

Installation instructions

Air Conditioning

Cool Top 110 / 140 RT-C



English

Installation instructions are valid for:

- 6237878D Cool Top 110 RT-C, 12 V, W/O AUTO CONTROL
- 6238282D Cool Top 110 RT-C, 12 V, WITH AUTO CONTROL

- 6237944D Cool Top 140 RT-C, 12 V, W/O AUTO CONTROL
- 6237945D Cool Top 140 RT-C, 12 V, WITH AUTO CONTROL

- 6238286D Cool Top 140 RT-C, 24 V, W/O AUTO CONTROL
- 6238285D Cool Top 140 RT-C, 24 V, WITH AUTO CONTROL

- 6242415B Cool Top 110 RT-C 12 V, AUTO + FRESH AIR

- 6242974B Cool Top 140 RT-C 12 V AUTO + FRESH AIR
- 6242975B Cool Top 140 RT-C 24 V AUTO + FRESH AIR

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1 About this document





1.1 Purpose of the document

The installation instructions are an integral part of the product and contain all the information required to ensure correct and safe installation.








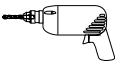
1.2 Using this document

Before installing the unit, read the installation instructions.

1.3 Use of symbols and highlighting

	Explanation
▶	Action to be taken
✓	Requirements for the following necessary action
	Note on a special technical feature
	Separate information is available
	Possibility on property damage
	Possibility on a severe or mortal injury

1.4 Necessary Tools

Tool	Description
	Lubricate all fittings and O-rings before connecting
	Equalize torsion couple by using 2 wrenches for tightening and loosening fittings
	Knife
	Heated cutting device
	Mechanical cutting device
	Soldering iron
	File
	Drill

Tool	Description
	Silicon glue gun
	Scissors
	Safety glasses
	Safety gloves
Silicon glue	Sikaflex®-211 EU

Tbl. 01: Tools

1.5 Warranty and liability

Webasto shall not assume liability for defects or damage that are the result of the installation and operating instructions being disregarded.

This liability exclusion particularly applies for:

- installation by untrained personnel
- improper use
- repairs not carried out by a Webasto service workshop
- use of non-genuine parts
- conversion of the unit without permission from Webasto
- mechanical damage to the equipment
- failure to comply with inspection and maintenance instructions

2 Safety

2.1 Intended use

The Cool Top 110 / 140 RT-C is approved for air conditioning passenger compartment:

- midi-bus

2.2 Qualifications of installation personnel

The installation personnel must have the following qualifications:

- Successful completion of Webasto training
- Corresponding qualification for working on technical systems
- Certified to work on air conditioning systems

2.3 Safety information

Safety information on installation

Danger posed by live parts

- ▶ Prior to installation, disconnect the vehicle from the voltage supply.
- ▶ Make sure the electrical system is earthed correctly.
- ▶ Always comply with legal requirements.
- ▶ Observe data on type label.

Danger of lacerations on sharp edges

- ▶ Fit protectors on sharp edges.

2.4 Safe lifting of the A/C frame

The A/C frame may only be lifted at 4 points located at the corners of the frame.

- Use 4 forged eye-bolts (M6)
- Use a 4-leg chain sling system

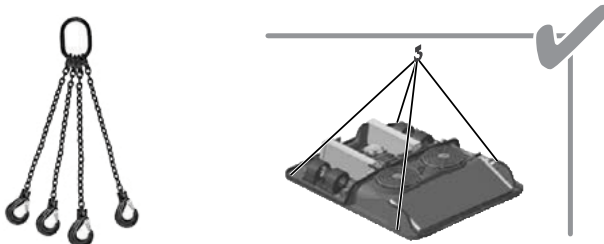



Fig. 01: Safe lifting of the A/C frame

 Webasto can supply a lifting frame for proper handling when transporting the A/C frame

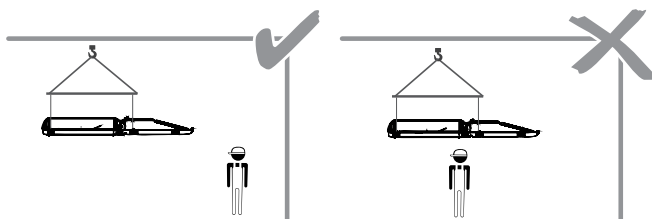


Fig. 02: Do not stand under lifted A/C frame

2.5 Safety information on operation

Avoiding damage to property

Incorrect handling

- ▶ Protect the unit against mechanical stress (e.g. dropping, impacts or knocks).
- ▶ Do not place heavy objects on top of the unit.
- ▶ Do not step on the unit.

Cables damaged on sharp edges can cause short-circuits

- ▶ Fit protectors on sharp edges.

2.6 High pressure

The Cool Top 110 / 140 RT-C has a built-in pressure switch set at 29 bar (PS)

- ▶ Check if the compressor is suitable for 29 bar (PS)

If not then the compressor must be equipped with a pressure switch

3 Scope of delivery

The package contains all the needed parts for a correct installation.




3.1 Included

Image	Description
	Cool Top A/C assembly
	Cover
	Roll adhesive seal, 5 mm thickness
	INOX TE Bolt M6x20 (9x)
	Washer 8x24x2 (10x)
	Washer EPDM Inox (9x)
	External temperature sensor with connector (automatic version)
	13 pin connector (manual version) 20 pin connector (automatic version)
	Crimp terminals
	Fresh air kit See cover page for availability
	Decal Webasto
	Manuals Important safety instructions Operating instructions

Tbl. 02: Scope of delivery

- Type label:** Applied by Webasto on the frame in the evaporating zone. The label shows the type and nominal refrigerant charge.
- System charge sticker:** Supplied in the manuals bag. For information about usage see „5 Charging the system“ on page 14.
- CE type declaration of conformity:** it is supplied in the manuals bag and the customer should take care of it.

3.2 Optional

Image	Description
	Drilling template
	Water Drain kit <ul style="list-style-type: none"> ■ 90 dg drain water connector ■ T - connector ■ Condense drain tube ■ Drip-guard adapter ■ Drip-guard
	Roll adhesive seal, 30 mm thickness
	Fittings & Hoses
	Wiring harness (12 V / 24 V)
	Power cable
	Heating kit (12 V / 24 V) Only available for automatic version <ul style="list-style-type: none"> ■ Heaters and flow control valve ■ Coolant hose and clamps ■ Stoppers and fittings ■ Internal auxiliary temperature sensor with connector (NTC 4) Coolant pump is not supplied
	Front-box kit <ul style="list-style-type: none"> ■ Refrigerant hoses ■ Coupling 90° ■ Grommet
	Lifting equipment
	Control element

Tbl. 03: Optional parts

3.3 Not included parts

- Compressor and support
- Transmission belt
- Drive pulley
- Wiring for compressor

These parts are vehicle specific and need to be ordered separately.

4 Install the A/C frame

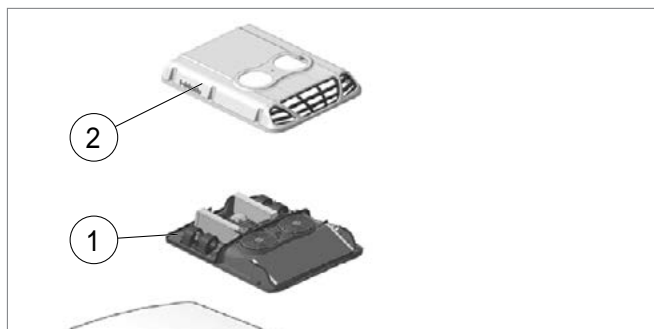


Fig. 03: Installation example



Fig. 04: Align drilling template

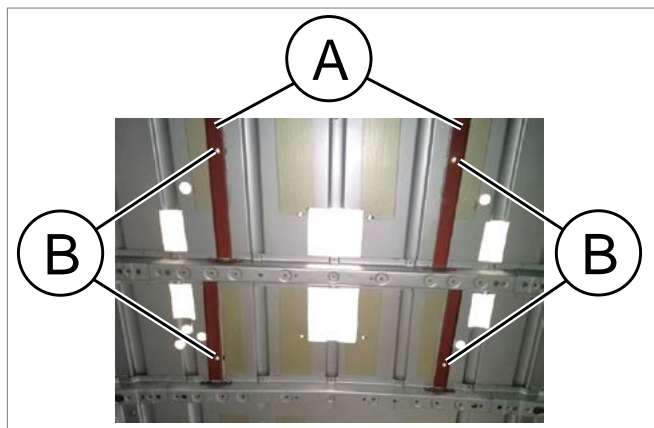


Fig. 05: Roof cross beams

4.1 Installation example

1. Cool Top A/C assembly
2. Cover

4.2 Align template



The template is not part of the scope of delivery and need to be ordered separately.

The drilling template needs to be aligned on the bus roof.

- ▶ Locate the place on roof
- ▶ Align sheet



ATTENTION

Incorrectly chosen location of the A/C frame
Result: Damage of components incorporate in bus ceiling

- ▶ Follow instructions given by the vehicle manufacturer.
- ▶ Check ceiling before drilling holes.



ATTENTION

Incorrectly chosen location of the A/C frame
Result: Leakage

- ▶ Check ceiling before drilling holes.

4.3 Roof cross beams

Install additional cross beams to increase stiffness of the roof.



Additional cross beams are not delivered by Webasto.
Contact your vehicle supplier for information about cross beams.

- ▶ Make sure that the cross beams do match with fixing holes for the Cool Top

- A Additional cross beam
- B Fixing hole for Cool Top

- ▶ Make sure that cross beams do not block the relay board and fuses. For maintenance you always must have easy access to the relay board and fuses.

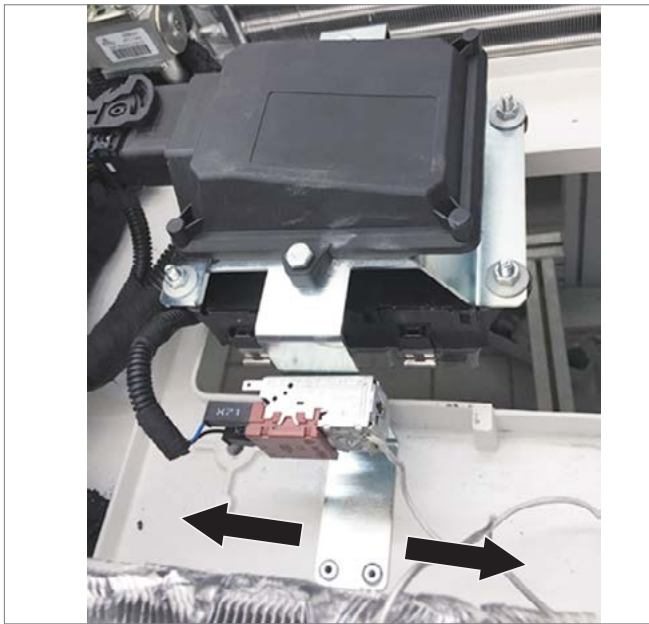


Fig. 06: bracket with relay board and fuses

If access to the relay board and fuses is blocked than move the bracket with relay board and fuses to a new position on the Cool Top frame.

- ▶ Remove the 4 rivets of the bracket
- ▶ Determine new position for the bracket with relay board and fuses
- ▶ Drill 4 new holes (\varnothing 5 mm)
- ▶ Install the bracket with 4 closed-end rivets

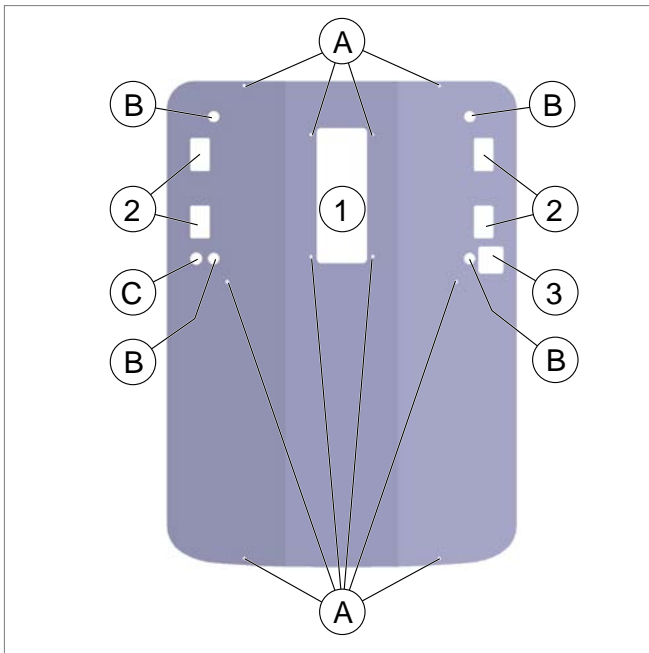


Fig. 07: Drilling holes

4.4 Drill holes in vehicle roof

- ✓ The template is aligned on the roof.
- ✓ The ceiling inside the vehicle has been checked on wiring, roof stiffeners and other elements which could be damaged because of drilling the holes.

Cut-outs

1. Opening for inlet air and interface connector
2. Opening for outlet air
3. Opening for hoses (85 x 79 mm)

Drilling

	Dimension [mm]	Quantity	Purpose
A.	\varnothing 10	10	Roof mounting
B.	\varnothing 37	4	Water drain hose
C.	\varnothing 40	1	Power supply wiring

- ▶ File off edges of aperture.
- ▶ Sand edges of aperture.
- ▶ Apply anti corrosion primer to cutting edge.
- ▶ Let primer dry.

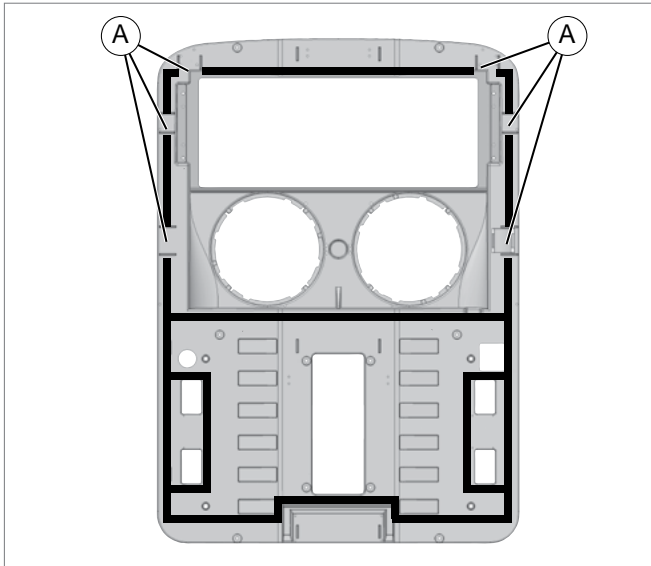


Fig. 08: Seal position for roof curvature of 5,200 mm

4.5 Place the seals, apply Sikaflex



ATTENTION

The position of the seals depends on the vehicle roof curvature. Be sure you know the vehicle roof curvature.

Result: Wrong placed seals lead to leakage

- ▶ Roof curvature is 5,200 mm and roof is without grooves. See § 4.5.1
- ▶ Roof curvature is less or more than 5,200 mm or roof has grooves. See 4.5.2

The supplied seals must be placed between the A/C frame and vehicle roof.

4.5.1 Roof curvature is 5,200 mm



The supplied seals (5 mm thickness) must be used for a roof curvature of 5,200 mm and roof without grooves.

If the vehicle roof does not match with these criteria then See 4.5.2

The seals are 1-side self adhesive.

Supplied with the kit is:

- 1 x Roll 5 mm thickness

The seals need to be cut to length.

- ▶ Make sure that the roof curvature matches with the seal thickness.
- ▶ Cut the seals to length, see Fig. 08
 - Do not seal apply at position "A"



Make sure that rain water can drain from under the condenser. Keep spaces marked "A" free of seal and Sikaflex

- ▶ Place seals with the self-adhesive at the bottom side of Cool Top frame.

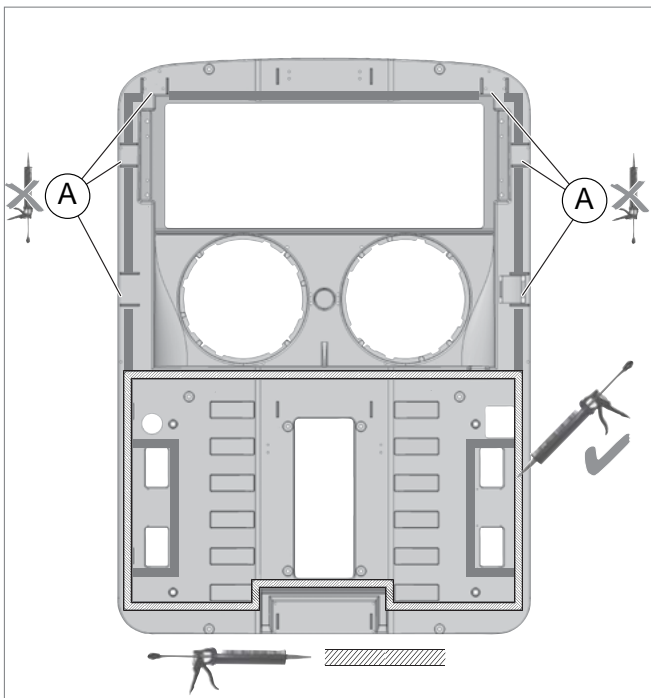


Fig. 09: Apply Sikaflex for roof curvature of 5,200 mm

Apply Sikaflex, roof curvature is 5,200 mm

✓ Seals are applied on to the A/C frame

- ▶ Apply Sikaflex on the other, non-adhesive side. See Fig. 09
 - Do not apply Sikaflex at position "A"

- ▶ Place the A/C frame on vehicle roof.



Make sure that rain water can drain from under the condenser. Keep spaces of Sikaflex

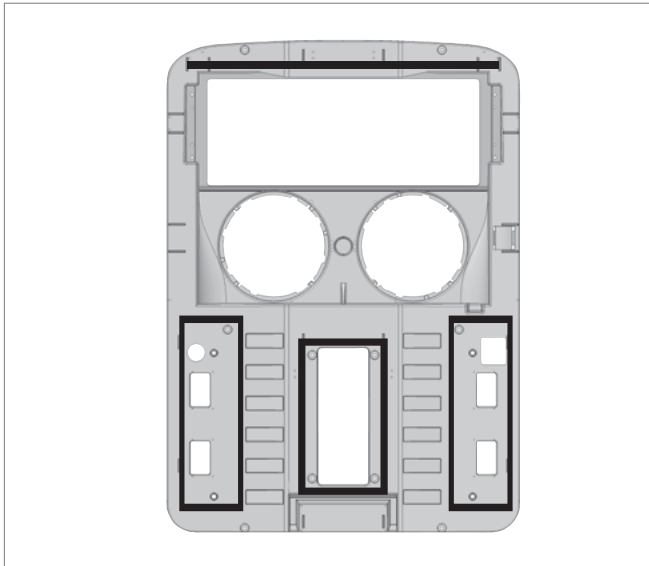


Fig. 10: Seal position for roof with curvature less or more than 5,200 mm

4.5.2 Roof curvature less or more than 5,200 mm or roof has grooves.

If the roof curvature is less or more than 5,200 mm or the roof has grooves, then a different seal pattern must be used



Do not use the supplied seals (5 mm thickness). Make sure to use the right seal thickness.

Different seal thickness can be ordered at Webasto



Make sure that the seals are made out of closed cell foam suitable for outdoor applications.

On request Webasto can supply (HxW) 32x20 mm seal

- ▶ Measure the gap between the roof and A/C frame.
- ▶ Make sure to use the right seal thickness
- ▶ Cut the seals to length, see Fig. 10



Fig. 11: Spacer

Spacers are required in case of:

- roof has grooves,
- uneven surfaces,
- roof curvature less or more than 5,200 mm

H = Gap to be filled

Make sure that spacers have the right height (H) to fill the gap at the fixing points. Spacers are made out of stainless steel or plastic.



Fig. 12: Seals and Sikaflex

Apply Seals and spacers on the roof

- ▶ Make a rectangular shape with the gasket around the opening for inlet air including the fixing points.
- ▶ Make a rectangular shape with the gasket around the openings for outlet air including the fixing points, water discharge exits, pipe exit and wiring exit.
- ▶ Cut a gasket to be mounted along the front side of the A/C frame.
- ▶ Fix the gaskets with Sikaflex on the roof.
- ▶ Add Sikaflex all around the external and internal edge of the gaskets.
- ▶ Fix the spacers with Sikaflex on the roof.
- ▶ Add Sikaflex on the gaskets.
- ▶ Place the frame on the roof.

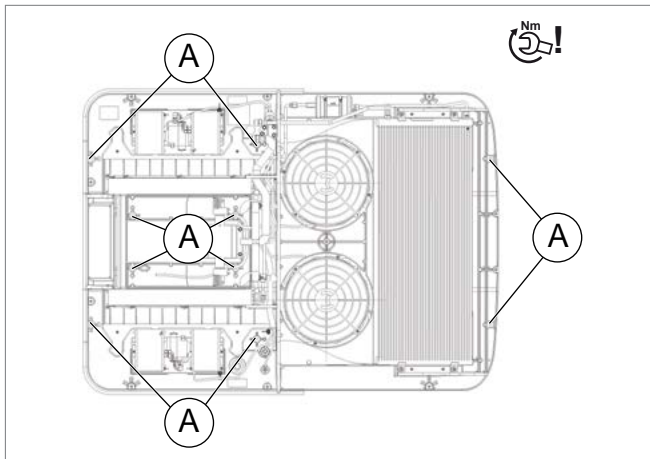


Fig. 13: Fasten the A/C frame on vehicle roof

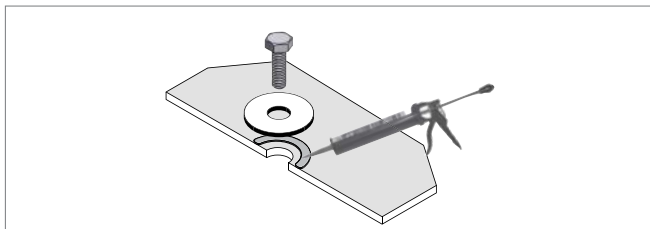


Fig. 14: Apply Sikaflex between washer and frame



Fig. 15: Apply Sikaflex from inside the vehicle

4.6 Fasten the A/C frame

- ✓ The holes in the roof are drilled and protected against rust
- ✓ The template has been removed
- ✓ "Sikaflex" applied on non-adhesive side of the seals

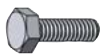



Fasteners are not part of the scope of delivery. These must be supplied by the installer. Washers are supplied with the system.

- ▶ Match the A/C frame with the holes and cut-outs
- ▶ Apply Sikaflex between frame and washer (Fig. 14)
- ▶ Tighten the fasteners (A)



Tightening torque according installation instructions. The max. torque for the A/C frame is 10 Nm

	Description [mm]	Max. [Nm]
	M8 bolts to be supplied by installer (10x)	10
	Washer 8x24x2 (10x)	

4.7 Apply Sikaflex from inside the vehicle

Before finishing the interior you need to check and make sure that there is no leakage between roof and A/C frame.

- ▶ Check and make sure that the seals completely close the space between roof and A/C frame.
- ▶ Check and make sure that spacers cannot vibrate.
- ▶ Apply Sikaflex to completely seal the A/C frame.

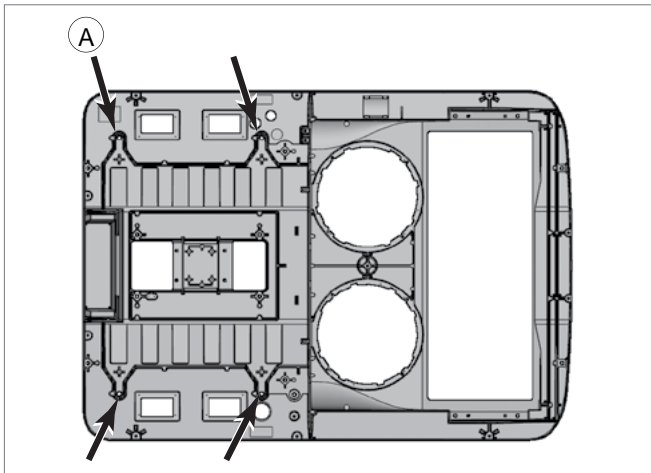


Fig. 16: Drain water hose

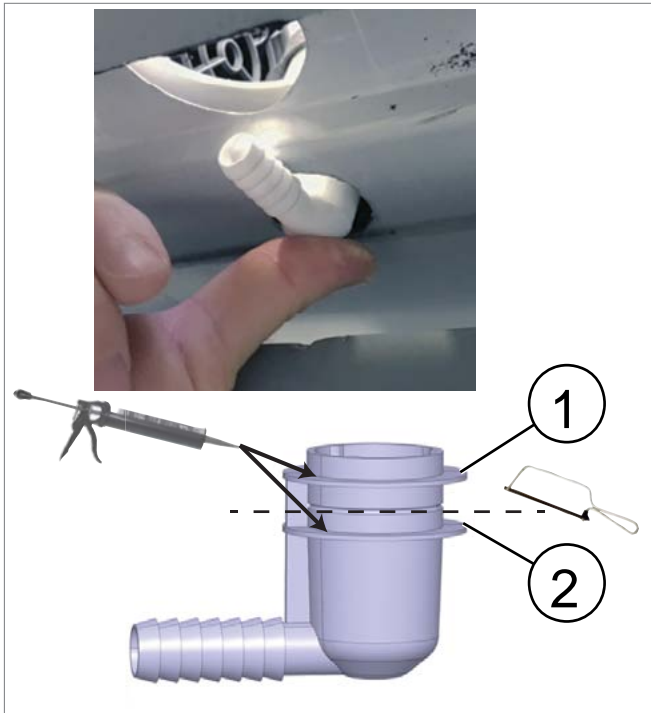


Fig. 17: Drain water plug

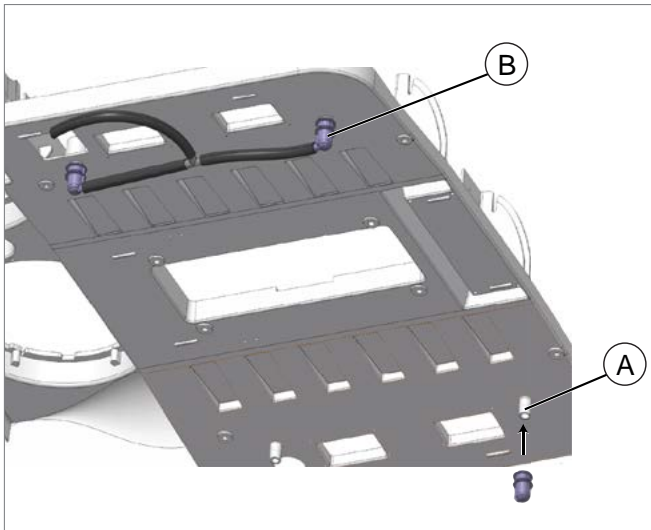


Fig. 19: Drain water hose locations

4.8 Connect drain water hoses

✓ The A/C frame has been fastened

- There are 4 drain water hoses needed
- Hose inside diameter $d=12$ mm



Hoses and fittings are not included in the standard scope of delivery and need to be ordered separately

- ▶ Put the drain hoses, through or along the front and rear pillars of the bus



ATTENTION

Hoses have kinks or siphons

Result: Blocked hose with risk of Leakages

- ▶ Make sure the drain hoses drain always in downwards direction.

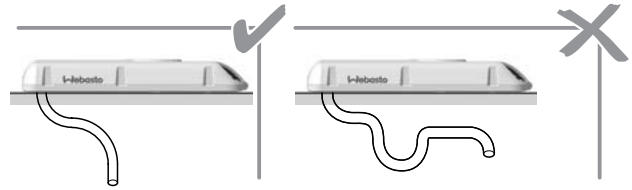


Fig. 18: Avoid syphon (risk of water accumulation)

You can cut the drain water plugs to length in function of the distance between the external roof surface and the inner roof.

1. Max. height of the inter-space 45 mm
2. Max. height of the inter-space 30 mm

- ▶ Check if it is needed to cut the drain water plugs to length. If yes, cut the plug along the throat between the 2 flanges
- ▶ Measure and cut the hoses to length
- ▶ Fix the hoses on the drain water plugs. Tighten the hoses with hose clamps.
- ▶ Apply Sikaflex on the flange of the water plugs
- ▶ Put the 4 drain water plugs in place. This must be done from the inner side of the vehicle, Fig. 19 Position "A"
- ▶ To keep the plugs in position and fix the hoses to the roof near the plug
- ▶ Wait for the Sikaflex getting dry



Use of drip guards is highly recommended

A = Frame

B = Plug

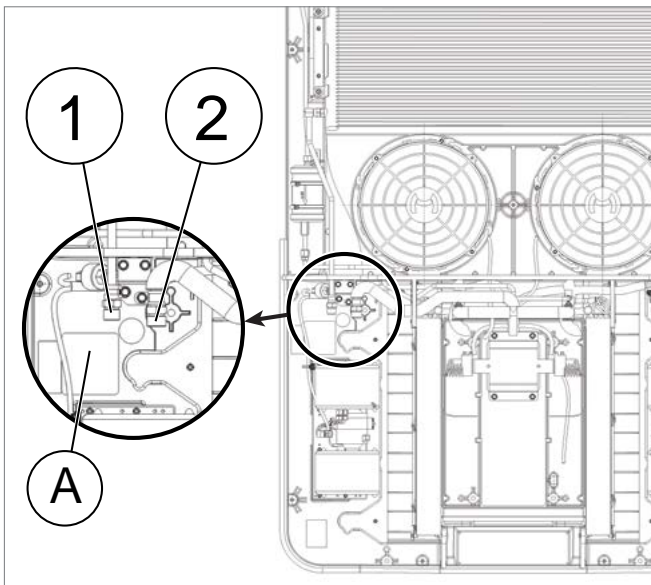


Fig. 20: Compressor connection on A/C system

4.9 Connect the A/C system to the compressor

✓ The A/C frame has been fastened

- ▶ Lubricate the O-rings
- ▶ Feed the hoses through hole "A"
- ▶ Connect the hoses to the fitting
- ▶ Position the fittings on A/C system

1. High pressure port to pressure port of the compressor
2. Low pressure port to suction port of the compressor

- ▶ Tighten the fitting
- ▶ Completely seal hole "A" with Sikaflex or polyurethane foam.

For recommended compressor gear ratio see „11 Technical data“ on page 21

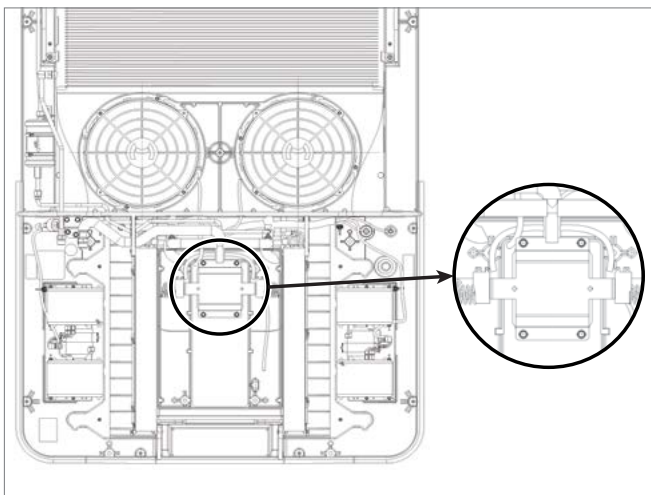


Fig. 21: Location of the interface connector

4.10 Connect interface cable

The interface connector is located in the opening of the air inlet.

- ▶ Feed the cable through the vehicle roof. This could be done left, right or from the center
- ▶ Connect crimp terminals to the wiring
- ▶ Place the terminals in the connector X35. For pin assignment See „12.8 Connector X35, automatic“ on page 24



Fig. 22: Temperature sensor

4.11 External temperature sensor



The external temperature sensor is only valid for Cool Top with automatic control.

The external temperature sensor measures the outside temperature.

The temperature sensor must be installed by the customer.



There are no fasteners supplied with temperature sensor.

The temperature sensor best position is in front of the vehicle in the side driver mirror.

- ▶ Feed the sensor cable to connector X35. See „12.8 Connector X35, automatic“ on page 24

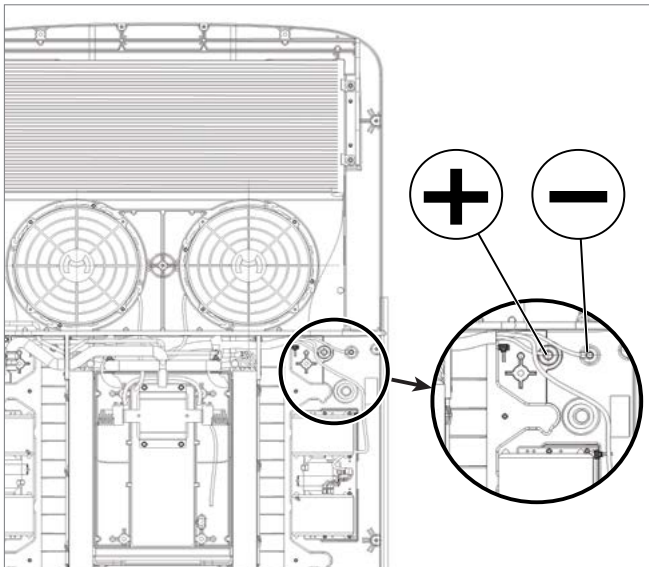


Fig. 23: Wiring from power connection

4.12 Connect power supply and control element cable

Connect the main power cables from underneath the A/C frame. The connection studs can be reached from inside the vehicle through opening. See Fig. 07 Pos "C"

- ▶ Feed the cables through the rubber grommets



After installation check if the parameter "Bat" (Battery) in the control element is set to the correct voltage.



For control element parameter settings see the Operating Instructions for Air Conditioning (Cool Top 110 | 140 | 190 | 220 | 250 | 300 | 360 RT-C)

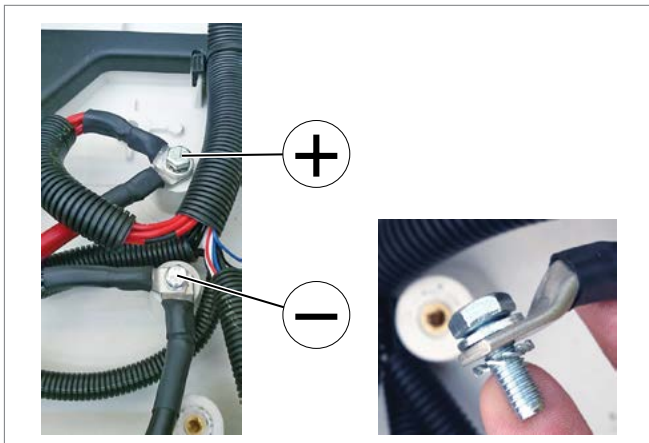


Fig. 24: Connect power supply

A/C system	Voltage [V]	Cable cross section [mm ²]
Cool Top 110 RT-C	12	16
Cool Top 140 RT-C	12	25
Cool Top 140 RT-C	24	16

- ▶ Connect the power cables

The power connections are different in size:

- + M8
- M6

The washer must be installed under the screw head (Fig. 24).

- ▶ Put the rubber grommets in place
- ▶ Seal the rubber grommets Sikaflex

5 Charging the system



Fig. 25: Add the correct quantity of lubricant

- ✓ Keep the compressor always lubricated according the instructions on the compressor
- ✓ Check the refrigerant type.



ATTENTION

Wrong refrigerant type
Result: System damage.

► Use refrigerant R134a

System	Amount [kg]*
Cool Top 110 RT-C	1.5
Cool Top 140 RT-C	1.6

Tbl. 04: Refrigerant quantity

* Refrigerant charge is based on 6 m distance between compressor and Cool Top.

Hose diameter [inch]	Approx. refrigerant per meter hose** [gr/m]
1 / 2 " – 13 / 32 "	10
5 / 8 " – 1 / 2 "	13

Tbl. 05: Approx. mass of refrigerant per meter hose length

** Distances of more than 6 m between compressor and roof top system.

- Charge system with refrigerant R134a, quantities according Tbl. 04 & Tbl. 05
- Check system on leakage

BG Съдържа флуорсъдържащи парникови газове.	IT Contiene gas fluorurati a effetto serra.
CZ Obsahuje fluorované skleníkové plyny.	LT Sudėtyje yra fluorintų šiltnamio efektą sukeliančių dujų.
DA Indeholder fluorholdige drivhusgasser.	LV Satur fluorētās siltumnīcefekta gāzes.
DE Enthält fluorierete Treibhausgase.	MT Fih gassijiet fluworurati b'effett ta' serra.
EL Περιέχει φθοριούχα αέρια του θερμοκηπίου.	NL Bevat gefluoreerde broeikasgassen.
EN Contains fluorinated greenhouse gases.	PL Zawiera fluorowane gazy cieplarniane.
ES Contiene gases fluorados de efecto invernadero.	PT Contém gases fluorados com efeito de estufa.
ET Sisaldab fluoritud kasvuhoonegaase.	RO Conține gaze fluorurate cu efect de seră.
FI Sisältää fluorattuja kasvihuonekaasuja.	SK Obsahuje fluorované skleníkové plyny.
FR Contient des gaz à effet de serre fluorés.	SL Vsebuje fluorirane toplogredne pline.
HR Sadržava fluorirane stakleničke plinove.	SV Innehåller fluorerade växthusgaser.
HU Fluortartalmú üvegházhatású gázokat tartalmaz.	

HFC – R134a kg = CO2 t [GWP=1430]

Fig. 26: System charge sticker

5.1 Fill in the system charge sticker

- Write the correct amount of refrigerant used to charge the system and the tonnes of CO2 equivalent on the system charge sticker.
- Place the sticker adjacent to the service point for charging.

6 Place cover

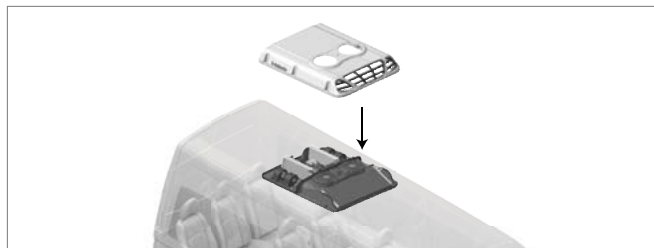


Fig. 27: Place cover

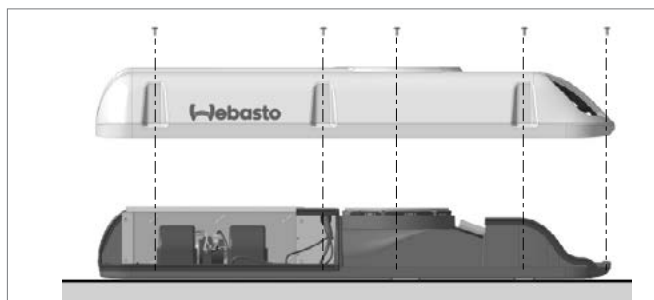


Fig. 28: Fasten cover



Fig. 29: Correct mounted washer

✓ All wiring and hoses are connected

- ▶ Place cover
- ▶ Make sure that the black gasket on the edge of the A/C frame gets down with the cover
- ▶ First tighten the bolt between the 2 condenser fans
- ▶ Tighten all other bolts

	Description (quantity)	Max. Nm
	INOX TE Bolt M6x20 (9x)	1.3
	Washer EPDM Inox (9x)	

7 Initial operation

- ▶ General performance check
- ▶ High and low pressure
- ▶ Correct operation

8 Heating kit 12 V / 24 V (optional)

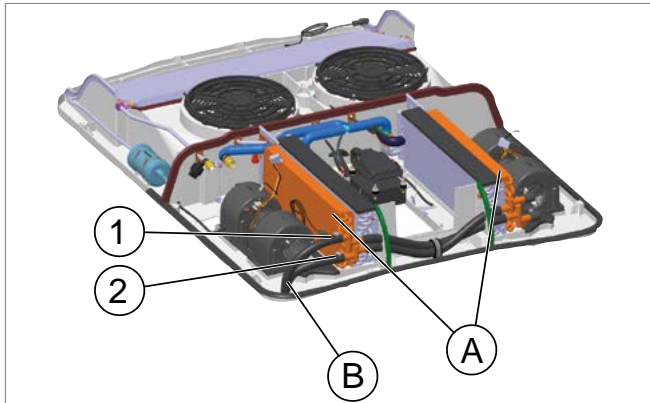


Fig. 30: Heating kit

An optional heating kit can be ordered at Webasto.



The heating kit is only valid for Cool Top with automatic control. Available in 12 V and 24 V version

The heating elements are placed in the evaporator unit between the centrifugal blowers and the evaporators.

A valve and hoses feed the vehicle coolant through the heating elements.

- A. Heating elements
- B. Coolant hoses (d = \varnothing 20 mm)

1. Coolant flow in
2. Coolant flow out



You can feed the coolant hoses from left or right side in to the A/C frame.

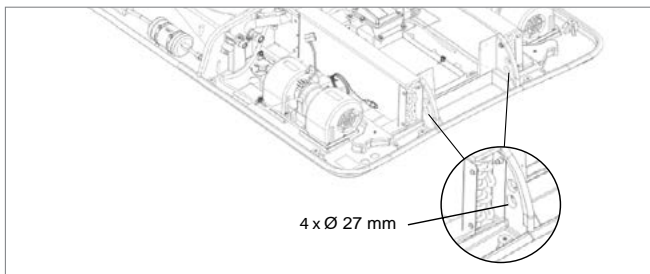


Fig. 31: Drill holes for coolant hoses in side board

- Drill holes in side-boards 4 x \varnothing 27 mm

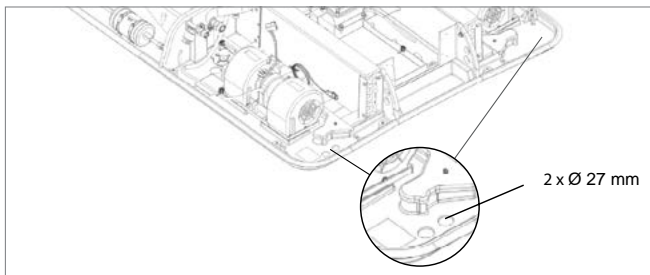


Fig. 32: Drill holes for coolant hoses in bottom plate

- Drill holes in bottom plate 2 x \varnothing 27 mm. This can be done left or right side in the A/C frame.

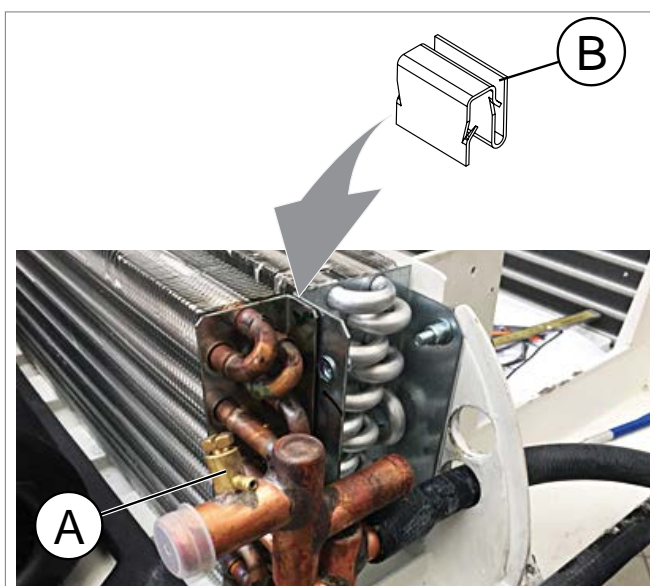


Fig. 33: Left side heating element with valve

- Place the heating elements between the radial fans and the evaporators. Fig. 30 Pos A



Make sure to place the heating element on the left side with the valve at left side.
The valve must be on top Fig. 33 Pos A

- Fixate the heating elements with clips Fig. 33 Pos B (4x)

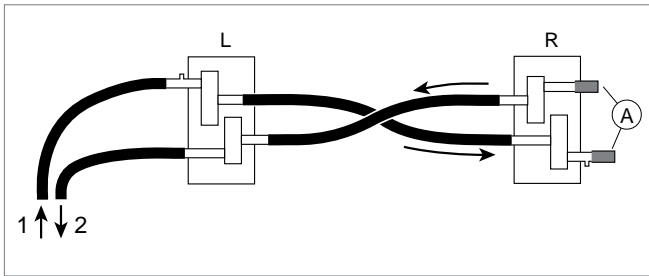


Fig. 34: Heater coolant hose connection (LH)

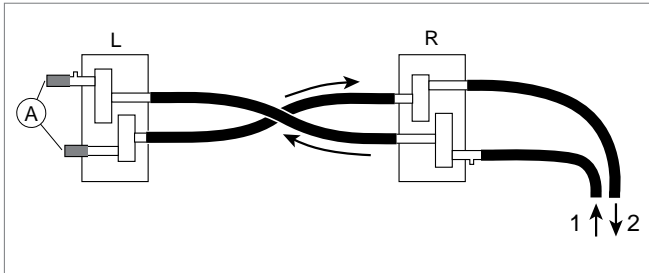


Fig. 35: Heater coolant hose connection (RH)

8.1 Coolant hose connections

You can connect the coolant hoses from left or right side.

- left side connection Fig. 34
- right side connection Fig. 35

1. Coolant flow in
2. Coolant flow out

A. End-cap

L = Heating element left side
R = Heating element right side

- ▶ Cut the hoses to length
- ▶ Connect the hoses using the supplied hose clamps

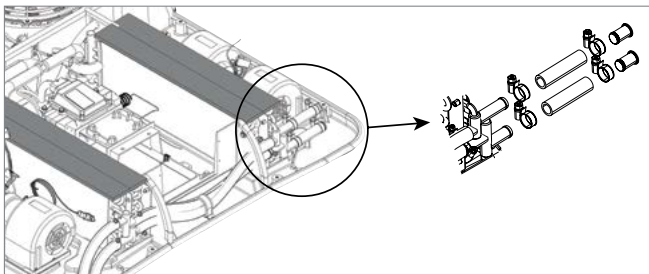


Fig. 36: Heater end caps

8.2 Heating element, end caps

The two open ends on the heating element need to be closed.

- ▶ Cut two hoses to length (approx. 80 mm)
- ▶ Mount the hoses and end-caps with hose clamps Fig. 36

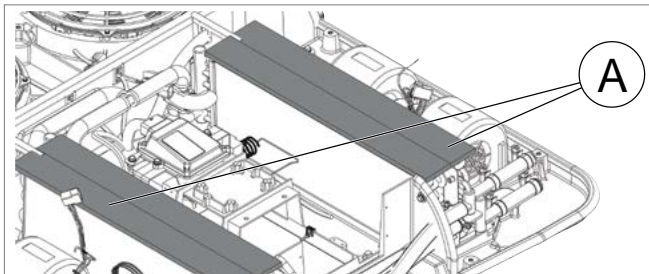


Fig. 37: Apply the seals

8.3 Apply seals

- ▶ Apply the seals "A"

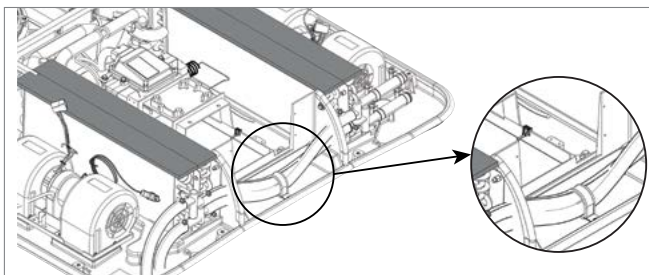


Fig. 38: Tighten hoses

8.4 Tighten hose

- ▶ Tighten the hoses to the A/C frame. Especially when a fresh air kit is installed. The hoses could block fresh air intake.

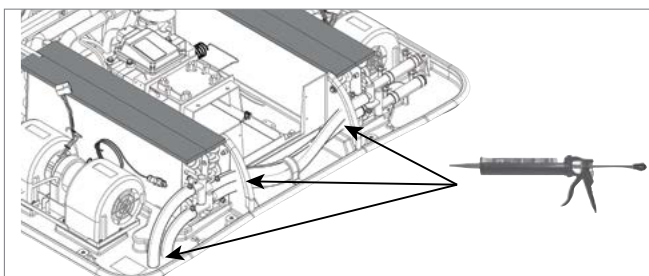


Fig. 39: Seal with Sikaflex

8.5 Seal with Sikaflex

- ▶ Seal the holes where the hoses are going through the A/C frame.



ATTENTION

Vibration will cause damaged hoses

Result: Coolant leakages

- ▶ Make sure that the hoses can not vibrate.

Optional grommets or sleeves can be installed to protect the hoses.

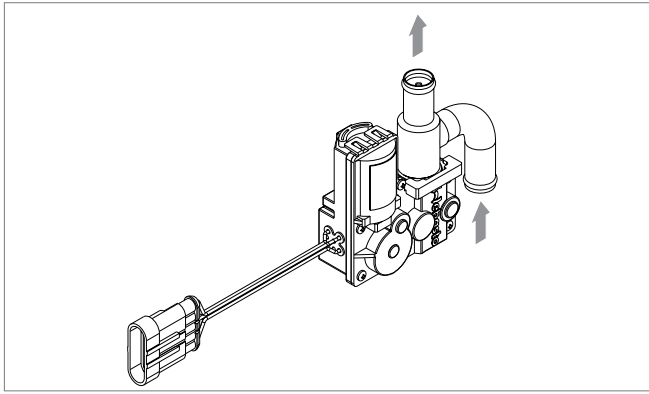


Fig. 40: Valve

8.6 Install valve and pump



The coolant pump is not supplied with the kit and has to be ordered separately.

- ▶ Install the valve
- ▶ Install the pump
- ▶ Connect the hoses (Coolant flow according arrows, Fig. 40)



The valve hose connection is $d = \varnothing 16$ mm. Use the reducer ($d = \varnothing 16/20$ mm) to connect the hoses from the heating element with the valve.



After installation check if the parameter "Cnf" in the control element is set to the configuration.



For control element parameter settings see the Operating Instructions for Air Conditioning (Cool Top 110 | 140 | 190 | 220 | 250 | 300 | 360 RT-C)

8.7 Internal auxiliary temperature sensor (NTC 4)

The Cool Top 110 / 140 RT-C is standard supplied with 1 temperature sensor (NTC 1) mounted in the roof top unit. This temperature sensor measures the air temperature flowing in the vehicle.

The internal auxiliary temperature sensor (NTC 4) improves the measurement of the temperature inside the vehicle.

The temperature sensor must be installed by the customer.



There are no fasteners supplied with temperature sensor

The temperature sensor best position is under one of the passenger seats.

- ▶ Feed the sensor cable to connector X35. See „12.8 Connector X35, automatic“ on page 24



The control element parameter "Ntc" is standard set to 1 temperature sensor (NTC 1).
If 2 temperature sensors are installed (NTC 1 & NTC 4) then change the setting for the number of temperature sensors in the control element.
Max. 2 temperature sensors can be used



For control element parameter settings see the Operating Instructions for Air Conditioning (Cool Top 110 | 140 | 190 | 220 | 250 | 300 | 360 RT-C)

9 Front-box kit (optional)

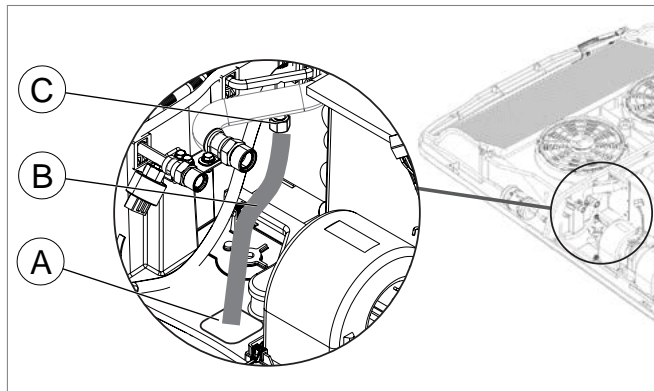


Fig. 41: High pressure hose to the Front-box

An optional Front-box kit can be ordered at Webasto.
With the Front-box kit you add an extra evaporator unit in the driver's cabin.

A second evaporator circuit needs to be added to the A/C system.
The Cool Top 110 / 140 RT-C is prepared to add the Front-box box.

- ▶ Install a high pressure refrigerant hose "B" from the high pressure line "C" through hole "A" in the A/C frame.
- ▶ Connect the high pressure line to the high pressure port of the Front-box.
- ▶ Connect the low pressure side from the Front-box directly to the compressor suction line.



See chapter Fig. 42 on page 20 for assembling instructions hoses and coupling

10 Crimp the hose to the fitting

This chapter describes the general procedure how to assemble the fitting to a hose. There are 2 fitting types.

1. Fitting with separate clamp see Fig. 42
2. Fitting with fixed clamp, these are standard supplied by Webasto see Fig. 43

10.1 Cut hose and lubricate the O-rings

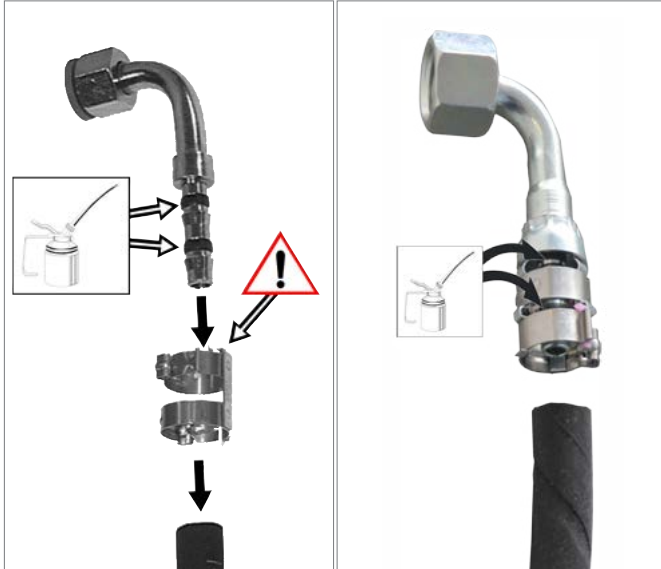


Fig. 42: Fitting with separate clamp Fig. 43: Fitting with fixed clamp



ATTENTION

Incorrectly cut hose

Result: Leakage

- ▶ Make sure that the hose is cut in perpendicular direction

The hose clamping instruction is the same for both fitting types.

The images below show the fitting with fixed clamp.

- ▶ Check the dimensions of fitting and hose.
- ▶ Lubricate the O-ring of the fitting. (Use the same oil as used in the refrigeration system)
- ▶ Place clamp and fitting on the hose.

10.2 Insert the fitting

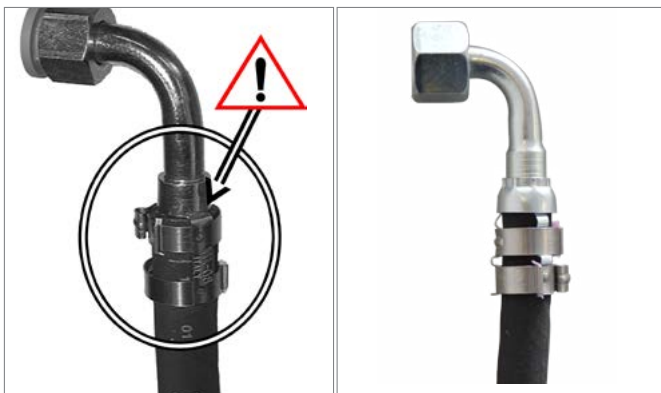


Fig. 44: Check clamp and fitting Fig. 45: Fitting with inserted hose

- ▶ Check that the tab of the clamp is aligned with the end of the hose.
- ▶ Insert the fitting in the hose.
- ▶ Position the fitting.

10.3 Tighten the clamp

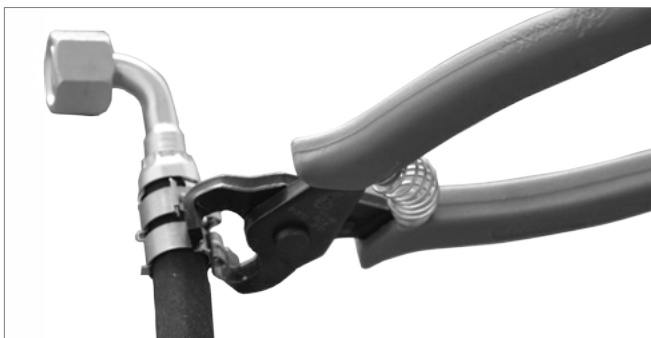


Fig. 46: Tighten the clamp

- ✓ Fitting and clamp are positioned correctly.
- ▶ Lock the clamp at 2 positions using the right pliers.

11 Technical data

Parameter	Cool Top 110 RT-C	Cool Top 140 RT-C
Cooling capacity [kW]	11	14
Cooling capacity [kW] (EN 5151)	8.5	11
Outside temperature 35 °C rel. humidity 46%		
Inside temperature 27 °C		
Heating capacity (optional) [kW]	12*	
Refrigerant	R134a	
Refrigerant charge [kg]	1.5	1.6
PS [bar] (2014/68/UE)	29	29
Operating voltage [V]	12	12 / 24
Max. power consumption at 12 V / 24 V [A]	50	80 / 40
Air flow (Free blowing) [m³/h]	1,500 (1,800)	2,000 (2,300)
Number of axial fans / radial blowers	2 / 2	
Dimensions (LxWxH) [mm]	1600 x 1150 x 204	
Weight [kg]	48	50
Roof radius R [mm]	5,200	
Compressor displacement [cm³]	150 / 160	160 / 210
Inlet connection	7 / 8" -14 UNF-2A	
Outlet connection	1-1/16" -14 UNF-2A	
Water connection Ø [mm]	18.5	
Expansion valve	Block valve	
Sound pressure level L_{pA} [dB]	79	
Measured according to standard UNI EN ISO 11204		

Tbl. 06: Technical data

* Optional

12 Annex

12.1 Cable assignment

Cable	Description	Auto		Manual	
		Cross section [mm ²]	Colour	Cross section [mm ²]	Colour
B+	See Tbl. 08				
B-					
B+01		2.5	red	2.5	red
B+02		4	red	4	red
B+03		4	red	4	red
B+04		6	red	6	red
B+05		4	red	4	red
B+06		4	red	4	red
B+07		2.5	red	2.5	red
B+08		2.5	red	2.5	red
B+09		1.5	red	1.5	red
B+10		1.5	red	1.5	red
B+11		2.5	red	2.5	red
B+12		4	red	4	red
B+13		1.5	red	1.5	red
B+14		2.5	red	2.5	red
B+15		4	red	4	red
B+16		2.5	white	2.5	white
B+17	1.5	red	1.5	red	
B+18	1.5	red			
B-01	V1	2.5	black	2.5	black
B-02		2.5	black	2.5	black
B-03	BWR1	4	black	4	black
B-04	BWR2	4	black	4	black
B-05	COMP	1.5	black	1.5	black
B-06	PUMP	1.5	black		
B-07		0.5/1.5*	black		
B-08		0.5	black		
B-09		0.5	black		
B-10		0.5	black		
B-11		0.5	black		
B-12		0.5	black		
B-13		0.5	black		
B-14		0.5	black		
B-16		0.5/1.5*	black		
B-17		0.5/1.5*	black		
001		0.75	black	0.5	red
002		0.75	red	0.5	red
003		0.75/0.5*	blue	0.5	red
004		0.5	blue	0.5	red
005				0.5	red
006				0.5	red
007				0.5	red
008		0.5	blue	0.5	red
009		0.5	blue	0.5	blue
010		0.75	blue	0.5	blue
011		0.75/0.5*	blue	0.5	blue
012		0.5	green	0.5	blue
013		0.5	yellow		

Cable	Description	Auto		Manual	
		Cross section [mm ²]	Colour	Cross section [mm ²]	Colour
015		0.5	red		
016		0.5	white		
017		0.5	black		
018		0.5	white		
019		0.5	black		
020		0.5	white		
021		0.5	black	0.5	black
022		0.5	blue		
023		0.5	blue		
024		0.5	blue		
025		0.5	blue	0.5	blue
026				0.5	black
027		0.5	red	0.5	black
028		0.5	blue	0.5	black
029		0.5	blue		
030		0.5	black	0.5	black
031				0.5	black
032				0.5	black
033		0.5	blue		
049		0.5	blue		
050	JUMPER PRESSUR SWITCH	0.5	-		
051		0.5	blue		
052		0.5	blue		
053		0.5	blue		
203	V1	2.5	white	2.5	white
206	V2	2.5	white	2.5	white
209		2.5	white	2.5	white
218	COMP			1.5	white
219	CLUTCH	1.5	white		
230	BWR1-BWR2 (1st speed)	1.5	white	1.5	white
231	BWR1-BWR2 (2nd speed)	2.5	white	2.5	white
232	BWR1-BWR2 (3rd speed)	4	white	4	white
255	PUMP	1.5	white		
306		2.5	white		

Tbl. 07: Cable assignment

* Different cross section in wiring harness from connector X35

12.2 Cable assignment, main power

Cable	Description	Cool Top			Colour	Max L [m]
		110 12 V	140 24 V	140 12 V		
B+	Clamp 30	16 mm ²	25 mm ²	25 mm ²	red	7
B-	Clamp 31	16 mm ²	25 mm ²	25 mm ²	black	7
F100	Fuse	60 A	100 A			

Tbl. 08: Cable assignment, main power

12.3 Wiring diagram overview

Diagram page number	Manual		Automatic	
	12 V	24 V	12 V	24 V
Power circuit	26	33	29	36
Auxiliary circuit	27	34	30	37
Control Element	28	35	32	39
ECU	--	--	31	38

Tbl. 09: Wiring diagram overview

12.4 Fuses

Code	Description	Current [A]	
		12 V	24 V
F100	RTC Protection, see Tbl. 08		
F101	Axial Fan 1 (condenser)	25	15
F102	Axial Fan 2 (condenser)	25	15
F103	Clutch Compressor	7,5	7,5
F104	Centrifugal Blower 1 (1 st Speed)	15	10
F105	Centrifugal Blower 1 (2 nd Speed)	20	15
F106	Centrifugal Blower 1 (3 rd Speed)	30	20
F107	Centrifugal Blower 2 (1 st Speed)	15	10
F108	Centrifugal Blower 2 (2 nd Speed)	20	15
F109	Centrifugal Blower 2 (3 rd Speed)	30	20
F110	Water Pump (automatic version only)	5	5
F111	ECU (automatic version only)	5	5
F110	Key (manual version)	7,5	7,5
F117	Key (automatic version)	3	3
D1	Axial Fan 2 (condenser) (only automatic version 24 V)	--	12

Tbl. 10: Fuses

12.5 Relays

Code	Description	[A] at 12 V
RL10	Axial Fan 2 (condenser) (only manual version, 24 V)	20 / 30
RL11	Axial Fan 1 (condenser)	20 / 30
RL12	Axial Fan 2 (condenser) and Clutch Compressor (only 12 V)	20 + 20
RL12	Axial Fan 2 (condenser) (only 24 V)	40
RL13	Centrifugal Blower 1 and 2 (1 st Speed)	40
RL14	Centrifugal Blower 1 and 2 (2 nd Speed)	40
RL15	Centrifugal Blower 1 (3 rd Speed)	20 / 30
RL16	Centrifugal Blower 2 (3 rd Speed)	20 / 30
RL17	Axial Fan 1 and 2 (Half Speed)	20 / 30
RL18	Water Pump (automatic version only)	20 / 30

Tbl. 11: Relays

12.6 Connector X1, automatic



Fig. 47: Connector X1 48 pin

Pin	Remark	Wire number
A1	--	--
A2	A_5V	016
A3	--	--
A4	--	--
B1	FAN SPEED 1	004
B2	ANALOG IN FLAP POSITION	033
B3	--	--
B4	--	--
C1	--	--
C2	ANALOG IN WATER VALVE POS.	028
C3	--	--
C4	--	--
D1	PUMP	008
D2	MIXED AIR SENSOR	024
D3	IGNITION KEY	027
D4	--	--
E1	FIRST SPEED BWR	009
E2	INTERNAL TEMPERATURE SENSOR (NTC 1)	022
E3	--	--
E4	--	--
F1	--	--
F2	EXTERNAL AIR SENSOR	023
F3	--	--
F4	--	--
G1	FLAP +	018
G2	INTERNAL AUXILIARY TEMPERATURE SENSOR (NTC 4)	025
G3	PRESSURE SWITCH H.P.-L.P.	029
G4	AGND	030
H1	FLAP -	017
H2	--	--
H3	--	--
H4	AGND	021
J1	VALVE +	020
J2	--	--
J3	--	--
J4	CAN_H	013
K1	VALVE -	019
K2	--	--
K3	--	--
K4	CAN_L	012
L1	BATTERY +	002

Pin	Remark	Wire number
L2	SECOND SPEED BWR	010
L3	THIRD SPEED BWR	011
L4	GND	001
M1	--	--
M2	COMPRESSOR	003
M3	--	--
M4	--	--

Tbl. 12: Connector X1 pin assignment

12.7 Connector X35, manual

Pin	Remark	Wire number
1	IGNITION KEY	008
2	COMPRESSOR	218
3	FIRST SPEED BLOWER	009
4	SECOND SPEED BLOWER	010
5	THIRD SPEED BLOWER	011
6	-	--
7	A/C ON	021
8	-	--
9	-	--
10	-	--
11	-	--
12	-	--
13	GND	031

Tbl. 13: Connector X35 pin assignment, 13 pins, manual

12.8 Connector X35, automatic

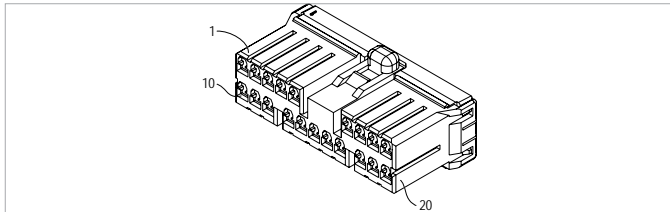


Fig. 48: Connector X35, automatic 20 pins

Pin	Remark	Wire number
1	COMPRESSOR	003
2	COMPRESSOR	003
3	IGNITION KEY	027
4	VALVE-	019
5	VALVE+	020
6	--	Spare
7	CAN_L	012
8	CAN_H	013
9	PUMP	255
10	GND CLUTCH	B-06
11	--	Spare
12	GND PUMP / CONTROL HEAD	B-05
13	ANALOG IN WATER VALVE POS.	028
14	CLUTCH	219

Pin	Remark	Wire number
15	--	Spare
16	A_5V (VALVE)	016
17	A_GND (VALVE)	021
18	INTERNAL AUXILIARY TEMPERATURE SENSOR (NTC 4)	032
19	EXTERNAL TEMPERATURE SENSOR	023
20	A_GND (TEMPERATURE SENSORS)	031

Tbl. 14: Connector X35 pin assignment, 20 pins, automatic

12.9 Connector X76 control element, manual

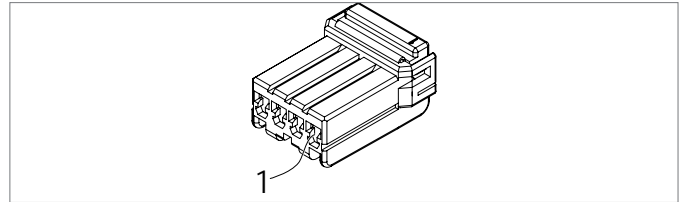


Fig. 49: Connector X75, manual, 6 pin

Pin	Remark	Wire number
1	GND	032
2	A/C ON	021
3	FIRST SPEED BLOWER	009
4	LIGHT	008

Tbl. 15: Connector X76 pin assignment, manual

12.10 Cable colours

Abbreviation	Colour
OG	Orange
Light BU	Light blue
WH	White
BU	Blue
YE	Yellow
GY	Grey
BN	Brown
BK	Black
PK	Pink
RD	Red
GN	Green
VT	Violet

Tbl. 16: Cable colours

12.11 Wiring diagram symbols

Symbol	Description
	Female connector
	Male connector
	Wire continues in other wiring diagram. Code refers to sheet and coordinates Example 5.3/D: <ul style="list-style-type: none"> ■ 5 refers to sheet number shown in right lower corner ■ 3 refers to column number ■ D refers to row number

Tbl. 17: Wiring diagram symbols

12.12 Fuse and Relay box

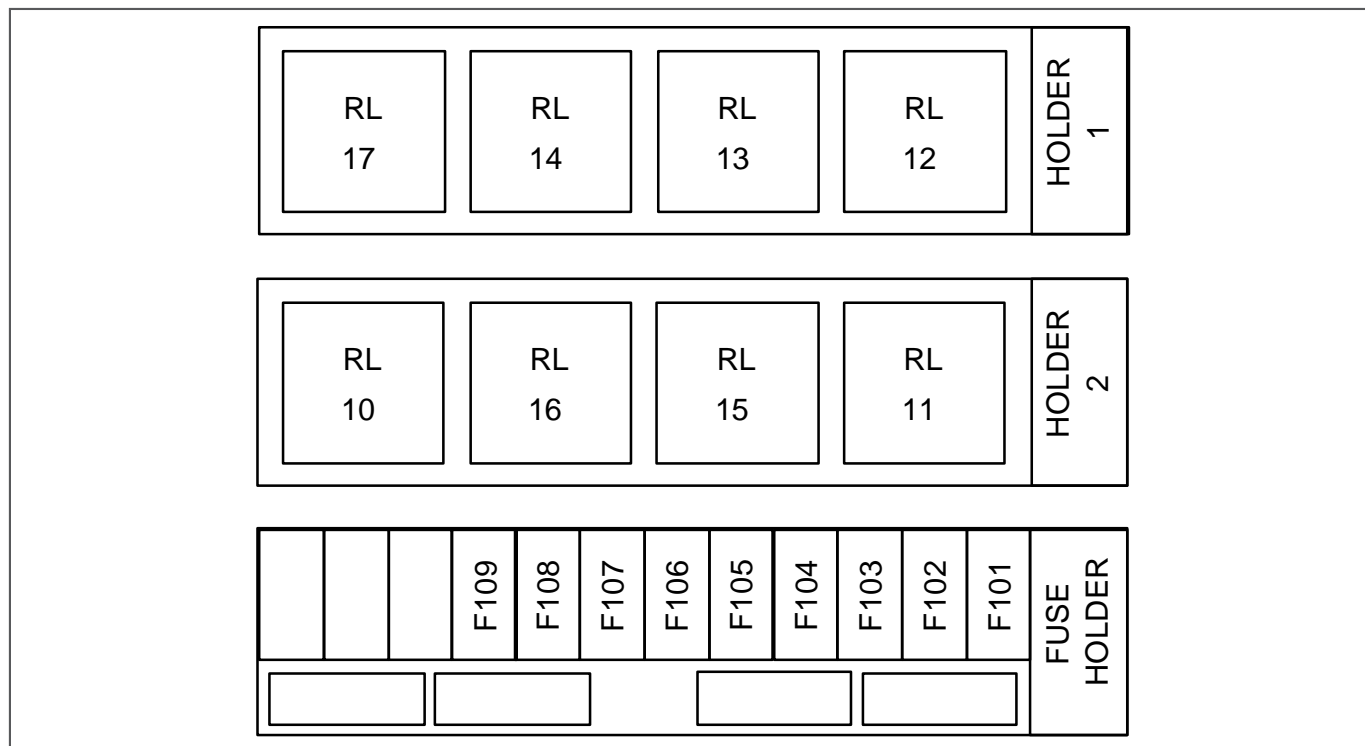


Fig. 50: Fuse and relay box Cool Top 110 / 140 RT-C, 12 V Manual

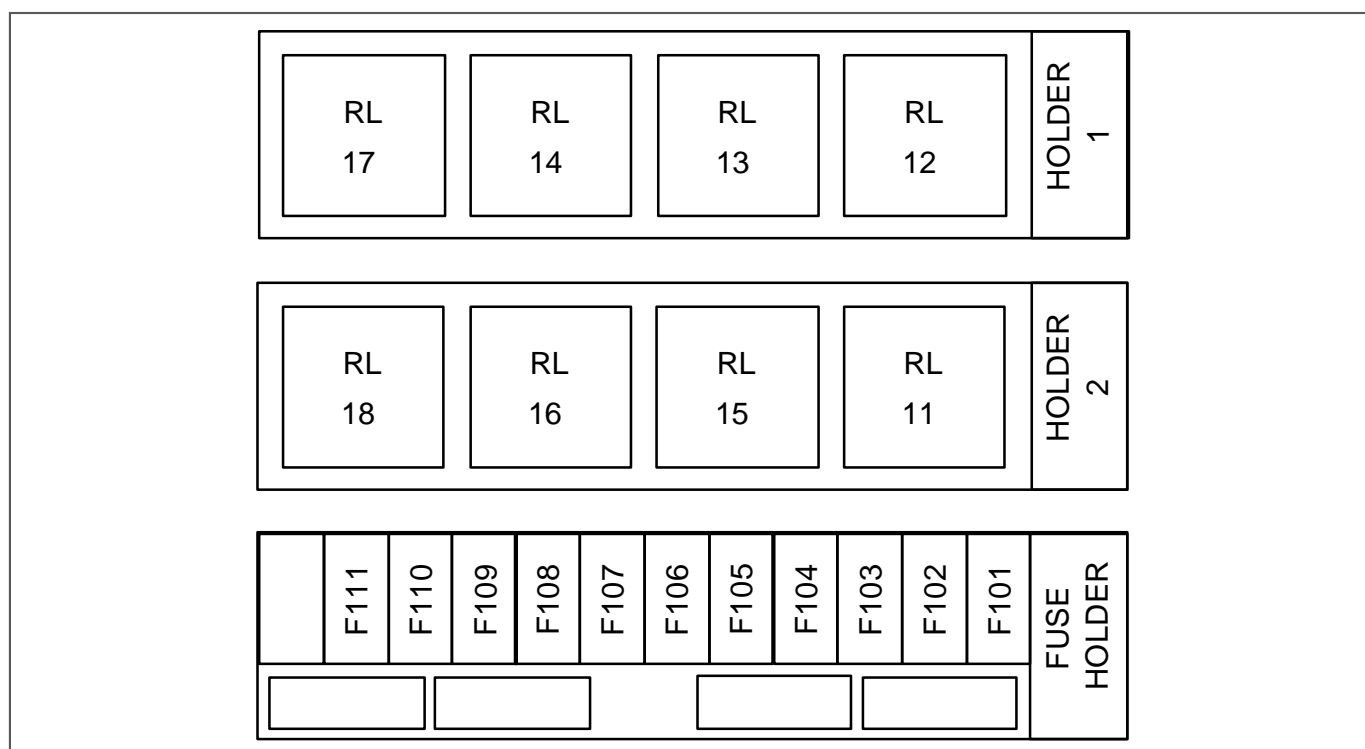


Fig. 51: Fuse and relay box Cool Top 110 / 140 RT-C, 12 V Automatic

12.13 Diagram Cool Top 110 / 140 RT-C, 12 V Manual, power circuit

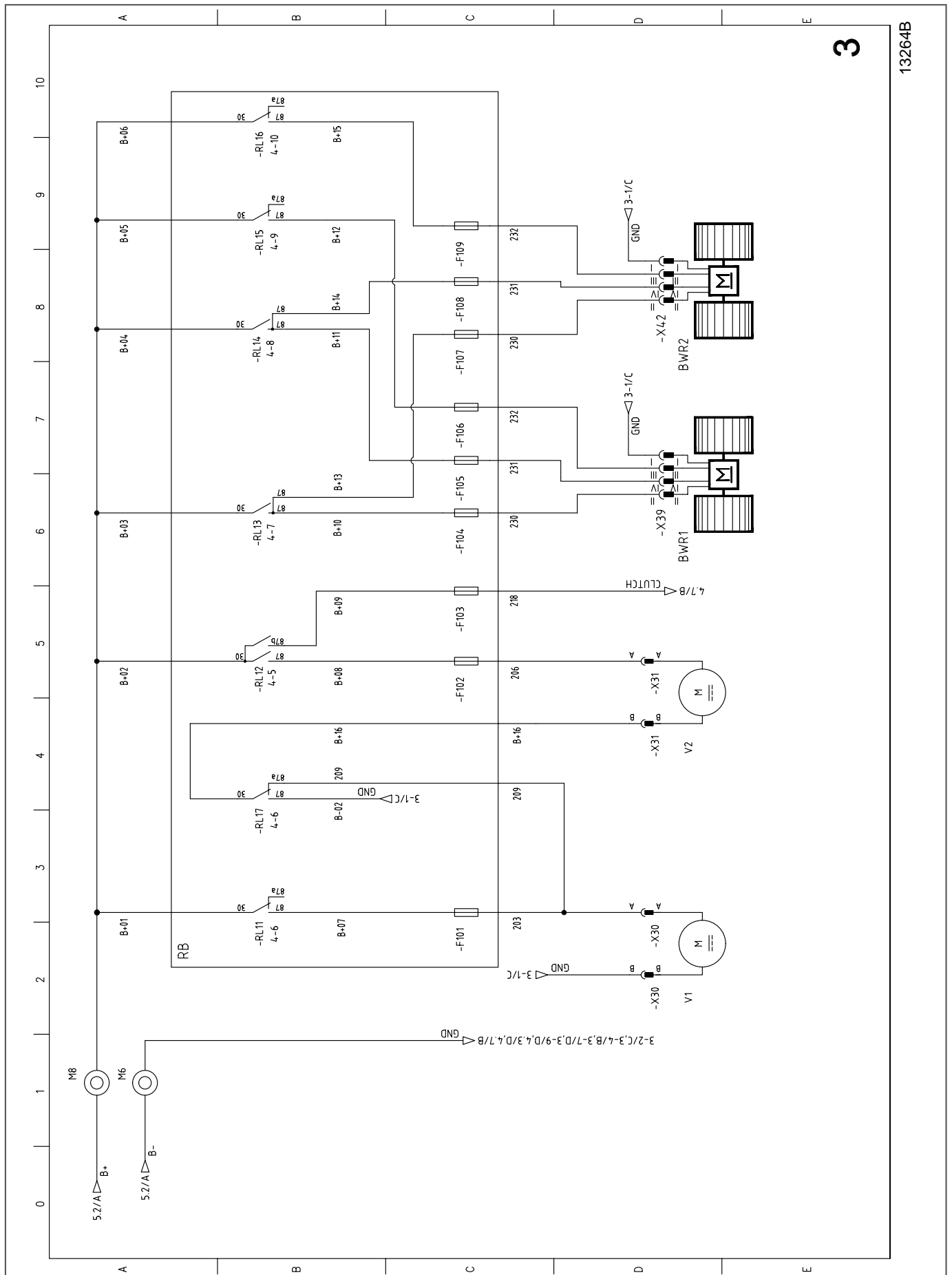


Fig. 52: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Manual, power circuit

12.14 Diagram Cool Top 110 / 140 RT-C, 12 V Manual, auxiliary circuit

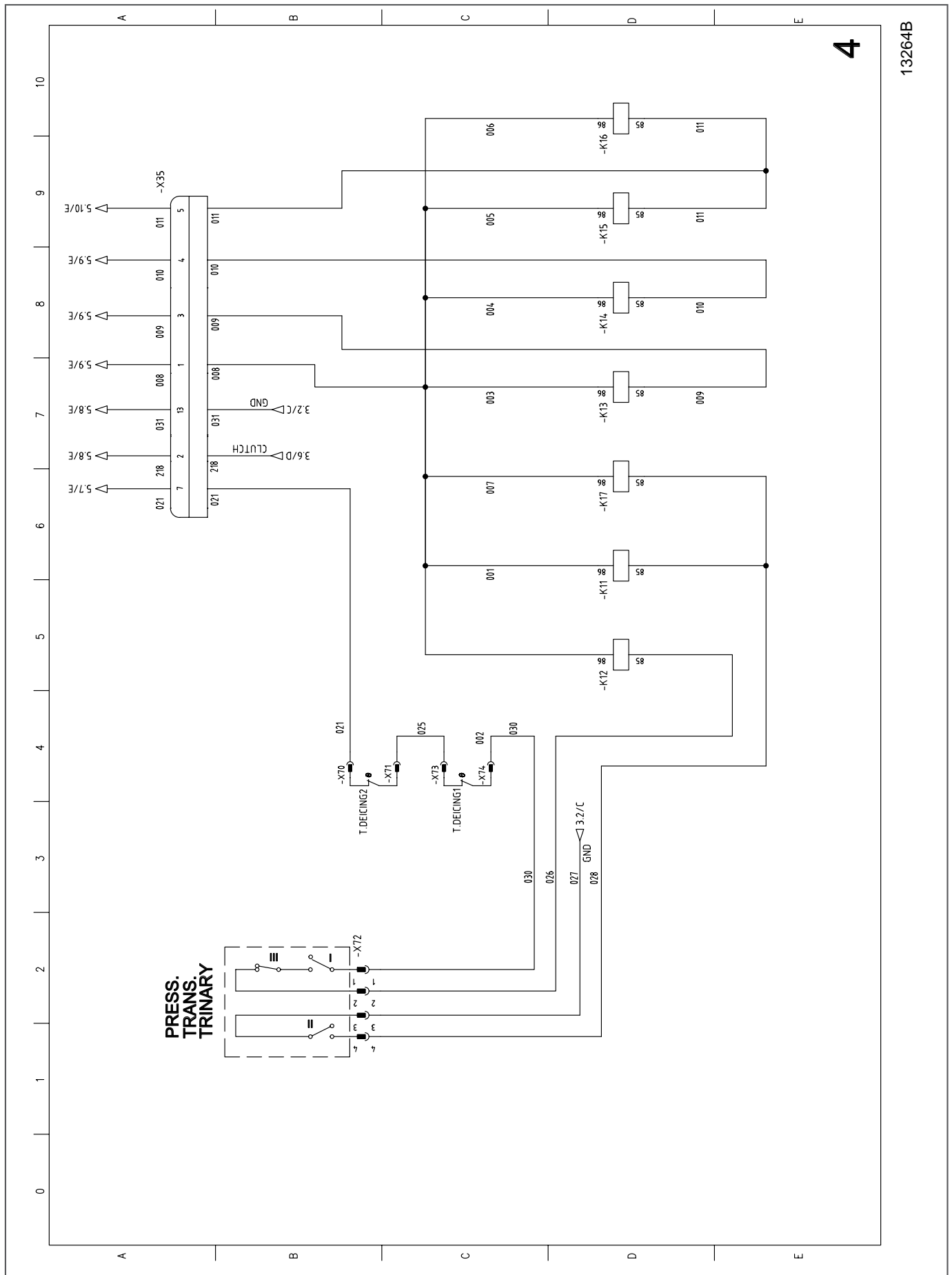


Fig. 53: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Manual, auxiliary circuit

12.15 Diagram Cool Top 110 / 140 RT-C, 12 V Manual, control element

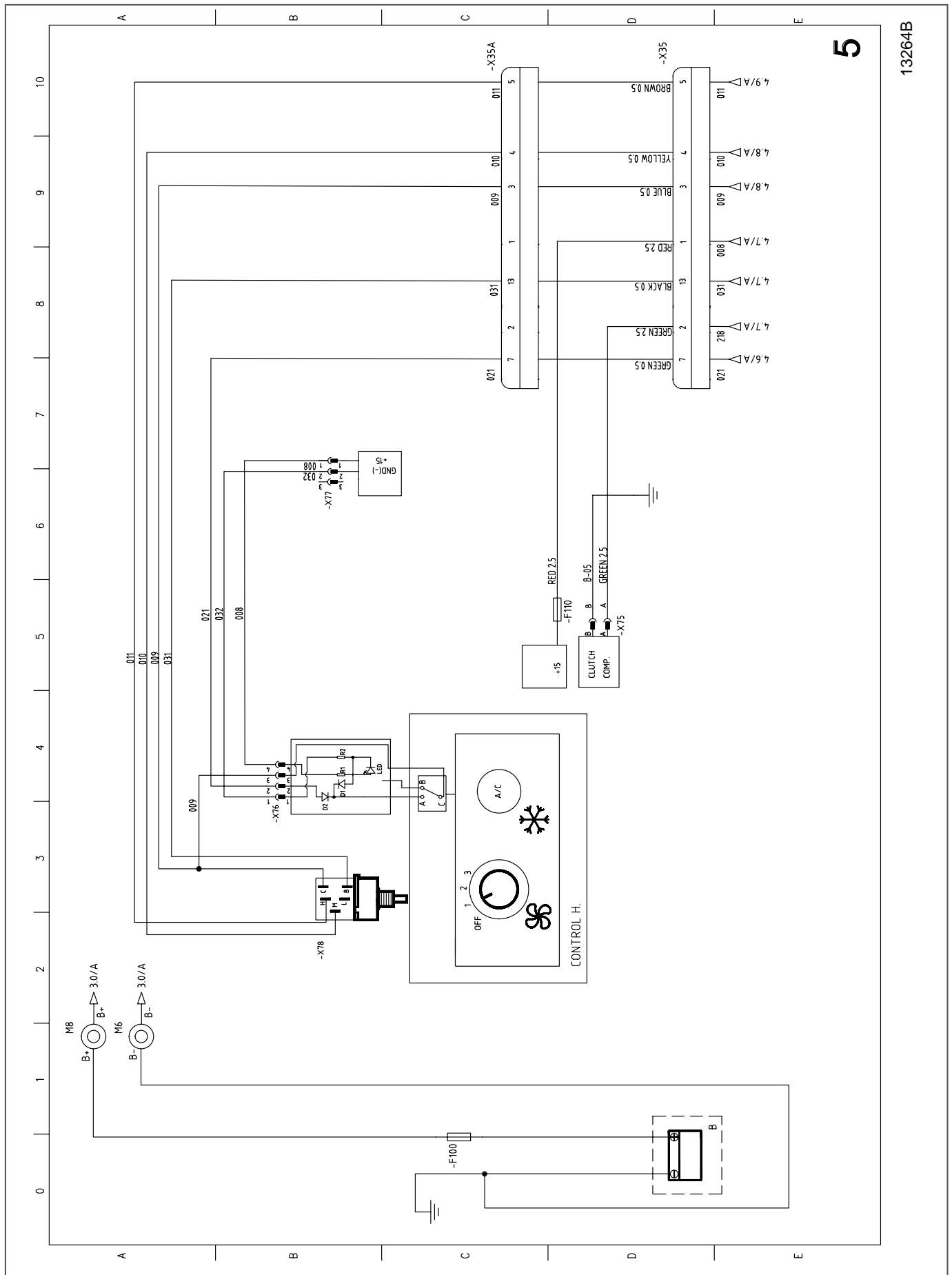


Fig. 54: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Manual, control element

12.17 Diagram Cool Top 110 / 140 RT-C, 12 V Automatic, auxiliary circuit

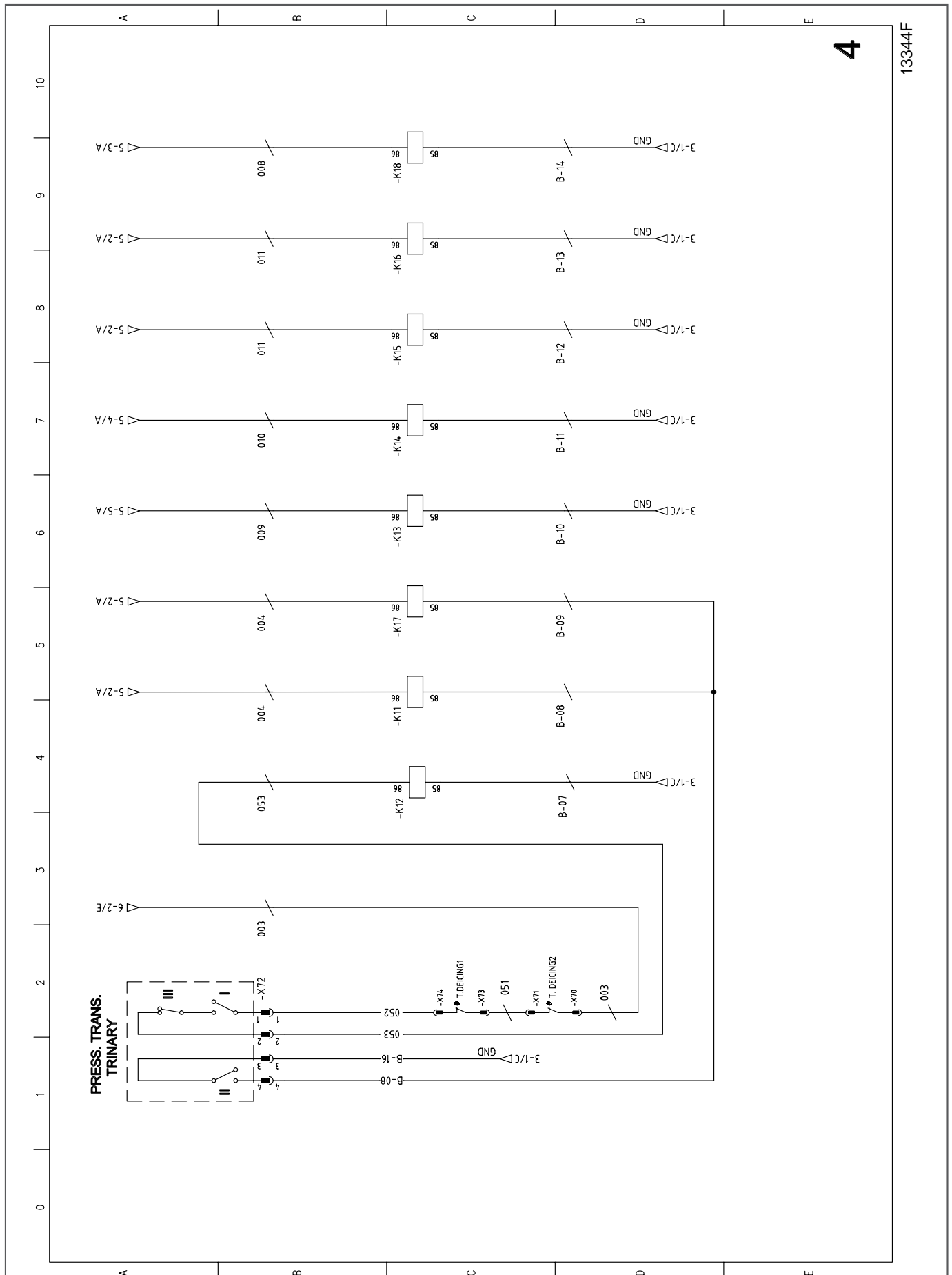


Fig. 56: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Automatic, auxiliary circuit

12.18 Diagram Cool Top 110 / 140 RT-C, 12 V Automatic, ECU

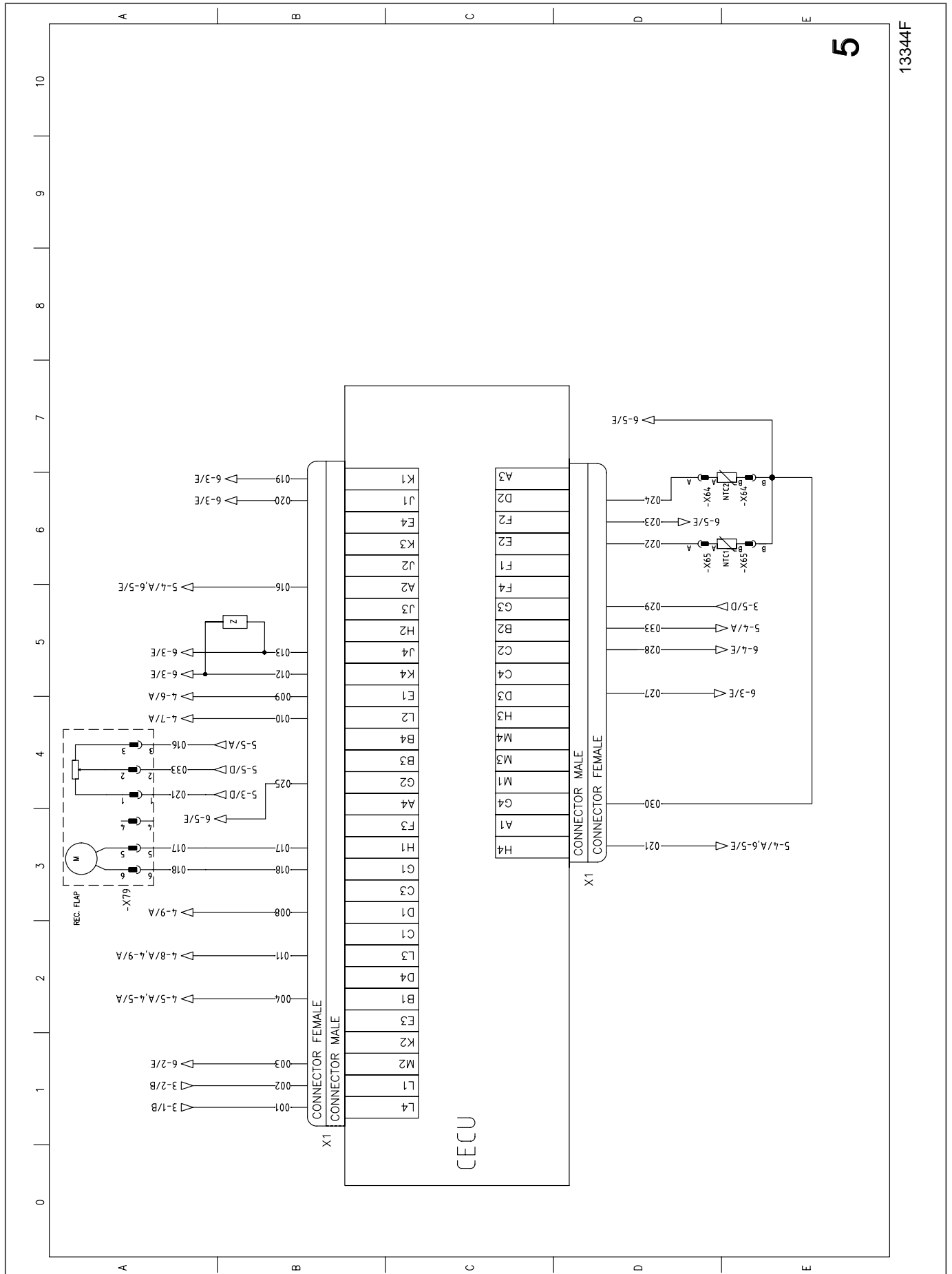


Fig. 57: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Automatic, ECU

12.19 Diagram Cool Top 110 / 140 RT-C, 12 V Automatic, control element

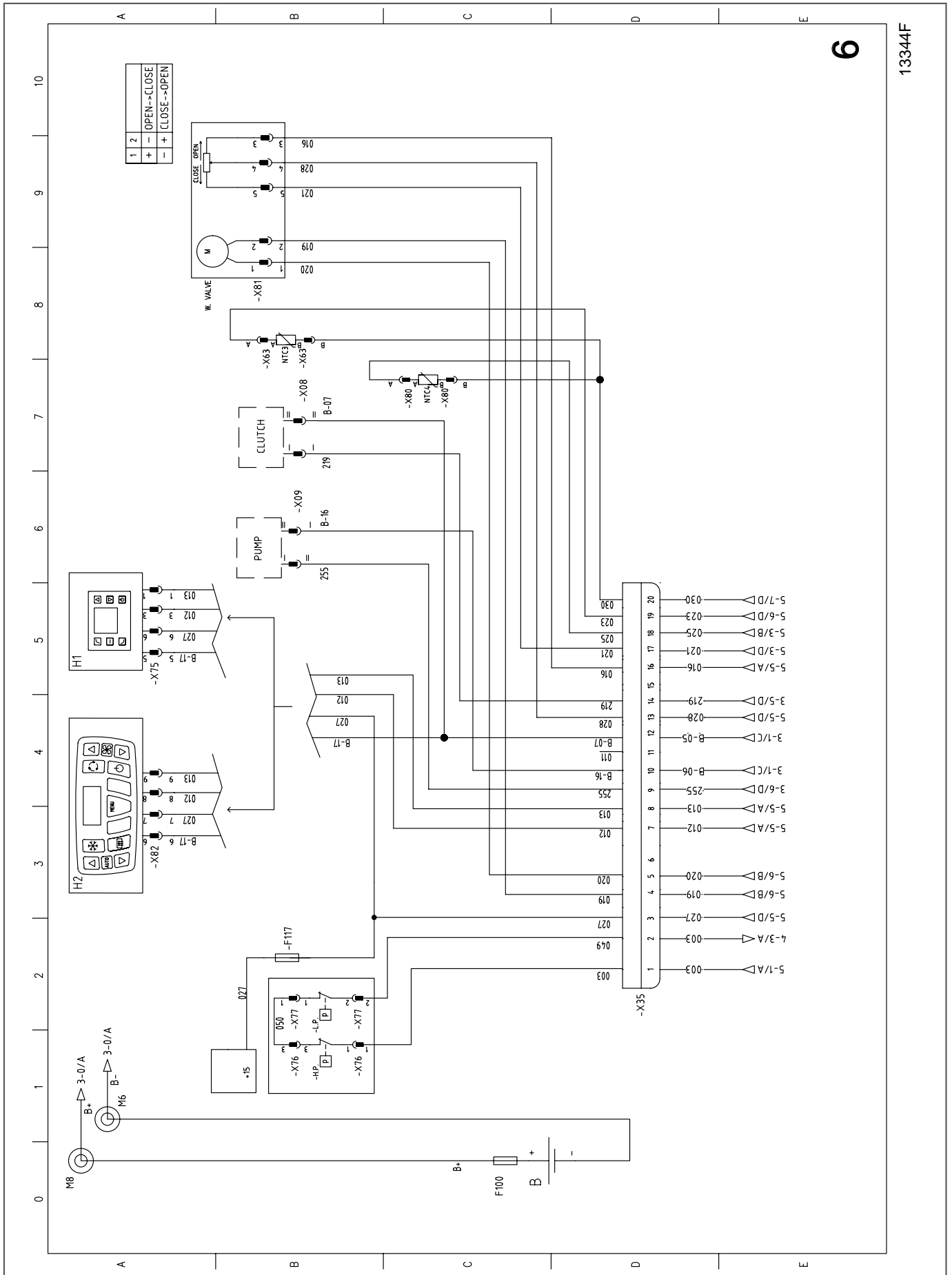
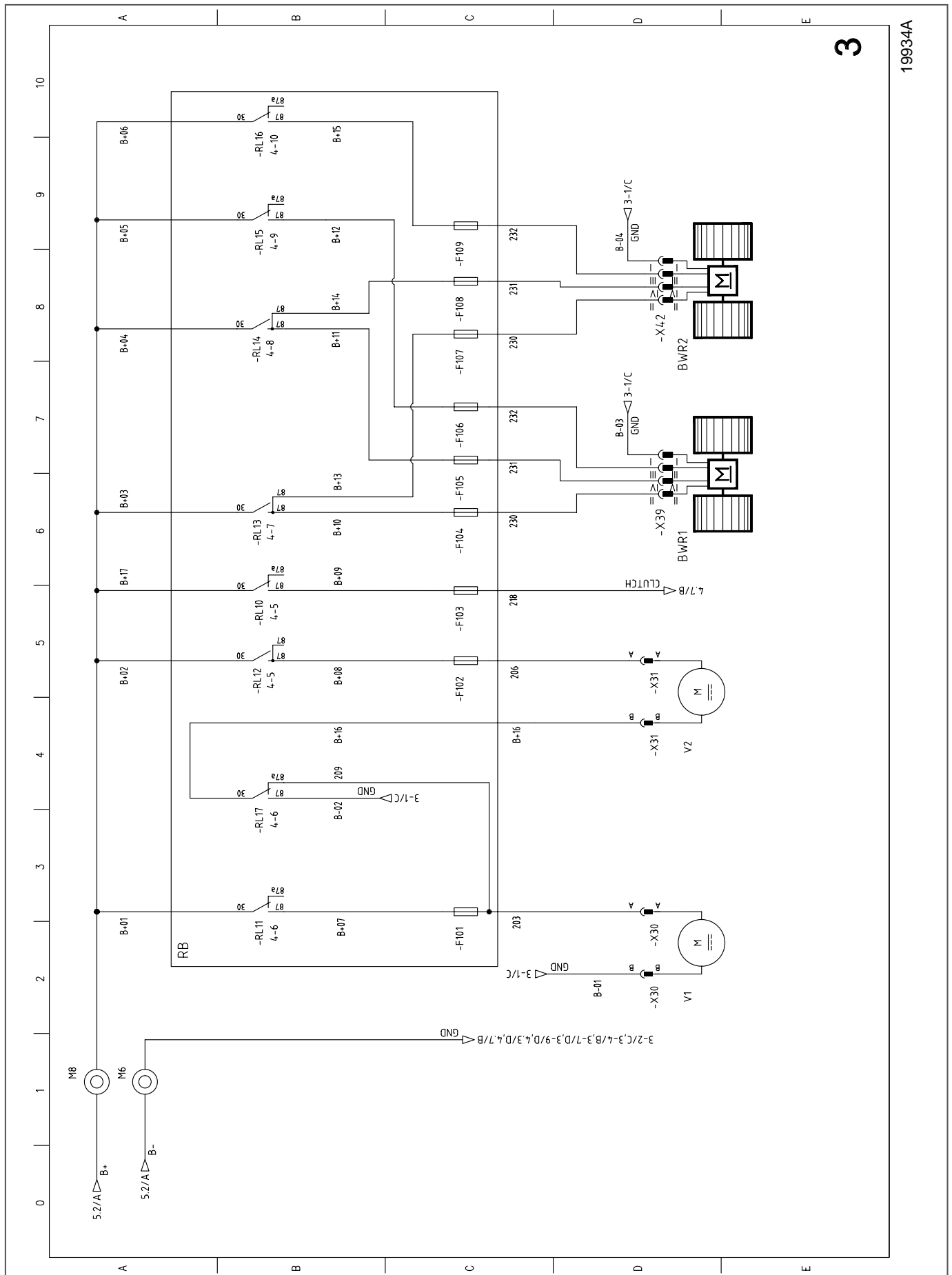


Fig. 58: Wiring diagram Cool Top 110 / 140 RT-C, 12 V Automatic, control element

12.20 Diagram Cool Top 140 RT-C, 24 V Manual, power supply



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Fig. 59: Wiring diagram Cool Top 140 RT-C, 24 V Manual, power supply

12.22 Diagram Cool Top 140 RT-C, 24 V Manual, control element

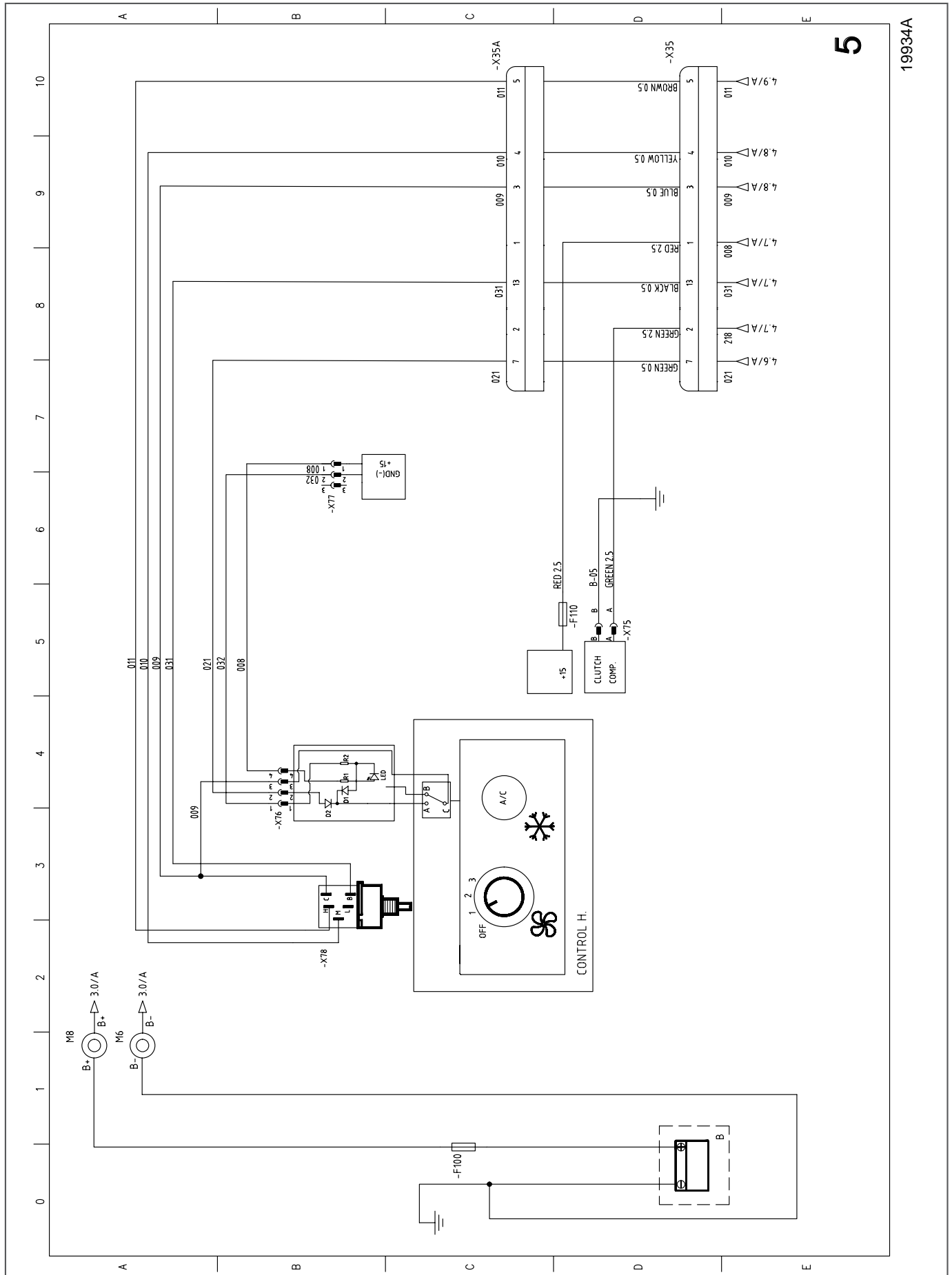


Fig. 61: Wiring diagram Cool Top 140 RT-C, 24 V Manual, control element

12.23 Diagram Cool Top 140 RT-C, 24 V Automatic, power supply

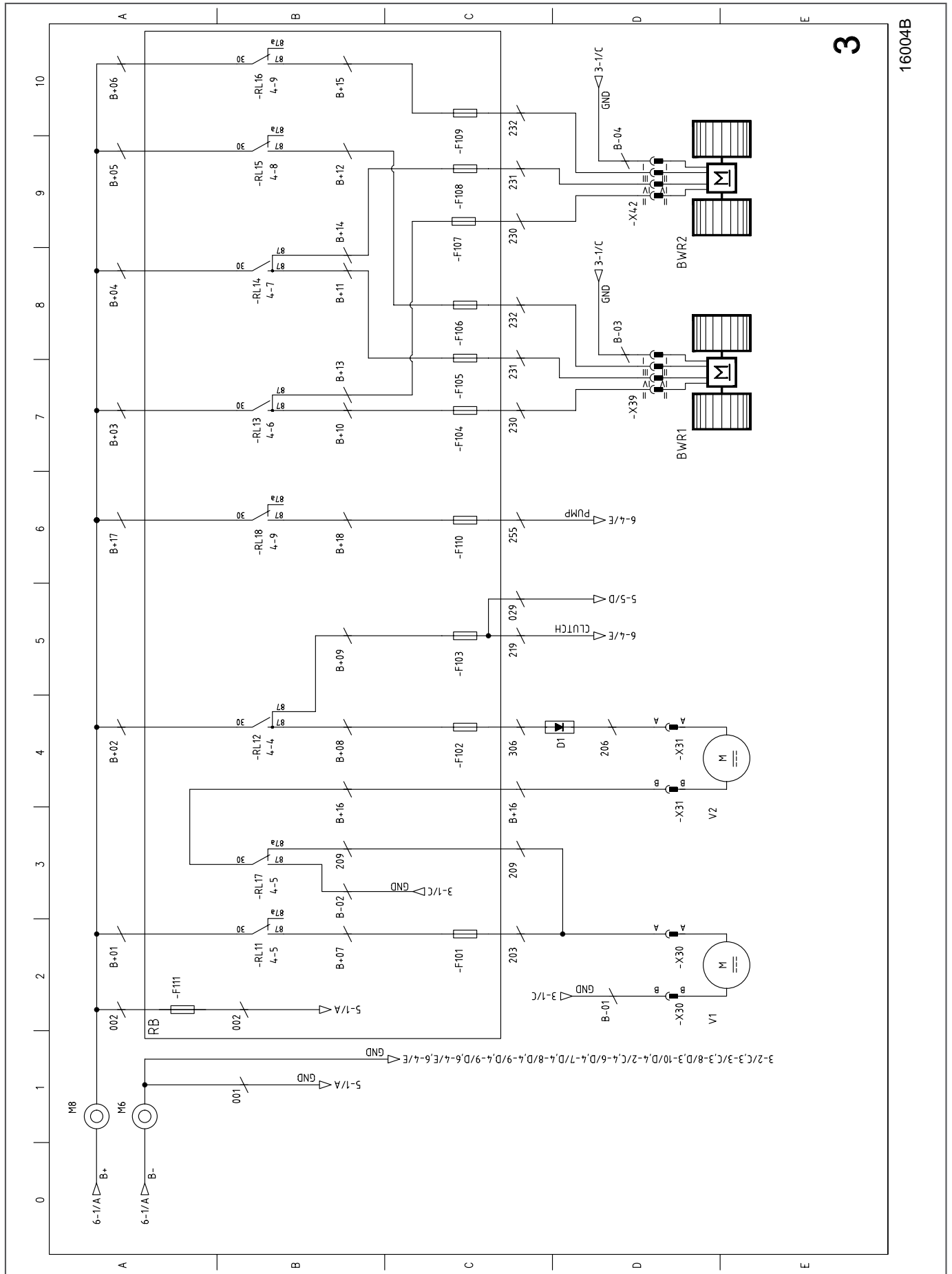


Fig. 62: Wiring diagram Cool Top 140 RT-C, 24 V Automatic, power supply

12.24 Diagram Cool Top 140 RT-C, 24 V Automatic, auxiliary circuit

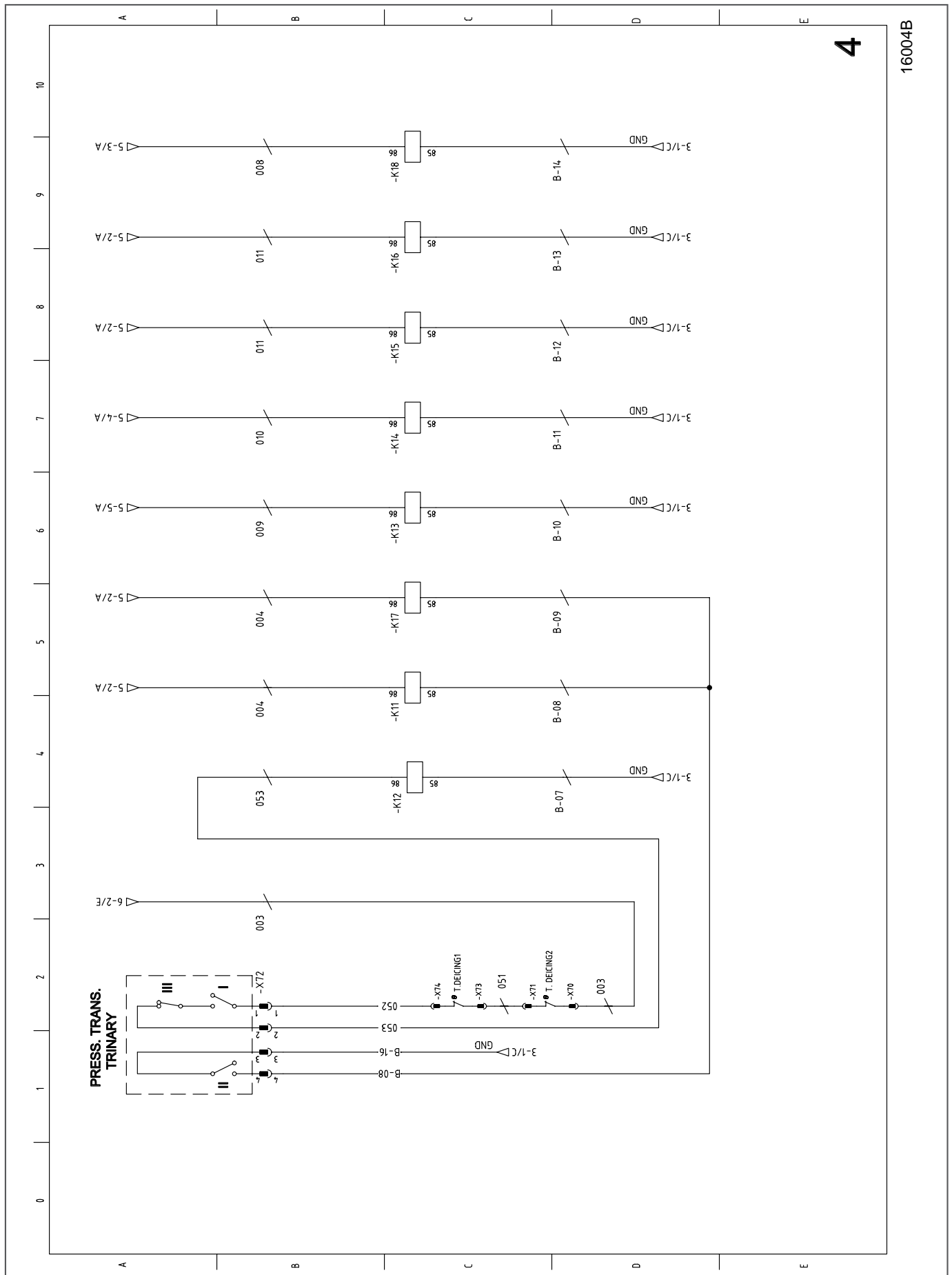


Fig. 63: Wiring diagram Cool Top 140 RT-C, 24 V Automatic, auxiliary circuit

12.25 Diagram Cool Top 140 RT-C, 24 V Automatic, ECU

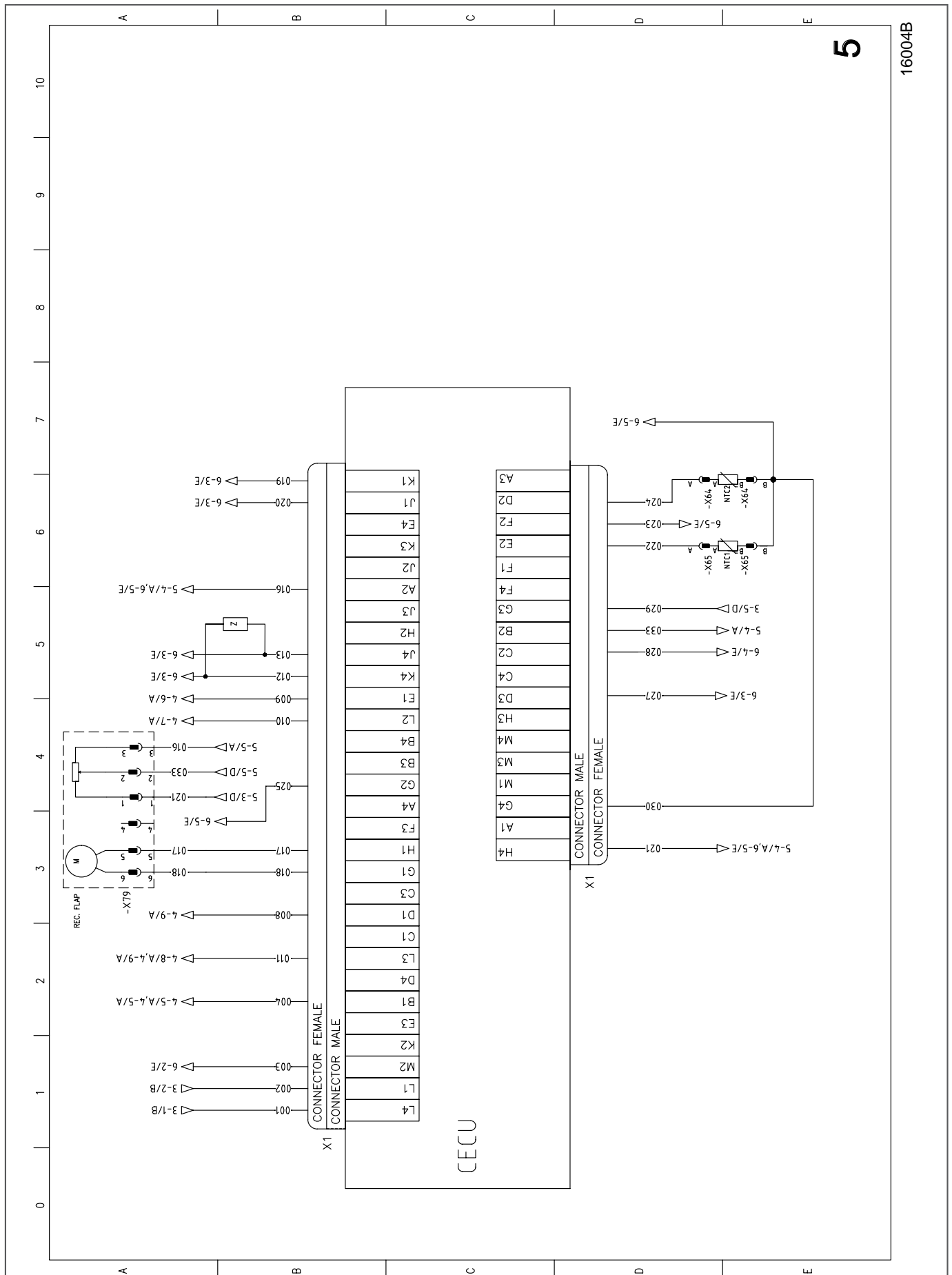


Fig. 64: Wiring diagram Cool Top 140 RT-C, 24 V Automatic, ECU

12.26 Diagram Cool Top 140 RT-C, 24 V Automatic, control element

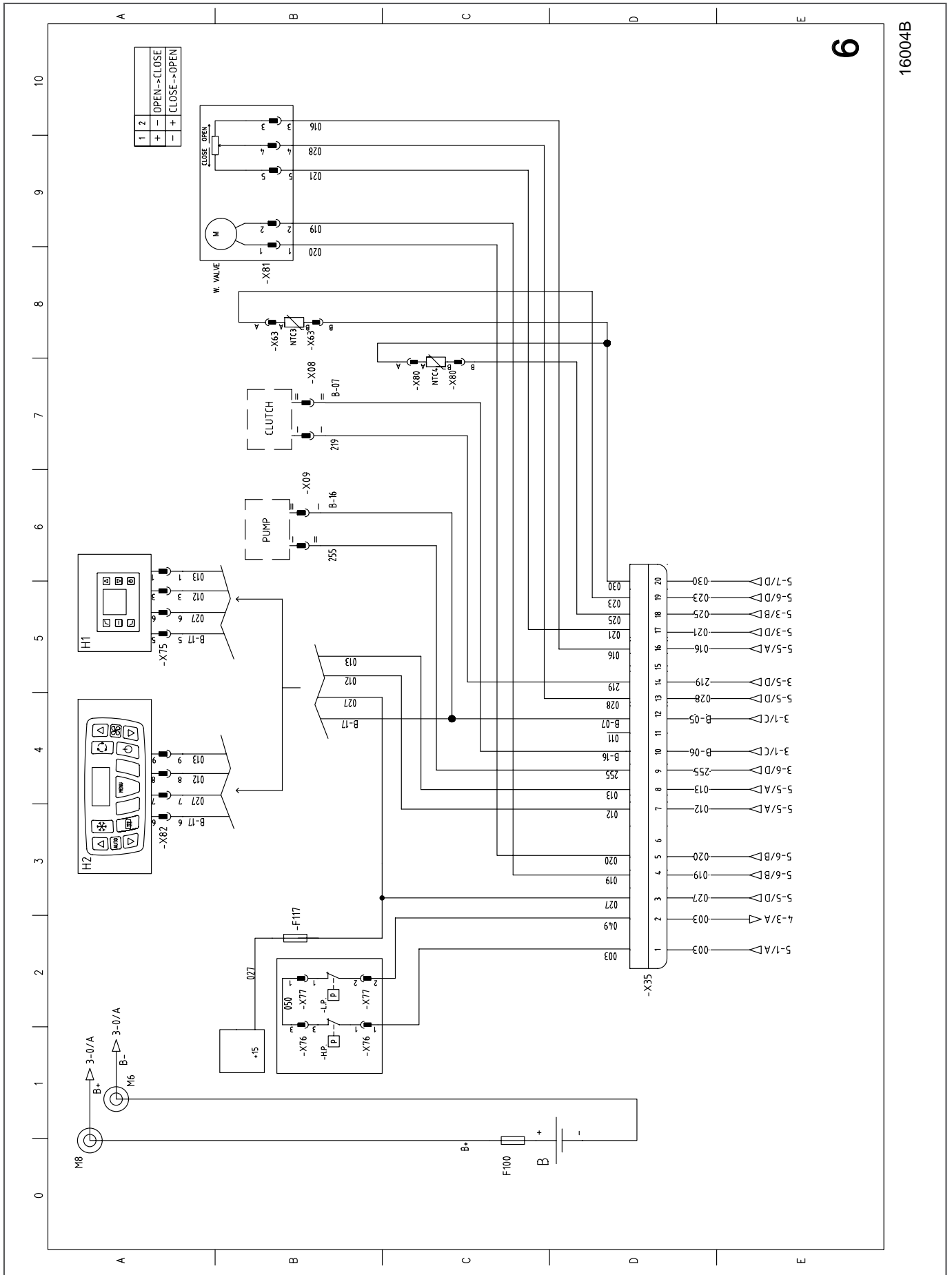


Fig. 65: Wiring diagram Cool Top 140 RT-C, 24 V Automatic, control element

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