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750 Autosampler

2.750.0020 Instrument version

8.750.1023 Instructions for Use

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1 Introduction

1.1 Instrument description

The **750 Autosampler** is a microcomputer-operated sampling/controller system designed to be used with the ion chromatographic instruments 732 IC Detector and 733 IC Separation Center. It has a capacity of up to 128 samples, which are transferred automatically into the sample loop of the 733 IC Separation Center.

The 750 Autosampler performs up to four, fixed loop injections per vial at user-selectable time intervals. All operating parameters are entered from the front panel. Additionally, the instrument can be controlled remotely either by an externally programmable contact closure or through the RS232 connector located on the rear panel.

Fig. 1: 750 Autosampler

1.2 Theory of operation

Displacement principle

The 750 Autosampler operates using the positive displacement principle of sample transfer. This sample transfer process into the sample loop of the 733 IC Separation Center is illustrated in *Fig. 2*. When an injection is initiated, the hollow transfer needle **5** descends into the vial. The needle tip punctures the polyethylene cap of the sample vial. The opening into the needle is located on the side to minimize plugging by cap material as the cap is punctured. The needle continues downward until the pushrod contacts the area around the puncture in the cap which forces the cap down into the vial. The piston action of the cap pressurizes the sample and forces it up through the needle and the transfer tubing **8** that is connected to the needle. From the transfer tubing, the sample flows through the injection valve and sample loop with the excess passing on through the waste tube to a waste container.

Rinsing by air bubbles

The air bubble (minimum 150 µL), which is always present at the top of a properly filled and capped vial, precedes the sample stream through the plumbing. The bubble disrupts the laminar flow of the fluid in the tubing while pushing out the previous sample and solvent. This effect, in addition to the large excess volume of sample, helps to minimize sample carryover.

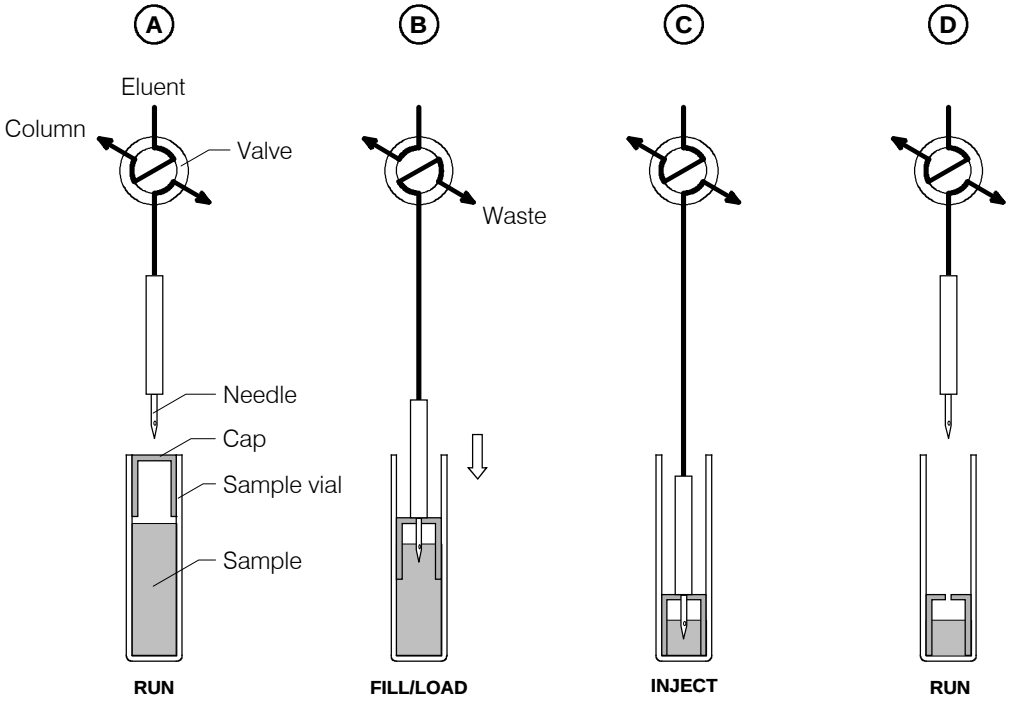


Fig. 2: Positive displacement sample injection

Number of injections

The number of injections per sample with the 750 Autosampler depends on the sample loop size. With sample loops > 10 µL max. 3, with sample loops ≤ 10 µL max. 4 injections are possible. *Fig. 3* details the needle position and displacement volume at the sample delivery action. Care should always be taken that the injection volume is at least three times greater than the volume of the sample loop. This is why only a maximum of 2 injections per sample should be made with 100 µL loops; the minimum sample volume is 300 µL for 1 and 600 µL for 2 injections. For sample loops with a volume ≤ 10 µL up to 4 injections per sample are possible. The minimum sample volume required is 150 µL for 1, 300 µL for 2, 450 µL for 3 and 600 µL for 4 injections.

Rinsing

Rinsing will be necessary for highly concentrated samples or for samples that may absorb in the tubing or in the injection valve. Rinse vials are filled with eluent or other suitable solvent. The Rinse process is shown in *Fig. 3*. Rinse vials can be used either after each vial (every even numbered or odd numbered vial) or at programmed vial intervals. There are two types of Rinses, the Normal Rinse and the Quick Rinse. The **Normal Rinse** occurs after all the injections have been made from the sample vial and the run time has elapsed. A **Quick Rinse** occurs immediately after an injection and is used in applications where the sample solution must not be left in the needle, transfer tubing or valve for whatever reason. Only one injection per vial can be programmed when using a Quick Rinse.

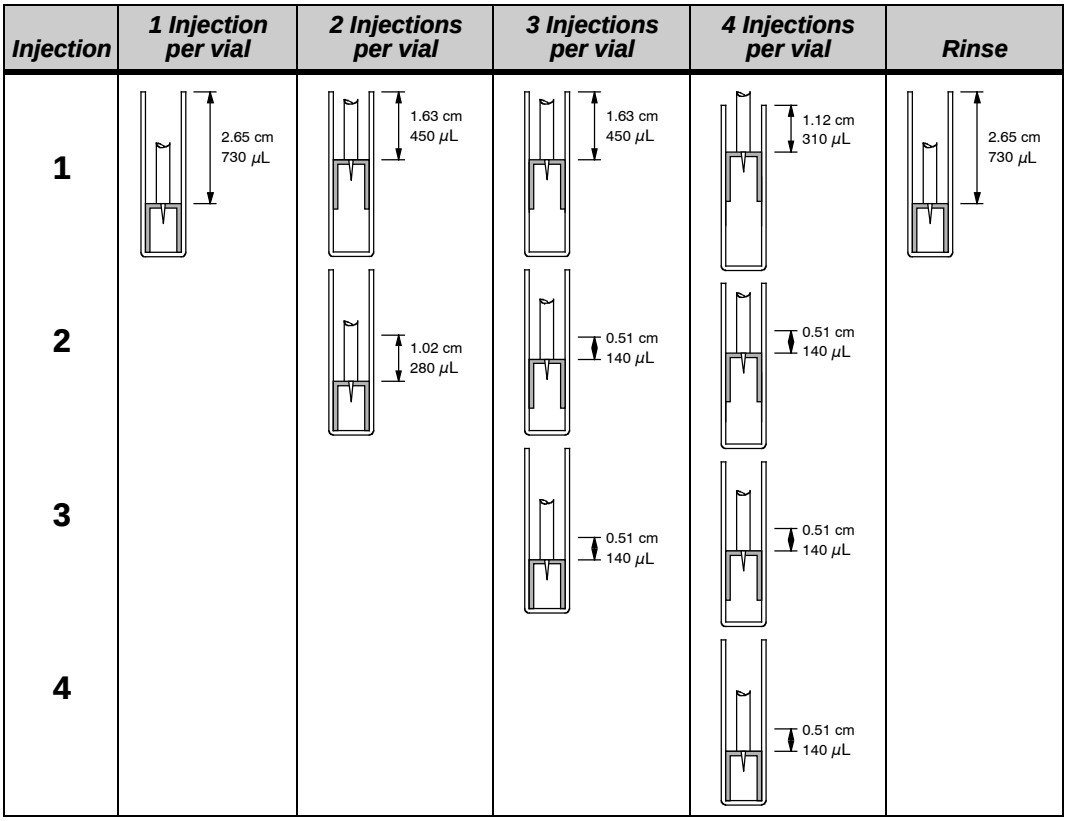


Fig. 3: Displacement volume versus needle position

1.3 Control elements

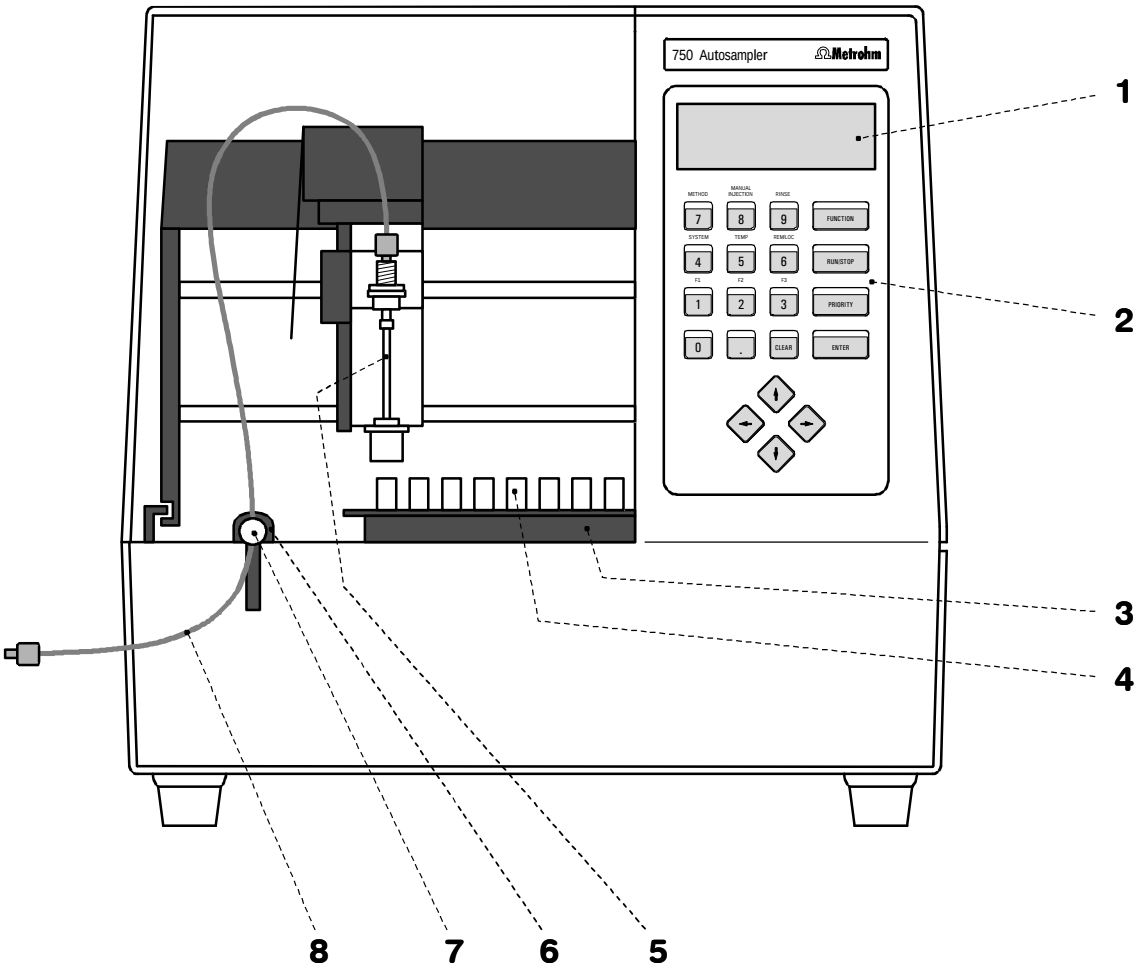


Fig. 4: Front of the 750 Autosampler

1	**Display (LCD)** comprising 4 lines each of 20 characters	**5**	**Transfer needle**
2	**Keypad** with function, numeric and cursor keys (details see *chap. 3.1.2*)	**6**	**Holder for transfer tubing**
3	**Sample rack (6.2041.600)** for 128 sample vials	**7**	**Holder stopper**
4	**Sample vial** 6.2743.000 sample vial (PP) or 6.2413.000 sample vial (glass)	**8**	**Transfer tubing** 6.1803.000 PTFE capillary for the connection of the 750 Autosampler with the injector of the 733 IC Separation Center

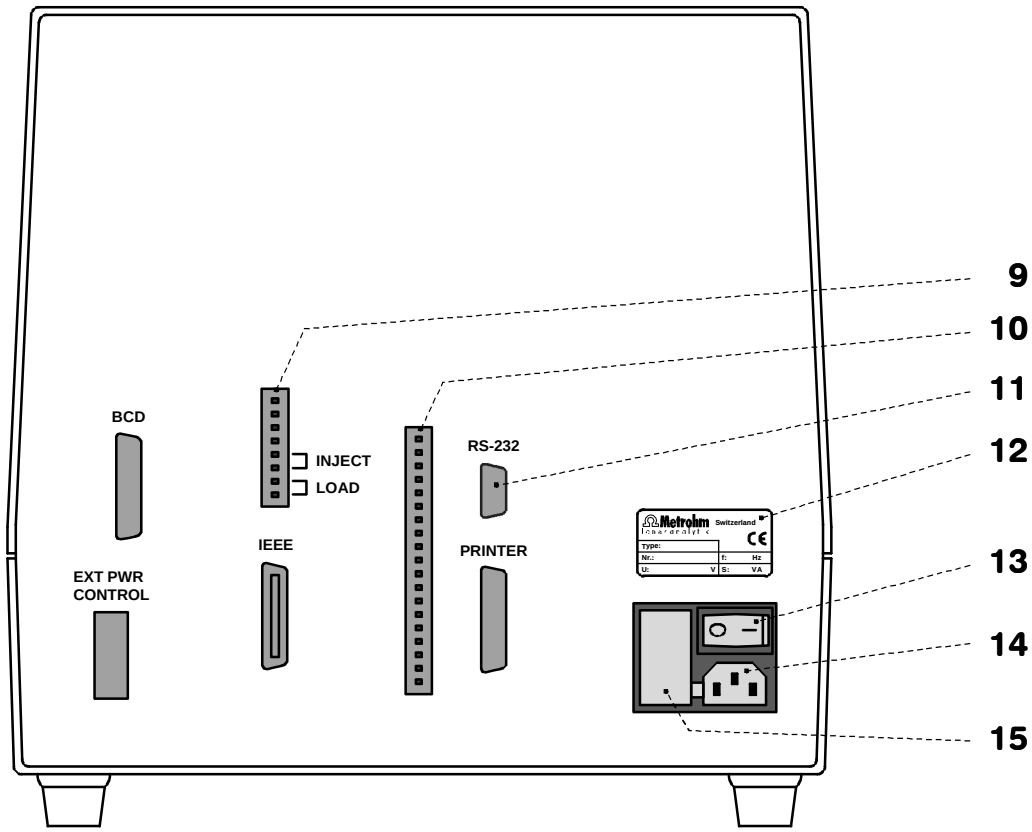


Fig. 5: Rear of the 750 Autosampler

9	**Contact closure strip for valve control** details see *chap. 5.2.1*	**13**	**Mains switch** switch to switch the instrument on and off: I = ON 0 = OFF
10	**Contact closure strip for external control** details see *chap. 5.2.1*	**14**	**Mains connection plug** mains connection see *chap. 2.3*
11	**RS232 interface** details see *chap. 5.2.2*	**15**	**Fuse cassette** changing the fuses, see *chap. 2.3.1*
12	**Model plate** with instrument and serial number, mains voltage, mains frequency, power consumption		

1.4 Information on the Instructions for Use

Please read through these Instructions for Use carefully before you put the 750 Autosampler into operation. The Instructions for Use contain information and warnings which must be heeded by the user to assure safe operation of the instrument.

1.4.1 Organization

These **8.750.1023 Instructions for Use** for the 750 Autosampler provide a comprehensive overview of the installation, startup procedure, operation, fault rectification and technical specifications of the instrument. The Instructions for Use are organized as follows:

Section 1 **Introduction**
General description of instruments, control parts and safety notes

Section 2 **Installation**
Installation of the 750 Autosampler, connection to IC Separation Center 733, initial checkout

Section 3 **Operation**
Detailed description of the operation and explanation of functions of all keys

Section 4 **Notes – Maintenance – Faults**
Notes on operation, maintenance, fault rectification, diagnostic tests

Section 5 **Appendix**
Technical data, interfaces, standard equipment, options, warranty, declarations of conformity, index

To find the required information on the instruments, you will find it an advantage to use either the **Table of contents** or the **Index** at the back.

1.4.2 Notation and pictograms

The following notations and pictograms (symbols) are used in these Instructions for Use:

<PARAM>	**Key**
"Run Time"	**Parameter or entry value**
5	**Control element of 750** (see *chap. 1.3*)
84	**Control element of 732/733** (see *Instructions for Use 732*)
14	**Control element of 762** (see *Instructions for Use 762*)
READY SELECT A FUNCTION	**Display** Text in display **1** of the 750 Autosampler
	**Hazard** This symbol draws attention to a possible danger to life or of injury if the associated directions are not followed correctly.
	**Warning** This symbol draws attention to possible damage to instruments or instrument parts if the associated directions are not followed correctly.
	**Caution** This symbol marks important information. First read the associated directions before you continue.
	**Comment** This symbol marks additional information and tips.

1.5 Safety notes

1.5.1 Electrical safety

While electrical safety in the handling of the 750 Autosampler is assured in the context of the specifications IEC 1010-1 (protection class 1, degree of protection IP20), the following points should be noted:

- **Mains connection**

*Setting the **mains voltage**, checking the **mains fuse** and the **mains connection** must be effected in accordance with the instructions in section 2.3.*

- **Opening the 750 Autosampler**

*When the 750 Autosampler is connected to the power supply the instrument must neither be opened nor should parts be removed from it, otherwise there is a danger of coming into contact with components which are live. Always disconnect the instrument from all voltage sources before you open it and ensure that the **mains cable is disconnected from mains connection plug** **14** !*

- **Protection against static charges**

Electronic components are sensitive to static charging and can be destroyed by discharges. Before you touch any of the components inside the 750 Autosampler, you should earth yourself and any tools you are using by touching an earthed object (e.g. housing of the instrument or a radiator) to eliminate any static charges which exist.

1.5.2 General precautionary rules

- **Handling of solvents**

Check all tubing of the IC system periodically for possible leaks. Follow the relevant instructions regarding the handling of flammable and/or toxic solvents and their disposal.

2 Installation

2.1 Setting up the instrument

2.1.1 Packaging

The 750 Autosampler is supplied together with the separately packed accessories in special packagings containing shock-absorbing foam linings designed to provide excellent protection. The actual instrument is packed in an evacuated polyethylene bag to prevent the ingress of dust. Please store all these special packagings as only they can assure damage-free transport of the instrument.

2.1.2 Check

After receipt, immediately check whether the shipment is complete and has arrived without damage (compare with delivery note and list of accessories in *section 5.3*). In the case of transport damage, see instructions in *section 5.5.1* "Warranty".

2.1.3 Location

Position the instrument in the laboratory at a location convenient for operation, free from vibrations and protected against a corrosive atmosphere and contamination by chemicals. The Autosampler should be located as close as possible to the IC system to minimize dead volume. When not in use the instrument should always be covered with the 6.2742.010 dust cover.

2.2 Connection to IC system

2.2.1 750 Autosampler as "Master"

When an IC system consisting of 732 IC Detector, 733 IC Separation Center, and 709 IC Pump is operated with the 750 Autosampler as "Master" the command to start the next injection after the analysis time "Run Time" has elapsed will be given by the Autosampler itself. In this case the 750 Autosampler is connected to the 733 IC Separation Center with the 6.2128.100 cable as shown in *Fig. 6*. In addition the 709 IC Pump can be connected to the 750 Autosampler in such a way that when the pump stops the Autosampler will also be automatically stopped (important for unattended continuous operation).

1 Electrical connection 750 – 733

- Connect 6.2140.020 connector plug to contact closure strip **9** of the 750 Autosampler.
- Connect one end of the 6.2128.100 cable to the connections "LOAD NO", "LOAD COM", "INJECT NO" and "INJECT COM" on the connector plug inserted in the contact closure strip **9**. The four cable ends are appropriately inscribed with "LOAD NO" (green), "LOAD COM" (yellow), "INJECT NO" (brown) and "INJECT COM" (white).
- Connect the other end of the 6.2128.100 cable to the connections "Ground", "Fill" and "Inject" on the terminal block **38** (valve A) or **46** (valve B) of the 733 IC Separation Center. The three cable ends are appropriately inscribed with "GND" (white), "FILL" (green) and "INJECT" (brown).

2 Electrical connection 750 – 709 (optional)

- Connect 6.2140.010 connector plug to contact closure strip **10** of the 750 Autosampler.
- Connect jumper P12 to the control interface of the 709 IC Pump in such a way that the contacts at outputs 3 and 4 will be closed when the pump has stopped (see *chap. 5.2* of the 709 Instructions for Use).
- Use 6.2134.070 cable (option) to connect outputs 3 and 4 of the control interface on the 709 IC Pump with connection "REMOTE STOP INPUT" and "GND" on contact closure strip **10** of the 750 Autosampler.

Settings with 750 Autosampler as "Master"
The following settings are recommended for operating the IC system with 750 Autosampler as "Master":

- *750 Autosampler:* "Run Time" ≥ 3.0 min
- *732 IC Detector:* *operation without program or with "Inject" program*

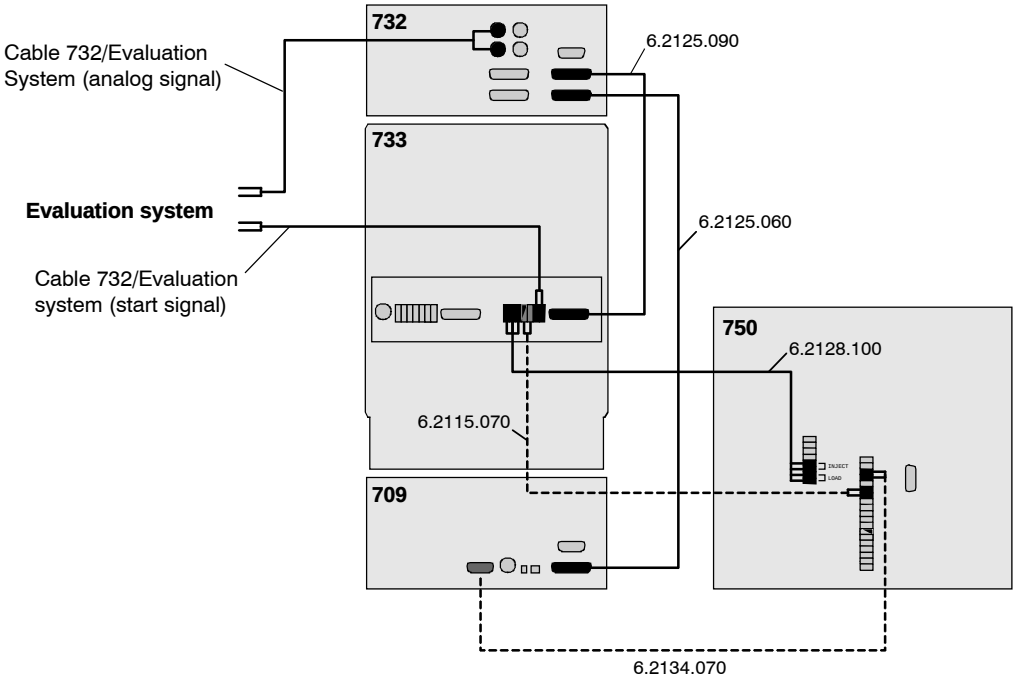


Fig. 6: Connection of 750 Autosampler at 732/733

2.2.2 732 IC Detector as "Master"

When an IC system consisting of 732 IC Detector, 733 IC Separation Center, and 709 IC Pump is operated with the 732 IC Detector as "Master" the 750 Autosampler sample change procedure will be started by a signal from the 733 IC Separation Center. The Autosampler must be connected to the 733 IC Separation Center with two cables as shown in *Fig. 6*. In addition the 709 IC Pump can be connected to the 750 Autosampler in such a way that when the pump stops the Autosampler will also be automatically stopped (important for unattended continuous operation).

1 Electrical connection 750 – 733

- Connect 6.2140.020 connector plug to contact closure strip **9** and 6.2140.010 connector plug to contact closure strip **10**of the 750 Autosampler.
- Connect one end of the 6.2128.100 cable to the connections "LOAD NO", "LOAD COM", "INJECT NO" and "INJECT COM" on the connector plug inserted in the contact closure strip **9**. The four cable ends are appropriately inscribed with "LOAD NO" (green), "LOAD COM" (yellow), "INJECT NO" (brown) and "INJECT COM" (white).
- Connect the other end of the 6.2128.100 cable to the connections "Ground", "Fill" and "Inject" on the terminal block **38** (valve A) or **46** (valve B) of the 733 IC Separation Center. The three cable ends are appropriately inscribed with "GND" (white), "FILL" (green) and "INJECT" (brown).

- Connect one end of the 6.2115.070 cable (option) to the connections "EXTERNAL INJECT INPUT" and "GND" on the connector plug inserted in the contact closure strip **10**.
- Connect the other end of the 6.2115.070 cable to the connections "Pos. Fill" on the terminal block **38** (valve A) or **46** (valve B) of the 733 IC Separation Center so that COM and GND are connected.

2 Electrical connection 750 – 709 (optional)

- Connect jumper P12 to the control interface of the 709 IC Pump in such a way that the contacts at outputs 3 and 4 will be closed when the pump has stopped (see *chap. 5.2* of the 709 Instructions for Use).
- Use 6.2134.070 cable (option) to connect outputs 3 and 4 of the control interface on the 709 IC Pump with connection "REMOTE STOP INPUT" and "GND" on contact closure strip **10** of the 750 Autosampler.

Settings with 732 IC Detector as "Master"
The following settings are recommended for operating the IC system with 732 IC Detector as "Master":

- *750 Autosampler:* *"*`Run Time`*" = 0.0 min*
- *732 IC Detector:* *operation with cycle program with command "*`valve A/B = fill`*" at time "*`0.0 min`*".*

2.2.3 Connection to 762 with «IC Net»

When a modular IC system consisting of 732 IC Detector, 733 IC Separation Center, 709 IC Pump, and 762 IC Interface is operated with the PC software «IC Net» as "Master" the 750 Autosampler sample change procedure will be started by a signal from the 733 IC Separation Center. The Autosampler must be connected to the 762 IC Interface using the 6.2134.000 cable and to the 733 IC Separation Center using the 6.2128.100 as shown in *Fig. 7*.

1 Electrical connection 750 – 762

- Connect RS232 interface **11** at the 750 Autosampler to one of the RS232 interfaces **14** or **18** at the 762 IC Interface using the 6.2134.000 cable.

2 Electrical connection 750 – 733

- Connect 6.2140.020 connector plug to contact closure strip **9** of the 750 Autosampler.
- Connect one end of the 6.2128.100 cable to the connections "LOAD NO", "LOAD COM", "INJECT NO" and "INJECT COM" on the connector plug inserted in the contact closure strip **9**.

The four cable ends are appropriately inscribed with "LOAD NO" (green), "LOAD COM" (yellow), "INJECT NO" (brown) and "INJECT COM" (white).

- Connect the other end of the 6.2128.100 cable to the connections "Ground", "Fill" and "Inject" on the terminal block **38** (valve A) or **46** (valve B) of the 733 IC Separation Center. The three cable ends are appropriately inscribed with "GND" (white), "FILL" (green) and "INJECT" (brown).

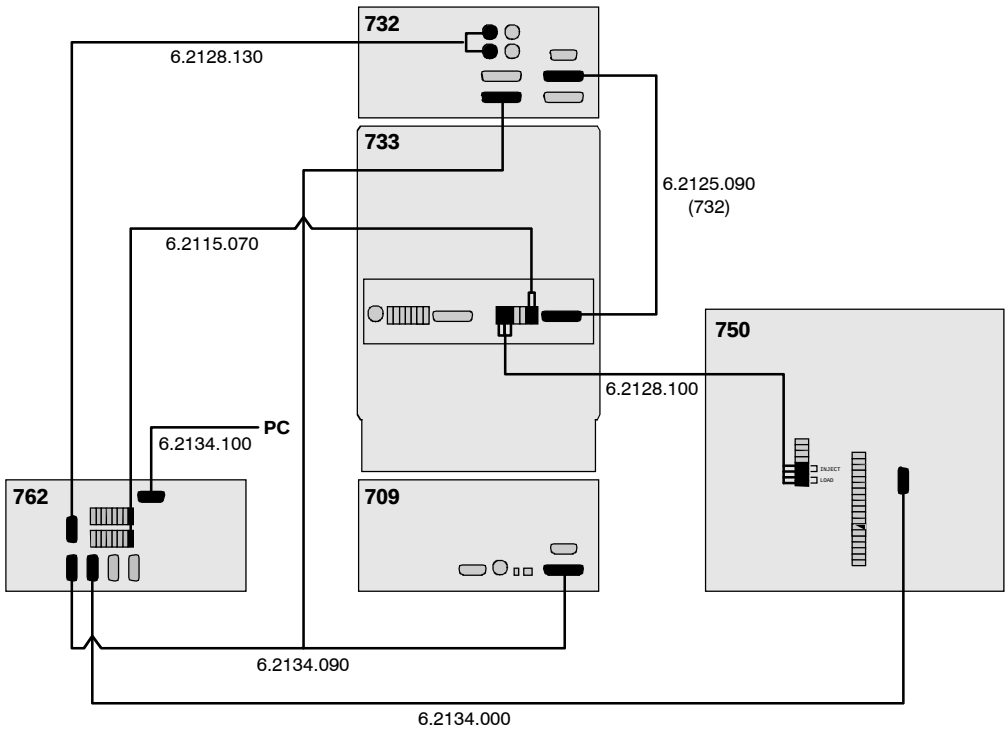


Fig. 7: Connection of 750 Autosampler at 732/733 and 762

2.2.4 Tubing connection

For transferring the sample from the 750 Autosampler to the injection valve of the 733 IC Separation Center the following tubing connections must be made:

1 Tubing connection 750 – injection valve

- At the 733 IC Separation Center, loosen the rotary nipple screwed onto the interior side of connection **22** or **28**.
- Take PTFE suction tubing **88** (see *Fig. 16* and *Fig. 17* of the 732/733 Instructions for Use) completely out of connection **22** or **28** and unscrew from connection "1" of injection valve **68**.
- Cut transfer tubing **8** (6.1803.000 PTFE capillary tubing of 750 accessories) to the shortest possible length between the needle of the 750 Autosampler and injection valve **68** of the 733 IC Separation Center.
- Remove the cover from transfer needle **5** of the 750 Autosampler and screw one end of transfer tubing **8** to this connection with the aid of a 6.2744.010 PEEK compression fitting.
- Remove holder stopper **7** from holder **6** and pull 6.1803.000 PTFE capillary tubing so far through the opening of holder stopper **7** that the tubing length between needle connection and the holder stopper is about 30 cm. Then press holder stopper **7** fully back into holder **6**.
- Pull the other end of the transfer tubing **8** through the opening **22** or **28** of the 733 IC Separation Center and screw onto connection "1" of injection valve **68** using a 6.2744.010 PEEK compression fitting.
- Retighten rotary nipple on the interior side of connection **22** or **28** to fix the capillary tubing.

2 Tubing connection injection valve – waste

- Insert 6.2744.020 coupling (from 733 accessories) into connection **21** or **27** of the 733 IC Separation Center.
- Screw PTFE suction tubing **88** onto the 6.2744.020 coupling attached to connection **21** or **27** and lead it into the waste container.

In the case of the 2.733.0X20 IC Separation Center with two injection valves, it is possible to fill both sample loops from the same 750 Autosampler. For this, connection "1" of valve A (outlet of the sample loop) must be connected to connection "2" of valve B (inlet of the sample loop) using a 6.1803.000 PTFE Capillary tubing cut to the appropriate length.

2.3 Mains connection

Follow the instructions below for connecting to the power supply. If the instrument is operated with the mains voltage set wrongly and/or wrong mains fuse there is a danger of fire!

2.3.1 Check fuses

The selection of mains voltage (100, 120, 220 or 240 V) and mains frequency (50 or 60 Hz) is made automatically by the 750 Autosampler according to the mains voltage and frequency used. Nevertheless, before the 750 Autosampler is switched on for the first time a check should be made as to whether the correct fuses for the intended mains supply have been inserted in the instrument. Proceed as follows:

1 Disconnect mains cable

Disconnect mains cable from mains connection plug **14** of the 750 Autosampler (see *Fig. 5*).

2 Remove fuse cassette

Using a screwdriver, loosen fuse cassette **15** alongside the mains connection plug **14** and take out completely.

3 Remove fuse holder

Lift up the spring clip on the upper side of fuse cassette **15** and remove the fuse holder completely from the fuse cassette.

4 Check fuses

Carefully take the two fuses out of the fuse holder and check their specifications:

100 ¼ 120 V	**2 A**	**(rapid-action, with low rupturing capacity, 3AG)**
230 ¼ 240 V	**1.25 A**	**(rapid-action, with low rupturing capacity, 5 ´ 20 mm)**

5 Insert fuses

Change fuses if necessary and reinsert in fuse holder.

6 Install fuse holder

Push the fuse holder into fuse cassette **15** until the spring clip clicks into position.

7 Insert fuse cassette

Completely reinsert fuse cassette **15** in 750 Autosampler.

2.3.2 Mains cable and mains connection

Mains cable

The instrument is supplied with one of three mains cables

- 6.2122.020 with plug SEV 12 (Switzerland, …)
- 6.2122.040 with plug CEE(7), VII (Germany, …)
- 6.2133.070 with plug NEMA 5-15 (USA, …)

which are three-cored and fitted with a plug with an earthing pin. If a different plug has to be fitted, the yellow/green lead (IEC standard) must be connected to protective earth (protection class 1).

Any break in the earthing inside or outside the instrument can make it a hazard!

Mains connection

Plug the mains cable into mains connection plug **14** of the 750 Autosampler (see *Fig. 5*).

2.3.3 Switching the instrument on/off

The 750 Autosampler is switched on and off using mains switch **13**. When the instrument is switched on display **1** lights up.

2.4 Initial checkout

Initial checkout will prove the general operation of the instrument and show that no shipping damage or installation problem exists which would prevent normal operation. To carry out this checkout the 750 Autosampler must be connected to the 733 IC Separation Center as described in *chap. 2.2* and correctly connected to the mains supply as described in *chap. 2.3*.

For the initial checkout a standard chromatogram for the separation column used in the 733 IC Separation Center should be recorded. In order to do this a sample vial **4** filled with at least 500 µL of a suitable standard ion solution should be placed in position 1 of sample rack **3**; then proceed step by step as follows:

1 Switch on 750 Autosampler

Switch on 750 Autosampler with mains switch **13**. The following screen will be displayed after powerup and initialization:

```
      READY

 SELECT A FUNCTION
```

2 Select "MANUAL INJECTION"

Press the <MANUAL INJECTION> key (<FUNCTION> + <8>). The following screen will appear:

```
  MANUAL INJECTION
→Sample Vial      1
 Needle Depth POS 1
 Run Injection     ↓
```

3 Enter sample vial position

Press the <1> key and then press the <ENTER> key. The screen will now change to:

```
  MANUAL INJECTION
 Sample Vial      1
→Needle Depth POS 1
 Run Injection     ↓
```

4 Enter needle depth

Press the <→> key two times and then press the <ENTER> key. This results in the following display:

```
  MANUAL INJECTION
 Sample Vial      1
 Needle Depth POS 3
→Run Injection     ↓
```

5 Start injection

Press the <ENTER> key. The 750 Autosampler will make an injection from the vial at position 1. Afterwards the following display will appear:

```
MANUAL INJECTION
   COMPLETED
```

6 Select "SYSTEM"

Press the <SYSTEM> key (<FUNCTION> + <4>). The following screen will appear:

```
  SYSTEM SETTINGS
→Park Needle
 Contact Closures
 Loop Size         ↓
```

7 Park needle

Press the <ENTER> key. The transfer needle will be withdrawn from the sample vial and moved back to its parking position in the back left-hand corner. The following display then reappears:

```
       READY

SELECT A FUNCTION
```

If any difficulties should occur during the initial checkout then proceed as described in *chap. 4.3*.

3 Operation

3.1 Fundamentals of operation

3.1.1 Display and instrument dialog

The LCD display **1** on the 750 Autosampler consists of 4 lines each with 20 characters. After the Autosampler has been switched on and initialized the following display appears:

```
      READY

SELECT A FUNCTION
```

This screen is called the **main screen**. It is always displayed any time the instrument is idle. Note that the line "SELECT A FUNCTION" flashes.

Methods, system settings, and other functions consist of a **menu** of parameters which can be edited for different sample requirements. The complete parameter menu, in many instances, cannot be shown on the display at one time due to the available number of display lines. For example, a typical menu has the following appearance:

```
  MANUAL INJECTION
 Sample Vial      1
→Needle Depth<POS 3>
 Run Injection     ↓
```

The first line always shows the **title** of the selected function. Parameters which can be edited with the numerical and/or cursor keys are shown beneath. If the arrows "↑" or "↓" appear at the right-hand side this indicates that the cursor keys <↑> and <↓> can be used to scroll through the menu. In most menus the last entry is "Exit" (return to basic condition).

An arrow pointing to the right "→" on the left-hand side shows the **parameter** which can currently be edited. Each parameter requires either a numerical entry or the selection of a value from an existing list.

Numerical parameter values are entered either directly with the numerical keys, or the <→> and <←> keys are used to increase or decrease the value step by step. The <CLEAR> key is used to delete an incorrect entry. When the required value for the parameter is shown it must be confirmed. This is done with the <ENTER> key or by changing to the next or previous parameter with the <↑> or <↓> keys.
If a numerical entry is made which is outside the range possible for that parameter the Autosampler will issue a warning alarm, followed by the display of the following error message:

```
      ERROR
Value out of range
Enter value between
     # - ##
```

where # and ## are the appropriate range limits. The error message will remain on the display until the <CLEAR> key is pressed.

Parameter lines which contain the characters "<" and/or ">" (e.g. "NONE>") on either side of the parameter value indicate that a selection must be made from a discreet menu of items. Pressing either the <→> or <←> key allows scrolling through the selection list. When the desired selection is displayed, press either the <ENTER>, <↑> or <↓> key to confirm the selection.

3.1.2 Overview of key functions

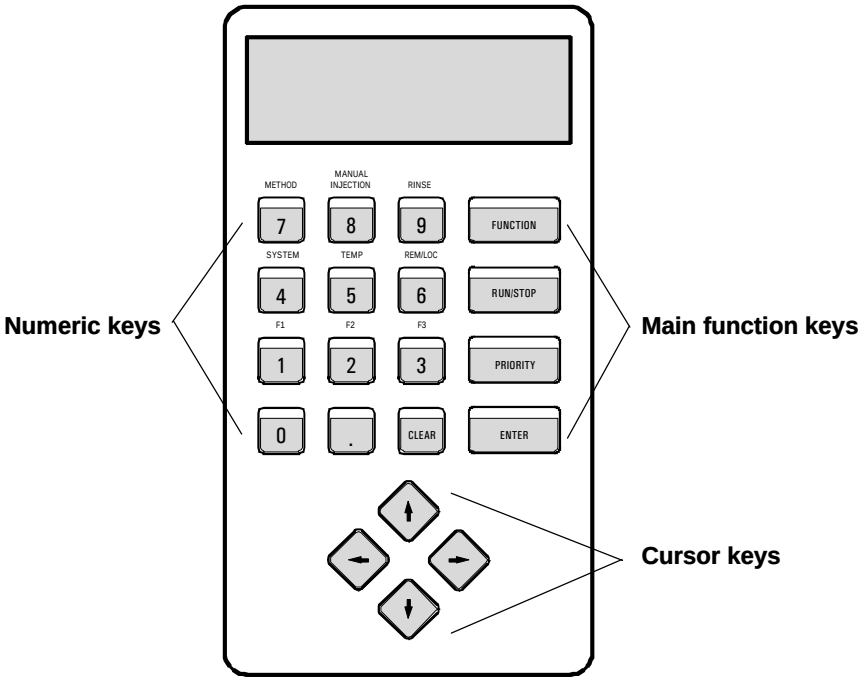
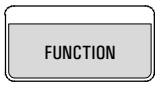
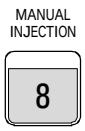
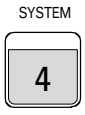
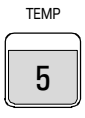


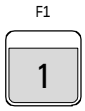
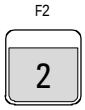
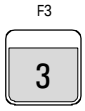
Fig. 8: Keypad

The keypad of the 750 Autosampler contains 4 main function keys, 12 numerical keys (incl. <CLEAR>) and 4 cursor keys. In the basic condition the functions given above the numbers can also be activated by pressing the <FUNCTION> key and the corresponding numeric key.

The following table provides a brief overview of the different functions of the individual keys of the 750 Autosampler. You will find more detailed information on the key functions in *sections 3.2¼3.8*.

Keys of 750 Autosampler

Key	*Normal function*	*Function with <FUNCTION>*
	**Function key** • Selection of a function in combination with the corresponding numeric key.	–
	**Run/Stop key** • If no method runs: Selection and start of a method. • If a method runs: Stop of the running method.	–
	**Key for priority sample** • Interruption of a running method and injection of a priority sample.	–
	**Enter key** • Confirmation of entered parameter.	–
	**Numeric entry 7** • Numeric entry of number "7".	**Method** • Selection of method menu for editing or deleting methods.
	**Numeric entry 8** • Numeric entry of number "8".	**Manual injection** • Selection of the "MANUAL INJECTION" menu for injections to be made from a specified sample vial.
	**Numeric entry 9** • Numeric entry of number "9".	**Rinse** • Rinsing of the transfer needle and the injection valve with a rinsing solution.
	**Numeric entry 4** • Numeric entry of number "4".	**System parameters** • Selection of the menu for system settings.
	**Numeric entry 5** • Numeric entry of number "5".	**No function** • The <TEMP> function is not available.
	**Numeric entry 6** • Numeric entry of number "6".	**Remote control** • Selection of the menu for the remote control (Local/RS232).

Key	Normal function	Function with <FUNCTION>
	**Numeric entry 1** • Numeric entry of number "1".	**No function** • The <F1> function is not available.
	**Numeric entry 2** • Numeric entry of number "2".	**No function** • The <F2> function is not available.
	**Numeric entry 3** • Numeric entry of number "3".	**No function** • The <F3> function is not available.
	**Numeric entry 0** • Numeric entry of number "0".	**Shipping position** • Transfer needle is moved to the shipping position.
	**Point** • Entry of decimal point ".".	–
	**Delete/reset** • Deletion of an entered parameter and/or resetting to default value.	**"Escape"** • Exit from parameter menus and return to standby mode.
	**Cursor key <↑>** • Moves the display cursor up a line.	**"Escape"** • Exit from parameter menus and return to standby mode.
	**Cursor key <↓>** • Moves the display cursor down a line.	–
	**Cursor key <←>** • Decrements numerical parameter values. • Moves the display one selection item to the left.	–
	**Cursor key <→>** • Increments numerical parameter values. • Moves the display one selection item to the right.	–

3.2 System settings

By pressing the <SYSTEM> key (<FUNCTION> + <4>) the system settings menu appears. The system settings are global parameters which affect the operation of the Autosampler, but are not required to be programmed for each sample or method. The following screen results:

SYSTEM SETTINGS	**System settings**
Park Needle	Park transfer needle in home position
Contact Closures	Enter contact closure times
Loop Size	Specify injection loop
Needle Setup	Specify needle settings
Key Beep	On/off switching of the audible beep
Time/Date	Set date/time
Injection Valve	*without function for 750 Autosampler*
Exit	Return to standby mode
Status	Status display

The individual menu points are selected by pressing the <↑> and <↓> keys. The individual inquiries of a menu point are accessed using the <ENTER> key and exited by pressing simultaneously the <FUNCTION> + <CLEAR> keys. The following listings show all dialog items which appear under <SYSTEM>. The values shown in the displays are the default values, the possible entry values or ranges are shown below the display.

```
SYSTEM SETTINGS
→Park Needle
```

Park transfer needle in home position

After confirmation of this command with <ENTER> the transfer needle is moved to the left rear of the instrument to provide easy access to the sample rack.

```
  SYSTEM SETTINGS
→Contact Closures
```

Contact closure times

On the 750 Autosampler there is the possibility of producing four signals in the form of a contact closure on contact closure strip **10** for controlling external instruments:

`Injection`	Automatic contact closure at output "START" for every injection triggered by the Autosampler.
`Event 1`	Contact closure after a time laid down in the method at output "T1".
`Event 2`	Contact closure after a time laid down in the method at output "T2".
`Event 3`	Contact closure after a time laid down in the method at output "T3".

Both signals are produced not only as "normal open" (between outputs NO – COM) but also as "normal closed" (between outputs NC – COM).

Entry of <ENTER> opens the following menu:

```
 CLOSURE DURATIONS
→Injection        1
```

1...32000 s

Contact closure time for "START"

Input of contact closure time for the signal to be produced at output "START" when the injection valve is switched to the "INJECT" position.

```
 CLOSURE DURATIONS
→Event #          1
```

1...32000 s

Contact closure time for "T1", "T2" or "T3"

Entry of contact closure time for the signal to be produced at output "T#". The signal output is made according to the time laid down in the method "`Event# Time`".

```
 CLOSURE DURATIONS
→Exit
```

Return to "SYSTEM SETTINGS" menu

```
  SYSTEM SETTINGS
→Loop Size
```

Loop size

Size of the loop at the injection valve at the 733 IC Separation Center. By pressing <ENTER> the following screen is displayed:

```
  Enter Loop Size
       10mL

  (Four injs/vial)
```

1...100 µL

Entry of loop size

Entry of loop size in µL. In the bottom line the number of possible injections per sample is displayed. For a volume of ≤ 10 µL the maximum is 4, for a volume > 10 µL a maximum of 3 injections can be made.

```
  SYSTEM SETTINGS
→Needle Setup
```

Needle settings

By pressing <ENTER> the following menu is opened:

`Depth` Needle depth.

`Pressure` Pressure for needle lowering.

```
    NEEDLE SETUP
→Depth
```

Needle depth

By pressing <ENTER> the following screen is displayed:

```
    Enter Needle
 position for ONE
injection per vial.
     <POS 3>
```

POS1,POS2,POS3,POS4

Entry of needle depth

Entry of the position to which the transfer needle is lowered with 1 injection per sample. The positions correspond to the following displacement volumes (see *section 1.2*):

POS1	310 µL	POS3	590 µL
POS2	450 µL	POS4	730 µL

If sample vessels closed with 6.2743.030 filter stoppers are used then immersion depth "POS4" must not be selected.

```
    NEEDLE SETUP
→Pressure       Low>
```

Low,High

Pressure for needle lowering

The needle can be lowered either with "Low" pressure or with "High" pressure.

If sample vessels closed with 6.2743.030 filter stoppers are used then pressure "High" must be selected.

```
SYSTEM SETTINGS
→Key beep
```

On/off switching of an audible beep

By pressing <ENTER> the following screen is displayed:

```
Audible Key Feedback
     Selection

        <ON
```

ON,OFF

Audible beep whenever a key is pressed

Switches acoustic signal each key a key is pressed on/off. Switching is made by means of the <→> or <←> cursor keys.

```
  SYSTEM SETTINGS
→Time/Date
```

Date/time settings

By pressing <ENTER> the following screens are displayed:

```
     Time/Date
→02/23/00  03:31 AM
```

Display of date and time

```
     Time/Date
→Set Date
```

Set date

By pressing <ENTER> a menu is opened for setting "Year", "Month", and "Day".

```
     Time/Date
→Set Time
```

Set time

By pressing <ENTER> a menu is opened for setting "Hour", "Month", and "AM" or "PM".

```
  SYSTEM SETTINGS
→Injection Valve
```

Injection valve

Without function for 750 Autosampler.

```
  SYSTEM SETTINGS
→Status
```

Status display

By pressing <ENTER> the following screen is displayed:

```
     Validated
709/50     S/N 03029
Version   H1.00A1.00
  <CLEAR> to Exit
```

Status display

Display of validation status, instrument type, serial number, and program version number.

3.3 Manual rinsing

RINSE

This command allows the rinsing of the transfer needle, transfer tubing and injection valve. When the <RINSE> key (<FUNCTION> + <9>) is pressed, the following screen appears:

```
Enter Rinse Vial

      #  1
```

1...128

Position of rinsing solution

Entry of position of the rinsing solution on the sample rack. After confirmation with <ENTER> the transfer needle moves to the given rinsing vial and sinks down to its lowest position "POS4". When the rinsing process has ended the instrument returns to its basic condition. The transfer needle remains in the rinsing vial.

3.4 Manual injection

MANUAL INJECTION

The <MANUAL INJECTION> key (<FUNCTION> + <8>) allows manual injections of a user specified sample. When pressed, the following screen is provided:

```
 MANUAL INJECTION
Sample Vial      1
Needle Depth POS 1
Run Injection
Exit
```

Manual injection
Position of sample vial
Needle depth
Run injection
Return to standby mode

The individual menu points are selected by pressing the <↑> and <↓> keys. The individual inquiries of a menu point are accessed using the <ENTER> key and exited by pressing simultaneously the <FUNCTION> + <CLEAR> keys. The following listings show all dialog items which appear under <MANUAL INJECTION>. The values shown in the displays are the default values, the possible entry values or ranges are shown below the display.

```
MANUAL INJECTION
→Sample Vial      1
```

1...128

Position of sample vial

Entry of the sample vial position on the sample rack for the desired sample to be injected.

```
MANUAL INJECTION
→Needle Depth  POS4
```

Needle depth

Entry of the position to which the transfer needle is lowered at the injection of the sample. The positions correspond to the following displacement volumes (see also *section 1.2*):

POS1	310 µL	POS3	590 µL
POS2	450 µL	POS4	730 µL

If sample vessels closed with 6.2743.030 filter stoppers are used then immersion depth "POS4" must not be selected..

```
  MANUAL INJECTION
→Run Injection
```

Run injection

After confirmation with <ENTER> the injection valve is switched to the "FILL" position, the transfer needle is moved to the given sample vial and lowered to the selected position. When the sample loop has been filled the injection valve is returned to the "INJECT" position. The following display appears while the injection is being carried out automatically:

```
MANUAL INJECTION
    Vial #  N
Needle Depth POS M
SAMPLE INJECTED
```

Manual injection running

The given sample position number N and the selected needle depth position M are displayed. When the valve has switched to the "INJECT" position "SAMPLE INJECTED" is additionally shown in the bottom line for a short time, after which the following display appears:

```
MANUAL INJECTION
   COMPLETED
```

Manual injection completed

When the injection has been completed the transfer needle remains in the sample vial. Further injections can now be started from the same sample vial, for which a new immersion depth must be selected.

3.5 Methods

By pressing the <METHOD> key (<FUNCTION> + <7>) the method menu appears. For the 750 Autosampler a method is understood as being a program defined by the operator which proceeds automatically after being started. A maximum of 10 methods with up to 128 program steps each can be stored in the Autosampler. The <METHOD> key opens the following menu:

```
 METHOD MENU
Edit Method
Run Method
Copy Method
Delete Method
Display Method Use
Print Method
Exit
```

Method menu
Enter or edit methods and steps
Execute the selected method
Copy steps from one method into another
Delete selected method
Shows which of the ten method blocks are filled
Print method
Return to standby mode

The individual menu points are selected by pressing the <↑> and <↓> keys. The individual submenus or inquiries of a menu point are accessed using the <ENTER> key and exited by pressing simultaneously the <FUNCTION> + <CLEAR> keys. The following listings show all dialog items which appear under <METHOD>. The values shown in the displays are the default values, the possible entry values or ranges are shown below the display.

```
   METHOD MENU
→Edit Method
```

Edit method

Allows a method to be edited by inserting, deleting and editing program steps. After entering <ENTER> the following display appears:

```
Enter Method Number

       # N
```

1...10

Select method

Enter the method number N which is to be edited. If the selected method already contains program steps the following program step menu will appear after confirmation with <ENTER>:

```
 EDIT METHOD # N
Edit Step
Append Step
Insert Step
Delete Step
Exit
```

Program step menu
Edit program step
Append program step to the end of the method
Insert program step between two existing program steps
Delete selected program step
Return to method menu

The individual menu points are selected by pressing the <↑> and <↓> keys:

```
  EDIT METHOD # N
→Edit Step
```

Edit program step

Allows an already existing program step to be called up and edited. The following display will appear after entering <ENTER>:

```
 Enter Step Number

        #M
```

1...128

Select program step

Entry of the number M of the program step which is to be edited. After confirmation with <ENTER> a menu with method number N and program step number M in the title line and the following 10 editable parameters for the program steps will appear:

```
 METHOD  N  STEP  M
→Start Vial       1
```

1...128

Start vial

Entry of the number of the first sample vial for the sample series defined in this program step.

```
 METHOD  N  STEP  M
→Final Vial       1
```

1...128

Final vial

Entry of the number of the last sample vial for the sample series defined in this program step. If the numbers of the first and last samples are identical then this program step applies only to this single sample.

If the transfer needle is removed from the sample vial after an injection then no further injections can be made from the same sample vial.

```
 METHOD  N  STEP  M
→Injections      <1>
```

0,1,2,3,(4),
SKIP,RINSE

Number of injections

The number of injections which are to be carried out per sample vial for the sample series defined in the program step. As well as the number of injections (1...4 depending on loop volume) the following values can also be selected with the <→> and <←> keys:

0	No injections are made. This step can be used for programming time-controlled events.
SKIP	The sample series will be skipped.
RINSE	The sample vials are only used for rinsing.

If sample vials sealed with 6.2743.030 filter stoppers are used then a maximum of only 3 injections per sample vial can be carried out.

```
 METHOD  N  STEP  M
→Run Time       3.0
```

0.0,0.1...999.9 min

Run time

Selects the run time (chromatographic analysis time) between switching the injection valve to the "INJECT" position and the start of a new injection with the same or the next sample.

The minimum run time is 0.1 min. If 0.0 min is entered the external injection start is activated. The sample loop will only be filled and the injection started when a contact closure has been made at the "EXTERNAL INJECT INPUT". The run time will then be determined externally.

```
 METHOD  N  STEP  M
→Event1 Time    0.0
```

0.0...999.9 min

Time for event T1

Selects the time after which a signal in the form of a contact closure will be produced at output "T1".

The signal will only be produced if the selected time is shorter or the same as the run time. If the production of a signal is to be avoided for a sample series then a time must be selected which is longer than the run time.

```
 METHOD  N  STEP  M
→Event2 Time    0.0
```

0.0...999.9 min

Time for event T2

Selects the time after which a signal in the form of a contact closure will be produced at output "T2".

The signal will only be produced if the selected time is shorter or the same as the run time. If the production of a signal is to be avoided for a sample series then a time must be selected which is longer than the run time.

```
 METHOD  N  STEP  M
→Event3 Time    0.0
```

0.0...999.9 min

Time for event T3

Selects the time after which a signal in the form of a contact closure will be produced at output "T3".

The signal will only be produced if the selected time is shorter or the same as the run time. If the production of a signal is to be avoided for a sample series then a time must be selected which is longer than the run time.

```
 METHOD  N  STEP  M
→Rinse Type   NONE>
```

NONE,EVEN,ODD,
QR_E,QR_O

Rinse type

This parameter allows every second sample vial to be programmed as a rinsing vial. The following options can be selected with the <→> and <←> cursor keys:

NONE No rinses. The vials are used as programmed.

EVEN Every even numbered vial is used for rinsing.

ODD Every odd numbered vial is used for rinsing.

QR_E Every even numbered vial is a quick rinse vial. The rinsing occurs immediately after the injection (possible only with 1 injection per sample).

QR_O Every odd numbered vial is a quick rinse vial. The rinsing occurs immediately after the injection (possible only with 1 injection per sample).

```
 METHOD  N  STEP  M
→Next Step
```

Next program step

Changes to next program step in the method. If no further program step exists the following display appears:

```
At end of method.
Add another step?
 <ENTER> for Yes
 <CLEAR> for No
```

<ENTER>,<CLEAR>

Add new program step

Decision as to whether a new program step is to be added:

<ENTER> Add a new program step.

<CLEAR> Return to program step menu.

```
 METHOD  N  STEP  M
→Previous Step
```

Previous program step

Changes to previous program step in the method.

```
  EDIT METHOD # N
→Append Step
```

Append program step

Allows the addition of a new program step at the end of the selected method. After <ENTER> is pressed a menu with the 10 editable parameters for the program step appears (see under "→Edit Step").

```
  EDIT METHOD # N
→Insert Step
```

Insert program step

Allows the addition of a new program step between two existing program steps. After <ENTER> is pressed the following display appears:

```
   INSERT A STEP

 Enter Step Number
       #N
```

Select program step

Entry of the number of the program step after which the new program step is to be inserted. After <ENTER> is pressed a menu with the 10 editable parameters for the program step appears (see under "→Edit Step").

```
  EDIT METHOD # N
→Delete Step
```

Delete program step

Allows program steps to be deleted. After <ENTER> is pressed the following display appears:

```
   DELETE A STEP

 Enter Step Number
       #N
```

Select program step

Entry of the number of the program step which is to be deleted. After <ENTER> is pressed the following display appears:

```
  Delete Step # N?

 <ENTER> to Delete
 <CLEAR> to Abort
```

Confirmation of deletion process

<ENTER> Delete selected program step N.

<CLEAR> Abort deletion process.

```
    METHOD MENU
→Run Method
```

Running a method

Allows a method to be started. After <ENTER> is pressed the following display appears:

```
Enter Method Number

       # N
```

1...10

Select method

Entry of the method number N which is to be started. After confirmation with <ENTER> the selected method is carried out exactly as if it has been started with the <RUN/STOP> key (details see *chap. 3.6*).

```
    METHOD MENU
→Copy Method
```

Copy a method

Allows a method to be copied. After <ENTER> is pressed the following display appears:

```
    COPY METHOD

 Copy FROM Method
      #  N
```

1...10

Source method

Entry of the method number N which is to be copied. After confirmation with <ENTER> the following display appears:

```
    COPY METHOD

  Copy TO Method
      #  M
```

1...10

Target method

Entry of the method number M which is to be overwritten with the selected source method. After confirmation with <ENTER> the method will be copied provided that the target method is empty.

If the target method already contains program steps then the following safety inquiry will appear:

```
    Method #
 contains a program
<ENTER> to Overwrite
<CLEAR> to Abort
```

<ENTER>,<CLEAR>

Overwrite confirmation

The selected target method already contains a program.

- <ENTER> Overwrite confirmation.
- <CLEAR> Return to method menu.

```
   METHOD MENU
→Delete Method
```

Delete a method

Allows a method to be deleted. After <ENTER> is pressed the following display appears:

```
Enter Method Number

       # N
```

1...10

Select method

Entry of the method number N which is to be deleted. After confirmation with <ENTER> the following display appears:

```
 Delete Method # N?

  <ENTER> to Delete
  <CLEAR> to Abort
```

Confirmation of deletion process

- <ENTER> Delete selected method N.
- <CLEAR> Abort deletion process.

```
   METHOD MENU
→Display Method Use
```

Method storage display

After <ENTER> is pressed the following display appears:

```
 PROGRAMMED METHODS

1 2 3 4 5 6 7 8 9 10
P - - - - - - - - -
```

Display of programmed methods

The occupation of the 10 possible places for methods in the method memory is shown. The characters have the following meaning:

- P Memory place occupied by programmed method.
- – Memory place free.

3.6 Method procedure

A previously programmed method can be started by pressing the <RUN/STOP> key or (as already described in *chap. 3.5*) by selection of the menu item "Run Method" in the method menu. In both cases the following display appears:

```
Enter Method Number

       # N
```

1...10

Select method

Entry of the method number N which is to be started. After confirmation with <ENTER> the selected method is started. While the program is running the following display appears:

```
METHOD STEP METHTIME
  NN    MM    XXX.X
 VIAL   INJ   RTIME
 nnn     m    xxx.x
```

Status display for running method

While the program is running the following data are displayed and continually updated:

METHOD	Number NN of current method
STEP	Number MM of program step
METHTIME	Total elapsed time since method start
VIAL	Number nnn of current vial
INJ	Number m of current injection
RTIME	Run time of current sample

When the last program step has been completed the transfer needle is returned to the park position. The following display appears:

```
     METHOD
   COMPLETED
```

Method completed

The selected method has been correctly completed. The instrument is ready for a method to be restarted or to return to the basic condition.

```
   METHOD STOPPED
<RUN/STOP> to Resume
   <ENTER> to Abort
  <FUNC-7> to Edit
```

Method stopped

A running program can be stopped at any time with the <RUN/STOP> key; the transfer needle remains in its position and the display shown alongside appears. The three following possibilities now exist:

<RUN/STOP>	Continue method run.
<ENTER>	Abort method.
<FUNC-7>	Edit the current method, then return to this selection.

3.7 Priority sample

By pressing the <PRIORITY> key a running method can be interrupted so that a single priority sample can be processed. The priority sample can be assigned its own parameters independently from those of the current method.

The priority sample has priority before the next sample, i.e. it will be processed as soon as all injections from the current sample vial have been completed. When the priority sample has been processed the Autosampler returns to the program step which would have followed had the priority sample not interrupted the method run.

When the <PRIORITY> key is pressed during a running method the following menu with parameters for the priority sample appears (for parameter details see *chap. 3.5*):

```
 PRIORITY SAMPLE
Priority Vial    N
Injections       1
Run Time       3.0
Event1 Time    0.0
Event2 Time    0.0
Event3 Time    0.0
Run Sample

Exit
```

Parameter menu for priority sample

Number of sample vial for priority sample
Number of injections (1…4)
Run time
Time for event T1
Time for event T2
Time for event T3
Triggers the start of the priority sample (carried out automatically directly after current sample has been processed)
Return to display of program status

After the current method has been processed the priority sample is started. The following display appears:

```
 PRIORITY  SAMPLE

VIAL   INJ   RTIME
nnn     m    xxx.x
```

Status display for priority sample

While the program is running the following data are displayed and continually updated:

VIAL	Number nnn of the sample vial with the priority sample
INJ	Number m of current injection
RTIME	Run time for priority sample

When the priority sample has been completed the Autosampler returns to the running method and carries on with the program step which would have followed had the priority sample not interrupted the method run.

3.8 Remote control

By pressing the <REM/LOC> key (key <FUNCTION> + <6>) the menu for switching between normal operation (Local) and remote-controlled operation via the RS232 interface (Remote) appears. The key opens the following menu:

```
   REMOTE/LOCAL
Local
RS-232
IEEE-488
Exit
```

Remote control/Normal operation
Normal operation
Remote control via RS232
Remote control via IEEE-488
Return to standby mode

The individual menu points are selected by pressing the <↑> and <↓> keys. The individual inquiries of a menu point are accessed using the <ENTER> key and exited by pressing simultaneously the <FUNCTION> + <CLEAR> keys. The following listings show all dialog items which appear under <REM/LOC>. The values shown in the displays are the default values, the possible entry values or ranges are shown below the display.

```
   REMOTE/LOCAL
→Local
```

Switch to normal operation

After confirmation of this command with <ENTER> the instrument is switched from operating under remote control via RS232 to normal operation.

```
   REMOTE/LOCAL
→RS-232
```

Switch to remote control via RS232

After confirmation of this command with <ENTER> the following display appears:

```
Select Baud Rate

     <4800>
```

300,600,1200,2400,
4800,9600,19200,
38400

Entry of baud rate

Entry of baud rate in bits/s for the RS232 interface. The value entered here must also be set on the external controller. After the baud rate has been confirmed with <ENTER> the following display appears:

```
Select Parity

     <None
```

Even,Odd,None

Entry of parity

Entry of parity for the RS232 interface. The value entered here must also be set on the external controller. After the parity has been confirmed with <ENTER> the following display appears:

```
Select Data Bits

        8
```

5,6,7,8

Entry of data bits

Entry of data bits for the RS232 interface. The value entered here must also be set on the external controller. After the data bits have been confirmed with <ENTER> the following display appears:

```
Select Stop Bits

        1
```

1,2

Entry of stop bits

Entry of stop bits in bits/s for the RS232 interface. The value entered here must also be set on the external controller. After the stop bits have been confirmed with <ENTER> the following display appears:

```
REMOTE MODE

    RS-232
```

Instrument in remote control mode

The Autosampler 750 is completely controlled by the computer connected to the RS232 interface. The Autosampler remains in this condition until it is switched to normal operation by the controller or the <REM/LOC> key is pressed.

Remote control via the RS232 interface is carried out with the commands described in the following table.

Summary of the remote control commands

Command	*Description*
`@GTV ###`	Go to vial position ### : `0` Rest position at left front `1 ... 128` Vial position on sample tray
`@LDL #`	Fill sample loop: The transfer needle is lowered to position # (1 … 4).
`@VLV LD/INJ`	Switch injection valve: `LD` LOAD (switch injection valve to FILL position) `INJ` INJECT (switch injection valve to INJECT position)
`@RNP`	Read needle position: The position (1 … 4) is put out.
`@RVN`	Read vial number: The position (1 … 128; HOME) is put out.
`@RVP`	Read injection valve position: The position (LOAD, INJECT) is put out.
`@RDX`	Read x position: The x position (0…760) is put out.
`@RDY`	Read y position: The y position (0…1000) is put out.
`@RDZ`	Read z position: The z position (0…46) is put out.
`@BZR $$$`	Trigger acoustic signal $$$: `CLK` single short acoustic signal `ERR` single long acoustic signal `ALM` triple slow acoustic signal `PNC` repeated slow acoustic signal `ON` continuous signal `OFF` switch off acoustic signal (`PNC`, `ON`)
`@AUX 1 ON/OFF`	Set contact closure 1 ("T1") on or off.
`@MSG ## "$$$"`	Display at position ## (1…80; 1…20 = 1st line; 21…40 = 2nd line; 41…60 = 3rd line; 61…80 = 4th line) on the LCD display the message "$$$...".
`@LOC`	Return to normal operation (LOCAL).

= digit 0 … 9; $ = any character

4 Notes – Maintenance – Faults

4.1 Operating information

4.1.1 Loading sample vials

Load the vial with sample to within ≈ 6 mm (1/4 in.) of the top and push the polyethylene cap (cup side down) into the vial. The cap has two sealing rings on its periphery. The cap should be pushed into the vial so that both rings engage and remain so. The maximum volume of sample is 800 µL, the minimum volume of sample is 300 µL using a loop size > 20 µL and 150 µL using a loop size ≤ 20 µL.

Air trapped under the plastic caps is of no consequence. The first stroke of the needle into the vial displaces enough liquid to force the air completely through the injector valve loop and through the waste outlet tube. Should any air remain in the vial, it will be above the needle opening and will not enter the tubing. The first stroke also forces enough sample through the tubing and loop to remove remnants of the previous sample.

4.1.2 Sample preparation

It is important that samples be free of particulate matter which may plug the needle or tubing. Metallic or gritty particles will cause damage to the injection valve and may plug the chromatographic system. All samples should be filtered therefore prior to filling the vials. This can be accomplished using a hand filtration device with a **0.45 µm membrane filter** shown in *Fig. 9*.

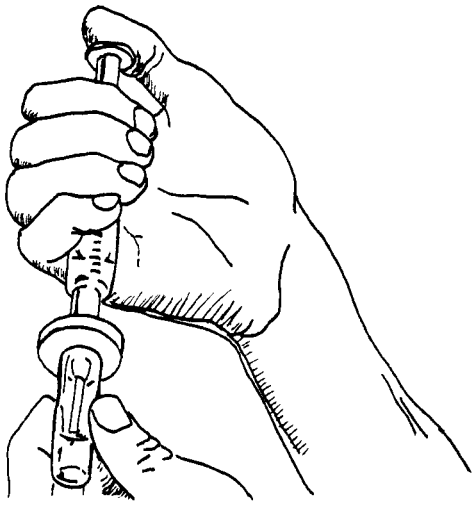


Fig. 9: Manual sample filtering

A further possible way of filtering samples is by means of the optional **6.2743.030 filter stoppers**. These filter stoppers, which contain a built-in filter unit, are fitted to the sample vials just like normal stoppers. The way they work is shown in *Fig. 10*.

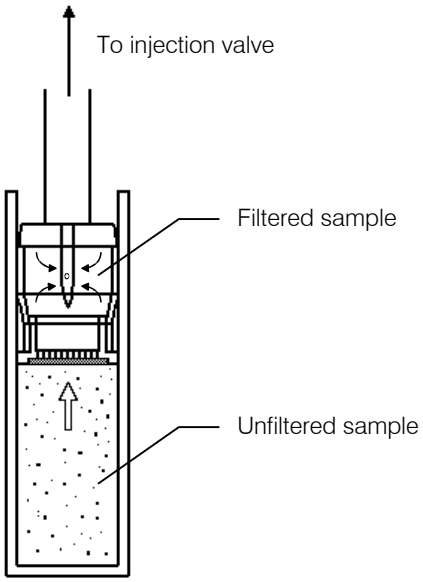


Fig. 10: Sample filtering with FilterCaps

FilterCaps™ were designed to free the chromatographer from the time-consuming task of hand filtering samples. They can be used to free samples from suspensions and particles. However, filter stoppers are not suitable for filtering samples containing a large amount of solids as this causes the filter to become blocked which also blocks the transfer needle. Those samples which are difficult to filter manually with a membrane filter (see *Fig. 9*) should be centrifuged before filtration.

*When working with filter stoppers the "*POS4*" setting for the needle immersion depth "*Needle Depth*" must not be selected.*

4.1.3 Operating parameters

Before samples can be injected all necessary instrument settings must be made. The most important parameter is the retention time. The time interval "Run Time" between individual injections must be sufficiently long so that all substances are eluted before the next sample is injected. Moreover, it may be necessary to include further time for baseline analysis and evaluation with the evaluation system.

4.2 Maintenance and servicing

4.2.1 General information

The 750 Autosampler was designed for years of maintenance-free use. The X,Y,Z sample tray assembly is equipped with bushings and bearings made from materials chosen to minimize the need for lubrication. The needle drive carriage position is recalibrated at powerup and with the start of each method. Therefore, there are no user serviceable parts in the X,Y,Z sample tray assembly or the needle drive carriage with the exception of changing the transfer needle (see *section 4.2.2*).

4.2.2 Transfer needle replacement

If the transfer needle is blocked it must be replaced. Proceed as follows (see *Fig. 11*):

1 Prepare Autosampler

- Stop any method which may be running by pressing <RUN/STOP> and <ENTER>.
- Park the transfer needle **5** by pressing <SYSTEM> and "`Park Needle`".
- Switch off instrument by means of mains switch **13**.

2 Remove old needle

- Hold connection screw **21** with open-end spanner and unscrew needle holder **17** together with transfer needle **5** with open-end 7/32" spanner (6.2621.020).
- Use two open-end spanners to unscrew nut **19** from connection screw **21** and remove connection screw **21** from holder **20**.
- Remove old transfer needle **5** from needle holder **17**.

3 Insert new needle

- Insert 6.2620.130 spare needle with already mounted ferrule **16** in needle holder **17**.
- Insert connection screw **21** into holder **20** from below.
- Use an open-end spanner to screw nut **19** firmly onto connection screw **21**.
- Screw needle holder **17** onto connection screw **21** by hand.
- Hold connecting screw **21** with open-end 7/16" spanner, tighten up needle holder **17** with open-end 7/32" spanner (6.2621.020) by about half a turn.

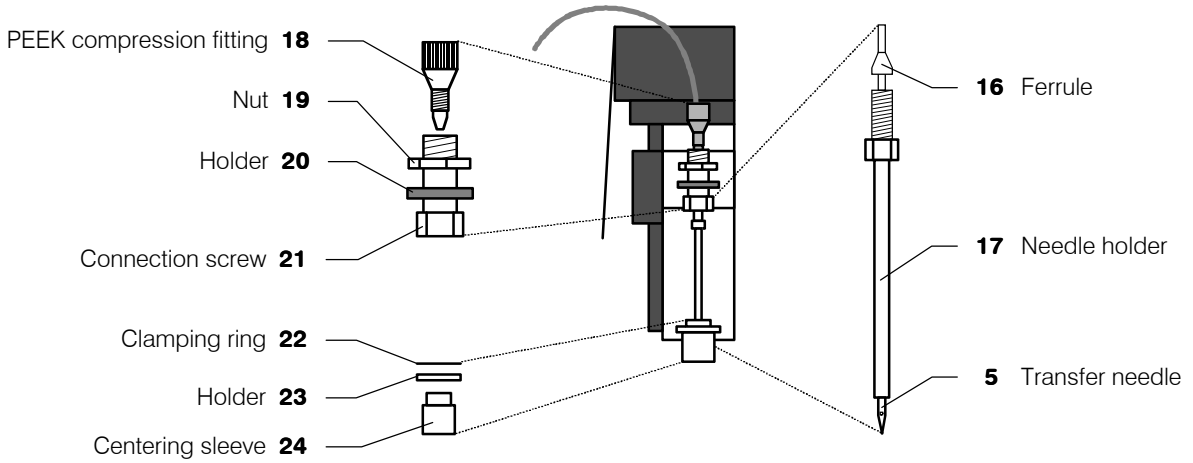


Fig. 11: Transfer needle replacement

4.2.3 Sample preparation

Experience has shown that most problems are caused by solids in the sample solutions. Such particles can block the needle, transfer tubing and the sample loop and also permanently damage the surfaces of the injection valve seals. This is the reason why all samples must be filtered before they are filled into the sample vials (procedure see *chap. 4.1.2*).

Solids may also be formed by the precipitation of buffer salts in the IC system. With buffered samples it is recommended that the sample loop feed is rinsed with a large volume of pure water after sample injection. For example, this can be achieved by filling several (e.g. 5) sample vials in sequence with distilled water after each sample and programming them as rinsing samples without run time. This procedure also avoids corrosion damage to the injection needle and the crystallization of salts.

4.3 Remedying malfunctions

4.3.1 Non-reproducible injections

Non-reproducible injections are usually due to problems such as fitting leaks, plugged tubing, poorly swaged fittings, or submerged waste tubes. In some instances, non-reproducibility may appear to be injector related when, in fact, it is caused by other components in the chromatographic system. Systematically analyze the entire system to assure that efforts are expended on the proper component before undertaking any repair.

Leaks

Plumbing leaks are the simplest causes of non-reproducibility to detect. Leaks affect reproducibility by diverting solvent from the column in an unknown amount and requiring a longer time to elute the sample because of reduced solvent flow. Places to check for leakage are the transfer tubing between the transfer needle and the injection valve, the transfer needle, sample loop, and injector seals. Once the leak has been found, either tighten the fitting or replace the fitting, should tightening not be sufficient.

Plugged tubing

Plugs and partial plugs due to debris may occur in the transfer needle, the transfer tubing, the sample loop, or the injector body. Plugs prevent proper loading of the sample loop.

Disconnect both ends of the transfer tubing **8** and use a syringe to force solvent through to check for blockage. There should be no difficulty in forcing solvent freely through the tubing. Force solvent through the transfer needle in the same fashion. There should be no difficulty in forcing solvent freely through the needle. Replace the needle or the tubing if either is plugged and resume operation.

Remove the sample loop from the injector valve body of the 733 IC Separation Center and check it for blockage with a syringe if the problem persists. Partial blockage of the loop will prevent accurate and consistent sample loading. Follow the procedures in the Instruction for Use for the valve if loop replacement is necessary.

Poorly swaged fittings

Non-reproducibility due to dead volume caused by poorly swaged fittings usually occurs after incorrect installation of new loops or other connections or after changing previously swaged loops. A gap as small as 0.05 mm between the end of the tubing and the shoulder inside the female portion of the fitting will have a dead volume of 0.1 µL with $^1/_{16}$" OD tubing. This type of irreproducibility always exhibits one of two peak height patterns. The patterns are observed by setting the 750 Autosampler to make three injections per vial. In the first pattern, the heights of the peaks in the first of the three injections tends to be smaller than the heights of the peaks for the second two injections which are usually about the same size. In the second pattern, larger peak heights on the

first injection followed by smaller but equal peak heights for the second two injections are observed. Observation of either pattern requires complete replacement of the loop.

The correct way to mount seals is described in detail in *chap. 2.5* of the 732/733 Instructions for Use.

When using a previously swaged steel capillary, be sure to use it with the fitting in which its ferrules were originally set. Small inconsistencies in the machining of the fitting are a source of dead volume.

Submerged waste tube

A waste tube that has been submerged below the liquid level in the waste container can cause the waste solution to siphon into the sample loop. The type of non-reproducibility this causes exhibits random peak heights. Do not allow the waste tube to be submerged below the liquid level in the waste container.

Injection valve leak

The probable cause of injection valve leakage on the 733 IC Separation Center is a worn or damaged seal. In this case new seals must be fitted.

4.3.2 Missed injections

Skipped vials

The torque of the stepper motor which drives the transfer needle is limited so as to prevent the vial from bursting under pressure in the event that a plug occurs in the transfer needle, transfer tubing, or injection valve. If more pressure is required to push a cap in than is provided, the needle motor will stall. While a method is running, if the motor stalls on two consecutive vials, the Autosampler will stop the method and issue an error message.

However, if the motor stalling is intermittent, the Autosampler will continue with the method. A list of the skipped vials will be shown on the display once the method is complete.

Plugs in the plumbing between Autosampler and injection valve are the major source for motor stalls and skipped vials (see *section 4.3.1*). However, the same symptom can occur with highly viscous samples or when FilterCaps™ are used.

FilterCaps™ due to job they are ask to do can pose some minor plugging problems. In some instances, the sample may be too "dirty" for use with FilterCaps™. A suggested work around for the problem of using FilterCaps™ with really "dirty" samples is to limit the number of injections per vial to 1 and to set the Needle Depth to "POS1" or "POS2" using the system settings key. Should this latter suggestion fail to provide satisfactory results, an alternative sample filtering procedure should be used.

Malfunctioning injection valve

If samples are only injected sometimes or not injected at all the injection valve of the 733 IC Separation Center must be checked. This is done by carrying out several injections with the 750 Autosampler while keeping the valve under observation. If the valve rotates perfectly but still no sample is injected then either a leak or a blockage is present (further procedure see *chap. 4.3.1*).

If the valve does not rotate proceed as follows: first check whether one of the two pilot lamps of the <FILL> or <INJECT> keys of the 733 IC Separation Center is lit up. Then check whether both plugs of 6.2128.100 connection cable between the 750 Autosampler and the IC Separation Center are properly plugged in and that electrical contact is made. Then trigger several injections by the 750 Autosampler and observe the valve. If the valve does not rotate, remove 6.2128.100 connection cable to the 733 IC Separation Center and operate the injection valve manually by means of the <FILL> and <INJECT> keys. Please inform Metrohm service if the valve can only be rotated with these keys or not rotated at all.

4.4 Error messages

There are two categories of error messages that the 750 Autosampler can display. **Entry errors** are errors usually caused by the user making an illegal keyboard entry or selection. These errors are identified by a flashing "ERROR" message, displayed on the top line of the display.

System error messages occur after a mechanical fault has been detected in the instrument. Service is usually indicated when a system error occurs. If the Autosampler is being operated under remote computer control by the RS232 interface, the error message will be sent in the form of a coded number.

4.4.1 Entry error messages

"A Method is NOT currently running"

The method status display was requested (from the method menu), but there is no method running.

"Cannot delete a Method that is currently running"

An attempt was made to delete a method while that method was running.

"Cannot execute! Autosampler is currently running."

An attempt was made to begin an operation while the Autosampler is currently running an operation. For example, if a manual injection is running and an attempt was made to run a method.

"Final vial # must be greater than or equal to start vial."

An attempt was made to program the final vial in a program step to a value less than the start vial. The final vial must always be ≥ the start vial.

"Maximum number of Steps for Method is 50"

All 50 program steps in a method have been programmed and an attempt was made to add or insert a program step.

"Method Number does NOT exist!"

An attempt was made to run, delete, or copy a method that is unprogrammed.

"Needle at lowest position. Select different vial."

An attempt was made to run a manual injection from a vial when the transfer needle was currently in the selected vial at the lowest needle position.

"Needle Stalled! Manual Injection not completed."

A needle stall occurred while running a manual injection. A needle stall generally occurs if the transfer needle hits an obstruction when attempting to enter the vial. An obstruction may be from the tray or sample vial being seated incorrectly or the vial cap getting stuck in the vial.

"Needle Stalled! Needle & Loop Rinse not completed."

This error is identical to the aforementioned error except that it occurs while running a manual rinse.

"No Steps programmed!"

An attempt was made to delete a program step in an unprogrammed method, i.e. the method contains no steps.

"No vials available! All vials have been used in other Steps."

An attempt was made to append or insert a program step but there are no unprogrammed vials available. All of the vials have been programmed in previous steps.

"Only ONE injection per vial allowed for a Quick Rinse."

More than 1 injection per vial was entered for a program step with quick rinses. Only one injection per vial is allowed for vials with a quick rinse because the transfer needle must leave the vial to index to the rinse vial immediately after injecting the sample and a vial cannot be reentered after puncturing the vial cap.

"Priority Sample currently running."

An attempt was made to begin a priority sample while a priority was already running.

"Source Undefined"

An error occurred but the origination is unclear or unknown. This error should not occur. If it does, then a problem probably exists with the ROM or RAM. Inform the Metrohm service.

"Unable to execute command while Method is running."

An attempt was made to select an operation that is not allowed to execute while a method is in operation, e.g. a manual injection or a manual rinse.

"Value out of range. Enter value between xx - yy"

A value was entered for a parameter that is not in the parameter's allowable range. The value must be between xx and yy.

"Vial # already used in this Method."

The vial # mentioned has already been programmed in a previous step in the same method. With the 750 Autosampler a sample vial can only be used once for injections.

4.4.2 System error messages

"Cannot determine vial position." RS-232: -30

The Autosampler is unable to determine the coordinates of a vial location. Inform the Metrohm service.

"Needle Drive Motor Stalled" RS-232: -32

The motor drive for moving the transfer needle up and down is blocked. Remove the cause of the blockage (see *chap. 4.4.1*). If the error still occurs please inform the Metrohm service.

"Needle Drive Motor Stepping Error" RS-232: -31

The motor drive for moving the transfer needle up and down no longer functions properly. Please inform the Metrohm service.

"No RS-232"

Reception error at the RS232 interface. Check the RS232 baud rate (same value as 750 Autosampler), data bit (8), stop bit (1) and parity (none) settings of the instrument connected to the RS232 interface.

"Row X Drive Motor Stepping Error" RS-232: -28

The motor drive assembly to move the needle carriage left and right is not working properly. Inform the Metrohm service.

"Row Y Drive Motor Stepping Error" RS-232: -29

The motor drive assembly to move the needle carriage forward and backward is not working properly. Inform the Metrohm service.

"SOURCE INDETERMINATE" RS-232: -35

Unknown error. Inform the Metrohm service.

4.4.3 Remote control error codes

If the remote control for the 750 Autosampler is switched on via the RS232 interface then each error will produce a corresponding error code. For each of the errors listed below information is provided as to whether the error can be remedied (R) or if it is a fatal system error (F). The Autosampler remains ready for operation with R-errors and the operator can enter a new command. With F-errors it is no longer possible to use the Autosampler. The instrument must be switched off and repaired (see *chap. 4.4.2*).

Code	*Error*	*Type*
0	No error, autosampler is not busy and is ready for a command.	–
-1	Invalid auxiliary output contact number request.	R
-2	Invalid auxiliary output command request.	R
-4	Request invalid because autosampler is busy performing an operation.	R
-5	Invalid buzzer request.	R
-6	Invalid command request. Autosampler did not recognize command.	R
-8	Invalid display request.	R
-12	Present needle position is unknown or invalid.	R
-13	Requested needle position is invalid.	R
-21	Invalid vial number request.	R
-22	Transfer needle is not at a valid vial position, so it cannot be lowered.	R
-27	Invalid injection valve position request.	R
-28	Motor drive error on x drive (left-right).	F
-29	Motor drive error on y drive (forward-back).	F
-30	Unable to determine vial position or vial position is invalid.	R/F
-31	Motor drive error on z drive (up-down).	F
-32	Motor stall error on z drive.	F
-35	Error, origin unknown.	F
-36	Autosampler stopped locally.	R
-43	Step position requested by MVZ not valid.	–
-47	Step position requested by MVX or MVY not valid.	–
-48	Not a valid X/Y step position.	–
-49	Serial communications error.	–

5 Appendix

5.1 Technical data

Sampling

Method	Positive displacement principle
Capacity	128 sample vials of 730 µL each
Number of injections per vial	max. 4 with sample loops ≤ 10 µL max. 3 with sample loops >10 µL
Max. loop size	50 µL with 3 injections per sample 100 µL with 2 injections per sample 300 µL with 1 injection per sample
Carryover	< 0.25 % without rinsing < 0.004 % with rinsing

Control elements

Display	LCD, 4 lines, each of 20 characters (character height 4 mm)
Keypad	Membrane keypad made of polyester with 20 keys
Mains switch	At rear of instrument

Mains connection

Voltage	100/120 V ± 10 % 230/240 V ± 10 % autoselectable
Frequency	50/60 Hz
Power consumption	80 VA
Fuses	100/120 V: 2 A (rapid-action, with low rupturing capacity, 3AG) 230/240 V: 1.25 A (rapid-action, with low rupturing capacity, 5 × 20 mm)

Interfaces

Contact closure strips	Outputs for control of external devices, inputs for remote control (see *section 5.2.1*)
RS232 interface	Data communication in accordance with RS232C (see *section 5.2.2*)

Safety specifications

Construction / testing	According to IEC 1010 / EN 61010 / UL 3101-1, protection class 1, degree of protection IP20
Safety notes	The Instructions for Use include information and warnings which must be heeded by the user to assure safe operation of the instrument.

Electromagnetic compatibility (EMC)

Emitted interference	Standards met: EN 55011 (class A)
Immunity to interference	Standards met: EN 50082-1

Ambient temperature

Nominal operating range	+5…+45°C (at 20…80 % atmospheric humidity)
Storage, transpor	–20…+70°C

Diagnostic tests

Self-diagnostic test	Automatic self-diagnosis when instrument switched on
User diagnostic test	Built-in diagnostic program (see *section 4.5*)

Housing

Material	Aluminum, enamelled

Dimensions

Width	324 mm
Height	335 mm
Depth	548 mm
Weight	13.0 kg (incl. accessories)

5.2 Interfaces

5.2.1 Contact closure strips

The contact closure strip **9** can be used for external control of an injection valve. The allocation of the 4 connections is shown in *Fig. 12*. The output signals are emitted as contact closures between two connections.

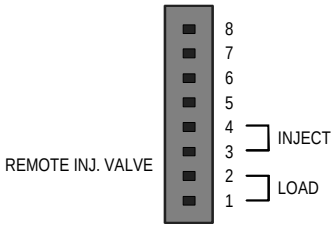


Fig. 12: Valve control

LOAD (output signal for switching the injection valve)
Automatic contact closure between connections 1 and 2 (normally open) before the start of the filling process. This signal is used to switch the injection valve of the 733 IC Separation Center to the "Fill" position.

INJECT (output signal for switching the injection valve)
Automatic contact closure between connections 3 and 4 (normally open) at the end of the filling procedure. This signal is used to switch the injection valve of the 733 IC Separation Center to the "Inject" position.

The contact closure strip **10** can be used both for external control of the 750 Autosampler as well as for the control of external instruments via the 750 Autosampler. The allocation of the 19 connections is shown in *Fig. 13*. The output signals are emitted as contact closures between two connections; the input signals must be applied in the same way between two connections.

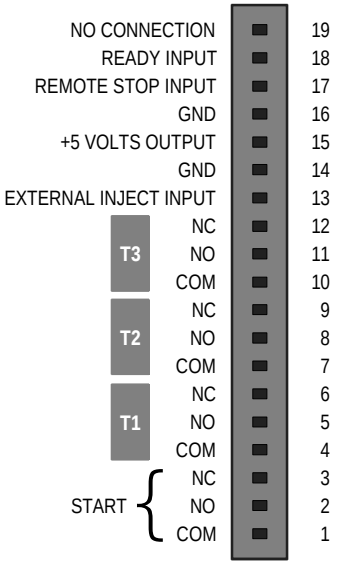


Fig. 13: Inputs/outputs

START (output signal for injection)
Automatic contact closure between connections 1 and 2 (normally open) and 1 and 3 (normally closed) for each injection triggered by a method. Under "`SYSTEM SETTINGS/Contact Closures/Inject`" the contact closure time can be set between 1…32000 s (for manual injections the contact closure time is always 6 s). This signal can be used, for example, for starting the data evaluation system.

T1 (output signal for freely programmable event)
Contact closure between connections 4 and 5 (normally open) and 4 and 6 (normally closed) according to the time laid down in the method "`Event1 Time`". The contact closure time can be set under "`SYSTEM SETTINGS /Contact Closures/Event 1`" between 1…32000 s. This signal can be used for controlling external instruments.

T2 (output signal for freely programmable event)
Contact closure between connections 7 and 8 (normally open) and 7 and 9 (normally closed) according to the time laid down in the method "Event2 Time". The contact closure time can be set under "SYSTEM SETTINGS /Contact Closures/Event 2" between 1...32000 s. This signal can be used for controlling external instruments.

T3 (output signal for freely programmable event)
Contact closure between connections 10 and 11 (normally open) and 10 and 12 (normally closed) according to the time laid down in the method "Event3 Time". The contact closure time can be set under "SYSTEM SETTINGS /Contact Closures/Event 3" between 1...32000 s. This signal can be used for controlling external instruments.

EXTERNAL INJECT INPUT (input signal for external injection start)
If a contact closure is made by an external instrument between connections 13 and 14 then the Autosampler will regard this as a starting signal for the injection of a new sample. A precondition for this is that the run time "Run Time" in the method has been set to "0.0". In this case the run time will be determined externally.

GND (ground 0 V)
An output signal of 0 V is present between connections 14 and 16.
+5 VOLTS OUTPUT (output signal +5 V)
Between connections 15 and 14 or 16 an output signal of +5 V is provided which can be used in combination with a contact closure for external instruments which require a +5 V impulse for activation.

REMOTE STOP INPUT (input signal for stop)
If a contact closure from an externally connected instrument is made between connections 16 and 17 then the Autosampler will be stopped. The instrument remains in this condition until the contact is again interrupted. On the Autosampler the same display then appears as if the stop had been made with the <RUN/STOP> key (see *chap. 3.6*).

READY INPUT (input signal for operation interruption)
The "Ready" signal provided at connection 18 is internally set to "high". If it is set to "low" by an externally connected instrument then the current Autosampler actions will be interrupted until the signal is reset to "high".

5.2.2 RS232 interface

The RS232 interface **11** is used for complete control of the 750 Autosampler by an external computer. The interface is wired as DCE device (DCE: Data Communication Equipment) and has the following technical data:

Baud rate: 300…38400 (selectable, see *section 3.8*)
Data bits: 5…8 (selectable, see *section 3.8*)
Parity: even, odd, none (selectable, see *section 3.8*)
Stop bit: 1, 2 (selectable, see *section 3.8*)

A 1:1 RS cable with a male 9-pole plug is required as a connection cable (e.g. 6.2134.000 Metrohm cable 9-pol/9-pol).

Remote operation of the Autosampler is carried out with the ASCII commands described in *chap. 3.8*. An example of the use of these commands in a RS232 control program, which is programmed in Microsoft Basic, is given below.

```
100 ' ***  OPEN COM1 FOR RS-232 ***
110 OPEN "COM1:4800,N,8,1,RS,CS,DS,CD" AS #1
120 ' ***  SEND CARRIAGE RETURN TO COM1 **
130 PRINT #1,CHR$(13)
140 ' *** PUT VALVE INTO THE LOAD POSITION ***
150 PRINT #1,"@VLV LD" + CHR$(13)
160 ' *** GO TO NEEDLE HOME POSITION ***
170 PRINT #1,"@GTV 0" + CHR$(13)
180 ' *** GO TO VIAL POSITION 25 ***
190 PRINT #1,"@GTV 25" + CHR$(13)
200 ' *** LOWER THE NEEDLE TO POSITION 1 ***
210 PRINT #1, "@LDL 1" + CHR$(13)
220 '*** PUT VALVE IN INJECT POSITION ***
230 PRINT #1, "@VLV INJ" + CHR$(13)
240 ' *** CLOSE RS-232 PORT ***
250 CLOSE #1
260 END
```

5.3 Standard equipment

Subject to changes !

The 2.750.0010 Autosampler includes the following parts:

Quant.	*Order No.*	*Description*
1	**6.1803.000**	**PTFE Microcapillary tubing** Transfer tubing for connection of transfer needle with injection valve; i.D. = 0.3 mm, e.D. = 1.5 mm, length = 1 m
1	**6.2041.600**	**Sample rack** For 128 sample vials
1	**6.2128.100**	**Connecting cable** Connecting cable 750 Autosampler– 733 IC Separation Center
1	**6.2140.010**	**Connector plug** With 19 connections, plugs into contact closure strip **10**
1	**6.2140.020**	**Connector plug** With 8 connections, plugs into contact closure strip **9**
1	**6.2621.020**	**Open-end spanner $^{7}/_{32}$"**
1	**6.2742.010**	**Dust cover** Dust cover for Autosampler 750
1	**6.2743.000**	**Polypropylene (PP) sample vials** Set of 1000, with 1000 stoppers (transparent) and 100 stoppers (colored) made of polyethylene
1	**6.2744.010**	**PEEK compression fitting** Set of 5, for connection of 6.1803.000 PTFE microcapillary tubing
1	**6.2122.0X0**	**Mains cable** to customer's specifications: Cable socket — Cable plug Type IEC 320/C 13 — Type SEV 12 (CH…) ..... 6.2122.020 Type IEC 320/C 13 — Type CEE (7), VII (D…) ..... 6.2122.040 Type CEE (22), V — Type NEMA 5-15 (USA…) 6.2122.070
1	**8.750.1023**	**Instructions for Use (English)** for 750 Autosampler

5.4 Optional accessories

Order No.	*Description*
6.2134.000	**RS Connecting cable** length = 2 m; plug = 9-pol male / 9-pol female
6.2115.070	**Connecting cable 750 – 733** length = 1.4 m
6.2134.070	**Connecting cable 750 – 709** length = 2 m
6.2620.130	**Transfer needle** Replacement needle, assembly see *chap. 4.2.2*
6.2413.000	**Borosilicate glass sample vials** Set of 1000, with 1000 stoppers (transparent) and 100 stoppers (colored) made of polyethylene
6.2743.010	**Polyethylene (PE) stoppers** Set of 1000, transparent
6.2743.020	**Polyethylene (PE) stoppers** Set of 1000, colored
6.2743.030	**Filter stoppers (FilterCaps™)** Set of 100, for automatic sample filtering

5.5 Warranty and conformity

5.5.1 Warranty

The warranty on our products is limited to defects that are traceable to material, construction or manufacturing error which occur within 12 months from the day of delivery. In such cases the defects will be rectified in our workshops free of charge. Transport costs are to be paid by the customer.

For day and night operation the warranty is limited to 6 months.

Glass breakage in the case of electrodes or other parts is not covered by the warranty. Checks which we are asked to carry out during the warranty period for reasons other than material or manufacturing faults will be invoiced. For parts manufactured by third parties, insofar as these constitute an appreciable part of our instrument, the warranty stipulations of the manufacturer in question apply.

With the regard to the guarantee of accuracy, the technical specifications in the instruction manual are authoritative.

With regard to defects in material, construction or design as well as the absence of guaranteed features, the purchaser has no rights or claims except those mentioned above.

If damage of the packaging is evident on receipt of a consignment or if the goods show signs of transport damage after unpacking, the carrier must be informed immediately and a written damage report demanded. Lack of an official damage report releases Metrohm from any liability to pay compensation.

If any instruments and parts have to be returned, the original packaging should be used if at all possible. This applies above all to instruments, electrodes, burette cylinders and PTFE pistons. Before embedding them in wood shavings or similar material, the parts must be packed in a dustproof package (for instruments the use of a plastic bag is imperative). If open assemblies are enclosed in the scope of delivery that are sensitive to electromagnetic voltages (e.g. data interfaces etc.) these must be returned in the associated original protective packaging (e.g. conductive protective bag). (Exception: assemblies with built-in voltage source belong in a non-conductive protective packaging). For damage which arises as a result of non-compliance with these instructions, no warranty responsibility whatsoever will be accepted by Metrohm.

5.5.2 EU Declaration of conformity

CE

EU Declaration of Conformity

The METROHM AG company, Herisau, Switzerland hereby certifies, that the instrument:

750 Autosampler

meets the requirements of EC Directives 89/336/EWG and 73/23/EWG.

Source of the specifications:

EN 50081-1	Electromagnetic compatibility, basic specification Emitted Interference
EN 50082-1	Electromagnetic compatibility, basic specification Interference Immunity
EN 61010	Safety requirements for electrical equipment for measurement, control and laboratory use

Description of the instrument:

Autosampler for ion chromatography

Herisau, November 8, 1996

Dr. J. Frank	Ch. Buchmann
Development Manager	Production and Quality Assurance Manager

5.5.3 Certificate of conformity and system validation

Certificate of Conformity and System Validation

This is to certify the conformity to the standard specifications for electrical appliances and accessories, as well as to the standard specifications for security and to system validation issued by the manufacturing company.

Name of commodity:	**750 Autosampler**	
Name of manufacturer:	Metrohm Ltd., Herisau, Switzerland	
System software:	Stored in ROMs	
Principal technical information:	Voltages:	100…120, 230…240 V
	Frequency:	50…60 Hz

This Metrohm instrument has been built and has undergone final type testing according to the standards:

EN55011 (class A), EN50082-1	— *Electromagnetic compatibility*
IEC1010, EN61010, UL3101-1	— *Security specifications*

It has also been certified by the Swiss Electrotechnical Association (SEV), which is member of the International Certification Body (CB/IEC).

The technical specifications are documented in the instruction manual.

The system software, stored in Read Only Memories (ROMs) has been validated in connection with standard operating procedures in respect to functionality and performance. The features of the system software are documented in the instruction manual.

Metrohm Ltd. is holder of the SQS-certificate of the quality system ISO 9001 for quality assurance in design/development, production, installation and servicing.

Herisau, November 8, 1996

Dr. J. Frank	Ch. Buchmann
Development Manager	Production and Quality Assurance Manager

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