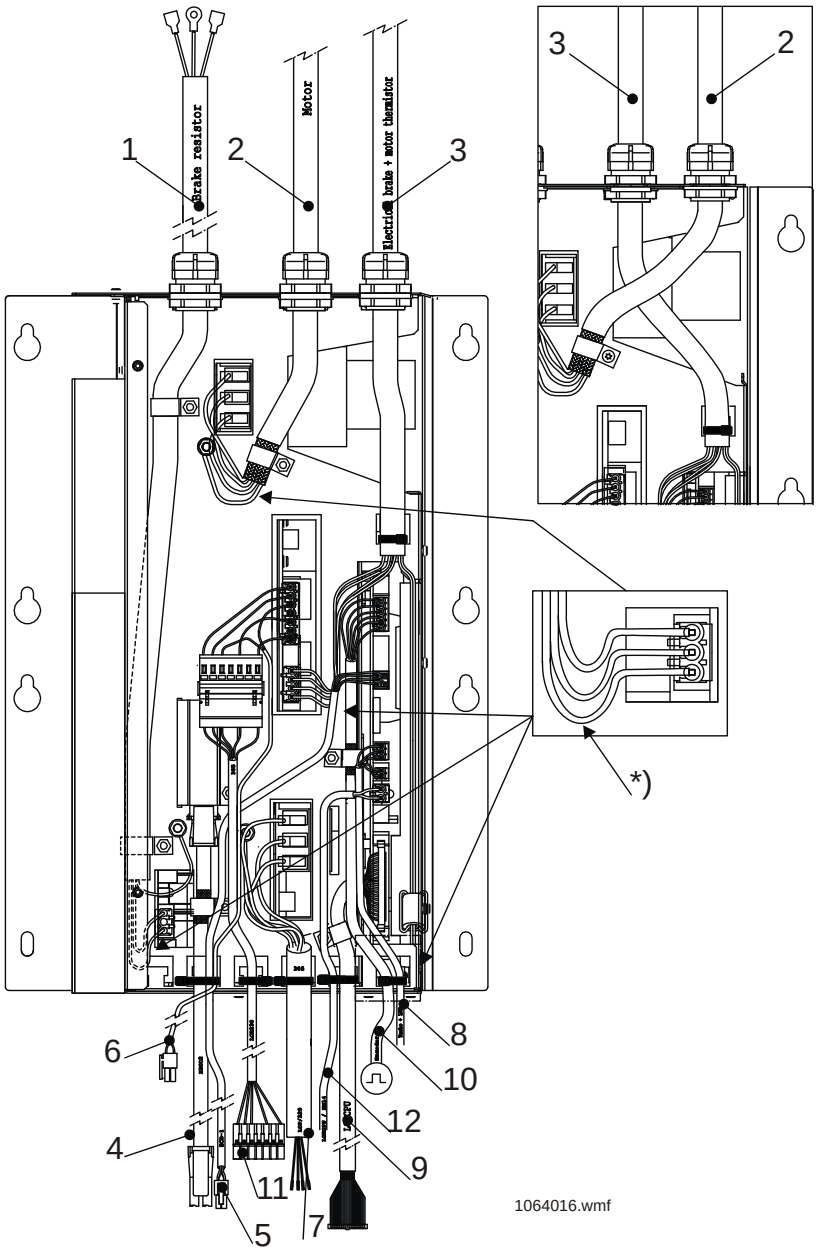
1.4.2 Braking resistor modules

The braking resistor module weighs approximately 5 kg.



Pos	Name	Part number
1	Braking resistor module (not included in the drive assembly)	KM769870G01
2		KM769870G02

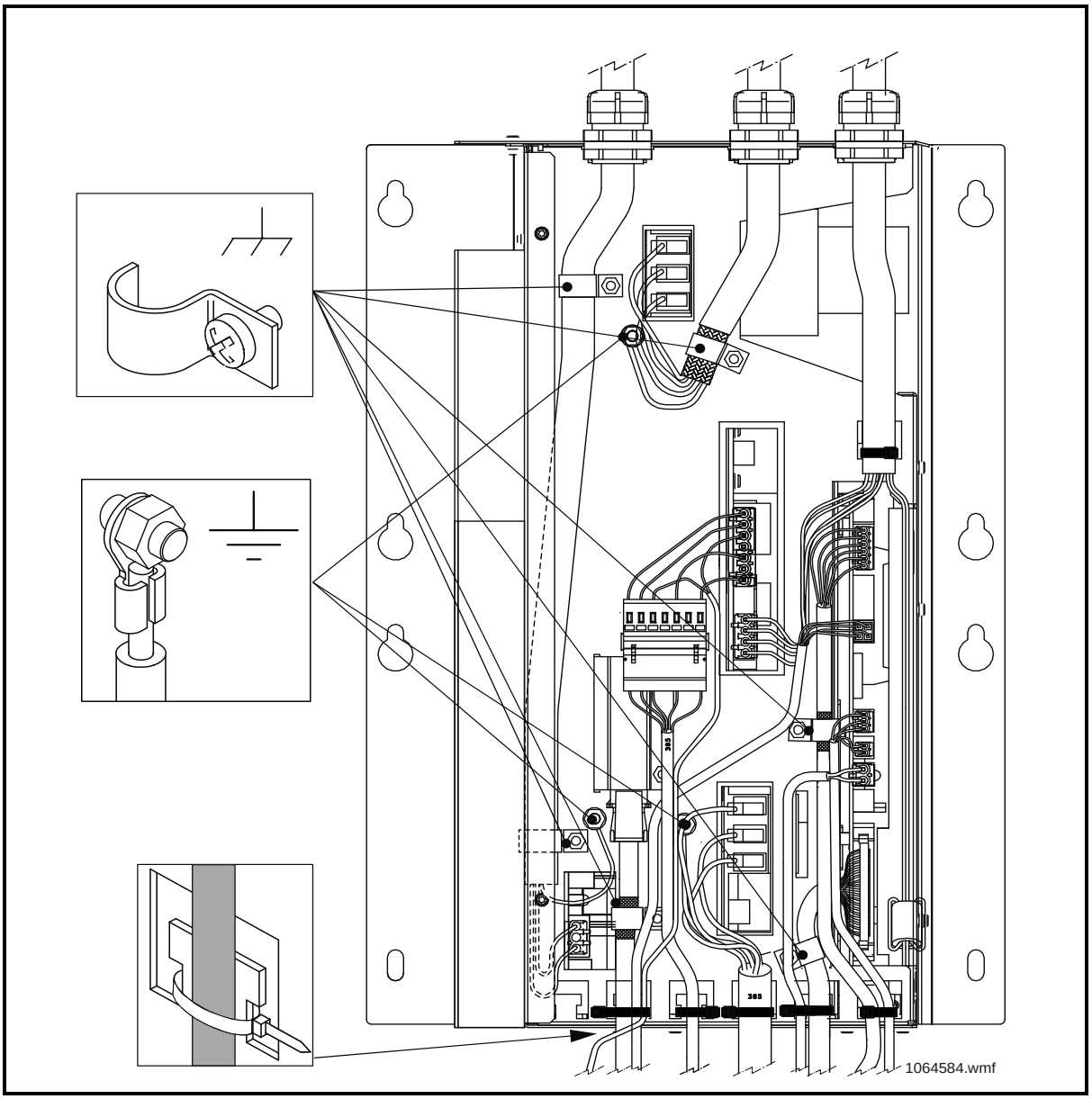
1.5 Connections of KDL16L drive module



1. Braking resistor (XBRE2)
2. Motor (U, V, W)
3. Brake (XBR4) / Thermistor (XT1)
4. DC-link (XECO2), if ECB is applicable
5. Control (XECO1), if ECB is applicable
6. Start permit linking (XS3A), if ECB is applicable
7. Terminal for power supply (T1-T3)
8. Load weighing device (XW1) / Speed feedback (XLG1)
9. LCECPU (XL1)
10. Encoder (XMEN5)
11. Brake supply (XS3)
12. 12V backup (XBAT1)
*) Loop the wires at the connectors. This is to avoid gravity water entering to the connectors.

NOTE! Cabling order of motor cable (2) and brake / thermistor cable (3) may be swapped if cables are not long enough.

1.6 Earthing of KDL16L drive module



2 ENVIRONMENTAL ISSUES

Hazardous waste material must be taken care of according to the local requirements and KONE Environment Strategy.

3 SAFETY

For more information on general safety precautions and personal safety, see AS-01.03.101.

3.1 Maintenance method safety

Note the following safety items when working with KDL16L drive module:

- General KONE safety regulations must be followed during the work. All normal safety measures required in elevator maintenance must be implemented. Local safety regulations must also be followed.
- Refer to AM-01.03.002 Take 5 - Electrical safety when working on elevators, escalators and autowalks. The Take 5 safety initiative is designed for installation, servicing, maintenance and modernisation work done on the elevators.
- Personal safety equipment must be used as required.
- Safety must be ensured with additional fences or guarding, depending on the site conditions.
- Do not work on the different levels in the elevator shaft at the same time.
- Ensure that the working site do not cause a danger to the outsiders! It is strongly recommended to use additional fences or guarding to prevent dangerous situations. For example the outsiders enter the working zone or some parts or tools cause risks of tripping on the landing.
- Ensure, that proper lighting is arranged at the work area.
- Cover of the drive module must be kept closed always when not working with the module, even if the main power has been switched OFF.
- Power must be turned OFF 5 min. before removing the protection shields.
- Prevent the reconnection of the possible emergency power supplies etc.
- Check that the drive module is de-energized before starting any work. There must be no voltage (AC or DC) in the drive module. Check the operation of the multimeter before and after the test.
- Each replacement case must be separately assessed for the risks due to site conditions. Replacement cases must not limit site conditions.
- Use only tested and calibrated measuring devices.

WARNING

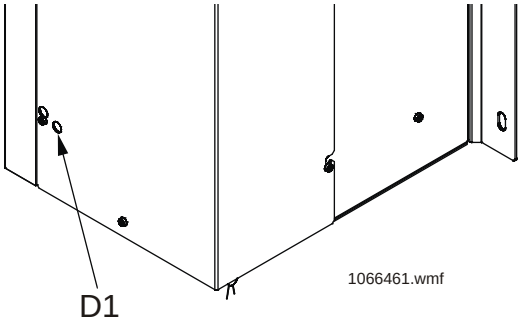
No one is allowed to be on the car roof, inside the car or in the elevator shaft when driving without encoder (6_65=0).

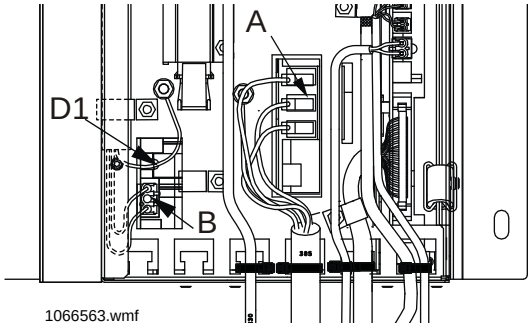
CAUTION

Run without encoder (6_65 = 0) disables encoder based speed supervisions. Avoid unnecessary use of this operation mode. Start jumps might appear. Start might fail if LWD is not working properly. This mode uses extra current and heats up the motor and causes stress for drive electronics.

3.2 Safe de-energizing method

- Check that the DANGER led (D1) is lit.
- Disconnect and prevent reconnection of the possible emergency power supplies.
- Switch OFF the main switch (220). Lock and tag.
- Wait for 5 minutes.
- Check that the DANGER led (D1) is NOT lit.
- Check that there is no voltage (AC) in power supply terminals (A) T1-T2, T1-T3, T2-T3.
- Check that there is no voltage (DC) in the intermediate circuit from braking resistor terminal XBRE2 (B). Measure from connector XBRE2 (B), between terminals 1 to ground and 3 to ground.





WARNING

If the DANGER led (D1) does not illuminate, when the main power is ON, do not open the drive module. Switch OFF the main switch (220). Lock and tag. Wait for 5 minutes. Remove the drive module with special caution! Replace the drive module with new one.

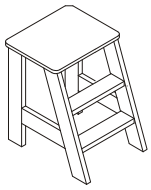
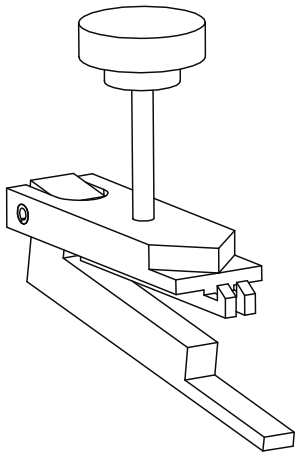
Inverter drives usually remain energized for about 5 minutes after the power has been disconnected.
DO NOT work on the drive, hoisting motor or braking resistors until you have verified that this energy has been discharged.

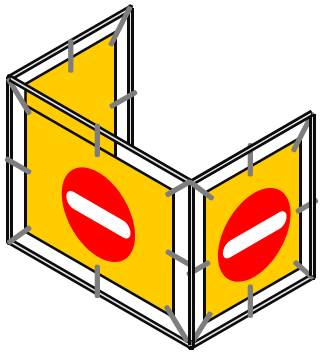
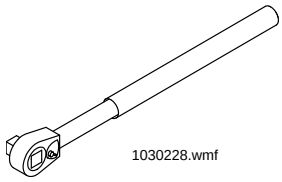
Test equipment must be set to the 1000 VDC range. The test equipment must be checked before and after the test to ensure that it functions correctly.

3.3 Basic rules preventing ESD hazards

1 Disconnect all power supplies.
2 Earth yourself before touching components.
3 Do not unpack the spare parts before installation.
4 Do not touch the components on the board unnecessarily.
5 Hold the PCB from its edges.
6 The old component must be handled in the same way as the new one.
7 Do not wear combinations of clothing that can create static charges.

4 TOOLS

Part number	Tool	Illustration/Note
	Normal hand tool set	
	Torx screwdriver	TX10
	Test weights	For LWD setup, according to rated load, only KONE ReGenerate™ with MX
	Multimeter	Fluke 179 (or equivalent) with insulated test probes (min. L = 100 mm) specified to 1000 VDC voltage  1057588.jpg
KM265173	Work stool	Height approximately 750 mm  1007089.wmf
KM871952	Door blocking tool	Only KONE MonoSpace® elevators  1052235.wmf

Part number	Tool	Illustration/Note
	Safety fence	
KM857505	ESD protection kit	Locally delivered 
	Torque wrench	Torque range 0 - 20 Nm  1030228.wmf

5 REPLACEMENT OF KDL16L DRIVE MODULE

5.1 Recording the parameters from the KDL16L drive module

Write following drive parameters down to the site survey list before switching OFF the power from the drive module.

You need this information later on when commissioning new drive module.

Reference list for parameter numbers of the replaced drive module	KDL16	Value
Motor setup type	6_60	
Nominal speed of the elevator (determines also acceleration and jerk)	6_3	
Elevator load	6_4	
Roping	6_7	
Acceleration (manually changeable, determines also jerk)	6_2	
Encoder type and polarity	6_65	
Balancing (percentage)	6_10	

5.2 Tools

Following tools are recommended to be used when replacing the drive module:

- Door blocking tool KM871952
- Safety fence
- Work stool
- Multimeter
- Torx screwdriver TX10

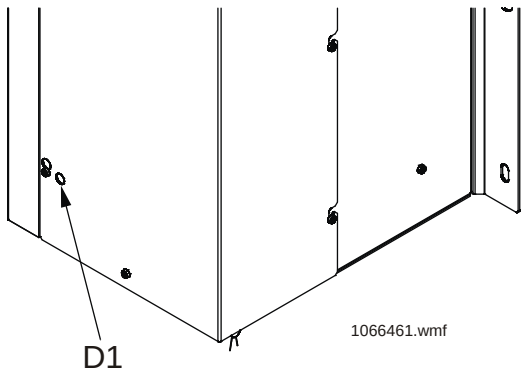
5.3 Safety measures

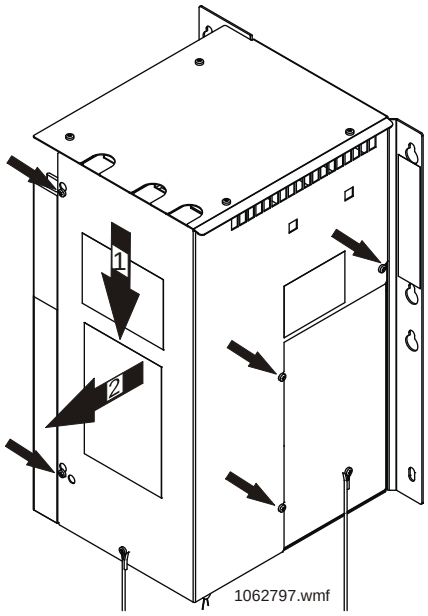
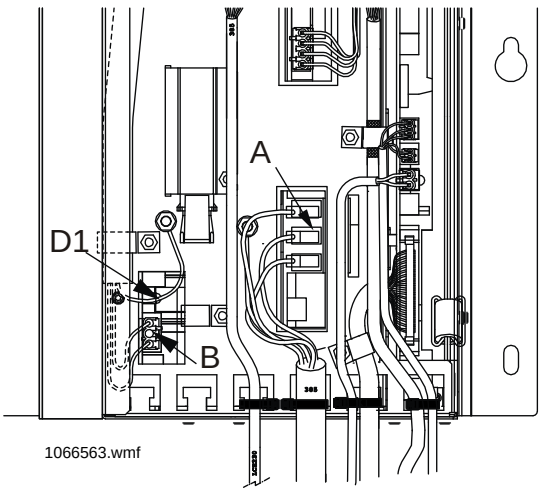
If the drive module is located in the elevator shaft, the car roof is used as a working platform. Therefore the special safety procedures and working methods are mandatory. The following safety measures must be carried out before the actual work.

5.3.1 Moving the car to suitable working position

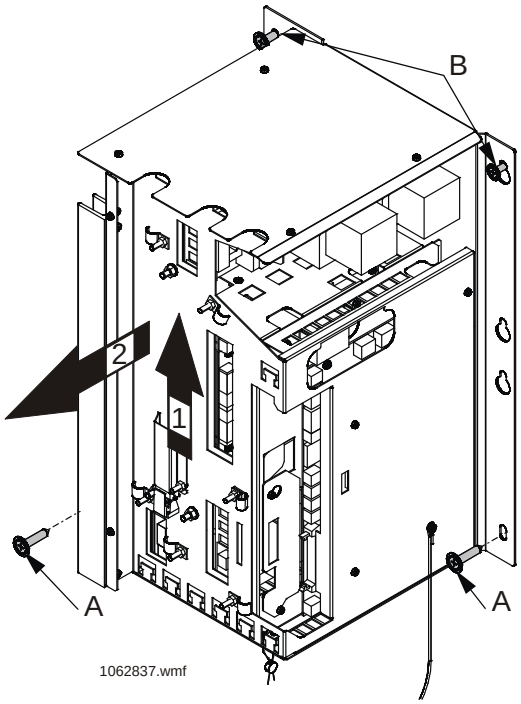
Step	Action	Illustration/Note
1	Drive the car to the topmost floor.	Only KONE MonoSpace® elevators
2	Take the elevator out of use.	Ensure the car and car roof are empty.
3	Put safety fence around the work place if needed.	
4	Open the MAP. Switch ON the RDF.	Only KONE MonoSpace® elevators
5	Move the car on RDF to a suitable working level with access to topmost landing and drive module.	Only KONE MonoSpace® elevators
6	Engage the blocking device.	Only KONE MonoSpace® elevators
7	**If the elevator could not be moved on RDF** to a suitable working level: • Switch OFF the main switch (220). • Lock and tag them. • Move the empty car upwards opening the brake or downwards using the counterweight lifting tool. • Switch ON the main switch (220). • Close the MAP.	Only KONE MonoSpace® elevators **Empty car upwards:** Open the machine brake. Move the car upwards in small steps. **Empty car downwards:** Use CWT lifting device, refer to operation instruction AS-01.05.001.

5.3.2 Measuring voltage from KDL16L drive module

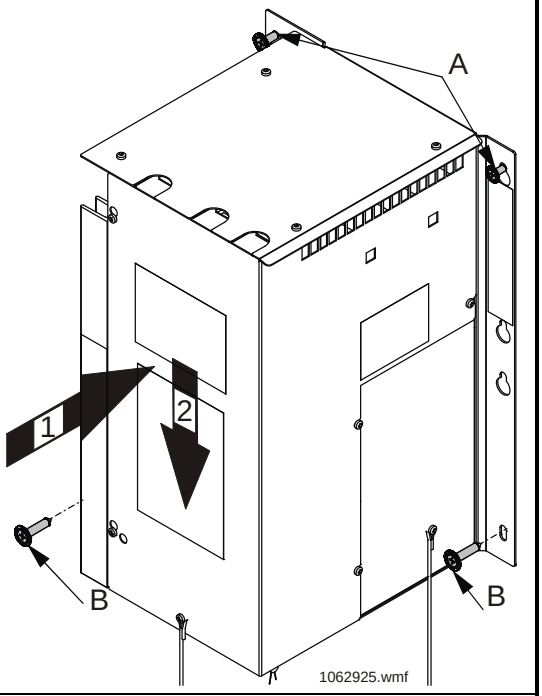
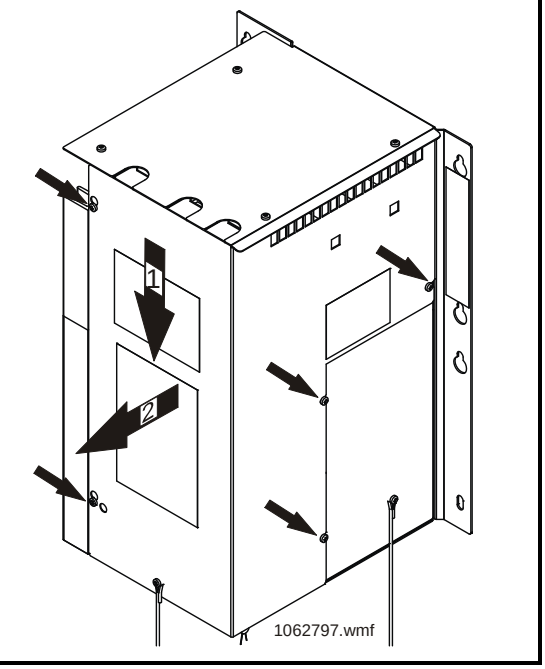
Step	Action	Illustration/Note
1	Check that the DANGER led (D1) is lit. **WARNING!**If the DANGER led (D1) does not illuminate, when the main power is ON, do not open the drive module. Switch OFF the main switch (220). Lock and tag. Wait for 5 minutes. Continue with special caution!	

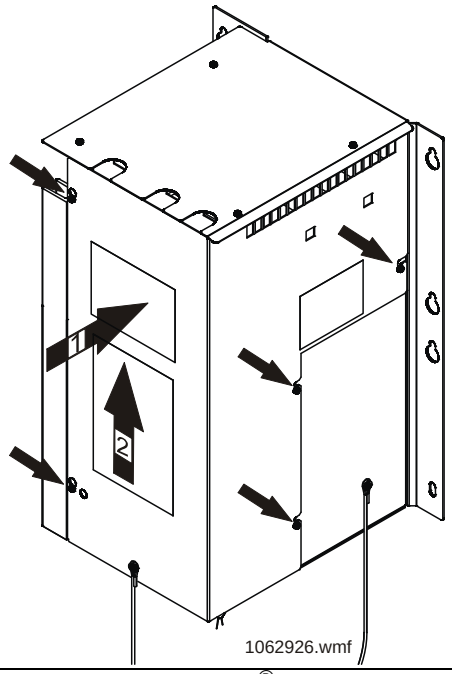
Step	Action	Illustration/Note
2	Disconnect and prevent reconnection of possible emergency power supplies.	
3	Open the MAP. Switch OFF the main switch (220). Lock and tag.	
4	Close the MAP.	
5	Open the landing door. Keep the landing door open by using door blocking device.	Only KONE MonoSpace®
6	Wait for 5 minutes.	
7	Check that the DANGER led (D1) is NOT lit.	
8	Loosen fixing screws (5 pcs.). Slide the cover of the drive module downwards and remove it.	
9	Ensure that AC voltage is not supplied to the drive module. Measure AC voltage from power supply terminals (A) T1-T2, T1-T3, T2-T3.	
10	Ensure that DC voltage is not supplied to the drive module. Measure DC voltage from connector (B) (XBRE2), between terminals 1 to ground and 3 to ground. NOTE! Check that the DANGER led (D1) is not lit (located above the XBRE2 connector (B)).	

5.4 Removing the drive module

Step	Action	Illustration/Note
1	Disconnect wires of the power supply cable from terminals.	Mark the wires, if the old markings are missing or unclear.
2	Disconnect wires of the motor cable from terminals.	Mark the wires, if the old markings are missing or unclear. Secure the lead-in nut from dropping down the shaft.
3	Disconnect all other cables from the drive module.	Mark the cables, if needed.
4	Wrap cables together in two sets by using cable ties. Place the cables so, that they do not hinder the replacement procedure.	Motor cables together Control cables together
5	Remove fixing screws (A). Loosen fixing screws (B). NOTE! The drive module has eight fixing points for different fixings, but only four of them are used. Remove the drive module and lower it to a safe working place on the landing / machine room.	

5.5 Installing new drive module

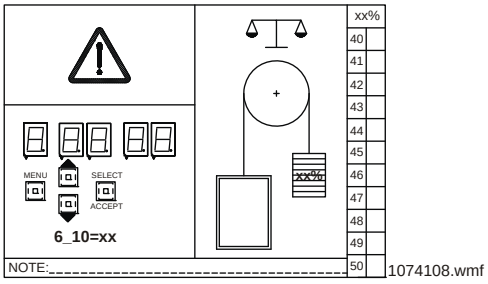
Step	Action	Illustration/Note
1	Place the cables so, that they do not hinder the installation procedure.	Wrap the motor cables together. Wrap the control cables together.
2	Lift the new drive module into the place.	
3	Tighten fixing screws (B). Insert and tighten fixing screws (A). NOTE! Check fixing points of the old drive module. The drive module has eight fixing points for different fixings, but only four of them are used.	
4	Loosen fixing screws (5 pcs.). Slide the cover of the drive module downwards and remove it.	

Step	Action	Illustration/Note
5	Connect the all the cables and earthings. Secure the cables by using cable ties.	Check the cable markings. See section 1.5 and 1.6.
6	Install the cover to the drive module. Lift the cover a little. Tighten fixing screws (5 pcs.). NOTE! Be careful not to damage the cables.	 1062926.wmf
7	Exit the car roof and close the landing door.	Only KONE MonoSpace® elevators.
8	Ensure the RDF is switched ON.	
9	Switch ON the main switch (220).	
10	Disengage the blocking device.	Only KONE MonoSpace® elevators.
11	Remove all the tools and waste material from the work site. Clean the site.	
12	Leave the car roof. Close the landing door.	Only KONE MonoSpace® elevators.

5.6 Setting the drive parameters

All the steps in the following table must always be carried out in the following order.

Step	Action	Note
1	Check that **Document identification (6_0)** parameter matches the ID on parameter list 972483D01. Record all parameter values in the parameter list and leave the list in the maintenance log book.	
Set the elevator dependent parameters:		

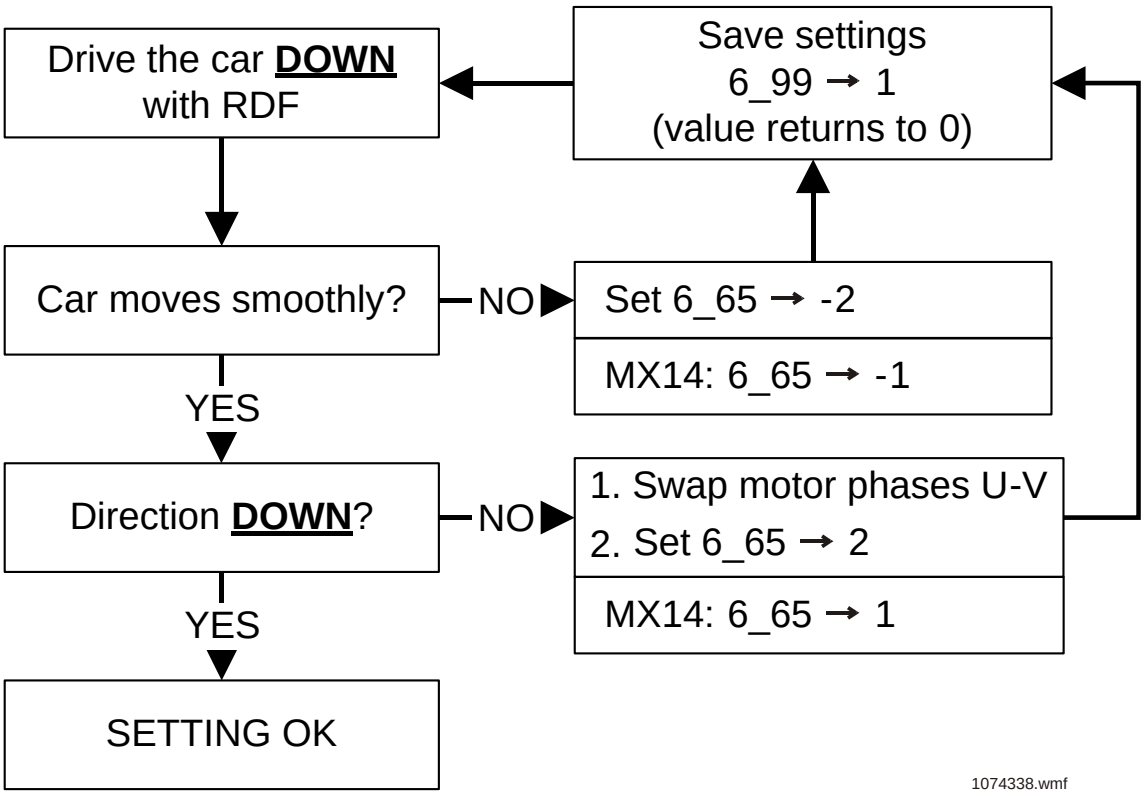
Step	Action	Note	
2	Parameter lock (6_95) parameter to 0.		
3	Default parameters (6_98) parameter to 1.	Value turns to 0.	
4	Wait at least 5 seconds.		
5	**Motor setup type (6_60)** parameter Refer to the motor data plate for motor setup type. NOTE! If Motor setup type is not listed here, please refer to APPENDIX D for adjusting it manually.	**Value** 5.20 5.22 6.20 6.21 10.20 10.21 10.26 14.02 14.12 14.04 14.14	**Type** MX05-10 MX05-16 MX06-05, MX06-10 MX06-16 MX10-05, MX10-10 MX10-11, MX10-10XE MX10-16KE MX14 (KM.....C02) MX14 (KM.....C12) MX14 (KM.....C04) MX14 (KM.....C14)
6	**Nominal speed (6_3) parameter**	Refer to layout drawings. For more information on the car balancing factor and adaptive balancing, see the layout drawings and AM-11.65.031.	
7	**Elevator load (6_4) parameter**		
8	**Roping (6_7)** parameter		
9	**Balancing (6_10)** parameter (for elevators with adaptive balancing only) Set the car balancing factor as the parameter value.		
10	Mark the car balancing factor to the sticker inside MAP (for elevators with adaptive balancing only).		
11	**Brake test (6_30)** parameter to 1 (enabled).		
12	**Save (6_99)** parameter to 1.	Value is returned automatically to 0.	
13	Switch the power OFF. Wait at least 15 seconds.		
14	Switch the power ON.		
15	Check that the **Motor setup type (6_60)** parameter is set to the correct value.		

5.7 Checking the motor direction and encoder polarity

WARNING

No one is allowed to be on the car roof when driving the car with RDF.

NOTE! Check movement directly from the car, do not look from the speed LEDs of LOP-CB.



6 REPLACING MACHINE ENCODER

This paragraph describes actions needed to be able to run the hoisting machine without encoder. The method may be needed to move the elevator car to a suitable level for encoder replacement in machineroomless elevators. The feature is available in KDL16 software version 2.10 and newer. Check existing software version from **software versions parameter 6_97**. Refer to chapter 11 for software update.

WARNING

No one is allowed to be on the car roof, inside the car or in the elevator shaft when driving without encoder (6_65=0).

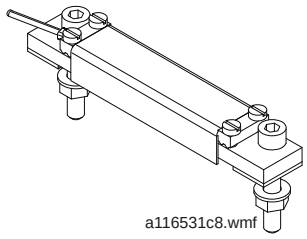
CAUTION

Run without encoder (6_65 = 0) disables encoder based speed supervisions. Avoid unnecessary use of this operation mode. Start jumps might appear. Start might fail if LWD is not working properly. This mode uses extra current and heats up the motor and causes stress for drive electronics.

Step	Action	Illustration/Note
1	Turn the elevator to RDF.	
2	Check that LWD is operative by 5_1 - must be real value but not -25% (out of range) or fixed 50% (LWD adjustment not done).	LWD must be connected and operative.
3	Record **Encoder type and polarity parameter (6_65)** value to be able to use recorded value after successful encoder change.	
4	Set **Encoder type and polarity parameter (6_65)** to 0.	LOP_CP speed display leds informs about this special feature by blinking up/ downwards.
5	Set **Save (6_99)** parameter to 1.	
6	Run the motor by RDF first downwards and then upwards and check that the elevator car moves to correct direction.	If the elevator does not move to both directions, the car might get stuck near the shaft top or bottom.
7	Run the car to best possible working position.	
8	Change the encoder. Refer to machine specific instructions.	
9	Set **Encoder type and polarity parameter (6_65)** to the recorded value in step 3.	
10	Try to run using RDF.	Some encoders might have different polarity. In that case run fails. Change the **Encoder type and polarity parameter (6_65)** sign and try again.

Step	Action	Illustration/Note
11	If RDF is successful set **Save (6_99)** parameter to 1.	

7 COMMISSIONING FOR RATED SPEED (KONE MONOSPACE® ELEVATORS)

Type of load weighing device	**Illustration/Note**
LWM:	 a116531c8.wmf

7.1 Selecting LWD setup type

Step	Action	Illustration/Note
1	Set **LWD setup (6_74)** parameter to -2.	
2	Set **Save (6_99)** parameter to 1.	Value is returned automatically to 0.
3	Leave **Menu 6**. Verify LWD value from **LWD adjustment parameter (5_1)**.	With empty car the parameter value should be 0. If the load weighing device is not working correctly, make adjustment according to APPENDIX A.

7.2 Elevator shaft setup

NOTE! Relevelling is not possible if LWD setup is not done.

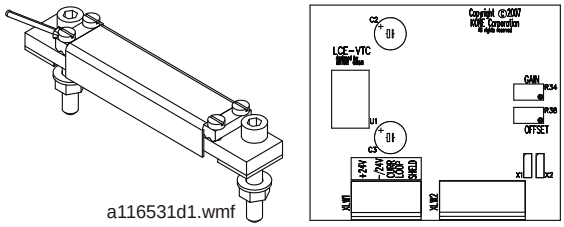
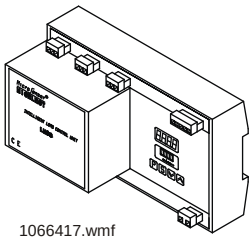
Step	Action	Illustration/Note
1	Ensure that the RDF is switched ON.	
2	Drive the car just below the bottom floor.	
3	Check that leds 61:U, 77:N and 77:S are lit.	Led 61:N must not be lit. LCE leds 30 and/or B30 must be lit.
4	Activate the setup mode from the controller. Set **Shaft setup (5_2)** parameter to 1.	
5	Switch elevator to normal mode.	Elevator starts the setup drive upwards.
6	Watch floor numbers on LOP-CB.	Elevator is ready for the normal drive when the car stops at the topmost floor. The car relevels and the LOP-CB shows the number of the topmost floor.
7	If the drive code 118 and related subcode is displayed after setup, refer to KDL16 diagnostic codes, 972485D01.	

7.3 Finalizing the commissioning

Step	Action	Illustration/Note
1	Remove all the tools and waste material from the work site.	
2	Clean the site.	
3	Return the elevator to normal. Perform a test run for the elevator.	If the load weighing device is not working correctly, make adjustment according to APPENDIX A.
4	Return the elevator to service.	

8 COMMISSIONING FOR RATED SPEED (KONE REGENERATE™ WITH MX)

Select the correct procedure (sections) for adjusting the load weighing device according to the load weighing device type.

Type of load weighing device	**Illustration/Note**
LWM + LCEVTC:	 a116531d1.wmf
WR (Micelect):	 1066417.wmf

8.1 Selecting LWD setup type

Step	Action	Illustration/Note
1	Set **LWD setup (6_74)** parameter to -2.	This must be done before programming load weighing device.
2	Set **Save (6_99)** parameter to 1.	
3	Leave **Menu 6**. Verify LWD value from **LWD adjustment parameter (5_1)**.	With empty car the parameter value should be 0. If the load weighing device is not working correctly, make adjustment according to APPENDIX B. or C.

8.2 Elevator shaft setup

Step	Action	Illustration/Note
1	Ensure that the elevator is in RDF mode.	
2	Drive the car just below the bottom floor.	
3	Check that the leds 61:U, 77:N and 77:S are lit.	**Led 61:N must not be lit.** LCE leds 30 and/ or B30 must be lit.
4	Activate the setup mode from the controller. Set **Shaft setup (5_2)** parameter to 1.	
5	Switch elevator to normal mode.	Elevator starts the setup drive upwards.
6	Watch floor numbers on LCECPU.	Elevator is ready for the normal drive when the car stops at the topmost floor, car relevels and the LCECPU shows the number of the topmost floor.
7	If the drive code 118 and related subcode is displayed after setup, refer to KDL16 diagnostic codes, 972485D01.	

8.3 Finalizing the commissioning

Step	Action	Illustration/Note
1	Remove all the tools and waste material from the work site.	
2	Clean the site.	
3	Return the elevator to normal. Perform a test run for the elevator.	If the load weighing device is not working correctly, make adjustment according to APPENDIX B. (LWM + LCEVTC) or APPENDIX C. (WR, Micelect).
4	Return the elevator to service.	

9 REPLACEMENT OF KDL16L DRIVE MODULE COMPONENTS

9.1 Tools

Following tools are recommended to be used when replacing the drive module:

- Door blocking tool
- Safety fence
- Work stool
- Multimeter
- ESD protection kit
- Torx screwdriver set

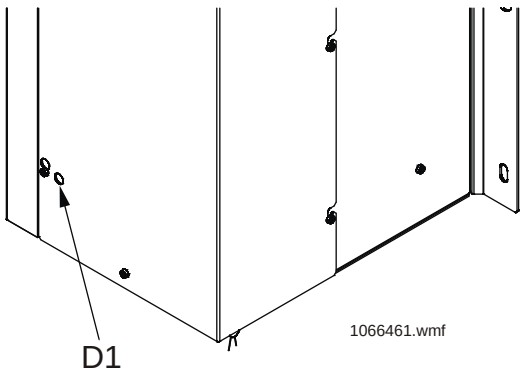
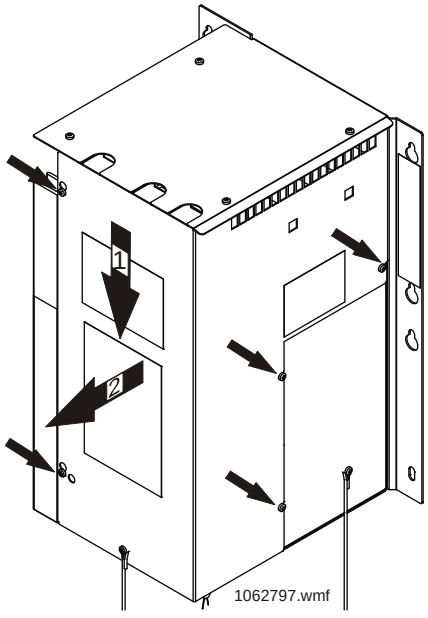
9.2 Safety measures

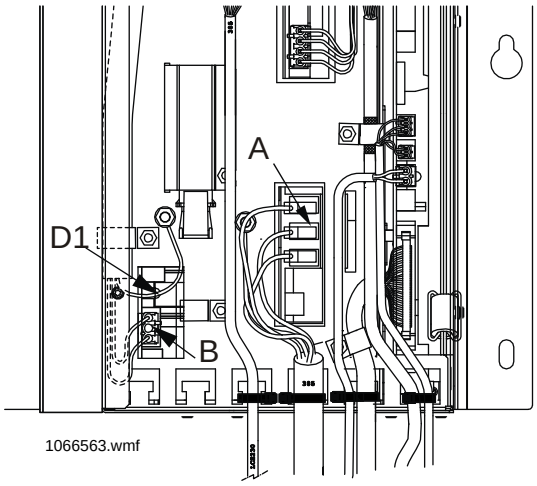
If the drive module is located in the elevator shaft, the car roof is used as a working platform. Therefore the special safety procedures and working methods are mandatory. The following safety measures must be carried out before the actual work.

9.2.1 Moving the car to suitable working position

Step	Action	Illustration/Note
1	Drive the car to the topmost floor.	Only KONE MonoSpace® elevators
2	Take the elevator out of use.	Ensure the car and car roof are empty.
3	Put safety fence around the work place if needed.	
4	Open the MAP. Switch ON the RDF.	Only KONE MonoSpace® elevators
5	Move the car on RDF to a suitable working level with access to topmost landing and drive module.	Only KONE MonoSpace® elevators
6	Engage the blocking device.	Only KONE MonoSpace® elevators
7	**If the elevator could not be moved on RDF** to a suitable working level: • Switch OFF the main switch (220). • Lock and tag them. • Move the empty car upwards opening the brake or downwards using the counterweight lifting tool. • Switch ON the main switch (220). • Close the MAP.	Only KONE MonoSpace® elevators **Empty car upwards:** Open the machine brake. Move the car upwards in small steps. **Empty car downwards:** Use CWT lifting device, refer to operation instruction AS-01.05.001.

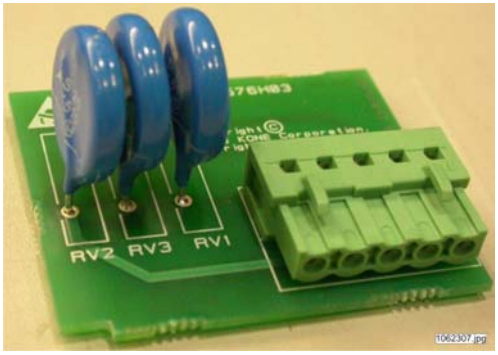
9.2.2 Measuring voltage from KDL16L drive module

Step	Action	Illustration/Note
1	Check that the DANGER led (D1) is lit. **WARNING!**If the DANGER led (D1) does not illuminate, when the main power is ON, do not open the drive module. Switch OFF the main switch (220). Lock and tag. Wait for 5 minutes. Remove the drive module with special caution! Replace the drive module with new one.	
2	Disconnect and prevent reconnection of possible emergency power supplies.	
3	Open the MAP. Switch OFF the main switch (220). Lock and tag.	
4	Close the MAP.	
5	Open the landing door. Keep the landing door open by using door blocking device.	Only KONE MonoSpace®
6	Wait for 5 minutes.	
7	Check that the DANGER led (D1) is NOT lit.	
8	Loosen fixing screws (5 pcs.). Slide the cover of the drive module downwards and pull out. Let the cover hang on the cover securing rope.	

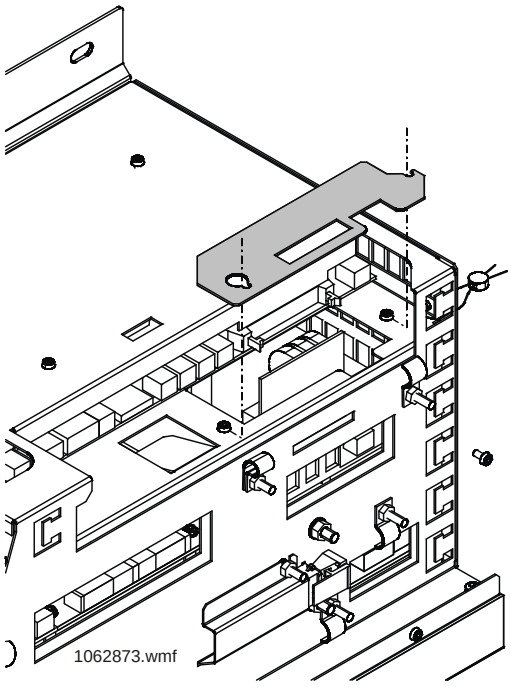
Step	Action	Illustration/Note
9	Ensure that AC voltage is not supplied to the drive module. Measure AC voltage from power supply terminals (A) T1-T2, T1-T3, T2-T3.	
10	Ensure that DC voltage is not supplied to the drive module. Measure DC voltage from connector (B) (XBRE2), between terminals 1 to ground and 3 to ground. NOTE! Check that the DANGER led (D1) is not lit (located above the XBRE2 connector (B)).	

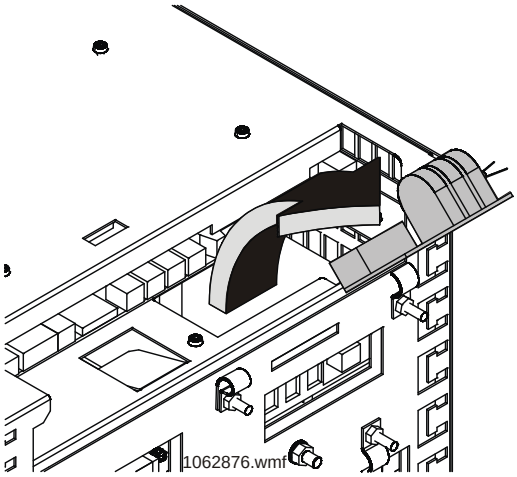
9.3 Replacing varistor board (VRB)

This section describes replacement method for varistor board (VRB) KM960575Gxx.



Before starting the replacement work ensure that safety measures are done as described in section 9.2.

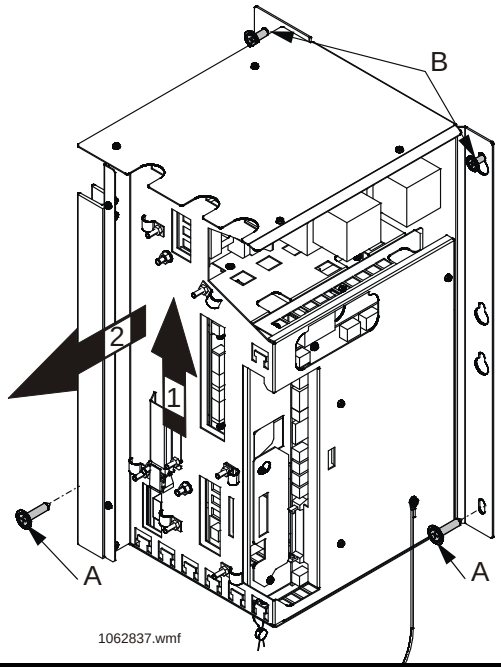
Step	Action	Illustration/Note
1	Loosen the fixing screws (2 pcs.) of the cover plate. Remove the cover plate.	

Step	Action	Illustration/Note
2	Replace the old varistor board with new one.	
3	Insert the cover plate and tighten the fixing screws (2 pcs.). Connect the cables. Install the top cover plate of the drive module.	Finalize the replacement according to section 9.5.

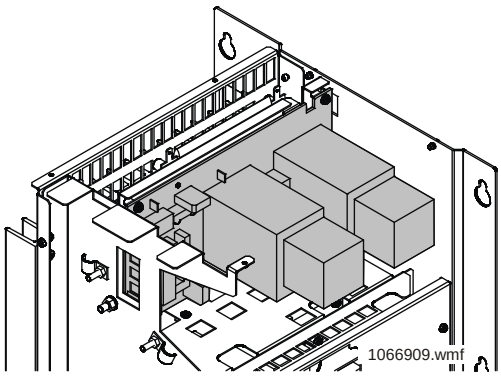
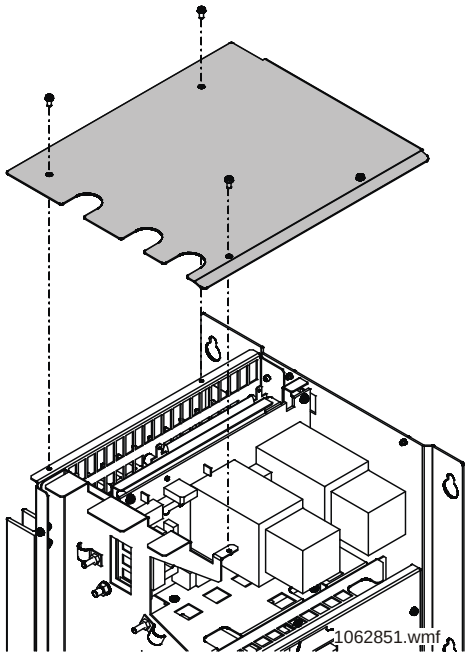
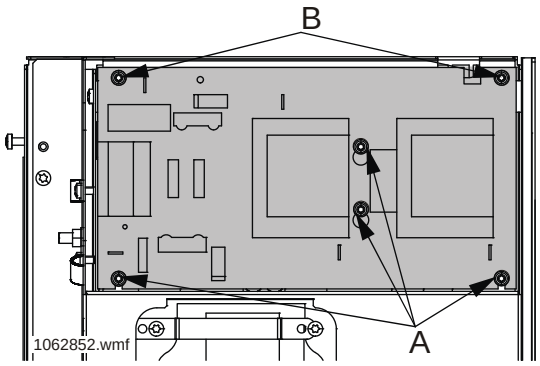
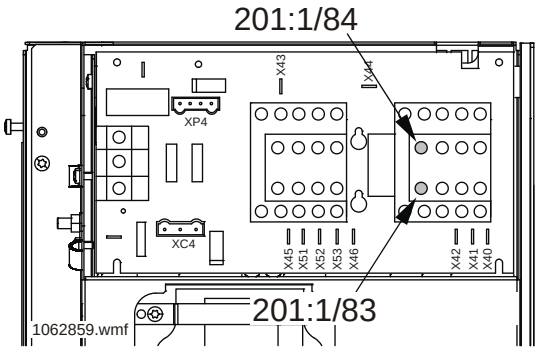
9.4 Replacing contactor board (CO16)

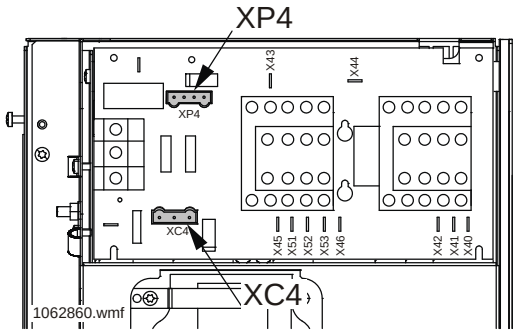
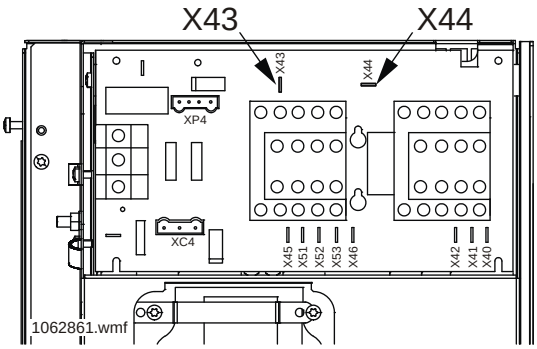
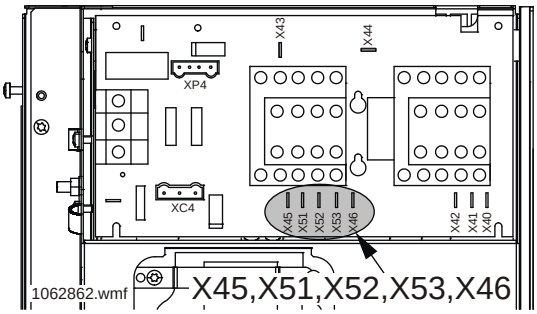
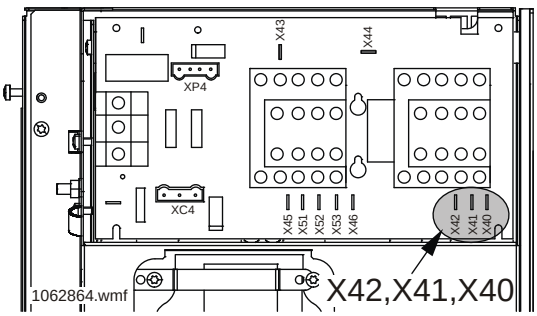
This section describes replacement method for contactor board (CO16) KM964619Gxx.

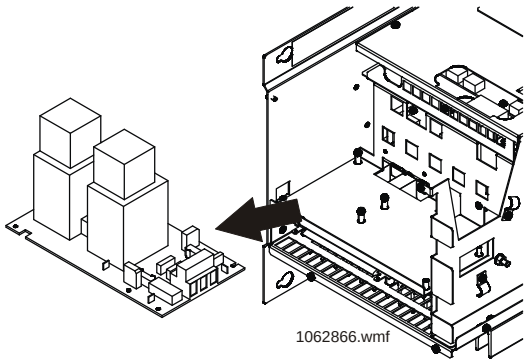
9.4.1 Removing the drive module

Step	Action	Illustration/Note
1	Remove cable ties. Disconnect all cables from the drive module.	Mark the cables, if needed.
2	Wrap cables together in two sets by using cable ties. Place the cables so, that they do not hinder the replacement procedure.	Motor cables together Control cables together
3	Remove fixing screws (A) and loosen fixing screws (B). NOTE! The drive module has eight fixing points for different fixings to guide rail, but only four of them are used. Remove the drive module and lower it to a safe working place on the landing / machine room.	

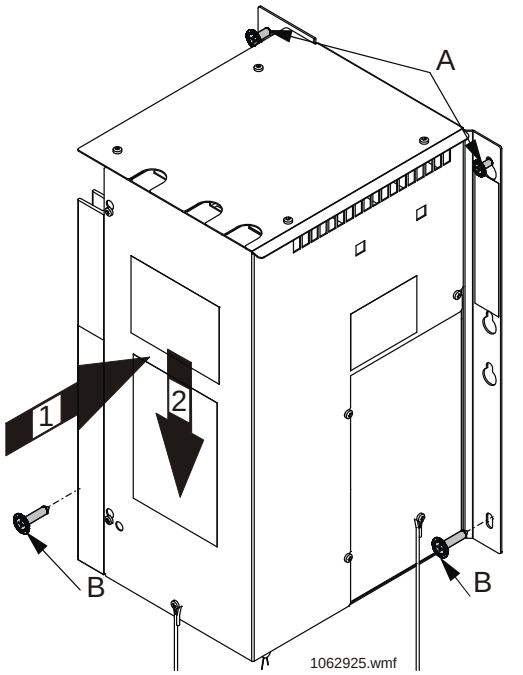
9.4.2 Replacing the contactor board

Step	Action	Illustration/Note
1	Remove fixing screws (3 pcs.) on the top of the drive module. Remove the top cover plate. 	
2	Loosen fixing screws (A) (4 pcs.) of the contactor board. Remove fixing screws (B) (2 pcs.). NOTE! Tightening torque for the fixing screws is 1.1 Nm.	
3	Disconnect contactor feedback cables from terminals (201:1/83) and (201:1/84). NOTE! Tightening torque for the fixing screws is 0.8 Nm.	

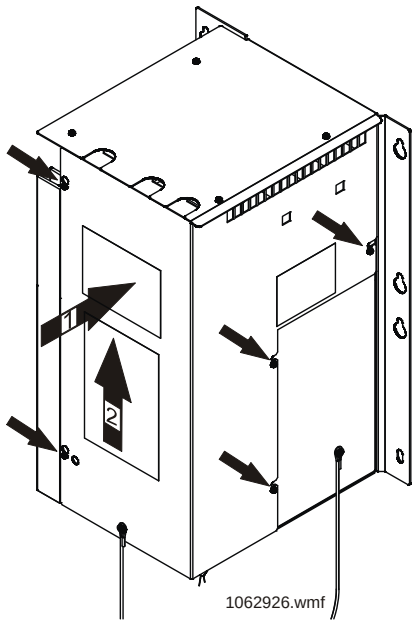
Step	Action	Illustration/Note
4	Disconnect start permit and contactor control cables from terminals (XP4) and (XC4).	
5	Disconnect contactor board input cables from terminals (X43 and X44).	
6	Disconnect charging resistor, contactor board input and contactor board output cables from terminals (X45), (X51), (X52), (X53) and (X46).	
7	Disconnect internal motor cables from terminals (X42), (X41) and (X40).	

Step	Action	Illustration/Note
8	Remove the old contactor board.	
9	Install new contactor board in reverse order. Connect the cables. Install the top cover plate of the drive module.	Check the correct tightening torques for the fixing screws.

9.4.3 Installing the drive module

Step	Action	Illustration/Note
1	Place the cables so, that they do not hinder the installation procedure.	Wrap the motor cables together. Wrap the control cables together.
2	Lift the drive module into the place.	
3	Tighten fixing screws (B). Insert and tighten fixing screws (A).	
4	Connect the all the cables and earthings. Secure the cables by using cable ties.	Check the cable markings. See section 1.5 and 1.6.

9.5 Finalizing varistor and contactor board replacements

Step	Action	Illustration/Note
1	Install the cover to the drive module. Lift the cover a little. Tighten fixing screws (5 pcs.). NOTE! Be careful not to damage the cables.	
2	Exit the car roof and close the landing door.	Only KONE MonoSpace® elevators
3	Ensure the RDF is switched ON.	
4	Switch ON the main switch (220).	
5	Disengage the blocking device.	Only KONE MonoSpace® elevators
6	Remove all the tools and waste material from the work site. Clean the site.	
7	Leave the car roof. Close the landing door.	
8	Turn the elevator to normal. Make a test run for the elevator.	Drive up and down with car calls and also with landing buttons for few runs.
9	Return the elevator to service.	

10 REPLACEMENT OF BRAKING RESISTOR MODULE

10.1 Tools

Following tools are recommended to be used with the replacement work:

- Door blocking tool (only KONE MonoSpace® elevators)
- Safety fence
- Work stool
- Multimeter

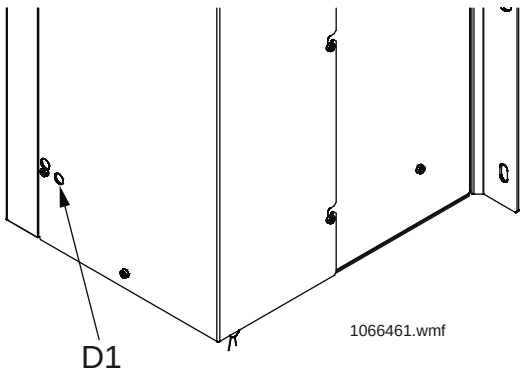
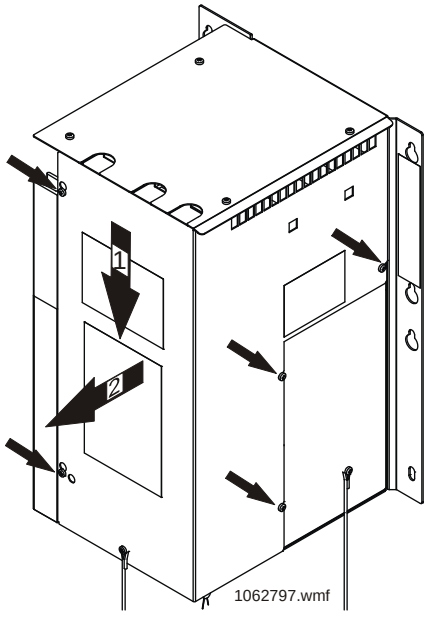
10.2 Safety measures

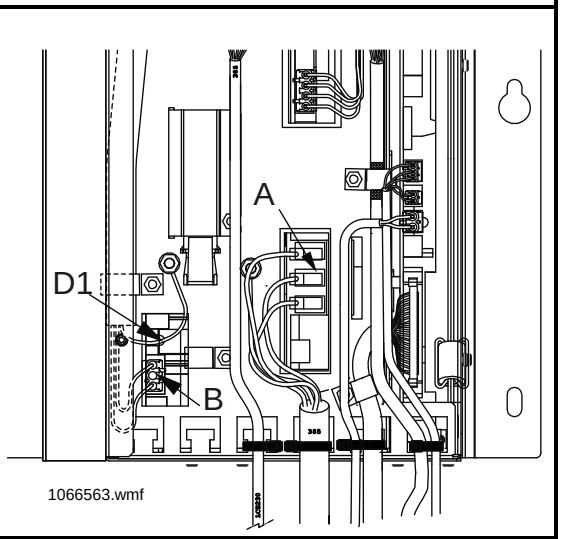
If the drive module is located in the elevator shaft, the car roof is used as a working platform. Therefore the special safety procedures and working methods are mandatory. The following safety measures must be carried out before the actual work.

10.2.1 Moving the car to suitable working position

Step	Action	Illustration/Note
1	Drive the car to the topmost floor.	Only KONE MonoSpace® elevators
2	Take the elevator out of use.	Ensure the car and car roof are empty.
3	Put safety fence around the work place if needed.	
4	Open the MAP. Switch ON the RDF.	Only KONE MonoSpace® elevators
5	Move the car on RDF to a suitable working level with access to topmost landing and drive module.	Only KONE MonoSpace® elevators
6	Engage the blocking device.	Only KONE MonoSpace® elevators
7	**If the elevator could not be moved on RDF** to a suitable working level: • Switch OFF the main switch (220). • Lock and tag them. • Move the empty car upwards opening the brake or downwards using the counterweight lifting tool. • Switch ON the main switch (220). • Close the MAP.	Only KONE MonoSpace® elevators **Empty car upwards:** Open the machine brake. Move the car upwards in small steps. **Empty car downwards:** Use CWT lifting device, refer to operation instruction AS-01.05.001.

10.2.2 Measuring voltage from KDL16L drive module

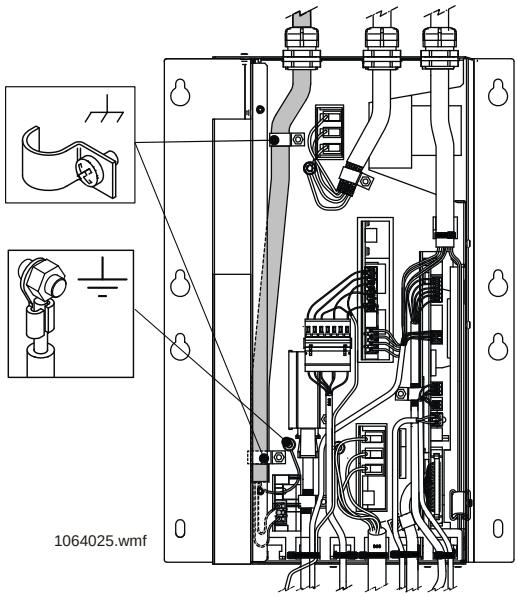
Step	Action	Illustration/Note
1	Check that the DANGER led (D1) is lit. **WARNING!**If the DANGER led (D1) does not illuminate, when the main power is ON, do not open the drive module. Switch OFF the main switch (220). Lock and tag. Wait for 5 minutes. Remove the drive module with special caution! Replace the drive module with new one.	
2	Disconnect and prevent reconnection of possible emergency power supplies	
3	Open the MAP. Switch OFF the main switch (220). Lock and tag.	
4	Close the MAP.	
5	Open the landing door. Keep the landing door open by using door blocking device.	Only KONE MonoSpace®
6	Wait for 5 minutes.	
7	Check that the DANGER led (D1) is NOT lit.	
8	Loosen fixing screws (5 pcs.). Slide the cover of the drive module downwards and pull out. Let the cover hang on the cover securing rope.	

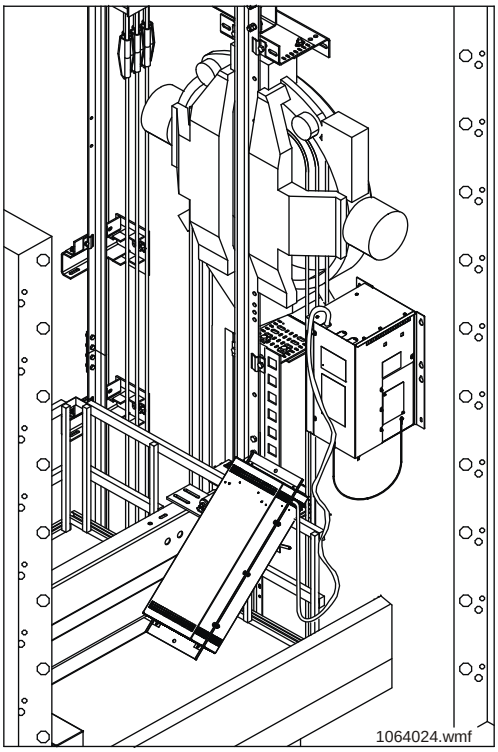
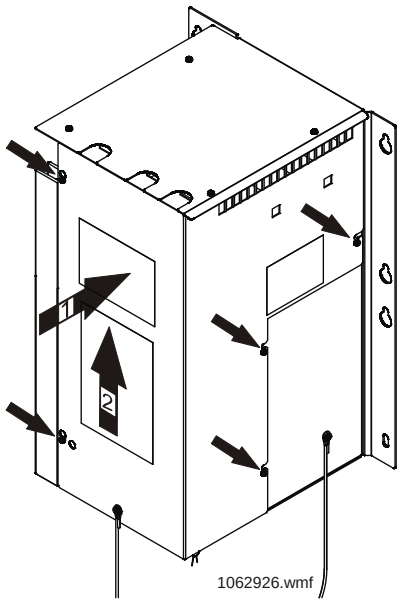
Step	Action	Illustration/Note
9	Ensure that AC voltage is not supplied to the drive module. Measure AC voltage from power supply terminals (A) T1-T2, T1-T3, T2-T3.	
10	Ensure that DC voltage is not supplied to the drive module. Measure DC voltage from connector (B) (XBRE2), between terminals 1 to ground and 3 to ground. NOTE! Check that the DANGER led (D1) is not lit (located above the XBRE2 connector (B)).	

10.3 Replacing braking resistor module

10.3.1 Connecting new braking resistor module

In order to replace the braking resistor module in the shaft, the new braking resistor module must be connected to the drive before moving the elevator.

Step	Action	Illustration/Note
1	Remove cable fixings and cable clamp of the braking resistor cable. Disconnect and remove the cable of the old braking resistor module from the terminals on the top of the drive module. **WARNING!** Before disconnecting the cable ensure that terminals are safely de-energized.	
2	Route the cable of the new braking resistor module carefully so that it cannot come into contact with moving parts of the elevator (for example ropes).	

Step	Action	Illustration/Note
3	Lift the new braking resistor module on to the car roof (only KONE MonoSpace®) elevators)	 1064024.wmf
4	Connect the cable to the terminals.	Earthing of the resistor cable is terminated and earthed to the cable clamp. The full width of the earthing should made contact to the earthed cable clamp.
5	Tighten the cable clamp.	
6	Install the cover to the drive module. Lift the cover a little. Tighten fixing screws (5 pcs.). NOTE! Be careful not to damage the cables.	 1062926.wmf

10.3.2 Replacing braking resistor module

Step	Action	Illustration/Note
1	Check that the cover of the drive module is closed.	
	Check that the elevator is on inspection drive.	Only KONE MonoSpace® elevators
	Switch ON the disconnector switch (220:2) on the shaft wall.	If applicable
	Switch ON the main switch (220:1).	
2	Drive the car on inspection drive to a level where the braking resistor module can be replaced from the car roof.	Keep the cables clear when moving the car. Only KONE MonoSpace® elevators
3	Push down the stop button on the car roof.	Only KONE MonoSpace® elevators
4	Remove the upper fixing screws of the old braking resistor module. Loosen the lower fixing screws.	
5	Lift the old braking resistor module off the wall.	Be careful when guiding the braking resistor module from side of the ropes.
6	Install new braking resistor module to the wall.	Fix the new cable properly. Be careful when guiding the box from the side of the ropes.

10.4 Finalizing the replacement of the braking resistor module

Step	Action	Illustration/Note
1	Remove all the tools and waste material from the work site. Clean the site.	
2	Exit the car roof and close the landing door.	Only KONE MonoSpace® elevators
3	Turn the elevator to normal.	
4	Make a test run for the elevator.	Drive up and down with car calls and also with landing buttons for few runs.
5	Return the elevator to service.	

11 UPDATE OF DRIVE SOFTWARE

11.1 Tools

Following tools are recommended to be used with the replacement work:

- Door blocking tool
- Safety fence
- Multimeter
- Torx screwdriver TX10
- KONE SD card, KM927300
- KDL16 parameter list 972483D01

11.2 Preparations

Before going to the site check that the SD card contains the correct drive software version. Update the software with the latest version from EDMS, if necessary.

NOTE! Also check that the SD card contains the following boot files for uploading the drive software to the drive:

- kdl16boo.bin
- kdl16b6_.bin

If the boot files are not on the SD card, order a new SD card from GSS.

NOTE! Stand-by mode and brake test features require LCE version 6.7.18 or newer.

Step	Action	Illustration/Note
1	Download KDL16 software package KM972486H0x from EDMS (eDSTAT) to your computer.	Select the latest version. The software package is stored in ZIP file.
2	Open the drive software package by using WinZip program (or equivalent) Extract all files into your computer.	The software package includes following files: • kdl16all.bin • kdl16a6_.bin • readme.txt • software_release_notes_xx.pdf
3	Copy the software files kdl16all.bin and kdl16a6_.bin to SD memory card by using the SD memory card reader.	

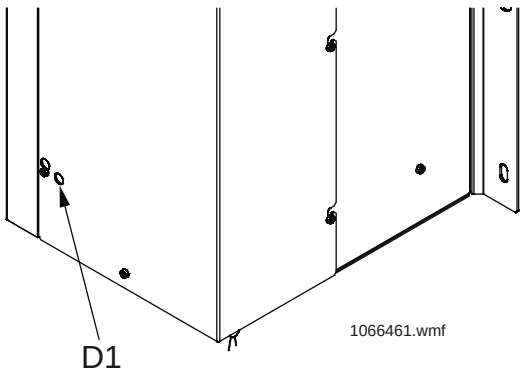
11.3 Safety measures

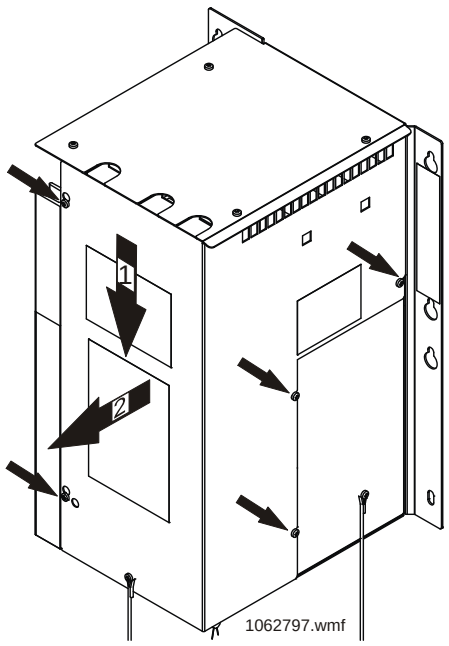
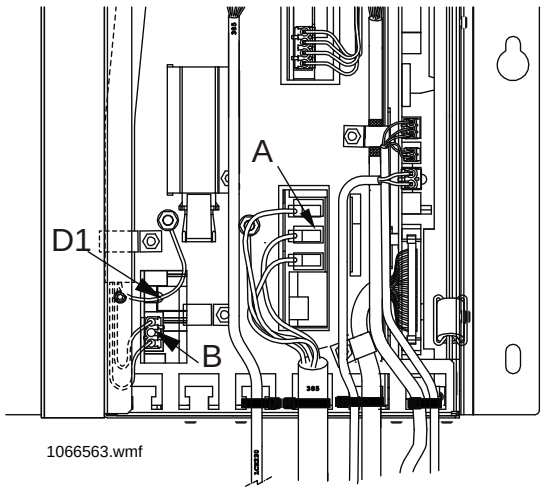
If the drive module is located in the elevator shaft, the car roof is used as a working platform. Therefore the special safety procedures and working methods are mandatory. The following safety measures must be carried out before the actual work.

11.3.1 Moving the car to suitable working position

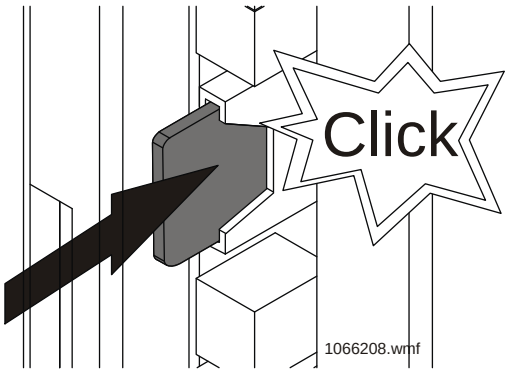
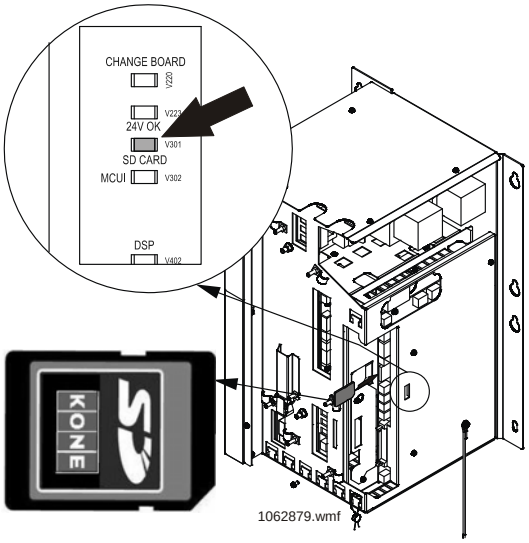
Step	Action	Illustration/Note
1	Drive the car to the topmost floor.	Only KONE MonoSpace® elevators
2	Take the elevator out of use.	Ensure the car and car roof are empty.
3	Put safety fence around the work place if needed.	
4	Open the MAP. Switch ON the RDF.	Only KONE MonoSpace® elevators
5	Move the car on RDF to a suitable working level with access to topmost landing and drive module.	Only KONE MonoSpace® elevators
6	Engage the blocking device.	Only KONE MonoSpace® elevators
7	**If the elevator could not be moved on RDF** to a suitable working level: • Switch OFF the main switch (220). • Lock and tag them. • Move the empty car upwards opening the brake or downwards using the counterweight lifting tool. • Switch ON the main switch (220). • Close the MAP.	Only KONE MonoSpace® elevators **Empty car upwards:** Open the machine brake. Move the car upwards in small steps. **Empty car downwards:** Use CWT lifting device, refer to operation instruction AS-01.05.001.

11.3.2 Measuring voltage from KDL16L drive module

Step	Action	Illustration/Note
1	Check that the DANGER led (D1) is lit. **WARNING!**If the DANGER led (D1) does not illuminate, when the main power is ON, do not open the drive module. Switch OFF the main switch (220). Lock and tag. Wait for 5 minutes. Remove the drive module with special caution! Replace the drive module with new one.	
2	Disconnect and prevent reconnection of possible emergency power supplies.	
3	Open the MAP. Switch OFF the main switch (220). Lock and tag.	
4	Close the MAP.	
5	Open the landing door. Keep the landing door open by using door blocking device.	Only KONE MonoSpace®
6	Wait for 5 minutes.	
7	Check that the DANGER led (D1) is NOT lit.	

Step	Action	Illustration/Note
8	Loosen fixing screws (5 pcs.). Slide the cover of the drive module downwards and pull out. Let the cover hang on the cover securing rope.	
9	Ensure that AC voltage is not supplied to the drive module. Measure AC voltage from power supply terminals (A) T1-T2, T1-T3, T2-T3.	
10	Ensure that DC voltage is not supplied to the drive module. Measure DC voltage from connector (B) (XBRE2), between terminals 1 to ground and 3 to ground. NOTE! Check that the DANGER led (D1) is not lit (located above the XBRE2 connector (B)).	

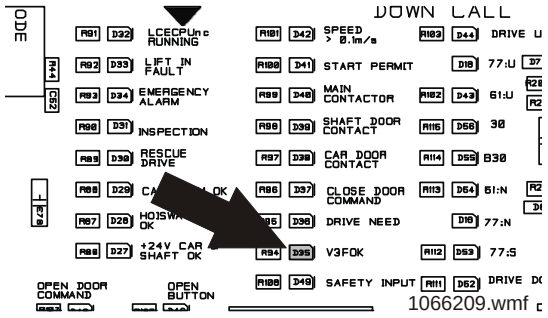
11.4 Inserting the SD card to the drive module

Step	Action	Illustration/Note
1	Remove battery backup cable from XBAT1 connector.	
2	Put the SD card in XSD1 connector.	
3	Switch ON the main switch (220). After switching ON the power: 1 SD CARD led (V301) is OFF approximately 10 seconds 2 Then SD CARD led blinks approximately 20 seconds. 3 Then SD CARD led stays lit all the time. Now the drive module is ready for uploading the software. NOTE! If the visibility is bad and you do not see the SD CARD led clearly, wait for at least one minute.	

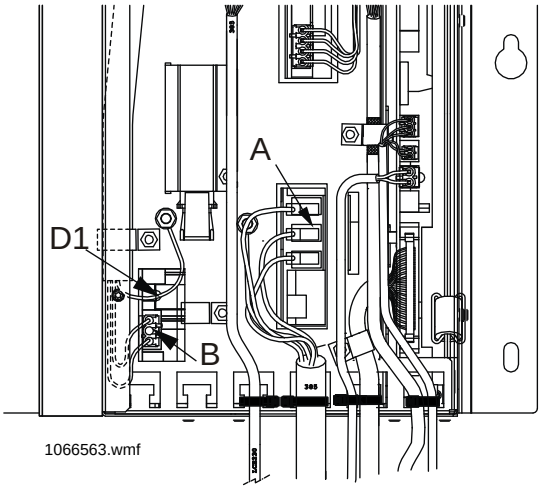
11.5 Uploading the drive software

CAUTION

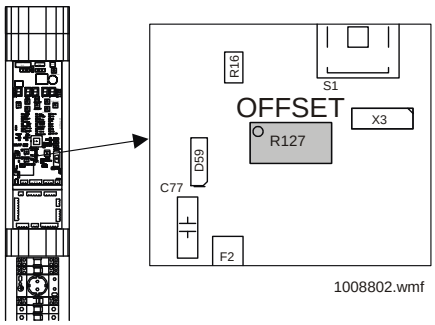
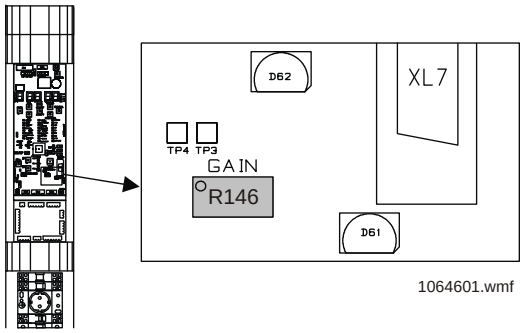
Do NOT switch OFF the main switch (220) during the software upload, because it will harm the drive module IRREPAIRABLE.

Step	Action	Illustration/Note
1	Record the following drive parameters: 6_2, 6_3, 6_4, 6_7, 6_10, 6_11, 6_60, 6_65 and 6_74.	After updating the drive software it is possible, that commissioning must be redone.
2	Check the current software version from parameter 6_97.	
3	Check that V3F OK led on the LOP-CB board is lit before uploading the drive software.	
4	Set parameter 6_95 value to 0. Set parameter 6_98 value to 5. **NOTICE: Do NOT switch OFF the main switch (220) during the software upload, because it will harm the drive module IRREPAIRABLE.**	The software upload will start automatically and V3F OK led turns off. If V3F OK led does not turn off within 10 seconds, reactivate the update by setting parameter 6_98 value to 5. Software upload progress can be checked from the SD card led. The SD card led blinks fast and slowly during the process.
5	Wait until V3F OK led on LOP-CB in the control panel / IMAP lights up.	It may take few minutes for the upload to be completed.
6	Select parameter 6_97 and read value.	Value must match to the new software version.

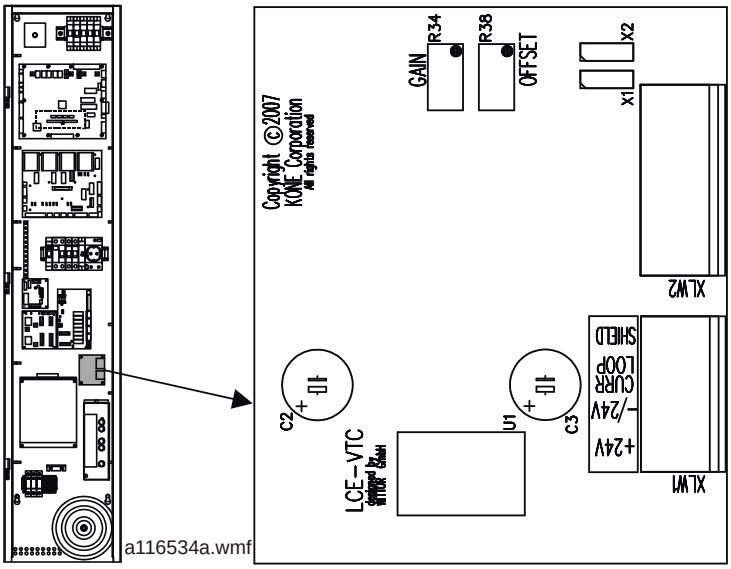
11.6 Finalizing update of drive software

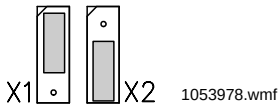
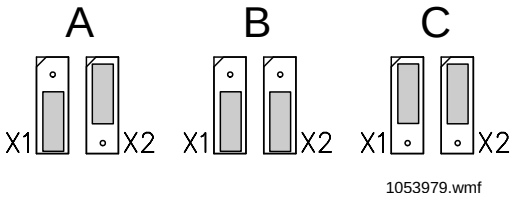
Step	Action	Illustration/Note
1	Go to drive module. Check that the DANGER led (D1) is lit.	
2	Switch OFF the main switch (220).	
3	Wait for 5 minutes.	
4	Check that the DANGER led (D1) is NOT lit.	
5	Lock and tag the main switch (220).	
6	Close the MAP.	
7	Ensure that AC voltage is not supplied to the drive module. Measure AC voltage from power supply terminals (A) T1-T2, T1-T3, T2-T3.	
8	Ensure that DC voltage is not supplied to the drive module. Measure DC voltage from connector (B) (XBRE2), between terminals 1 to ground and 3 to ground.	
9	Remove the SD card.	
10	Connect the battery backup cable to XBAT1 connector.	
11	Install the cover to the drive module.	Lift the cover a little. Tighten fixing screws (5 pcs.). Be careful not to damage the cables.
12	Close the landing door.	Only KONE MonoSpace® elevators
13	Switch ON the main switch (220).	
14	Check value of the Motor type (6_60) parameter.	If the parameter value is same as read earlier, continue onwards. If the parameter value is 0, redo the parameter setting according to section 5.6 and commissioning according to section 7 (KONE MonoSpace® elevators) or 8 (KONE ReGenerate™ with MX).
15	Disengage the blocking device.	Only KONE MonoSpace® elevators
16	Switch OFF the RDF.	Elevator will automatically make a correction drive to the next level below.
17	Turn the elevator to normal.	
18	Make a test run for the elevator.	Drive up and down for few runs by using car calls and also by using landing buttons.
19	Return the elevator to service.	

APPENDIX A.ADJUSTING LOAD WEIGHING DEVICE (LWM)

Step	Action	Illustration/Note
1	Adjust the load weighing device OFFSET setting to 0%.	
	Action	**Display**
	Push MENU button until there is number 5 on the MENU display.	5 _ _ __
	Push ACCEPT button.	5 _1 _ __
	Push ACCEPT button.	L _ _ (xx where xx is load %)
	Turn the OFFSET potentiometer on LOP-CB board until there is number 0 on the screen.	L _ _ 0
2	Drive the car to a suitable height at the top of the elevator shaft and lock it with blocking device.	
3	Open the brake and wait until the load display is steady. Close the brake and open again for a few seconds to ensure that all the tension is released.	
4	Check balancing % value from MAP sticker (40-50%).	
5	Set the GAIN of the load weighing device with the LOP-CB in the MAP.	
	Action	**Display**
	Push MENU button until there is number 5 on the MENU display.	5 _ _ __
	Push ACCEPT button.	5 _1 _ __
	Push ACCEPT button.	L _ _ xx (where xx is load %)
	Adjust the potentiometer GAIN until there is correct balancing % -value on the MENU display. Check the value from the site survey form.	For example L _ _ 50
6	Check the setting by releasing the brake again. Close the brake.	If the reading is not stabilised, readjust the load weighing device.

APPENDIX B.ADJUSTING OFFSET POTENTIOMETER (LCEVTC)



Step	Action	Illustration/Note
1	Set jumper X1 and X2 positions on the LCEVTC board.	
2	Use MENU button to navigate to menu **LWD adjustment (5_1)** parameter and press ACCEPT button.	LCECPU displays load in elevator in percentage of full load.
3	Adjust the OFFSET potentiometer on the LCEVTC board so that the LCECPU shows 0.	Turning potentiometer clockwise increases the value.
	If the value of 0 cannot be reached, re-set the jumper positions: • If the value in first adjustment is less than 0 use jumper setting A. If the value is still less than 0 use jumper setting B. • If the value in first adjustment is more than 0 use jumper setting C.	
4	Place 50 % of the rated load in the car.	
5	Adjust the GAIN potentiometer on the LCEVTC board so that the LCECPU shows 50.	
6	Remove the weights from the car.	

APPENDIX C. PROGRAMMING AND ADJUSTING LOAD WEIGHING DEVICE (WR, MICELECT)

C.1 Programming procedure

Step	Action	Illustration/Note
1	Check that the control unit display is lit.	Energy saving control turns display OFF after 5 minutes. By pressing any of the buttons turns the display ON.
2	Ensure that the elevator is in RDF mode.	
3	Program the load weighing device. Press the P button for 3 sec. to begin the programming. (Refer to the following programming procedure.)	Press P to accept setting you have chosen. Press the arrow (up and down) buttons to change the value of the setting.

NOTE! Before starting the procedure (Zero Calibration), the car should be positioned in the shaft at a point when it is lightest. The weight of the car is affected by the weight of the roping system (1:1 or 2:1 roping, compensation chain) and the travelling cable. For example, the car is usually the lightest: at the bottom floor, in 1:1 and 2:1 roping with compensation chain; or at the topmost floor, in 2:1 roping without compensation chain.

The LWD display must always show a positive value when the car is at any point of the shaft. The negative value marking should never appear in the display (dot on the bottom right). After setup, run the car up and down the shaft to check the weight.

Check the LWD software version.

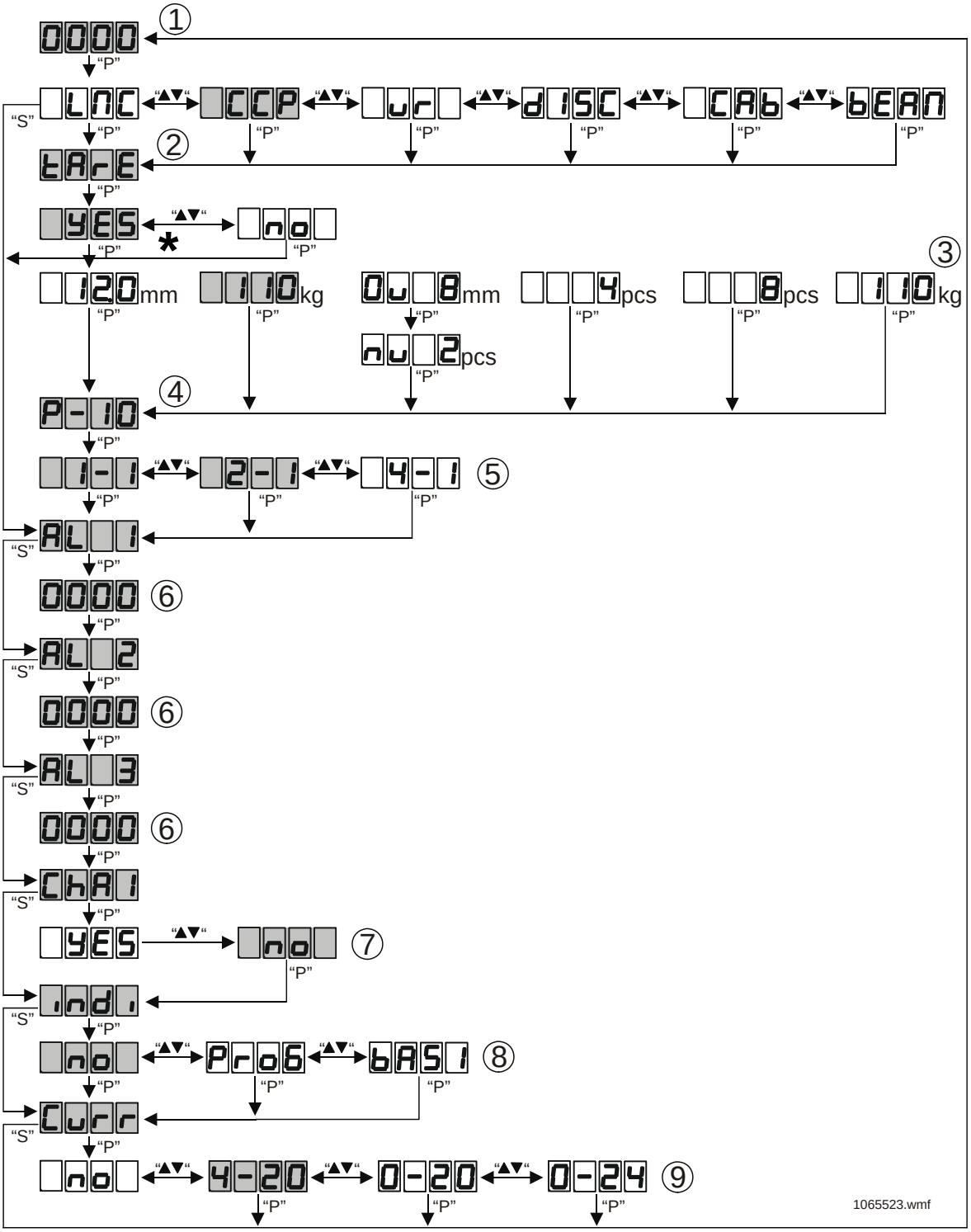
- If the software version is P-LM3D-025 or newer, continue on Appendix C.1.1.
- If the software version is P-LM3D-022, or older, or not marked, continue on Appendix C.1.2.

C.1.1 LWD mode (P-LM3D-025 or newer)

①	**Sensor selection** • Display shows “0000” • Press P. • Select “CCP” (well known weight). • Press P.
②	**Zero calibration (“TARE”), with lightest car position (see above):** • Display shows “TARE”. • Press P button. • Make zero setting with empty car by selecting “YES”. • Press P. (The display blinks and beeps for 5 seconds.)

③	**Sensor configuration:** • **Add 100% of the rated load to the car**. • Set the elevator rated load (kg) by pressing the arrow buttons (the same load as above). • Press P.
④	**Number of passengers:** • Set the maximum number of persons in the car using arrow buttons. • Press P.
⑤	**Roping ratio:** • Select roping 2:1 using arrow buttons. • Press P.
⑥	**Alarm values:** • Display shows “AL 1” . • Press P • Set the rated load of the elevator using arrow buttons. • Press P. • Display shows “AL 2”. • Press P. • Set the rated load of the elevator using arrow buttons. • Press P. • Display shows “AL 3”. • Press P. • Set 120% of the rated load of the elevator using arrow buttons. • Press P.
⑦	**Compensation chain weight (“CHAI”):** • Display shows “CHAI”. • Press P. • Select “NO” using arrow buttons. • Press P.
⑧	**Car indicator (“INDI”):** • Display shows “INDI” • Press P. • Select “NO” using arrow buttons. • Press P.
⑨	**Analogical output (“CURR”):** • Display shows “CURR” • Press P. • Select “4-20” using arrow buttons. • Press P.

Rated load of the elevator is displayed.

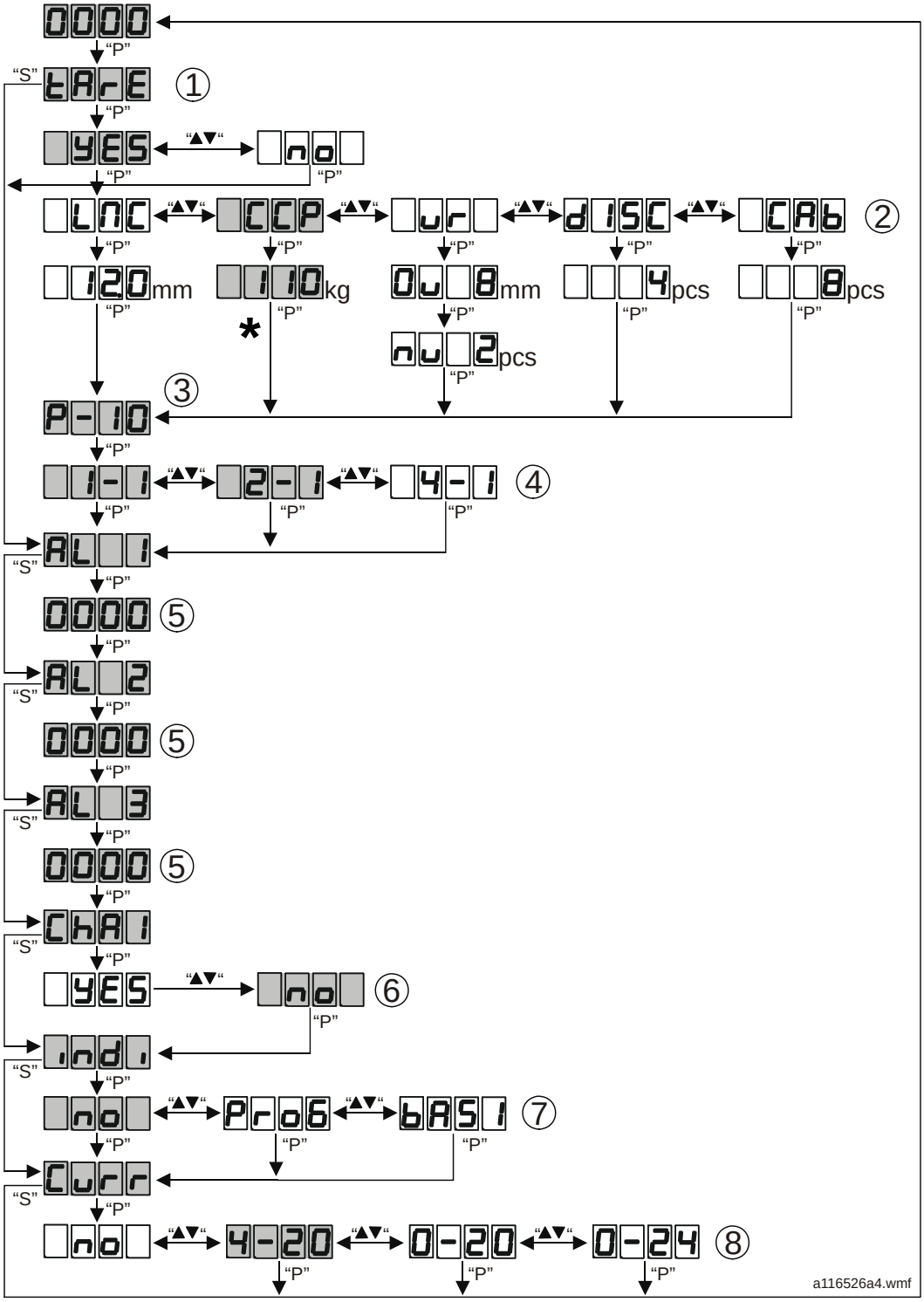


*** NOTE!** Add 100% of the rated load to the car before setting the load and pressing P.

C.1.2 LWD mode (P-LM3D-022, or older, or not marked)

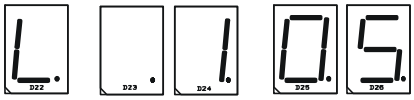
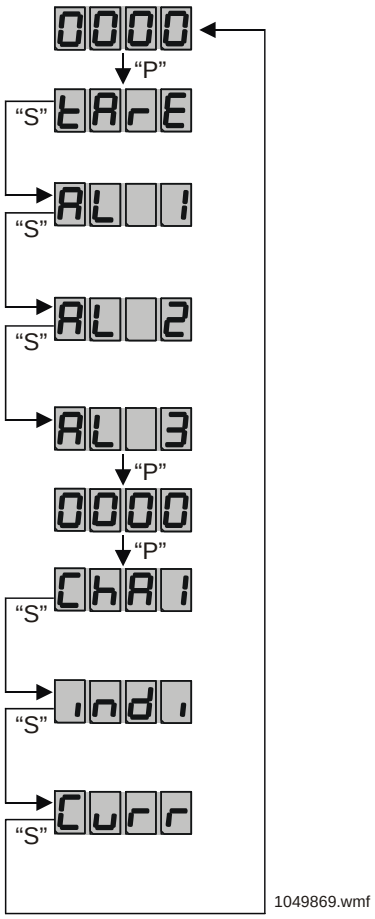
①	**Zero calibration ("TARE"):** • Display shows "TARE". • Press P button. • Make zero setting with empty car by selecting "YES". • Press P. (The display blinks and beeps for 5 sec.)
②	**Sensor configuration:** • Select "CCP" (well known weight). • Press P. • Add 100% of the rated load to the car. • Set the elevator rated load (kg) by pressing the arrow buttons (the same load as above). • Press P.
③	**Number of passengers:** • Set the maximum number of persons in the car using arrow buttons. • Press P.
④	**Roping ratio:** • Select roping 1:1 or 2:1 using arrow buttons. • Press P.
⑤	**Alarm values:** • Display shows "AL 1" . • Press P • Set the rated load of the elevator using arrow buttons. • Press P. • Display shows "AL 2". • Press P. • Set the rated load of the elevator using arrow buttons. • Press P. • Display shows "AL 3". • Press P. • Set 120% of the rated load of the elevator using arrow buttons. • Press P.
⑥	**Compensation chain weight ("CHAI"):** • Display shows "CHAI". • Press P. • Select "NO" using arrow buttons. • Press P.
⑦	**Car indicator ("INDI"):** • Display shows "INDI" • Press P. • Select "NO" using arrow buttons. • Press P.
⑧	**Analogical output ("CURR"):** • Display shows "CURR" • Press P. • Select "4-20" using arrow buttons. • Press P.

Rated load of the elevator is displayed.



* NOTE! Add 100% of the rated load to the car before setting the load and pressing P.

C.2 Adjusting load weighing device

Step	Action	Illustration/Note
1	**In the control panel:** • Push MENU button until number 5 shows on the MENU display. • Push ACCEPT button. • Push ACCEPT button. NOTE! Normally the value is more than 100 %, for example 134 %. It should be between 103 % and 109 %.	**5** __ __ **5** **_1** __ **L** **_x xx** (where xxx is load %)
2	**In the LWD control unit:** • Adjust the value of AL3-parameter until the control panel (5_1) displays 103-109 %.  1049868.wmf NOTE! Increasing the AL3 value in the LWD control unit is reducing 5_1 value in the control panel.	 1049869.wmf

APPENDIX D.ADJUSTING MOTOR SETUP TYPE MANUALLY

If you are not able to find proper setup type selection, you can do manual adjustment by following actions.

NOTE! Following instructions are valid if KDL16 software is 2.10 or newer.
Check software from 6_97.
If needed, update the software according to section 11.

Step	Action	Note
1	Set parameter **6_95** to 0. This is to open parameter lock.	
2	Set parameter **6_98** to 1. This restores defaults.	
3	Wait 5 seconds.	
4	Set **Motor setup type parameter 6_60** to 88.88.	
5	Scroll back to menu 6 main level (re-entering menu 6 activates selectable parameters).	
6	Set **Encoder pulses per motor round parameter 6_64** according to machine type: • MX05 = 14452 • MX06 = 17767 • MX10 = 19819 • MX14 = 8192	If needed, drive will fine-tune parameter **6_64** value automatically after shaft setup.
7	Set **Encoder type and polarity parameter 6_65** : • MX14 = 1 • MX05, MX06, MX10 = 2	
8	Set **Motor source voltage E [V] parameter 6_80** - see from the motor label.	Parameter value must be set to line-to-line source voltage, not phase voltage. Some motor labels have the phase voltage value. To check that the motor label has line-to-line source voltage, do the following: Compare U (Motor voltage) and E (Motor source voltage) If 2*E is smaller than U (E in the motor label is phase voltage...) then multiply E by 1,73 and use that value as 6_80.
9	Set **Motor nominal current [A] (I) parameter 6_81** - see from the motor label.	

Step	Action	Note
10	Set **Motor nominal stator frequency [Hz] parameter 6_82** - see from the motor label.	
11	Set **Motor nominal rotation speed [rpm] parameter 6_83** - see from the motor label.	
12	Set **Motor nominal output power [kW] parameter 6_84** - see from the motor label.	
13	Set **Motor stator resistance [ohm] (Rs) parameter 6_86** - see from the motor label.	
14	Set **Motor stator reactance [ohm] (Xs) parameter 6_87** - see from the motor label	If only stator inductance Ls available, Xs can be calculated by formula Xs= 6,28*Motor nominal frequency*Ls.
15	**Brake control type parameter 6_61** is by default set to 0 or 3: a) Check 6_61: If you have 6_61 in set to 3, adjust parameters 6_90 (brake pick voltage) and 6_91 (brake hold voltage) according to motor label). b) Check 6_61: If you have 6_61 in set to 0, check brake voltages from motor label. If lift off voltage is 200V and hold on voltage is 100V, set 6_61 to 1. Otherwise leave it to 0.	If lift off voltage is 200V and hold on voltage is 100V, set 6_61 to 1. Otherwise leave it to 0.
16	Set Save (6_99) parameter to 1.	
17	Continue other parameter settings in section 5.6 on page 19, step 6.	

12 APPROVALS AND VERSION HISTORY

Compiled by:	Information Product Author	Janne Kaskimies
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Approved by:	SEB Maintenance Development Manager	Seppo Valliovuo

Translation approved by:

Issue	Date	Description of Change	Ref CR	Approved by
-	2009-06-30	First issue		S. Valliovuo
A	2009-10-16	Valid from drive version KM953503 revision 0.6		S. Valliovuo
B	2010-05-25	SD card information updated	CR-014457	S. Valliovuo
C	2010-11-04	Drive software file information updated		S. Valliovuo
D	2011-05-31	Running motor without encoder added. Other minor changes, see change bars at the left side of the pages.	CR-017261	S. Valliovuo
E	2011-11-29	Updated warnings when driving without encoder. Updated disconnecting and connecting XBAT. Updated hoisting machine types when setting parameters 6_64 and 6_65 in APPENDIX D. Updated reference to section 5.6 from APPENDIX D. Updated returning to Menu 6 in APPENDIX D. Updated reactivating the drive software upload with 6_98 5.		S. Valliovuo