IvoBase® Injector

Operating Instructions

Valid as of Software Version 2.0

CE

ivoclar vivadent® technical

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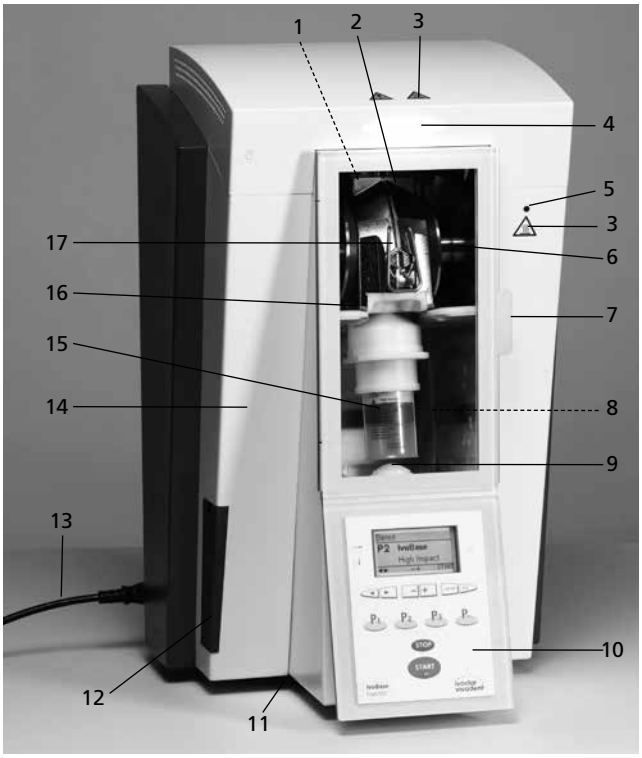

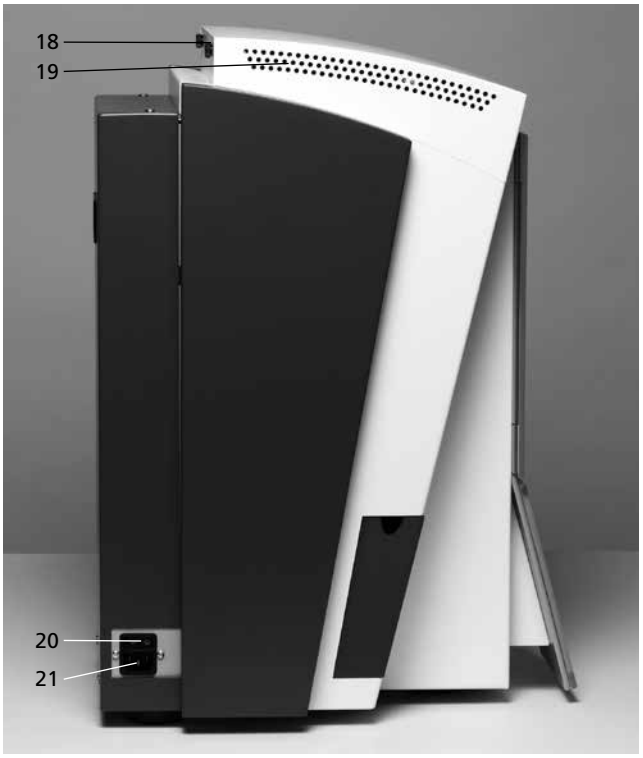

Injector:

1 Temperature sensor
2 Heater
3 Warnings
4 Operating Status Display (OSD)
5 Warning light
6 Clasps
7 Door handle
8 Polymerization chamber
9 Injection head
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18 Knurled screw for hood
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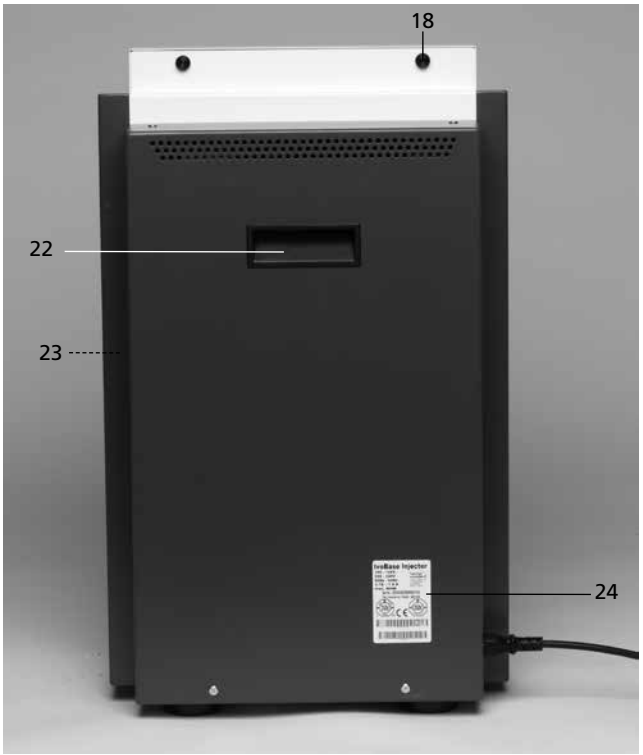
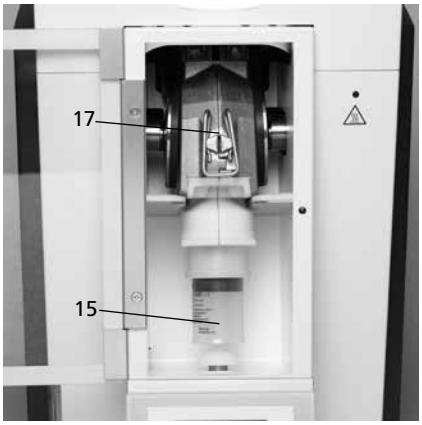
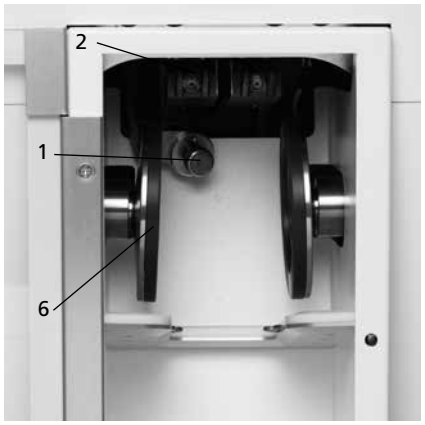
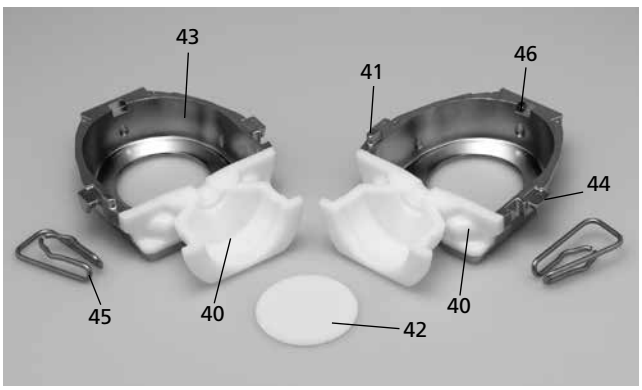


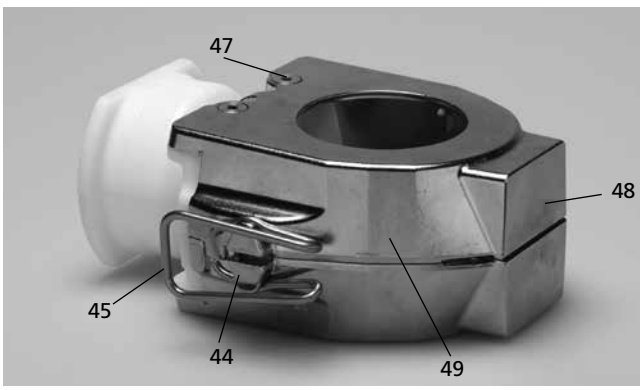




Flask:

40 Isolating shoulder
41 Centering peg
42 Flask lid
43 Flask housing
44 Locking clasp attachment
45 Locking clasp
46 Recess for the aeration filter
47 Screws
48 Heating surface
49 Sensor surface

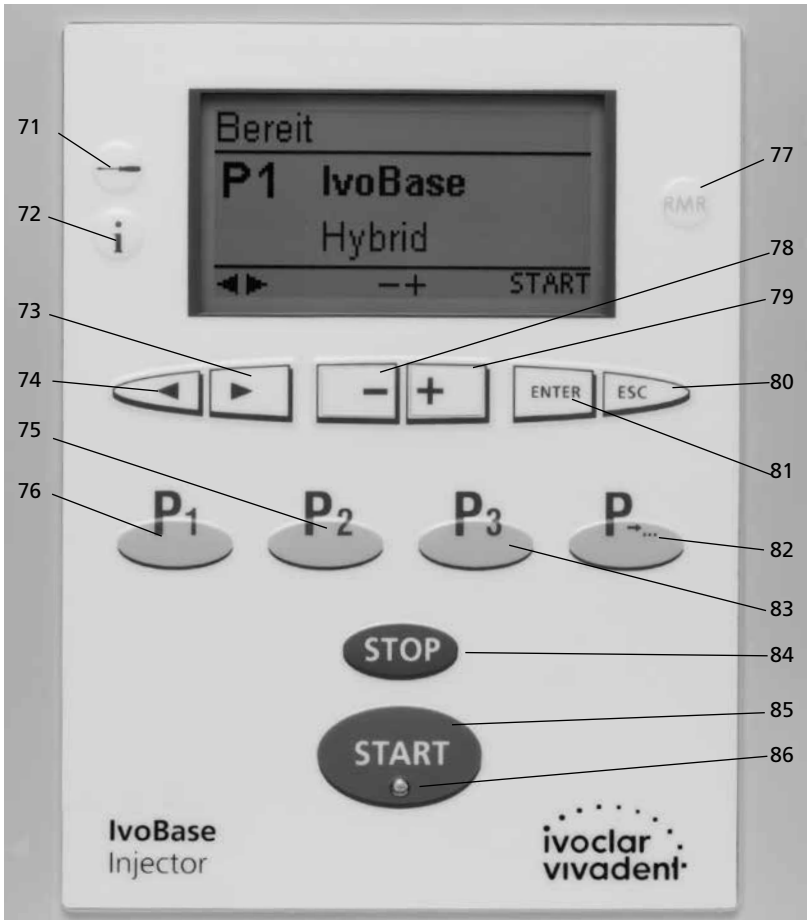




61 Access former half
62 Access former full
63 Centring insert
64 Deflasking aid

Operating panel

71 Settings key
72 Information key
73 Right cursor key
74 Left cursor key
75 Program 2 key
76 Program 1 key
77 RMR key
78 – key
79 + key
80 ESC key
81 ENTER key
82 Next Program Number key
83 Program 3 key
84 STOP key
85 START key
86 START LED



100 Thermal glove

101 USB download cable

102 Temperature Checking Set

Please note that the list of parts applies to the entire Operating Instructions. References are made to the parts and/or the numbering in later chapters.

1. Introduction / Signs and Symbols

1.1 Preface

Dear Customer

Thank you for having purchased the IvoBase Injector. It is a modern injection device for dental applications. The injector has been designed according to the latest industry standards. Inappropriate use may damage the equipment and be harmful to personnel.
Please observe the relevant safety instructions and read the Operating Instructions carefully.
Enjoy working with the IvoBase Injector.

1.2 Introduction

The signs and symbols in these Operating Instructions and on the injector facilitate the finding of important information and have the following meanings:


Risks and dangers


Important information


Contraindication


Burn hazard


Risk of crushing


Fire hazard


The Operating Instructions must be read.

1.3 Notes regarding the Operating Instructions

– Device concerned: IvoBase Injector
– Target group: Dental technologists

These Operating Instructions facilitate the correct, safe and economic use of the IvoBase Injector. Should you lose the Operating Instructions, extra copies can be ordered at a nominal fee from your local Ivoclar Vivadent Service Centre or downloaded in the Download Center at www.ivoclarvivadent.com/downloadcenter.

1.4 Note on the different voltage versions

The injector is suitable for the following voltage range:

100 – 120 V / 50 Hz – 60 Hz
200 – 240 V / 50 Hz – 60 Hz

No manual switch-over is necessary to use the individual voltage versions. Please make sure that the voltage indicated on the rating plate complies with the local power supply before setting the injector into operation.

2. Safety First

This chapter is especially important for individuals who work with the IvoBase Injector or who have to carry out maintenance or repair work. This chapter must be read and the corresponding instructions followed!

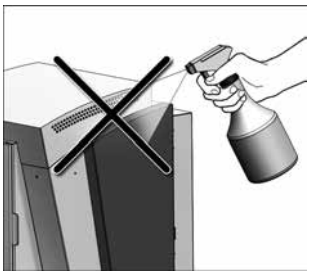
2.1 Indications

The IvoBase Injector is solely intended for the processing of special resins for dental applications. It should be used for this purpose only. Uses other than the ones stipulated, e.g. injection of other materials, etc., are contraindicated. The manufacturer does not assume any liability for damage resulting from misuse. The user is solely responsible for any risk resulting from failure to observe these Instructions.

Further instructions to assure proper use of the injector:
- The instructions, regulations and notes in these Operating Instructions must be observed.
- The instructions, regulations and notes in the material's Instructions for Use must be observed.
- The injector must be operated under the indicated environmental and operating conditions (see Chapter 9).
- The IvoBase Injector must be properly maintained.

2.1.1

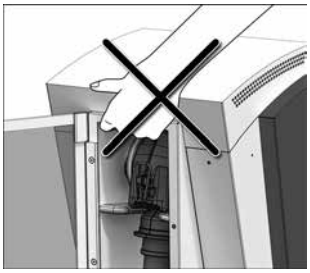
Risks and dangers



Make sure that no liquids or other foreign substances enter the injector during cleaning.

2.1.2

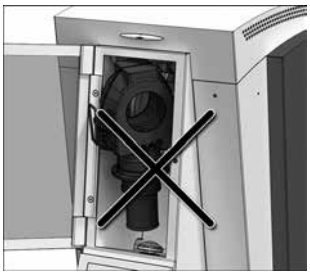
Risks and dangers



The injector may only be carried by supporting the bottom under the operating field and by the recessed grip at the rear of the injector.

2.1.3

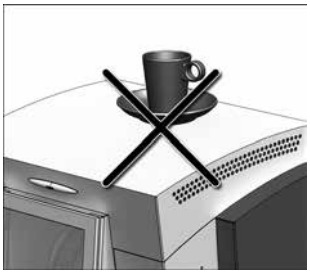
Risks and dangers



Make sure that the flask is correctly positioned.
The injection program must not be started if the flask is incorrectly positioned.

2.1.4

Contraindication



Foreign objects must not be placed on the injector.

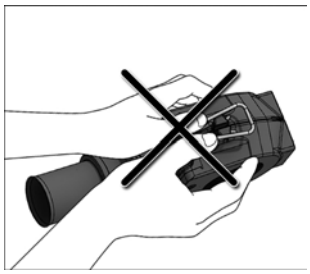
2.1.5

Contraindication

The hood may only be removed while the injector is switched off and the power plug disconnected.

2.1.6

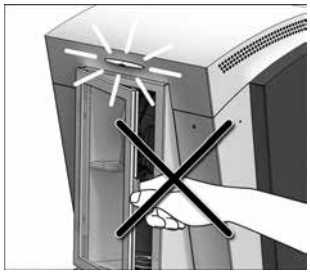
Contraindication



The locking clasp may only be removed from the flask by rotating, rather than pushing it.

2.1.7

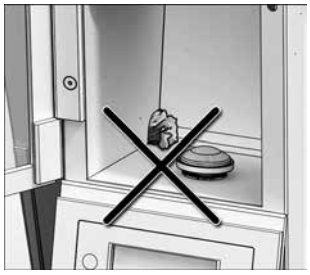
Contraindication



The safety door must not be opened while a program is in progress.

2.1.8

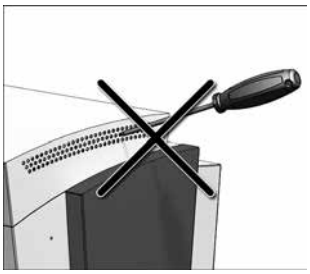
Contraindication



If the discharge outlet is clogged, the injector must not be operated.

2.1.9

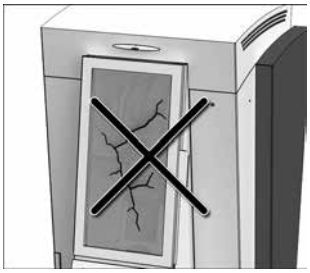
Contraindication



Foreign objects must not enter the air vents.

2.1.10

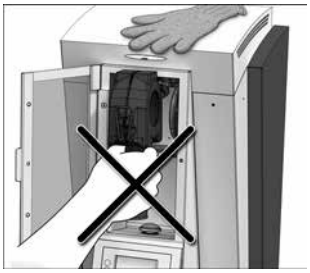
Contraindication



The injector must not be operated if it shows visible damage, for example, at the heater, safety door or clasps, etc.

2.1.11

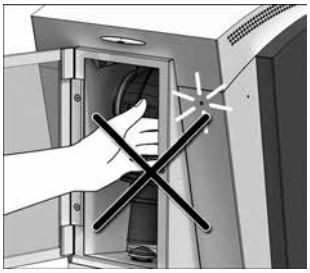
Burn hazard



The flask must not be loaded or removed from the injector without thermal glove.

2.1.12

Burn hazard



Do not reach into the hot injector!
Do not reach into the injector while the red warning light is still on. When switched off, the injector may still be hot even if the warning light is not on.

2.2 Health and safety instructions

This injector has been designed according to EN 61010-1 and has been shipped from the manufacturer in excellent condition as far as safety regulations are concerned. To maintain this condition and to ensure risk-free operation, the user must observe the notes and warnings contained in these Operating Instructions.

- It is important that the user becomes familiar with the warnings and operating conditions to prevent injury to personnel or damage to materials. The manufacturer is not responsible for damage resulting from misuse or failure to observe the Operating Instructions. Warranty claims cannot be accepted in such cases.
- Before switching on the injector, make sure that the voltage indicated on the rating plate complies with your local power supply.
- The mains socket must be equipped with a residual current operated device (FI).
- The power plug may only be inserted into sockets with protected contacts.
- Place injector on a fire-proof table. Observe local regulations (e.g. distance to combustible substances or objects, etc.).
- Always keep the air vents unobstructed.
- Do not touch any parts that become hot during operation of the injector. Burn hazard!
- Clean injector only with a dry, soft cloth. Do not use any solvents! Disconnect power before cleaning and allow the injector to cool down!
- The injector must be cool before it is packed for transportation.
- Use original packaging for transportation purposes.
- Before calibration, maintenance, repair or change of parts, the power must be disconnected and the injector has to be cool if it has to be opened.
- If calibration, maintenance or repair has to be carried out with the power connected and injector open, only qualified personnel who are familiar with the risks and dangers may perform the procedures.
- After maintenance, the required safety tests (high voltage resistance, protective conductor, etc.) must be carried out.
- Make sure that only fuses of the indicated type and rated current are used.
- If it is assumed that safe operation is no longer possible, the power must be disconnected to avoid accidental operation
  - if the injector is visibly damaged.
  - if the injector does not work.
  - if the injector has been stored under unfavourable conditions over an extended period of time.
- Use only original spare parts.
- Observe the correct temperature range to ensure faultless operation (see section 9.2 Technical data).
- If the injector has been stored at very low temperatures or high atmospheric humidity, it must be dried or left to adjust to the room temperature for approx. 4 hours prior to connecting power.
- The injector is tested for use at altitudes of up to 2000 m (6562 ft) above sea level.
- The injector may only be used indoors.

Any disruption of the protective conductor either inside or outside the injector or any loosening of the protective conductor may lead to danger for the user in case of a malfunction. Deliberate interruptions are not permissible.

Material developing harmful gases must not be processed.

Monomer is used in the processing of denture base material in the IvoBase Injector. This substance contains methyl methacrylate (MMA), which is highly flammable. Please handle this substance with care and avoid direct skin contact. Please observe the detailed health and safety instructions contained in the Instructions for Use of the respective material.

Disposal:

The apparatus must not be disposed of in the normal domestic waste. Please correctly dispose of old devices according to the corresponding EU council directive. Information regarding disposal can be found on the respective national Ivoclar Vivadent website.

3. Product Description

3.1 Components

The IvoBase Injector comprises the following components:
– Basic injector with polymerization chamber and operating panel
– Flask
– Waste water container
– Power cord

3.2 Hazardous areas and safety equipment

Description of the hazardous areas of the injector:

Hazardous area	Type of risk
Polymerization chamber	Burn hazard
Polymerization chamber	Risk of crushing
Electrical components	Risk of electrical shock

Description of the safety equipment of the injector:

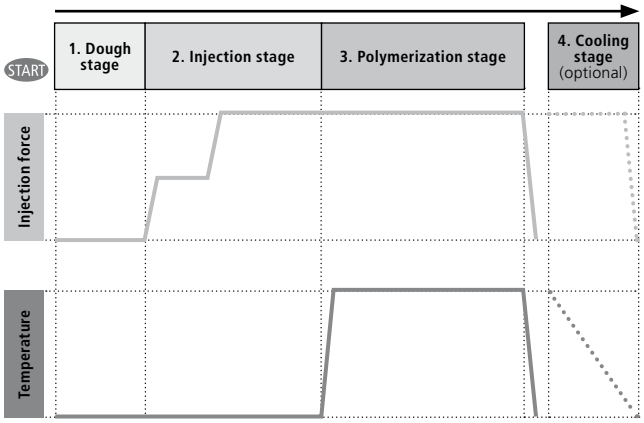
Safety equipment	Protective effect
Protective conductor	Protection from electrical shock
Electrical fuses	Protection from electrical shock
Housing and end caps	Protection from electrical shock, burning and crushing
Red warning light (5)	Warns against hot components in the polymerization chamber

3.3 Functional description

The IvoBase Injector has been developed for the IvoBase System and allows an automated and controlled injection process. The injector may be used for both self-curing and heat-curing polymers. The integrated heater permits the flask to be heated up to 120 °C (248 °F). With the controlled and automated injection, high-quality products with outstanding physical properties can be fabricated.

The injection process taking place in the IvoBase Injector can be basically divided into four stages (see image):

1. Dough stage: During this stage, the material changes to an injectable consistency.
2. Injection phase: During this stage, the material is injected into the flask by means of a forward movement of the injection head.
3. Polymerization stage: The controlled heat supply initiates the polymerization with shrinkage compensation.
4. Cooling stage: During the cooling stage, the system normalizes the temperature and the tension.



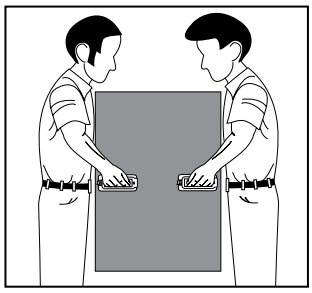
4. Installation and Initial Start-Up

4.1 Unpacking and checking the contents

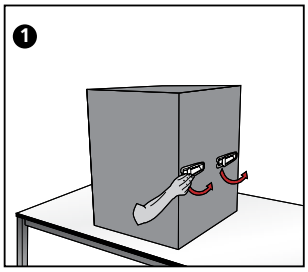
The packaging provides the following advantages:
– Reusable packaging
– Closing mechanism with integrated transportation grips
– Ideal protection by Styrofoam inserts
– Easy handling during unpacking
– The packaging may be used in several ways (modules).

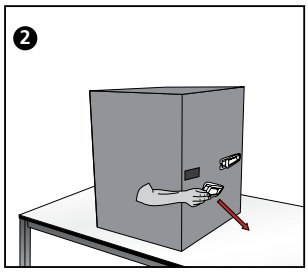
Remove the injector from the packaging and place it on a suitable table. Please observe the instructions on the outer packaging.

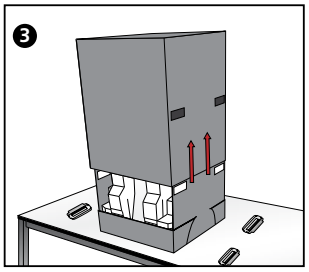
Please keep in mind that the IvoBase Injector is very heavy. It should always be lifted and carried by at least two people (see image).



The IvoBase Injector is equipped with a special recessed grip at the back and can conveniently be held at the operating panel at the front.







Check the delivery for completeness (see delivery form in Chapter 9) and transportation damage. If parts are damaged or missing, contact your local Ivoclar Vivadent Service Centre.

Packing and shipping

The packaging may be discarded with the regular household refuse. However, we recommend keeping the original packaging for future service and transportation purposes.

The packaging permits simple and safe shipping. Simply use the corresponding plastic inserts and fold the side flaps.

4.2 Selecting the location

Place the injector on a flat table on the rubber feet. Make sure that the injector is not placed in the immediate vicinity of heaters or other sources of heat. Make sure that air may properly circulate between the wall and the injector.

Also ensure that there is enough space between the injector and the user, as the injector releases heat during the opening of the safety door.

The injector should neither be placed nor operated in areas where there is an explosion hazard.

4.3 Removing the transport protection

Once the injector has been set up, the transport protection (adhesive tape) at the safety door and the waste water container can be removed.

4.4 Establishing the connections

Power connection
Please make sure that the voltage indicated on the rating plate complies with the local power supply. Subsequently, connect the power cord (13) with the power socket of the injector (21).

Connect the USB download cable.
If required, e.g. for software updates, connect the injector with a laptop/PC using the USB cable (101) and the respective USB slot (23).

4.5 Initial start-up

1. Connect the power cord (13) with the wall socket.
2. Put the On/Off switch (20) on position "I".

Immediately after switching on, the display shows the start screen for a few seconds.

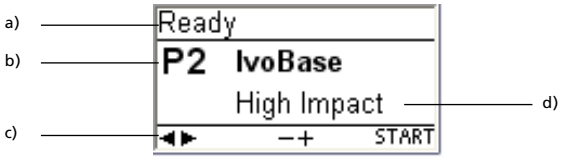
The injector now conducts an automatic self-test. During the test, the performance of all injector components is automatically checked. The display shows the following indications during the self-test:

a) Software version
b) Progress bar
c) Power supply voltage
d) Number of injections performed

If the program recognizes an error or a hint, the corresponding information (e.g. "Hint 1700") appears on the display. If all components are in order, the display will go to stand-by mode and an acoustic signal will sound.

Make sure that the safety door is always closed during the self-test.

Stand-by indicator
The stand-by indicator is shown after the self-test, and the last program used before switching off will be loaded.

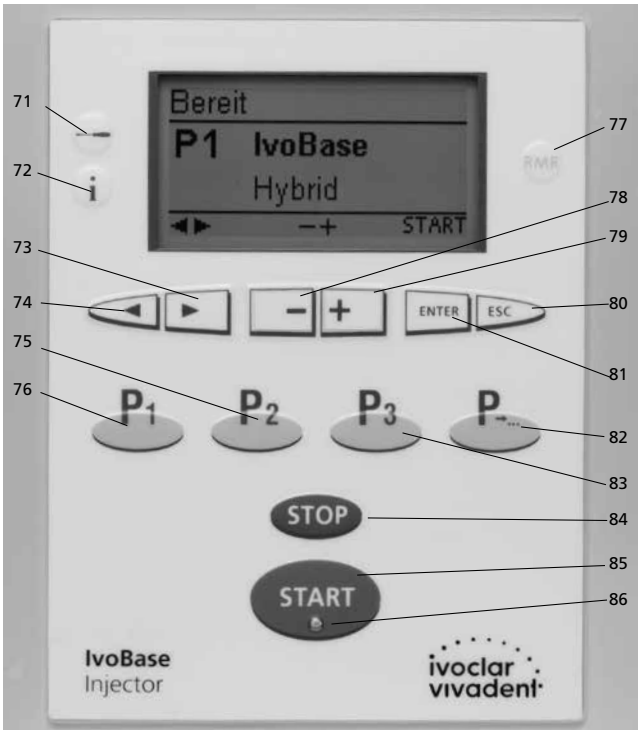


a) Status of the injector
b) Program number
c) Possible key strokes
d) Program name

5. Operation and Configuration

5.1 Introduction to the operation

The IvoBase Injector is equipped with a graphic display with back-lighting. The injector can be operated by means of the membrane-sealed keypad. The input and command keys can be used to program and control the injector.



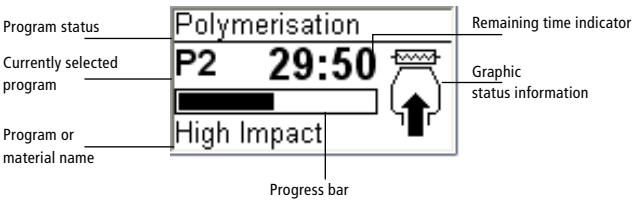
5.2 Description of the key functions

Key	Function
P1	**Program 1 key** Pressing results in the direct change to Program 1.
P2	**Program 2 key** Pressing results in the direct change to Program 2.
P3	**Program 3 key** Pressing results in the direct change to Program 3.
P...	**Next Program Number key** Pressing results in the direct change to the next higher program number.
◄ ►	**Cursor keys left, right** These keys are used to move the cursor.
– +	**Minus/Plus keys** These keys are used to change the numeric value.
	Settings Settings, programming, special programs, etc.
i	**Information** Serial number, software versions, etc.
ENTER ESC	**ENTER, ESC keys** **ENTER** Confirmation of the set numeric value. **ESC** – Ends an entry without accepting the value. – Return from the current to the previous screen. – Acknowledgement of error messages.
STOP	**STOP** – A program in progress can be aborted by pressing this key twice. – The beeper can be confirmed by pressing the STOP key.
START	**START (Start LED)** Starts the selected program. The green LED indicates that a program is running.
RMR	**RMR (Residual Monomer Reduction)** With this function, the residual monomer content can be reduced to below 1% (acc. to ISO 20795-1).

5.3 Basic meaning of the screens

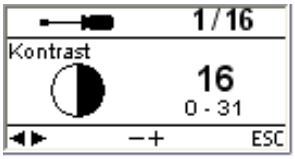
– Stand-by

– Program progress screen



5.4 Settings and information

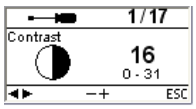
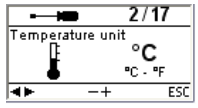
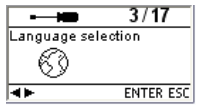
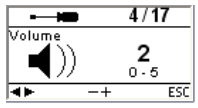
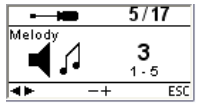
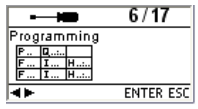
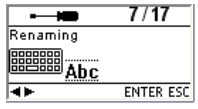
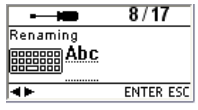
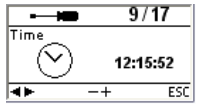
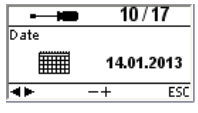
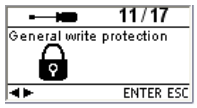
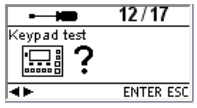
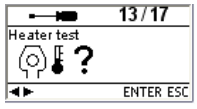
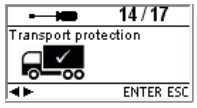
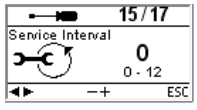
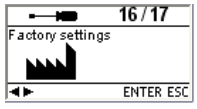
By pressing the "Settings" key (71) you can access the settings screen (the latest selected settings will be indicated).



The cursor keys (73, 74) can be used to toggle between possible settings. This screen can be exited with the ESC key (80) or any of the program keys (75, 76, 83).

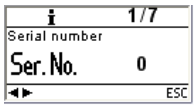
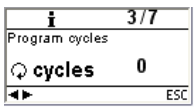
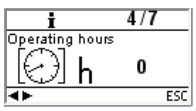
5.4.1 Settings

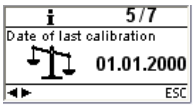
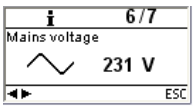
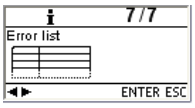
Settings marked with "*" are protected by Ivoclar Vivadent with a code. The code is communicated if changes become necessary.

Settings	Indication on display	Short description
Contrast		The contrast can be changed by means of – or +.
Temperature unit		The – and + keys can be used to toggle between °C and °F.
Language selection		Enables the language selection.
Volume		The volume can be adjusted by means of – or +.
Melody		The desired tune can be set using – or +.
Programming *		Allows the parameters of the currently selected program to be set.
Renaming *		Permits renaming of the currently selected program.
		Permits renaming the material.
Time		The time can be set using the – or + keys.
Date		The date can be set using the – or + keys.
General write protection		Permits activation or deactivation of the general write protection (using – or +) once the user password has been entered. The general write protection applies to all the programs.
Keypad test		Permits checking the keypad.
Heater test		Permits the examination of the heater system. See Chapter 7.6 Heater test for details.
Transport protection		Activates the transport protection. See Chapter 7.8
Service interval		Select the interval for the next reminder. The interval is set in months.
Load factory settings		Resets all the values and parameters to the factory settings.

5.4.2 Information

By pressing the "Information" key (72) you can access the information screen (the latest selected information will be indicated). The cursor keys (73, 74) can be used to toggle between the possible information. This screen can be exited with the ESC key (80) or any of the program keys (75, 76, 83).

Information	Indication on display	Short description
Serial number		Serial number of the device
Software version		Currently installed software version
Program cycles		Sum of all the executed program cycles (injections)
Operating hours		

Settings	Indication on display	Short description
Date of the latest calibration		
Supply voltage		Shows the current supply voltage.
List of errors		

5.5 Explanation of the symbols on the display

Symbol name	Explanation	Symbol
Door open	Shows that the door is open. The door must be closed in order to start a program.	
Start possible	Shows that the injector is ready to use. The door is closed and a program can be started.	START
Program write protection	A closed lock indicates that the program write protection is active. With an open lock, this protection is inactive (adjustable with the – or + key).	
General write protection	If this symbol is displayed, the general write protection is active. This protection applies to all injector programs.	
Page selection	Program parameters are available on two pages. By selecting the appropriate symbol with the cursor key and by pressing ENTER, the program changes to the respective page.	1.← →2.

5.6 Description of the beeper sounds

Basically, the beeper tune and volume set by the user are used for all acoustic signals. The acoustic signal can be stopped by pressing STOP.

1. **After the self-test has been completed**
   The set beeper tune briefly sounds to inform the user that the automatic self-test has been successfully completed.
2. **In the case of error messages**
   Error messages are indicated with the error beeper tune (endless beeping). The beeper can be confirmed by pressing the STOP key, while the error message still remains visible. If the error message is confirmed by pressing the ESC key, the beeper is also ended.
3. **At the end of an injection program**
   The set beeper tune briefly sounds to inform the user that the current program has been completed.
4. **Upon opening of the safety door during an injection program in progress**
   If the safety door is opened while an injection program is running, the user is warned by the error tune (endless beeping). The acoustic signal can be stopped by closing the safety door.

5.7 Operating status display

The integrated optical operating status display (OSD) indicates the different operating statuses of the injector.

The following activities are indicated:

Colour	Activities
green	The injector is ready for operation (with the door closed and the self-test completed).
white	The injector is in the preparation stage (with the door open).
red	The injection process is active; injector is busy.
yellow (flashing)	Information, note or error message.

6.1 Switching on the injector

Put the On/Off switch (20) on position "I". The injector now conducts an automatic self-test. Make sure that the injector is not manipulated during that time.

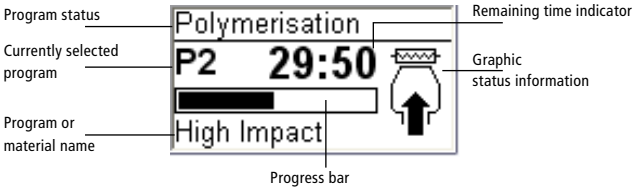
6.1.1 Stand-by screen

If the self-test has been successfully completed, the stand-by screen is displayed. Now the desired program can be selected with the program or cursor keys.

Once the flask has been placed in the injector and the safety door has been closed, the START symbol appears in the recommendation section. The selected program is started by pressing START.

6.1.2 Program progress screen

After the program has been started, the program progress screen is displayed.



6.2 Loading

To load the IvoBase Injector, proceed as follows:

Step 1:
Open the safety door (16).

Step 2:
Slide the flask into the holder intended for this purpose as shown in the picture.

Make sure that the flask is securely placed and that it has been inserted until it stops. The flask perceptibly snapping into place indicates the correct position.

Step 3:
Close the door. If the OSD lights up green, the injector is ready for the process.

Please read the following processing notes carefully.

- Make absolutely sure that both flask halves have cooled to room temperature before injection. A temperature of >30 °C (>86 °F) jeopardizes controlled polymerization and might lead to inaccuracies of fit.
- When working with self-curing materials, make sure that as little time as possible lies between mixing the material and injection.

A lit warning light (5) indicates that the injector temperature is high during loading or removal and, therefore, there is a burn hazard (>45 °C/>113 °F).

Always use the thermal glove supplied when removing the flask from the injector!

6.3 Starting the injection process

For practical use, please observe the Instructions for Use of the respective material!

Step 1:
Select the desired program (P1 to P20) using the program or cursor keys.

Step 2:
Open the safety door and insert the flask into the injector. The flask perceptibly snapping into place indicates the correct position.

Step 3:
Close the safety door. The injector cannot be started if the door is open. Press Start to start the program.
The course of the program can be observed on the program progress indicator.

6.4 Further possibilities and special features of the injector

6.4.1 General write protection

If the programs are write protected as a whole, a closed, solid lock is displayed in the parameter list. The setting "Renaming" cannot be selected if the write protection is active. A hint in the form of closed lock is shown next to the keyboard symbol.

6.4.2 Stopping the running program

Pressing STOP once results in the program abort screen being displayed.

You can now abort the program by pressing the STOP key again, or you can press ESC and the program abort screen disappears and the program is resumed.

If the safety door is opened while an injection program is running, the program is stopped for safety reasons. While the program is interrupted, the green LED in the START key flashes. The process is automatically resumed once the door has been closed.

6.4.3 RMR function (Residual Monomer Reduction)

Pressing the RMR key (77) activates the RMR function. This means that the residual monomer content of the processed material can be reduced to below 1%.

6.4.6 Software update

The user will be able to conduct a software update via PC and USB download cable. For that purpose, the software download mode is activated by pressing two special keys simultaneously while the power supply is switched on. For further details, please refer to the Software Update Instructions in the Download Center (www.ivoclarvivadent.com/downloadcenter).

7. Maintenance, Cleaning, Diagnosis

This chapter describes the user maintenance and cleaning procedures for the IvoBase Injector. Only those tasks are listed that may be performed by dental professionals. All other tasks must be performed by qualified service personnel at a certified Ivoclar Vivadent Service Centre.

The time for these maintenance procedures depends on the frequency of use and the working habits of the users. For that reason, the recommended times are only approximations.

This injector has been developed for typical use in dental laboratories. If the product is used for continuous operation, premature ageing of the expendable parts has to be expected.

Expendable parts are, for instance:
– Heater
– Clasps

Expendable parts are not covered by the warranty.
Please also observe the shorter service and maintenance intervals.

7.1. Monitoring and maintenance

What:	When:
Check all plug-in connections for correct fit.	weekly
Check the water level in the waste water container and empty it, if necessary (see 7.2 for details).	daily
Check if the heater is dirty or damaged (see 7.3 for details).	weekly
Check if the temperature sensor in the polymerization chamber is dirty or damaged (see 7.4 for details).	weekly
Check if the safety door is dirty or damaged.	daily
Check the keypad for visible damage. If the keypad is damaged, it has to be replaced by a certified Ivoclar Service Centre.	weekly

7.2 Emptying the waste water container

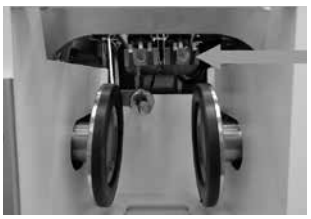
During the polymerization process, condensation develops within the injector, which is discharged via a drain outlet. Check the water level at regular intervals and empty the waste water container, if necessary.
The waste water container can be removed from and replaced in the injector as shown in the picture.

7.3 Replacing the heater

Before replacing the heater, disconnect the injector from the power supply.

The heater system of the IvoBase Injector has been developed in such a way that users may replace it by themselves, if required (cleaning, defect).

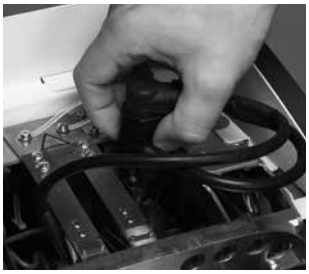
Dismounting the heater:
To dismount the heater, please proceed as follows:



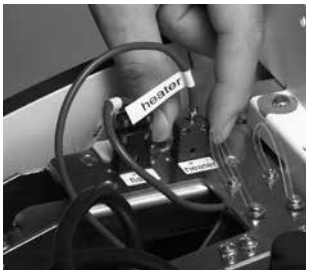
Step 1:
Remove the two knurled screws at the rear and remove the hood.

Step 2:
Unplug the cable for the OSD.

Step 3:
Unplug the heater plug.

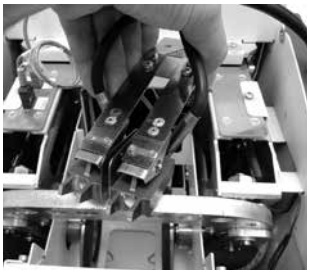


Step 4:
Unplug the plug with the label "heater".

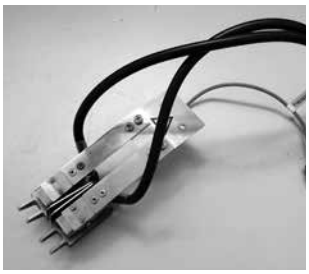


Step 5:
Remove the screws of the heater.

Step 6:
Remove the heater.



Dismounted heater.



Mounting the heater:
Place the heater back in its original position (align the heater in the centre with the help of an inserted flask) and secure it in place with the screws. (The heater is mounted in the same way as it is dismounted. Follow the Steps 6 to 1.)

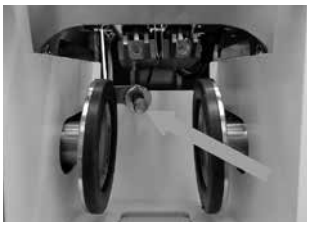
7.4 Replacing the temperature sensor

Before replacing the temperature sensor, disconnect the injector from the power supply.

The temperature sensor of the IvoBase Injector has been developed in such a way that users may replace it by themselves, if required (cleaning, defect).

Check weekly if the temperature sensor is damaged and/or bent. Also, check it for correct fit or other damage.

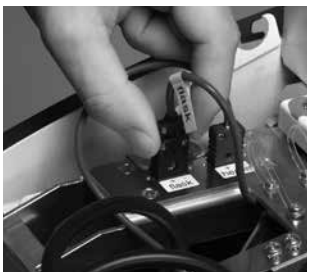
Dismounting the temperature sensor:
To dismount the temperature sensor, please proceed as follows:



Step 1:
Remove the two knurled screws at the rear and remove the hood.

Step 2:
Unplug the cable for the OSD.

Step 3:
Unplug the plug with the label "flask".



Step 4:
Remove the screws of the sensor.

Step 5:
Remove the sensor.

Dismounted sensor:

Mounting the temperature sensor:
Mounting the temperature sensor is carried out in the same way as dismounting. Simply reverse the order of the above steps (Step 5 to Step 1).

7.5 Cleaning

The injector may only be cleaned when it is cool, since there is a burn hazard. Do not use any cleaning solutions. Disconnect the power to the injector before cleaning.

The following parts have to be cleaned from time to time:

What	When	Cleaning material
Injector housing and membrane-sealed key-pad	if required	soft, dry cloth
Safety door	if required	soft cloth
Polymerization chamber	if required	soft cloth
Flask and flask accessories *	after every use	water

* The flask housing may show a dark discolouration, for instance, when plaster material is left in the flask for a longer period. This oxide layer can be removed by means of pumice flour. This dark layer does not influence the usability of the flask in any way.

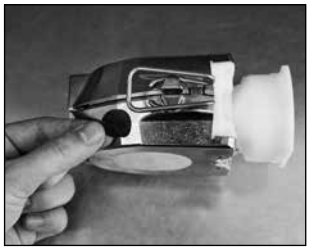
7.6 Heater test

The heater test is used to check the observance of the temperature in the IvoBase Injector independently and at regular intervals.
For that purpose, proceed as follows:

Step 1:
Fabricate a test flask that is exclusively filled with stone (without model – see Fig. 1). If the stone in the flask set a longer while ago and is dry, the flask has to be soaked in water before the test.

Step 2:
Clean the IvoBase polymerization chamber, heater and temperature sensor while they are cold. Please make sure that the contact surfaces of the heater and the temperature sensor are clean.

Step 3:
Close the flask with the locking clamps and attach a measuring point to the spot on the left flask half shown in the picture (see picture). It is important that the exact position is observed. Only in this way can correct measuring values be achieved.



Step 4:
Load the IvoBase Injector with the test flask and close the safety door.

Step 5:
Select the heater test program with the „Settings" key. Confirm your selection with the Enter key.

Step 6:
Start the test program using the Start key. The flask is heated to 100 °C / 212 °F for approximately 10 minutes. The remaining time is indicated in the display. The Operating Status Display is not illuminated during the heating phase.

Important: The door must not be opened during the test. If this is not observed, the test program is immediately aborted.

Step 7:
After the program is completed, the message „Hint 1970" appears in the display, with the prompt to determine the temperature now. The acoustic signal can be switched off with the ESC key.

Step 8:
Open the safety door and conduct the measurement. In order to obtain the most reliable result, conduct several measurements in close succession. The available time window for that purpose is 60 seconds. This time must not be exceeded, since the flask would cool down too much and the measurement would be skewed.

Important: The sensor of the IR thermometer must be held as closely as possible to the measuring point (see picture). However, a small air gap should be present. Measurements directly on the metal surface without measuring point are not admissible, since these measurement can be skewed by reflections.

Step 9:
Analyze the measurement. The measuring results must be in the following temperature range:
– Min.: 90 °C / 194 °F
– Max.: 110 °C / 230 °F
If the measured value is not within this range, please contact your Ivoclar Vivadent Service Centre.

Step 10:

Press the Stop key to end the test. After that, remove the flask from the injector and remove the measuring point.

7.7 Service Hint

When the Service Hint is displayed for the first time (Hint 1700), 3 years have passed or 10,000 cycles have been carried out. Therefore, Ivoclar Vivadent recommends having a maintenance procedure performed on the injector. The interval until the next appearance of the Service Hint can be changed in the Settings (see Section 5.4.1).

7.8 Information about transport protection

In order to transport the Ivobase Injector, the clamps must be brought into a transport position. This function can be activated in the Settings (see Chapter 5.4 Settings and information).

8. What if....?

This chapter will help you to recognize malfunctions and take appropriate measures.

8.1 Error messages

During operation, the injector continuously monitors all the functions. If an error is detected, the respective error message is displayed.

Error / Hint No.	Error	Text Error Message
1700	Service reminder	Three years have passed since the last technical inspection of the injector. Therefore, Ivoclar Vivadent recommends having a maintenance procedure performed on the injector. For further information, please refer to the Equipment Service Passport or the Operating Instructions. The interval until the next appearance of the Service Hint can be changed in the Settings.
1900	Door is open.	Once a program has been started, the door must remain closed. Close the door. The program will automatically resume.
1901 **	Hood is missing.	The injector hood may only be removed for maintenance purposes. The injector must be turned off beforehand. The injector cannot be started without the hood in place.
1913 **	Insert the flask.	Insert a flask into the injector and start the program again.
1914 **	Insert the capsule.	Insert a flask including a material capsule into the injector and start the program again.
1917	Power failure	A program in progress will automatically resume, irrespective of the duration of the power failure.
1920 **, ***	Technical malfunction heater/sensor	No temperature increase in the flask was noted during the polymerization phase.
1921 **, ***	Technical malfunction heater/sensor	No temperature increase of the heater was noted during the polymerization phase.
1928	Checking the start temperature	The flask is too hot to start a program. Press START to start the program anyway.
1930 **, ***	Technical malfunction heater/sensor	The function of the heater is checked during the self-test. No temperature increase is noticeable.
1935 **,***	Technical defect; service	The press motor has exceeded the permitted travelling distance.
1936	Low amount of material in capsule	The injection motor has reached the maximum travelling distance. The amount of material in the capsule is low. Reasons for this could be: There is not sufficient material in the capsule for the dental lab work. Material leaks from a flask.
1941 **	Press force too low!	The press force which squeezes the flask halves together is too low (sudden pressure drop).
1960 **	The door is open during the self-test.	The door must be closed during the self-test. Close the door and switch the injector off and on again.
1970	Open door and conduct measure-ment	At the end of the heater test, open the door and use the supplied IR thermometer to determine the temperature of the flask.
1971 **	Heater test aborted	If the door is opened during the heater test or the cover removed from the injector, the test pro-gram is aborted. Manual abortion is also possible by pressing Stop twice.
1972	Heater test completed	At the end of the heater test, the temperature of the flask must be determined within one minute. After a longer waiting time, the flask has cooled down too much.
1980	Switch off device	At the end of the transport protection program, the IvoBase Injector can be transported safely. The device can now be switched off.

** A program in progress is aborted. *** Error cannot be acknowledged; programs cannot be started.

If one of the following error codes is displayed, please contact the Ivoclar Vivadent After Sales Service directly.
25, 29,
54, 56,
103, 107,
700, 701, 705, 706 707,
1010, 1011, 1012, 1013, 1014, 1015, 1016, 1028
1202, 1203, 1204, 1206, 1207
1400, 1401, 1402
1500
1910, 1911, 1912, 1931, 1935, 1950, 1951, 1952, 1953

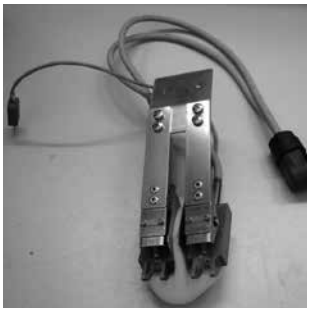
8.2 Resin leaks from the flask

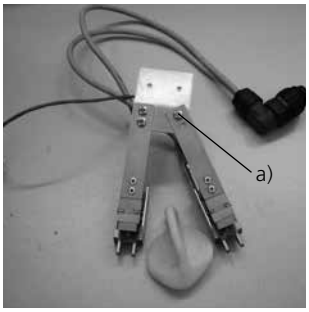
Under certain circumstances – e.g. if the filter component was forgotten to be placed in the flask (see Instructions for Use of the corresponding materials) – resin may leak from the flask during injection. This results in contamination of the heating shoes or the temperature sensor. Please proceed as follows in such cases:

8.2.1 Cleaning the heater

Step 1:
Dismounting the heater: Proceed as described in section 7.3 of these Operating Instructions.

Step 2:
The heater consists of two heating elements. Loosen both screws on one of the two heating elements. One screw (a) must be completely loosened and removed. Subsequently, this heating element can simply be swivelled away from the the remaining element. Polymerized resin material can then be easily removed from the heater (see image).





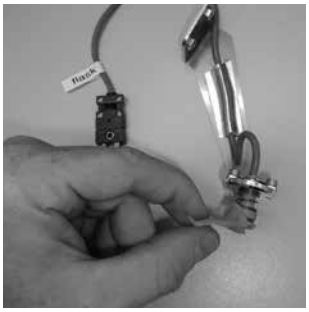
Step 3:
After having cleaned the heater, mount it in the injector again. Swivel the heating element back to its original position and tighten the screw that was previously removed (see image). To insert the heater, proceed as described in Section 7.3.

Wait until the material has completely set/ polymerized before removing it.

8.2.2 Cleaning the temperature sensor

Step 1:
Dismounting the temperature sensor. Proceed as described in section 7.4 of these Operating Instructions.

Step 2:
Carefully remove the material from the temperature sensor.

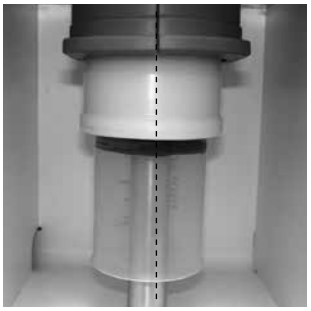


Step 3:
Remount the temperature sensor in the injector (see 7.4)

Wait until the material is completely set/ polymerized before removing it.

8.3 Resin leaks from the injection head

In case of a malfunction, resin may leak from the material capsule during injection (e.g. if the plunger is tilted in the material capsule – see image). If leaked and polymerized material is deposited in the material capsule, the injection head may get stuck in the capsule, since it is not fixedly connected with the plunger.



If this is the case, proceed as follows:

Step 1:
Wait until the program has ended and the plunger has moved all the way down.

Step 2:
Remove the injection head of the material capsule and completely remove the material.

Step 3:
Replace the injection head in the plunger. The head is pushed in – there is no screw connection to the plunger.

Wait until the material has completely set/ polymerized before removing it.

To insert the injection head in the plunger, dampen the rubber rings of the injection head.

8.4 Technical malfunctions

These malfunctions may occur without an error message being displayed:

Error	Double-check	Measure
Display incomplete		Contact Ivoclar Vivadent After Sales Service.
Text on the display is difficult to read.	Is the contrast set correctly?	Adjust the contrast.
Display is not illuminated.	Has the injector been correctly connected and switched on according to the Operating Instructions?	Correctly connect and switch on the injector.
Buzzer does not sound.	Is the beeper switched off (Volume = 0)?	Set the volume from 1–5.

8.5 Repair

Repairs may only be carried out by a certified Ivoclar Vivadent Service Centre. Please refer to the addresses on the last page of these Operating Instructions.

If repairs during the warranty period are not carried out by a certified a Ivoclar Service Centre, the warranty will expire immediately. Please also refer to the corresponding warranty regulations.

9. Product Specifications

9.1 Delivery form

– IvoBase Injector
– Power cord
– USB download cable
– 2 Sets of flasks
– Thermal glove
– Temperature Checking Set
– var. accessories
– Warranty Card, Operating Instructions, Service Passport

9.2 Technical data

Nominal voltage	100–120 V /200–240 V
Nominal frequency	50 Hz–60 Hz
Acceptable voltage fluctuations	+/– 10%
Nominal output	450 W
Protection category I Overvoltage category II Contamination level 2	
Dimensions	Depth: 400 mm Width: 340 mm Height: 560 mm
Max. temperature	300 °C (572 °F)
Weight	35.6 kg

Safety notes
The IvoBase Injector complies with the following guidelines:
– IEC 61010-1:2001
– EN 61010-1:2001
– UL 61010-1:2004
– CAN/CSA-C22.2 No. 61010 -1:2004
– IEC 61010-2-010:2003
– EN 61010-2-010:2003
– CAN/CSA-C22.2 No. 61010-2-010:2004

Radio protection / electromagnetic compatibility	EMC tested

9.3 Acceptable operating conditions

Acceptable ambient temperature:
+5 °C to +40 °C / +41°F to +104 °F

Acceptable humidity range:
Relative humidity 80% for temperatures up to 31 °C / 87.8 °F gradually decreasing to 50% relative humidity at 40 °C / 104 °F condensation excluded.

Acceptable ambient pressure:
The injector is tested for use at altitudes of up to 2000 m (6562 ft) above sea level.

9.4 Acceptable transportation and storage conditions

Acceptable temperature range: –20 °C to +65 °C / –4 °F to +149 °F
Acceptable humidity range: Max. 80% relative humidity
Acceptable ambient pressure: 500 mbar to 1060 mbar

Use only the original packaging together with the corresponding foam material for shipping purposes.

10. Appendix

10.1 Program structure

Program No.	Name	Description	Duration
1	IvoBase Hybrid	Program for the polymerization of the IvoBase Hybrid material, residual monomer <= 1.5%	35 min
		Program for the polymerization of the IvoBase Hybrid material with additional RMR, residual monomer <= 1.0%	45 min
2	IvoBase High Impact	Program for the polymerization of the IvoBase High Impact material, residual monomer <= 1.5%	50 min
		Program for the polymerization of the IvoBase High Impact material with additional RMR, residual monomer <= 1.0%	60 min
3	SR Ivocap High Impact	Program for the polymerization of the SR Ivocap High Impact material, residual monomer <= 1.5%	55 min
		Program for the polymerization of the SR Ivocap High Impact material with additional RMR, residual monomer <= 1.0%	65 min
4	SR Ivocap Clear	Program for the polymerization of the SR Ivocap Clear material, residual monomer <= 1.5%	55 min
		Program for the polymerization of the SR Ivocap Clear material with additional RMR, residual monomer <= 1.0%	65 min
5	SR Ivocap Elastomer	Program for the polymerization of the SR Ivocap Elastomer material	65 min
6–20	Ivoclar Vivadent – Spare	Space for future Ivoclar Vivadent injection programs.	

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