
















Repair manual - Refrigeration

	Concerning this document.....	4
1.1	Important information.....	4
1.1.1	Purpose.....	4
1.1.2	Target group.....	4
1.1.3	Other applicable documents	4
1.2	Explanation of symbols.....	4
1.2.1	Danger levels.....	4
1.2.2	Hazard symbols.....	4
1.2.3	Structure of the warnings.....	5
1.2.4	General symbols.....	5
	Safety.....	6
2.1	Qualification	6
2.2	General safety instructions.....	6
2.2.1	All domestic appliances	6
2.3	Product-specific safety information	7
2.3.1	Refrigeration and freezer appliances	7
2.4	Measures after each repair	7
	Design and function.....	8
3.1	Energy label.....	8
3.1.1	Energy Label: Valid until February 28, 2021.....	8
3.1.2	The new Energy Label: Valid from March 1, 2021	8
3.2	Cooling zones	10
3.3	Speed controlled compressor	11
3.4	Dryer	12
3.5	Hinges	13
3.5.1	Concealed (cap) hinge	13
3.5.2	Flat hinge	13
3.5.3	Cushioned flat hinge	13
3.5.4	Sliding (tandem) hinge.....	14
3.5.5	Hinge for flush door (Fat hinge).....	14
3.6	Lokring connections.....	15
3.7	Winter switch.....	17
3.8	iService functions	18
3.8.1	iService overview	18

	Tools and aids	21
4.1	Refrigeration circuit repair tools.....	21
4.2	Water circuit repair tools	23
4.3	Repair support tools and aids	23
4.4	Measuring tools	25
4.5	Cleaning and care accessories	26
	Fault Diagnosis	27
	Condensation / Humidity / Leakage.....	27
	Moisture on food or glass plates	27
	Compressor evaporation tray overflowing	27
	Compressor.....	27
	Compressor too hot.....	27
	No cooling power	28
	Protective conductor connection on compressor detached	28
	Filling pipe on compressor too short.....	28
	Mechanical damage	29
	Stainless steel rusts	29
	Stainless steel discoloured	29
	Crack at bottom of refrigerator compartment in front of vegetable drawer	30
	Horizontal stress crack on the back wall above or below the foamed-in evaporator	31
	Vertical crack on the back wall originating from the fan.....	32
	Cracks in cabinet cover	32
	Bitumen mass dissolves	33
	Small holes in refrigerator compartment cooler innerliner.....	33
	Circle stains on glass shelves	34
	Refrigeration circuit pipe is pressed.....	34
	Installation fault.....	35
	Increased power consumption and cooling power affected	35
	Appliance protruding	35
	Front panel hits against body, door does not close	35
	Front panel brushes against kitchen cabinets	35
	Top cabinet cover brushes against front panel	35
	Screw brushes against cover mask	35
	Cabinet base softens, appliance lifts up or sinks	35
	Noise	35
	Compressor noise.....	35

Repair manual - Refrigeration


Flow noise.....	35
Clicking sounds	36
Swishing noises.....	36
Vibration noises.....	36
Injection noises on the evaporator	37
Abnormal noises.....	37
Excessive noise measured by customer using smartphone app	38
 Odour	39
Typical plastic smell.....	39
Strong smell of food.....	39
Musty smell in case of prolonged periods being out of operation	40
Off-odors coming from the appliance exterior	40
 Result problem	41
Drinking water tastes stale	41
 Temperature problem	41
Complete over icing of the evaporator.....	41
Icing up / condensation on side panels.....	42
Build-up of ice at a single point.....	42
Icing up on input of evaporator	43
Frost on dryer.....	44
Frost on suction pipe	45
Icing up on no-frost evaporator.....	45
 Measuring technology.....	46
6.1 Measuring temperature inside the appliance	46
6.1.1 Temperature measurement with data logger.....	46
6.1.2 Temperature measurement without data logger	47
6.2 Nominal temperature graph.....	48
6.3 Checking temperature indicator (Sticker "OK")	49
6.4 Measuring energy consumption.....	49
 Test.....	50
7.1 Performing customer service test program	50
7.2 Tracing leakage in refrigeration circuit.....	51
7.3 Checking compressor (quick test).....	52
7.3.1 Checking compressor input current	52

7.3.2 Checking speed on the inverter module	52
7.3.3 Checking resistance values of compressor motor windings	52
7.4 Checking stop valve	53
7.4.1 Checking stop valve for leaks	53
7.4.2 Checking stop valve function	53
7.4.3 Measuring stop valve power consumption	53
7.4.4 Measuring suction pressure	53

Repair..... 54

8.1 Inside Lokring technology	54
8.1.1 Hints for Lokring installation	54
8.1.2 Using Lokring pliers	54
8.1.3 Handling Lokring pliers with two pivots.....	54
8.1.4 Changing Lokring pliers jaw	55
8.1.5 Selecting correct Lokring.....	55
8.1.6 Using Lokprep	55
8.1.7 Using capillary tube pliers	55
8.1.8 Checking dryer capsule	56
8.1.9 Installing reducing connector.....	56
8.1.10 Connecting capillary tube.....	56
8.1.11 Connecting dryer and capillary tube.....	56
8.1.12 Connecting aluminium and copper pipes.....	57
8.1.13 Making one-sided pressed connection	57
8.1.14 Installing NTR connection (Y-pipe) (part 1).....	57
8.1.15 Installing NTR connection (Y-pipe) (part 2).....	57
8.1.16 Connecting T-piece with Schrader valve	58
8.1.17 Repairing too short compressor tube	58
8.2 Rinsing refrigeration circuit	59
8.3 Repairing refrigeration circuit (R600a)	60
8.3.1 Replacing dryer and compressor	60
8.3.2 Disposing compressor oil	61
8.3.3 Preparing refrigerant (R600a).....	61
8.3.4 Evacuating refrigeration circuit (R600a)	61
8.3.5 Filling refrigeration circuit (R600a)	63
8.4 Repairing refrigeration circuit (R134a)	64
8.4.1 Replacing dryer and compressor	64
8.4.2 Disposing compressor oil	65

Repair manual - Refrigeration

8.4.3	Filling the filler cylinder (R134a)	65
8.4.4	Evacuating refrigeration circuit (R134a)	66
8.4.5	Filling refrigeration circuit (R134a)	67
8.5	Sanitising the water system	68
8.6	Sticking brand logo	69
	Customer advice	71
9.1	Reducing energy consumption	71
9.1.1	Room conditions	71
9.1.2	Compartment temperatures	71
9.1.3	Door opening times	71
9.1.4	Food storage	72
9.1.5	Defrosting	72
9.2	Transporting the appliance	73

i Concerning this document

1.1 Important information

Read and observe chapter 2 "Safety" before performing any work!

1.1.1 Purpose

These repair instructions form the basis for a systematic and safety conscious procedure for the repair of domestic appliances.

These repair instructions include information about troubleshooting and repair.

1.1.2 Target group

These repair instructions are intended for persons who are familiar with equipment technology and were instructed by BSH or an authorised body:

- Service technicians for the repair of domestic appliances
- Pre-assemblers in the spare part stockroom when determining required spare parts
- Call centre employees during order acceptance

1.1.3 Other applicable documents

The following documents include additional relevant repair information:

- General repair instructions
- Error codes and service programs
- Circuit diagrams
- Exploded drawings
- Parts lists
- Repair videos

1.2 Explanation of symbols

1.2.1 Danger levels

The warning levels consist of a symbol and a signal word. The signal word indicates the severity of the danger.








Warning level	Meaning
 Danger	Non-observance of the warning message will result in death or serious injuries.
 Warning	Non-observance of the warning message could result in death or serious injuries.
 Caution	Non-observance of the warning message could result in minor injuries.
Notice	Non-observance of the warning message could result in damage to property.

Table 1: Danger levels

1.2.2 Hazard symbols

Hazard symbols are symbolic representations which give an indication of the kind of danger.

The following hazard symbols are used in this document:

Hazard symbol	Meaning
	General warning message
	Danger from electrical voltage
	Risk of explosion
	Danger of cuts

i Concerning this document







Hazard symbol	Meaning
	Danger of crushing
	Danger from hot surfaces
	Danger from strong magnetic field
	Danger from non-ionizing radiation



Table 2: Hazard symbols

1.2.3 Structure of the warnings

Warnings in this document have a standardised appearance and a standardised structure.

	<div> Danger</div> <p>Type and source of danger! Possible consequences of ignoring the danger / warning.</p> <ul style="list-style-type: none"> ► Measures and prohibitions for preventing the danger.
--	--

The following example shows a warning that warns against electric shock due to live parts. The measure for avoiding the danger is mentioned.

	<div> Danger</div> <p>Risk of electric shock due to live parts! Death by electrocution</p> <ul style="list-style-type: none"> ► Disconnect appliances from electrical supply at least 60 seconds before starting repairs.
--	---

1.2.4 General symbols

The following general symbols are used in this document:











Gen. symbol	Meaning
	Identification of a special tip (text and/or graphic)
	Identification of a simple tip (only text)
	Identification of a link to a video tutorial
	Identification of required tools
	Identification of required preconditions
	Identification of a condition (if ..., then ...)
	Identification of a result
	Identification of a key or button
	Identification of a material number
	Identification of displayed text / window (in the appliance's display)

Table 3: General symbols

2.1 Qualification

In Germany, only qualified electricians trained by BSH or an authorised body may perform any repair work.

In other countries, only similarly trained qualified personnel is permitted to perform the repair work.

Appliances must only be repaired by persons that are qualified, **approved** and trained by BSH or an authorised body as instructed.

2.2 General safety instructions

2.2.1 All domestic appliances

Risk of electric shock due to live parts!

- Disconnect the appliance from the mains for at least 60 seconds before starting work.
- Do not touch the housing, components and cables.
- For tests on an energised system, use a residual current circuit breaker.
- Discharge high-voltage capacitors.

Risk of injury from sharp edges!

- Wear protective gloves.

Risk of crushing during repair, maintenance, troubleshooting and service due to heavy and moving components

- Wear protective shoes.
- Secure heavy components from falling down.
- Do not stick body parts into moving components.

Risk of injury when dealing with harmful substances!

- Observe the associated safety data sheet!

Risk to the appliance's safety / function!

- Only use original spare parts.

Risk of damage to electrostatically sensitive components (ESDs)!

- Before touching ESDs, use an electrostatic protection system (wristband with earth safe plug).
- Do not touch connections and conductor paths of the modules.
- Only transport ESDs in conductive materials or original packaging.
- Keep ESDs clear of electrostatically chargeable materials (i.e. plastic).

2.3 Product-specific safety information

2.3.1 Refrigeration and freezer appliances

Risk of burns caused by refrigerants!

- Wear protective gloves and goggles.

Explosion hazard due to refrigerants!

- Do not solder pipe connections, only use Lokring connections.
- Do not press any electrical switches. Do not press any electrical switches.
- Keep clear of thermal appliances.
- Extinguish / keep clear of open flames.
- Ensure that room is well ventilated.

2.4 Measures after each repair

If the appliance is functional:

- Check according to VDE 0701 or country-specific regulations.
- Check external appearance, function and tightness.
- Document repair work, measured values and functional reliability.

If the appliance is **not** functional:

- Identify the appliance as “not functionally reliable”.
- Warn customers of commissioning and notify them in writing .

3.1 Energy label

Since 1995, the European energy label has been providing standardized information on the energy and water consumption of home appliances.

3.1.1 Energy Label: Valid until February 28, 2021

The energy label, which has had the layout depicted below since 2012, specifies the efficiency class of the relevant appliance. It also uses language-neutral pictograms to provide additional information on the appliance, such as its noise value and capacity as well as energy and water consumption.

In addition to the total usable volume of all freezer and refrigerator compartments, the label specifies the appliance's noise value. The energy efficiency class is particularly important for these appliances. The better the energy efficiency class, the more energy costs can be saved - especially since these devices are in continuous operation.

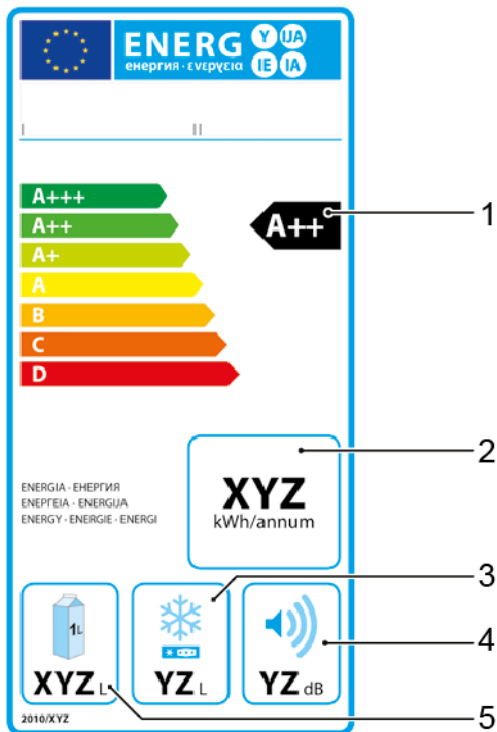


Fig. 1: Sample energy label for fridge and freezer appliances: Valid until February 28, 2021

1 Energy efficiency class

- 2 Energy consumption in kWh / year (measured under standard conditions)
- 3 Total volume of all freezer compartments
- 4 Noise emissions expressed in dB(A) re 1 PW
- 5 Total volume of all refrigerator compartments

3.1.2 The new Energy Label: Valid from March 1, 2021

Technological development over the past few years has resulted in a higher concentration of products that carry labels with a value of A+ or better. Consequently, the label has not been fulfilling its original function as an aid for making purchasing decisions as well as it formerly did. Other basic conditions like user behavior have also changed. That's why it's time to adapt the existing energy label.

The procedure for determining the energy class is now more comprehensive. It takes into account the type of appliance, its operating principle, the room temperature, and the number and size of storage compartments. The rest of the elements on the new energy label basically remain the same. Energy consumption continues to be specified in kWh as annual consumption ("annum"). The label also provides information on the total volume of all refrigerator compartments and all freezer compartments, if any, and on noise emissions and the noise emission class.

The most significant change in the new energy labels is the elimination of the energy efficiency plus classes like, for example A+++. In the future, classification will be from A to G. New methods will also be used for measuring energy consumption and determining the label class.

Design and function

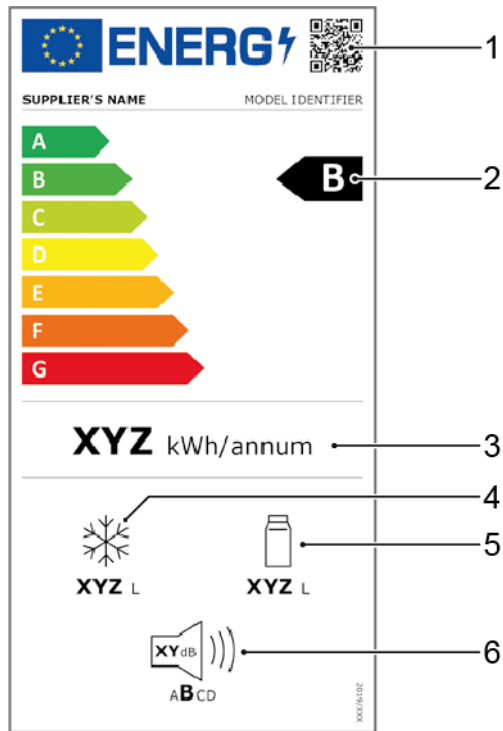


Fig. 2: Sample energy label for fridge and freezer appliances: Valid from March 1, 2021


- 1 QR code
- 2 Energy efficiency class
- 3 Energy consumption in kWh / year (measured under new standard conditions)
- 4 Total volume of all freezer compartments
- 5 Total volume of all refrigerator compartments
- 6 Noise emissions expressed in dB(A) re 1 PW and noise emission class

3.2 Cooling zones

Depending on the type of food, it must be stored in the different cooling zones. Depending on the appliance, there are special compartments for fresh food, which increase the storage time of the food.

Compartment	Temperature	Moisture	Food	Control
Cooling	2 °C to 11 °C		Milk products, tinned food	
Freezing	-18 °C and colder		Frozen food	
Chiller	2 °C to 3 °C colder than cooling temperature*	50 %	Fish, meat	None
FreshProtect-Box (side-by-side appliances)	Variable setting		Variable	Manually: temperature
HydroFresh	Cooling temperature	Variable setting	Fruit, vegetables	Manually: moisture
CrisperBox				
0 °C - Vita-fresh (two climate zones)	near 0 °C	95 %	Fruit, vegetables	Automatically: temperature, moisture
		50 %	Fish, meat	
Vacuum (two climate zones)	near 0 °C	95 %	Fruit, vegetables	Automatically: temperature, moisture, vacuum
		50 %	Fish, meat	

Table 4: Different cooling appliance compartments

	* - depending on refrigerator compartment temperature setting temperature below 0 °C is possible in chiller compartment.
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3.3 Speed controlled compressor

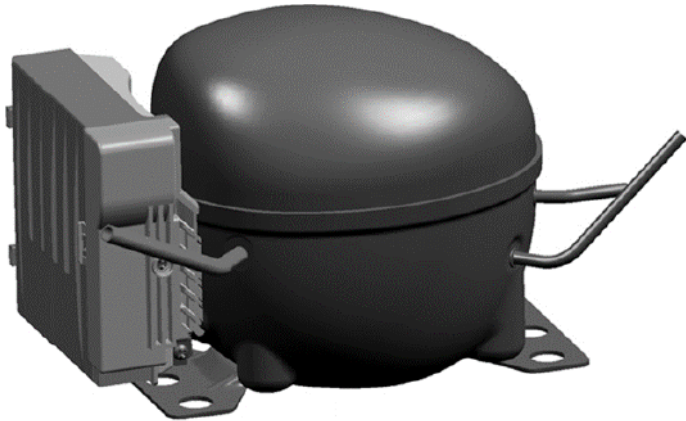


Fig. 3: Speed controlled compressor with control electronics

Speed-controlled compressor adapts to the required cooling power with variable rotary speed. As a result the compressor works efficiently and saves energy.

Compressor has a 3-phase AC motor with specified rotation direction.

Inverter prevents starting current peaks and creates a high level of torque. In case of overload on system side, the inverter reduces capacity first of all and thus the rotary speed, and then switches off the compressor.

In case of low rotary speed - compressor can vibrate, in case of high rotary speed - high-frequency noises are possible.

There are two different types of speed control:

- **Frequency-controlled** - control module sends frequency signal to the inverter, which controls the compressor speed in accordance with the ratio $n \text{ [rpm]} = f \text{ [Hz]} \times k$.
- **Drop-in** - control module sends an On / Off signal to the inverter, which controls compressor speed in accordance with the power consumption of the compressor.

3.4 Dryer

Dryer is installed in the refrigeration circuit to remove any moisture which may have entered the circuit. It is filled with strongly hygroscopic granules.

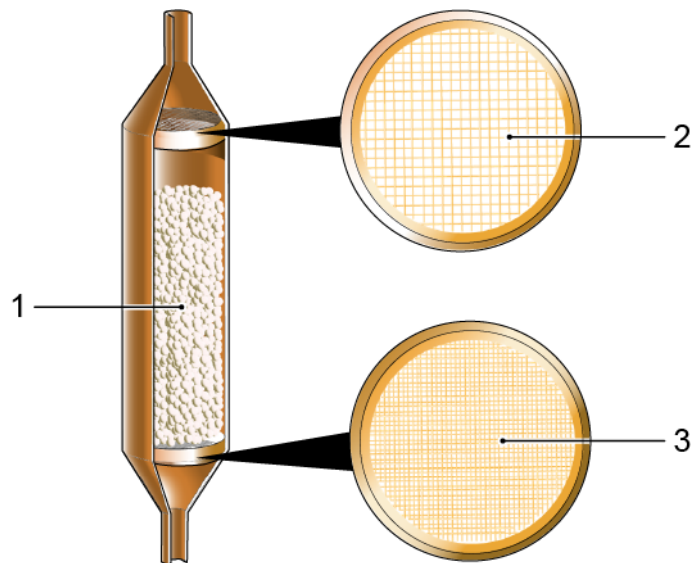


Fig. 4: Dryer structure

- 1 Drying agent
- 2 Coarse sieve
- 3 Fine sieve

Foreign objects can be caught in the sieve so that they cannot block the capillary tube. Dryer must be replaced every time work is done on the refrigeration circuit. It should always be mounted vertically.

There are three dryers available that can be used for repairs depending on the configuration / position of components in appliance machine room.

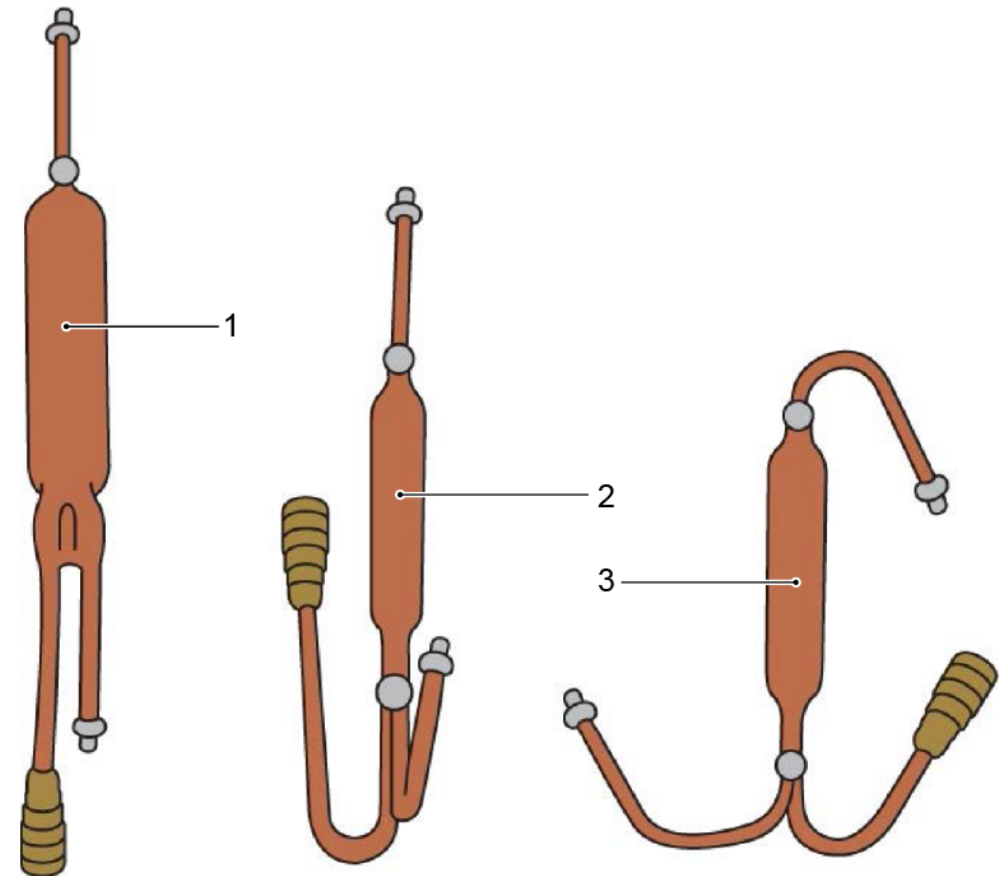


Fig. 5: Dryers released by the product area available for repairs

- 1 [00093110]
- 2 [00643484]
- 3 [00649378]

3.5 Hinges

3.5.1 Concealed (cap) hinge

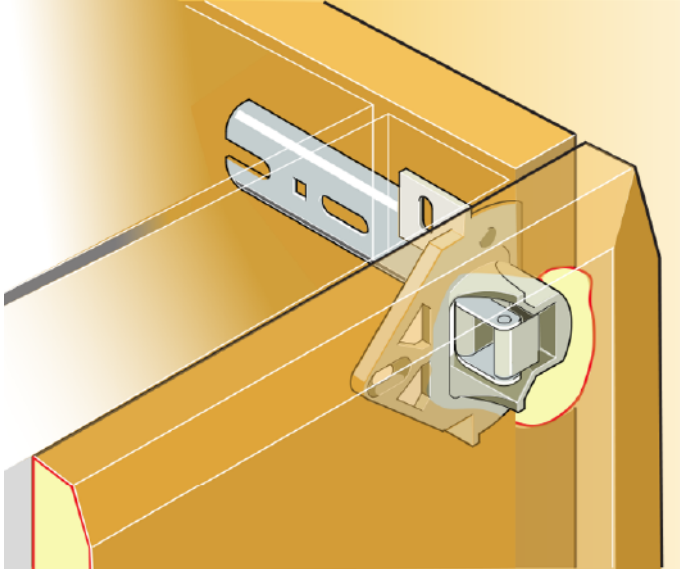


Fig. 6: Concealed (cap) hinge overview

On appliances with cup hinges, the cabinet door is fixed to the appliance door. The cabinet door must be prepared with drilled recesses to house the hinges. No additional cabinet hinges are required.

Door equipped with concealed (cap) hinges has opening angle of 90°. Below 20° there is self-closing effect.

Permissible weight:

- 2 hinges door - 9 kg cabinet weight
- 3 hinges door - 15 kg cabinet weight
- 4 hinges door - 18 kg cabinet weight

3.5.2 Flat hinge

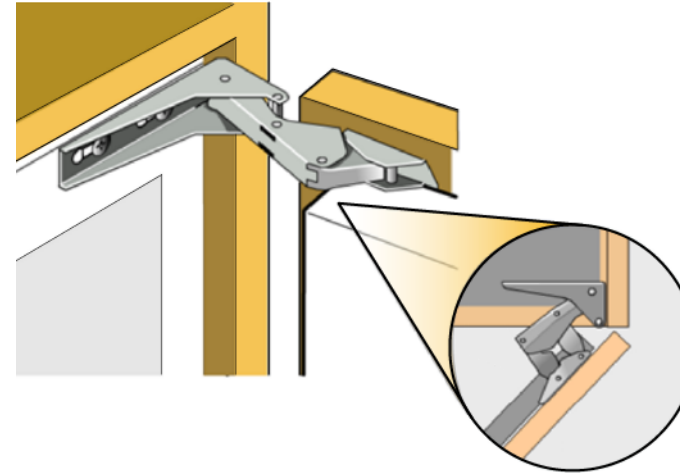


Fig. 7: Flat hinge overview

In flat hinge technology the cabinet door is fixed to the appliance door.

Door equipped with flat hinges has opening angle of 115°. Below 20° there is self-closing effect.

Permissible weight is 45 kg in total for cabinet panel, appliance door and loading of door compartments.

3.5.3 Cushioned flat hinge

For cushioned flat hinges there is self-closing effect for opening angle below 20°.

Permissible weight is 62.5 kg in total for cabinet panel, appliance door and loading of door compartments.

3.5.4 Sliding (tandem) hinge

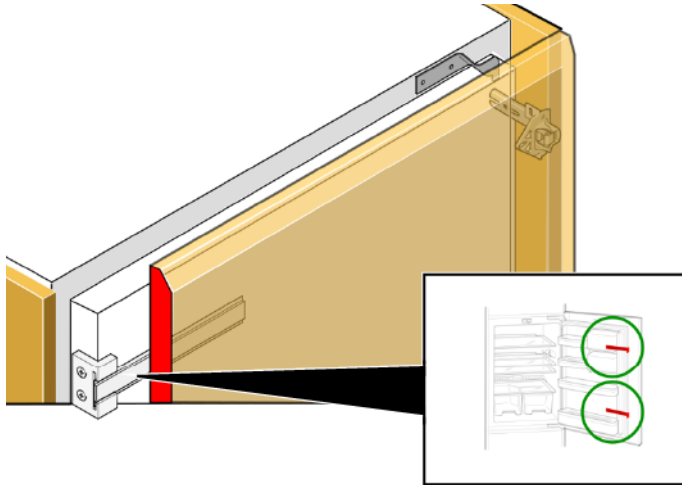


Fig. 8: Sliding (Tandem) hinge overview

Connection between cabinet and appliance door is made via sliding rails. Cabinet door hinges are required.

Cabinet door pulls appliance door along when opening. There is no self-closing effect.

3.5.5 Hinge for flush door (Fat hinge)

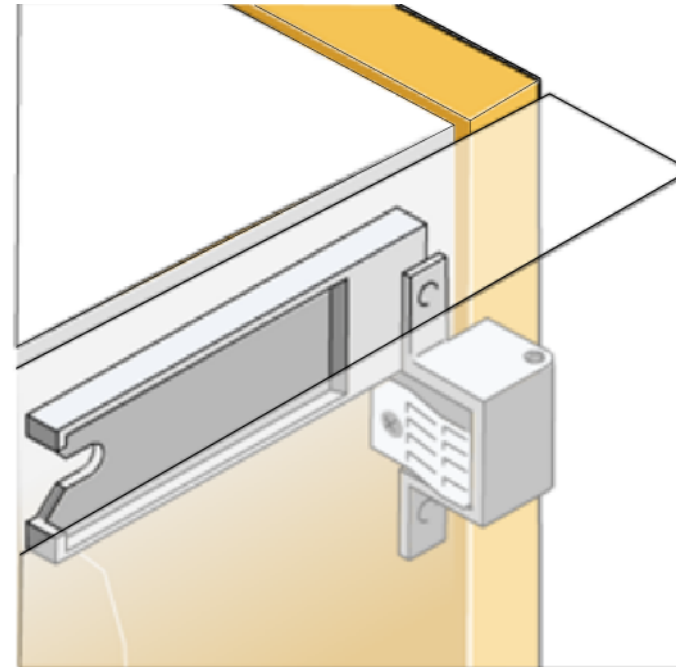


Fig. 9: Hinge for flush door (Fat hinge) overview

The use of tandem hinge technology calls for a cabinet door hinge. The appliance door is connected to the door of the kitchen cabinet by means of slide-rails. When the cabinet door is opened, the appliance door is opened with it. The appliance door does not have a self-closing feature.

3.6 Lokring connections

In case of repair on the refrigeration circuit, the cut pipe connections are restored with the Lokring technology.

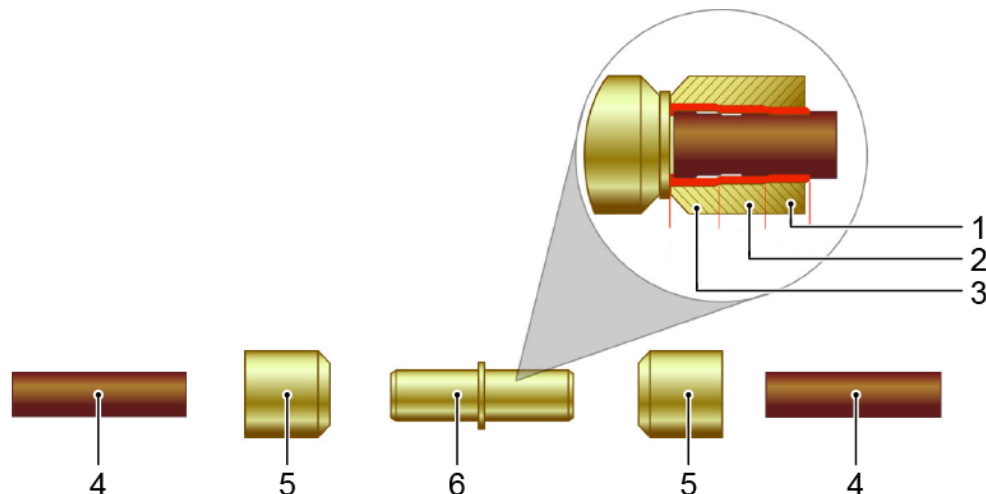


Fig. 10: Structure of Lokring connection

- 1 Main sealing area / reduces the tube diameter by 2 %
- 2 Cylindrical area / reduces the tube diameter by 0.2 %
- 3 Lokring insertion area / facilitates the initial positioning of the Lokring on the connecting piece
- 4 Cooling tube
- 5 Lokring
- 6 Tubular concreting piece

Lokring connection consists of two Lokrings (5) and a tubular connecting piece (6) for supporting the pipe ends. With the special inside contour of the Lokring, the connecting piece is reduced so that a hermetically sealing metal-to-metal connection is created.

There are suitable Lokring connections for all pipe dimensions.

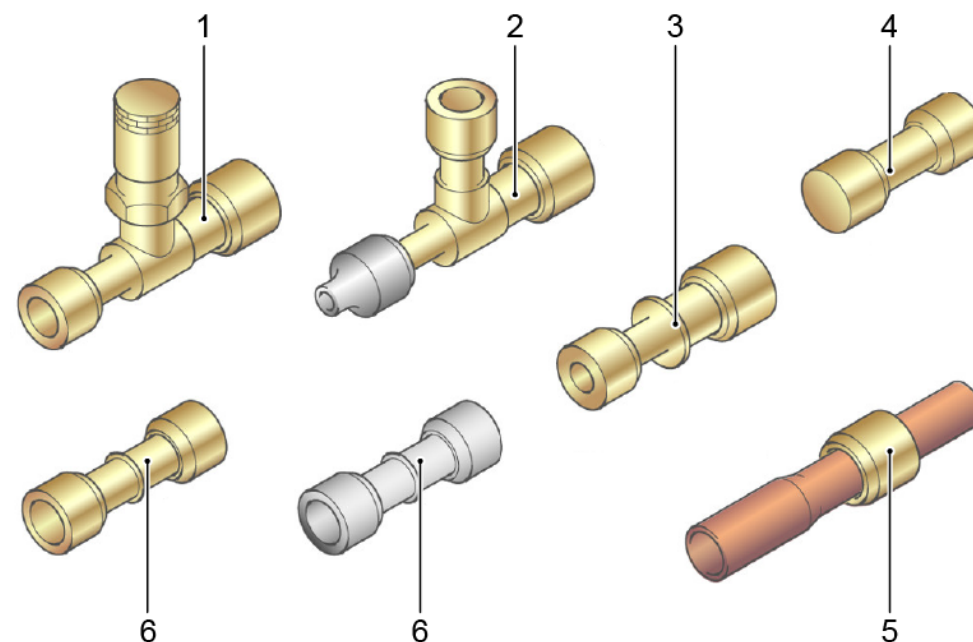


Fig. 11: Types of Lokrings

- 1 T-piece with Schrader valve / used if the compressor is not replaced but the service nozzle is too short
- 2 NTR connection / used for repairing the point at which the capillary tube is inserted into the intake tube (Y-joint)
- 3 Reducing connection / used to connect tubes of different sections, available along with a number of Lokring connections for special applications
- 4 Stopper (sealing cap) / used to block off a compressor connection prior to transportation
- 5 NAV connection (extension) / used to extend compressor connection if it is too short
- 6 Straight connections from 1.6 mm through to 13.0 mm / used for tubes of the same diameter, aluminum or brass



In the case of **connections between different metals**, an electrical potential is created under the influence of moisture, and this can lead to contact corrosion in the connection.

To prevent this corrosion, an aluminium connection should be used when making a connection in an aluminium tube. Brass is used for all other connections. Even the connection between a steel tube and a copper tube is made by means of a **brass connection**.

💡 Design and function

In spite of the high degree of sealing efficiency of Lokring connection, it is not always possible to compensate for existing damage to the tube ends. To provide additional security in this case, use is made of **Lokprep**. Lokprep is an inorganic liquid similar to superglue. However it is not used for its adhesive effect but for its characteristic of hardening without the need for solvents to evaporate.

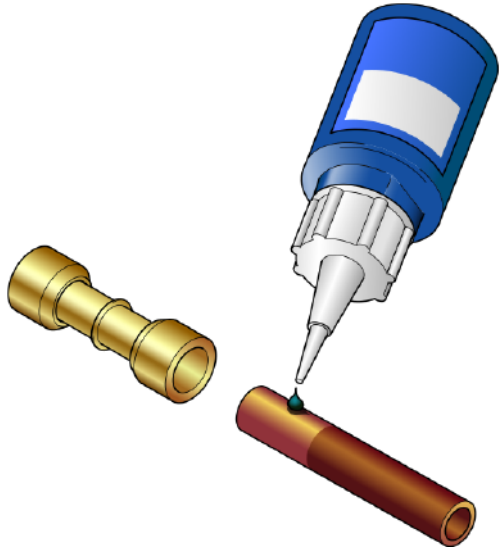


Fig. 12: Applying Lokprep

The exclusion of oxygen is the necessary precondition to allow Lokprep to harden. Enough Lokprep should be applied to the tube ends to allow a thin film to be spread over the length of the tube which is then inserted into the Lokring connection. Tube ends should be pushed fully home into the Lokring connection. For improved distribution of the Lokprep connection should be turned through 360°.

3.7 Winter switch

For ambient temperatures of 0 °C to 17 °C, heat input in the refrigerator compartment decreases and compressor runtime is reduced.

As a result, the temperature in the freezer compartment can rise and defrost the freezer compartment. Winter switch prevents this and maintains a temperature of -18 °C in the unregulated freezer compartment.

Winter switch heats the refrigerator compartment and thus makes sure the compressor switches on early.

Winter switch can be actuated manually via a switch or automatically.

There are two options for warming up:

- Interior lighting of the appliance,
- Foamed refrigerator compartment heater.

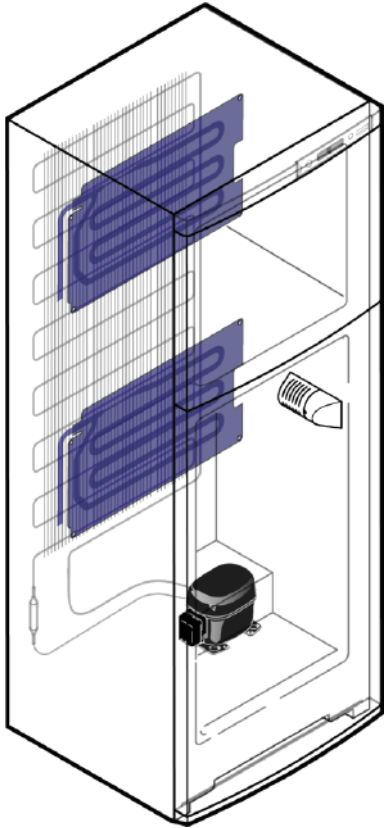


Fig. 13: Winter switch heaters

With an automatic winter switch, the heater is on permanently when the ambient temperature is below 17 °C. When the ambient temperature is between 17 °C and 21 °C the heater is activated in the off period of the compressor cycle.

3.8 iService functions

iService is a software tool designed for the after sales service, supporting the repair of home appliances. The software can establish wired or wireless connection to the appliance and provides one or more of the following functionalities, depending on what has been supplied for the individual appliance. The software only works, if the compatible hardware is connected to the computer and the driver software for the hardware is installed.

Overview of iService functions (available depending on appliance):

- monitoring of internal components and sensors
- remote control of internal components and test programs
- read out of internal statistics and failure memory
- writing configuration codes to the internal memory of the appliance
- flashing / re-flashing / updating one or more modules of the appliance, using rom-boot-loader
- hardware-measurements: typical multi-meter applications and safety tests according to EN0701

In the next sub-chapters there are described some of the functions of iService with refrigeration appliances specifics. Three zones fridge-freezer is taken as an example.

3.8.1 iService overview

3.8.1.1 Monitoring and control function

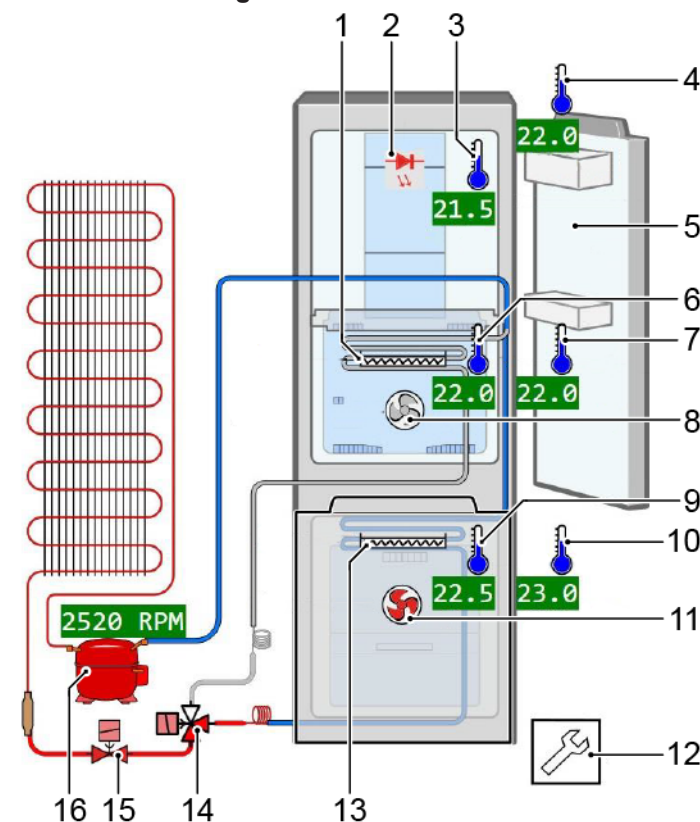


Fig. 14: iService monitoring - window overview

- 1 0 °C compartment evaporator heater
- 2 Refrigerator compartment LED light
- 3 Refrigerator compartment temperature in °C
- 4 Ambient temperature in °C
- 5 Refrigerator compartment door state
- 6 0 °C compartment temperature in °C
- 7 0 °C compartment evaporator temperature in °C
- 8 0 °C compartment fan
- 9 Freezer compartment temperature in °C

💡 Design and function

- 10 Freezer compartment evaporator temperature in °C
- 11 Freezer compartment fan
- 12 Control mode off button
- 13 Freezer compartment evaporator heater
- 14 Solenoid valve
- 15 Stop valve
- 16 Compressor speed display in RPM



All LEDs in the refrigerator compartment are considered as on "logical" LED (1).

Important Information for control function:

- Only the following components can be controlled during Control Mode: **1, 2, 8, 11, 13, 15, 16**
- Picture will only update after clicking a control element (e.g. light on / off)
- Only one component can be controlled at a time due to safety reasons
- Compressor (**16**) control will activate Refrigerator Cooling. Freezer cooling will be supported with next iService update. Compressor RPM will not update.
- To leave control Mode, click the "Black/White Wrench Picture" (**12**)

3.8.1.2 Memory function

```


-----short term counter-----0
daycounter (x/30)                  :0
freezer door alarm                  :0
refrigerator door alarm             :0
freezer temperature alarm           :19
freezer door openings               :2
refrigerator door openings          :10
power off / restart                 :35
undervoltage                        :0
                                   0
-----long term counter-----0
freezer door alarm                  1x :0
refrigerator door alarm             1x :0
freezer door openings              40x :0
refrigerator door openings          255x :0
power off / restart                 8x :4
undervoltage                        8x :0
defrost cycles                     29x :0
super mode activations              4x :3
setpoint changes                   1x :1
fridge undercooling                4x :0
vitafresh undercooling              4x :7
  
```

Fig. 15: iService memory - window overview

Counter	Description
daycounter (x/30)	Number of days since last short term re-set
freezer door alarm	Number of freezer door alarm occurrences
refrigerator door alarm	Number of refrigerator door alarm occurrences
freezer temperature alarm	Number of freezer temperature alarms
freezer door openings	Number of freezer door openings
refrigerator door openings	Number of refrigerator door openings

Design and function

Counter	Description
power off / restart	Number of restarts
undervoltage	Number of undervoltages
defrost cycles	Number of defrost cycles
super mode activations	Number of super mode activations
setpoint changes	Number of setpoint changes
fridge undercooling	Number of undercoolings for the refrigerator compartment
vitafresh undercooling	Number of undercoolings for 0 °C compartment

	Short Term Counter will reset every 30 days. Long Term Counter maybe need to be calculated.
---	--

Tools and aids

4.1 Refrigeration circuit repair tools

Pipe cutter

Usage:
Straight cutting of refrigeration circuit pipes.

[00340966]



Pipe cutting pliers

Usage:
Cutting copper, aluminum and steel pipes with outside diameter of 4 mm - 13 mm and wall thickness up to 1.5 mm.

[00341282]



Capillary tube pliers

Usage:
Cutting capillary tube.

[00340751]



Hose gauge

Usage:
Measuring refrigeration circuit pipe diameter.

[00340555]




Lokprep


Usage:
Sealing Lokring connections.

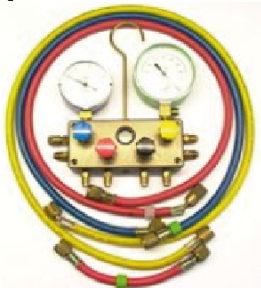
[00340083]




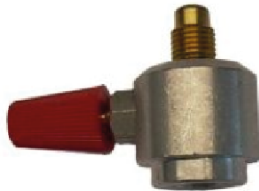
Tools and aids


Lokring pliers	
Usage: Lokring installation with pressing power.	[00340080] 


Vacuum pump	
Usage: Evacuating / filling refrigeration circuit.	[00340790] 

R600a-Installer Support	
Usage: Evacuating / filling refrigeration circuit.	[00340401] 

Probe valve	
Usage: Allowing intervention in a closed refrigeration circuit.	[00340965] 


Service valve	
Usage: Extraction valve for R600a refrigerant bottle.	[00341006] 




Refrigerant R600a	
Usage: Filling refrigeration circuit.	[00310353] 



Refrigerant R134a	
Usage: Filling refrigeration circuit.	[00310352] 

Tools and aids


4.2 Water circuit repair tools



Pipe cutter	
Usage: Straight cutting straight (90 °) of water pipes.	[00342475] 

Quick connector	
Usage: Connecting water pipes.	5/16" to 1/4" - [00614404] 1/4" - [00615795] 5/16" - [10010051]
<div>  <p>Important: Install the red locking clip!</p>  </div>	

Water pipe	
Usage: Repairing appliance water connections.	1/4" - [11030756] 5/16" - [00677979]
<div>  <p>Use pipe cutter for straight cuts.</p> </div>	

4.3 Repair support tools and aids

Guard plate	
Usage: Protecting floor during appliance installation / de-installation.	20 cm x 80 cm - [15000007] 60 cm x 86 cm - [15000008] 

Air bag	
Usage: Lifting heavy appliances (maximum 100 kg).	[00342500] 
<div>  <p>Video: see attached documents in QuickFinder. Use two air bags to lift heavier appliances.</p> </div>	

Tools and aids

Disassembly tool

Usage:

- Left side of the tool: built-in appliances front panel removal.
- Right side of the tool: free-standing appliances front panel removal.
- Front side of the tool: removal of plastic parts with sensitive surface.

[00342180]



Combine the disassembly tool with a suction cup.



Video: see attached documents in QuickFinder.

Suction cup (50 mm)

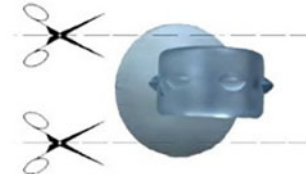
Usage:

Removing front panels and plastic parts without damaging the surface.

Φ 50 mm: [00342224]
Φ 30 mm: [00342303]
Φ 14 mm: [15000470]



Cut off the edges to remove smaller front panels → more strength than a smaller suction cup.



Combine two or more suction cups (and screwdriver) for more strength.



Mounting wedges

Usage:

Removing bigger plastic parts with sensitive surface.

[15000155]



Damping material (outside)

Usage:

Damping for the outside of the appliance.





[00153737]






Important: Use the damping material only for the outside of the appliance, because it's not food safe.






Tools and aids

Damping material (inside)	
Usage: Butyl mass for damping noises on the injection point.	[00604326] 
Touch-up applicator (new white)	
Usage: Touching up of scratches.	[00310026] 
Buraton disinfectant	
Usage: For appliances, objects and surfaces alcoholic disinfection, Buraton Rapid, 1 L.	[00080524] 
<div>  <p>Application in refrigerators and freezers: interior, containers and racks. Versatile and fast-acting. Dries residue-free. Usable on food-contact surfaces.</p> </div>	

4.4 Measuring tools

Energy measurement device	
Usage: Measuring appliance energy consumption. Voltcraft Energy Logger 4000, DE version for Schuko socket.	[15000102] 
Data logger	
Usage: Measuring temperature and humidity with data recording.	[00342125] 
Pocket scale	
Usage: Measuring range: 200 g, resolution: 0.01 g.	[15000780] 

4.5 Cleaning and care accessories

Cleaning & care set	
Usage: Stainless steel conditioning set: Cleaning powder and Conditioning cloth for stainless steel surfaces.	Set: [00311964] Cleaning powder: [00311946] Conditioning cloths: [00312007] 
Cleaner	
Usage: For intensive cleaning of refrigerators: <ul style="list-style-type: none"> ▪ Applicable for out- and indoor ▪ Removes easy and powerful residues ▪ Reduces unpleasant odors and gives a pleasant freshness ▪ Food safe 	[00311910] 
Odor catalyzer	
Usage: For neutralization odors in the fridge and preventing them from spreading to other dishes.	[00578734] 

Fault Diagnosis


Condensation / Humidity / Leakage

Fault	Possible cause	Troubleshooting
Moisture on food or glass plates	Compressor runtime reduced due to low ambient temperature	<ul style="list-style-type: none"> ▶ Set lower cooling temperature in order to increase compressor runtime.
	Temperature insufficiently distributed	Valid only for appliances with internal fan. <ul style="list-style-type: none"> ▶ Check fans.
Compressor evaporation tray overflowing	Incorrect installation - no ventilation	1. Check appliance installation. 2. Ensure that appliance is ventilated properly (see Installation instruction).
	Incorrect installation - door does not close completely There is gap between the door and the door's sealing due to an incorrect appliance installation or unintentional jamming of a sealing part, which inhibits the door from closing tightly.	<ul style="list-style-type: none"> ▶ Check door installation.
	Appliance error - door does not close completely	1. Check door hinges. 2. Check door sealing.
	Appliance error - evaporation tray incorrectly mounted / defective	1. Check evaporation tray installation. 2. Check evaporation tray for mechanical damage.
	Operating errors - door is not closed properly for long periods of time	<ul style="list-style-type: none"> ▶ <i>Advise customer: Ensure that door is closed properly.</i>
	Operating errors - placing hot goods into appliance	Storing of hot goods leads to high amounts of moisture appliance compartment. <ul style="list-style-type: none"> ▶ <i>Advise customer: Let hot goods cool down before storing in the appliance.</i>
	Operating errors - storing high degree of moisture food not packed	<ul style="list-style-type: none"> ▶ <i>Advise customer: Pack food with high degrees of moisture (e.g. lettuce) before storing to ensure, that the moisture stays within the product – for a longer shelf life and less water in the appliance.</i>

Compressor


Fault	Possible cause	Troubleshooting
Compressor too hot	Leak in refrigeration circuit	<ul style="list-style-type: none"> ▶ Check refrigeration circuit for leakage. → Page 51

Fault Diagnosis

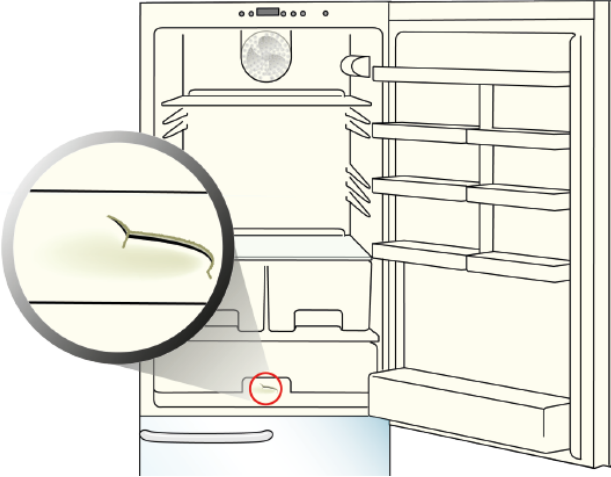
Fault	Possible cause	Troubleshooting
	Insufficient refrigerant / underfilling	1. Check refrigeration circuit for leakage.→ Page 51 2.  If no leak was found. - Repair refrigeration circuit.→ Page 60
	Blockage / partial blockage at bottlenecks (e.g. capillary tube, magnetic valve) resulting from contamination	► Rinse refrigeration circuit.→ Page 59
No cooling power	Compressor not operating Compressor operating of continuously Stop valve closed	1. Check electrical connections. 2. Check voltage (198 VAC - 254 VAC). 3. Check resistance (5 Ω - 100 Ω). 4. Measure input current (0.5 A - 1.2 A). 5. Check compressor (quick test)→ Page 52. 6. Quick stop valve→ Page 53 (if applied).
Protective conductor connection on compressor detached	Compressor vibrations Compressor operating of continuously Stop valve closed	1. Check compressor electrical connections. 2. Install cable harness [00610943].
Filling pipe on compressor too short <i>Compressor filling pipe and customer service filling pipe cannot be connected with a Lokring</i>	Compressor filling pipe was squeezed out in the factory	1. Install a T-piece Lokring connector with Schrader valve [00066020] (6 mm / 8 mm, brass) or [00066030] (6 mm / 8 mm, brass) for filling on suction side. 2. Evacuate the refrigeration circuit via the valve.→ Page 61 3. Fill refrigeration circuit.→ Page 63

⚡ Fault Diagnosis

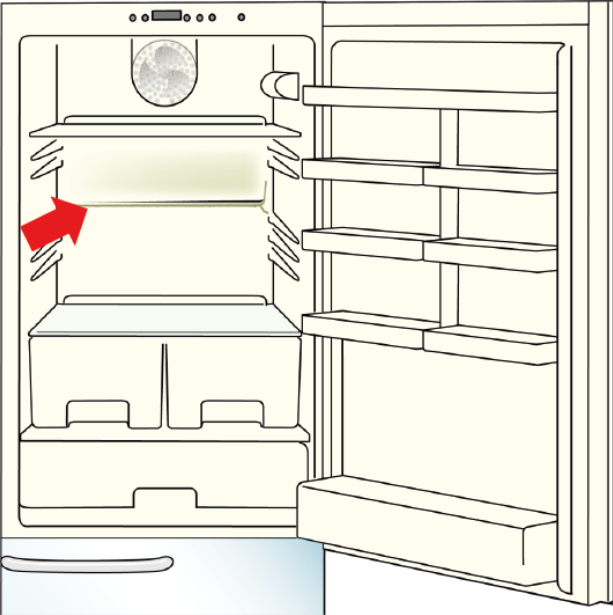
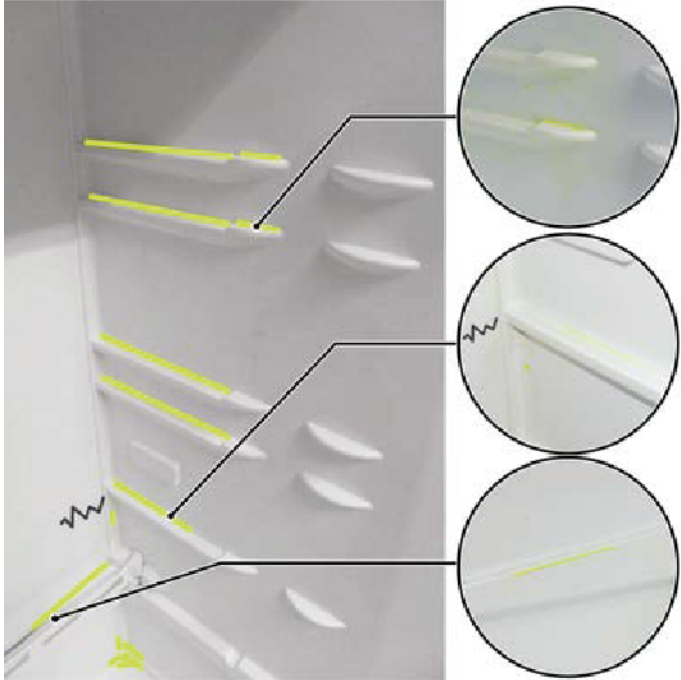
🔧 Mechanical damage

Fault	Possible cause	Troubleshooting
<p>Stainless steel rusts</p> 	<p>Surface came in contact with non-oxidising acids, solutions and their salts, chloride-containing media, sea water, sponge cloth</p> <p>Commercially-available "sponge cloths" are dyed and, due to the colouring process, residual salts remain in the sponge cloth. If a sponge cloth is used to clean the stainless steel, the stainless steel begins to rust.</p>	<p>Required tools:</p> <ul style="list-style-type: none"> 🔧 Cleaning and care for stainless steel surfaces set [00311964] ▶ Clean surface using cleaning and care set.
<p>Stainless steel discoloured</p>	<p>Surface came in contact with mustard, onion, sauerkraut, rhubarb</p>	<p>Required tools:</p> <ul style="list-style-type: none"> 🔧 Cleaning and care for stainless steel surfaces set [00311964] ▶ Clean surface using cleaning and care set.

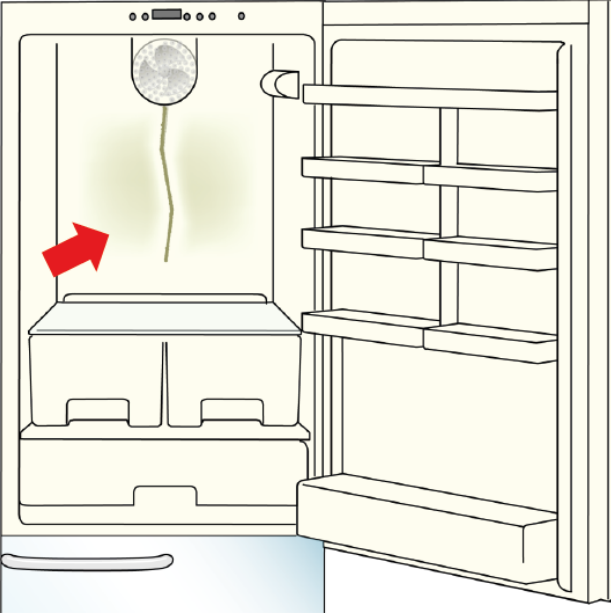
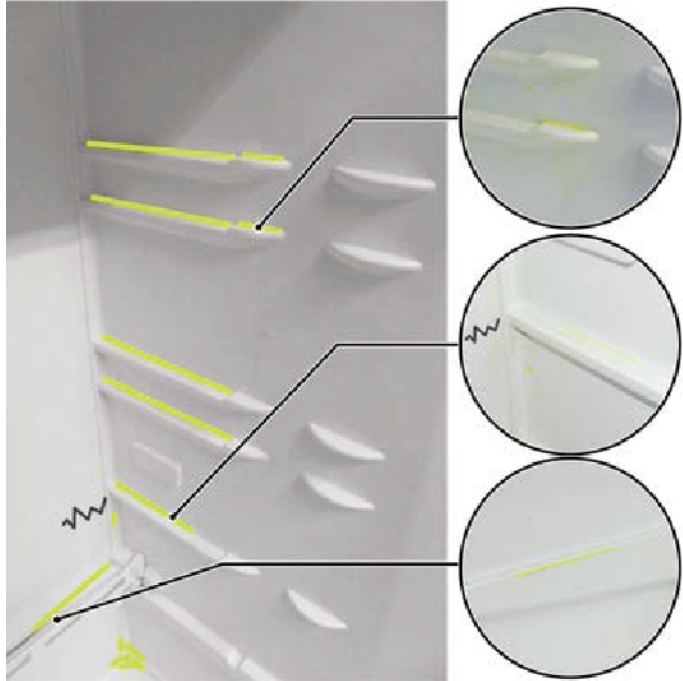
⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
<p>Crack at bottom of refrigerator compartment in front of vegetable drawer</p>  <p>Pressure mark visible, underhooking of a side with crack</p>	<p>Fallen down object (e.g. glass shelf or food tin)</p>	<ul style="list-style-type: none"> ► Advise customer: Customer's fault - repair is not possible.



⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
<p>Horizontal stress crack on the back wall above or below the foamed-in evaporator</p> 	<p>Storage of cooking oil in the refrigerator compartment</p>	<p>Troubleshooting</p> <p>Required tools:</p> <p>🔧 Repair set for repairing cracks at innerliner [00714422]</p> <p>Storing cooking oil in the refrigerator compartment may create the conditions in which a tension crack tends to appear.</p> <ol style="list-style-type: none"> 1. Remove trays to identify oil residue as the cause.  2. Advise customer: <i>Do not store cooking oil in the refrigerator.</i> 3. ⓘ For some free-standing appliances and fridge-freezer combinations, it is possible to repair a tension crack. A plastic plate of the same size as the entire back wall of the refrigerator compartment is bonded on to the back wall of the refrigerated-food container. Use the repair set described in the specific repair instructions to repair a tension crack. 4. Install repair set according to spare part leaflet. 5. Unscrew the fan if required.

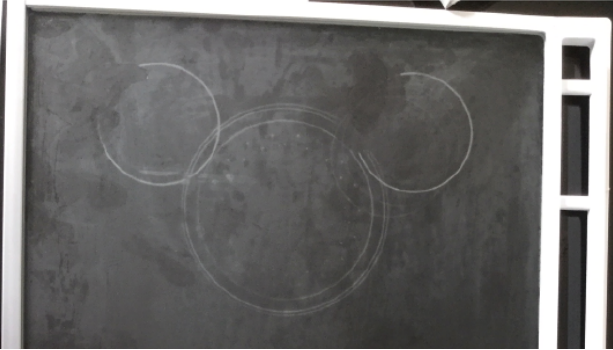

⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
<p>Vertical crack on the back wall originating from the fan</p> 	<p>Oil leaking from the internal fan bearing / Cooking oil comes into contact with the refrigerated goods container</p>	<p>1. Remove trays to identify oil residue as the cause.</p>  <p>2. Advise customer: <i>Do not store cooking oil in the refrigerator</i></p> <p>3. Advise customer: <i>Repair is not possible.</i></p>
<p>Cracks in cabinet cover <i>Screws loose, appliance position no longer correct</i></p>	<p>Final flooring in fitted cabinet is missing</p>	<p>► Screw cover plate on upper surface of appliance to front of cabinet cover.</p>

⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
Bitumen mass dissolves 	Currently not known	Required tools: ⚙ Insulation material butyl mass [00604326] ▶ Apply butyl mass to seal the defective surface. 
Small holes in refrigerator compartment cooler inner-liner	Ventilation holes due to the production process	▶ <i>Advise customer: This is not a fault.</i>

⚡ Fault Diagnosis

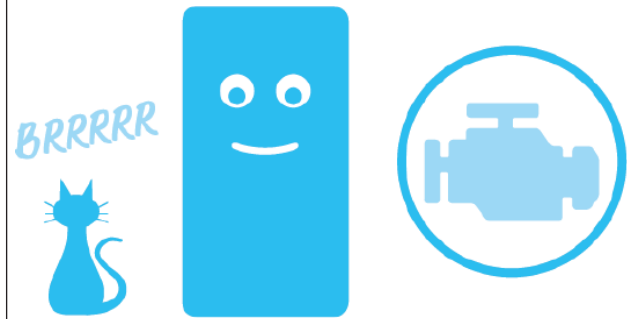
Fault	Possible cause	Troubleshooting
<p>Circle stains on glass shelves</p>  <p><i>Stains visible as soon as condensate forms</i> Stains appears in new acquired appliances glass shelves and spare parts glass shelves Stains fade out in room temperature Stains cannot be cleaned</p>	<p>Stains are the imprints of silicone suction cups that are used during processing and handling of glass shelves in the factory</p>	<ul style="list-style-type: none"> ▶ <i>Advise customer:</i> There is no technical or material defect. Stains exists due to production and part handling process in the factory. With a loaded glass shelf or "normal" air humidity the imprints are not visible. Imprints will disappear even after several months of use.
<p>Refrigeration circuit pipe is pressed</p> 	<p>This is not a fault</p>	<ul style="list-style-type: none"> ▶ Refrigeration circuit pipe pressed the way visible on the graphic in "Fault" section is the technical solution for low pass filter. It reduces pulsation from the refrigerant on the pressure side.

Fault Diagnosis

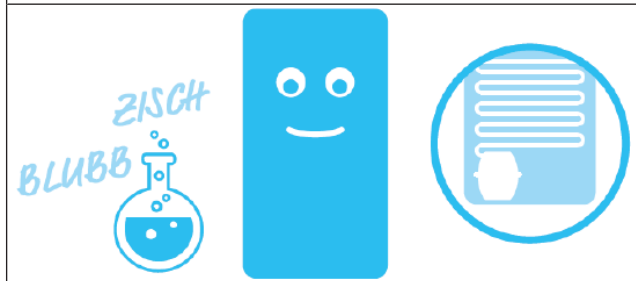
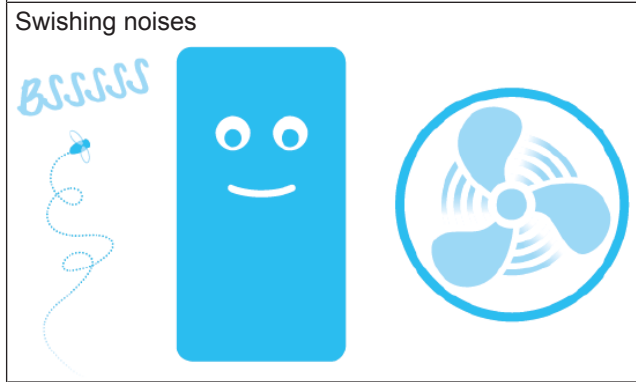


Installation fault

Fault	Possible cause	Troubleshooting
Increased power consumption and cooling power affected	Ventilation at rear covered	<ul style="list-style-type: none"> Refer to dimensions in installation instructions. Leave sufficient distance between appliance and back panel.
Appliance protruding <i>Heat accumulation and compromised refrigerating capacity</i>	Reinforcing brace for transport in rear area of the kitchen cabinet not removed	<ul style="list-style-type: none"> Remove reinforcing brace.
	Socket (surface-mounted) in area of machine room	<ul style="list-style-type: none"> Connect the appliance to another socket.
Front panel hits against body, door does not close	Depth adjustment on pedestal missing or too far back	<ul style="list-style-type: none"> Correct depth adjustment.
Front panel brushes against kitchen cabinets	Front panel is mounted at a slant	<ol style="list-style-type: none"> Remove front panel. Align the fixing rail.
Top cabinet cover brushes against front panel	Cabinet cover not properly mounted	<ul style="list-style-type: none"> Correct cabinet cover.
Screw brushes against cover mask <i>Screw of the upper installation rail brushes against the cover mask of the cabinet</i>	Improper cup holes / Mounting of fixing rail to front panel is not dimensionally accurate	<ul style="list-style-type: none"> Align the fixing rail.
Cabinet base softens, appliance lifts up or sinks	Water escaping through blocked condensation outlet	<ul style="list-style-type: none"> Replace cabinet base.

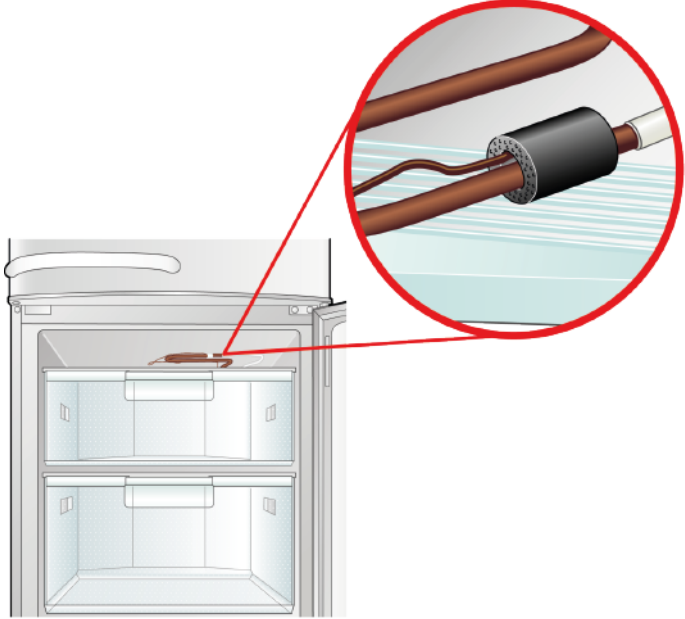
Noise

Fault	Possible cause	Troubleshooting
Compressor noise 	Humming noise when switching on / Rattling noise when switching off	<ul style="list-style-type: none"> Advise customer: <i>Normal, harmless noise</i>
	Compressor touches housing	<ul style="list-style-type: none"> Check compressor installation.
	Compressor stimulates surrounding parts	Required tools: <ul style="list-style-type: none"> Noise damping mass Butyl, outside use [00153737] Install damping material on affected pipes.
	Pipes touching components	<ul style="list-style-type: none"> Carefully bend pipes.
Flow noise	Refrigerant flowing through the pipes	<ul style="list-style-type: none"> Advise customer: <i>Normal, harmless noise</i>

Fault Diagnosis

Fault	Possible cause	Troubleshooting
	<p>On the evaporator: Residual air in the refrigeration circuit</p>	<p>i Do not rinse the refrigeration circuit! Make sure that no air gets into the refrigeration circuit.</p> <ol style="list-style-type: none"> 1. Evacuate the refrigeration circuit on both sides for 15 minutes. 2. Refill refrigeration circuit.
<p>Clicking sounds</p>	<p>Temperature controller or magnetic valve</p>	<p>► <i>Advise customer:</i> <i>Normal, harmless noise.</i></p>
<p>Swishing noises</p> 	<p>Air flow in the appliance interior</p>	<p>► <i>Advise customer:</i> <i>Normal, harmless noise.</i></p>
<p>Vibration noises</p>	<p>Vibrations on the junction of capillary tube and suction pipe</p>	<p>Required tools:</p> <ul style="list-style-type: none">  Noise damping mass Butyl, outside use [00153737] ► Cover the junction using damping mass. 

⚡ Fault Diagnosis




Fault	Possible cause	Troubleshooting
Injection noises on the evaporator	High flow rate of refrigerant / Capillary tube bent	<p>Required tools:</p> <ul style="list-style-type: none"> ⚙ Noise damping mass Butyl, outside use [00153737] ℹ For refrigerator compartment aluminum evaporators, the capillary tube is not accessible! <ol style="list-style-type: none"> For freezer compartment wire tube evaporators: bend capillary tube straight. Cover the injection point with damping mass. 
Abnormal noises	Appliance not leveled	<ol style="list-style-type: none"> Align appliance flat with a spirit level. Adjust threaded feet or place something underneath.
	Appliance positioned against other objects	<ul style="list-style-type: none"> ▶ Move appliance away from adjacent furniture.
	Removable parts inside appliance compartment loosed or jammed	<ol style="list-style-type: none"> Check removable parts. Replace defective removable parts.
	Bottles or containers touching each other	<ul style="list-style-type: none"> ▶ Separate bottles or containers.

Fault Diagnosis



Fault	Possible cause	Troubleshooting
<p>Excessive noise measured by customer using smart-phone app</p> <p><i>Measured noise level exceeded values declared on the energy label</i></p>	<p>There is no fault inside the appliance - measuring tool and conditions are not adequate</p>	<p>Argumentation when the customer is measuring noise level with a smartphone app.</p> <p>For the determination of noise the declaration value manufacturers have to follow exactly described rules. Rules are defined in the international standard IEC 60704. The procedures and boundary conditions described in this standard cannot be fulfilled in a regular household environment and by technical equipment of a smartphone. Out of that errors and deviations must be expected when doing a noise measurement with a smartphone in a living environment. Main arguments are:</p> <ol style="list-style-type: none"> 1. Advise customer: <i>The manufacturer's declared noise level is a sound power level. Smartphone apps only measure sound pressure level. Both may not be mixed up.</i> 2. Advise customer: <i>The used equipment – a smartphone – does not have the required precision.</i> 3. Advise customer: <i>The application does not apply all needed post processing procedures as required in the standard IEC 60704. Especially the required time average for a clearly specified time frame is not done.</i> 4. Advise customer: <i>It must be expected that the applied algorithms in the app are faulty. Usually such apps are not certified or created by hobby programmers who do not know about all required specification. Thus errors must be expected.</i> 5. Advise customer: <i>Kitchens, living rooms or apartments in general do not fulfill the requirements for standardized test room as described in IEC 60704. By not fulfilling these requirements measurements at home cannot give the right and comparable measurement result.</i>

Fault Diagnosis

Odour

Fault	Possible cause	Troubleshooting
Typical plastic smell	New delivered appliance smells plastic	<p>All BSH refrigerator appliances are made from materials and plastics that are in accordance with food legislation requirements, especially certified for food-contact and thus are specifically designed for the storage of fresh foods.</p> <p>The appliances may have a faint plastic smell upon delivery in warm condition that will fade after starting the appliance. If the customer complaint is not transmitted directly after starting the appliance, the appliance cannot be the root-cause of the odor complaint</p> <p>► <i>Advise customer:</i> <i>The smell disappears after commissioning.</i></p>
Strong smell of food	Food spoilage due to extended storage time, wrong storage conditions and product damages resulting from wrong handling or transport	<p>Required tools:</p> <p> Cleaner for intensive cleaning of refrigerators [00311910]</p> <ol style="list-style-type: none"> 1. <i>Advise customer:</i> <i>Clean the appliance with vinegar water or cleaner.</i> 2.  Freshly ground coffee, baking powder, lemon juice dispel bad smells. Place a bowl with the ingredient inside the appliance. 3. <i>Advise customer:</i> <i>Ventilate the appliance.</i> 4. <i>Advise customer:</i>  Foods that are especially sensitive to carry-over effects such as dairy products like milk, cream or curd, vegetables such as lettuce, carrots, asparagus and mushrooms, fruit like berries, stone fruit, grapes or kiwi fruit as well as fresh meat and fish should be especially protected. The packaging material should be gas-tight, durable and leak proof, food grade and moisture-proof or moisture resistant. Suitable packaging materials are: <i>Store food wrapped or covered.</i> 5. <i>Advise customer:</i> <i>Weekly control the food stock for the continuous removal of spoiled or spilled foods and damaged food packages.</i> 6. <i>Advise customer:</i> <i>Regularly clean the appliance with mild detergent solution.</i>

Fault Diagnosis

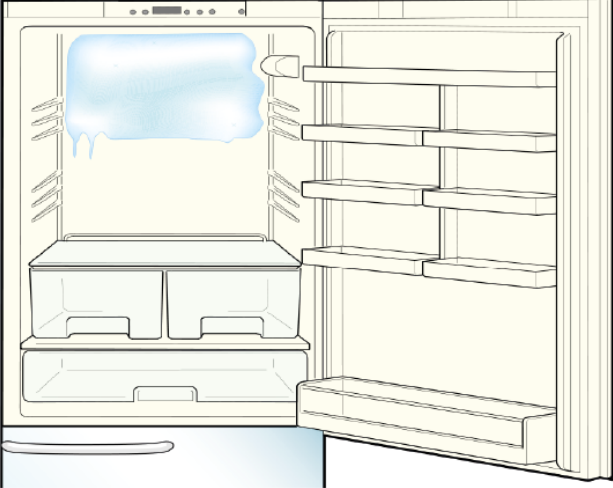
Fault	Possible cause	Troubleshooting
	Insufficient cleaning / food stains in storage drawers and on glass plates / stagnant condensation water in drawers / blocked defrost drain outlet	<p>► <i>Advise customer:</i> <i>Regularly clean of all parts of appliance compartment with lukewarm water and mild detergent.</i></p>
Musty smell in case of prolonged periods being out of operation	Doors closed / Appliance not cleaned	<p>Required tools:</p> <p> Cleaner for intensive cleaning of refrigerators [00311910]</p> <ol style="list-style-type: none"> 1. <i>Advise customer:</i> <i>Switch off the appliance.</i> 2. <i>Advise customer:</i> <i>Defrost the freezer compartment (if available).</i> 3. <i>Advise customer:</i> <i>Clean the appliance thoroughly.</i> 4. <i>Advise customer:</i> <i>Keep doors open in case of extended periods out of operation.</i>
Off-odors coming from the appliance exterior	Dirty water drainage system	<p>The condensation water occurring in cooling and freezing appliance is led to an evaporation tray at the appliance exterior by a defrost outlet, where it is continuously evaporated.</p> <p>In normal use just clean water –having just a very faint smell coming from the stored foods - is transferred to the evaporation tray. The evaporation of this conventional condensation water will not be noticeable.</p> <p>In static cooled appliances food components or liquid foods may be transported to the evaporation tray via the defrost drain outlet. This may happen if fluids are spilled within the refrigerator compartment or solid food components such as crumbs are transferred to the defrost drain outlet upon storage or appliance cleaning.</p> <p>The evaporation of such water-food mixtures may cause a noticeable smell as food components such as proteins, fats and carbohydrates are slowly decomposed by chemical, biochemical and microbial processes. These decomposition processes may take several weeks, always depending on the amount and type of the water-food mixture within the evaporation pan and location specific ambient conditions.</p> <p>Along with that the formation of a biofilm may occur which will be clearly visible (slimy-greasy layer, especially at boundary layers). Especially strong smell results from the decomposition of dairy products such as cream, milk or fatty dressings and broth.</p> <p>► Clean the drain water outlet, the drain hose and the evaporation pan.</p> <p> For the complete removal of food components, stains and a possible biofilm from the evaporation pan a conventional vinegar cleaner is recommended.</p>

⚡ Fault Diagnosis

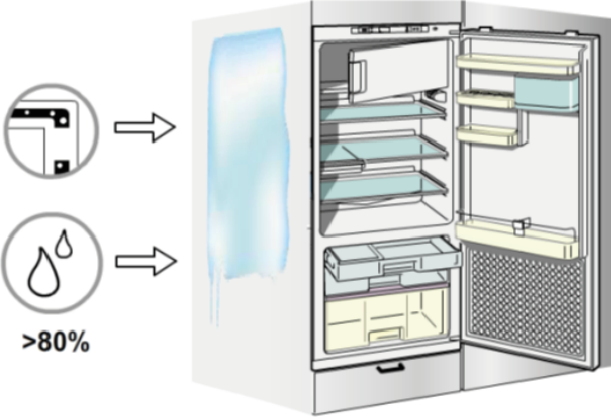

👍 Result problem

Fault	Possible cause	Troubleshooting
Drinking water tastes stale	Activated charcoal filter used up. / No water was used for some time / Ice maker was switched off for an extended period	<ol style="list-style-type: none"> 1. ⓘ If activated charcoal filter is installed. <ul style="list-style-type: none"> - Replace activated charcoal filter after a maximum of 6 months. 2. Sanitise the water system.→ Page 68

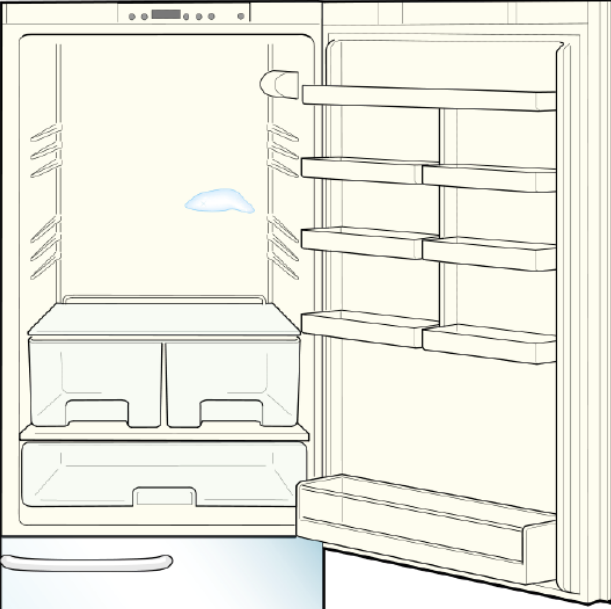
🌡 Temperature problem

Fault	Possible cause	Troubleshooting
 <p>Complete over icing of the evaporator</p> <p>Too much humidity inside the appliance</p>	Long door opening times	<ul style="list-style-type: none"> ▶ Advise customer: Avoid long door opening times.
	Unwrapped foodstuffs stored in the compartment	<ul style="list-style-type: none"> ▶ Advise customer: Store food packed.
	Hot dishes stored in the compartment	<ul style="list-style-type: none"> ▶ Advise customer: Wait until dish cools down before placing it inside appliance compartment.
	Door seal leakage	<ul style="list-style-type: none"> ▶ Replace door seal.
	Door seal not completely inserted into inner door	<ul style="list-style-type: none"> ▶ Check door seal installation.
	Gap between door and front strip	<p>Required tools:</p> <ul style="list-style-type: none"> ▶ Washer for base hinge (0.5 mm) [00616387] ▶ Install retaining washer between door hinge and door lock.
	Door bent	<ul style="list-style-type: none"> ▶ Replace door.


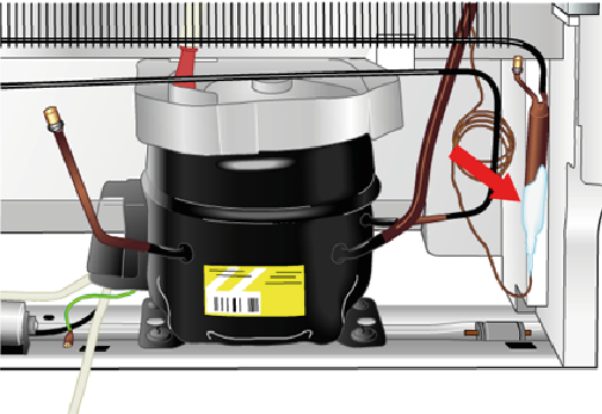
⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
<p>Icing up / condensation on side panels</p> 	<p>Humidity above 80 %, insufficient ventilation between the side panels, particularly in side-by side appliances (refrigerator and freezer are set up together)</p>	<p>Required tools:</p> <ul style="list-style-type: none"> ⚙ Insulation mat non flammable [20000786] ▶ 1. Install insulation mat (1). ▶ 2. Cut insulation mat (2). 
	<p>Foaming failure due to trapped air in the separating wall between refrigerator and freezer compartment</p>	<p>▶ Replace appliance.</p>
<p>Build-up of ice at a single point</p>	<p>Drain gutter or hole for condensation water blocked or covered</p>	<p>▶ Wipe back panel with detergent solution.</p>

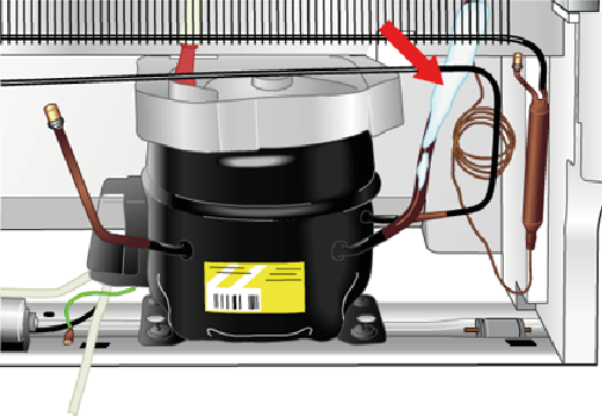
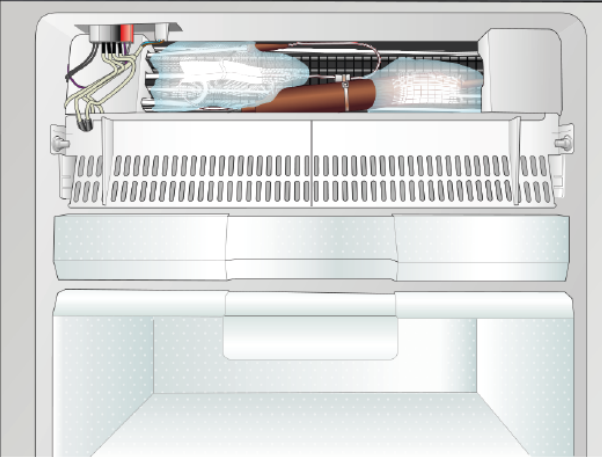
⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
	Food stored too close to back panel	<ul style="list-style-type: none"> ▶ <i>Advise customer:</i> Store food by keeping a gap to the back panel.
	Leak in refrigeration circuit	<ul style="list-style-type: none"> ▶ Check refrigeration circuit for leakage.→ Page 51
	Insufficient refrigerant / underfilling	<ol style="list-style-type: none"> 1. Check refrigeration circuit for leakage.→ Page 51 2. ⓘ If no leak was found. <ul style="list-style-type: none"> - Repair refrigeration circuit.→ Page 60

⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
	<p>Partial blockage at bottlenecks (e.g. capillary tube, solenoid valve) resulting from contamination</p>	<p>► Rinse the refrigeration circuit.→ Page 59</p>
<p>Frost on dryer</p> 	<p>Partial blockage at bottlenecks (e.g. capillary tube, magnetic valve) resulting from contamination</p>	<p>► Rinse the refrigeration circuit.→ Page 59</p>

⚡ Fault Diagnosis

Fault	Possible cause	Troubleshooting
<p>Frost on suction pipe</p> 	<p>Overfilling of the refrigeration circuit</p>	<p>► Repair refrigeration circuit.→ Page 60</p>
<p>Icing up on no-frost evaporator</p> 	<p>Inadequate temperature distribution</p>	<ol style="list-style-type: none"> 1. Check fan. 2. Check evaporator heating system. 3. Check if drainage channel is not blocked.

Measuring technology

6.1 Measuring temperature inside the appliance

To allow the internal temperature of a refrigerating appliance to be measured exactly, the measurement must be taken in the geometric center of the compartment.

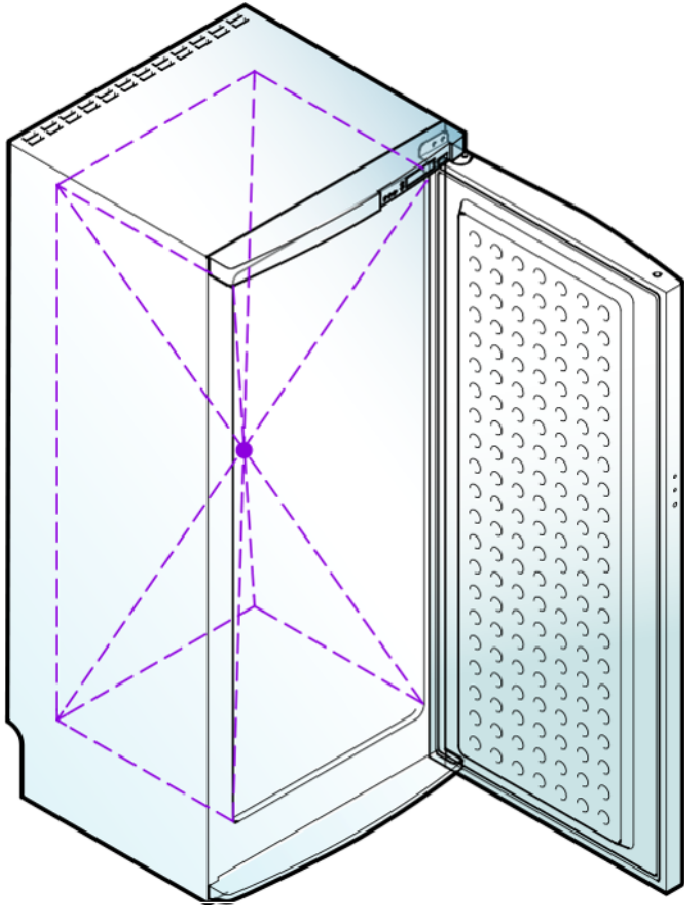


Fig. 16: Appliance geometric center

Temperature inside the appliance depends on different factors:

- Appliance model
- Ambient temperature
- Frequency and duration of door opening
- Products stored

Equilibrium: The compressor works exclusively to compensate the heat intake through insulation, door seal and thermal bridges. There is a temperature stratification in the appliance interior.

There are different temperatures inside the appliance even with interior ventilator.

6.1.1 Temperature measurement with data logger

Required tools:

-  Data logger for temperature and relative humidity Omega OM-EL-USB-2, EU-Version, [00342125] inklusiv Lithium-Batterie ([00341369])



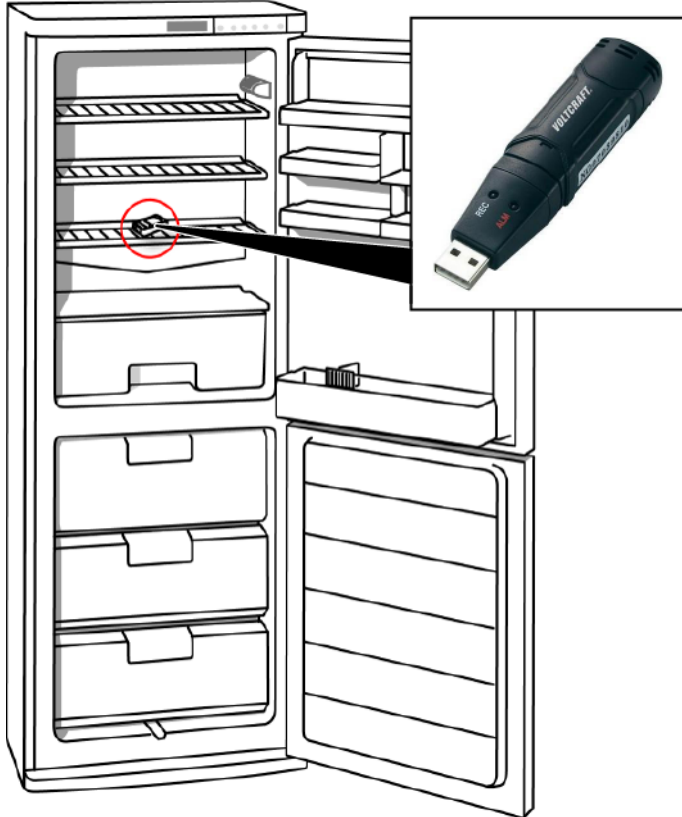
Data logger must not come into contact with evaporation surface.

Prerequisite:

-  Appliance is in equilibrium during measurement.

Measuring technology

1. Place data logger in geometric center of the compartment.



1. Place glass of water in geometric center.
2. Inform the customer that the appliance door should be opened as infrequently as possible and only little amount of fresh products should be placed in the appliance during the measurement.
3. Leave glass of water inside appliance for a longer period (at least 24 h).
4. Perform temperature measurement in the water.

2. Inform the customer that the appliance door should be opened as infrequently as possible and only little amount of fresh products should be placed in the appliance during the measurement.
3. Leave data logger inside appliance for a longer period (at least 24 h).
4. Evaluate the data from data logger.

6.1.2 Temperature measurement without data logger

Required tools:

-  Thermometer High-precision fast-response thermometer GTH 1170 [00341176]

Prerequisite:

-  Appliance is in equilibrium during measurement.

6.2 Nominal temperature graph

Because of the various appliance constructions and evaporator arrangements, every refrigerator has its own standard behavior pattern. To make it possible to check the temperatures in an appliance at a later date, for every refrigerating appliance there are standard curve specification sheets available (ASP - Diagram setpoint curve).

The temperature range at each setting is exactly specified on these standard curve sheets. The sheets also indicate how regulators behave at various ambient temperatures. It is possible to read off the relative time the appliance is switched on and energy consumption relative to the selected regulator setting.

With the nominal temperature graph, the measured temperature values (actual values) of an appliance can be compared with the nominal values, and troubleshooting measures can be initiated in case of temperature discrepancies.

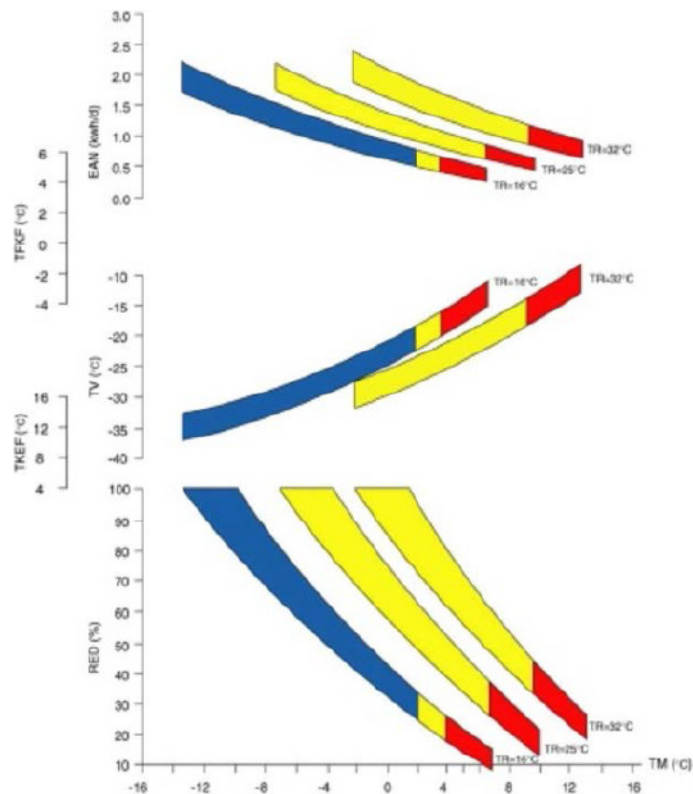


Fig. 17: Nominal temperature graph example

The nominal graph consists of the following test values:

- **EAN (kWh / d)**: medium energy consumption per day

- **Controller positions**: Segments of the tolerance ranges
 - Minimum controller position: right segment
 - Medium controller position: medium segment
 - Maximum controller position: left segment
- **RED (%)**: relative compressor power-on time
- **TM (°C)**: medium temperature inside refrigerator
- **TV (°C)**: medium freezer compartment temperature
- **TFKF (°C)**: medium temperature in the 0 °C compartment
- **TKEF (°C)**: medium temperature in the cold storage drawer
- **TR 16**: 16 °C ambient temperature
- **TR 25**: 25 °C ambient temperature
- **TR 32**: 32 °C ambient temperature

Measuring technology

6.3 Checking temperature indicator (Sticker "OK")

Temperature indicator (Sticker "OK") determines the required controller position for the cooling zones in the cooling compartment.

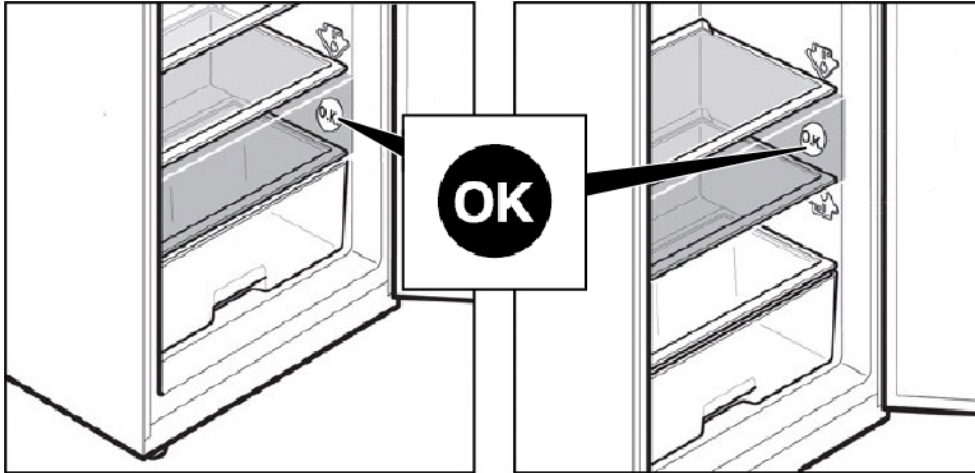


Fig. 18: Sticker "OK" position

1. Check temperature indicator.
 - ➔ In case of temperatures below 4 °C, the black dot becomes green and "OK" is displayed.
2. ⓘ If the sticker does not indicate "OK".
 - Gradually reduce the temperature.



When the appliance is switched on, it may take 12 h until the desired temperature is reached.

6.4 Measuring energy consumption

Required tools:

- 🔧 Energy cost measuring device VOLTcraft, Energy Logger 4000 [15000102]

Specified energy consumption was determined in the lab under standard conditions.

Following factors affect measurements in the household:



- Fluctuating ambient temperature (day / night)
- Unchecked heat input due to door openings during measurement
- Heat radiation, e.g. from adjacent cookers
- Measurement period too short
- Fluctuating temperatures in the compartment caused by control cycles




Prerequisite:

- ✓ Ambient temperature 25 °C.
 - ✓ Cold-storage compartment temperature 8 °C to 12 °C.
 - ✓ Refrigerator compartment 5 °C.
 - ✓ Fresh food compartment -2 °C to 3 °C.
 - ✓ Freezer compartment -18 °C.
 - ✓ No door openings.
 - ✓ Full load.
1. Connect appliance to energy measuring device.
 2. Measure energy consumption 24 h.

7.1 Performing customer service test program

Valid for all appliances with on-board customer service test program.

	Customer service test program must be performed before any repair action (e.g. component exchange, electronic flashing).
	Customer service test program details are described in service documents "Check routine (ASP)".

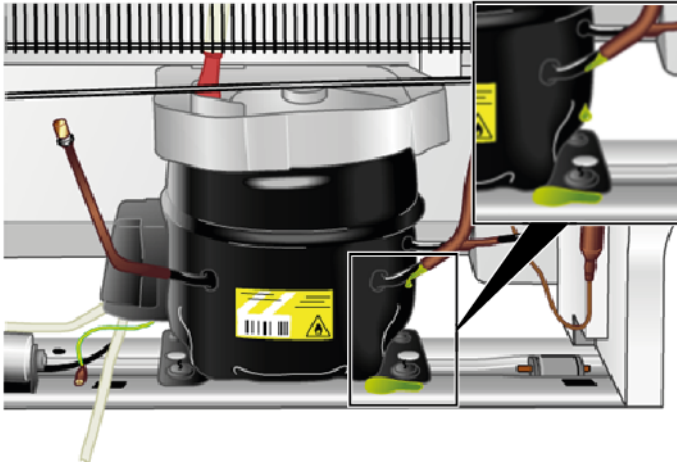
1. Check if customer service test program is available in repaired appliance.
2. Check all components with test program.
3. Check power consumption of consumers (compressor, motor, fan, heaters, etc.).
4.  If specific failure is detected in the test program.
 - Initiate repair based on test program outcome.
5.  If there is no failure detected in the test program.
 - Initiate required repair action.
6.  If repair is finished.
 1. Start test program second time.
 2. Check components and power consumption.

7.2 Tracing leakage in refrigeration circuit




As there is always refrigerant oil from the compressor mixed in with the refrigerant, in the case of a leak it will also be possible to identify traces of oil.


1. Search for leakage near the welding points and at tube connections.



2. Run your fingers over tube connections and check for traces of oil.

3.  For fault-finding purposes, nitrogen can also be used to increase the pressure in the refrigeration circuit to 7 bar. Higher pressure may damage the evaporator. It should then be possible to identify any leak. Further auxiliary materials for identifying leaks are available in the form of special leak-finding sprays or soap suds.

Spay (or apply soap solution to) the point where the leakage is suspected to allow any bubbles to be observed.


4.  If the leak is identified at the intake side.
- [Replace compressor along with the dryer.→ Page 60](#)



Replace the dryer before any repair of the refrigeration circuit.
If the refrigeration circuit leaks on intake side, the compressor needs to be replaced in addition to the dryer. Compressor oil is irreparably damaged by penetrating air moisture.

7.3 Checking compressor (quick test)



Required tools:

 Multimeter Digital multimeter VC 850K [15000062]

Prerequisite:

 Compressor is running.

7.3.1 Checking compressor input current

1. Switch off the appliance.
2. Wait 10 minutes for pressure to equalize.
3. Actuate the compressor in the internal test program.
4. Measure compressor input current.
5.  If compressor input current is in the range 0.1 A - 1.1 A.
 - [Check speed on the inverter module.→ Page 52](#)
6.  If compressor input current > 1.1 A.
 - [Check resistance values of compressor motor windings.→ Page 52](#)

7.3.2 Checking speed on the inverter module


Compressor speeds changes in three stages.

- Electronics emit pulses to change the speed.
- Control device (inverter module) converts pulses for compressor.
- Compressor implements different speeds.





Speeds alternating after 20 s:

- **Low:** 1215 Hz - 39 Hz
- **Medium:** 2500 Hz - 84 Hz
- **High:** 4500 Hz - 150 Hz



1. Check if compressor changes speed in three stages.
2.  If speeds do not change in three stages.
 - Replace the inverter module.

7.3.3 Checking resistance values of compressor motor windings



1. Check resistance values of all three compressor motor windings.
2.  If compressor motor windings resistance values are equal.
 - Replace inverter module.
3.  If compressor motor windings resistance values are not equal.
 - Replace compressor.

7.4 Checking stop valve

7.4.1 Checking stop valve for leaks

1. Check stop valve cooling pipes connections for refrigerant leakage.
2.  If refrigerant leakage is detected.
 - Eliminate leakage.
3.  If there is no refrigerant leakage.
 - [Measure power consumption.→ Page 53](#)



7.4.2 Checking stop valve function

1. Actuate stop valve in the internal test program.
2.  If acoustic sound of stop valve switching is not heard.
 1. Check electrical connections between the stop valve and electronic module.
 2. Replace stop valve.
 3. Perform the test run.
3.  If acoustic sound of stop valve switching is heard.
 - [Measure power consumption.→ Page 53](#)



7.4.3 Measuring stop valve power consumption

Required tools:

-  Energy cost measuring device VOLTcraft, Energy Logger 4000 [15000102]








1. Actuate the compressor in the internal test program.
2. Measure the power consumption.
3.  If power output > 20 W.
 - Disconnect the stop valve from the power supply.
4.  If power output < 20 W.
 - [Check the suction pressure.→ Page 53](#)

7.4.4 Measuring suction pressure

1. Measure suction pressure.
2.  If suction pressure is near vacuum.
 1. Replace dryer.
 2. Refill refrigeration circuit.
 3. Perform the test run.
3.  If suction pressure > 1 bar (compressor defective).
 1. Replace compressor.
 2. Perform the test run.

8.1 Inside Lokring technology

8.1.1 Hints for Lokring installation

	The ends of the tubes must be clean, bare metal and free of any oil, paint or coating. To ensure this, clean the tube ends with emery cloth, using circular movements. Cleaning lengthways should be avoided as this can lead to fluting in the surface of the tube. Such flutings can cause leakage.
	Check and mark on the tube how far it should be put into Lokring connection. This way you'll establish tube surface where Lokprep should be applied.
	Apply enough Lokprep to the tube ends to allow a thin film to be spread over the length of the tube which is then inserted into the Lokring connection. Push the tube ends fully home into the Lokring connection. For improved distribution of the Lokprep, turn the connection through 360° .
	Lokprep must be used sparingly. Especially with narrow tubes, such as the capillary tube, there is a danger that an overdosage will seal the tube opening .
	On assembling, pull the capillary tube 10 mm out from the Lokring connection and apply Lokprep from the rear. Insert the capillary tube back into the connection and turn through 360° for improved distribution of the Lokprep. Then press the Lokring.
	After four minutes standing time , the pressed Lokring connection is ready for loading. For zinc compounds, the time is 7 minutes.
	With a special insert, assembly of a Lokring at one side only is also possible. This insert is inserted into one side of the Lokring only, and in this way initially only one Lokring is compressed. Then the second tube can be fitted and compressed in turn.

Lokrings and Lokring tooling can be selected and ordered via QuickFinder using ENR **LOKRING/01**.

Bosch				LOKRING/01				Accessories refrigeration			
A [mm]	B [mm]	Material	Pos. No	A [mm]	B [mm]	Material	Pos. No	A [mm]	B [mm]	Material	Pos. No
1.8	3	Ms	0201					7	8	Ms	0229
1.8	3.5	Ms	0205					7	9.53	Ms	0234
1.8	4	Ms	0206					7.5	8	Ms	0230
								8	9.53	Ms	0235
1.8	5	Ms	0209								
1.8	6	Ms	0214								
2	3	Ms	0202								
2	4	Ms	0207								
2	4	Ms	0207								
2	5	Ms	0210								
2	6	Ms	0215								
2	8	Ms	0224					2	5	AL	0270
3	5	Ms	0211					5	6	AL	0271
4	5	Ms	0212					5	7	AL	0272
4	6	Ms	0217					5	8	AL	0274
4	8	Ms	0225					6	7	AL	0273
4.5	5	Ms	0213					7	8	AL	0275
4.5	6	Ms	0218								
4.5	7	Ms	0220								
4.5	8	Ms	0228								

8.1.2 Using Lokring pliers



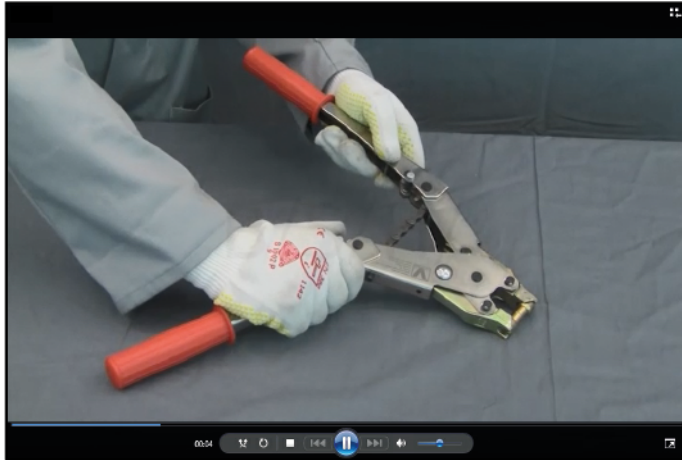
[Video tutorial](#)



8.1.3 Handling Lokring pliers with two pivots



[Video tutorial](#)



8.1.4 Changing Lokring pliers jaw



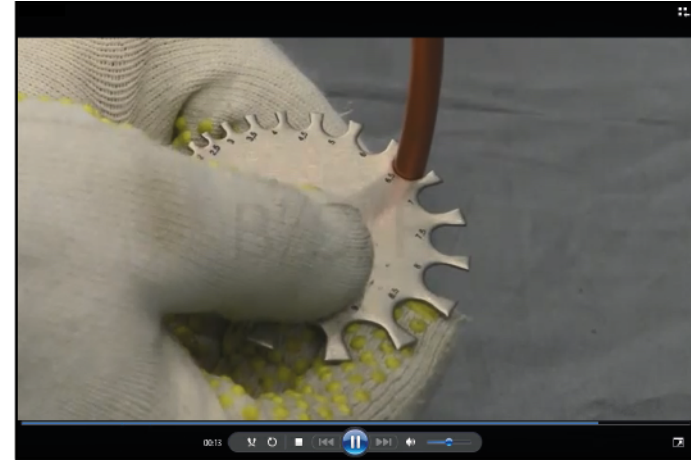
[Video tutorial](#)



8.1.5 Selecting correct Lokring



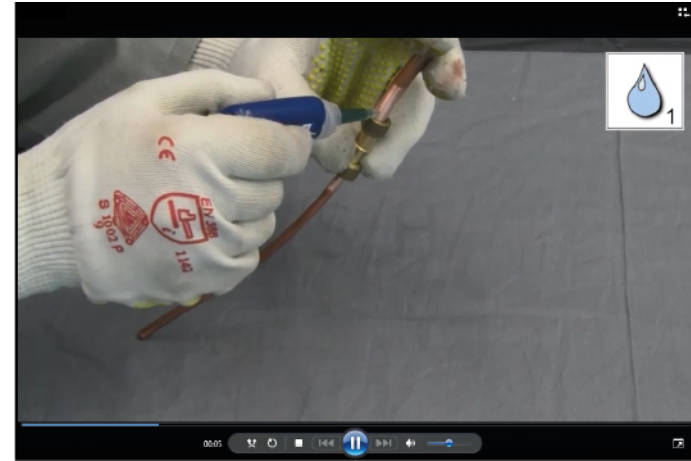
[Video tutorial](#)



8.1.6 Using Lokprep



[Video tutorial](#)



8.1.7 Using capillary tube pliers



[Video tutorial](#)



8.1.8 Checking dryer capsule



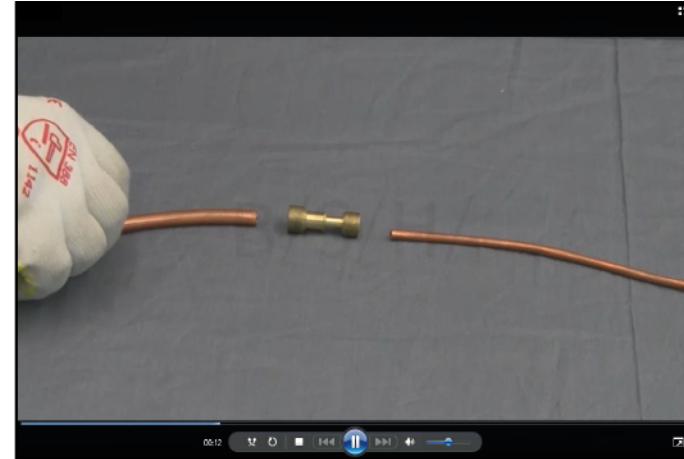
[Video tutorial](#)



8.1.9 Installing reducing connector



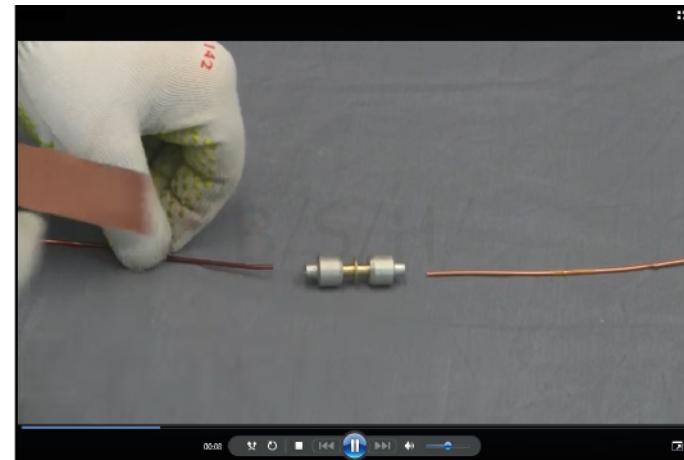
[Video tutorial](#)



8.1.10 Connecting capillary tube



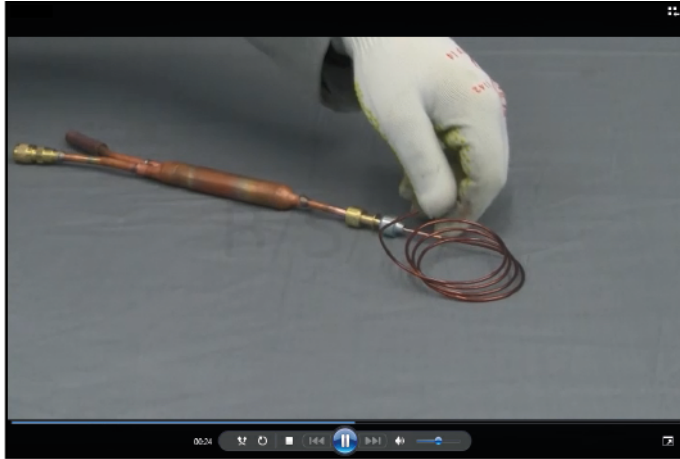
[Video tutorial](#)



8.1.11 Connecting dryer and capillary tube



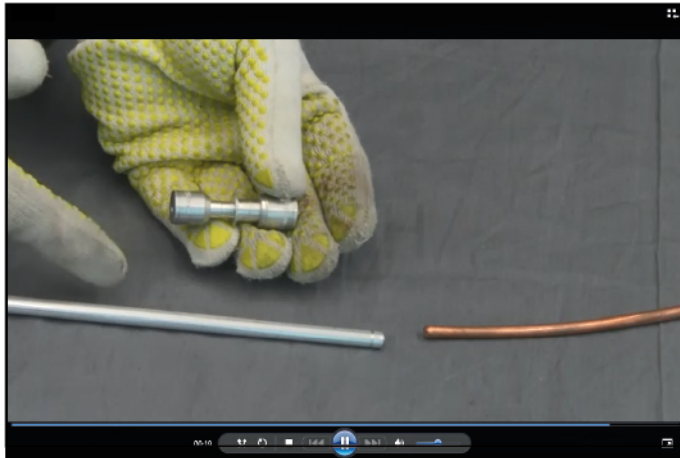
[Video tutorial](#)



8.1.12 Connecting aluminium and copper pipes



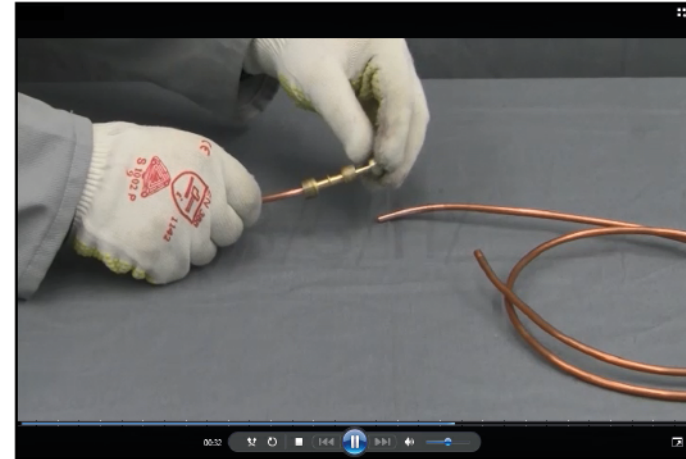
[Video tutorial](#)



8.1.13 Making one-sided pressed connection



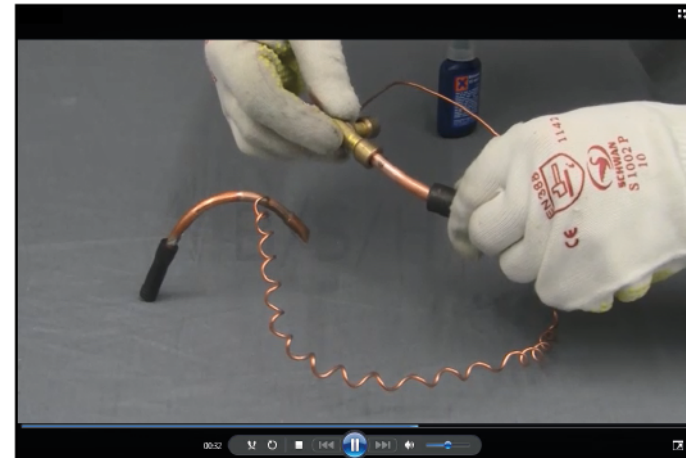
[Video tutorial](#)



8.1.14 Installing NTR connection (Y-pipe) (part 1)



[Video tutorial](#)



8.1.15 Installing NTR connection (Y-pipe) (part 2)



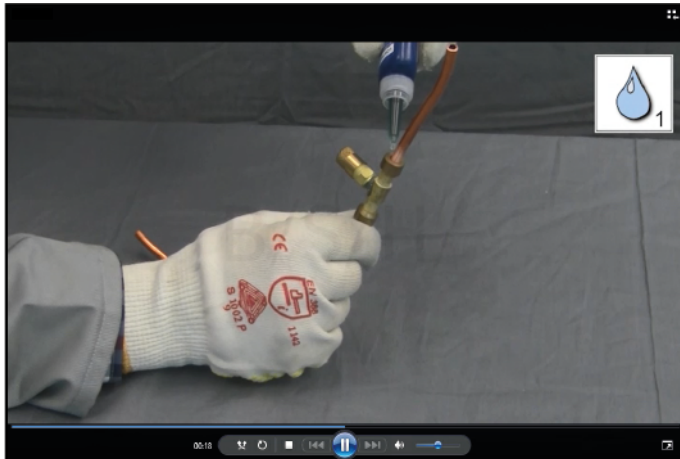
[Video tutorial](#)



8.1.16 Connecting T-piece with Schrader valve



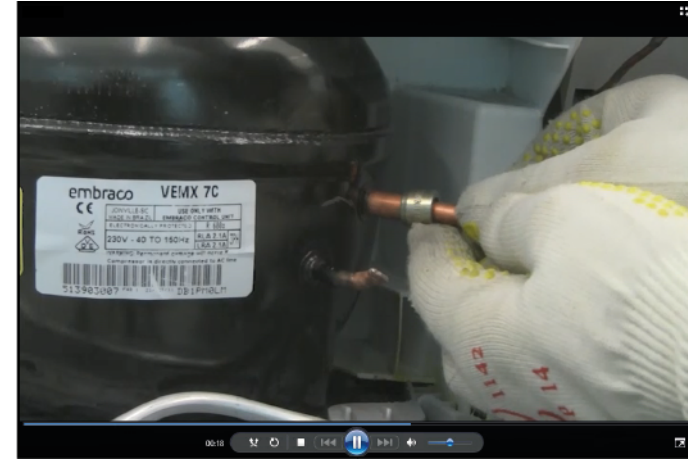
[Video tutorial](#)



8.1.17 Repairing too short compressor tube



[Video tutorial](#)



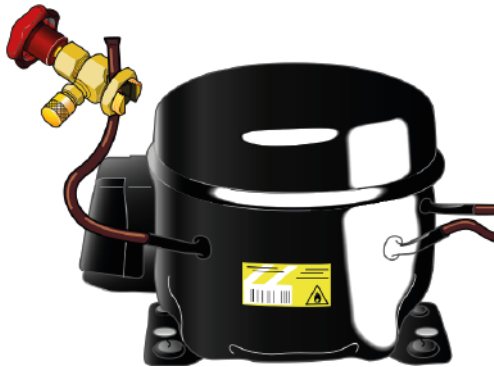
8.2 Rinsing refrigeration circuit

Required tools:


-  Pipe insertion valve for pipe insertion [00340965]

To remove blockages caused by contaminations, the refrigeration circuit must be flushed.




1. Disconnect the suction pipe from the compressor and the capillary tube from the dryer.
2. Attache probe valve to the service nozzle on the compressor or to the intake line.



Do not disconnect suction pipe.

3. Connect nitrogen tube to suction pipe with pipe coupling.
4. Open the valve on the nitrogen cylinder.
 - ➡ Evaporator and capillary tube are rinsed against the flow direction.
5.  Blockage after rinsing not removed.
 - Shorten the capillary tube to remove blocked section.



8.3 Repairing refrigeration circuit (R600a)

	<p>Danger</p> <p>Explosion hazard due to combustible refrigerants! Explosion hazard due to combustible refrigerants</p> <ul style="list-style-type: none"> ▶ Do not solder pipe connections; use Lokring connections. ▶ Keep clear of thermal appliances. ▶ Keep clear of naked flames. ▶ Ensure that room is well ventilated.
	<p>Notice</p> <p>High operating pressure in refrigerant cycle! Risk of injury caused by high pressure injection.</p> <ul style="list-style-type: none"> ▶ Do not open refrigeration circuit while the appliance is switched on.
	<p>Notice</p> <p>Leaking refrigerant! Cold burns of skin and eyes.</p> <ul style="list-style-type: none"> ▶ Wear protective gloves. ▶ Wear protective goggles. ▶ Wear personal protective equipment.

1. [Replace dryer and compressor.→ Page 60](#)
2. [Dispose of compressor oil.→ Page 61](#)
3. [Prepare refrigerant.→ Page 61](#)
4. [Evacuate refrigeration circuit.→ Page 61](#)
5. [Fill refrigeration circuit.→ Page 63](#)

8.3.1 Replacing dryer and compressor

Required tools:

- | | | | |
|--|----------------------|---|------------|
|  | Pipe cutting pliers | for copper, alu and steel pipes with outside diameter of 4 mm - 13 mm and wall thickness up to 1.5 mm | [00341282] |
|  | Pipe insertion valve | for pipe insertion | [00340965] |

Dryer can only retain a certain amount of moisture. It is not possible to identify the degree of saturation of the dryer. Accordingly, to prevent any moisture penetrating the refrigeration circuit as a result of a saturated dryer, it must be replaced after every cooling circuit repair.



When during repair it is required to open refrigeration circuit **always replace the dryer** before evacuating and filling the circuit.

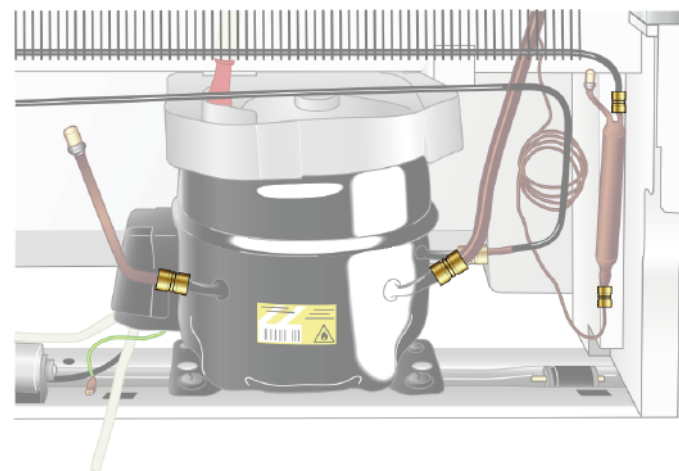
In the case of any leakage at the intake side of the refrigeration circuit, it is essential for the compressor to be replaced during the repair. As a result of the penetration of moisture into the refrigeration circuit, irreparable damage is caused to the oil in the compressor. In addition, deposits are created at the valves, and these result in compressor failure in later operation.



Compressor must only be replaced if the refrigeration circuit is leaking on the intake side.

Prerequisite:

- ✓ Compressor electrical connections are disconnected.
- 1. Insert into refrigeration circuit on both sides using pipe insertion valve.
 - ➡ Free overpressure proportion of refrigerant gas of the is released.
- 2. Using pipe cutter disconnect dryer and if required compressor from the refrigeration circuit.
 - ➡ Dryer is removed.
 - ➡ Compressor is removed.
- 3. Hermetically seal compressor connections using Lokring plug.
- 4.
 1. [Install service dryer.→ Page 12](#)
 2. Install new compressor.



8.3.2 Disposing compressor oil

Refrigerant dissolved in the oil of the R600a compressors cannot be completely removed at a justifiable cost. R600a compressors should therefore be completely and hermetically sealed and disposed of.



After compressor removal its connections must be hermetically sealed with Lokring blank plugs to prevent the R600a dissolved in the compressor oil from evaporating and flowing out of the connectors during transportation.

Prerequisite:

- ✓ Compressor is removed.
- 1. Dispose the complete compressor hermetically sealed.
- 2. ⓘ If the compressor oil has to be disposed of separately:
 1. Before removing the oil, evacuate the compressor for at least 15 minutes. In doing so, provide good ventilation or convey the exhaust gases of the vacuum pump outside.
 2. Add compressor oil to A1-suitable containers of maximum 1 L.
 3. Notify the taker of the compressor oil that the refrigerant dissolved in the compressor oil is combustible and explosive.

8.3.3 Preparing refrigerant (R600a)

Required tools:

🔧 Pocket scale	VOLTCRAFT, PS-200	[15000780]
	Measuring range: 200 g, resolution: 0.01 g	
🔧 Refrigerant	R600a, 55 g, Isobutane	[00310353]
🔧 Service valve	extraction valve for R600a, R12	[00341006]

R600a refrigerant is supplied in bottles. The amount of refrigerant required to fill the circuit must be measured very accurately. Electronic scales are used for this purpose.



During storage, refrigerant can escape from the bottle through the valve. The actual capacity can thus deviate from the specified capacity.

1. Weigh the service valve.
2. Add the net weight printed on the bottle to this value.
3. Screw service valve onto the refrigerant bottle.

4. Weigh the refrigerant bottle with screwed on service valve.



5. Deduct the weight of the service valve and net weight of the refrigerant bottle from the total weight.
- ➡ The exact quantity of refrigerant contained in the bottle is established.



The amount of refrigerant should be reduced by 1 g **if the compressor is not replaced**. The refrigerant dissolves in the compressor oil and cannot be fully expelled even by means of evacuation.

Reduce the quantity in the bottle by tapping off gas until there is only the required quantity of gas left in the cartridge (see appliance rating plate).

As R600a (isobutane) does not pollute the environment, the surplus refrigerant can be released on site into the atmosphere – however outside the customer's house – and the bottle content can be calibrated to the appliance filling amount. Then the refrigerant circuit is filled with liquid from the bottle adjusted to the filling amount.

7. ⓘ If the amount required is greater than the capacity of a single bottle.
 - Use several bottles respectively.



Please make sure to measure the quantity of refrigerant exactly!

8.3.4 Evacuating refrigeration circuit (R600a)

Required tools:

Vacuum pump

R600a, Refco RL-4, Weight: 5.65 kg, [00340790]
Output: 65 l/min (2.3 cfm), Vacuum ex
works: 15 micron, Engine: 0.19 KW,
2400 rpm, Connections: 1/4" SAE +
3/8" SAE

Pressure gauge and tubes set

R600a, double pressure gauge, tubes [00340401]
red, yellow, blue length 930 mm, tube
red length 300 mm

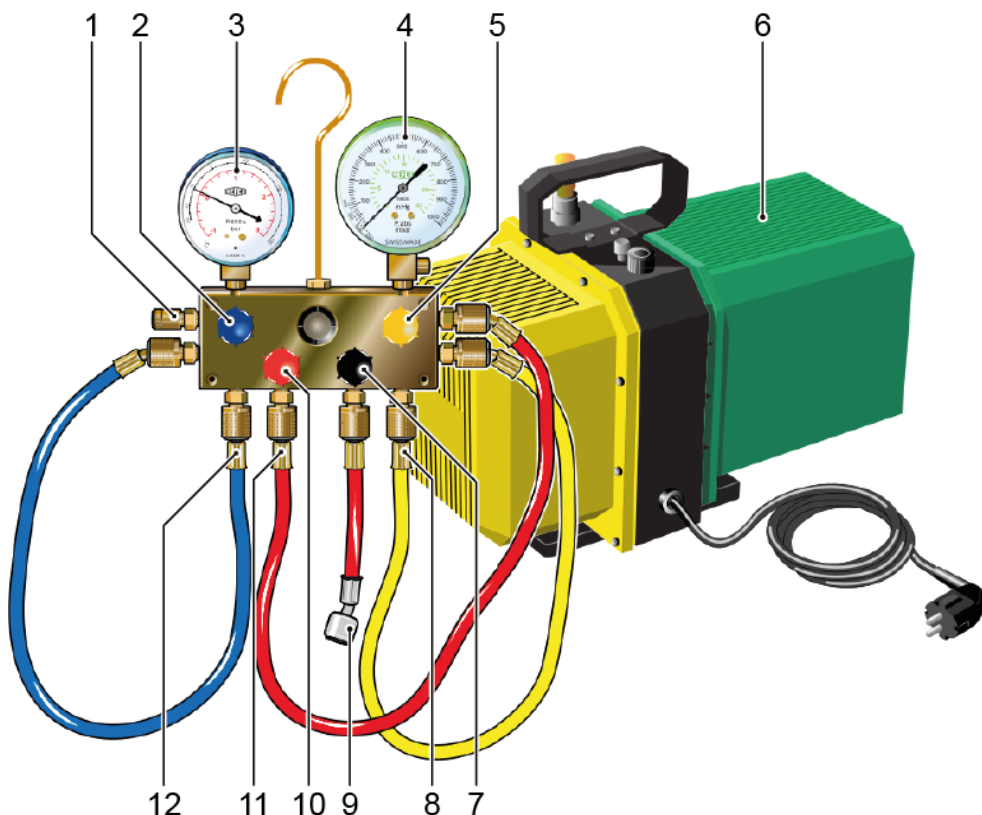


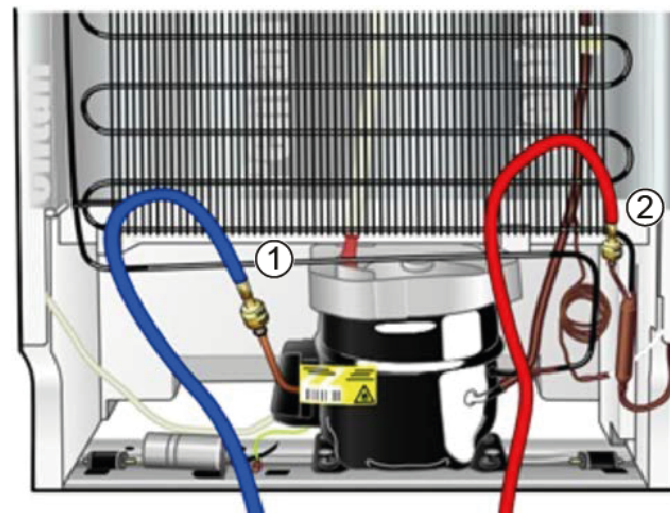
Fig. 19: Filler tools for R600a refrigerant

- 1 Connection for tormeter
- 2 Intake side valve / blue
- 3 Vacuum-pressure gauge / blue
- 4 Tormeter
- 5 Valve to shut off the tormeter / yellow / for vacuum pump

- 6 Vacuum pump
- 7 Filler valve / black / for refrigerant
- 8 Connecting hose / yellow / for vacuum pump
- 9 Connecting hose / red / for service valve attached on refrigerant bottle
- 10 Pressure side valve / red
- 11 Connecting hose / red / for service pipe of the dryer (pressure side)
- 12 Connecting hose / blue / for service pipe of the compressor (suction side)

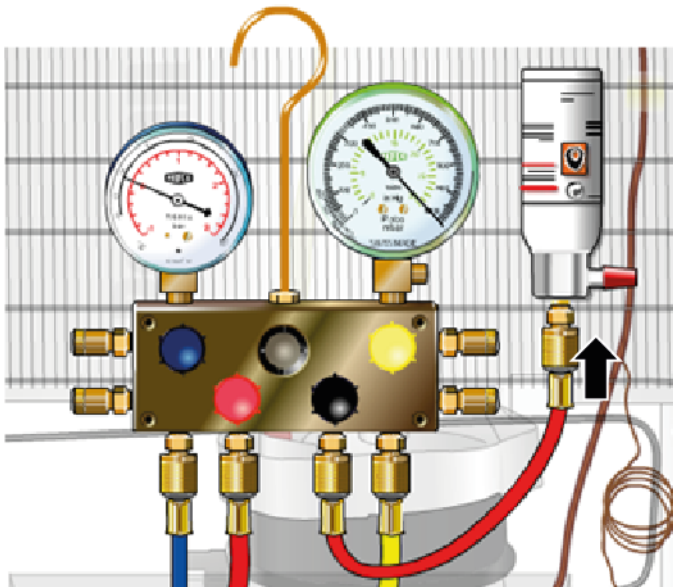
Prerequisite:

- ✓ [Dryer and compressor \(if required\) are replaced.→ Page 60](#)
 - ✓ [Refrigerant cartridge is prepared.→ Page 61](#)
 - ✓ All filling station valves are closed.
1. 1. Connect the blue hose to for the intake side to the compressor service connection (1).
 2. 2. Connect the red hose for the pressure side to the dryer service connection (2).



2. 2. Connect yellow hose to the vacuum pump.

3. Connect prepared refrigerant bottle with service valve to the short red hose.



4. Switch on vacuum pump.
5.
 1. Open yellow valve (1).
 2. Open red and blue valves (2).
 ➡ Evacuation of refrigeration circuit has started.
6. Open the black valve.

➡ Evacuation the short red filling hose has started.
7. Evacuate the refrigeration circuit for at least 10 min, until the pointers on the vacuum gauge reach 0 bar.
8. Close all filling station valves.
9. Switch off the vacuum pump.

➡ Refrigeration circuit is evacuated.

8.3.5 Filling refrigeration circuit (R600a)

Required tools:




Sealant LOKPREP 65G, 15 ml [00340083]

Prerequisite:

- ✓ [Refrigeration circuit is evacuated.→ Page 61](#)
- ✓ All filling station valves are closed.

1.
 1. Hold the refrigerant bottle down (1).
 2. Open the service valve on the refrigerant bottle (2).
 ➡ Liquid refrigerant flows into short red hose.
2.
 1. Open black and blue valves.
 2. Observe blue pressure gauge from the intake side.
 ➡ Refrigerant starts flowing into refrigeration circuit.
3. Start the compressor to accelerate the filling process.
4.
 - if If additional refrigerant bottle is required.
 1. Close black valve.
 2. Replace empty refrigerant bottle with another bottle filled with required amount of refrigerant.
 3. Continue refrigeration circuit filling process.
5.
 - if If desired amount of refrigerant is in the refrigeration circuit.
 1. Close black and blue valves.
 2. Close the service valve on the refrigerant bottle.
6. Switch off the compressor.
7. Remove red connecting hose from the dryer service pipe.
8.
 1. Pinch off the dryer service pipe.
 2. Apply Lokprep to the thread of the Schrader valve on the dryer service pipe.
 3. Close the Schrader valve with the locking cap.
9. Remove blue connecting hose the compressor service pipe.
10.
 1. Pinch off the compressor service pipe.
 2. Apply Lokprep to the thread of the Schrader valve on the compressor service pipe.
 3. Close the Schrader valve with the locking cap.
 ➡ Refrigeration circuit is filled with refrigerant.
11. [Check refrigeration circuit for leaks.→ Page 51](#)



8.4 Repairing refrigeration circuit (R134a)

	<p>Notice</p> <p>High operating pressure in refrigerant cycle! Risk of injury caused by high pressure injection.</p> <ul style="list-style-type: none"> ▶ Do not open refrigeration circuit while the appliance is switched on.
	<p>Notice</p> <p>Leaking refrigerant! Cold burns of skin and eyes.</p> <ul style="list-style-type: none"> ▶ Wear protective gloves. ▶ Wear protective goggles. ▶ Wear personal protective equipment.
	<p>Work on any open R134a refrigeration circuit should be completed without delay. A synthetic ester oil is used in these refrigeration circuits. One characteristic of this oil is that it binds with moisture in the atmosphere very quickly. For this reason, where possible the refrigeration circuit should not be left open for more than 30 min, as this will result in severe enrichment with moisture, and therefore to a build-up of acid in the oil.</p>


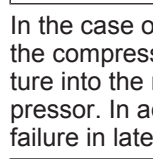

1. [Replace dryer and compressor.→ Page 64](#)
2. [Dispose of compressor oil.→ Page 61](#)
3. [Filling the filler cylinder→ Page 65.](#)
4. [Evacuate refrigeration circuit.→ Page 66](#)
5. [Fill refrigeration circuit.→ Page 67](#)

8.4.1 Replacing dryer and compressor

Required tools:

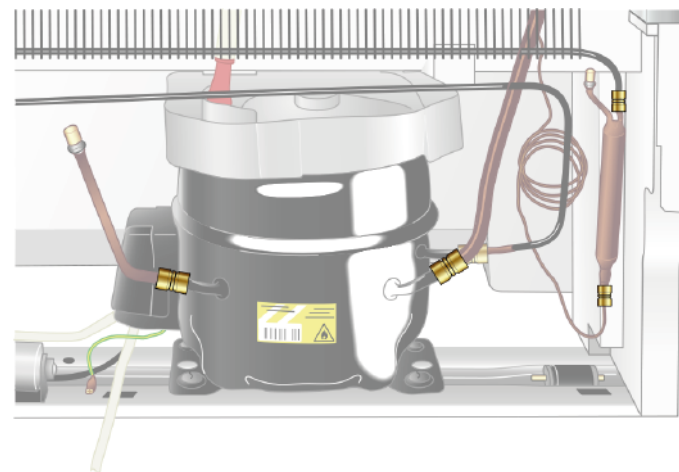
 Pipe cutting pliers	for copper, alu and steel pipes with outside diameter of 4 mm - 13 mm and wall thickness up to 1.5 mm	[00341282]
 Pipe insertion valve	for pipe insertion	[00340965]

Dryer can only retain a certain amount of moisture. It is not possible to identify the degree of saturation of the dryer. Accordingly, to prevent any moisture penetrating the refrigeration circuit as a result of a saturated dryer, it must be replaced after every cooling circuit repair.

	<p>When during repair it is required to open refrigeration circuit always replace the dryer before evacuating and filling the circuit.</p>
	<p>In the case of any leakage at the intake side of the refrigeration circuit, it is essential for the compressor to be replaced during the repair. As a result of the penetration of moisture into the refrigeration circuit, irreparable damage is caused to the oil in the compressor. In addition, deposits are created at the valves, and these result in compressor failure in later operation.</p>
	<p>Compressor must only be replaced if the refrigeration circuit is leaking on the intake side.</p>

Prerequisite:

- ✓ Compressor electrical connections are disconnected.
- 1. Insert into refrigeration circuit on both sides using pipe insertion valve.
 - ➡ Free overpressure proportion of refrigerant gas of the is released.
- 2. Using pipe cutter disconnect dryer and if required compressor from the refrigeration circuit.
 - ➡ Dryer is removed.
 - ➡ Compressor is removed.
- 3. Hermetically seal compressor connections using Lokring plug.
- 4. 1. [Install service dryer.→ Page 12](#)
2. Install new compressor.



8.4.2 Disposing compressor oil

Refrigerant dissolved in the oil of the compressors cannot be completely removed at a justifiable cost. Compressors should therefore be completely and hermetically sealed and disposed of.



After compressor removal its connections must be hermetically sealed with Lokring blank plugs to prevent the dissolved in the compressor oil from evaporating and flowing out of the connectors during transportation.

Prerequisite:

- ✓ Compressor is removed.
- 1. Dispose the complete compressor hermetically sealed.
- 2. ⓘ If the compressor oil has to be disposed of separately:
 1. Before removing the oil, evacuate the compressor for at least 15 minutes. In doing so, provide good ventilation or convey the exhaust gases of the vacuum pump outside.
 2. Add compressor oil to A1-suitable containers of maximum 1 L.
 3. Notify the taker of the compressor oil that the refrigerant is dissolved in the compressor oil.
- 3. Notify the taker of the compressor oil that the refrigerant dissolved in the compressor oil.

8.4.3 Filling the filler cylinder (R134a)

Required tools:

- | | | |
|-------------------|---|------------|
| ⚙ Filling station | R134a, Refco, complete | |
| ⚙ Refrigerant | R134a, 750 ml / 920 g, Tetrafluoro-ethane | [00310352] |



Prior to evacuation, the required quantity of refrigerant for a refrigeration circuit repair must be added to the filler cylinder.

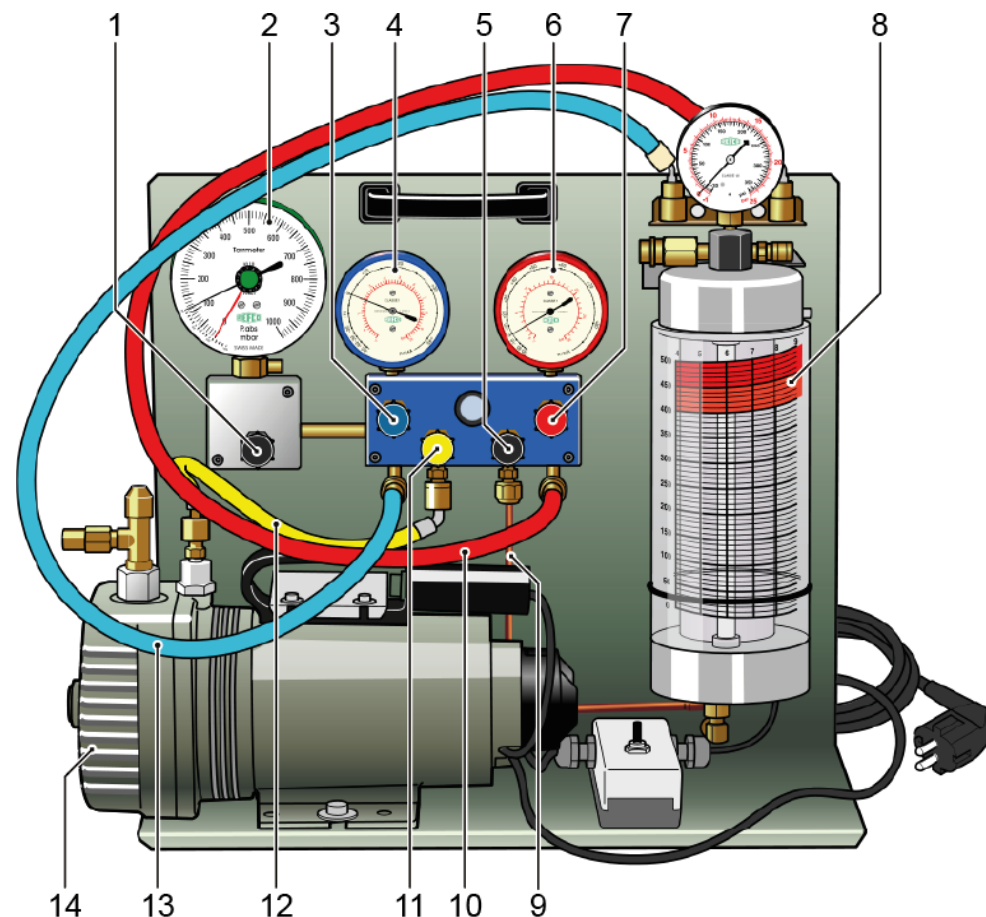
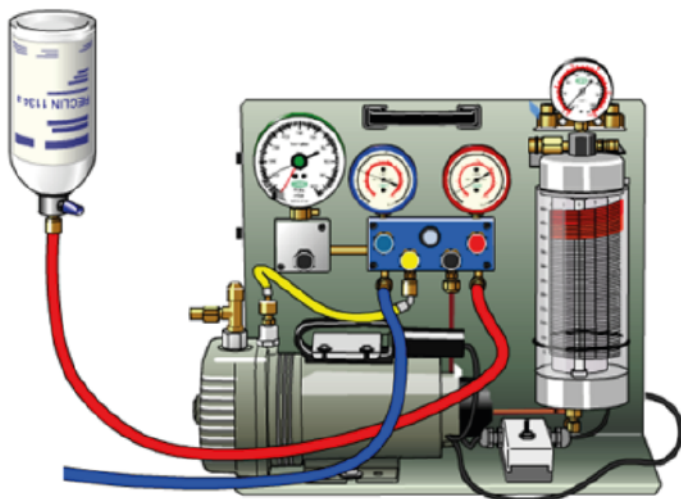


Fig. 20: Filling station refrigerant for R134a

- 1 Valve / black / for vacuum gauge
- 2 Vacuum gauge
- 3 Valve / blue / for suction side
- 4 Manometer / blue / for suction side
- 5 Valve / black / for refrigerant
- 6 Manometer / red / for pressure side
- 7 Valve / red / for pressure side
- 8 Fill cylinder
- 9 Filling hose / red / for fill cylinder

- 10 Connecting hose / red / for service pipe of the dryer (pressure side)
- 11 Valve / yellow / for vacuum pump
- 12 Connecting hose / yellow / for vacuum pump
- 13 Connecting hose / blue / for service pipe of the compressor (suction side)
- 14 Vacuum pump

1. Close all valves of the filling station.
2. Connect the refrigerant bottle to the red hose.



3. Open the red and black valve.
4. Hold the refrigerant bottle with the tapping valve down.

➡ Liquid refrigerant flows into the cylinder.

5.

i	The glass tube in the middle of the cylinder serves as a level indicator . The manometer on the cylinder shows the pressure in the cylinder.
----------	---

Select the right scale by turning the scale ring.

6. Read the necessary quantity off from the scale.
7. Mark the necessary volume of refrigerant on the scale ring.
8.

i	When filling the cylinder, add as much refrigerant so that about 25 g of the refrigerant remain in the cylinder.
----------	--

Add refrigerant to the cylinder until the marking on the scale is reached.

9. Close the red and black valves.
10. Remove the refrigerant cylinder.

➡ When removing the refrigerant cylinder, the refrigerant escapes between the red valve and the refrigerant cylinder.

8.4.4 Evacuating refrigeration circuit (R134a)

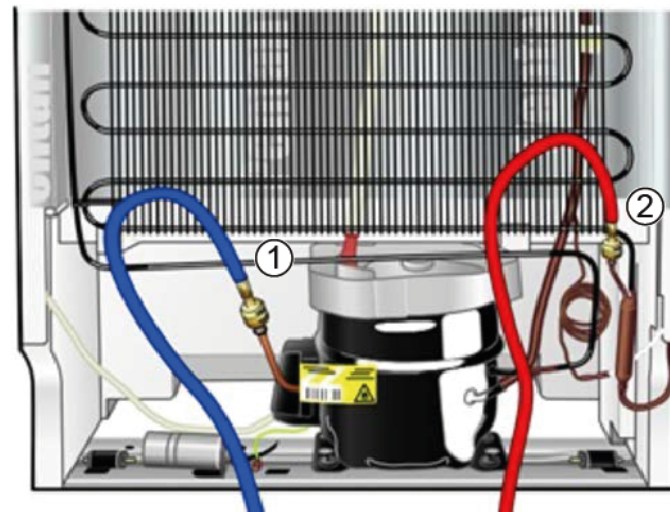
Prerequisite:

✓ [Dryer and compressor \(if required\) are replaced. → Page 64](#)


✓ [Filler cylinder is filled with refrigerant. → Page 65](#)

✓ All filling station valves are closed.

1. 1. Connect the blue hose to for the intake side to the compressor service connection.
2. Connect the red hose for the pressure side to the dryer service connection.



2. Connect the yellow hose to the vacuum pump.
3. Connect the red hose (below black valve) to the cylinder.
4. Switch on the vacuum pump.
5. Open the yellow valve.
6. Open the black valve on the vacuum gauge.
The status of the vacuum can be read off at the tormaneter.
7. Align the red pointer with the black pointer of the vacuum gauge.
8. 1. Open blue valve for the intake side.
2. Open red valve for the pressure side.

9.  The vacuum is reached once the red and black pointers are aligned.

Allow the vacuum pump to run for at least 10 min, until the pointers on the vacuum gauge reach 0 bar.



10. Close the yellow valve.

11. Switch off the vacuum pump.

➡ Refrigeration circuit is evacuated.

8.4.5 Filling refrigeration circuit (R134a)

Required tools:

	Pipe cutting pliers	for copper, alu and steel pipes with outside diameter of 4 mm - 13 mm and wall thickness up to 1.5 mm	[00341282]
	Sealant	LOKPREP 65G, 15 ml	[00340083]



Notice

Electrical flashover on the compressor!

Destruction of the compressor

- Ensure that the compressor is only started once the vacuum is broken.

Prerequisite:

✓ [Refrigeration circuit is evacuated.→ Page 66](#)

✓ All filling station valves are closed.

1. Open black and blue valves.

➡ Refrigerant flows into the refrigeration circuit.

2. Start the compressor to accelerate the filling process.

3.  If desired quantity of refrigerant is in the circuit:

- Close the black and blue valves.

4. Remove red connecting hose from the dryer service pipe.

5. 1. Pinch off the dryer service pipe.

2. Apply Lokprep to the thread of the Schrader valve on the dryer service pipe.

3. Close the Schrader valve with the locking cap.

6. Remove blue connecting hose the compressor service pipe.

7. 1. Pinch off the compressor service pipe.

2. Apply Lokprep to the thread of the Schrader valve on the compressor service pipe.



3. Close the Schrader valve with the locking cap.

➡ Refrigeration circuit is filled with refrigerant.

8. [Check refrigeration circuit for leaks.→ Page 51](#)

8.5 Sanitising the water system

Required tools:

	Disinfection set	in the suitcase	[00342230]
	Disinfectants	Huwa-San Med2, 5 litres canister	[00310550]

Sanitisation reduces the bacterial count in water pipe systems (ice maker, water dispenser) improving the water taste as a result.

1. Prepare the appliance:

1. Remove water inlet hose of appliance at water tap.
2. Replace internal water filter with filter bypass.
3. Remove external water filter.
4. Connect hoses with existing coupling.

2. Prepare sanitisation solution:

1. Pour 5 L of sanitisation solution into the pressure tank of the garden pump and close the lid.
2. Connect the hose of the garden pump to the water inlet hose of the appliance.
3. Increase the pressure of the garden pump to max. 5 bar and open tap.

3. Fill pipework of water dispenser with sanitising solution:

1. Remove 3 L of liquid from water dispenser into measuring beaker and discard.
2. Disconnect the appliance from the power supply.

4. Rinse the pipework of the water dispenser:

1. Connect the mains plug of the appliance.
2. Remove 5 L of liquid from water dispenser into measuring beaker and discard.
3. Remove filter bypass.
4. Insert a new water filter.

5. Fill ice maker pipe system with sanitisation solution:

1. Remove the ice container and empty it.
2. Remove the ice maker.
3. Attach the hose to the water inlet pipe of the ice maker.
4. Position the measuring beaker and place the hose in it.
5. Increase the pressure in the garden pump to max. 5 bar again.
6. Remove the rear cover of the machine room.
7. Connect the protective conductor of the mains cable to the protective conductor terminal of the appliance.
8. Connect the mains cable to the solenoid valve for the ice maker and, if applicable, to the safety valve as well.
9. Plug the current-operated circuit breaker into the socket ("Off" position).
10. Connect the current-operated circuit breaker with the powerstrip.
11. Plug the mains cable into the powerstrip.
12. By switching the powerstrip on and off, activate the magnetic valve until 1 L of liquid has poured into the measuring beaker.
13. Discard the liquid.

6. Rinse the ice maker pipe system:

1. Allow sanitising solution to take effect for 30 minutes.
2. Close tap on hose of garden pump.
3. Connect water inlet hose of appliance to water tap.
4. Position the measuring beaker in the ice maker compartment.
5. Insert the hose into the measuring beaker.
6. By switching the powerstrip on and off, activate the magnetic valve until 5 L of liquid have poured into the measuring beaker.
7. Discard the liquid.
8. Unplug the current-operated circuit breaker.
9. Unplug the mains cable from the powerstrip.
10. Check the tightness.
11. Install the appliance.

7. Follow-up work for sanitisation set:

1. Empty the garden pump.
2. Clean all parts.
3. Dry all parts.

8. Advise customer:

1. Throw away any ice produced in the next 24 hours.
2. Draw fresh water regularly.
3. Do not switch off the appliance for longer than 24 hours.

8.6 Sticking brand logo

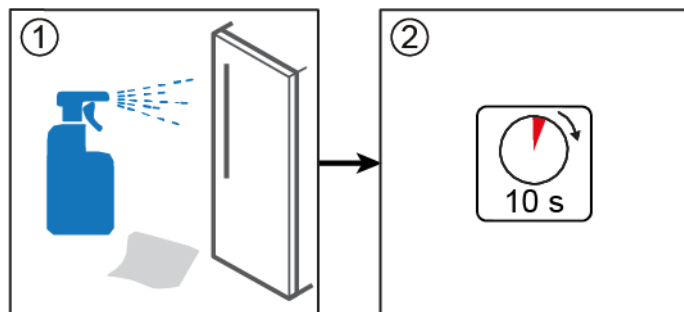
Required tools:

☞ Cleaner	Buraton® rapid, 1 l, for surfaces alcoholic disinfection	[00080524]
☞ Cleaning cloth	antistatic	[00341878]
☞ Polishing paste	Glasurit Fine polishing paste 562-1602, 375 ml	[00311399]
☞ Cotton pads	100% cotton, especially strong, lint-free and super soft	
☞ Hand roller	Hard rubber or rubber coated steel roller	

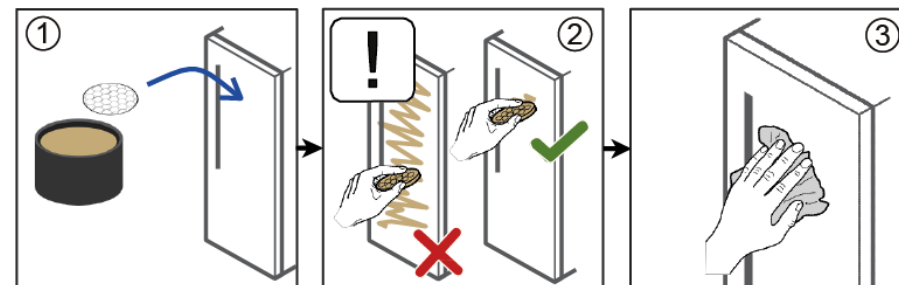
Prerequisite:

- ✓ Surface to be glued is dry, free of dust, grease and release agents.
- ✓ There is no moisture precipitation (e.g. from moving cold appliance to warm room).
- ✓ Optimal processing temperature is from 21 °C to 38 °C, minimum. 18 °C.

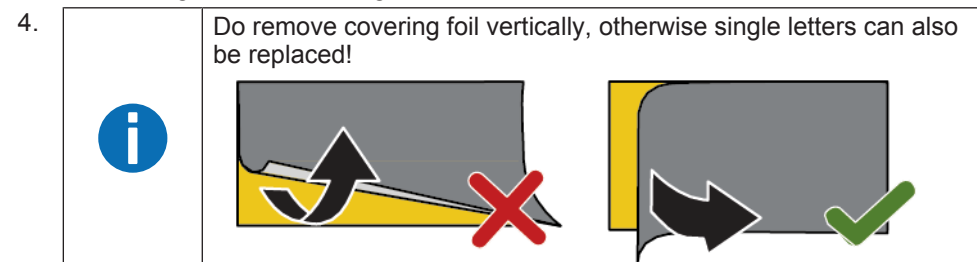
1. ☞ If door surface for brand logo stick is **inox / plastic**:
 1. Clean surface with cleaner and wet wipe (1).
 2. Let surface dry for approx. 10 s (2).



2. ☞ If door surface for brand logo stick is **inox look**:
 1. Using cotton swab apply small drop of polishing paste on the door surface (1).
 2. Wipe back and forth twice over the surface to be glued (2).
 3. Polish surface with soft, dry cloth (3).

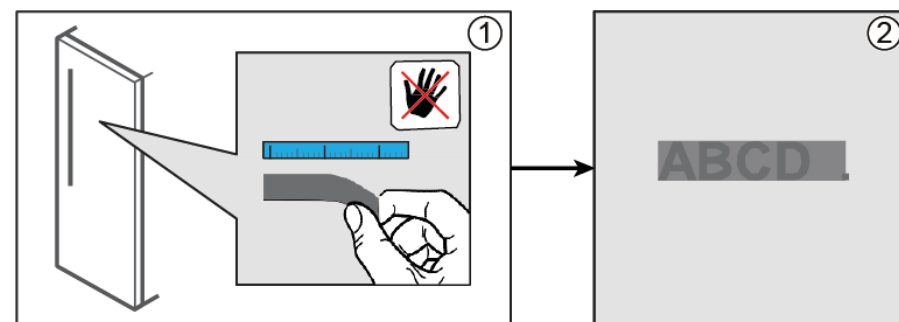


3. Peel off logo sticker covering foil at one corner.



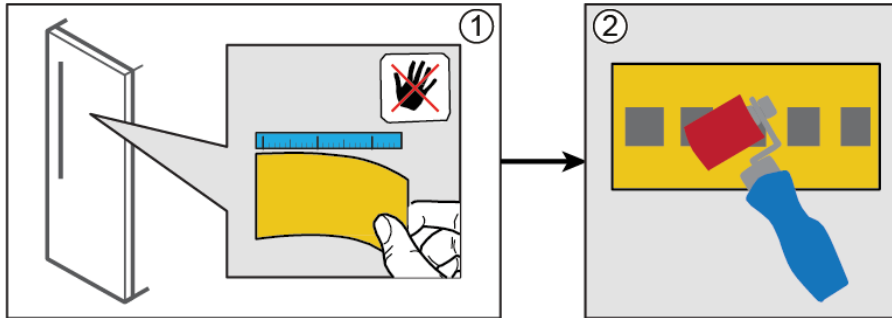
Remove covering foil.

5. ☞ Do not touch the adhesive surface. Touching this surface reduces adhesion.
 1. Stick logo on the dedicated position of door (1).
 2. Remove protective foil (2).



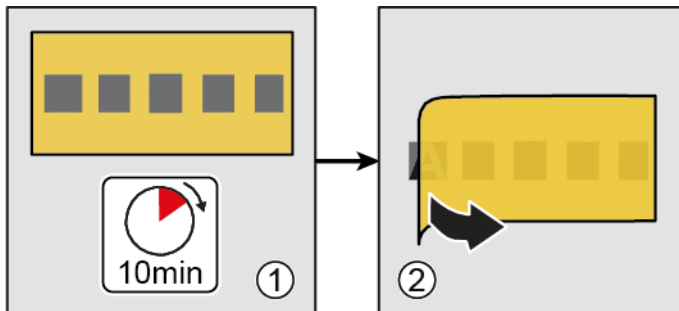
➡ Logo is installed.

6. **if** If logo is single letters logo:
1. Stick logo on the dedicated position of door (1).
 2. Move hand roller (e.g. rubber-coated steel roller or hard rubber roller) 3-4 times over the logo (2).



7. **i** Adhesive takes time to build up liability!

1. Wait 10 min (1).
2. Carefully remove protective foil (2).




- ➡ Single letter logo is installed.

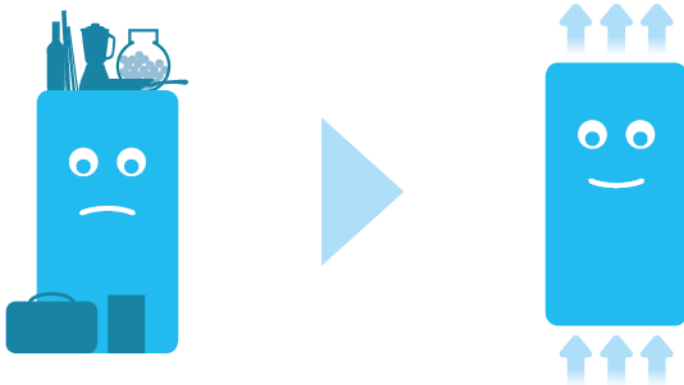
Customer advice

9.1 Reducing energy consumption

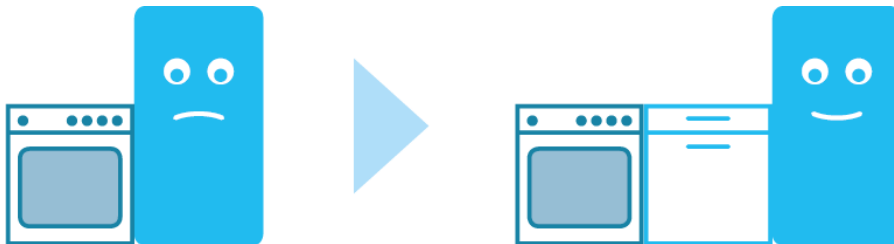
9.1.1 Room conditions

	Ideal room temperature around is 20 °C.
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1. Advise customer:
Position appliance in a room that can be ventilated.



2. Advise customer:
Keep the appliance out of direct sunlight.
3. Advise customer:
Appliance should not be installed nearby heat sources (e.g. heating element, cooker, oven).



9.1.2 Compartment temperatures

1. Advise customer:
ⓘ *If precise temperature adjustment is available set temperature setting:*
 1. Cold-storage compartment: from +8 °C to +12 °C.
 2. Refrigerator compartment: +4 °C.
 3. Fresh food compartment: close to 0 °C.
 4. Freezer compartment: -18 °C.
2. Advise customer:
Alternatively select medium temperature controller setting.

9.1.3 Door opening times

1. Advise customer:
Open door as briefly as possible.



2. Advise customer:
Arrange and store food neatly.



Customer advice

9.1.4 Food storage

1. Advise customer:
Leave hot food to cool down before storing it.



2. Advise customer:
Store food wrapped or well covered.



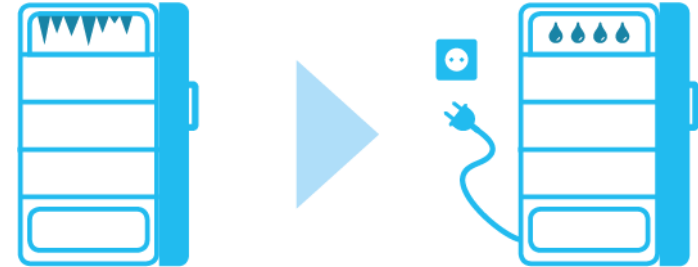
3. Advise customer:
When thawing frozen products, place them in the refrigerator compartment.

4. Advise customer:
In order to ensure air circulation do not overload compartments.



9.1.5 Defrosting

- Advise customer:
Defrost freezer compartment in case of ice formation of more than 1 cm.



In appliances with Low Frost cooling system compartment does not defrost automatically. Layer of frost need to be removed regularly.

9.2 Transporting the appliance

During transportation the oil in the compressor may have flowed into the refrigeration system.

- Once the appliance has been set up, wait at least 1 hour before commissioning.