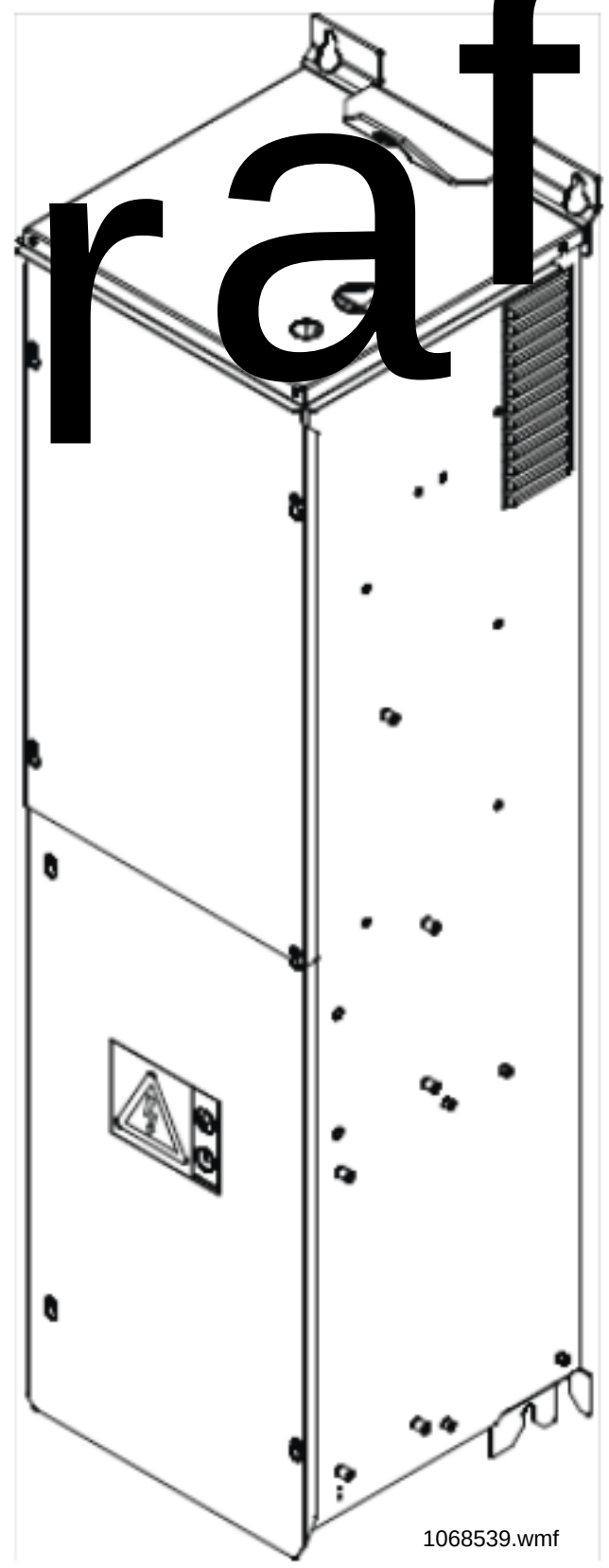
MONOSPACE? COMMISSIONING WITH KDL32 DRIVE AND SAFETY INSPECTION



LIST OF CONTENTS

1 GENERAL

1.1 Validity of the instruction

This instruction is valid for commissioning, safety inspection and testing the operation of the KDL32 drive in following elevator configurations.

Elevator/revision	Drive/type	Control system	Elevator level manual
MonoSpace?, MonoSpace? Special, KONE 3000 MonoSpace? KONE 3000S MonoSpace? TranSys ?	KDL32 / KM9213[illegible]G05	LC[illegible]	AM-01.01.026, AM-01.01.049, AM-01.01.049-CHN, AM-01.01.072-CHN AM-01.01.073
MonoSpace? with MX14	KDL32 / KM921317G05		

1.2 Abbreviations

EBD = Emergency Battery Drive

EPD = Emergency Power Drive

ETS = Emergency Terminal Slowdown

LBR = Line Bridge

LWD = Load Weighing Device

NTS = Normal Terminal Slowdown

RDF = Recall Drive Feature

1.3 Related documents

Refer to the elevator level instructions for the commissioning prerequisites, safety chain checking, setting the non-drive features, special features and especially for the working safety .

? AM-01.03.001 Use of fall arrest systems on elevator construction and modernisation sites
? AM-01.03.002 Take 5 - Electrical Safety When Working on Elevators
? Elevator level instructions
? 948570D01 Parameter list
? 948570D02 KDL32 diagnostic codes
? 948570D03 KDL32 parameter guide
? AS-11.65.031 Repair Instruction for KDL32 drive system
? ASG-11.65.031 Maintenance Instruction for KDL32 drive
? AR-11.65.031 Spare Parts Manual for KDL32 drive

2 SAFETY

WARNING

ALWAYS ASSUME THAT EQUIPMENT IS STILL LIVE UNTIL IT HAS BEEN LOCKED, TAGGED AND TESTED FOR ZERO ENERGY STATE - Locking and tagging must be used wherever possible. Always test, using approved equipment that equipment is safe, ie. DE-ENERGISED. Do not rely on LED ’s or other indicator lights and always allow sufficient time for all stored energy to discharge. Check the measuring tools to ensure they are operative. Ensure that switching OFF the power will not affect other people (e.g. people in the elevator car).

WARNING

There is high voltage behind the panel containing the fuses. Even when power has been switched OFF there is a low risk of electric shock. Use of probes to ensure power is OFF is advisable.

2.1 General working safety

This instruction is used in accordance with several elevator configurations. You must read the safety instructions in each elevator level installation manual to ensure your working safety.

Take special care when working on the car roof or other position where is danger of falling.

Refer to AM-01.03.001 use of fall prevention systems on elevator construction and modernisation sites.

When there is any doubt of the correct working method, ask your superiors.

2.2 Installation method safety

2.2.1 Electrical working safety

Read carefully the electrical working safety instructions in the corresponding elevator level manual to ensure the correct switching off and locking methods for each elevator.

Pay special attention when working on the car roof if there are powered parts in your working area.

- ? Refer to AM-01.03.002 , Take 5 Electrical Safety When Working on Elevators.
- ? Panel doors must always be closed when not working in the panels.
- ? Separate the electrical parts of the drive system from the main network during maintenance operations. Use the main supply switch, which must be locked to the open position.
- ? Ensure that high voltage parts do not cause a danger to other building users. Safety must be ensured with fences or additional guarding depending on site conditions if protection shields are removed and main power is ON.
- ? Use additional fences or guarding, when there is a danger that outsiders enter working zone or there are parts or tools causing risks of tripping on the landing.
- ? Use temporary insulation shields or fences in case that there are unprotected live parts in the vicinity of the working zone.

AM-01.03.002, Take 5 - Electrical Safety When Working on Elevators

The Take 5 safety initiative is designed for installation, servicing, maintenance and modernisation work done on elevators. The AM describes safe working procedures for preventing electric shock and other possible hazards from unwanted movement of equipment to yourself and others when working on elevators. Read and follow all related instructions and comply with your local safety codes and rules.

The following 5 steps must be taken in the specified order unless there are essential reasons for doing otherwise:

Take 5 steps to ensure electrical safety:

1. Disconnect power supply completely.
2. Secure power supply against re-connection.
3. Verify that the installation is de-energised.
4. Check the requirements for earthing in special circumstances. (This operation may only be carried out by qualified personnel in co-operation with the person responsible for the building electrification who must ensure that the technique can be safely employed in this situation.)
5. Provide protection against adjacent live parts.

2.2.2 Danger and personal protection signs

Safety gloves, overall, safety shoes with ankle protection, safety helmet, safety goggles, dust mask, hearing protection and safety harness are provided for your personal protection. USE THEM AS REQUIRED.

Danger signs		Personal protection signs	
Danger	Sign	Mandatory	Sign
Electric shock		Safety helmet	
Risk of falling		Overall	
Magnetic field		Dust mask	
Risk of fire		Hearing protection	
Corrosion Dermatological risk		Safety shoes with ankle protection	
Entry prohibited		Safety gloves Rubber gloves for cleaning guide rails	
General hazard warning		Safety harness and associated equipment	
Suspended load		Safety goggles	
Tirak mandatory inspection		First aid kit	

The words WARNING and CAUTION are used to highlight possible hazardous situations to persons or equipment as follows:

WARNING	This is to warn about serious safety hazards.
CAUTION	This is to warn about damage to equipment which may also involve a safety hazard.

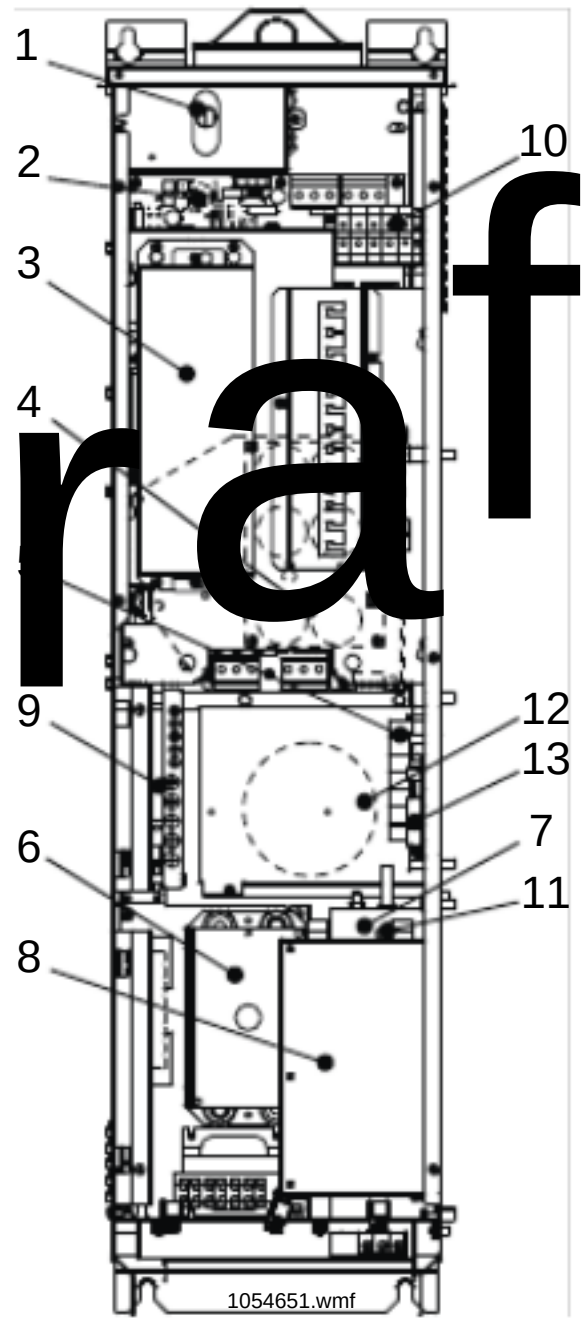
3 TOOLS

The following tools are needed for safety inspection.

? Insulation resistance meter
? Handheld tachometer
? Digital multimeter protected against high voltage (Fluke 179 of equivalent) with insulated long test probes (minimum length 100 mm)
? AC current clamp on meter (true RMS)
? Test weights totalling 125% of capacity
? Variable-speed drill motor
? Governor spinning wheel
? Normal hand tools

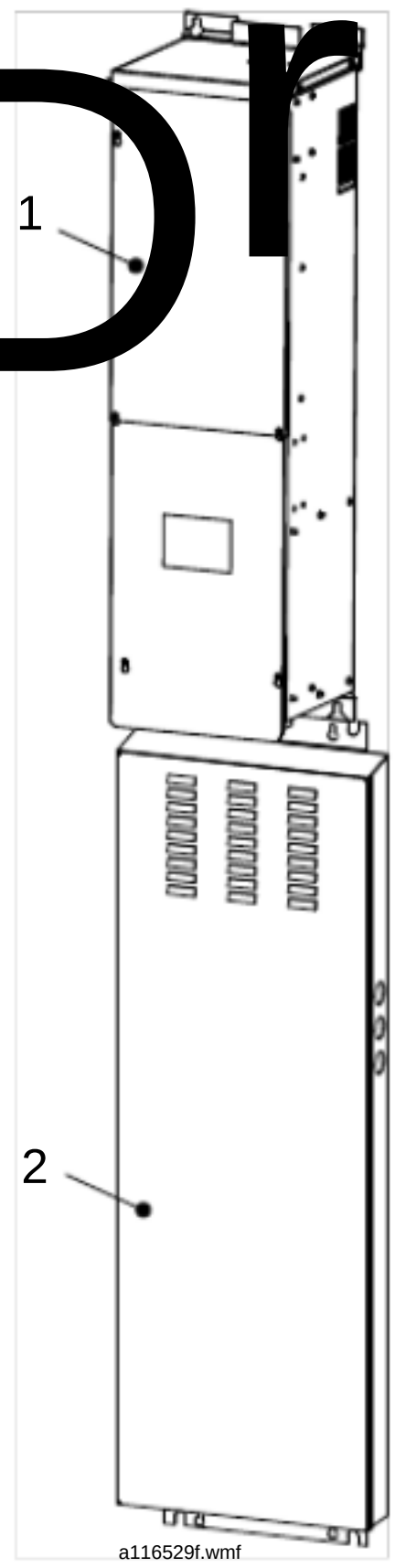
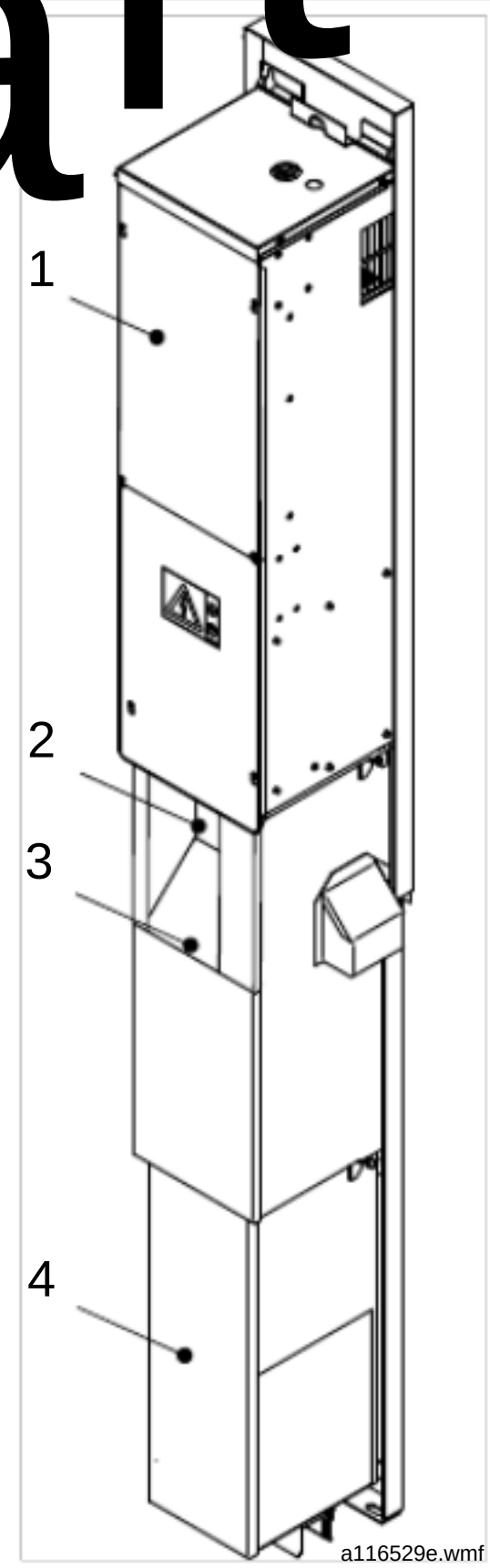
4 INTRODUCTION OF COMPONENTS

4.1 KDL32 drive panel

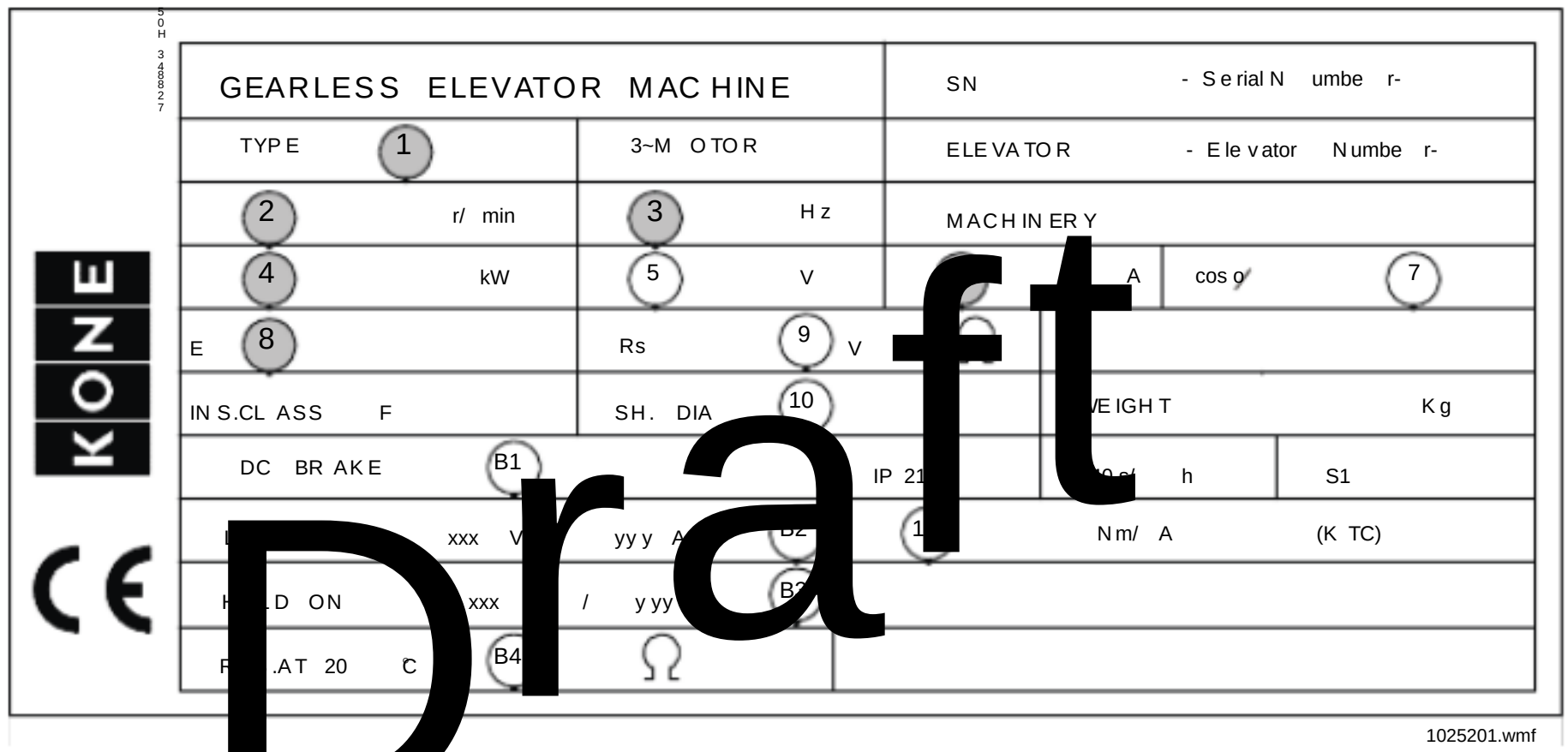


1	Dynamic braking module	KM926998G01
2	Power module	KM926995G01
3	Control module	KM926996G01
4	DC-LINK capacitor module	KM926997G01
5	Backup power module	KM921317G22 (option)
6	Contactor module	KM923107G01
7	Filter, Network RFI 40A	KM273116
8	Brake control module	KM885513G01
9	Earth bar, PE1	
10	Earth bar, PE2	
11	Screw for earth leakage current reduction	
12	Fan	
13	LOP-ADA module	KM940475G01

4.2 Panels in the elevator shaft

Panels in the elevator shaft in the MonoSpace? elevators	Shaft electrification panel in the MonoSpace? Special and TranSys? elevators
1. KDL32 drive panel (385)	1. KDL32 drive panel (385)
2. LCE and optional boards	2. Main switch module
	3. Main switch 20:1
	4. LCE and optional boards
	

4.3 Machine data plate



NOTE! Record the values of positions 1,2,3,4,6 and 8 before starting the commissioning.

Machinery data		Brake data	
Pos	Name	Pos	Name
1	Machinery type	B1	Brake unit type
2	Motor nominal rotation speed (rpm)	B2	Brake pull voltage/current
3	Motor nominal stator frequency (Hz)	B3	Brake hold voltage/current
4	Motor nominal output power (kW)	B4	Brake coil resistance
5	Motor nominal voltage (V)		
6	Motor nominal current (A)		
7	Motor power factor (cos phi)		
8	Motor source voltage (Er)		
9	Stator resistance, 1 phase		
10	Traction sheave diameter		
11	KTC factor (Nm/A)		

4.4 How to use Real time display function

This chapter is a general instruction describing how to activate and use Real time display function.

The Real time display function is a build in feature which measures / shows the different drive module signals on the LCE User Interface.

The RealTimeDisplay monitor selection (6_75) parameter activates a function that enables for example: observing of the elevator speed, direction of the car movement, position of the car and motor current in real time.

For more details see drive parameter list 948570D01.

Step	Action	Note
1	Select parameter RealTimeDisplay monitor selection (6_75).	
2	Select any of the elevator functions that you want to see (201...209).	948570D01 parameter list.
3	Return to floor display by pressing the Menu-button.	
4	Activate the Real time display by pressing Select/Accept-button. You can now use Select/Accept-button to change display to show floor, real time or speed display.	
5	De-activate the Real time display by returning to floor display.	Press Menu-button.

4.5 Reading detailed fault codes

The sub fault codes of the KDL32 drive are describing the faults in detail.

The numbering of the sub fault codes is divided to the following categories:

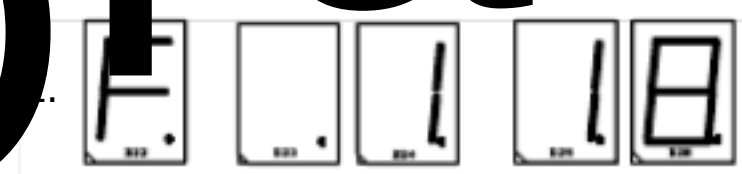
? 1000-serie, the elevator is locked (driving is prevented).
? 2000-serie, driving of the elevator is stopped by a machine brake.
? 3000-serie, warnings indicated in advance (before a device or equipment break down).
? 6000-serie, diagnostic information. All sub codes in this category DO NOT indicate a fault. They are for getting additional information.

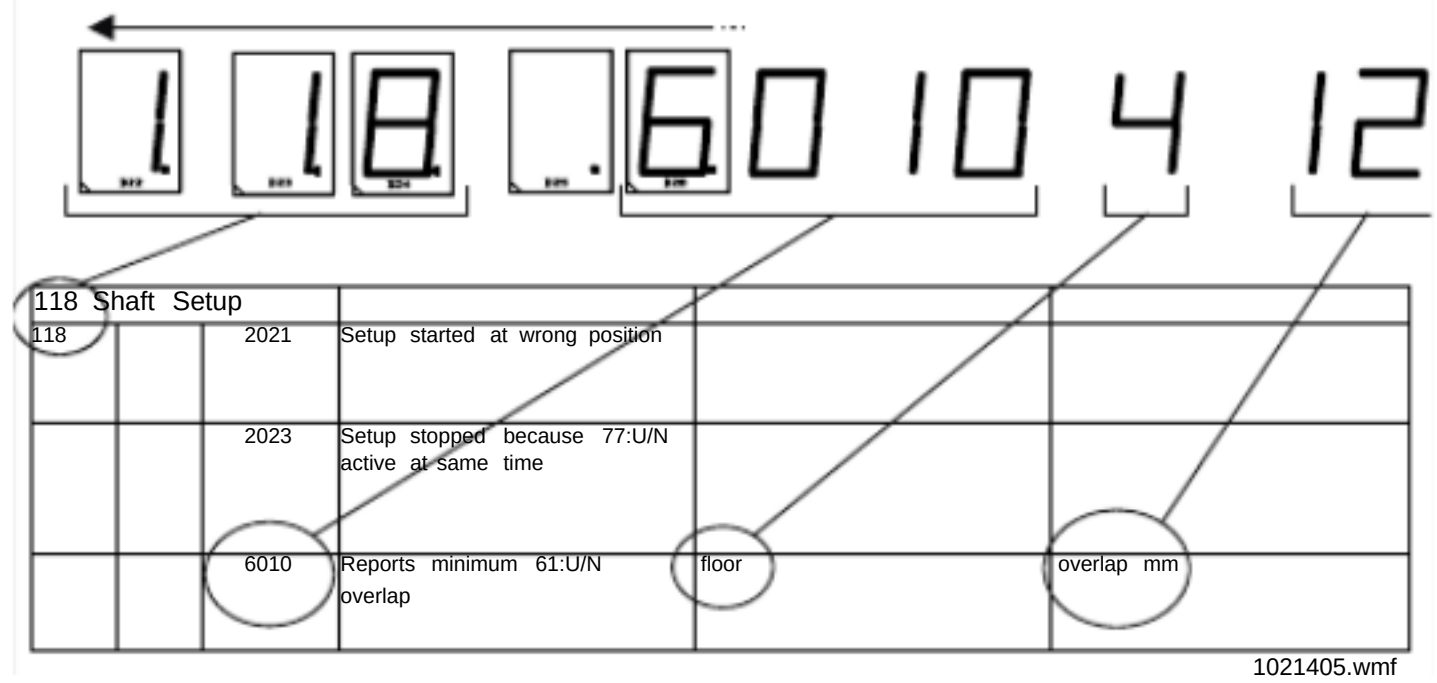
4.5.1 How to read the sub fault codes

This example describes how to read sub codes 118_6010 and 118_6011.

1. Enter error log.

2. Push ACCEPT (a row of figures starts to scroll).





5 COMMISSIONING FOR INSPECTION DRIVE

5.1 Prerequisites and preparations

Refer to the elevator level installation manuals for the prerequisites and preparations that each elevator needs to have been done before commissioning for inspection drive.

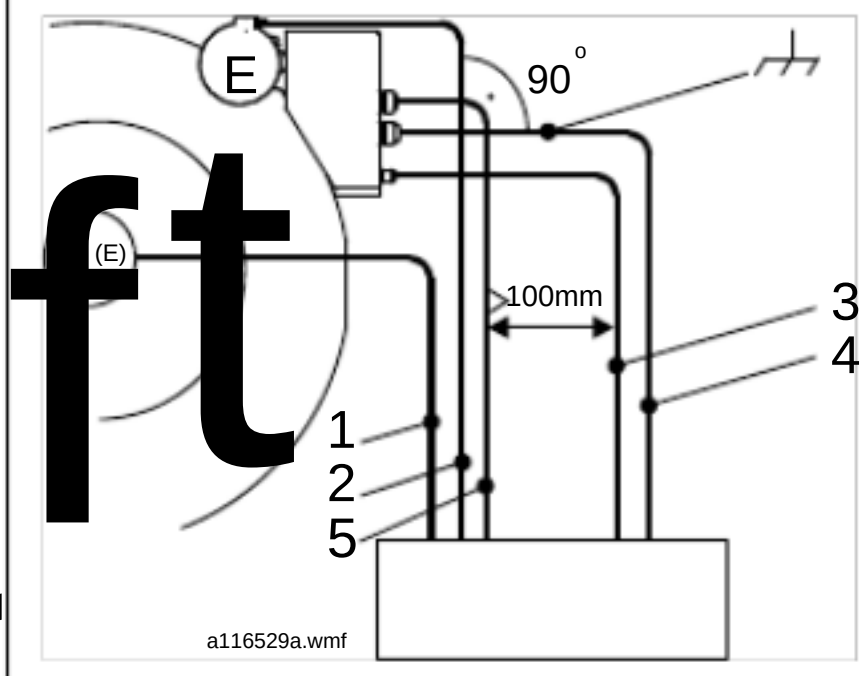
NOTE! Commissioning for inspection drive can be done with suspension ropes installed. The method in this instruction is considering that the ropes are installed.

Step	Action	Note
1	Record the machine values from the machine data plate: ? Motor nominal rotation speed (rpm) ? Motor nominal motor frequency (Hz) ? Motor nominal output power (kW) ? Motor nominal current (A) ? Motor source voltage (Er) Values will be used when setting the drive parameters.	

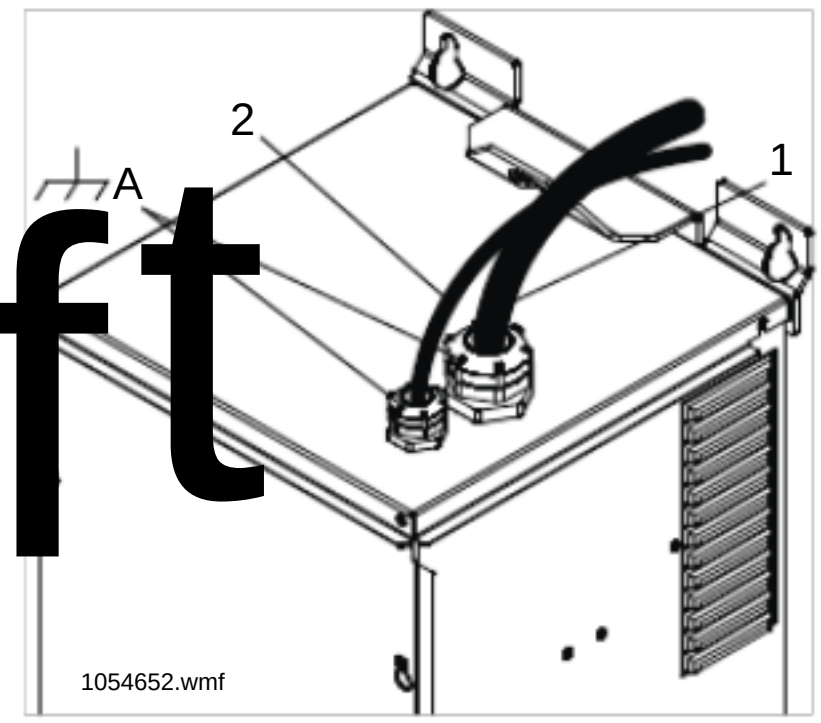
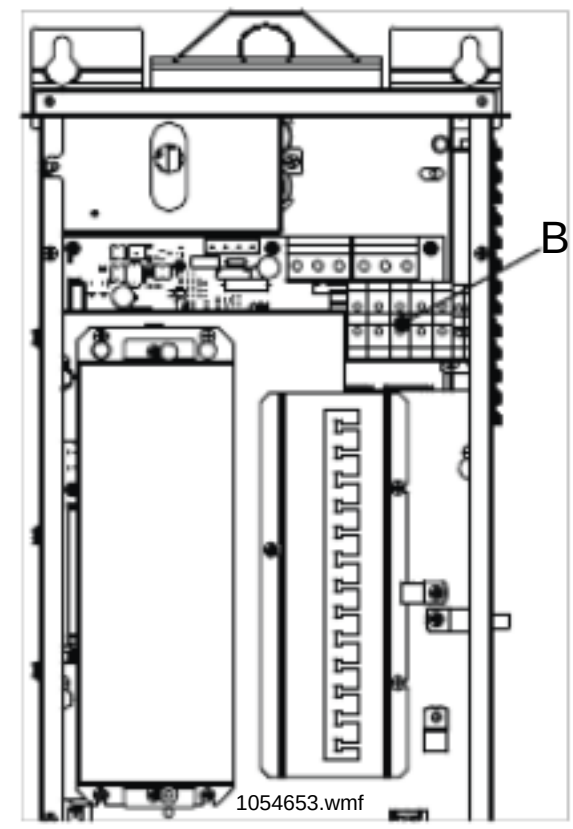
5.1.1 Checking the mechanical obstructions

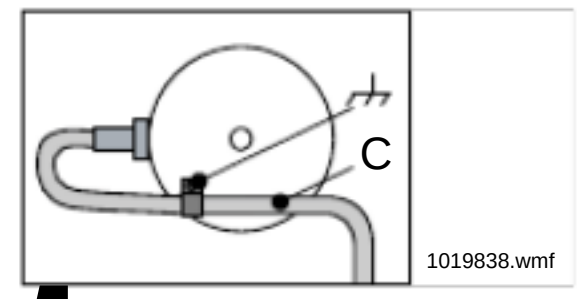
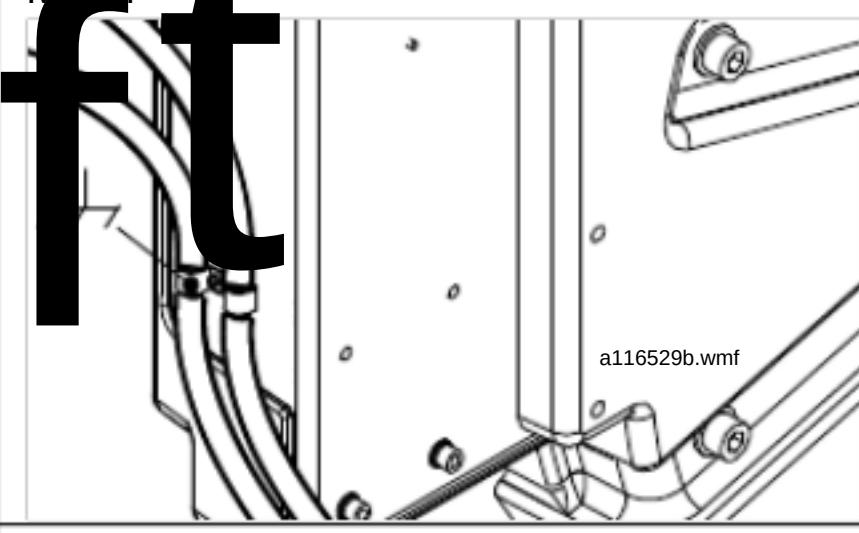
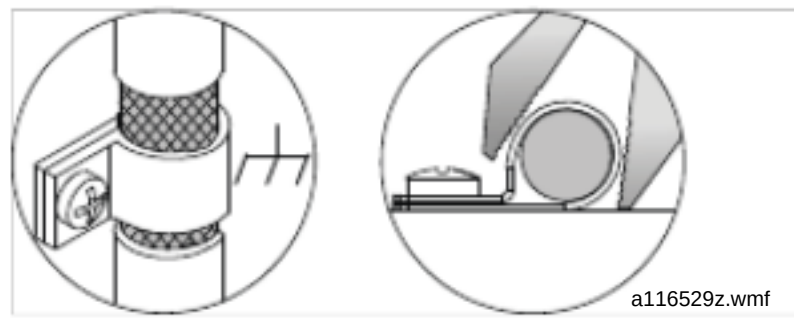
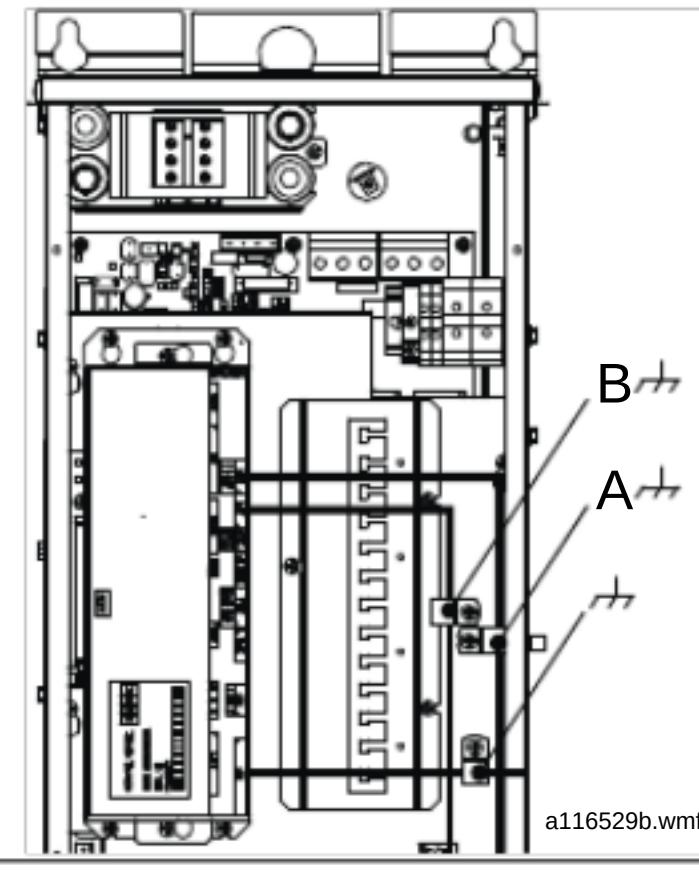
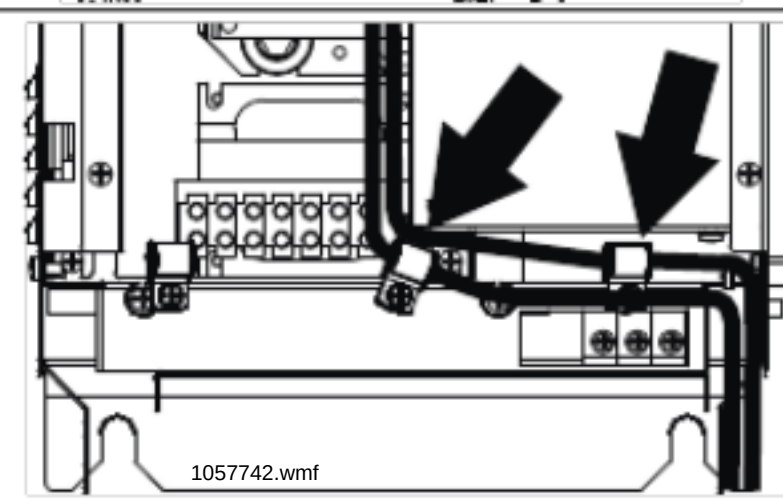
Step	Action	Note
1	Check that there is nothing leaning against the traction sheave.	
2	Check that the cables are connected.	

5.1.2 Checking cable routes

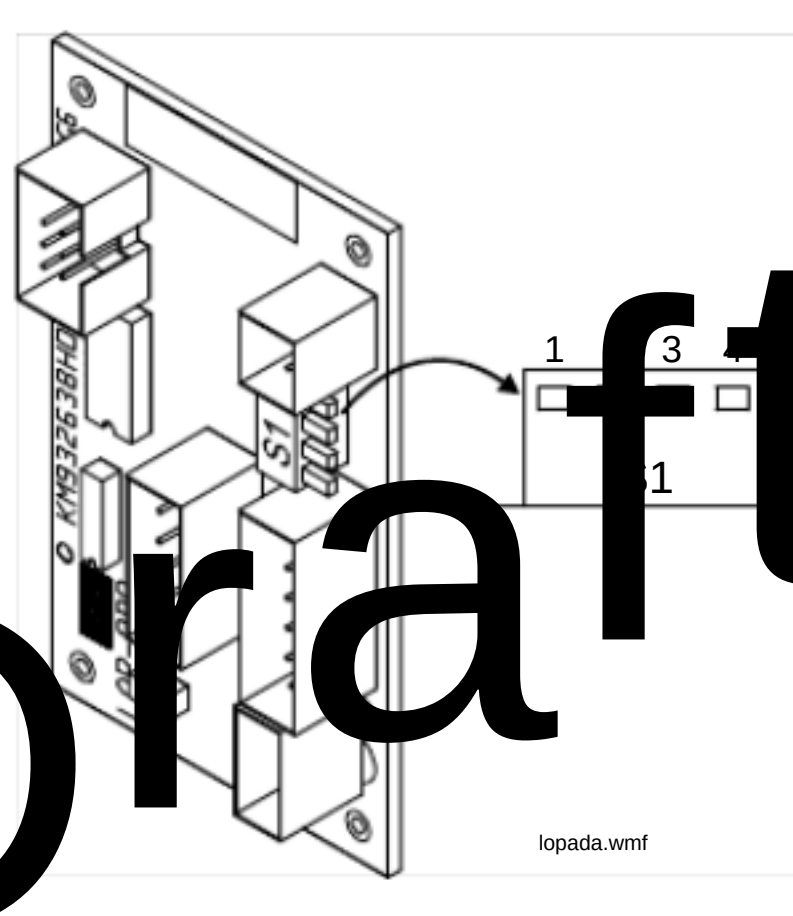
Step	Action	Note
1	Resolver, encoder and thermistor cables must be separated from motor supply and brake control cables. Otherwise there might be disturbances in the resolver and encoder signals. These cables can cross each other at an angle of 90 degree. If these cables are routed parallel, the minimum clearance between these two cable groups must be 100 mm.	 1 = Resolver cable 2 = Encoder cable 3 = Brake control cable 4 = Motor cable 5 = Thermistor cable

5.1.3 Checking the earthing and connections of the motor cables

Step	Action	Note
1	Check that the motor supply cable (1) and braking resistor cable (2) is earthed in both ends: ? Motor supply cable shield is connected to the motor body. ? Braking resistor cable shield is connected to the brake resistor. ? Cable shield is connected to the cabinet top plate (A). ? Motor supply cable earth wire is connected to the upper earth terminal of PE2 in the drive (B).	 
2	Check that the earth wire from PE1 in the drive panel is connected to PE in the SEP (TOP).	

Step	Action	Note
3	Check that the resolver cable shield (C) is connected to the resolver/machine body at the machine end.	MX10  MX14 
4	Check that the resolver cable shield is connected to the drive body (A). Check that the encoder cable shield is connected to the drive body (B). 	
5	If shielded brake cables, check that the shield of the brake cable is connected to the drive body.	
6	Check the connection and tightness of wires in the terminals.	Refer to the wiring diagrams.
7	Fix the drive panel covers in place.	

5.2 Setting the dip switches in the LOP-ADA board



Step	Action	Note
1	Check the: ? motor type from the machine data plate ? roping (R) ? rated speed of the elevator (Vn)	
2	Set the dip switches according to the table on next page.	

Motor id	R [n:1]	v_n [m/s]	D_{ts} [mm]	n_n [rpm]	POS SW 4	POS SW 3	POS SW 2	POS SW 1
MX10	2:1	1,00	480	79,6	1	0	0	1
MX10	4:1	0,50	480	7[illegible]6	1	1	0	0
MX10	2:1	1,60	480	12[illegible]3	1	0	0	1
MX10	2:1	0,80	480	6[illegible]0	1	0	0	1
MX10	4:1	[illegible],75	480	60,0	1	0	0	1
MX10	2:1	[illegible],60	480	127,3	1	0	0	1
MX10	2:1	1,75	480	139,3	0	1	1	0
MX10	2:1	2,00	480	159,2	0	1	1	0
MX14	2:1	1,00	520	74,0	0	1	0	1
MX14	2:1	1,60	520	118,0	0	1	0	1
MX14	2:1	1,75	520	129,0	0	1	0	1
MX14	2:1	2,00	520	147,0	0	1	0	1
MX14	2:1	2,50	520	184,0	0	1	0	1
MX20	4:1	0,50	600	64,0	1	0	0	1
MX20	2:1	1,00	600	64,0	0	1	1	0
MX20	4:1	0,63	600	80,0	1	0	0	1
MX20	2:1	1,25	600	80,0	0	1	1	0
MX20	4:1	0,75	600	96,0	1	0	0	1
MX20	2:1	1,60	600	102,0	0	1	1	0
MX20	2:1	1,75	600	111,0	0	1	1	0
MX20	4:1	1,00	600	127,0	1	0	0	1
MX20	2:1	2,00	600	127,0	0	1	1	0
MX20	2:1	2,50	600	159,0	0	1	1	0

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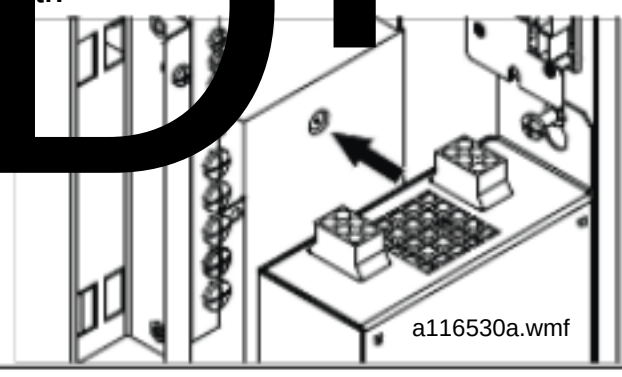
5.3 Setting parameters

NOTE! Ensure that covers of the panels and boxes are closed.

5.3.1 Setting the LCE parameters

Refer to the LCE user interface menu 813131.

NOTE! Before doing any changes record the original values.

Step	Action	Note
1	Switch the elevator to ID.	
2	Switch the power ON. Refer to the elevator level installation manual.  	Elevators with construction-time power supply: If the residual current switch of the lift supply trips, remove the screw for earth leakage current reduction. After elevator commissioning (construction-time power supply is replaced with final power supply), replace the screw.
3	Activate the inspection drive limit by setting the value Inspection drive limited (1_71) parameter to 3.	WARNING! With this parameter setting inspection drive stops latest at the terminal floor level.
Set following parameters:		
4	FRD (1_62) parameter to 0 (no FRD).	
5	Car light supervision (1_77) parameter to 0 (not in use).	
6	Drive interface (1_95) parameter to 1.	
7	If option boards (LCEOPT) are disconnected, set all LCEOPT supervision (7_91) sub parameters to 0.	
8	Switch the power OFF. Wait at least 15 seconds.	Check that the LOP-CB is shut down.
9	Switch the power ON.	

5.3.2 Setting the drive parameters

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

Step	Action	Note
1	Check that Document identification (6_0) parameter matches the ID on parameter list 948570D01 (APPENDIX).	
Set the elevator dependent parameters:		
2	Parameter lock (6_95) parameter to 0.	
3	Default parameters (6_98) parameter to 1.	
4	Motor type (6_60) parameter See table below.	Setting motor type (6_60) parameter transmits parameters 6_6, 6_33, 6_61, 6_63, 6_64, 6_65, 6_66 and 6_67 values to default settings for that type of motor.

Values for Motor type (6_60) parameter:

Value	Type	6_6	6_33	6_61	6_63	6_64	6_65	6_66	6_67
10.37	MX10, encoder wheel size, 37.3 mm	480	0.15	0	2	19766	2	6.0	120
14.00	MX14, encoder on axle	520	0.34	1	1	8192	1	6.0	130
20.37	MX20, encoder wheel size 37.3 mm	600	0.25	1	2	25943	2	6.0	120
20.55	MX20, encoder wheel size 55 mm	600	0.25	1	2	17594	2	6.0	120
20.75	MX20, encoder wheel size 75 mm	600	0.25	1	2	12902	2	6.0	120

Step	Action	Note
5	Acceleration (6_2) parameter	MX14: 0.60 m/s2 Other machines: 0.80 m/s2
6	Nominal speed (6_3) parameter	Refer to layout drawings.
7	Elevator load (6_4) parameter	
8	Traction sheave diameter (6_6) parameter	Refer to machine data plate See chapter 4.3.
9	Roping (6_7) parameter	Refer to layout drawings.
10	KTW/Q factor (6_25) parameter	2.8 = travel ≤30 m 5.0 = travel ≤80 m 8.0 = travel ≤240 m These are proposed pre-settings.

Step	Action	Note
11	Brake voltage reduction enable (6_61) parameter	0 = disable 1 = enable
12	Resolver speed and polarity (6_63) parameter	1 = 1-speed resolver 2 = 2-speed resolver
13	Encoder pulses per motor round (6_64) parameter	See previous table.
14	Encoder type and polarity (6_65) parameter	1 = encoder on motor shaft 2 = encoder on brake wheel
15	Motor source voltage (6_80) parameter	Refer to machine data plate. See chapter 4.3.
16	Motor nominal current (6_81) parameter	
17	Motor nominal motor frequency (6_82) parameter	
18	Motor nominal rotation speed (6_83) parameter (rpm)	
19	Motor nominal output power (6_84) parameter	
20	Save (6_99) parameter to 1.	Value is returned automatically to 0.

5.4 Checking the resolver and encoder polarity

5.4.1 Checking the resolver polarity

Step	Action	Note
1	Select RealTimeDisplay monitor selection (6_75) to 134 (resolver angle).	For instructions on how to set the Real Time Display Monitor refer to chapter 4.4 How to use real time display function.
2	Manually rotate the traction sheave upwards. ? The value increases when the motor rotates in the up direction and decreases when the motor rotates down. NOTE: Resolver angle range is 0 - 360.	
3	If the polarity is wrong: ? Set Resolver speed and polarity (6_63) parameter to -1 = for 1-speed resolver -2 = for 2-speed resolver Repeat the test by rotating the traction sheave upwards.	
4	Manually rotate the traction sheave downwards and check that the value decreases.	

5.4.2 Checking the encoder polarity

Step	Action	Note
1	Select RealTimeDisplay monitor selection (6_75) to 1 (elevator speed).	For instructions on how to set the Real Time Display Monitor refer to chapter 4.4 How to use real time display function.
2	Manually rotate the traction sheave upwards. ? The value is positive when the motor rotates in the up direction and negative when the motor rotates down.	
3	If the polarity is wrong: ? Set Encoder type and polarity (6_65) parameter to -1 = encoder on motor shaft -2 = encoder on brake wheel Repeat the test by rotating the traction sheave upwards.	Ensure that SPEED LEDs working correctly. If not, swap wires in XLG6 on LOP-ADA board.
4	Manually rotate the traction sheave downwards and check that the value is negative.	
5	Save (6_99) parameter to 1.	Value is returned automatically to 0.

5.5 Initial setting of the resolver angle

WARNING

Check that there is nothing in contact with the machinery traction sheave or ropes.

? Inspection and normal drives are not allowed before resolver angle is detected.

5.5.1 Resolver angle autodetection

NOTE! Resolver angle autodetection must be repeated always after swapping the motor supply cable wires or changing the value of parameter Resolver speed and polarity (6_63).

Step	Action	Note
1	Elevators without ropes : Reset the LWD set up (see LWD setup (6_74) parameter 1).	
2	Ensure that Torque angle offset (6_62) parameter is 0.	Torque angle offset must be zero before resolver angle autodetection.
3	Set Drive commissioning (6_70) parameter to 1.	
4	Activate the Realtime display. The display should show 0.	
5	NOTE! During this step the machine will make loud noise. Press RDF RB and UP or DOWN buttons and keep them pressed until the value in Realtime display changes to the new value of resolver angle.	Normal function ? Main contactor energises ? Motor emits noise several seconds ? Main contactor de-energises Traction sheave does not rotate.
6	Drive the car to both directions using RDF to ensure functionality. Start by driving downwards. If the car does not drive: Switch the power OFF. Wait at least 15 seconds. Swap the motor supply cable wires on terminals U and V in the drive panel. Close the panel covers and repeat the steps in this chapter.	

5.5.2 Checking the resolver angle and recording the value

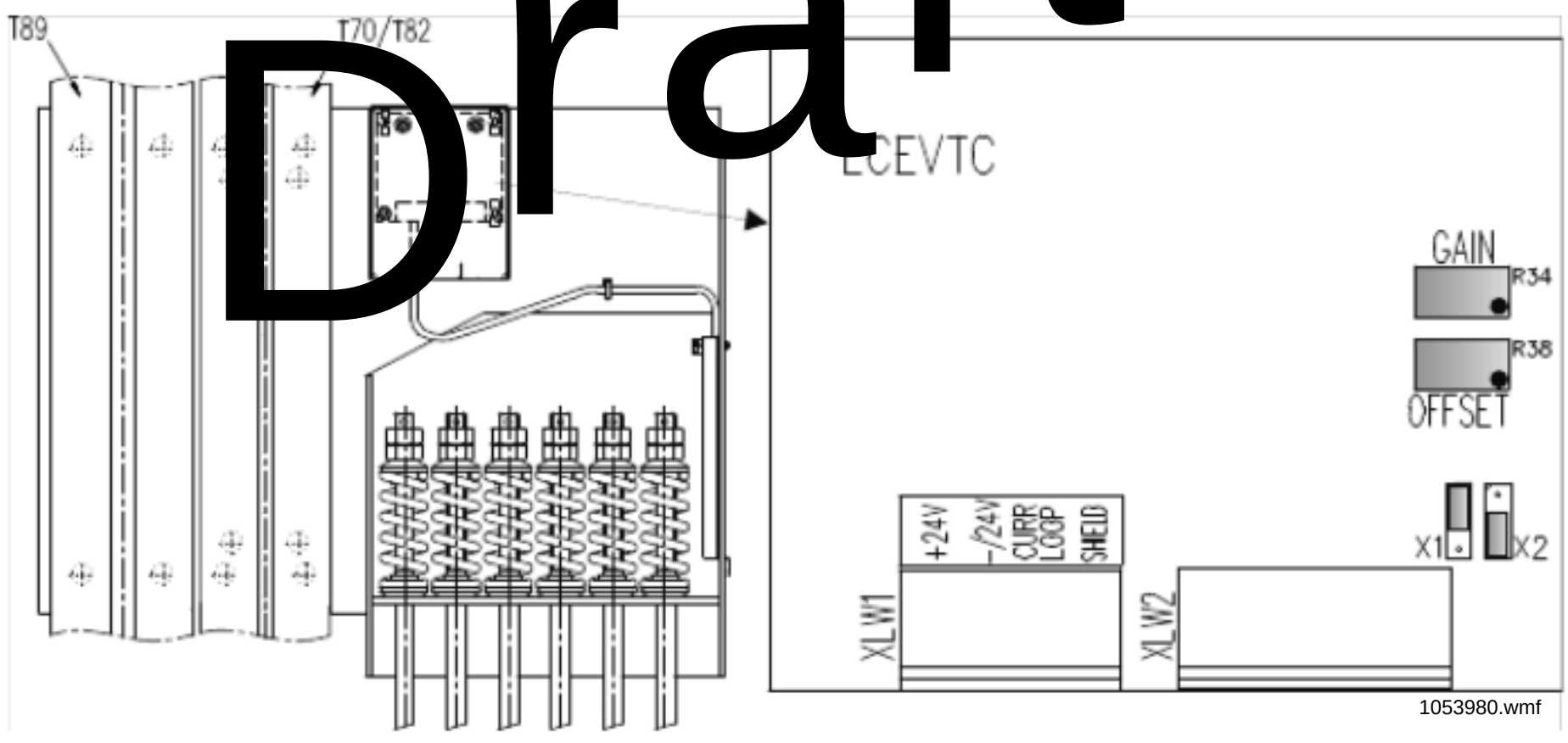
Step	Action	Note
1	Read the value of Torque angle offset (6_62) parameter. If the value is 0, repeat the chapter 5.4.1.	
	If no other possibility, resolver angle can also be found manually by entering the value of Torque angle offset (6_62) parameter in the range of 1 - 360 degrees. Change the value by increments of 20 degrees, attempt to run the car after each increment. Resolver angle is satisfactory when the car runs. Fine tuning will be required before final commissioning.	
2	Save (6_99) parameter to 1.	Value is returned automatically to 0.

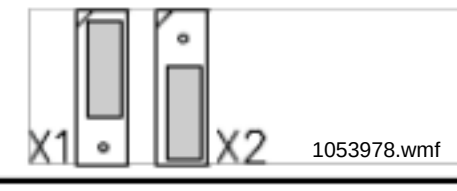
6 COMMISSIONING FOR RATED SPEED

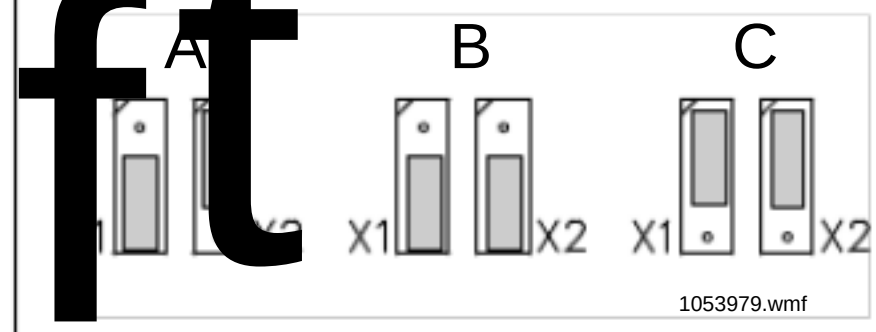
Refer to the elevator level installation manual before commissioning.

6.1 Adjusting the OFFSET and GAIN potentiometers in LCEVTC board (optional)

NOTE! This chapter is valid for elevators with load weighing device and LCEVTC board on the rope anchorage. If this is not the case skip this chapter.



Step	Action	Note
1	Ensure that the car is empty.	
2	Set jumper X1 and X2 positions on the LCEVTC board.	

Step	Action	Note
3	Select RealTimeDisplay monitor selection (6_75) to 65 (LWD input value). Adjust the OFFSET potentiometer on the LCEVTC board so that the LOP-CB shows value between 6-8 (mA).	Turning potentiometer clockwise increases the value.
	If the value of 6 (mA) cannot be reached, re-set the jumper positions: ? If the current in first adjustment is less than 6 use jumper setting A. If the current is still less tha use jumper setti ? rrent in t adjust ent is more tha use umper s ting C.	
4	Plac 50 % of th ated load in the car.	
5	Sele RealTi Display monitor selection (6_75) to 65 (LWD input value). Adju the GAIN potentiometer so that the LOP-CB shows value between 10-12 (mA).	
6	Remove the weights from the car and do LWD setup.	

6.2 Set up load weighing device

NOTE! If elevator is taken in use before car decoration is fully ready the load weighing setup must be redone when car is finalized.

Follow this working order exactly. If you forget one step or give wrong values, you have to restart whole LWD setting.

Step	Action	LOP-CB display
Reset the LWD setup.		
1	Select LWD setup (6_74) parameter.	0 is blinking.
	Switch 0 to -1 (minus one).	-1 is blinking.
	Press ACCEPT.	6_74_0, all digits start to blink.
	Press MENU.	6_74
Zero load:		
2	Select RealTimeDisplay monitor selection (6_75) to 65 (LWD input value). Check that LOP-CB shows value between 6-8.	This indicates current output from the sensor (mA). If value is 0 => Sensor is not connected or too wide gap. If the value is too high => Check the LWD sensor.
3	Select LWD setup (6_74) parameter.	0 is blinking.
	Press ACCEPT.	6_74_0, all digits start to blink.
	Press MENU.	6_74
Half load:		
4	Place from 40 % to 60 % of the rated load in the car.	6_74
5	Select RealTimeDisplay monitor selection (6_75) to 65 (LWD input value). Check that LOP-CB shows value between 10-15.	
6	Select LWD setup (6_74) parameter.	0 is blinking.
	Give the load value as percentage of rated load.	Load value is blinking.
	Press ACCEPT.	6_74_0, all digits start to blink.
	Press MENU	6_74
7	Leave menu 6 and check that the correct value is recorded by reading the value of LWD adjustment (5_1) parameter.	
8	Check that the LWD information changes when the load is changing.	
9	Set Save (6_99) parameter to 1.	

6.3 Elevator shaft setup (with 50 % load)

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

Step	Action	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 light.	LED 61:N must not light. LCE LEDs 30 and/or B must light.
4	Ensure that Inspection speed (6_20) parameter is set to 0.3.	Elevator shaft setup speed = Inspection speed
5	Activate the setup mode from the control. Set Shaft setup (5_2) parameter to 1.	
6	Switch the RDF to normal.	Elevator starts the setup drive upwards.
7	Wait floor numbers on LOP-CB.	Elevator is ready for the normal drive when the elevator stops at the topmost floor, car relevel and the LOP-CB shows the number of the topmost floor. If the diagnostic code 118_6010 or 118_6011 appears after shaft setup, check and re-adjust the distance between 61-switches. Refer to KDL32 diagnostic codes. All 6000-serie codes are diagnostic information. All sub codes in this category DO NOT indicate a fault. They are for getting additional information.

6.4 Resetting the LCE parameters

Step	Action	Note
1	Reset LCE parameters to original values. ? Inspection drive limited (1_71) ? FRD (1_62) ? Car light supervision (1_77)	
2	Switch the power OFF. Wait at least 15 seconds.	DC-LINK retains stored charge.
3	Switch the power ON.	

7 FINE ADJUSTMENTS

Adjustments should be made to optimise the ride comfort and maximize performance.

Refer to the elevator level installation instruction for the prerequisites.

If the elevator mechanics or balancing are changed, the fine adjustment should be repeated.

These adjustments can be done after several successful drives over the full length of travel.

7.1 Check the car and counterweight balancing (wit 50 % oad)

Step	Actio	Note
1	Loa 50% of ra d loa into e car	
2	Inhi door open g ar landing calls.	LOP-CB switches 263 and 261.
3	Swit the RDF N.	
4	Sele RealTi eDisplay monitor selection (6_75) to 14 (midpoint) to locate midpoint. When display shows 1 the car is above elevator shaft midpoint. When display shows 0 the car is below midpoint.	For instructions on how to set the Real Time Display Monitor refer to chapter 4.4 How to use real time display. See parameter list 948570D01.
5	Drive the car and counterweight to the same level in the elevator shaft.	No one is allowed to be on the car roof inside the car or in the elevator shaft.
6	Open the brake slowly.	Close the brake immediately if the car starts to move. Add or remove counterweight fillers if needed.

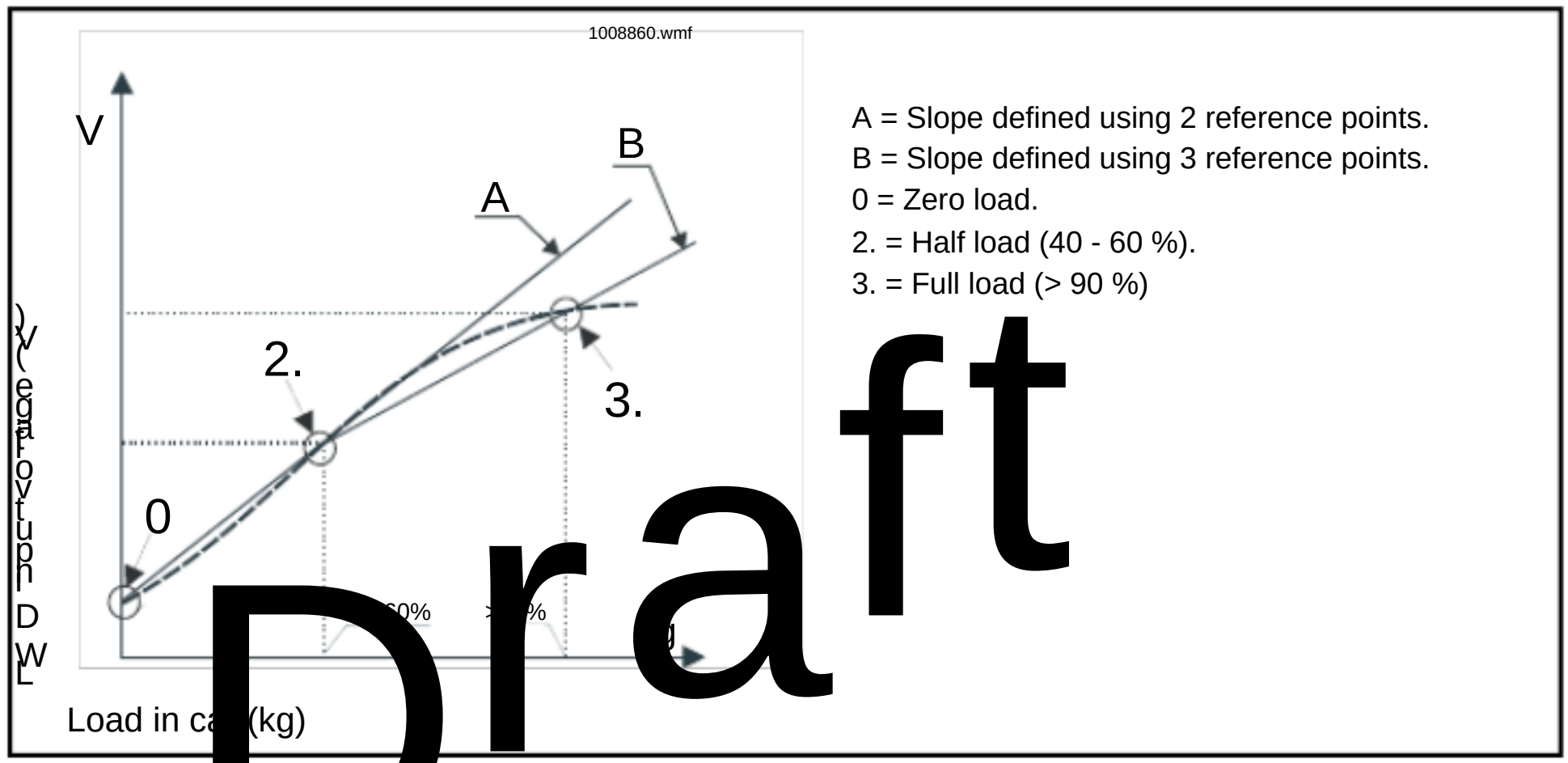
7.2 Final checking of the car and counterweight balancing (electrical) (with 50 % load)

Step	Action	Note
1	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
2	Switch elevator to RDF mode (270).	
3	Select RealTimeDisplay monitor selection (6_75) to 30 (Average motor current).	
4	Switch elevator to normal drive.	

Step	Action	Note
5	Drive elevator between bottom and top floors. Add or remove counterweight fillers if needed.	Record current values after each complete run at rated speed. Measured values (upwards and downwards) depend on shaft friction, unbalance and motor resolver angle. Balance is correct when values are equal in both directions. The values are positive or negative depending on the drive direction.

7.3 Fine adjustment of the LWD operation

Step	Action	Note
1	Set zero point and half load point. See chapter 6.4.	Set points when car is at the nearest served floor in the middle of the elevator shaft. Make all load weighing adjustments with car standing at same floor.
2	Place more than 90 % of the rated load in the car. Check that the springs under the car are not fully compressed.	If there is not enough weight in the car, the half load point setting will change and the third point setting will not be registered. This will make the ride comfort worse.
3	Drive the elevator to the nearest served floor in the middle of the elevator shaft.	
4	Select LWD setup (6_74) parameter.	LOP-CB display flashes “0”.
5	Use scroll buttons to enter weight as percentage of rated load.	
6	Press ACCEPT button to enter weight.	This step sets third gain reference point. LOP-CB display flashes between 6_74 and 0, after pressing ACCEPT.
7	Press MENU button one time.	LOP-CB displays (6_74) parameter.
8	Set Save (6_99) parameter to 1.	
9	Use MENU button to navigate to menu LWD adjustment (5_1) parameter and press ACCEPT button.	LOP-CB displays load in elevator in percentage of full load. Check that correct value is displayed.



When setup has been done, each step can be reset separately. Example to set new 0-load point select (74) parameter value 0. Other points will remain as set.

7.4 Tips for speed control adjustments

Action	Too high parameter value	Too low parameter value
Change the value of P factor (6_1) parameter in 0.5 increments. NOTE! Usually it is better to set the value as high as possible.	Vibrations and noise in motor.	Car does not reach the floor level. Car may jump during relevelling. Relevelling problems.
Change the value of I factor (6_21) parameter in 0.05 increments.	Car does not reach the floor. May decrease vibrations.	May cause noise in motor. May cause other vibrations.
Change the value of Speed feedback filter time (6_32) parameter step by step. NOTE! This parameter is typically changed to avoid interference in encoder signal.	Car may not reach the floor. May cause overspeeding.	

Action	Too high parameter value	Too low parameter value
Change the value of KTW/Q factor (6_25) parameter.		Car does not reach the floor. Car movement does not follow the speed curve. Car jumps when slowing to a floor. Relevelling problems.

7.5 KTW/Q factor (with 100 % load)

Step	Action	Note
1	Drive the car to the bottom floor.	
2	Switch the RDF ON.	
3	Select RealTimeDisplay monitor selection (6_75) to 27 (KTW/Q estimate).	
4	Inhibit door opening and landing calls	LOP-CB switches pos. 263 and 261.
5	Switch the RDF OFF.	
6	Drive the car with rated speed from bottom floor to top floor and record value from the LOP-CB after the complete run.	
7	Drive the car with rated speed from top floor to bottom floor and record value from the LOP-CB after the complete run.	
8	Switch the RDF ON.	
9	Set KTW/Q factor (6_25) parameter based on the calculation below: KTW/Q factor = (value on the LOP-CB display at the top floor + value on the LOP-CB display at the bottom floor) / 2.	
10	Set Save (6_99) parameter to 1.	

7.6 Starting

Step	Action	Note
1	If the mechanical brakes are still engaged when the drive starts, increase the value of Start delay (6_33) parameter. Recheck the operation.	Normally the brake start delay parameter does not need adjustment. NOTE! Do not increase the value unnecessarily. A too high value decreases the performance of the elevator.

7.7 Jerky start / roll back

Whenever the resolver angle is changed or fine tuned, repeat these adjustments.

It is important to adjust these in the following order.

7.7.1 Balancing parameter (with 50 % load)

Step	Action	Note
1	Load 50% of rated load on the car and drive the car to exactly the middle of the elevator shaft.	Select RealTimeDisplay monitor selection (6_75) to 14 (midpoint) to locate midpoint.
2	Set P factor (6_1) parameter to 1.5. Set Start delay (6_33) parameter to 1.0.	Record the original values.

Step	Action	Note
3	Select RealTimeDisplay monitor selection (6_75) to 3 (elevator position) or 134 (resolver angle). Drive the car upwards few times using RDF. Observe the movement of the traction sheave during the start by observing realtime display values. ? If there is roll back decrease the value of Balancing (6_10) parameter in 0.02 steps. ? If there is roll forward increase the value of Balancing (6_10) parameter in 0.02 steps. After up start is adjusted, check down start and adjust (6_10) if needed.	Default value on Balancing (6_10) parameter is 50.00. Wait about 10 seconds between starts to allow the LWD signal to stabilize. Always start drive from the same position. Start should similar in both directions.
4	Set Save (6_99) parameter to 1.	

7.7.2 Rope weight parameter (with 50 % load)

Step	Action	Note
1	Drive the car with 50% load to the bottom floor.	In long elevator shaft, it is permissible to increase P factor to original value and drive the car at normal speed to the bottom floor.
2	If P factor was increased to original value for a normal drive, set P factor (6_1) parameter to 1.5.	

Step	Action	Note
3	Select RealTimeDisplay monitor selection (6_75) to 3 (elevator position) or 134 (resolver angle). Drive car upwards on RDF. Observe the traction sheave during the first second of motion by observing the realtime display values. ? If there is roll back, increase the value of Rope weight (6_26) parameter in 0.5 steps. ? If there is roll forward, decrease the value. Rope weight is correct when there is no movement during the first second of start.	Wait about 10 seconds between starts to allow the LWD signal to stabilize. Rope weight (6_26) parameter: Without compensation ropes --> typical value is 3.0. With compensation ropes --> typical value is 0. Default value of Rope weight (6_26) parameter is 0. Rope weight parameter can also have negative values.
4	Verify rope weight adjustment at the top floor by running downwards and adjust if needed.	
5	Set Load weighing (6_29) parameter to 1.	

7.7.3 Start torque scaling (with 0 % load)

Step	Action	Note
1	Drive the empty car to exactly the middle of the elevator shaft. NOTE!Select RealTimeDisplay monitor selection (6_75) to 14 (midpoint) to locate midpoint.	In long elevator shaft, it is permissible to increase P factor to original value and drive the car at normal speed to the middle of the elevator shaft.
2	If P factor was increased to original value for a normal drive, set P factor (6_1) parameter to 1.5.	
3	Drive car upwards on RDF observing the traction sheave during the first second of motion. ? If there is roll back, decrease the value of Start torque scaling (6_23) parameter in 0.05 steps. ? If there is roll forward, increase the value. Start torque scaling is correct when there is no movement during the first second of start.	Default value of Start torque scaling (6_23) parameter is 1.00. Wait about 10 seconds between starts to allow the LWD signal to stabilize.

Step	Action	Note
4	Set Save (6_99) parameter to 1.	

7.7.4 Car cable weight parameter (with 0 % load)

This setting is valid only in high rise applications (travel height more than 100 m).

Step	Action	Note
1	Drive the empty car to topmost floor of the elevator shaft.	In long elevator shaft, it is permissible to increase P factor to original value and drive the car at normal speed to the topmost floor.
2	If P factor was increased to original value for a normal drive, set P factor (6_1) parameter to 1.5	
3	Drive the elevator downwards a few times on RDF observing the traction sheave during the start. ? If there is roll forward, increase the value of Car cable weight (6_27) in 0.5 steps. To fine adjust the parameter use smaller steps.	Car cable weight parameter: - Menu 6_27 - Value is given in kg/m - Default value is 0.00 Always start to drive from the topmost floor. Wait 10 seconds between successive drives: the LWD signal oscillates for a while after stopping.
4	Set Save (6_99) parameter to 1.	

7.7.5 Restore Start delay and P factor to original values

Step	Action	Note
1	Set Start delay (6_33) and P factor (6_1) parameters to original values.	
2	Set Save (6_99) parameter to 1.	

7.8 Final jerk distance

Step	Action	Note
1	For smoother and longer rounding increase the value of Final jerk distance (6_28) parameter. If you want faster landing to the floor level decrease the value.	Default value of Final jerk distance (6_28) parameter is 80 mm.

7.9 P factor and I factor

Step	Action	Note
1	Adjust P factor (6_1) parameter and I factor (6_21) parameter so that elevator makes accurate and stable floor stops. If elevator “ hunts ” at the floor, increase P factor and decrease I factor. Too high P factor and too low I factor may cause vibration.	

NOTE! P factor, I factor, KTW/Q, Rope weight and Car cable weight are parameters that can be copied to other similar elevators in the group.

8 SAFETY INSPECTION

It is recommended to do the testing in the described order to avoid unnecessary loading and unloading.

8.1 Standards and rules

This safety inspection procedure is according to EN 81-1 and KONE Corporation safety policies.

Possible differences between this instruction and local safety regulations must be considered.

Compare this instruction to the delivery documents to find possible variations, for example in the circuit diagrams.

8.2 Safety

All the work must be carefully planned in order to avoid safety hazards or damage to the product.

WARNING

Check that there is no-one inside the car or in the elevator shaft during the safety inspection time.

Disconnect the landing calls using the user interface during the safety inspection time, so that the inspection will not be interrupted and to avoid trapping passengers in the elevator.

Inhibit landing calls and door opening when it is not necessary to enter car.

Before going to the car roof, push the car roof stop button down and switch the inspection drive unit to inspection drive before releasing the stop button.

8.3 Pre-requisites

Before starting the safety inspection tests, ensure that:

? Installation and adjustments are completed.
? Commissioning for rated speed (including the safety chain checks) is completed.
? Buffer heights are correctly aligned, fixed and buffers are filled with oil (where applicable).
? Safety spaces above and under car and counterweight are correct.
? Travelling cable is long enough to drive onto the buffer.
? There are no unnecessary objects in the elevator shaft or on the car roof.
? Inhibit landing calls and door opening when it is not necessary to enter car.
? Brakes are adjusted.
? Car and counterweight are balanced.
? Counterweight clips are fitted.
? Load weighing device is adjusted.
? SPEED LEDs on LOP-B board working correctly.

8.4 Safety tests with 0 % load in car

NOTE! After the labels of each block, there is a short reference to EN 81-1:1998 Annex D.

WARNING

Keep the door opening inhibited when you do not need to open the doors.

8.4.1 Visual check (with 0 % load) (Annex D1.c and d, Annex D2.a, b and c)

Step	Action	Note
1	Locking.	Landing doors must be locked when the car is not at the floor level. MAP, main switch and lighting switch must be lockable.
2	Verification of components.	Check that the safety devices, suspension elements and their attachments are according to the elevator documentation.

Step	Action	Note
3	Controlling devices: Switch the RDF in the controller ON and Inspection drive unit on the car roof to Inspection. Try to drive using the RDF, the car should not move.	RDF buttons in the MAP and the inspection unit on the car roof MUST NOT control the elevator simultaneously.
	Switch Inspection drive unit on Normal and RDF ON. Push both RUN and one of the direction buttons in the RDF. The car should now move in the correct direction. When removing the finger from the RUN button, the elevator should stop.	The elevator MUST NOT run unless the RUN button and one of the direction buttons are pressed simultaneously.
4	Safety chain check during RDF/inspection drive: Check that the safety chain switches (that are not bypassed by RDF) prevent driving.	All landings: Landing door lock contact Landing door contact Car: Car door contact Slack rope contact (if applicable) Inspection drive unit stop button Car roof stop button(s) Emergency exit contact (if applicable) Ladder contact (if applicable) Pit: Stop switch Overspeed governor tension weight contact(s) Maintenance door contact (if applicable) Compensation rope contact RDF bypasses the following safety devices: ? Safety gear contact ? Final limit switch ? Overspeed governor contact(s) ? Buffer contacts

8.4.2 Measuring insulation resistance of the main power connectors (with 0 % load) (Annex D2.f)

Insulation resistance meter is needed.

Step	Action	Note
1	Switch the main switch (220) OFF.	
2	Measure the insulation resistance between the earth bar and secondary side of the phase terminals in the main switch (220).	The maximum measuring voltage is 500 VDC.
3	Switch the lighting switch (262) OFF. Measure the insulation resistance between the earth bar and secondary side of the phase (L) and neutral terminal (N) in the lighting switch (262).	
4	Measure the insulation resistance between the motor terminals and the earth bar.	

8.4.3 Measuring safety chain insulation resistance (with 0 % load) (Annex D2.f)

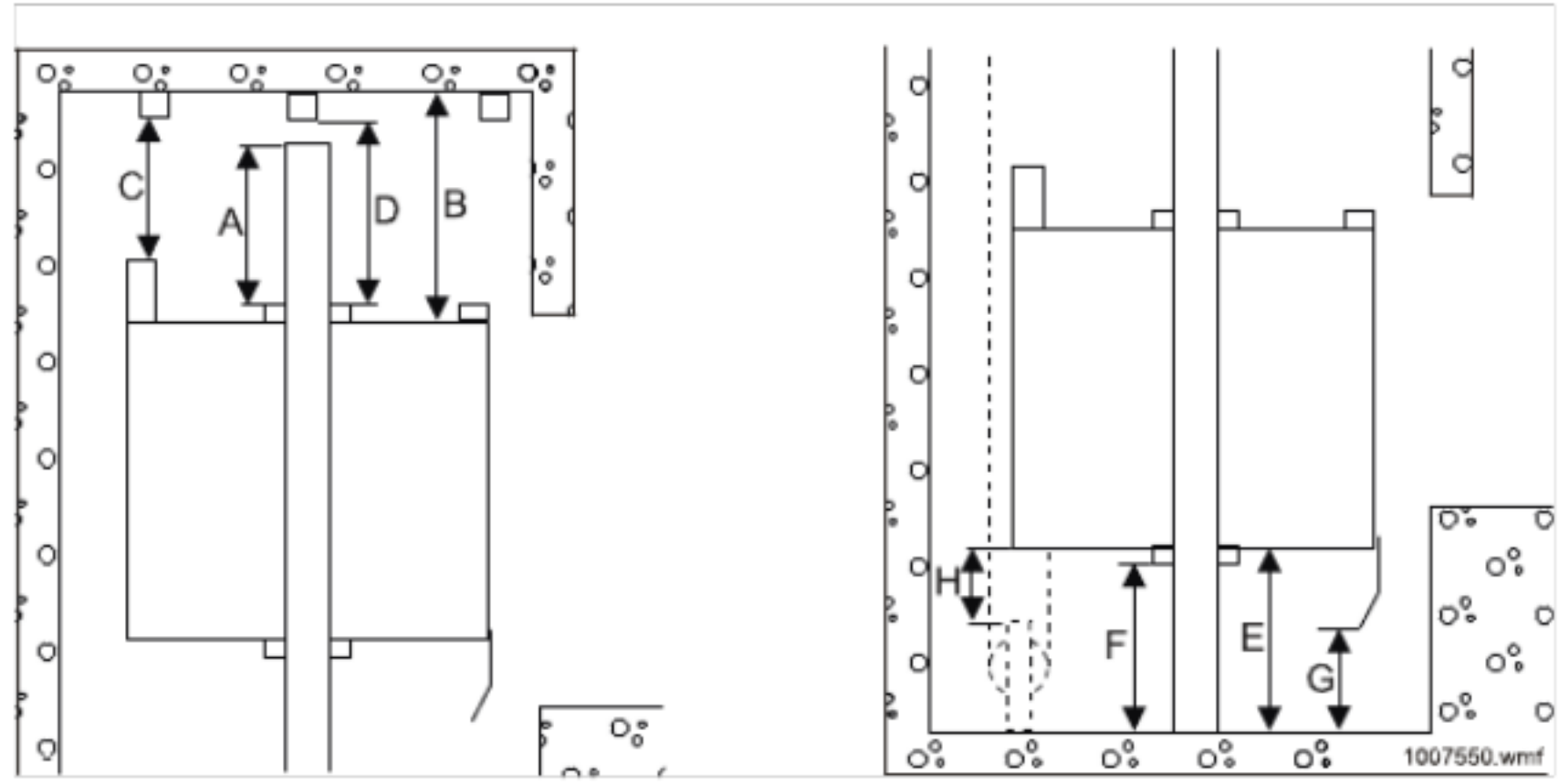
Insulation resistance meter is needed.

Step	Action	Note
1	Drive the car using RDF below the top floor to allow access to the SEP if required later.	Moving the car also ensures that all safety circuits are closed and ready for measurements.
2	Switch the main switch (220) OFF.	
3	Switch the RDF OFF.	
4	Disconnect the connector XLH1 from the MAP .	
5	Measure the insulation resistance between the earth bar and the safety chain terminals of each connector.	XLH3, XLH4, XLH5, XLH6, XLH7, XLH8 The maximum measuring voltage is 500 VDC. Always refer to the circuit diagrams.
6	Reconnect the connector XLH1.	
7	Switch the RDF ON. Check that the elevator runs with the RDF.	

8.4.4 Alarm devices (with 0 % load) (Annex D2.m)

Step	Action	Note
1	Test the operation of the alarm buttons in the car operating panel (39:1), under the car (39:3) and on the car roof (39:2).	Check the set delay and configurated alarm connections.
2	Check that the alarm operates according to the configuration.	The configuration is downloaded from the local KONE Service Centre during the installation. Refer to the KONE Remote Monitoring (KRM) instructions.
3	Reset the alarm.	

8.4.5 Checking the running clearances (with 0 % load)

Step	Action	Note
1	Check the clearances indicated A - H and counterweight guided travel as per EN 81-1. 	
2	Ensure that the inspection drive limits are functioning, before driving on the car roof.	

8.4.6 Car and counterweight (if applicable) overspeed governor tests (with 0 % load) (Annex D2.i and n)

NOTE! If you have both car and counterweight overspeed governors the counterweight overspeed governor must have the higher tripping speed.

Step	Action	Note
1	Drive the car using RDF drive to a suitable height to engage the blocking device.	
2	Push the car roof stop button down and go to the car roof. Engage the blocking device.	
3	Lift the overspeed governor rope out of the groove and hang it temporarily to the overspeed governor fixing. Secure it with cable ties.	
4	Measure the overspeed governor electrical tripping speed using a manual tachometer. Accelerate the overspeed governor manually in car down direction until the electrical contact (127) operates. Note the operating speed.	Read the correct operating speed from the overspeed governor data plate.
5	Measure the overspeed governor mechanical tripping speed using a manual tachometer. Accelerate the overspeed governor manually in car down direction until it trips. Rotate the overspeed governor to the tripping direction. Note the tripping speed.	For correct tripping speed refer to the following table.
6	Replace the rope in the groove after testing.	

Rated speed	Tripping range	
	V_n x 1.15	V_n x 1.25 + (0.25/V_n)
0.6 m/s	> 0.70 m/s	< 1.50 m/s
1.0 m/s	> 1.15 m/s	< 1.50 m/s
1.6 m/s	> 1.80 m/s	< 2.15 m/s

8.4.7 Traction test with empty car (with 0 % load) (Annex D2.h2)

Step	Action	Note
1	Drive the counterweight to the buffers using RDF.	
2	Open the brake to ensure that the counterweight is resting on the buffers.	
3	Fix a piece of paper to the car door so that it projects through the landing doors.	This piece of paper indicates the car movement.
4	Set Inspection speed (6_20) parameter to 0.1.	Record original value.
5	Set Inspection elevator test (6_72) parameter to 1 (Inspection test up).	
6	Drive the car upwards with RDF approximately three seconds. Look at the LEDs in the MAP to ensure that the motor encoder tries to rotate.	The car should not move.
7	Bring the car back to the topmost floor using the RDF drive.	

8.4.8 Upper limit switch check (with 0 % load) (pos. 51) (Annex D2.g)

Step	Action	Note
1	Drive the empty car to the topmost landing.	
2	Switch the main switch (220) OFF.	
3	Disconnect the plug XLH8 from LOP-230 board in MAP . Measure with multimeter in ohm zone the resistance between the pins XLH8/7 and XLH8/9 on XLH8 plug.	
4	Pull the brake release lever and move the car 1-2 cm at a time.	
5	The operation point of the limit switch is reached, when the multimeter shows "infinity".	The multimeter buzzer is useful if you are working alone. CAUTION! Be careful when releasing the brake(s). Do not let the elevator overspeed.

Step	Action	Note
6	Measure the limit switch operating point from the topmost landing sill to the car sill.	The limit switch contact must break the safety chain before the counterweight touches the buffer.
7	Connect the plug XLH8. Switch the power ON. Drive the car back to the topmost landing using RDF.	

8.4.9 Motor thermistor circuit test (with 0 % load)

Step	Action	Note
1	Drive using RDF to suitable height to reach the drive module.	
2	Switch the power OFF. Wait at least 15 seconds.	
3	Disconnect the thermistor plug XT1 from the drive module.	
4	Switch the power ON.	
5	Switch elevator to normal mode.	Elevator makes correction drive.
6	Give car call using LOP-CB.	Car must not move.
7	Check the fault code from LOP-CB.	Fault 104 must be on.
8	Switch the power OFF. Wait at least 15 seconds.	
9	Reconnect the plug XT1.	
10	Switch the power ON.	

8.4.10 Counterweight buffer test (with 0 % load) (Annex D2.l)

WARNING

No one is allowed to be on the car roof, inside the car or in the elevator shaft.

Step	Action	Note
1	Go into the pit and secure the car safety gear linkage using wire or a large cable tie (minimum width of the cable tie is 4.7 mm).	The car safety gear may engage during the test if the operation of the safety gear is not prevented.
2	Call the car to the lowest floor using landing calls.	The car must be empty.

Step	Action	Note
3	Switch the RDF ON (switch 270 on control panel DOWN).	
4	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
5	Set Enable elevator test (6_72) parameter to 3 (counterweight buffer test).	6_72 is only available when car is on terminal floor. Activation is valid only for one drive.
6	Turn the RDF OFF (switch 270 on maintenance access panel UP).	
7	Call the car to the topmost floor using car calls.	
8	Observe the LED 30 on the LOP-CB board.	
9	Push the buffer test button on the LOP-CB board once just after the LED 30 turns OFF (car is above the lowest landing floor zone).	Fault code 0109 or 0083 (position lost) blinks on display. WARNING! No one is allowed to be on the car roof, inside the car or in the elevator shaft.
10	Immediately after that push the buffer test button again and keep it pressed down.	The counterweight drives onto the buffer.
11	Drive the counterweight from the buffer using RDF.	
12	Check that the counterweight and/or buffer are undamaged.	
13	Remove the cable tie from the car safety gear.	

8.4.11 Drive time supervision test (with 0 % load)

Step	Action	Note
1	Drive the car under 77:S on topmost floor using RDF.	
2	Switch the power OFF.	
3	On the car roof disconnect the plugs of 61:N, 61:U, 30 and 30B (if applicable) from the oscillators.	
4	Switch the power ON.	

Step	Action	Note
5	Switch the RDF OFF. The elevator starts correction drive downwards. Fault 0001 turns ON after DTS time.	No one is permitted in the car, on the car roof or in the elevator shaft during correction drive. The real DTS time can be read from the user interface menu (4_20). It varies according to the travel height.
6	Reset the elevator by switching the main supply OFF. Wait at least 15 seconds. Switch the power ON.	
7	Bring the car back to floor level using RDF drive.	
8	Reconnect the plugs 60:N, 61:U, 50 and 50B (if applicable).	

8.5 Safety tests with 50 % load in car

8.5.1 Preparations

Step	Action	Note
1	Load 50 % of the rated load in car.	

8.5.2 Check the balance (with 50 % load)

Step	Action	Note
1	Drive the car and counterweight to the same level in the elevator shaft.	Select RealTimeDisplay monitor selection (6_75) to 14 (midpoint) to locate midpoint. No one is allowed to be in the car or on the car roof.
2	Open the brake slowly.	Close the brake immediately if the car starts to move.

8.5.3 Current measurement (with 50% load) (Annex D2.e)

Step	Action	Note
1	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
2	Switch elevator to RDF mode (270).	
3	Select RealTimeDisplay monitor selection (6_75) to 30 (Average motor current).	
4	Switch elevator to normal drive.	
5	Drive elevator between bottom and top floors.	Record current values after each complete run at rated speed. Measured values (upwards and downwards) depend on shaft friction, unbalance and motor resolver angle. Balance is correct when values are equal in both directions. The value is positive or negative depending on the drive direction.

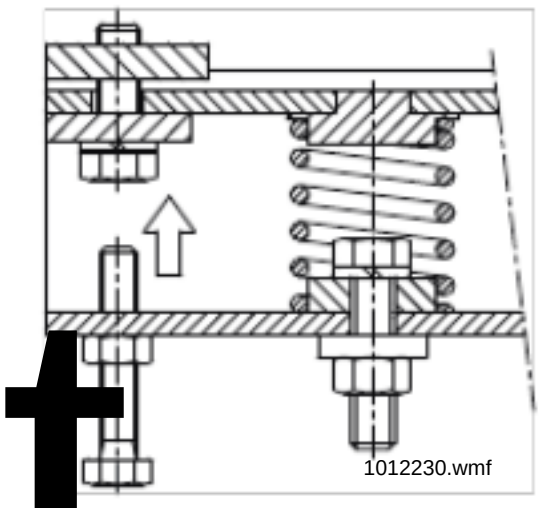
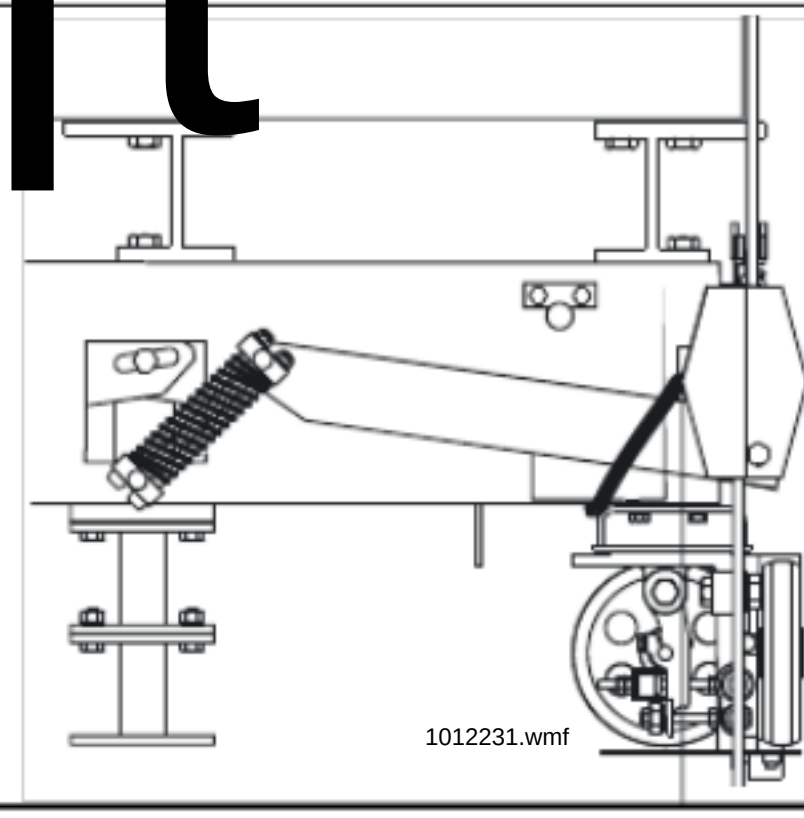
8.5.4 Checking levelling accuracy (±5 mm) (with 50 % load)

Step	Action	Note
1	Check the levelling accuracy. Adjust if needed.	

8.6 Safety tests with 100% load in car

8.6.1 Preparations

Step	Action	Note
1	Add weights to the car to correspond to rated load.	
2	Switch the elevator to normal and add weights inside the car (at least 110 % load). Check that the overload indicator operates correctly.	
3	Remove the additional weights.	
4	Inhibit door opening and landing calls.	
5	Drive the car just above the lowest landing and go to the pit.	

Step	Action	Note
6	Wind the locking screws of the platform hand tight (if any).	 1012230.wmf
7	If there is a counterweight safety gear, tie down the counterweight safety gear lever to prevent the counterweight safety gear from engaging.	 1012231.wmf

8.6.2 Lower limit switch check (with 100 % load) (Annex D2.g)

Step	Action	Note
1	Drive the car with the rated load to the lowest floor.	
2	Switch the main switch (220) OFF.	
3	Disconnect the plug XLH8 from LOP-230 board in maintenance access panel. Measure with multimeter in ohm zone the resistance between the pins XLH8/7 and XLH8/9 on XLH8 plug.	
4	Pull the brake release lever and move the car 1-2 cm at a time.	
5	The operation point of the limit switch is reached, when the multimeter shows "infinity".	The multimeter buzzer is useful if you are working alone. CAUTION! Be careful when releasing the brake(s). Do not let the elevator overspeed.

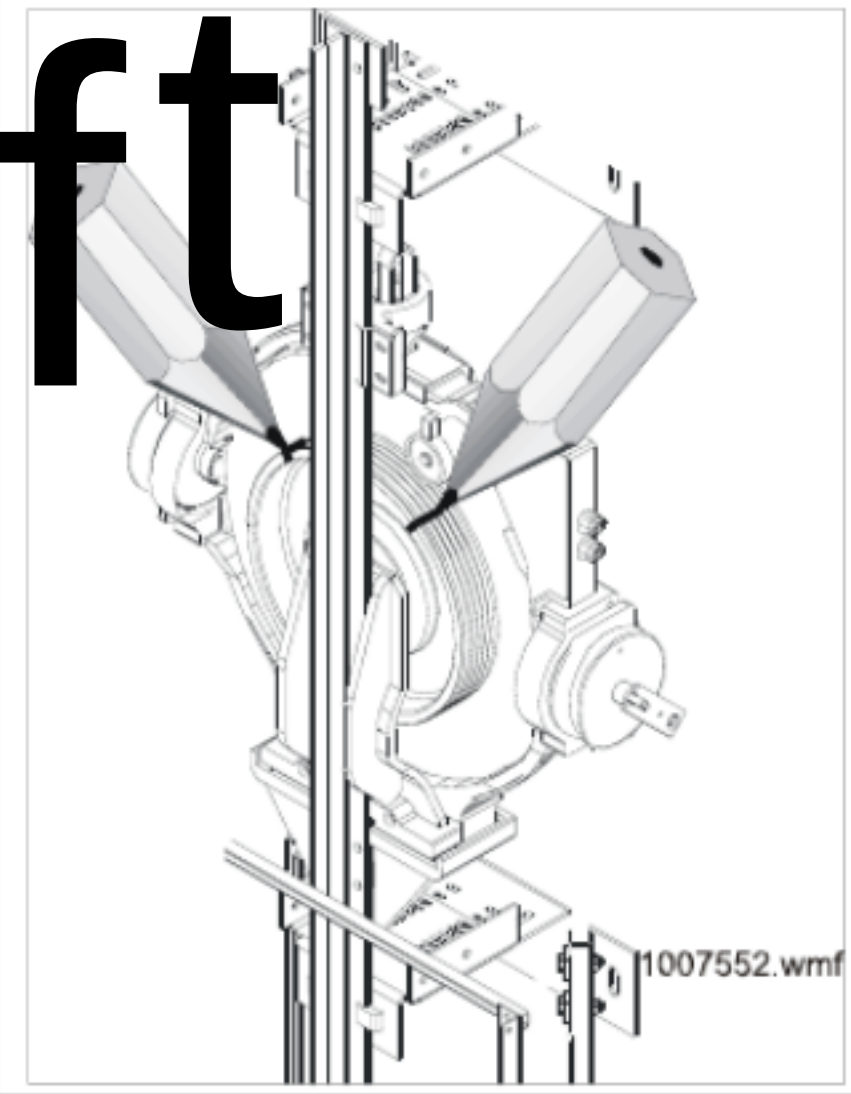
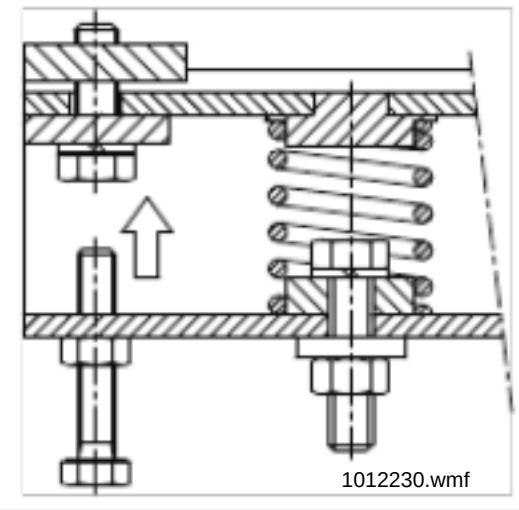
Step	Action	Note
6	Measure the limit switch operating point from the lowest landing sill to the car sill.	The limit switch contact must break the safety chain before the car touches the buffer.
7	Connect the plug XLH8. Turn the electrification on. Drive the car back to the lowest landing using RDF.	

8.6.3 Car buffer test with rated load (with 100 % load) (Annex [illegible])

Step	Action	Note
1	Go in the pit and secure the counterweight safety gear linkage using wire or a large cable tie (minimum width of the cable tie is 4.7 mm).	The counterweight safety gear may engage during the test if the operation of the safety gear is not prevented.
2	Call the car to the topmost floor using landing calls.	
3	Switch the RDF ON (switch 270 on control panel DOWN).	
4	Set Enable elevator test (6_72) parameter to 4 (car buffer test).	6_72 is only available when car is on terminal floor. Activation is valid only for one drive.
5	Switch the RDF OFF.	
6	Call the car to the bottom floor using car calls.	
7	Push the buffer test button on the LOP-CB board once just after the LED 30 turns OFF (car is below the topmost landing floor zone).	Fault code 0109 or 0083 (position lost) blinks on display. WARNING! No one is allowed to be on the car roof, inside the car or in the elevator shaft.
8	Immediately after that push the buffer test button again and keep it pressed down.	The car drives onto the buffer.
9	Drive the car using RDF to the second floor.	
10	Check that the car and buffer are undamaged.	
11	Remove the cable tie from the counterweight safety gear.	

8.7 Safety test with 125 % load in car

8.7.1 Preparation

Step	Action	Note
1	Switch RDF ON.	
2	Drive the car to a suitable height to get to the car roof.	
3	Push the car roof stop button down and go to the car roof.	
4	Mark the ropes and the sheave for the traction test.	
5	Loosen the locking bolts.	
6	Increase the load in car to correspond 125 % of the rated load.	
7	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
8	Wind the locking bolts of the platform hand tight.	

8.7.2 Braking test (with 125 % load) (Annex D2.d) and checking of traction (Annex D2.h1b)

Step	Action	Note
1	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
2	Switch the elevator to RDF.	
3	Select RealTimeDisplay monitor selection (6_75) to 1 (Elevator speed).	
4	Switch elevator to normal drive.	
5	Give a car call down using LOP-CB.	
6	When the elevator has reached the rated speed, push the stop button. If there is no stop button, stop the car by switching the elevator to RDF.	Car must stop!
	Make several stops in the lower part of the travel.	At each test complete stoppage of the car shall occur.
7	Switch the main switch (220) OFF and ON.	
8	Drive the car back to the top floor using RDF.	
9	Check the markings on the ropes and sheave. Measure the sliding of ropes.	Record the measured rope slip.

8.7.3 Car safety gear test with 125 % load (Annex D2.j)

CAUTION

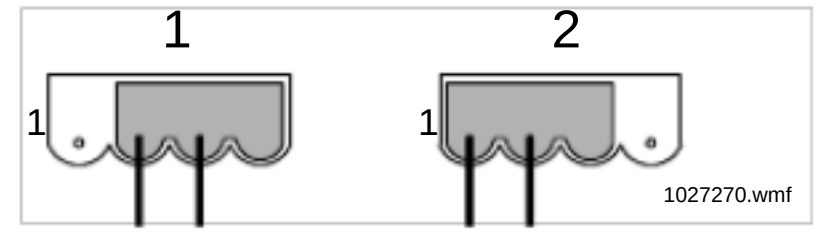
The safety gear must be tested before this test with empty car at inspection drive speed.

WARNING

Disconnect the landing calls and inhibit door opening. Ensure that no one can go in the elevator shaft or the car during the test.

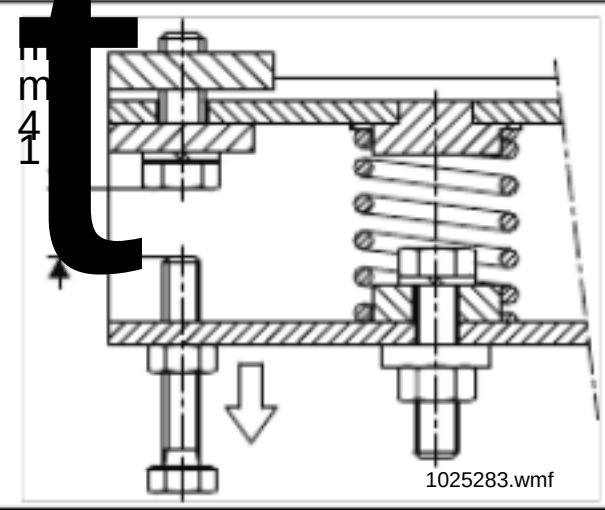
NOTE! If there is a counterweight safety gear, tie down the counterweight safety gear lever to prevent the counterweight safety gear from engaging.

Step	Action	Note
1	Drive the car to the top floor. Inhibit door opening and landing calls.	LOP-CB switches 263 and 261.

Step	Action	Note
2	Move the plug of the XL8 connector from normal (right) position to test (left) position.	 1. Normal position 2. Test position
3	Give a car call downwards using the user interface.	The elevator should stop immediately.
4	Observe the door zone LEDs and the overspeed governor test button immediately when the door zone appears, so the gear is stopping at door zone.	
5	Try to drive downwards using the RDF drive to check that the safety gear is engaged. The elevator should not drive, when the safety gear is engaged.	
6	Set Inspection speed (6_20) parameter to 0.1.	
7	Drive the car upwards using the RDF. Check that the safety chain remains broken. If the car does not move: 1. Set Enable elevator test (6_72) parameter to 1 (traction test up).	
8	Release the safety gear contact under the car by pulling the overspeed governor rope on the tension weight side upwards. Check that the safety circuit is intact.	
9	Remove the security wire or cable tie from the counterweight safety gear if applicable	
10	Check that the safety gear marks are level and equal on both sides.	
11	Measure the gripping distance. Adjust the safety gear if needed. Adjust the locking screw back to normal position.	Refer to the AM-07.04.015 . Gripping distance should be 2/3 from the distance “ gripping speed of the overspeed governor and 100% load ” .
12	Remove the safety gear marks using a file.	
13	Switch the power OFF Wait at least 15 seconds Switch the power ON.	This restores the original parameters.

8.8 Final safety tests with 0 % load in car

8.8.1 Preparation

Step	Action	Note
1	Remove the test weight from the car.	
2	Adjust the locking bolts (14 mm).	

8.8.2 One-sided electrical braking test (with 0 % load)

The purpose of this test is to verify that one brake is capable of holding the car. This test is not required by EN81-1, Annex D.

Before this test, elevator commissioning must be completed, the elevator must drive in normal run without failures and the brake release wire must be adjusted. During this test one brake will lift but the motor does not try to run.

Ensure that no-one can enter the elevator shaft or car during this test.

Step	Action	Note
1	Inhibit landing calls and door opening.	
2	Drive the empty car to the topmost floor.	The LEDs 61:U, (77:S), 61:U, 30, B30 (if through type car) and 61:N are lit.
3	Switch the RDF to ON.	
4	Change the value of the 6_72 parameter to 21 (brake 1 test).	Test is activated for one start only.
5	Push the RDF DOWN and UP buttons. One brake opens for testing (brake 1 opened, brake 2 tested). The drive stops the test by itself after 10 seconds (maximum). Monitor the SPEED LEDs at the same time.	The motor does not try to run. If the car moves, stop the test.
6	Check the drive code from the error log. Only with MX10/MX18 (MX14 brakes are not adjustable): If the car moves or fault codes are displayed, check the following possible causes for brake 2 (the one that did not open during the test): ? Brake center nut is too tight ? Brake shoe is mechanically stuck ? Manual brake release wire too tight ? Incorrect counterweight/car balance ? Dirt on the brake shoe ? External lubricant leakage ? Internal lubricant leakage Repeat the test. If the test fails again, replace the brakes.	Drive code 126 and subcode 6022: ? test passed Drive code 126, subcodes 2071 or 2072: ? test failed

Step	Action	Note
7	Change the value of the 6_72 parameter to 22 (brake 2 test).	Car should be still at the topmost floor. The LEDS 77:U, (77:S), 61:U, 30, B30 (if through type car) and 61:N are lit. Test is activated for one start only.
8	Push the RDF RUN and UP buttons. One brake opens for testing (brake 1 tested, brake 2 opened). The drive stops the test by itself after 10 seconds (maximum). Monitor the SPEED LEDs at the same time.	The motor does not try to run. If the car moves, stop the test.
9	Check the drive code from the error log. Only with MX10/MX18/MX14 brakes are not adjustable: If the car moves or fault codes are displayed, check the following possible causes for brake 1 (the one that did not open during the test): ? Brake center nut is too tight ? Brake shoe is mechanically stuck ? Manual brake release wire too tight ? Incorrect counterweight/car balance ? Dirt on the brake shoe ? External lubricant leakage ? Internal lubricant leakage Repeat the test. If the test fails again, replace the brakes.	Drive code 126 and subcode 6021: ? test passed Drive code 126, subcodes 2071 or 2072: ? test failed
10	Switch the RDF OFF.	

8.8.3 Counterweight safety gear test (with 0 % load) (Annex D2.k)

CAUTION

Test the counterweight safety gear with empty car at inspection drive speed before full speed test.

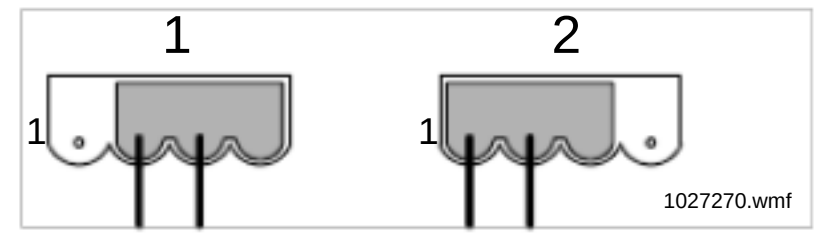
WARNING

Disconnect the landing calls and inhibit landing doors, ensure that no one can go in the elevator shaft or the car during the test.

Preparation

Step	Action	Note
1	Operate the safety gear lever by hand and check that both safety gears begin gripping at the same time.	If not, adjust the synchronisation.
2	Drive the car using RDF to suitable height to reach the underside of the car from the pit.	
3	Inhibit landing calls and door opening.	LOP-CB switches 263 and 261.
4	Go to the pit and secure the car safety gear linkage using wire or a big cable tie.	The car safety gear may engage during the test if the operation of the safety gear is not prevented.

Testing

Step	Action	Note
1	Move the plug of the XL8 connector from normal (right) position to test (left) position.	 1. Normal position 2. Test position
2	Give a car call to the topmost floor using the user interface.	WARNING! No one is allowed to be on the car roof or in the elevator shaft.
3	Observe the door zone LEDs and push the overspeed governor test button immediately when the door zone appears, so the car is stopping at door zone.	The elevator should stop immediately.

Step	Action	Note
4	Try to drive up with the RDF drive to check that the counterweight safety gear is engaged.	The elevator should not drive, when the counterweight safety gear is engaged. See tacho LEDs on the LOP-CB board.
5	Drive the car downwards with the RDF. Check that the safety chain remains broken.	Place test loads in the car or on the car roof to release the counterweight safety gear, if necessary.
6	Reset the overspeed governor switch using the provided resetting stick.	The safety chain should be complete after this reset.
7	Reset the plug XL8 to the normal position.	
8	Remove the test cable of counterweight overspeed governor from XL8. Connect the test cable of car overspeed governor to XL8, normal position.	

Resetting

Step	Action	Note
1	Drive the car downwards using RDF.	
2	Release the counterweight safety gear contact by pulling the overspeed governor rope on the tension weight side upwards. Check that the safety circuit is intact.	
3	Drive the car to the lowest landing level.	
4	Remove the securing wire or cable tie from the car safety gear if applicable (see step 4 on page 59).	
5	Check that the safety gear marks are level and equal on both sides.	
6	Measure the gripping distance. Adjust the safety gear if needed.	Refer to the AM-07.04.015 or AM-07.04.017 .
7	Remove the safety gear marks using a file.	
8	Switch the power OFF Wait at least 15 seconds Switch the power ON.	This restores the original parameters.

8.8.4 NTS testing (with 0 % load)

Step	Action	Note
1	Ensure that the landing calls and door opening are inhibited.	
2	Drive the car to the lowest floor.	
3	Switch the RDF ON.	
4	Set Enable elevator test (6_72) parameter to: 6 (NTS test up) 7 (NTS test down)	
5	Switch the RDF OFF.	
6	Call car to the topmost floor.	The car continues running towards the terminal floor. The elevator makes NTS (normal terminal slowdown), when the car passes the 77 switch (77:U/N), and fault code 0152 starts to blink on display. After NTS car runs slowly to the nearest floor. Drive re-initializes.
7	Repeat the test to the opposite direction.	

8.8.5 Load weighing sensor adjustment

Step	Action	Note
1	Check the adjustment of the load weighing sensor.	Refer to the chapter 6.2.

8.8.6 Short circuit test (with 0% load) (Annex D2.f)

Reserve a spare ceramic fuse 250VAC, 1 A, 5x20 mm for the short circuit test.

Step	Action	Note
1	Switch the main switch (220) OFF.	
2	Make a temporary connection between the earth bar and the end of the safety chain (XLH8/3).	Always refer to the circuit diagrams for correct connections.
3	Switch the main switch (220) ON and try to run the elevator by RDF.	The elevator must not start and the safety chain fuse must blow.
4	Switch the main switch (220) OFF and replace the fuse.	
5	Remove the temporary connection.	

9 APPROVALS AND VERSION HISTORY

Compiled by: Technical Editor / Ville Malmiala

Checked by: PCM / Pasi Raassina
Global Installation Support / Michael Pichlhofer

Approved by: Global Installation Support / Anssi Venho

Issue	Date	Description of Change	Ref CR	Approved by
-	2008-10-23	Issue for piloting.		Anssi Venho
A	2009-04-09	Minor changes.		Anssi Venho
Draft B	2010-02-05			

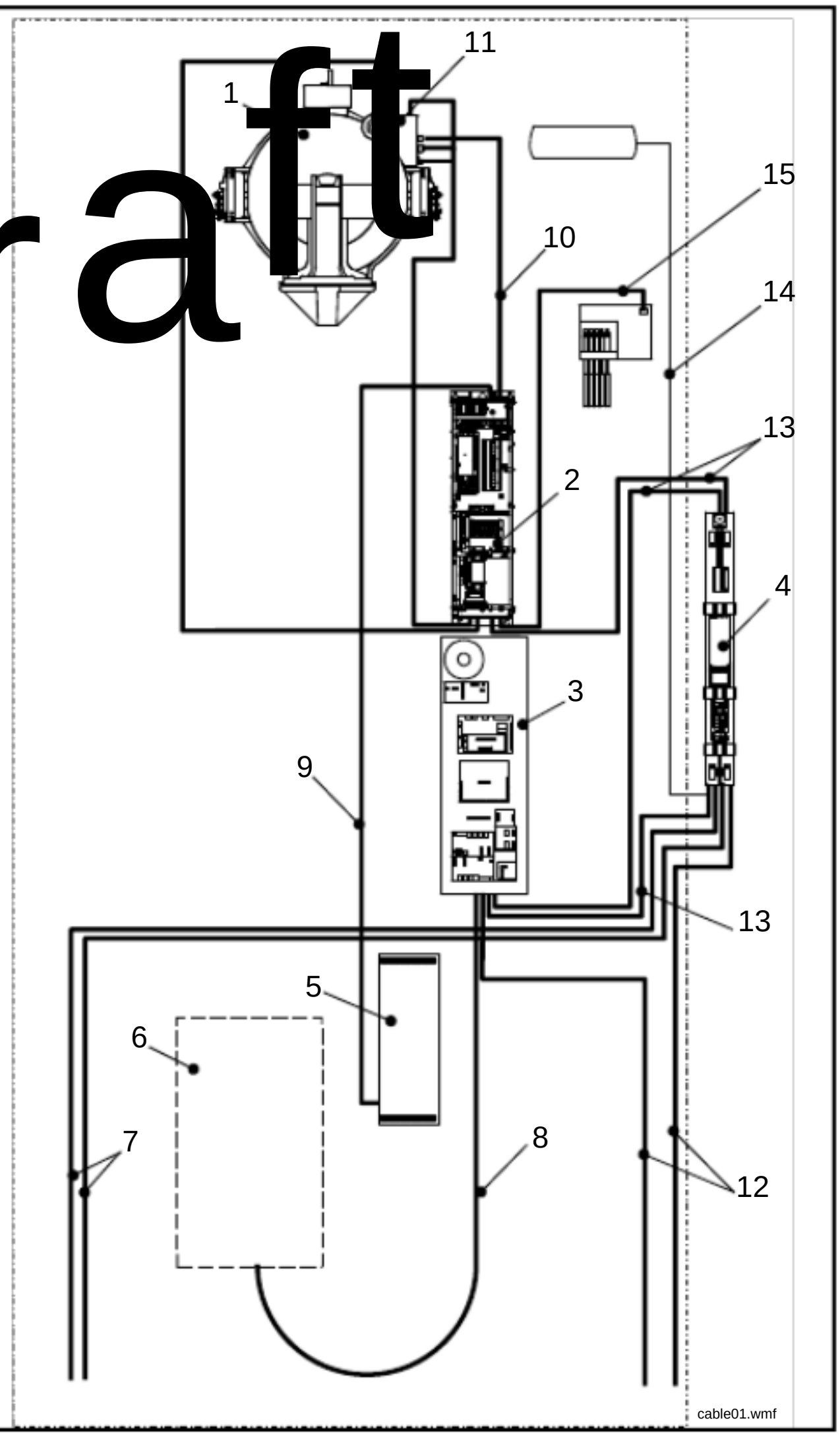
APPENDIX A. Returning the initial settings

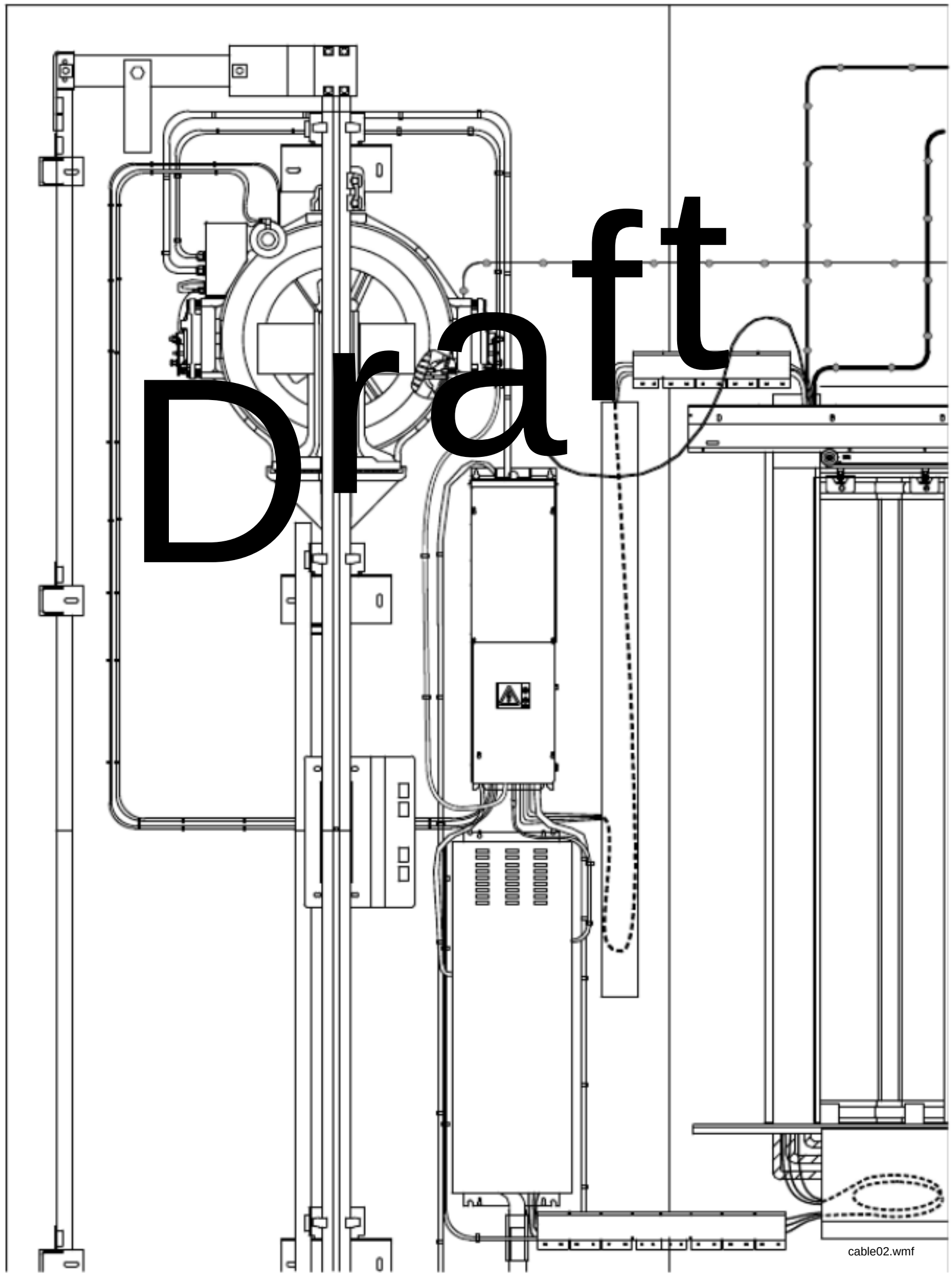
Step	Action	Note
1	Set Parameter lock (6_95) parameter to 0.	This is recommended when you do not know the status of the settings of the DCBMCPU board.
2	Set Default parameters (6_98) parameter to 1.	
3	Set Default parameters (6_98) parameter to 2.	
4	Switch the power OFF and ON.	

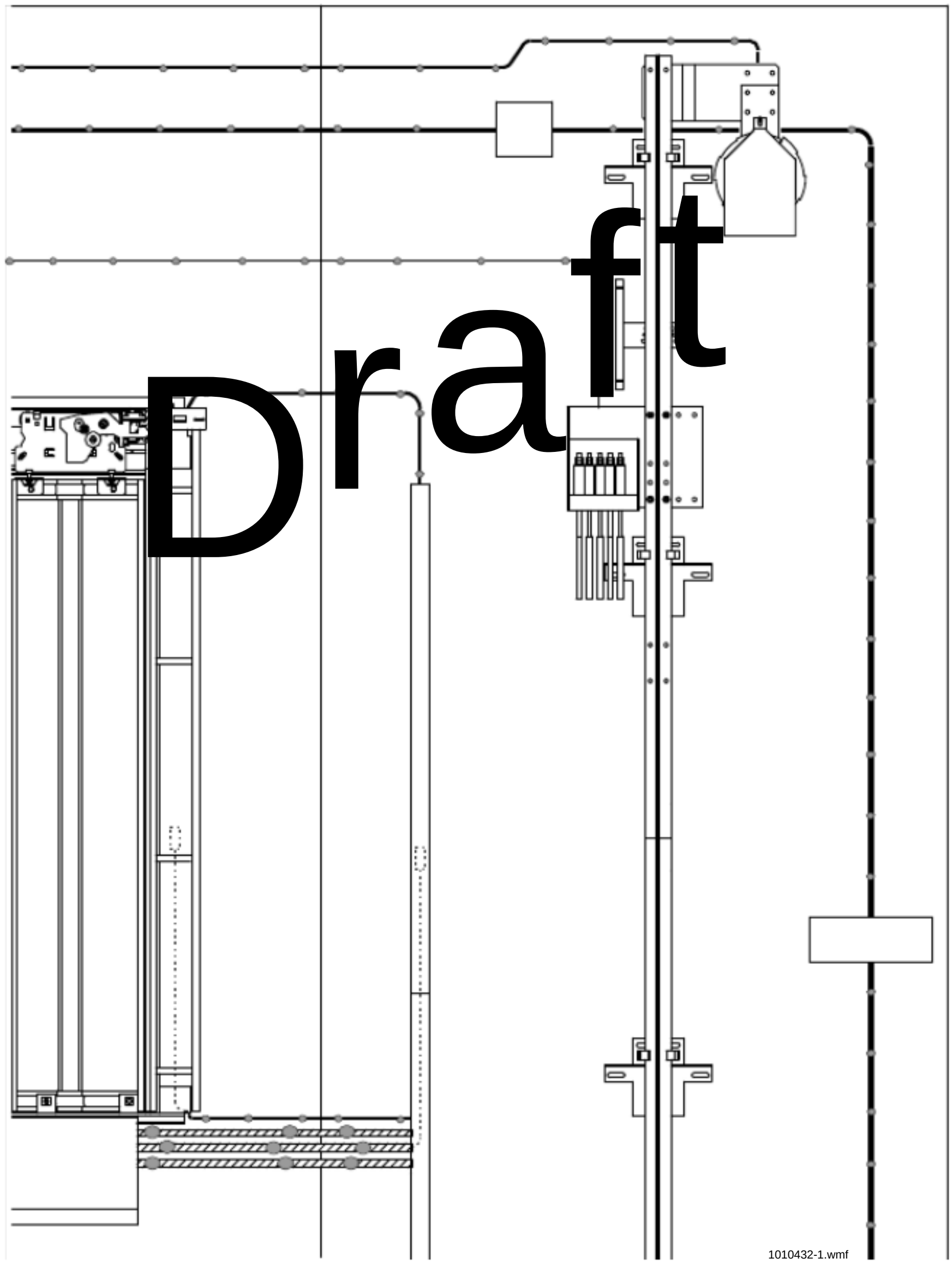
APPENDIX B. KDL32 wiring

B.1 Overview

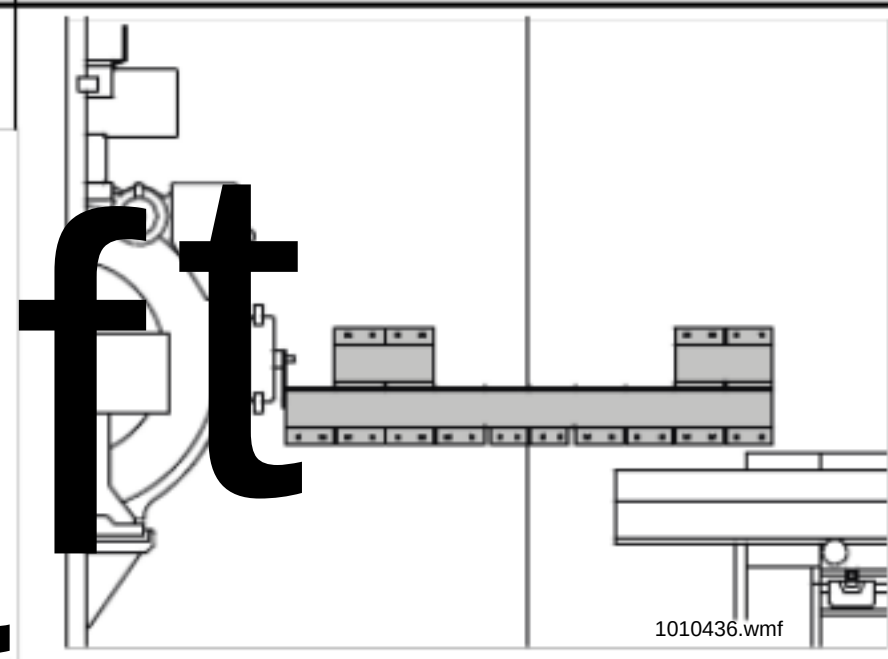
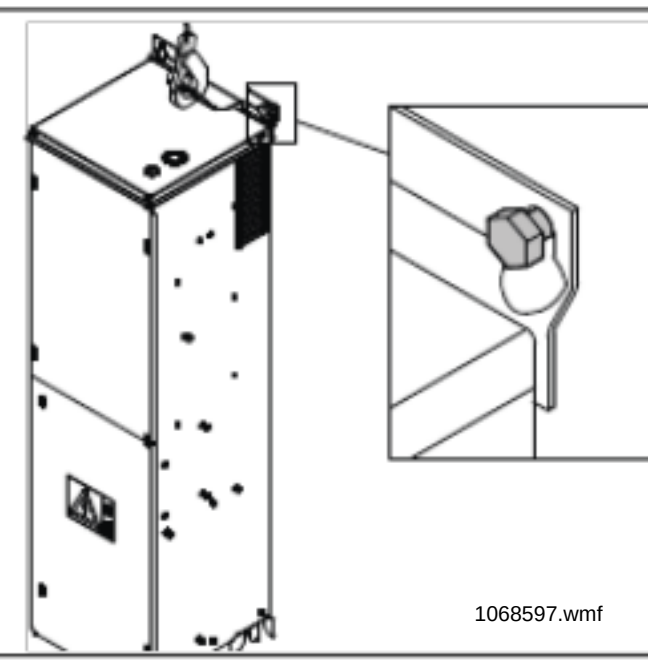
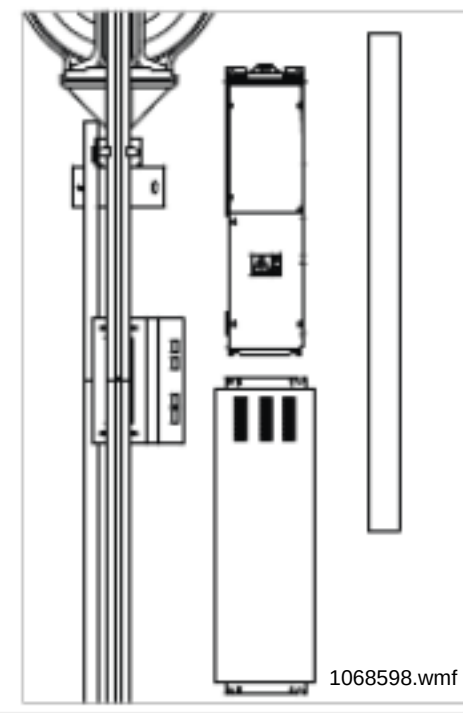
1. Machine
2. Drive panel
3. Shaft electrification panel (SEP)
4. Maintenance access panel (MAP)
5. Braking resistor
6. Car
7. Customer cables:
   - ? main supply cable
   - ? lighting supply (if applicable)
8. Travelling cables
9. Braking resistor cable
10. Motor supply
11. Motor connections
    - ? brake supply
    - ? thermistors
    - ? resolver
    - ? encoder
12. Shaft bundle
13. Maintenance access panel connections
14. Elevator shaft lighting
15. Load weighing device cable to drive

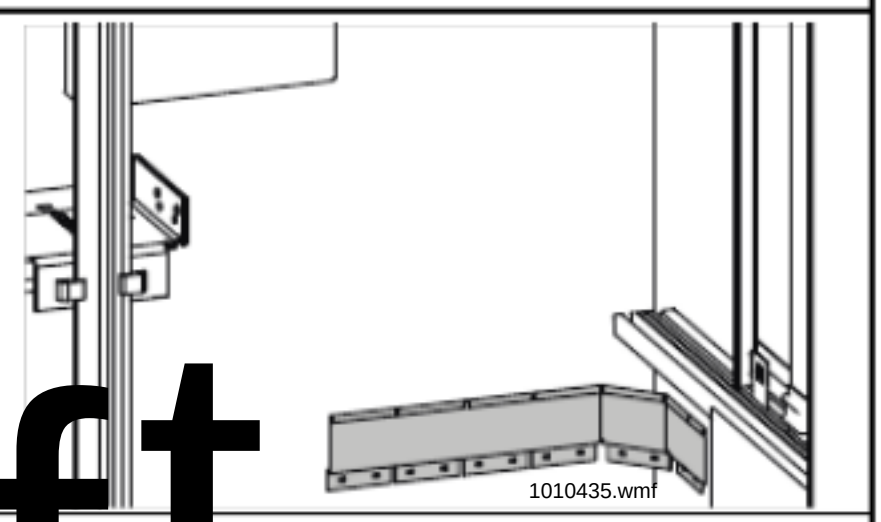






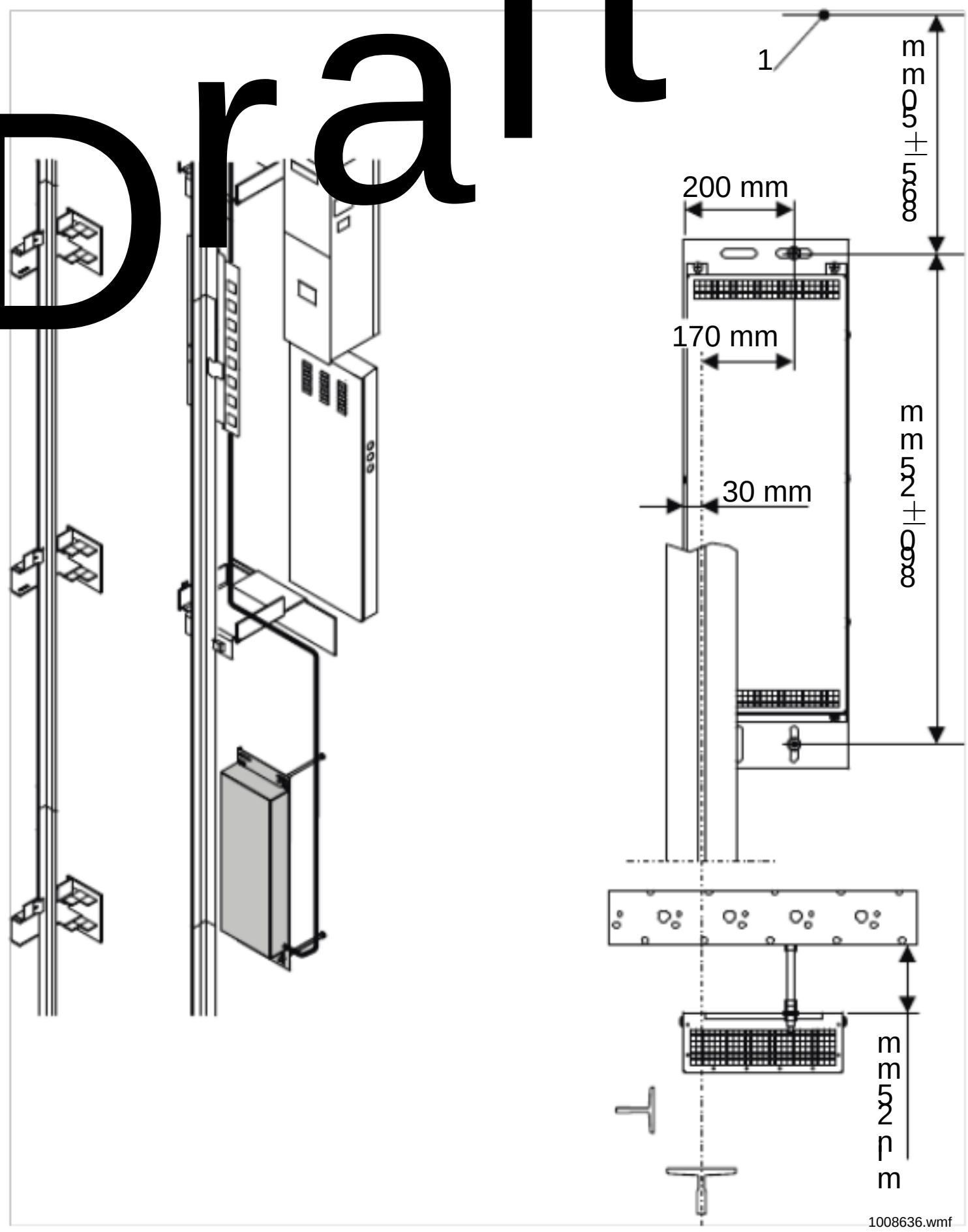
B.2 SEP, drive panel and trunkings

Step	Action	Note
1	Fix the metal plate trunking above the top track.	
2	Drill and fix the upper fixing bolts for drive panel.	Refer to layout drawings.
3	Attach the Trak hook to the drive lifting eye.	
4	Hoist the drive panel into position and hang it onto the fixing bolts.	
5	Drill and fix the lower fixing bolts. Tighten the fixings.	
6	Fix the SEP to the wall.	
7	Fix the 2 m piece of trunking (125 x 50 mm) beside the drive and shaft electrification panel.	

Step	Action	Note
8	Fix the metal plate trunking below the topmost landing sill with a minimum four screws per one metre of plate. Fit the plastic end caps over the sharp edges.	
9	Fix the topmost trunkings for the shaft bundle.	Refer to the layout drawings.

B.3 Braking resistor

Step	Action	Note
1	Install the braking resistor on the elevator shaft wall below the topmost landing level.	Refer to the drilling and fixing documentation delivered with the resistor box. Fixing items and drilling instruction drawing are connected with cable ti[illegible]ack plate of panel.



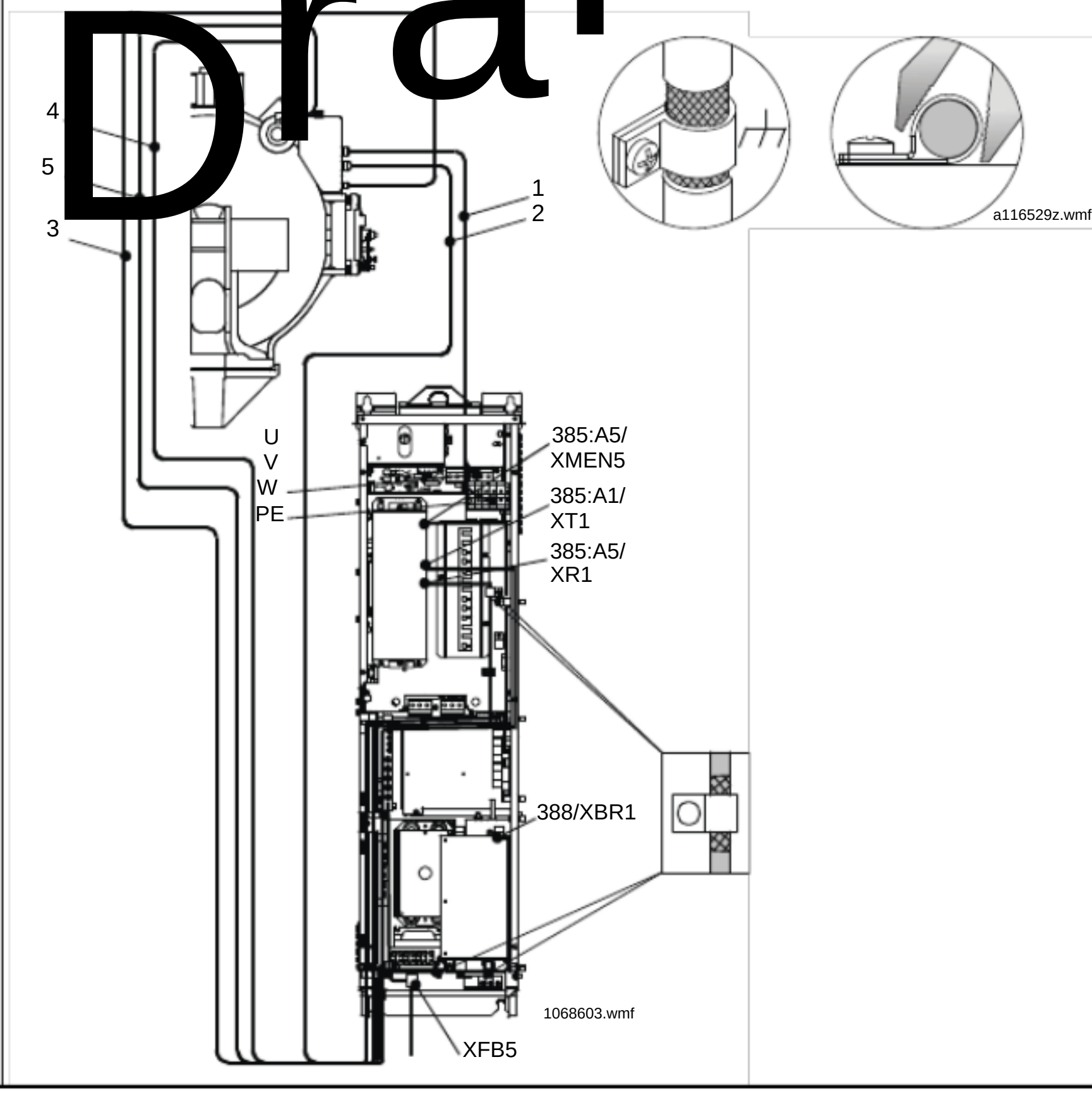
1. Topmost landing level

B.4 Cables: Machine - drive

WARNING

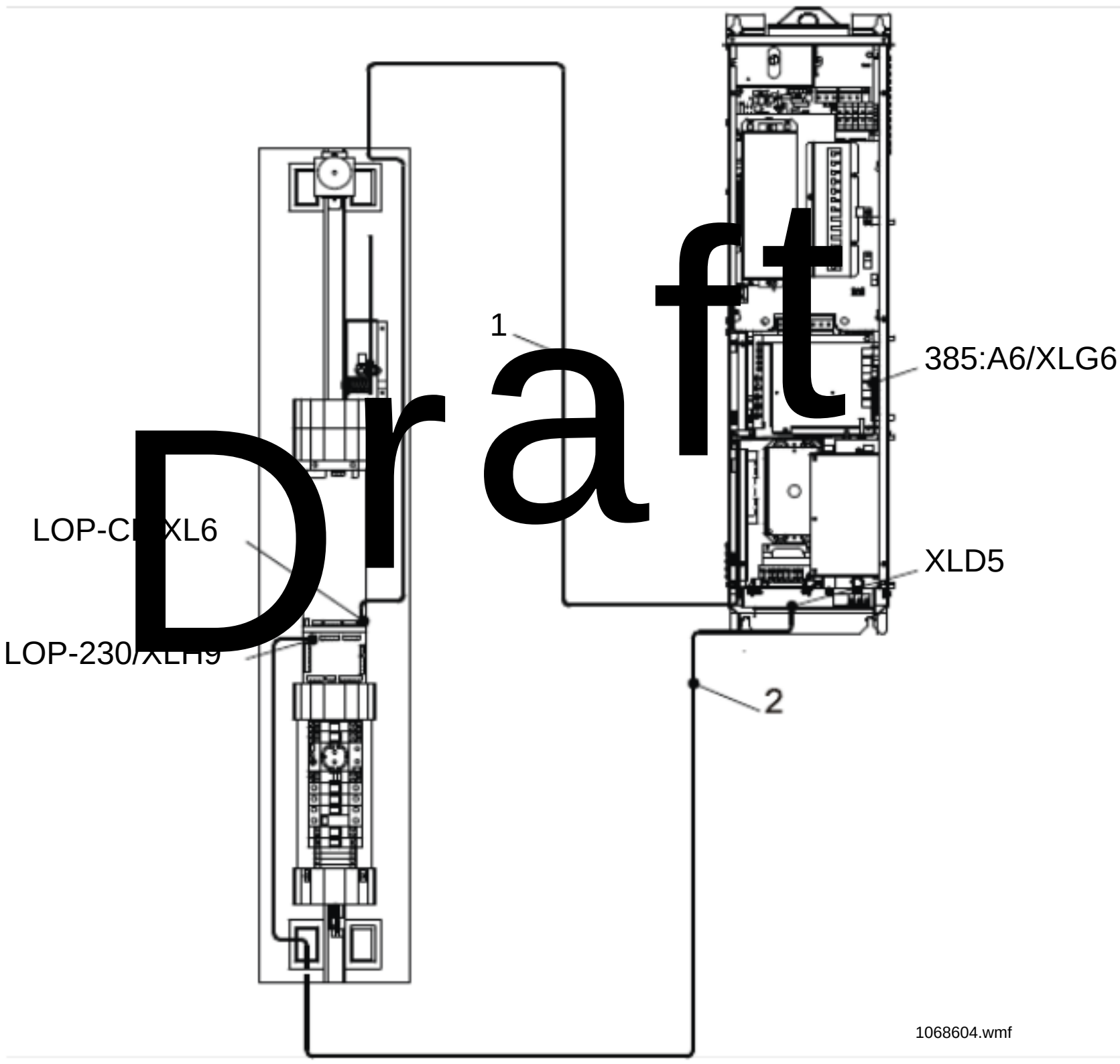
Ensure that the power supply is safely locked off. Refer to AM-01.03.002 Take 5.

Step	Action	Note
1	Make the following connections.	CAUTION! When connecting the machine supply cable the phases must be connected correctly. See the following table.



Cable	No.	From	To
Machine		Machine	Drive
	1	Machine power supply	U, V, W, PE2
	2	Brakes	388/J4
	3	Thermistors	385:A1/XT1
	4	Resolver	385:A5/XR1
	5	Encoder	385:A5/XMEN5
NOTE! Ensure that all connections are clean and clamps are secure. A firm contact between earthing clamps and cable sleeves is very important.			

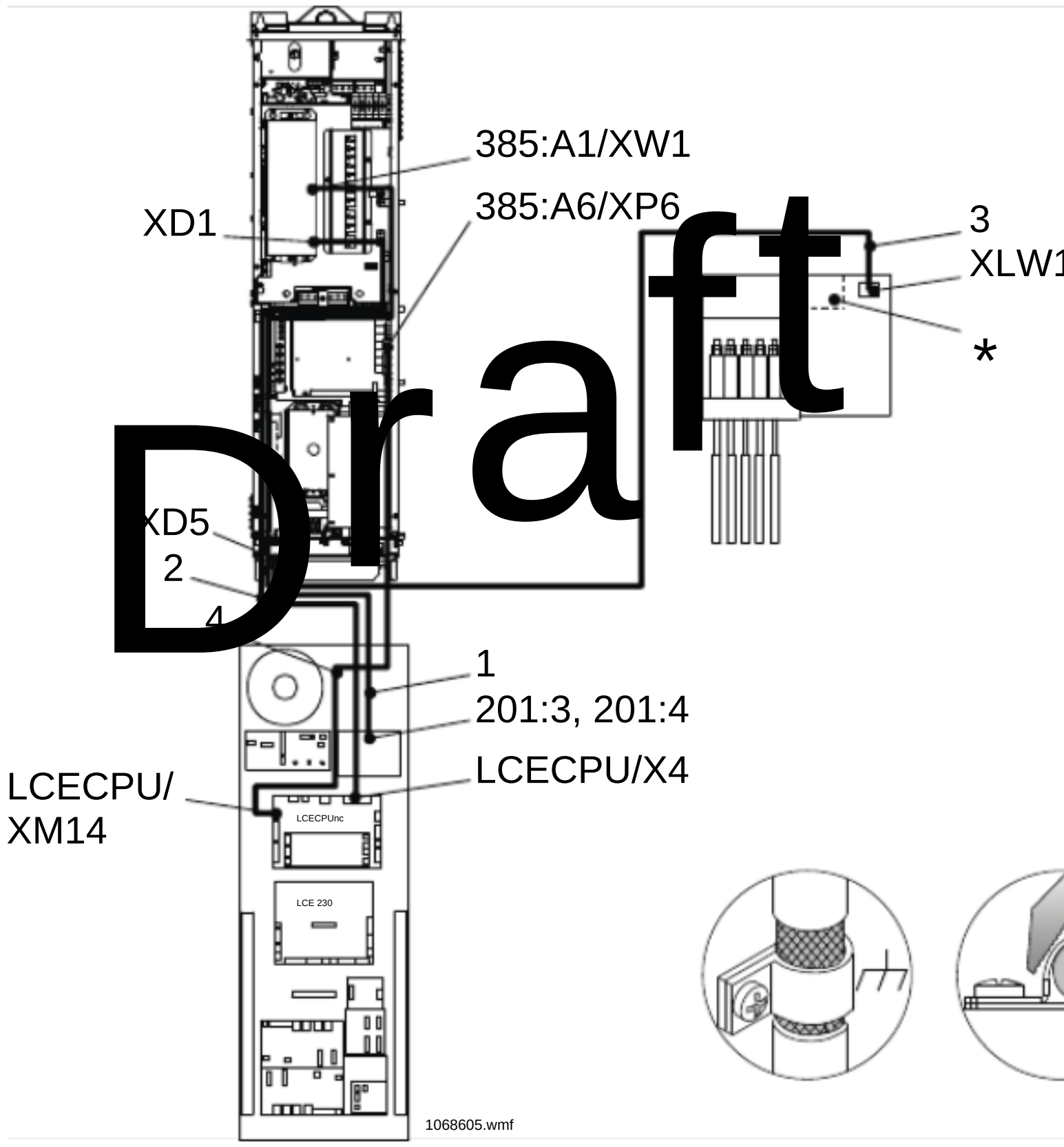
B.5 Cables: MAP - drive



NOTE! Tie all the excess cables (coming from the bottom of the MAP) behind the toe guard of the topmost landing door.

Cable	No.	From	To
Connections		MAP	Drive
Encoder cable	1	(LOP-CB/XL6)	385:A6/XLG6
Motor fan (power supply)	2	(LOP-230/XLH9)	XLD5

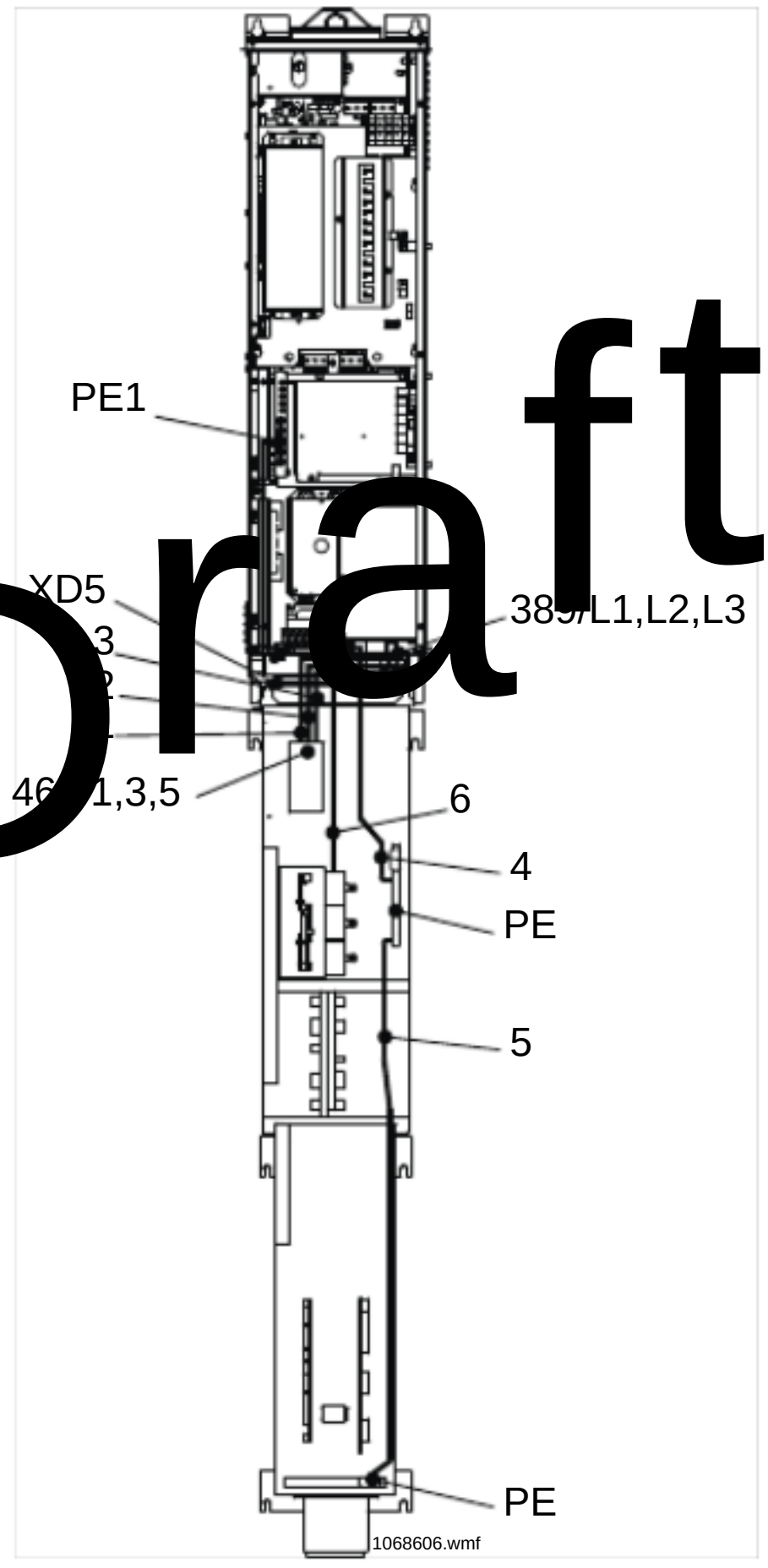
B.6 Cables: SEP - drive



*) VTC board

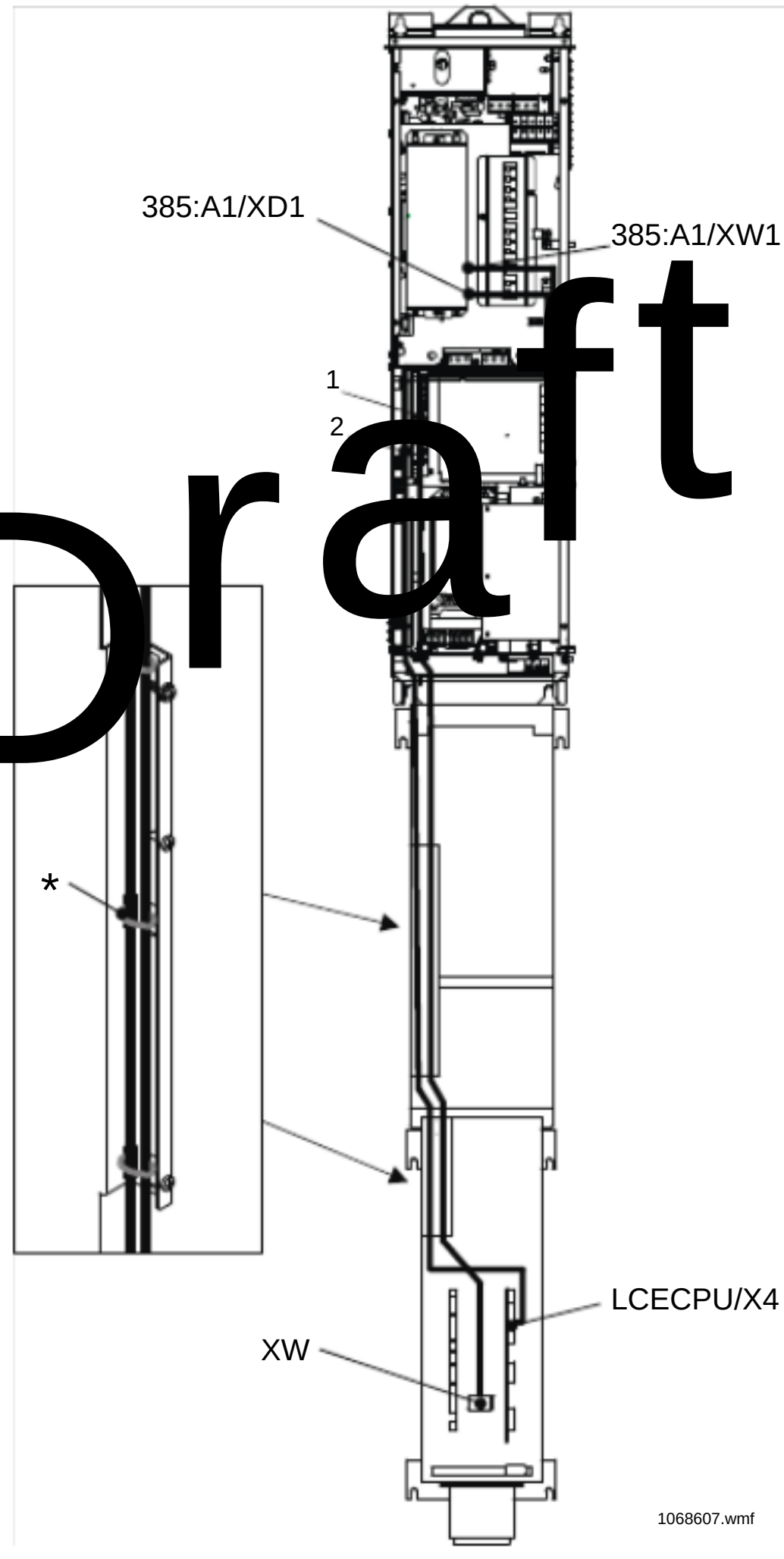
Cable	No.	From	To
Internal connections		SEP	Drive
LCE main contacts	1	LCE contactor 201:3, 201:4	XD5
LCE data cable	2	LCECPU/X4	XD1
LWD	3	Load weighing device XLW1	385:A1/XW1
12 VDC	4	LCECPU/XM14	385:A6/XP6

B.7 Cables: SEP , top - drive



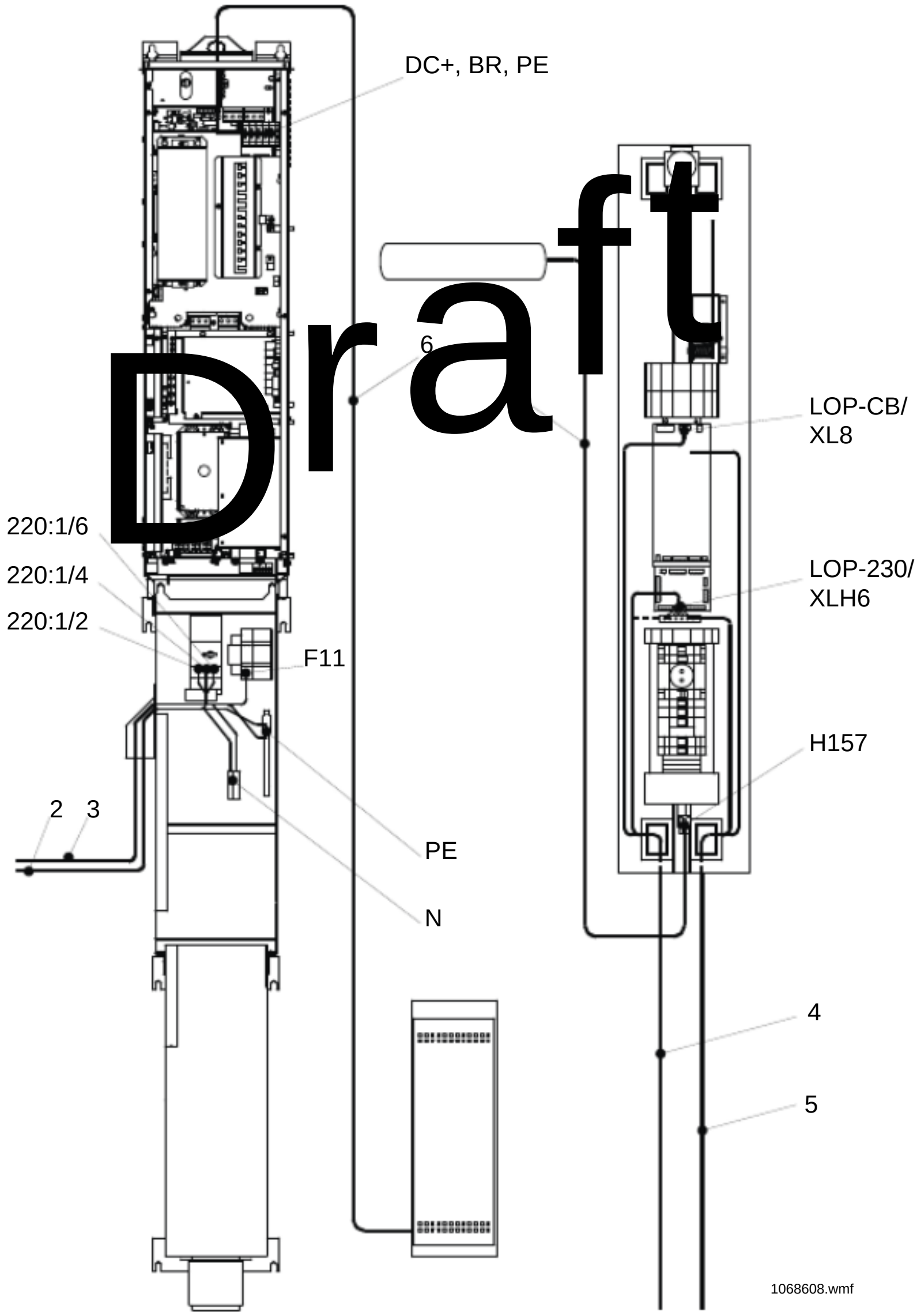
Cable	No.	From	To
Internal connections		SEP, top	Drive
Power supply cable	1	460/1	389/L1
	2	460/3	389/L2
	3	460/5	389/L3
Earthing cable	4	PE	PE1/ ⏚
Earthing cable	5	PE	SEP, bottom / PE
Main contactors	6	contactors 201:3, 201:4	XD5

B.8 Cables: SEP , bottom - drive



Cable	No.	From	To
Internal connections * Fix with cable tie		Shaft electrification panel, bottom	Drive panel
Load weighing cable	1	XW	385:A1/XW1
LCE data cable	2	LCECPU/X4	385:A1/XD1

B.9 Other connections



Cable	No.	From	To
Elevator shaft lighting (optional)		Elevator shaft	Maintenance access panel
	1	H157	(H157)
		NOTE!Customers shaft lighting is not allowed to be connected to the maintenance access panel.	
Power supply		Builders	Top of top panel
	2		220:1/2 220:1/4 220:1/6 N PE
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Separate lighting supply (if any)	3	Builders	F11 N ⏚
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Overspeed governor of car		Overspeed governor	Maintenance access panel
	4	(127)	LOP-230/XLH6
			LOP-CB/XL8, centre position  1029938.wmf
		earthing	⏚ terminal
Overspeed governor of counterweight	5	(127:1)	Connection strip/XLH6
			LOP-CB/XL8 (for testing)
		earthing	⏚ terminal
Braking resistor		Braking resistor	Top end of drive unit
	6		DC+ BR ⏚

Cable	No.	From	To
Elevator shaft lighting (optional)		Elevator shaft	Maintenance access panel
	1	H157	(H157)
		NOTE!Customers shaft lighting is not allowed to be connected to the maintenance access panel.	
Power supply		Builders	Top of top panel
	2		220:1/2 220:1/4 220:1/6 N PE
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Separate lighting supply (if any)	3	Builders	F11 N
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Overspeed governor of car		Overspeed governor	Maintenance access panel
	4	(127)	LOP-230/XLH6 LOP-CB/XL8, centre position
		earthing	terminal
Overspeed governor of counterweight	5	(127:1)	Connection strip/XLH6 LOP-CB/XL8 (for testing)
		earthing	terminal
Braking resistor		Braking resistor	Top end of drive unit
	6		DC+ BR

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Cable	No.	From	To
Elevator shaft lighting (optional)		Elevator shaft	Maintenance access panel
	1	H157	(H157)
		NOTE!Customers shaft lighting is not allowed to be connected to the maintenance access panel.	
Power supply		Builders	Top of top panel
	2		220:1/2 220:1/4 220:1/6 N PE
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Separate lighting supply (if any)	3	Builders	F11 N
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Overspeed governor of car		Overspeed governor	Maintenance access panel
	4	(127)	LOP-230/XLH6 LOP-CB/XL8, centre position
		earthing	terminal
Overspeed governor of counterweight	5	(127:1)	Connection strip/XLH6 LOP-CB/XL8 (for testing)
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Braking resistor		Braking resistor	Top end of drive unit
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Separate lighting supply (if any)	3	Builders	F11 N
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Overspeed governor of car		Overspeed governor	Maintenance access panel
	4	(127)	LOP-230/XLH6 LOP-CB/XL8, centre position
		earthing	terminal
Overspeed governor of counterweight	5	(127:1)	Connection strip/XLH6 LOP-CB/XL8 (for testing)
		earthing	terminal
Braking resistor		Braking resistor	Top end of drive unit
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Elevator shaft lighting (optional)		Elevator shaft	Maintenance access panel
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Power supply		Builders	Top of top panel
	2		220:1/2 220:1/4 220:1/6 N PE
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Separate lighting supply (if any)	3	Builders	F11 N
		(Check the labels on the cover plate of the shaft electrification panel, top SEP)	
Overspeed governor of car		Overspeed governor	Maintenance access panel
	4	(127)	LOP-230/XLH6 LOP-CB/XL8, centre position
		earthing	terminal
Overspeed governor of counterweight	5	(127:1)	Connection strip/XLH6 LOP-CB/XL8 (for testing)
		earthing	terminal
Braking resistor		Braking resistor	Top end of drive unit
	6		DC+ BR

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KDL32 Parameter List 948570D01

Compiled by: HAT/T. Kauppinen
Changed by: HAT/T. Kauppinen
Checked by: HAT/J. Laaksonheimo
Approved by: PCM/P. Raassina

Date: 18.11.2008
? KONE Corporation
Drawing no: 948570D01
Component family code: KDL

Issue: -
No of Pages: 3
Language: en
SW: MS Excel

The document id of this sheet must match with the id reported by UI menu 6_0	UI menu	unit range	comment

Document identification					
- document identification of the parameter set (= this sheet)	6_0		6200	Read only	

Elevator parameters					default	site	
- P factor (proportional gain of speed controller)		6_1		1,0 , ⋯, 15,0	5.0		
- acceleration (in normal mode, determines also jerk)		6_2	m/s ^{2}	0,30 , ⋯, 1,20	0.60		
- nominal speed (elevator speed)		6_3	m/s	0,40 , ⋯, 4,00	1.60		
- elevator load		6_4	kg	400 , ⋯, 4 00	1 000		
- traction sheave diameter	S	6_6	mm	1 ⋯, 1	480		
- roping	S	6_7		2, 4, 6	2		
- balancing (0 = no counterweigh)		6_10	%	0 , ⋯, 65	50.00		
- car and sling mass		6_11	kg	4 , ⋯, 9 0	1 000		Applicable only if 6_10 is 0.

Additional elevator parameters					default	site	
- inspection speed (speed used in inspection and RDF mode)		6		, ⋯, 0,5	0.3		Speed used also in shaft setup.
- I factor (integration time of speed co ller)		21		0,05 , ⋯, 2,00	0.25		
- reduced speed		22		0,25 , ⋯, 3,20	1.20		25...80% of nominal speed.
- start torque scaling		6_2		0,50 , ⋯, 1,50	1.00		
- KTW/Q factor (total moving masse levator load)		6_25		0,4 , ⋯, 11,0	4.0		
- rope weight		6_26	kg/m	-2,0 , ⋯, 7,0	0.0		
- car cable weight		6_27	kg/m	0,00 , ⋯, 5,00	0.00		
- final jerk distance (distance used		6_28	mm	0 , ⋯, 400	80		
- brake test (0=disabled, 1=enabled, 2=every 5 min.)		6_30		0 , ⋯, 2	1		
- tacho fault counter (0=TFC disabled)		6_31		0 , ⋯, 10	3		
- speed feedback filter time (time constant of low pass filter)		6_32	ms	0 , ⋯, 80	30		
- start delay (brake open command -> speed reference)		6_33	s	0,01 , ⋯, 2,00	0.35		
- jerk (jerk 1 in normal mode)		6_37	m/s ^{3}	0,10 , ⋯, 2,40	calc		Calculated when 6_2 changed.
- ADO speed (Advanced Door Opening speed level)		6_39	m/s	0,20 , ⋯, 0,70	0.50		

S = new shaft setup needed if parameter is changed

KDL32 Parameter List 948570D01

		UI menu	unit	range	default	site	comment
Special parameters					default	site	
- torque limit (max torque / nominal torque)		6_40		1,5 , ⋯, 7,0	4.0		Max. value limited by drive.
- full speed jerk (jerks 2 and 3 in normal mode)		6_52	m/s^3	0,10 , ⋯, 2,40	calc		Max. 6_37 jerk.
- distance advance (additional deceleration distance)		6_53	mm	0 , ⋯, 400	150		Min. 6_28 final jerk distance.
Machinery parameters					default	site	
- motor type	S	6_60		2,00 , ⋯, 20,75	0.00		To select 6_95 needs to be 0.
- brake voltage reduction enable (1=enable)		6_61		0, 1	1		
- torque angle offset (0=offset not set)		6_62	° ele	0 , ⋯, 360	0		
- resolver speed and polarity		6_63		+/- 1, 2	1		
- encoder pulses per motor round		6_64		500 , ⋯, 30 000	0		
- encoder type and polarity (1=shaft 2=friction)		6_65		, 2	1		
- PWM switching frequency		6_66	kHz	, ⋯,	5.5		
- motor temperature limit		6_67	° C	, ⋯, 140	100		Used only with NTC sensor.
- motor overload full speed current (0=not in use)		6_68	A	1 , ⋯, 10	0.0		
- motor overload acceleration current (0=not in use)		6_69	A	1 , ⋯, 10	0.0		
Commissioning and tests					default		
- drive commissioning (1=torque ction)				0 , ⋯, 1	0		To select 6_62 needs to be 0.
- enable elevator test 1=traction test up 2=traction test down 3=counterweight buffer test 4=car buffer test 5=DTS test 6=NTS test up 7=NTS test down 21=brake 1 test 22=brake 2 test		6_72		1 , ⋯, 22	0		
- LWD setup (-1=clear setup, -2=fixed scaling)		6_74	%	-2 , ⋯, 120	0		
- RealTimeDisplay monitor selection		6_75		1 , ⋯, 209	1		See page 3.
- EZO and virtual floor setup (0.01=clear setup)		6_76		0,00 , ⋯, 99,00	1.00		
Motor data					default	site	
- motor source voltage E		6_80	V	100 , ⋯, 350	0		
- motor nominal current		6_81	A	10,0 , ⋯, 80,0	0.0		
- motor nominal stator frequency		6_82	Hz	10,0 , ⋯, 400,0	0.0		
- motor nominal rotation speed		6_83	r/min	20 , ⋯, 1 500	0		
- motor nominal output power		6_84	kW	0,0 , ⋯, 50,0	0		
Permanent store					default		
- parameter lock (0=open, 1=locked)		6_95		0, 1	1		Locks at powerdown and when parameters are saved.
- software versions		6_97					Read only. xx.xx=DCBMCPU sw version 1xx.xx=DCBMMCB sw version
- default parameters (1=load default parameters, 2=clear NTS setup)	S	6_98		0, 1, 2	0		To select 6_95 needs to be 0.
- save (saves parameters into permanent memory)		6_99		0, 1	0		

NOTE! Elevator tests are valid for one start only.

S = new shaft setup needed if parameter is changed

RealTimeDisplay signals (selectable with 6_75)	unit	comment
Speed and position:		
1. Elevator speed	m/s	Positive up, negative down
5. Elevator position	m	0.00m at bottom floor
7. Distance to next floor	m	
14. Midpoint	-	0:below midpoint 1:above midpoint
Motion control		
20. Velocity reference	m/s	
23. Motor torque	PU elevator nominal torque	
25. Motor current	A_{rms}	Negative value means motor is generating.
27. KTW/Q estimate	-	
30. Average motor current	A_{rms}	Negative value means motor is generating.
31. Motor power	kW	Negative value means motor is generating.
Temperatures:		
40. Heatsink	^{o}C	
41. DCBM-CPU board	^{o}C	
45. Motor	^{o}C	Available only if motor NTC is connected.
Supervisions / times:		
61. Drive mode		
62. Power up timer		
63. Power down counter		Number of powerdowns.
65. LWD input value	m	
Additional signals		
110. DC bus voltage	V	
111. Motor voltage	V	
134. Resolver angle	^{o}	
203. Speed error	m/s	
208. Torque feedforward reference	PU elevator nominal torque	
209. Speed controller torque reference	PU elevator nominal torque	