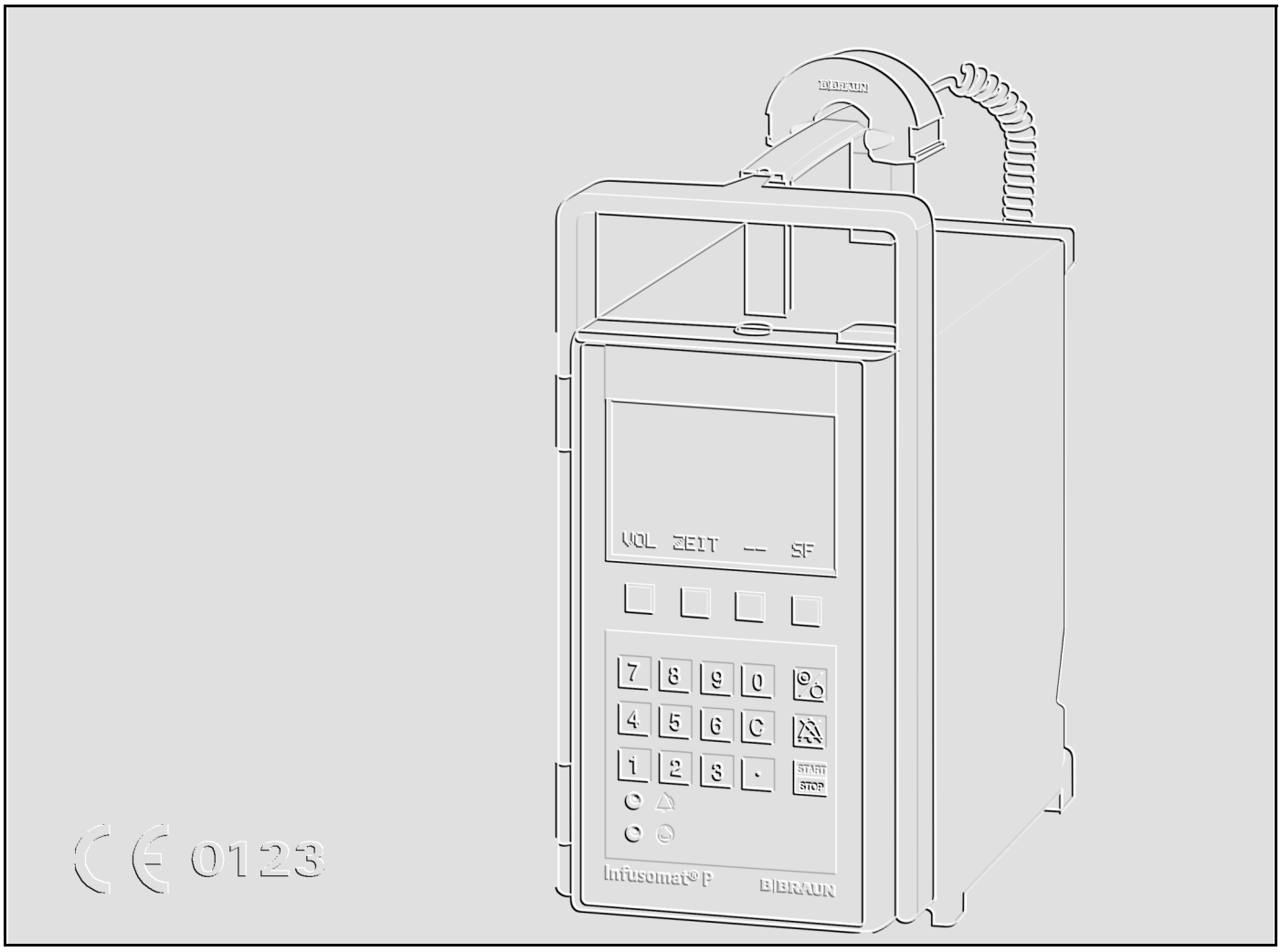
Infusomat P

Service-Manual



Version 2.0 English

Software: IFPC02001
IFPC02002
IFPe02003
IFPE13002
IFPE13003

This Service-Manual is valid for

Voltage 230 V:	**Ord. No.**
Infusomat P, German	871 2174
Infusomat P, French	871 2182
Infusomat P, Dutch	871 2190
Infusomat P, Italian	871 2204
Infusomat P, Danish	871 2298
Infusomat P, Norwegian	871 2301
Infusomat P, Swedish	871 2310
Infusomat P, Finnish	871 2336
Infusomat P, Czech	871 2344
Infusomat P, Polish	871 2352
Voltages 200 V / 230 V / 240 V, switchable:	
Infusomat P, English	871 2212
Infusomat P, English	871 2379
Infusomat P, Spanish	871 2263
Infusomat P, Portuguese	871 2271
Infusomat P, Turkish	871 2280
Voltages 100 V / 110 V / 120 V, switchable:	
Infusomat P, English	871 2387
Infusomat P, Dutch	871 2395
Infusomat P, Spanish	871 2409
Infusomat P, Portuguese	871 2417

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Important Information on this Manual 0

The following notes should be observed:

Service Work

The present manual is for your information only. The possession of this manual does not authorize the performance of service work. Service tasks may only be executed by persons, who

- have received appropriate training on the system from B. Braun
- are included in the revision service
- possess the necessary test equipment and mechanical aids, and
- fulfil the personal requirements (training and knowledge).

Technical Safety Inspections

B. Braun also recommends training on the technical safety inspections, or to perform at least the steps indicated in the current version of the manual, as:

- the TSI requires that the instructions in the manuals are observed
- the manuals are a reference for measurements
- depending on the unit type, the service program must be called up which may lead to a dangerous unit condition in the case of an inappropriate operation. Furthermore, a special service connector may be necessary.

Current Versions

This manual version corresponds to the state when the manual was written. Technical changes, especially software modifications must always be expected. The state of the revision is indicated by the index number on the title page.

Revision Service

The possession of this manual does not automatically mean inclusion in the revision service. You will be included in the revision service after:

- technical training by B. Braun Melsungen or
- a written order placed with the sales department of B. Braun (incurred costs).

Non-Liability

B. Braun Melsungen AG does not assume any responsibility for injuries to persons, property damages or other damages caused by:

- the use of a wrong manual, or a manual which does not correspond to the revision state for maintenance, repair, and service tasks
- the non-inclusion of the service technician in the revision service
- technicians who have not participated in a technical training course for the specific B. Braun unit.

ISO 9000 ff/EN 46 000 ff

B. Braun is certified in accordance with DIN ISO 9001 and DIN EN 46 001. This certification also includes maintenance and service.

The Infusomat P complies with the IEC/EN60601-1 and IEC/EN60601-2-24 standards and is certified with the CE label according to the EC directive 93/42/EC.

Repair and Inspection only by Trained Technicians

Training may only be performed by B. Braun. The possession of the manual does not authorize the performance of repairs. The instructions on electrostatic sensitive components (ESD standards) must be observed.

An electrical check must be performed following each repair (see „Checks after Repair" ➨ pg. 5 - 1).

Spare Parts and Test Equipment

Only use original spare parts from the manufacturer. Do not tamper with assembly groups which can only be exchanged completely. The spare parts required are listed in the repair instructions.

The inspection personnel is responsible for the calibration of the test equipment. Original test equipment can be calibrated at the works of B. Braun. Further information is available upon request.

Setting Off

Additional notes and warnings are set off as follows:

Note

Gives additional or special notes on information and working steps.

CAUTION

Is used for working steps which may result in damage to the unit, system or to a connected device.

WARNING

IS USED FOR WORKING STEPS WHICH MAY RESULT IN PERSONAL INJURY.

Technical Training

B. Braun Melsungen AG
Stadtwald Haus 6
D-34 212 Melsungen
Germany

Responsibility
Dieter Gundlach
Tel.: +49 5661 71 - 37 74
Fax: +49 5661 71 - 28 81

Entry for the Product Training

Only via the responsible representative

Ordering of Spare Parts and Test Equipment

B. Braun Melsungen AG
P.O. Box 11 20
D-34209 Melsungen
Germany

Hospitals and Suppliers of Hospitals
Tel.: +49 800 2 27 28 24
Fax: +49 5661 71 37 98

Dealer and Medical Houses
Tel.: +49 5661 71 36 28/29
Fax: +49 5661 71 35 50

Return of Spare Parts

B. Braun Melsungen AG
Schwarzenberger Weg 73-79
Wareneingang Werk C
D-34 212 Melsungen
Germany

Service Hotline

Mr. Tippel, Mr. Clobes
Tel.: +49 56 61 71 - 35 25
Fax: +49 56 61 71 - 35 26
E-Mail: karl.tippel@bbraun.com
E-Mail: christian.clobes@bbraun.com

Safety Officer

Dr. Wilhelm Wucherpfennig
Fax: +49 56 61 71 - 46 36
E-Mail: wilhelm.wucherpfennig@bbraun.com

Translation

Brückner GmbH, Germany

For your notes:

System Overview 1

Design

The Infusomat P is a compact volumetric peristaltic infusion pump.

Standard delivery rate range 0.1 to 999.9 ml/h

The unit is operated via a membrane keypad. It is equipped with an LCD (liquid crystal display) for the display of the delivery rate and the operating support of the user. Two control LEDs display alarms, and the running of the infusion pump.

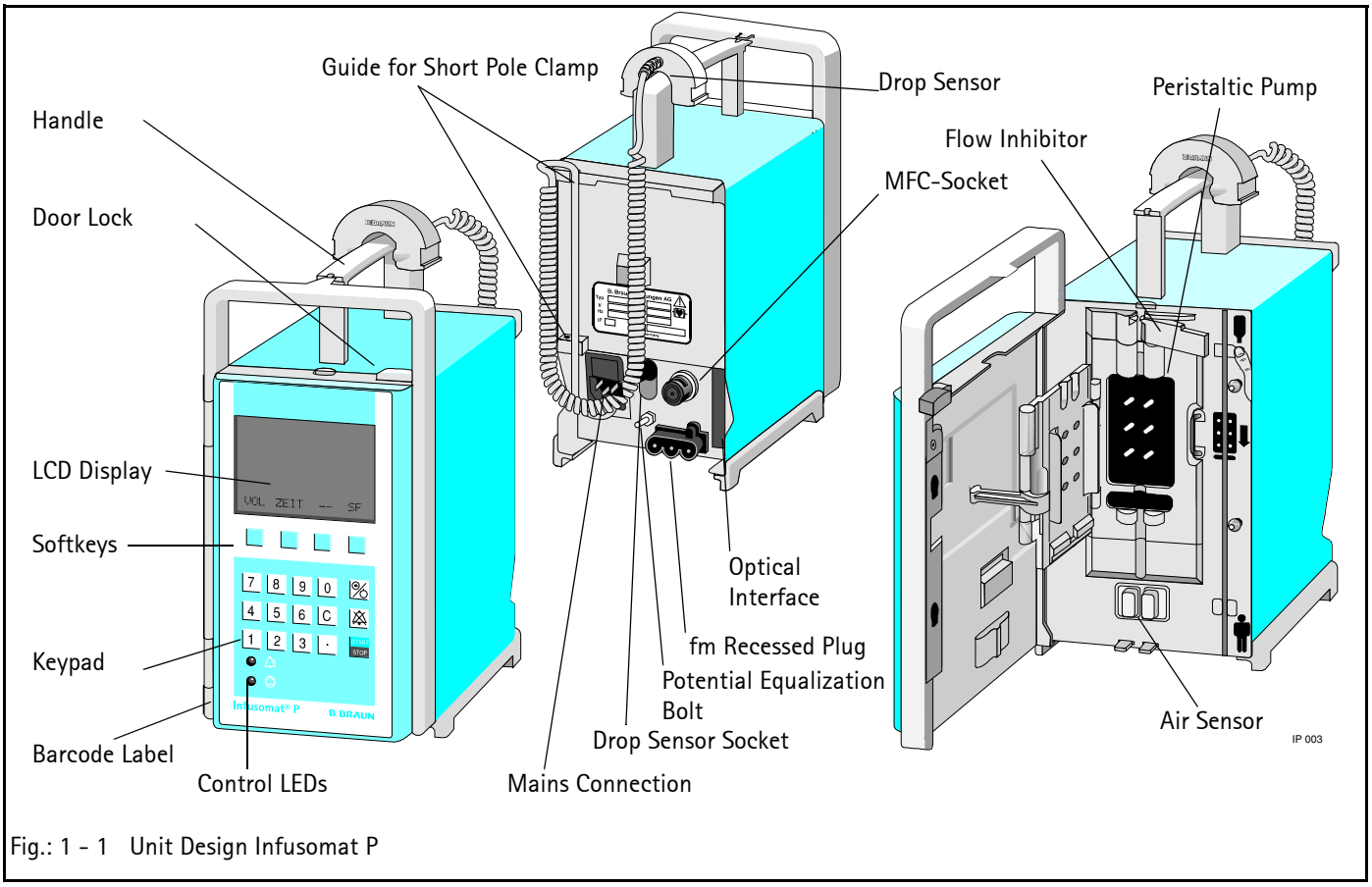


Fig.: 1 - 1 Unit Design Infusomat P

A barcode label is attached to the left front side of new Infusomat P unit versions which can be retrofitted on previous devices. This barcode label is used to read the serial and DIANET type number via a scanner when the Infusomat P is operated in an fm-system.

1 System Overview

Operation Flow Chart

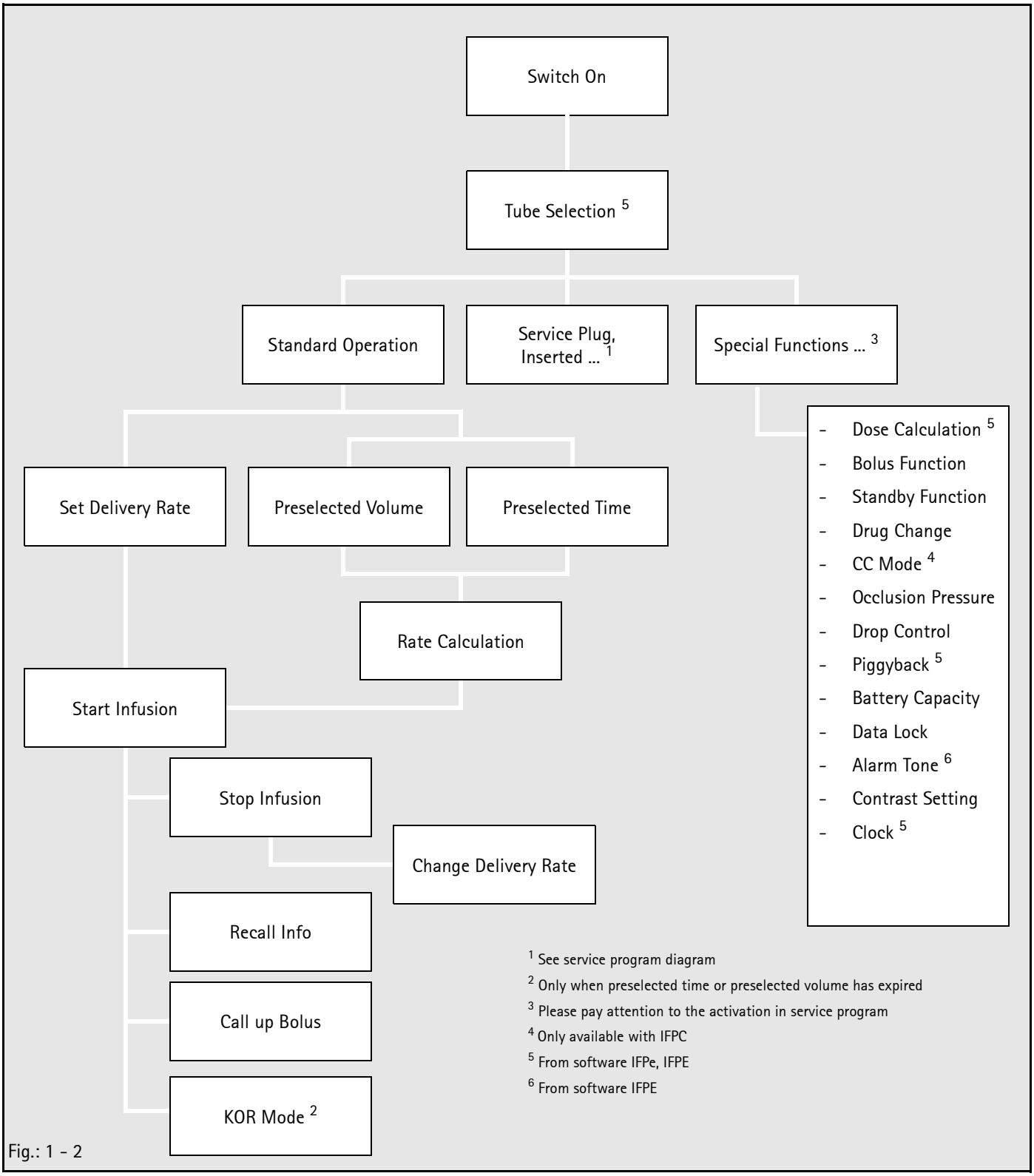


Fig.: 1 - 2

See Instructions for Use for detailed information.

Function

Two independent software-controlled microprocessor systems control and monitor the hardware. On the basis of their functions, they are defined respectively as a control and a function processor. Both systems work with independent clock frequencies and have access to different program and data memories. All safety-relevant functions are handled by both processors and the results are counter checked (CF- and FC-latch).

The input via the keypad is fed to both processors. Additionally the acknowledgement signal of the ON/OFF key is fed to the mains power supply logic (voltage E/A-TAS). The function processor has also access to this logic via E/A-INT.

Description of the voltage signals (see „Signal Table“ ➡ pg. 1 - 5).

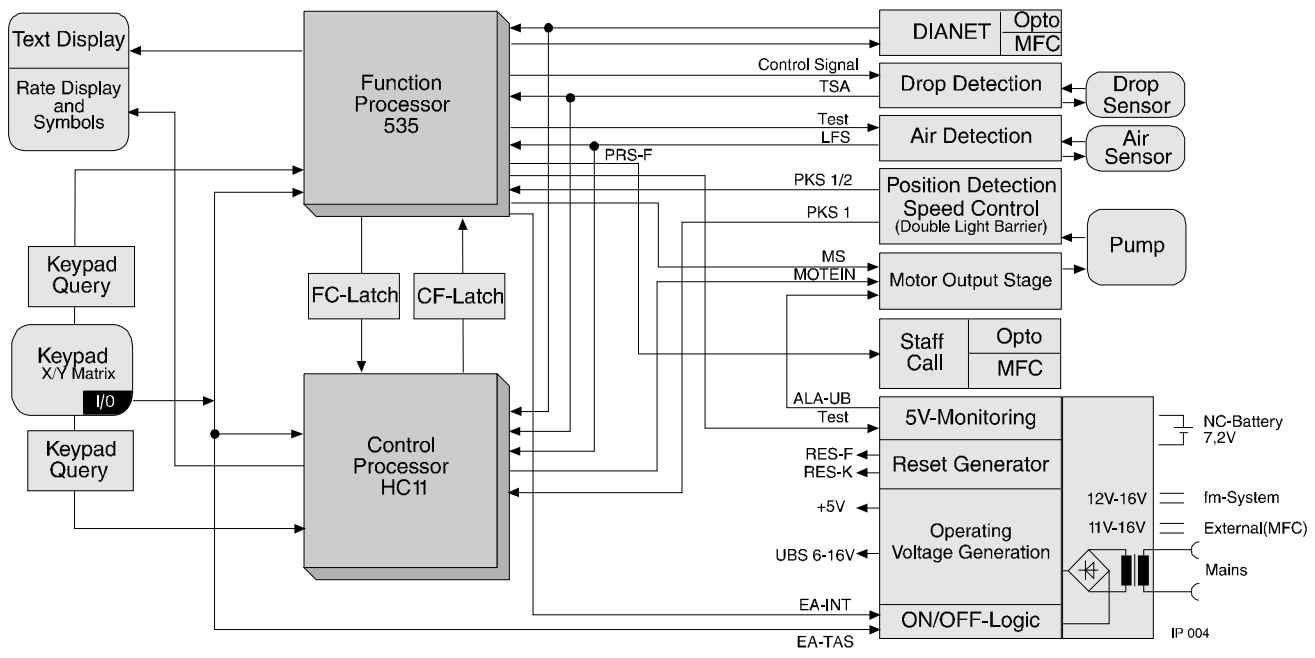


Fig.: 1 - 3

Voltage Supply

The voltage supply is generated either directly from mains, via the FM plug (14 V connection to the fluid manager system), or via the MFC connector (11 to 16 V) and as an internal supply via the internal 7.2 V NiCD battery. The mains module is available in three versions: 230 V, 220 / 230 / 240 V and 100 / 110 / 120 V. The rated voltage has a tolerance of + 10% to – 15 %.

A voltage of 11 V to 18 V is available after transformation and rectification. This voltage is fed to the battery charge circuit and the unit supply. This is also valid for an external 12 V supply from the MFC or FM plug. The FET V10 switches between the external and the internal voltage supply. The transistor V10b works as an ON/OFF switch for the operating voltages UBS, UMOT and +5V. The +5V supplies the complete electronics including the double channel microprocessor system. A window comparator constantly monitors the +5V for undervoltage or overvoltage. The function is checked during switch-on. The operating voltage UBS supplies the stepper motor and the UMOT, the stepper motor drive.

The transistor V47 switches the operating voltage UMOT. In case of an alarm the motor is switched off by V47. Additionally the switching function of the transistor is checked during the switch-on test.

The circuit has two separate assembly groups with separate supply voltages UBA and UBB. The ON/OFF circuit has a retriggerable delay switch-off. A follow-up charging circuit drives the transistor V10b.

The alarm logic (operating voltage UBB) is an RS latch. This is set when the unit is running and activates the alarm circuit. The alarm buzzer and drive are also driven by UBB. The ON/OFF circuit is activated and the voltage supply is switched on by pressing the ON/OFF key. The alarm latch is reset simultaneously. A function test of the voltage monitoring, motor circuit and alarm activation is performed. The voltage supply is maintained by cyclic self-holding pulses fed to the logic. The alarm latch is also activated.

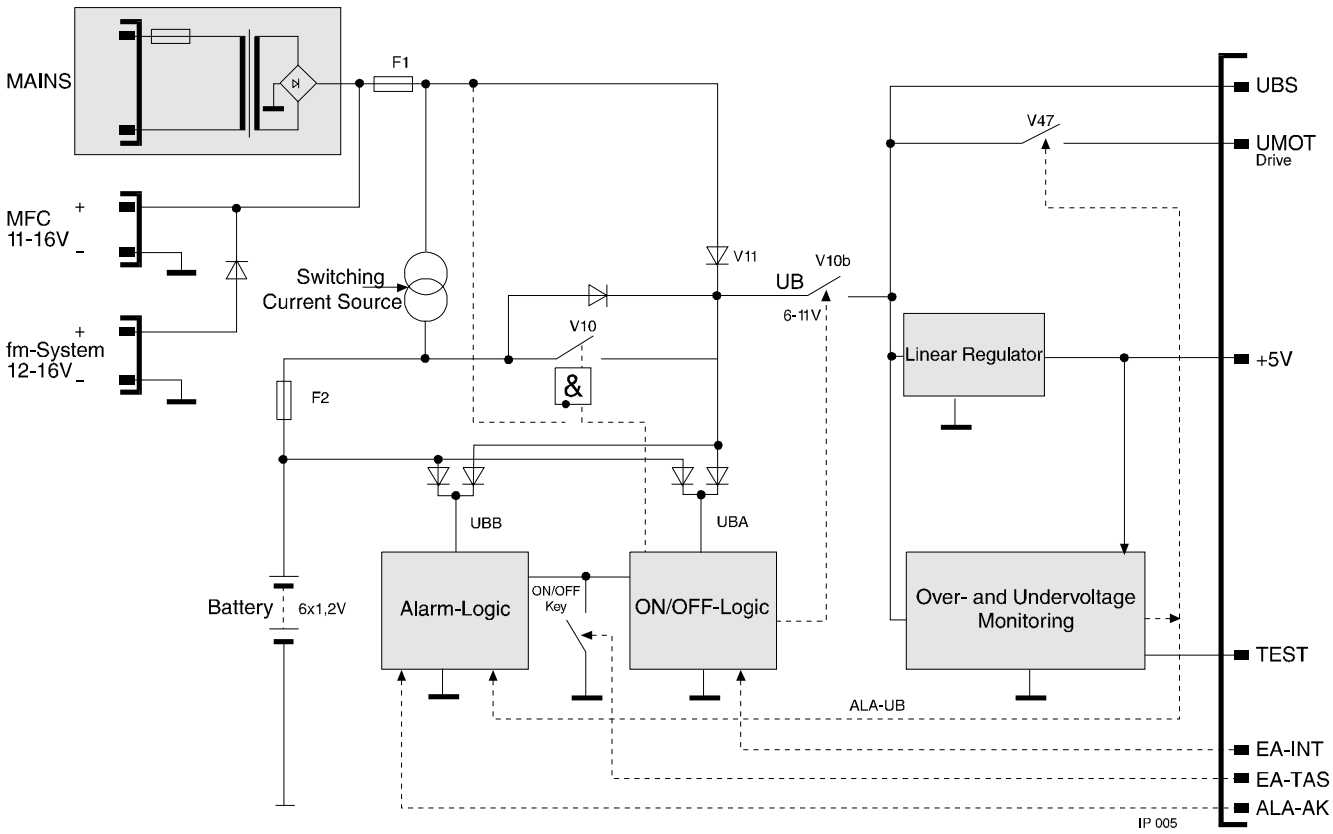


Fig.: 1 - 4

Signal Table

Signal	Meaning	Signal	Meaning
+5V	Voltage Supply Electronic	PKS2	Pump Head Sensor 2
5V-HT	Overvoltage Test	PKSS	Pump Head Sensor Control
5V-LT	Undervoltage Test	PRS	Staff Call Relay Control
AK-I	Battery Charge and Discharge Current	PRS-F	Staff Call Relay Function Channel
AK-LAD	Battery Capacity ON/OFF	PKSS	Pump Head Sensor Control
AK-Test	Battery Test	PRS.RUF	Staff Call Relay Control
ALA-UB	Operating Voltage Alarm	RDE	Rate Display Enable
CS	Chip Select	RES	Power on Reset
DI	Data Input	RES-F	Reset Function Channel
DO	Data Output	RES-K	Reset Control Channel
E/A-INT	ON/OFF by Microprocessor	RTS	Return to Send (DIANET)
E/A-ST	ON/OFF Status	Rx	Receive Data

Table 1 - 1 Signal Table (Part 1 of 2)

Signal	Meaning	Signal	Meaning
E/A-TAS	ON/OFF Key	SCK	Serial Data Lock
EDB	Electronic Occlusion Pressure	TD-A0	Text Display Address 0
FMC-F	FM Connection Function Channel	TD-A1	Text Display Address 1
FMC-K	FM Connection Control Channel	TD-A2	Text Display Address 2
UEXT-N	External 12V Supply (-)	TD-A3	Text Display Address 3
UEXT-P	External 12V Supply (+)	TD-E	Text Display Enable
UFM-P	External 12V Supply (FM)	TD-R/W	Text Display Read/Write
LFCL	Air Sensor Clock	TD4	Text Display Data 4
LFDA	Air Sensor Data	TD5	Text Display Data 5
LFS	Air Sensor Signal	TD6	Text Display Data 6
LFSEL	Air Sensor Selection	TD7	Text Display Data 7
LFT	Air Sensor Reset	TSA	Drop Sensor Output
MISO	Serial Data Output Interface	TSCL	Drop Sensor Clock
MOSI	Serial Data Input Interface	TSE	Drop Sensor Receiver
MOTEIN	Motor ON	TSR	Drop Sensor Regulation
MS	Motor Control	TSS	Drop Sensor Control
P-ENA	Port Enable	Tx	Transmit Data
PH0	Phase 0	UBA, UBB	Supply Voltage for Alarm, On/Off Logic, RTC
PH1	Phase 1	UBS	Switched Operating Voltage UB
PH2	Phase 2	UBS-M	UBS Measurement Line
PH3	Phase 3	UMOT	Supply Voltage of Motor Drive
PKS	Pump Cover Sensor	UMOT-M	UMOT Measurement Line
PKS1	Pump Head Sensor 1	URTC	Supply Voltage Clock Module

Table 1 - 1 Signal Table (Part 2 of 2)

Mains Operation

When the unit is connected to mains the unit supply voltage is switched on for the duration of the switch-off delay time. If the microprocessor recognizes a sufficient mains voltage for the charging, the voltage supply is maintained. In this case only a battery balance is carried out, because a key was not pressed. The actual battery capacity and the battery operting hours are displayed in the LCD. The unit is switched off when the ON/OFF key is pressed for at least 2 seconds. Thereby the self-holding is triggered and the alarm latch is reset with a delay. After another 20 seconds the unit is switched off, because the pulses are missing. If the Infusomat P is switched off in mains operation with the ON/OFF key, the internal mains voltage is still present.

In mains operation the battery function is checked during the switch-on test. Therefor the charge and discharge current is

measured and the charging of the battery is interrupted for the duration of the measurement.

Battery Operation

The battery function is monitored by the following data: charge current, discharge current and time, and self-discharge time. In battery operation the battery function is checked during the switch-on test. The theoretical load condition is read from the clock module of the battery. Then the battery is connected to UBS and the voltage is measured. If the minimum requirements are not reached a battery alarm is activated.

Alarm Circuit

The alarm generation consists of:

- Standstill of pump due to switch-off of MS (motor circuit) and UMOT (motor operating voltage)
- Audible alarm due to the drive of the buzzer or the loud-speaker via ALA-AK (control channel) or via ALA-UB
- Optical alarm. Is displayed in the LCD and a separate LED display. Additionally the set rate flashes with AAA.A.
- Staff call via the MFC staff call cable.

The user must check the optical and audible alarm during the switch-on test. An alarm must be activated to test the staff call alarm of the Infusomat P, e.g. open pump cover during operation.

Pump Unit

The pump head is driven by a stepper motor. Each full step of the motor is realized by 5 microsteps. The motor is driven by an FET output stage. The function processor controls the motor with the MS signal. A slot disc which is mounted on the pump head axle is scanned by two light barriers (PKS1 and PKS2 signal). Thereby the control microprocessor monitors the direction of rotation and speed of the pump head.

The pump head position is also determined with the PKS2 signal. The motor can therefore be accelerated during the withdrawal phase. Thus a nearly pluse-free flow is realized in the lower delivery range (<100 ml/h). The total pump head cycles and running time are available in the service program under history data.

Mechanical Occlusion Pressure:

The Infusomat P has a linear peristaltic pump. This pump has 12 slides which are driven by a camshaft.

When the pump cover is closed, the pump tube is squeezed (occlusion) by at least one of the slides, independent of the pump head position. The complete pump unit is mounted behind the front panel in the cabinet frame. The hinges and the locking bow for the pump cover are led through the front panel. The pump cover is automatically closed when the operating unit door is closed. The slides are pressed against the pump cover by a spring system in the pump unit. Thereby a delivery pressure is realized and mechanically limited by the springs.

If the pressure limit is exceeded there is no volume delivery. The drop sensor activates an alarm. If one of the springs fails, the spring system will ensure that an unsafe condition cannot occur (free flow). The two remaining springs ensure an appropriately high occlusion pressure.

Electronic Occlusion Pressure:

The electronic occlusion sensor is mounted on the output side of the pump. A spring pressure loaded slide is seated on the infusion line. An increase of pressure in the infusion line leads to a deflection of the coil core via the pressure slide. The depth of immersion is measured inductively. When a preset pressure threshold is reached the pump drive is switched off, and an alarm is activated. The electronic occlusion pressure is a single channel circuit. In case of a failure, the mechanically limited maximum pressure can be reached.

Motor Switch-Off by Both Processors:

Function processor: MS signal to switch-off the motor drive. - Control processor: MOTEIN signal to switch-off the drive of the motor operating voltage.

Computer Interface

The Infusomat P is equipped with a computer interface. It can be connected to the optical interface or via the MFC service plug. To activate the computer operation please ask for a detailed description from B. Braun.

Until software version IFPC: DIANET
From software version IFPe, IFPE Dianet^{Star}

Braun fluid manager system (fm system)

The Infusomat P can be operated as a stand-alone unit or integrated in an intensive care unit, e.g. the B. Braun fluid manager system (fm system). It is integrated by simply snapping the unit into the system.

Mains supply and data communication are automatically connected. Thereby data acquisition and transmission to higher computer system levels are possible.

Internal Assignment

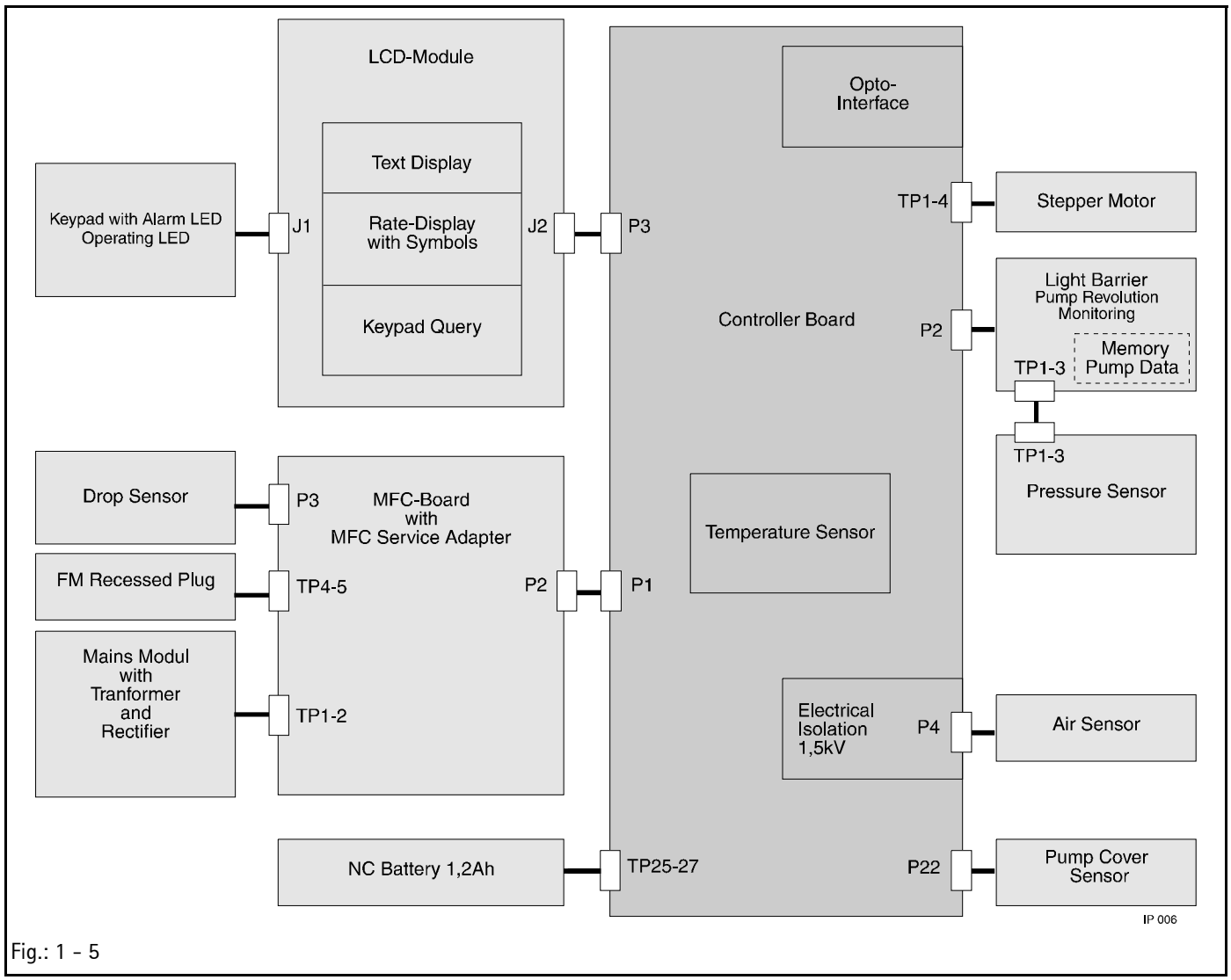


Fig.: 1 - 5

Accessories

General

Designation	Ord. No.
Mounting clip for drop chamber "TK 2000"	3477 3223
Mounting clip for drop chamber "Intrafix P"	3477 3215
Universal adapter for drop sensor	0871 1747
Drop sensor, complete	3450 578A
Short infusion pole	0870 1644
Drop chamber holder	3477 3088
Mains lead (200-240V~)	3450 2718
Mains lead (100-120V~)	3450 5423
Mains lead USA / CAN	3450 5393

Universal Clamp

Universal clamp, complete	3450 5857
Pole Clamp (rotating)	0871 8482

Software 2

Software Update

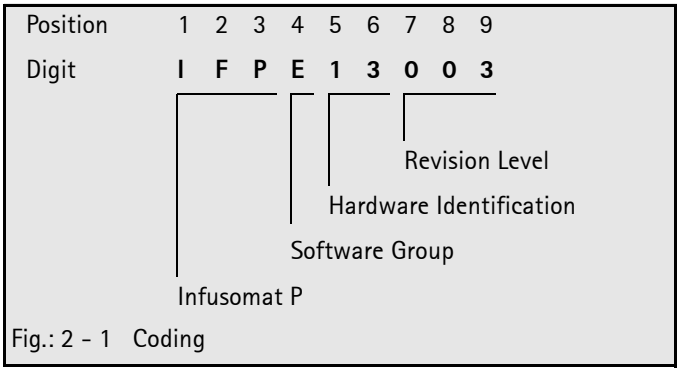


Fig.: 2 - 1 Coding

Designation	Ord. No.
Update-Kit IFPC02002	3450 6462
Update-Kit IFPe02003	On request
Update-Kit IFPE13003 (only units with controller board with loudspeaker)	On request
MFC interface line	0871 1661

The higher digit always replaces the lower digit for the revision level, e.g. IFPE13003 replaces IFPE13002.

When the software group changes (IFPE13002) the unit functions are changed, too. Therefore unit users must be informed (e.g. instruct the user and exchange the instructions for use – software coding, e.g. IFPE is on the cover page of the instructions for use.)

Note

Mark the unit after having updated the software! The new software version must be clearly recognizable.

Only update from old to new software versions, never in reverse order (e.g. never update from IFPC02002 to IFPC02001!).

All units used in one ward should have the same software status and basic setup to avoid operator mistakes.

Note

Software updates must be reported to B. Braun for registration. Observe the notes of the update program and the supplements!

2 Software

Approved Software Versions

IFPC02001

- Basic software
  (Must not be used any more. Please contact the Technical Service of B. Braun).

IFPC02002

- No optical staff call after power up (fluid manager system)
- Optimized air sensor evaluation
- Manual bolus volume limited to 99.9 ml
- Optimized special bolus function

IFPe02003

- Preselected volume and time counted down to 0
- Long-time compensation of delivery rate
- Interface changed to DIANET Star
  (not compatible with Dianet)
- New special function Piggyback
- New special function clock
- Storage of alarms in case of malfunctions, which can be re-called in the service program menu 230
- Tube selection menu
- Calibration occlusion sensor
- Tube update

IFPE13002

Only controller board with loudspeaker (see „Controller Board" ➨ pg. 4 - 6).

- Alarm volume can be set
- History function

IFPE13003

- Optimized dose calculation

Error Messages and Alarms

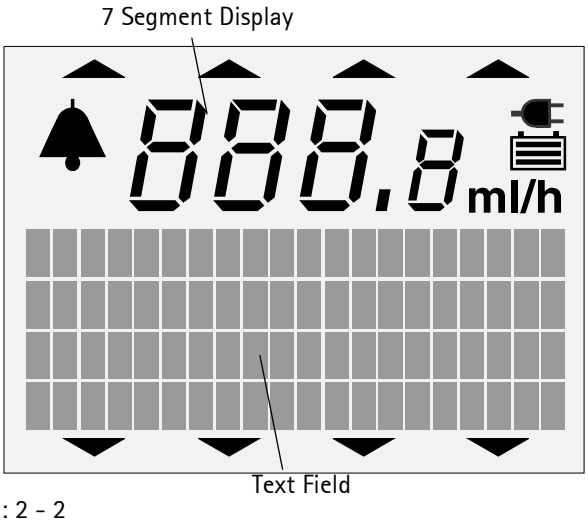


Fig.: 2 - 2

Alarms of the function processor 80c535 are displayed in the text field of the LCD. Alarms of the control processor 68HC11 are displayed in the 7 segment display. The alarms help to troubleshoot unit malfunctions. As not all malfunctions can be considered, unit malfunctions with different messages, which are not listed, can be displayed, or there may be no message.

Detected unit alarms are displayed in the text field as "Unit Alarms" in the selected language. Additionally the error number is displayed in the text field.

Text Field	Description
100	defective RAM memory
101	UMOT cannot be switched on
102	UMOT still switched on despite overvoltage
103	UMOT still switched on despite MOTEIN=0
104	UMOT still switched on despite undervoltage
105	ON/OFF key pressed longer than 14 sec
106	defective air sensor (calibration value?)
107	defective program memory
108	defective program flow
109	different number of pump head cycles
110	different keypad gaps between 80c838 and 68hc11
111	different program versions between 80c535 and 68hc11
112	defective program flow
113	testbit!=0 out of switch-on test
116	defective program memory - text
117	defective program memory - text does not match with program
118	reset during active operation
119	defective program memory transit time ROM-test
120	defective program memory tube parameters

Table 2 - 1

Control Microprocessor 68hc11

FFxx is displayed in the 7 segment display with flashing dots. FFxx is the error code.

7 Segment Display	Description
FF01	dummy for test
FF02	battery not present / missing battery current
FF03	defective RAM memory
FF04	defective program memory - ROM test error 1
FF05	defective program memory - ROM test error 2
FF06	calibration data error from EEPROM
FF07	pump head cycle not plausible
FF08	failure / inaccuracy of system clock
FF09	failure 100msec system clock
FF10	reset during active operation
FF12	no dynamic pressure sensor signal (EDB)
FF14	defective temperature sensor
FF16	defective membrane keypad (from IFPe02003)
FF17	defective program memory tube parameters

Table 2 - 2

Software Default Values **Unit No.:** _____

	Menu Point	Default	Customer Setting
Standard Function	User Language	Depending on Art. No.	_____
	Alarm Type	Single stage	_____
	Staff Call	Static without OFF Alarm, without switch-on pulse	_____
	Ward Identification	"Ward Identification"	_____
	Drug 1 ... 9	Drug 1 ... 9	_____
	Operating Alarms	0	_____
	Minimum Delivery Rate	0.1 ml/h	_____
	Maximum Delivery Rate	999.9 ml/h	_____
	Maximum Air Rate	1.5 ml/h	_____
	Maximum Air Bubble	0.30 ml	_____
Special Functions	Dose Calculation	Deactivated	_____
	Bolus	Deactivated	_____
	Standby	Activated	_____
	Drug Selection	Deactivated	_____
	CC Mode [2]	Deactivated	_____
	Occlusion Pressure	Activated	_____
	Drop Control	Deactivated	_____
	Piggyback[1]	Deactivated	_____
	Battery Capacity	Deactivated	_____
	Data Lock	Deactivated	_____
	Alarm Tone [1] [3]	Deactivated	_____
	Contrast	Deactivated	_____
	Clock [1]	Activated	_____
SM Menu	Interval Bolus Dose	Off	_____
	Online Rate Setting	On	_____
	Double Rate Entry	Off	_____
	Tube Selection [1]	Off	_____
User Data	Occlusion Pressure	High	_____
	Contrast	Optimum contrast	_____
	CC Address[2]	1	_____
	Drug	Blank	_____
	Data Lock	Off	_____
	Standby Time	24h 00min	_____

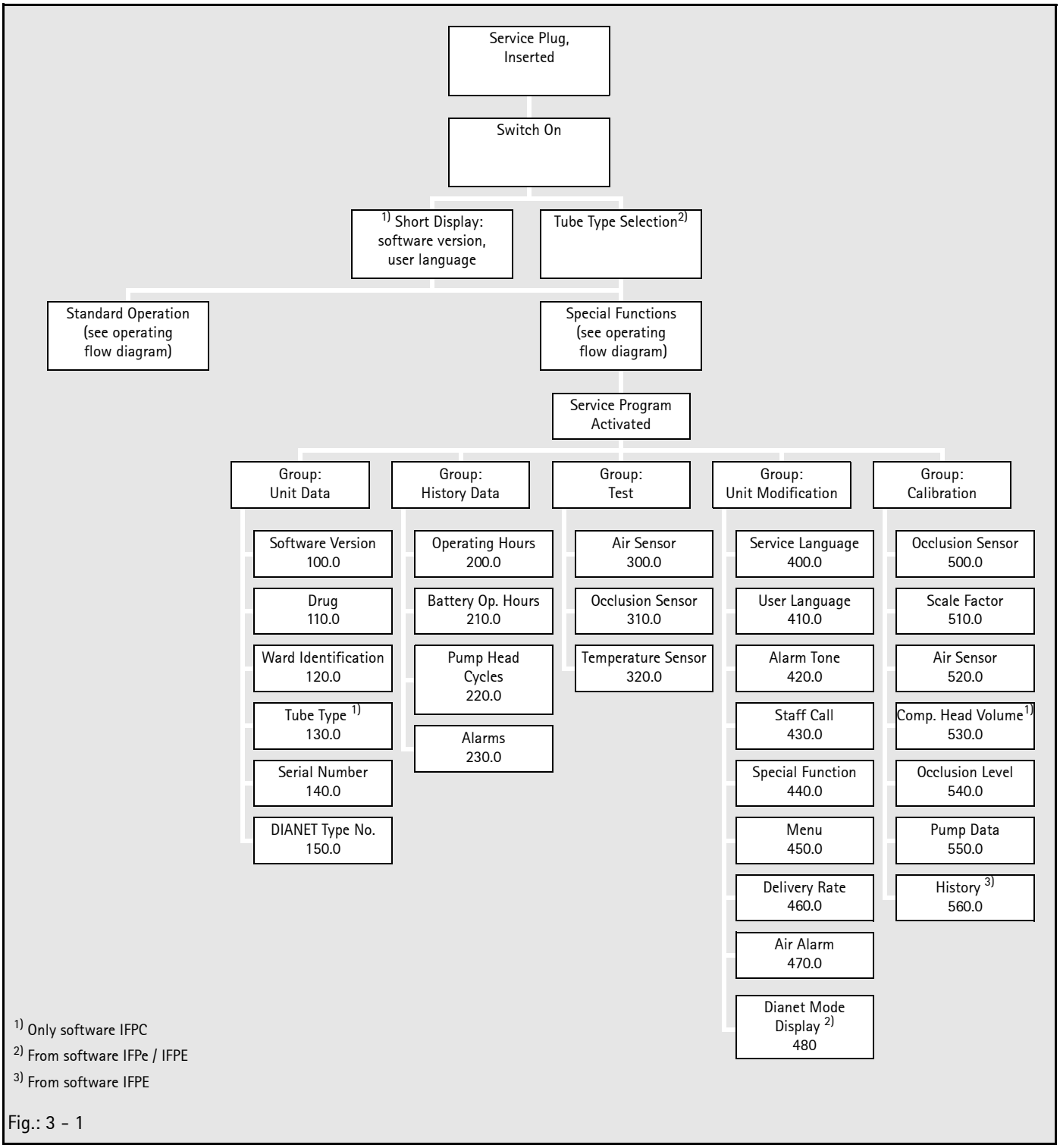
[1] From software IFPE
[2] No longer available in software IFPe, IFPE
[3] Not software IFPe

	Menu Point	Default	Customer Setting
	Drop Control	On	_____
	Alarm Tone [1) 3)]	Stage 7	_____
	Dianet Mode Display[1)]	60sec	_____
	Bolus Key	On	_____
	Bolus Rate	999.9 ml/h	_____
Calibration Data	Air Sensor Calibration Value Tube group I (dependent on tube)	130 mV	Must not be changed
	Air Sensor Calibration Value Intrafix Air P (dependent on tube)	130 mV	Must not be changed
	Scale Factor (dependent on tube)	50 (Intrafix Air)	_____
	Occlusion Level, Low	6	_____
	Occlusion Level, High	12	_____
	History Function	Activated	_____
Unit Specific Data	DIANET Type No.	Depending on unit	_____
	Unit No.	Depending on unit	_____
	Operating Hours	Depending on unit	_____
	Battery Hours	Depending on unit	_____
	Number of Pump Head Cycles	Depending on unit	_____

[1)] From software IFPE
[2)] No longer available in software IFPe, IFPE
[3)] Not software IFPe

Service Program 3

Structure of the Service Program



1) Only software IFPC

2) From software IFPe / IFPE

3) From software IFPE

Fig.: 3 - 1

3 Service Program

Additional Functions with Inserted Service Plug

Software Version and User Languages

1. Insert service plug into the MFC socket at the rear of the unit.
2. Switch on unit and keep the ON/OFF button pressed (for max. 15 s).
3. The software version and user languages are displayed in the LCD.
4. The unit is switched on when the ON/OFF button is released.
5. ** appears in the LCD if the service plug is inserted.

Two LEDs are integrated in the service plug:

- green = Power supply active
- red = Alarm

The following conditions are active:

- The operating alarms are muted.
- All special functions are accessible (including the disabled).
- The special functions are slightly modified. (Example: SM battery capacity has key for 0 min/32 min presetting).
- The battery capacity display switches between the nominal and the actual capacity. If the maximum battery capacity is not reached "?" will be displayed before the new nominal capacity.
- The tube type will be displayed in the tube selection menu.

Disabling the Occlusion Sensor

The electronic pressure monitoring can be deactivated to check the mechanical occlusion pressure.

1. Select "Occlusion Pressure" with the SM key.
2. Then select "mechanical".
3. Return to the main menu with END.

A too low pump speed is indicated in the display by "Pressure Alarm" with underlined stars.

The display "Pressure Alarm" with underlined questions marks indicates that no tube has been inserted. [1)]

1) From software IFPe / IFPE

Start / Quit the Service Program

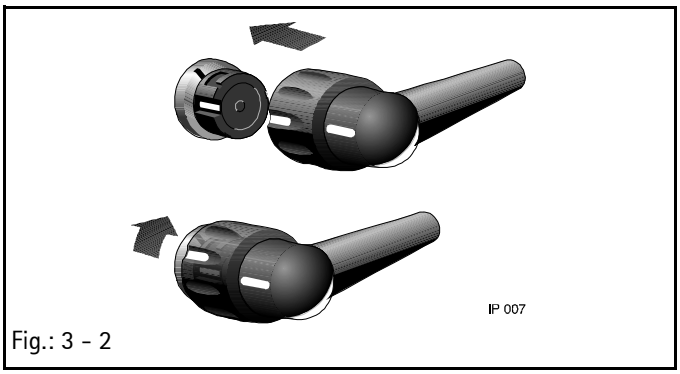


Fig.: 3 - 2

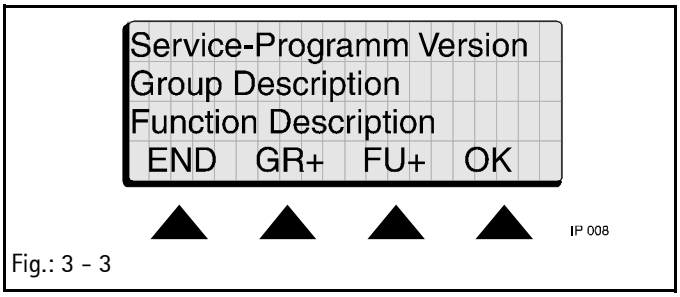


Fig.: 3 - 3

Activate the Service Program

1. Insert service plug into the MFC socket at the rear of the unit. - ** appears in the display.
2. Select "Service Program" with the SM key. When the service program is activated the red alarm LED flashes. The LED displays the code number of the selected group and function.

FUNCTION

END	Jumps to the initial function
GR+	Selects group
FU+	Selects function in the activated group
OK	Activates the selected function or if necessary skips to the sub-functions with NEXT

Quit the Service Program

1. Press END in the main menu. - A data storage query is activated: "Save Changes? Yes / No".
   Y / N terminates the service program.
   Press END to jump to the last function.
2. Switch off the Infusomat P and remove service plug.

Note

Disconnect the Infusomat P from mains for at least 30 seconds after termination of the service program (memory is deleted). Then the unit can be switched on again.

Unit Data

Software Version **Function 100.0**

1. Select sub-functions with NEXT.
2. The current software version is displayed in the LCD:
   - User program version with date
   - Language with text version. Further languages with (+).
   - Service program version
   - Service language with text version
   - Tube type version
3. Return to the initial function with END.

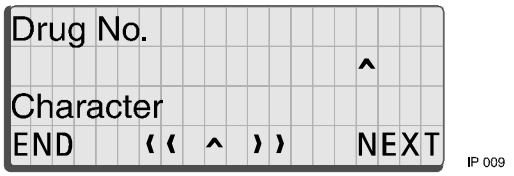


Fig.: 3 - 4

Drug Name **Function 110.0**

Memory for maximum 9 drugs and 20 characters per name.

1. Display the stored drug names with the NEXT key.
2. Delete displayed entry with CLR.
3. Press YES to modify a drug name:
   Move cursor to character with NEXT.
   Select new character from line 3 with << or >>.
4. Repeat the procedure for each character.
5. Return to the initial function with END.

Ward Identification **Function 120.0**

Enter and display of a ward specific unit identification. Permanent display if the unit is connected to mains and switched off.

1. Delete displayed entry with CLR. Press YES to enter modifications:
   Move cursor to character with NEXT.
   Select new character from line 3 with << or >>.
2. Repeat the procedure for each character.
3. Return to the initial function with END.

Tube Type [1] **Function 130.0**

There is only one tube type implemented in version IFPC02002. This function is for future extensions.

Serial Number **Function 140.0**

The displayed serial number must correspond with the number on the unit type plate, as this number is used in the interface mode.

1. YES activates the entry mode. Enter via the numeric keypad.
2. YES stores the changed or new number.
3. Return to the initial function with END.

DIANET Type Number **Function 150.0**

The displayed serial number must correspond with the number on the unit type plate, as this number is used in the interface mode.

1. YES activates the entry mode. Enter via the numeric keypad.
2. YES stores the changed or new number.
3. Return to the initial function with END.

[1] Only software IFPC

History Data

Operating Hour Counter **Function 200.0**

1. OK activates the display.
2. Return to the initial function with END.

Battery Operating Hours **Function 210.0**

1. OK activates the display.
2. Return to the initial function with END.

Pump Head Cycles **Function 220.0**

Display of the pump head cycles (delivered volume).

1. OK activates the display.
2. Return to the initial function with END.

Operating Alarms **Function 230.0**

The last 20 operating alarms can be recalled.

They are displayed as 16 bit binary codes and each bit position can be set from 0 to 1.

1. OK activates the alarm display.
2. Display operating alarms -01 to -20 with the (+) and (-) key.
3. Delete the operating alarms with CLR.
4. Return to the initial function with END.

In addition the last unit alarm (GA) will be displayed from software version IFPe, IFPE.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Code	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Example for Alarm "Pump Cover Open"

0	Battery empty (battery alarm)
1	Pump cover open
2	Drop alarm
3	Air alarm
4	Occlusion alarm
5	Expired standby time
6	Interface alarm
7	KOR end alarm
8 to 14	free
15	Operating alarm

Fig.: 3 - 5

Test

Air Sensor — Function 300.0

After exchange check the function of the air sensor.

See TSI-List for permissible check values (see „Technical Safety Inspection TSI“ ➨ pg. 7 - 1).

1. Press OK. The received signal amplitude is displayed as a measurement value.
   (The test value with NEXT is not important).
2. Insert an infusion line filled with air and check the maximum permissible air value.
3. Insert an infusion line filled with fluid and check the minimum permissible water value.
4. Return to the initial function with END.

Pressure Sensor — Function 310.0

Test Equipment

2.2 mm template
(see „Test Equipment and Special Tools“ ➨ pg. 9 - 1)

1. Push in the bottom slide of the finger pump.
2. Press OK twice.
3. Open unit door.
4. Note the measurement value (actual value).
5. Insert the 2.2 mm template and close the unit door.
6. The new measurement value will be displayed. It must be 15 to 25 digits higher than the first value.
7. Return to the initial function with END.

If the 15 to 25 digits are not reached, the pressure sensor unit must be mechanically aligned (see „Occlusion Sensor“ ➨ pg. 4 - 15).

Temperature Sensor — Function 320.0

Display of the measured temperature of both processors. Deviations are possible, the display is only for internal use.

1. OK activates the display.
2. Return to the initial function with END.

Unit Modifications

Service Language — Function 400.0

English or German can be selected.

1. OK activates the function.
2. Select language with NEXT.
3. Acknowledge with YES.
4. Return to the initial function with END.

User Language — Function 410.0

Four user languages per language group are available (depending on software).

1. OK activates the function.
2. Select language with NEXT.
   The language no. and text version are displayed.
3. Acknowledge with YES.
4. Return to the initial function with END.

Alarm Tone — Function 420.0

Different alarm modes can be selected:

- Single stage
- A "10 minutes off alarm" can be selected.
  In this mode the audible alarm is activated with a delay of 10 minutes.

The activation of the 10 minutes off alarm is only permissible, if:

- the staff call is connected and
- the Infusomat P has an attention label (label drawing no. M007100000F04).

1. OK activates the function.
2. Select alarm tone with NEXT.
3. Acknowledge with YES.
4. Return to the initial function with END.

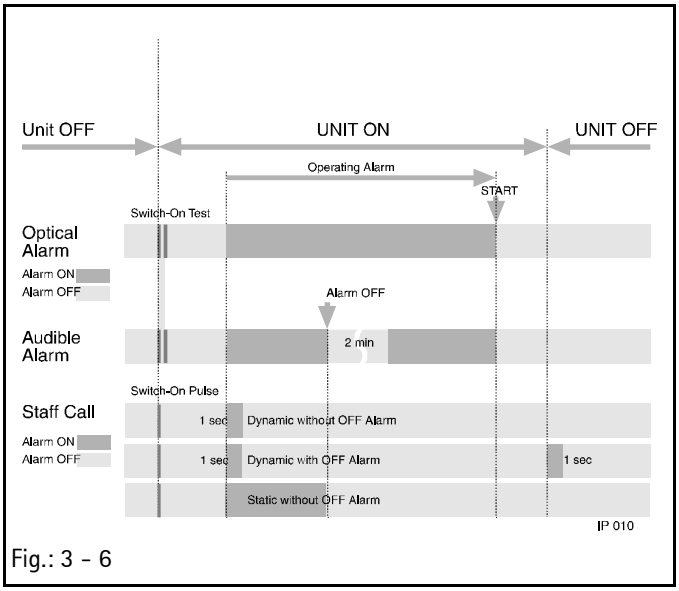


Fig.: 3 - 6

Staff Call **Function 430.0**

Select first, whether the switch-on pulse shall be activated (YES/NO). The switch-on pulse is used to test the staff call line. Different staff call modes can be selected with the NEXT key:

- Dynamic with OFF Alarm
- Dynamic without OFF Alarm
- Static without OFF Alarm

For further details see staff call line in the instructions for use.

An additional switch-on pulse (YES/NO) can be activated for each mode to test the staff call unit.

1. OK activates the function.
2. Select staff call type with NEXT.
3. Acknowledge with YES.
4. Return to the initial function with END.

Special Functions **Function 440.0**

Special functions can be activated in the service program, which are then available on the user interface. Deactivated special functions will not be displayed. The SM softkey will not be displayed in standard operation, if all special functions are deactivated. - Special functions to be selected, see **Fig.: 1 - 1**.

1. OK activates the function.
2. Select special functions with NEXT.
3. Activate / deactivate the respective function with YES/NO.
4. Return to the main menu with END.

Menu **Function 450.0**

The availability of menus on the user interface can be set.

- Double rate entry
- Online rate entry
- Interval bolus
- Tube selection

1. OK activates the function.
2. Activate / deactivate the decimal function with NEXT.
3. Acknowledge with YES.
4. Return to the main menu with END.

Delivery Rate **Function 460.0**

The maximum and minimum delivery rates can be set. Range of adjustment of the delivery rate: 0.1 to 999.9 ml/h

1. OK activates the function.
2. Select the min./max. delivery rate with NEXT.
3. Acknowledge with YES.
4. Enter value with a numeric key.
5. Acknowledge with OK.
6. Return to the initial function with END.

Air Alarm **Function 470.0**

The air sensor sensitivity of the air rate alarm in ml/h (total air alarm) and of the maximum air bubble in ml (single bubble) can be adjusted.
Setting range air rate: 0.5 to 3.5 ml/h
Setting range air bubble: 0.01 to 0.3 ml/h

1. OK activates the function.
2. Select air rate (ml/h) or air bubble (ml) with NEXT.
3. Acknowledge with YES.
4. Enter value with a numeric key.
5. Acknowledge with OK.
6. Return to the initial function with END.

Dianet Mode Display **Function 480.0**

When operated with DianetStar the respective DianetStar-mode (CA, CC, CD) with address 01, e.g. mode CA and address 01 is displayed by: "###CA01###".

The duration of the display after the last data transmission can be set between 0 and 255 seconds.

Calibration

All safety-relevant parameters are set by the manufacturer. If these parameters are changed, a new calibration must be performed with calibrated test equipment.

Occlusion Sensor **Function 500.0 ***

Measurement and setting of the zero value of the occlusion sensor, Ord. No.: 3450 7353.

1. Press the OK key twice.
2. Press the Align key.
3. Open the unit door and remove tube.
4. Check the occlusion sensor for cleanliness and function (briefly operate the sensor and check whether the displayed measurement value changes).
5. Wait until the displayed measurement value does not change any more (+/- one digit). The measurement value must be between 150 and 220 digits.
6. Acknowledge the measurement value with YES.
7. Return to the initial function with END.

It is not allowed to enter the zero point value via the keypad.

Occlusion Sensor **Function 500.0 ****

Measurement and setting of the zero value "3" of the occlusion sensor, Ord. No.: 3452 0589. Calibration (see „Occlusion Sensor" ➨ pg. 4 - 15).

1. Press the OK key twice.
2. Press the Align key.
3. Open the unit door and remove tube.
4. Check the occlusion sensor for cleanliness and function (briefly operate the sensor and check whether the displayed measurement value changes).

Pay attention to the indications in Table 4 - 1 „Compatibility List" ➨ pg. 4 - 6).
* Until software IFPC
** From software IFPe / IFPE

5. Wait until the displayed measurement value does not change any more (+/- one digit). The measurement value must be between 250 and 400 digits.
6. Acknowledge the entry with YES.
7. Return to the initial function with END.

It is not allowed to enter the zero point value via the keypad.

Scale Factor **Function 510.0**

The scale factor can be set in the limits between 40 and 99 digits for each tube type. Every digit step is equivalent to a 0.5 % modification of the delivery rate. An increase of the scale factor reduces the pump speed, and a decrease increases the pump speed.

1. Press the OK key twice to activate the function.
2. Select the tube type with the NEXT key.
3. "Yes" activates the function for the selected tube type.
4. The value can be changed with the entry keypad.
5. Acknowledge the entry with OK.
6. Return to the initial function with END.
7. Quit the service program and save changes with YES.
8. Switch on unit and check the delivery rate (see „Delivery Accuracy" ➨ pg. 8 - 4).
   If necessary repeat the delivery rate measurement.

Air Sensor **Function 520.0**

Alignment or check of the air sensor value (alarm threshold) (see „Air Sensor" ➨ pg. 4 - 18).

Note

The value is dependent on the tube type.

1. Press OK twice and then YES to activate the function.
2. Press OK again to activate the air sensor value.
3. The value can be changed with the entry keypad.
4. Acknowledge the entry with YES.
5. AIR SENSOR IS SET acknowledges the entry.
6. Return to the initial function with END.
7. Quit the service program and save changes with YES.

Compensation Head Volume **Function 530.0 ***

Only for test purposes at the manufacturers. The compensation of the head volume must always be activated.

Occlusion Level **Function 540.0**

Setting of the occlusion threshold values for the occlusion levels "low" and "high".

1. Press the OK key twice to activate the function.
2. Select the occlusion level with NEXT.
3. YES activates the entry mode.
4. Enter the pressure value via the numeric keys (pay attention to the displayed limit values!).
5. Press the YES key to take over the settings.
6. Return to the initial function with END.

Pump Data **Function 550.0**

Note

Compatibility between controller board and pump must be checked before acknowledging. Only press YES if pump corresponds to controller board.

History **Function 560.0 ***

The history function can be activated or deactivated.

1. Press the OK key twice to activate the function.
2. Select the history function with NEXT.
3. ON activates the function. The history protocol memory is initialized (the actual software version and the serial number are registered).
   Press the OFF key to deactivate the function. The history protocol memory is deleted.
4. Return to the initial function with END.

* Only software IFPC
* From software IFPE

Unit Elements 4

4.1 Mains Fuses

Designation **Ord. No.**

Fuse T 0.16 A for 200 / 230 / 240 V
(10 pcs.) 3477 2847

Fuse T 0.315 A for 100 / 110 / 120 V
(10 pcs.) 3477 0534

Fuse holder 3450 0979

Note

Only use recommended fuses.

Exchange

1. Press the expansion clamps at the fuse holder on the recessed mains plug with a screw driver in direction of the arrows and pull out fuse holder.
2. Replace blown fuse and press in fuse holder. Only use recommended fuses.

Check

Safety check, functional check.

4.2 Battery

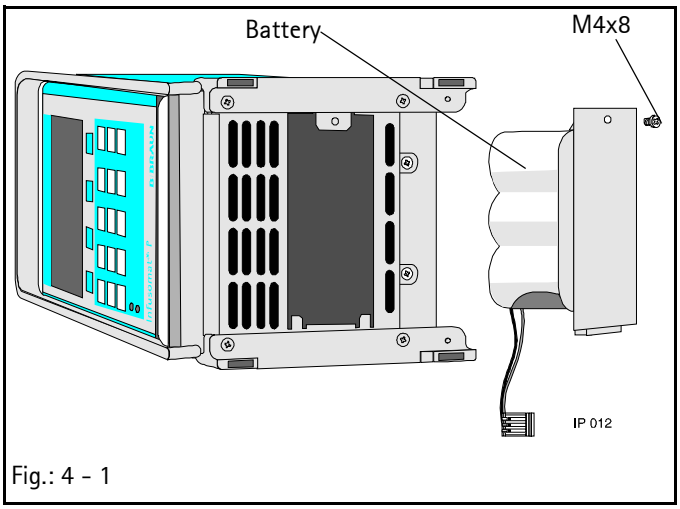


Fig.: 4 - 1

Designation **Ord. No.**

Battery incl. connector 1.2 AH / 7.2 V and holder. . . . 3450 2556

Exchange

1. Switch off unit and disconnect from mains.
2. Loosen screw, open the cover of the battery compartment and remove battery.
3. Pull off the battery connector.
4. Assembly is done in reverse order.
5. After having exchanged the battery the Infusomat P must be connected to mains, before switching on the unit. Thereby the charge and discharge currents are aligned.
6. Charge battery (16 h).

Note

Defective batteries must be orderly disposed of, e.g. send back to B. Braun (see „Return of Spare Parts" ➨ pg. 0 - 7).

Check

Perform switch-on test in battery operation and check the battery running time, if necessary.

4.3 Door Lock

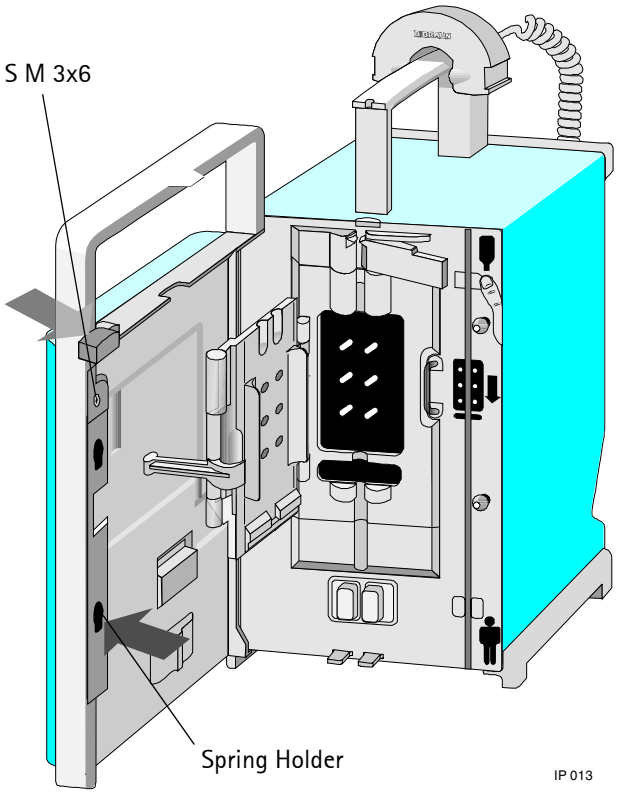


Fig.: 4 - 2

Designation	Ord. No.
Door lock complete with push button	3450 5601
Spring holder for door lock	3450 5440
Mounting for door lock	3477 2790

Exchange

1. Open door and unlatch the spring holder.
2. Remove coutersunk screw and press out the mounting by pressing the holder for the door lock.
3. Remove door lock in an upward direction and exchange.
4. Assembly is done in reverse order.

Check

Pump unit check (only mechanical occlusion pressure).

4.4 Pump Cover

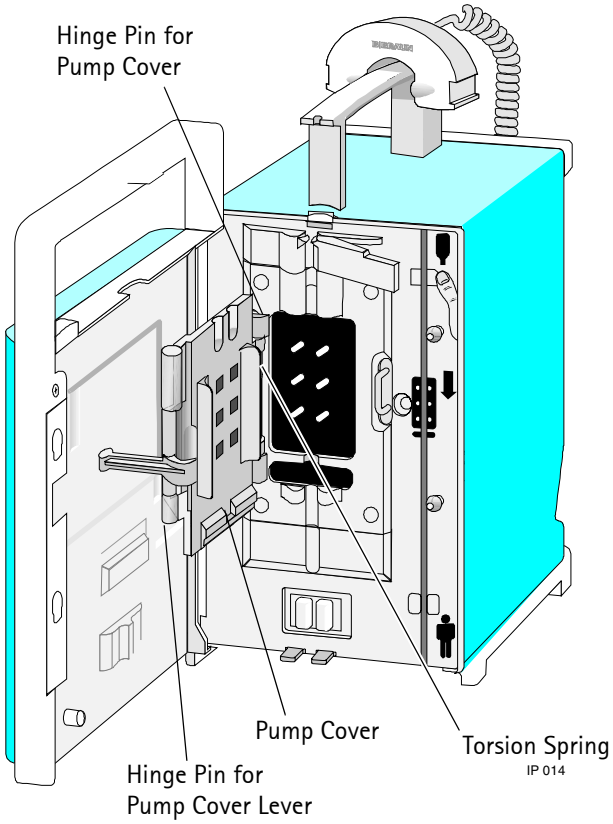


Fig.: 4 - 3

Designation	Ord. No.
Pump cover with lock	3450 1916
Blind plug 7.1 mm (10 pcs.)	3477 3207
Torsion spring in lever/pump cover (5 pcs.)	3477 3363
Torsion spring for pump cover (5 pcs.)	3477 3355
Lever (pump cover)	3477 4092
Hinge pin for pump cover	3477 3967
Hinge pin for pump cover lever	3450 5725

Exchange

Tools: Pin punch 1.8 mm, pin punch 6 mm, 2.2 mm template

1. Open door and remove hinge pin with pin punch (1.8 mm) from below. Do not lose the torsion spring.
2. Disassemble pump cover.
3. Insert the torsion spring in new pump cover. Insert the hinge pin from the top with a pin punch (6 mm).
4. Check the occlusion sensor with 2.2 mm template in the service program, and align, if necessary.

Check

Safety check, pump unit check.

4.5 Pump Housing

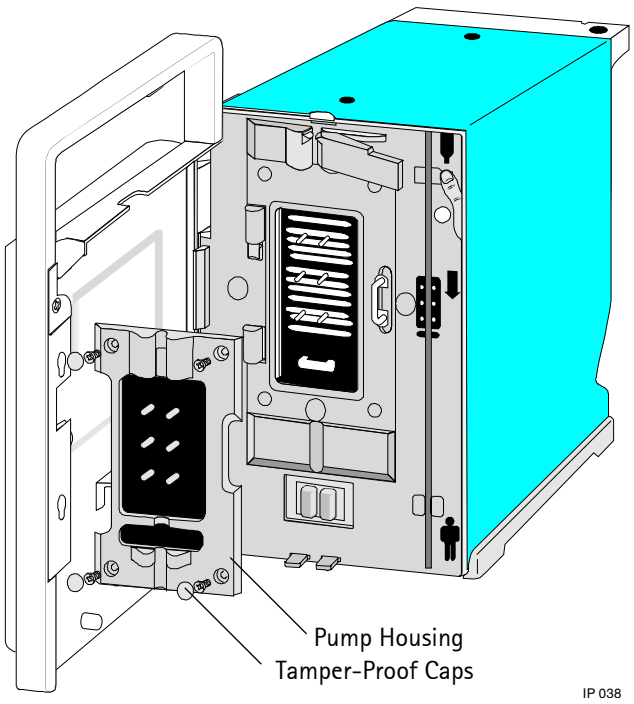


Fig.: 4 - 4

Designation	Ord. No.
Pump housing, (cpl.).	3450 3390

Exchange

1. Remove 4 tamper-proof caps by piercing a screwdriver through the caps.
2. Loosen the screws.
3. Remove the pump housing.

Note

Do not use the pump housing again, but replace it by a new one.

4.6 Housing and Handle

Designation	Ord. No.
Housing Labelling	
German	3450 1851
French	3450 1851
Dutch	3450 1851
Italian	3450 1851
English	3450 3382
Spanish	3450 3382
Danish	3450 3404
Norwegian	3450 3404
Swedish	3450 3404
Finnish	3450 3404
Portuguese	3450 3382
Czech	3450 3358
Polish	3450 3358
Turkish	3450 3382
Foot stand complete with rubber feet	3450 5415
Rubber feet (20 pcs.)	3477 3096
Unit handle with O-rings and PT screws	3450 3450

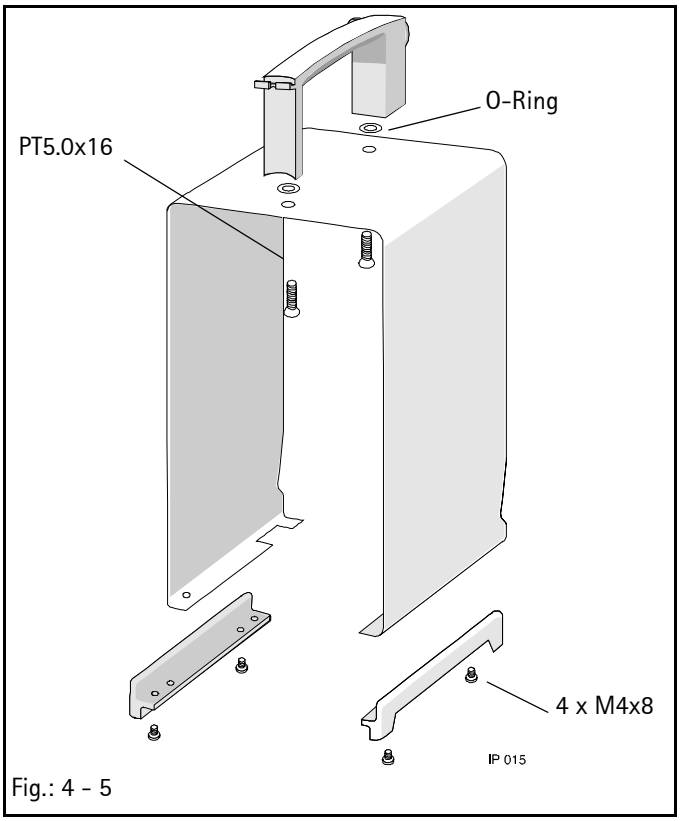


Fig.: 4 - 5

Exchange

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Loosen 4 screws from the foot stands and remove foot stands.
3. Remove the safety seal from the rear panel, break tamper-proof cap and remove screw.
4. Slidly widen the sides at the bottom of the housing and pull off to the top.
5. Lay the unit on the front side and assemble in reverse order.
6. Safety seal the rear panel screw after functional check.

Check

Safety check.

4.7 Controller Board

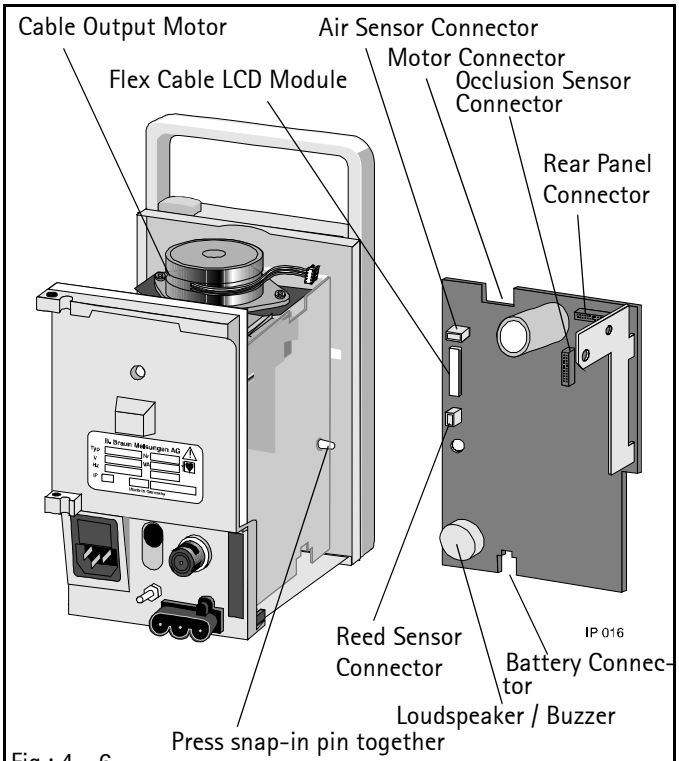


Fig.: 4 - 6

Designation	Ord. No.
Distance sleeve	3450 3366
Buzzer	3450 3447
Loudspeaker	3450 8848

Controller board with buzzer, raw material No. 3810 7660, software IFPC, can be updated to IFPe, if desired.

Language Group*	New Part	Exchange
A	Ord. No.:3450 2041	Ord. No.:3488 0895
B	Ord. No.:3450 2050	Ord. No.:3488 0909
C	Ord. No.:3450 2068	Ord. No.:3488 0917
D	Ord. No.:3450 2076	Ord. No.:3488 0925
E	Ord. No.:3450 2084	Ord. No.:3488 0933

Controller board with loudspeaker, volume control and history function, raw material no. 3810 8003, software IFPE:

Language Group*	New Part	Exchange
A	Ord. No.:3450 8767	Ord. No.:3488 0941
B	Ord. No.:3450 8775	Ord. No.:3488 0950
C	Ord. No.:3450 8783	Ord. No.:3488 0968
D	Ord. No.:3450 8791	Ord. No.:3488 0976
E	Ord. No.:3450 8805	Ord. No.:3488 0984

CAUTION

The controller boards (raw material no. 3810 7660 and 3810 8003) are not compatible.

Controller Board Raw Material No.	Software	Buzzer	Occlusion Sensor Order No.	Calibration Device	Finger Pump, cpl. Order No.
3810 7660	IFPC	Buzzer	3450 7353	no	3450 1746
3810 7660, with update	IFPe	Buzzer	3452 0589	yes	3452 0597
3810 8003	IFPE	Loudspeaker	3452 0589	yes	3452 0597

Table 4 - 1 Compatibility List

* Language Group:
A German, French, Dutch, Italian
B English, Dutch, Spanish, English
C Danish, Norwegian, Swedish, Finnish
D Spanish, Portuguese, English, Turkish
E Czech, Polish, Hunguarian, English

If the controller board (raw material no. 3810 7660) is to be replaced by the new controller board (raw material no. 3810 8003) the occlusion sensor (3451 0589) has also to be installed (see „Occlusion Sensor“ ➨ pg. 4 - 15). An exchange in reverse order is not permitted.

Exchange

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Dismount housing (see „Housing and Handle“ ➨ pg. 4 - 5).
3. Press snap-in pin together at the distance sleeves and remove the board carefully.
4. Pull off connector (see figure).
5. Exchange the board or buzzer.
6. Assembly is done in reverse order. Be careful with the optical components. Insert the board into the lower guide parallel to the base plate. (Otherwise problems with the optical interface can occur.)

Note

If "Calibration Defective" is displayed after having exchanged the controller board, check that the correct board (risk of mix-up) was assembled.

Check

Safety check, functional check.

4.8 Rear Panel

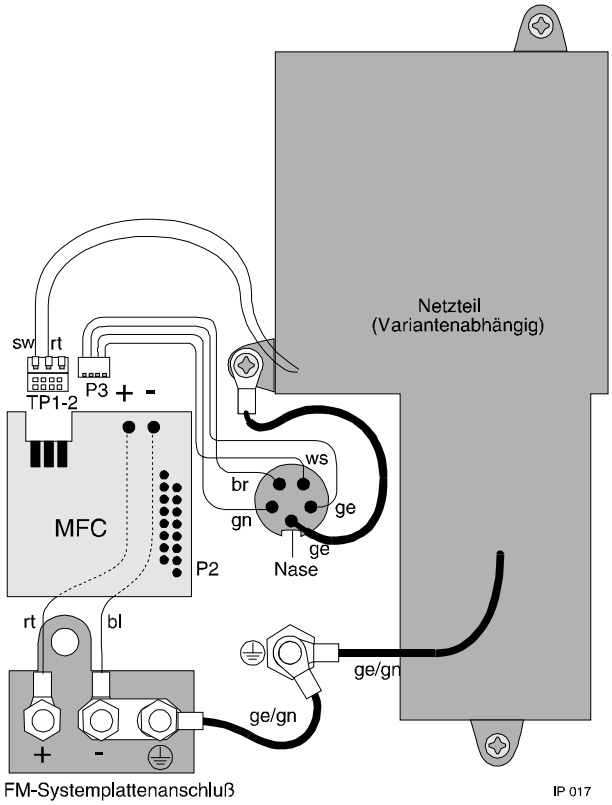


Fig.: 4 - 7

Designation	Ord. No.
Rear panel with screws (M3) and seal	3450 1860
Cover for optical interface	3477 3164
Strip seal for rear panel	3477 3142
MFC connector board	3450 3374
Potential equalization bolt	3477 0550
fm recessed plug (3 pin)	3477 3177
Screw 30x8 for fm recessed plug (20 pcs.)	3477 3185
U Washer 3.2 (20 pcs.)	3477 3193
Mains module 200/230/240 V	3450 1886
Mains module 100/110/120 V	3450 1894
Mains module 230 V	3450 190A
Drop sensor socket incl. cable and plug	3450 1878

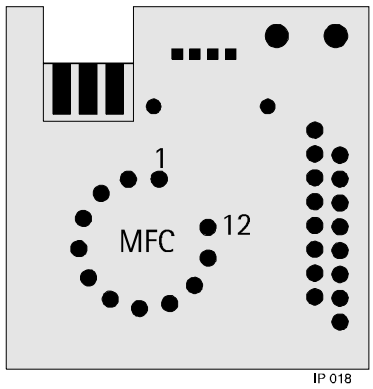


Fig.: 4 - 8

Pin No.	Signal Name	Function
Pin 1	Uext-	Input of external supply voltage, connection of shield
Pin 2	not assigned	
Pin 3	GND	Reference level 0V
Pin 4	Staff call	Output open collector or standard 74HC level each with 220 Ω-series resistance
Pin 5	Ub	Output supply voltage
Pin 6	MFC-KAD	Analogue input K
Pin 7	Emergency Off	Input interface
Pin 8	MFC-FAD	Analogue input F
Pin 9	Tx	Transmit line interface
Pin 10	STB	Output with 470 Ω-series resistance, activation of MFC circuit

Table 4 - 2 MFC Pin Assignment

Pin No.	Signal Name	Function
Pin 11	Rx	Receive line interface
Pin 12	Uext+	Input of external supply voltage

Table 4 - 2 MFC Pin Assignment

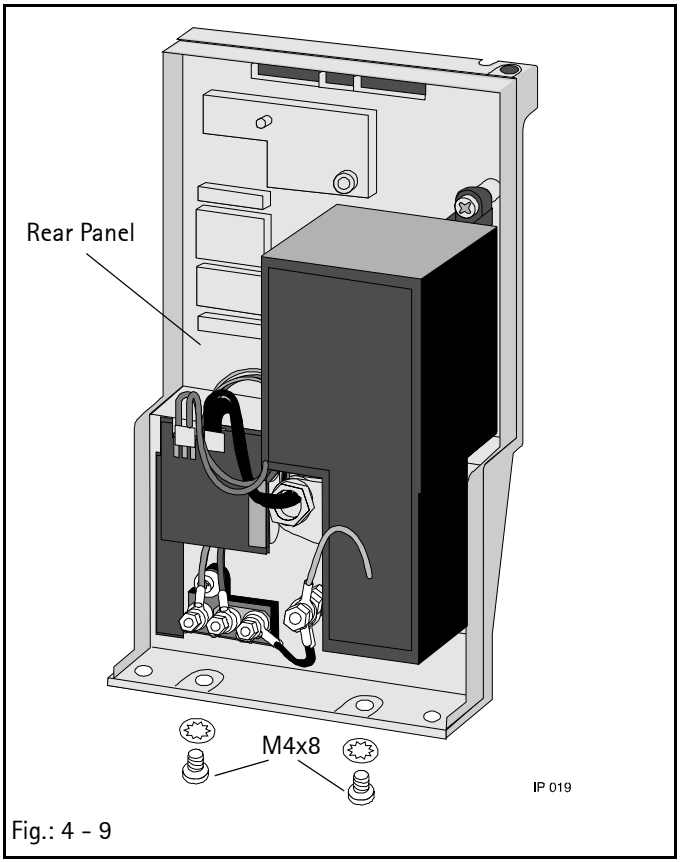


Fig.: 4 - 9

Exchange Rear Panel

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Dismount housing (see „Housing and Handle“ ➨ pg. 4 - 5).
3. Pull off the rear panel connectors and loosen both screws on the unit bottom.

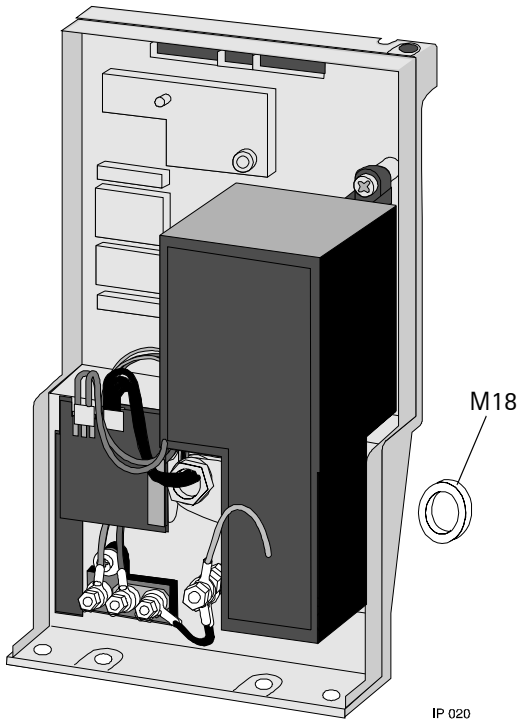


Fig.: 4 - 10

Exchange MFC Connector Board

Tools: Special socket spanner M18

1. Remove nuts at the fm recessed plug (red/blue).
2. Pull off the connector to the mains power supply and drop sensor, see **Fig.: 4 - 7**.
3. Loosen the MFC socket with special socket spanner M18.
4. Assembly is done in reverse order.

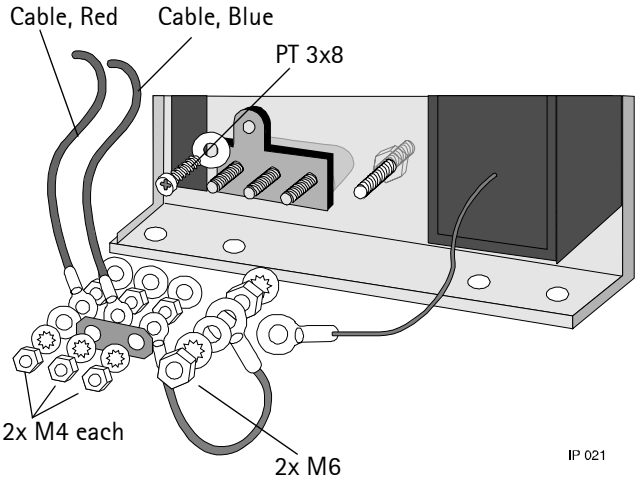


Fig.: 4 - 11

Exchange fm Recessed Plug

1. Loosen screws and nuts.

Note

The new recessed plug must be slightly moveable after assembly.

Exchange Potential Equalization Bolt

1. Remove nuts with ring spanner.
2. Exchange the bolt.

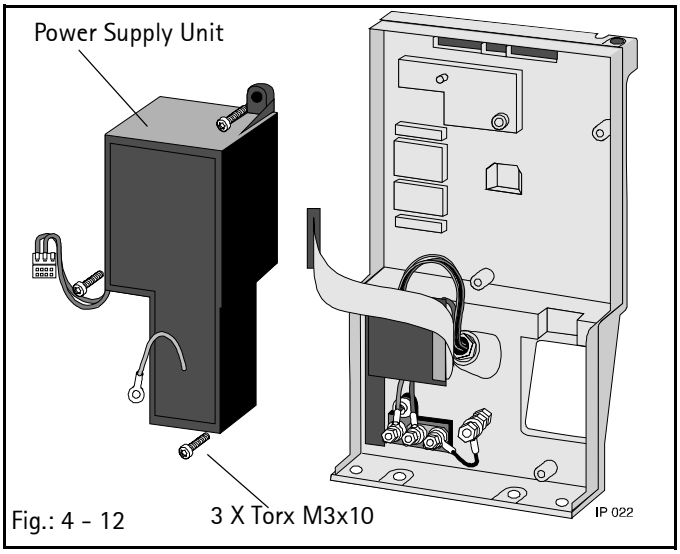


Fig.: 4 - 12

Exchange Mains Module

Tools: Screw driver Torx T10

1. Loosen 3 screws and remove the power supply unit.

Note

The voltage selection for switchable power supplies is at the fuse element.

Exchange Drop Sensor Socket

1. Loosen nut and exchange the drop sensor socket.
2. Safety lock with Sicomet 50.
3. Make ground connection.

Check

Safety check, functional check.

4.9 Front Panel

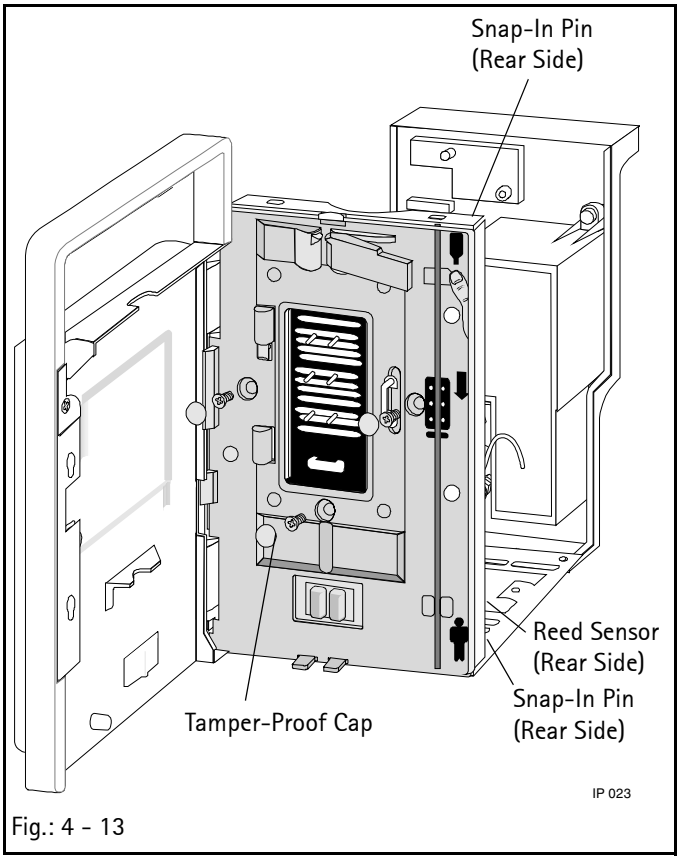


Fig.: 4 - 13

Designation	Ord. No.
Front panel without clamp lever and torsion spring	3450 2092
Circular seal 45 mm	3477 3126
Tamper-proof caps 10 mm (50 pcs.)	3477 3134
Cover Ø 6.4	3450 3412
Clamp lever with torsion spring and pin 4x20	3450 3420
Torsion spring	3450 3439
Reed sensor	3450 1754

Exchange

Tools: Pin punch

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Dismount housing (see „Housing and Handle“ ➨ pg. 4 - 5).
3. Disassemble pump cover (see „Pump Cover“ ➨ pg. 4 - 3).
4. Disassemble pump housing (see „Pump Housing“ ➨ pg. 4 - 4).
5. Remove countersunk screws by piercing a screwdriver through the caps to loosen the countersunk screws.
6. Press reed sensor out of the holder on the rear side, see Fig.: 4 - 14.
7. Press both snap-in pins inwards (rear side top and bottom). Then remove the front panel to the front.
8. Exchange the flow inhibitor, i.e. pull straight pin with M3 screw. Prior to assembly slightly grease the plastic surfaces with Molikote Platislip PG 602 grease.

9. Insert circular seal. Assembly is done in reverse order. Snap-in pins manually. Insert reed sensor and seat the cables firmly with cable ties.

Note

Always use a new pump housing.

Check

Safety check, pump unit check.

4.10 Pump Unit

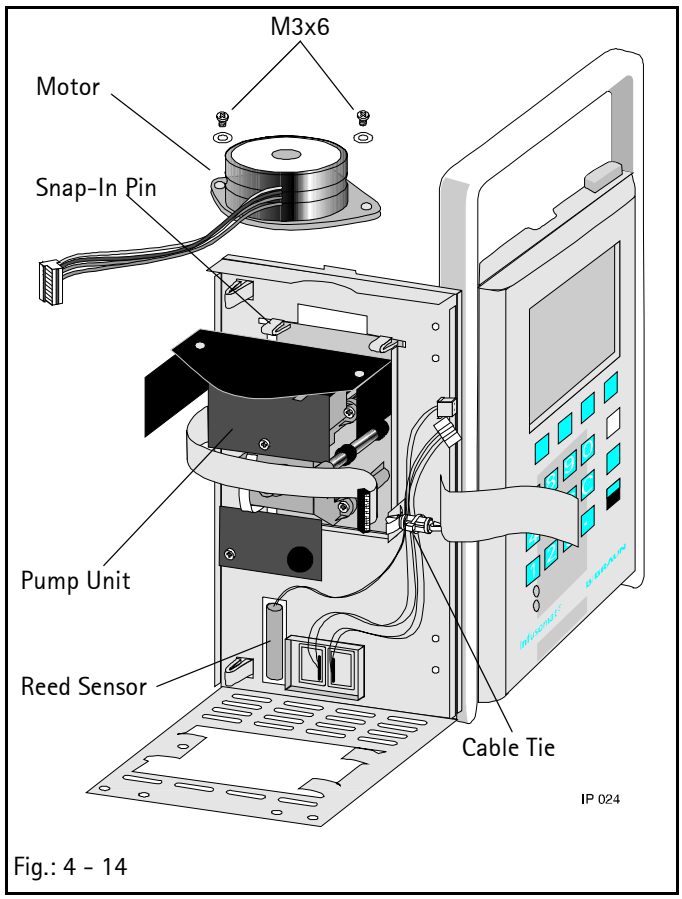


Fig.: 4 - 14

Designation **Ord. No.**

Note

When replacing the finger pump adhere to Table 4 - 1 „Compatibility List“ ➨ pg. 4 - 6).

Finger pump (without motor) including pump, pump cover, seal membrane and occlusion sensor board, software IFPC (installed up to unit serial no. 5505) 3450 1746

Finger pump (without motor) including pump, pump cover, seal membrane and occlusion sensor board, software IFPe, IFPE (installed from unit serial no. 5506) 3452 0481

Finger pump (without motor and board) incl. pump, pump cover, and seal membrane 3452 0597

Motor with pinion for finger pump 3450 1924

Exchange

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Dismount housing (see „Housing and Handle“ ➨ pg. 4 - 5).
3. Disassemble front panel (see „Front Panel“ ➨ pg. 4 - 11).
4. Loosen motor screws, pull off the motor connector and remove motor from pump unit.

Note

Do not loosen the assembly screw on the lower occlusion sensor board! Otherwise the pump has to be calibrated with the 2.2 mm template.

5. Pull off the connector from the controller board.
6. Press down snap-in pins (from the inside) and tilt the pump forward and unhinge.
7. Assembly is done in reverse order.

CAUTION

Due to the improved occlusion sensor the finger pump to be installed is dependent on the controller board and the software.

Note

Be sure that the cable of the reed sensor and air sensor do not hinder the function of the occlusion sensor and the monitoring of the motor speed (slot disc).

The complete pump unit (pump without motor, pump cover, membrane, boards) was calibrated by B.Braun. After a complete exchange the unit data and user data must be entered in the service program again as the data memory is on the pump board:

8. Enter unit and user data in the EEPROM.

- Serial number according to the type plate
- DIANET type number according to the type plate

If necessary enter:

- Drug name
- Ward identification
- Alarm tone
- Delivery rate min./max.
- Air alarm: air bubbles in ml and air rate in ml/h respectively
- User language
- Special functions (ON/OFF)
- Menu
- Staff call type

Note

If data is not entered, "Calibration Defective" may be displayed after the unit is switched on again.

9. After ending the service program save the data.

The counters for operating hours, battery operation and pump head cycles are reset to zero when the pump unit is exchanged. If "Calibration Defective" is displayed, select the service program and quit with "Save? Yes".

Check

Safety check, pump unit check.

4.11 Occlusion Sensor

Test Equipment	Ord. No.
Template 2.2 mm	0770 5034
Calibration device	0770 501A

Designation	Ord. No.

Note

When replacing the occlusion sensor pay attention to Table 4 - 1 „Compatibility List“ ➨ pg. 4 - 6.

Occlusion sensor (cpl.) 3450 7353
Software IFPC
(installed up to unit serial no. 5505)

Occlusion sensor (cpl.) 3452 0589
Software IFPe, IFPE
(installed from unit serial no. 5506)
(only delivered when a pressure calibration device is available)

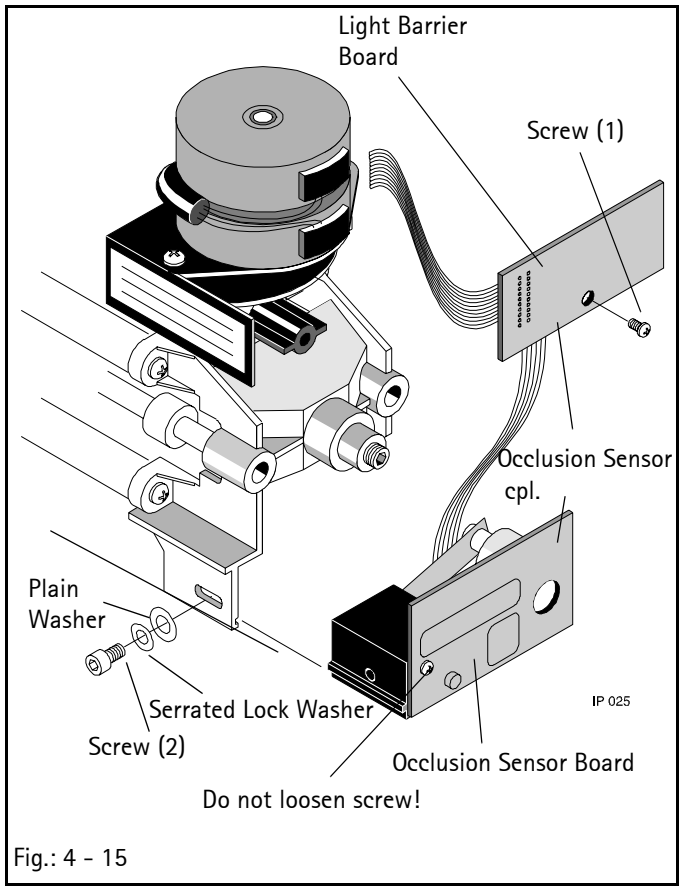


Fig.: 4 - 15

Exchange

CAUTION

The occlusion sensor unit is mechanically very sensitive. It must not be dismounted, which means that the occlusion sensor board and the spring element must not be detached from the occlusion sensor support (plastic part). Make sure that the movement of the coil core inside the coil is not hindered.

The occlusion sensor consists of the light barrier board with EEPROM and the occlusion sensor board with holder. Coil core and bending element are screwed on this holder. Both boards are connected via a flat cable.

1. Dismount the rear panel (see „Rear Panel“ ➨ pg. 4 - 8) or the pump unit (see „Pump Unit“ ➨ pg. 4 - 13).
2. Pull off the connecting cable to the microprocessor board.
3. Loosen and remove screw (1) of the light barrier board.
4. Loosen screw (2) of the occlusion sensor and remove it together with plain washer and serrated lock washer. Then remove the occlusion sensor with occlusion sensor board and light barrier board.
5. Mount new occlusion sensor.

CAUTION

The occlusion sensor to be installed is dependent on the controller board and the software.

Note

Make sure that the occlusion sensor slide can smootly run in the guides and that the coil core can move inside the coil.

6. Calibrate occlusion sensor:
   a) Call the pressure display in the service program (see „Pressure Sensor Function 310.0“ ➨ pg. 3 - 6).
   b) Loosen hexagon socket screw (M 3x6) on the occlusion sensor unit (with a 2.5 mm Allen key).
   c) Push the occlusion sensor unit with board slightly forward or backward.
   d) Tighten the Allen screw.
   e) The new measurement value will be displayed (repeat if necessary until the value is increased by 15 to 25 digits).
   f) After calibration return to the initial function with END. - Select SAVE NO. (Do not operate the YES key.)
   g) Switch off the unit.
7. Assembly is done in reverse order.

After a complete exchange the unit data and user data must be entered in the service program again as the data memory is on the lightbarrier board.

8. Enter unit and user data in the EEPROM.

- Serial number according to the type plate
- DIANET type number according to the type plate
  If necessary enter:
- Drug name
- Ward identification
- Alarm tone
- Delivery rate min./max.
- Air alarm: air bubbles in ml and air rate in ml/h respectively
- User language
- Special functions (ON/OFF)
- Menu
- Staff call type

Note

If data is not entered, "Calibration Defective" may be displayed after the unit is switched on again.

9. Calibrate occlusion sensor, Ord. No. 3450 7353: (see „Occlusion Sensor Function 500.0 *“ ➨ pg. 3 - 10).

10. Calibrate occlusion sensor, Ord. No. 3452 0589:

Note

To calibrate the occlusion sensor, Ord. No. 3452 0589 calibration weights are required. An alignment with infusion lines is not permitted.

a) Clean the pump front side.
b) Place the Infusomat P without mains lead and drop sensor and the service plug inserted horizontally (front facing upwards) in the cellular packing of the calibration device.
c) Call function 500 in the service program (see „Pressure Sensor Function 310.0“ ➨ pg. 3 - 6).
d) Activate the calibration function with "Align".
e) Select calibration value low "1" by pressing ">>".
f) Open the pump cover.
g) Fasten the holders for the calibration weights under the pump cover and let snap in at the locking bow.
h) Position weight 1 (100 g) for calibration value low "1" (1.04 N) carefully on the occlusion sensor. The weight must be placed without any friction in the holder.
i) Acknowledge calibration value low "1" with ">>" and set calibration value high "2" with weight 3 (166g).
j) Acknowledge calibration value high "2" by pressing ">>" and remove weight.
k) Acknowledge calibration value "3" "Zero point" with "Yes".
l) Remove the holder.

Note

If the calibration values are known the values can also be entered manually.

m) Call function 500 in the service program (see „Occlusion Sensor Function 500.0 **“ ➨ pg. 3 - 10).
n) Open the data entry window with "yes".
o) Select Calibration value low "1" and Calibration value high "2" by pressing "<<" and ">>". Enter the calibration values via the keypad and acknowledge with "yes".
p) Quit function in the service program and save data.
q) Register the changed pressure values in the unit book.

r) Check the electronic occlusion pressure (see „Electronic Occlusion Pressure (Occlusion Sensor)“ ➨ pg. 8 - 3).

11. Quit function in the service program and save data.
12. Check the electronic occlusion pressure (see „Electronic Occlusion Pressure (Occlusion Sensor)“ ➨ pg. 8 - 3).

Check

Safety check, functional check.

4.12 Air Sensor

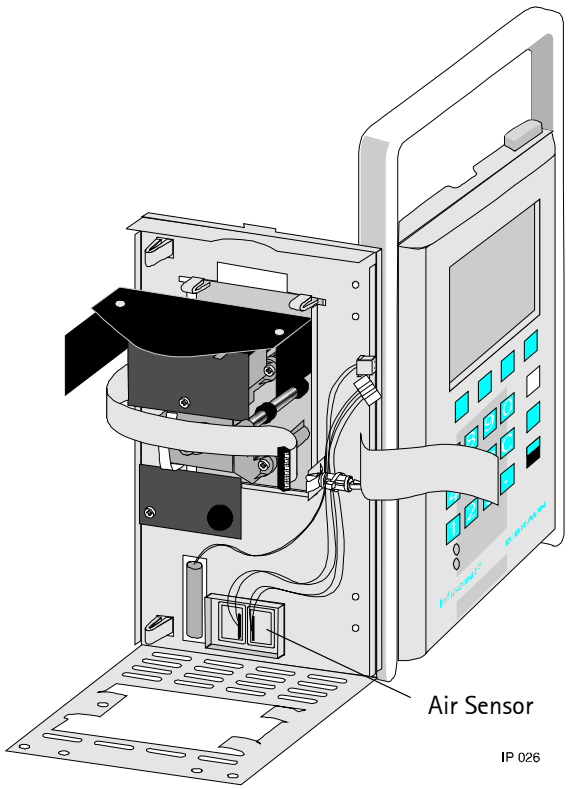


Fig.: 4 - 16

Designation **Ord. No.**

Air sensor incl. connector 3450 193A

Exchange

1. Remove battery (see „Battery“ ➨ pg. 4 - 1).
2. Dismount housing (see „Housing and Handle“ ➨ pg. 4 - 5).
3. Dismount controller board (see „Controller Board“ ➨ pg. 4 - 6).
4. Disassemble front panel (see „Front Panel“ ➨ pg. 4 - 11).
5. Press the complete sensor from behind and out of the frame.
6. Insert new sensor and seat the cables firmly with cable ties.

Note

Be sure that the cables of the reed sensor and air sensor do not hinder the function of the occlusion sensor and the monitoring of the motor speed (slot disc).

Check

After exchange of the air sensor:

- Check the air value, please refer to the TSI-list (see „Technical Safety Inspection TSI“ ➨ pg. 7 - 1).
- Check the water value; please refer to the TSI-list (see „Technical Safety Inspection TSI“ ➨ pg. 7 - 1).
- Check the calibration value (alarm threshold) and adjust if necessary; refer to the TSI-list (see „Technical Safety Inspection TSI“ ➨ pg. 7 - 1).

Safety check, functional check.

4.13 Operating Unit

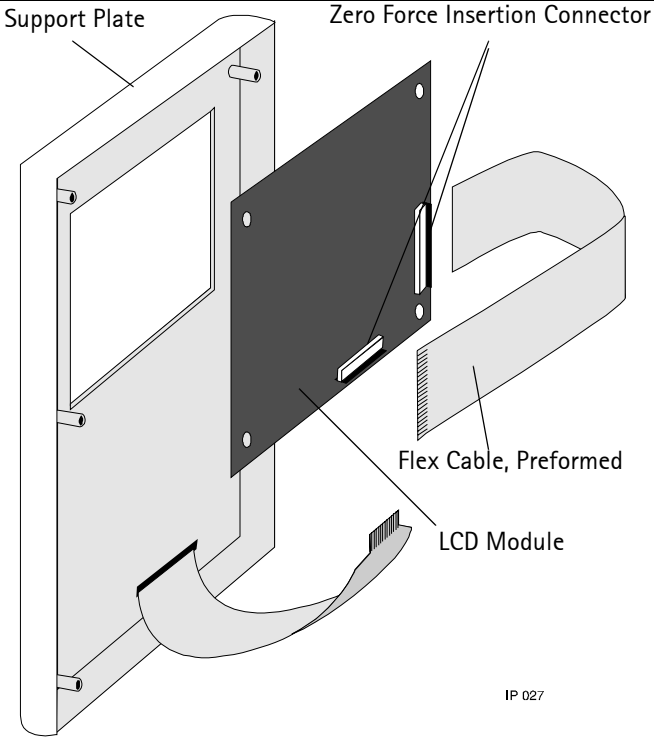


Fig.: 4 - 17

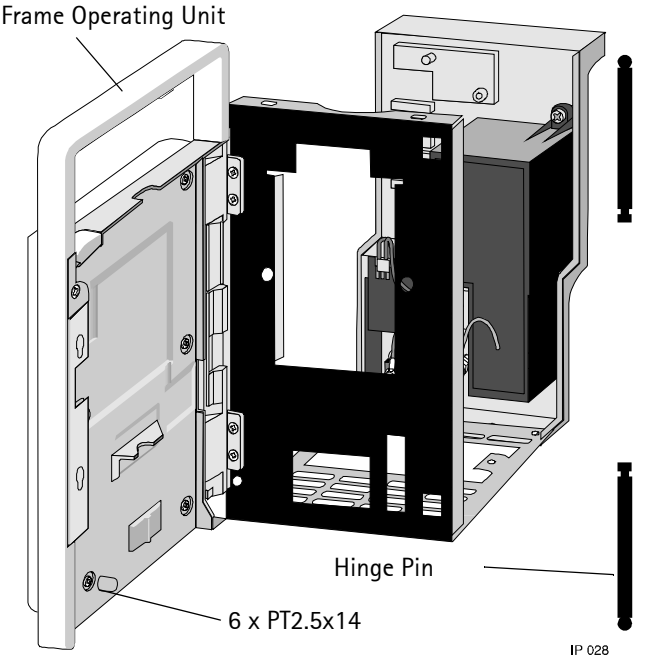


Fig.: 4 - 18

Designation	Ord. No.
Membrane keypad with support plate and seal	3450 1800
LCD module	3450 1819
Flex cable, preformed	3450 8830
Frame incl. pressure spring and magnet	3450 1835
Flexible cable 42 mm (5 pcs.)	3477 3347
Hinge unit	3450 5571
Hinge pin (3 mm)	3450 5580
Magnet	3450 5849

Exchange

Tools: Screw driver Torx T6

1. Remove battery (see „Battery" ➨ pg. 4 - 1).
2. Disassemble the door lock.
3. Loosen countersunk screw and bridge.
4. Remove tamper-proof caps (6 pieces) on the door frame by piercing a screwdriver through the caps to loosen the countersunk screws.
5. Unlatch the zero force insertion connector and loosen the flex cable.

Note

The position of the flex cable must not be changed, i.e. the preformed section must be in the hinge area (pivot). Mark the cable, if necessary.

6. Disassemble either LCD module or support plate with membrane keypad or door hinge pins respectively and exchange the door frame.
7. Assembly is done in reverse order. Pay attention to the correct direction of the door hinge pin during assembly.

Note

Do not kink either of the flex cables. Push the contacts to the stop of the zero force insertion connector and lock in same position.

Check

Electrical safety, functional check, pump unit check.

4.14 Barcode Label

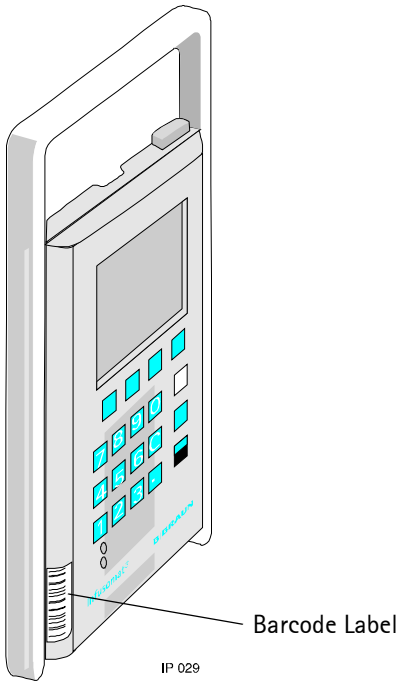


Fig.: 4 - 19

Designation **Ord. No.**

Barcode label 3450 9070

(see „Order Form“ ➨ pg. A - 2)

Exchange

1. Remove old barcode label, if existing.
2. Clean the adhesion surface with an alcoholic cleaning agent and let dry.
3. Loosen barcode label from the base material and stick it on.

Note

Destroy the type plate delivered.

Check

Check that serial number and pump symbol in the plain text field of the barcode label correspond with the type plate on the pump of the Infusomat P.

4.15 Frame with Seal

Designation **Ord. No.**

Frame with seal plate 3450 1770

Exchange

1. Disassemble all parts as described before and exchange the frame with seal plate.

Check

Electrical safety, functional check, pump unit check.

Checks after Repair 5

Depending on the work carried out, perform the relevant check blocks (1., 2., 3 and / or 4.).

1. Visual Inspection	2. Safety Inspection As per IEC/EN 60 601-1	3. Functional Inspection	4. Pump Unit Inspection
❒ OK after visual inspection	❒ Mains voltage ____ V AC ❒ Protective conductor resistance incl. mains cable < 0.2Ω ____ Ω ❒ Insulation resistance >> 2 MΩ ____ Ω ❒ Earth leakage current ≤ 30 µA ____ µA	Switch on Unit: ❒ Self-test ❒ Control lamps Compare with Display: ❒ Set delivery rate Battery Test: ❒ Switch mains/battery/ mains ❒ Switch on in battery mode and check self-test Air Sensor: ❒ 0.4 ml air bubbles alarm ❒ Air value ❒ Water value ❒ Calibration value (alarm threshold), adjust if necessary Values see TSI Drop Sensor: ❒ Simulate occlusion alarm (alarm with closed roller clamp) ❒ Simulate free flow (alarm) ❒ Staff call ❒ Alarm suppression	Room Temperature 20-28° C Electronic Occlusion Pressure: ❒ Check alarm with switch-off pressure low / high ❒ Zero value setting Service program function 500.0 Mechanical Occlusion Pressure ❒ Flow inhibitor Pressure check ≥ 0.8bar no free flow ❒ Delivery accuracy

Observe the procedure information (see „Procedural Instructions for Inspection“ ➨ pg. 8 - 1)!

5 Checks after Repair

For your notes:

Maintenance 6

It is recommended every 2 years. In addition to the technical safety inspection, perform the following inspection points:

1. Check the rubber feet and if necessary exchange.
2. Check easy running of the pump cover, lock mechanism and door.
3. Check easy running of the flow inhibitor, clean and if necessary exchange pressure springs.
4. Check seal membrane and if necessary exchange.
5. Check the drop sensor optic and spring mechanics and clean, if necessary.
6. Open unit. Internal visual inspection. Clean the seal surfaces and if necessary exchange seal strip.
7. Check mechanical occlusion pressure and if necessary calibrate.
8. Check electronic occlusion pressure and if necessary calibrate (see „Occlusion Sensor“ ➨ pg. 4 - 15).
9. Assemble and seal unit ready for operation.

6 Maintenance

For your notes:

Technical Safety Inspection TSI

Index c

(Kopiervorlage - Gerätedokumentation beifügen)

Checklist for Technical Safety Inspection – Every 24 Months

Unit: Infusomat P
Manufacturer: B. Braun Melsungen AG

User

Observe the service manual and the instructions for use. All measured values are to be documented. Accessories used should be included in testing. Make exclusive use of calibrated measuring instruments.

Article No.	Unit No.	Year of Procurement

1. Visual Inspection

- ❒ Cleanliness, completeness, damage
- ❒ Pump sealing diaphragm
- ❒ Softkeys, rubber feet
- ❒ Control unit, lock mechanism, pump cover
- ❒ Flow inhibitor
- ❒ Mains cable and mains plug connector
- ❒ MFC connector incl. MFC cable
- ❒ Drop sensor line and plug connector
- ❒ Check voltage values
  100/110/120 V = T 0.315 A
  200/230/240 V = T 0.16 A

2. Safety Inspection

as per IEC/EN60601-1

- ❒ Check mains voltage _____ V AC
- ❒ Protective conductor resistance incl. mains cable < 0.2Ω _____ Ω
- ❒ Insulation resistance >> 2 MΩ _____ Ω
- ❒ Earth leakage current ≤ 30 µA _____ µA

3. Accessories Used

- ❒ MFC staff call lead
- ❒ _____
- ❒ _____

4. Functional Inspection

Switch on Unit:
- ❒ Self-test
- ❒ All symbols in LCD
- ❒ Control lamps

Compare with Display:
- ❒ Set delivery rate
- ❒ Set volume
- ❒ Set time
- ❒ Press every key once

Battery Test:
- ❒ Switch mains/battery/mains
- ❒ Switch on in battery mode and check self-test

Air Sensor:
(Check with Intrafix Air P Ord. No. 0406 2957, in temperature range 20°C...25°C)
- ❒ 0.4 ml air bubbles alarm
- ❒ Air value max. 65mV
- ❒ Water value min. 455mV
- ❒ Alarm threshold = 130 mV check and if necessary enter

Drop Sensor:
- ❒ Simulate occlusion alarm with closed roller clamp
- ❒ Simulate free flow (alarm)

Electronic Occlusion Pressure:
- ❒ Check alarm with switch-off pressure low and high

Mechanical Occlusion Pressure:
- ❒ max. 2.9 bar _____ bar
- ❒ > 1.8 bar _____ bar

- ❒ Staff call
- ❒ Pump cover alarm
- ❒ Alarm suppression
- ❒ Flow inhibitor pressure check up to 0.8bar no free flow
- ❒ Check delivery accuracy according to service manual

CAUTION: Charge battery!

Applied infusion line
Type: _____ Manufacturer: _____

Test Result: Defects found which could endanger patients, users or third parties: ☐ Yes ☐ No

Measures to be taken: ☐ Repair
☐ _____

Special Features / Documentation:

Inspection performed by:

Unit handed over to/on:

Date / Signature:

Next deadline:

7 Technical Safety Inspection TSI

For your notes:

Procedural Instructions for Inspection 8

1. Visual Inspection

Operating unit, lock mechanism, pump cover, seal membrane, flow inhibitor. Door lock: easy opening and closing, correct top and bottom locking.

Pump cover must automatically open when the unit door is opened.

2. Electrical Safety Inspection as per IEC/EN60 601-1

Protective Conductor Resistance

Protective conductor resistance < 0.2 Ω. incl. mains lead.

Measurement points:

- Potential equalization bolt
- Bolt for door lock
- Unit housing:

  a) If the unit is not sealed countersunk screw at the rear of the unit.

  b) If the unit is sealed, remove lacquer from one of the holes in the foot stands.

Note

Do not use the foot stand assembly screws as alternative measurement points.

Document the largest value.

Insulation Resistance

Insulation resistance >> 2 MΩ

Measurement with 500 V between shorted mains connectors and potential equalization bolt.

Earth Leakage Current

Earth leakage current ≤ 30 µA incl. mains cable.

Measurement under standard conditions at the protective conductor of the mains cable. Two measurements (one with changed poles).

Document the largest value.

8 Procedural Instructions for Inspection

3. Functional Inspection

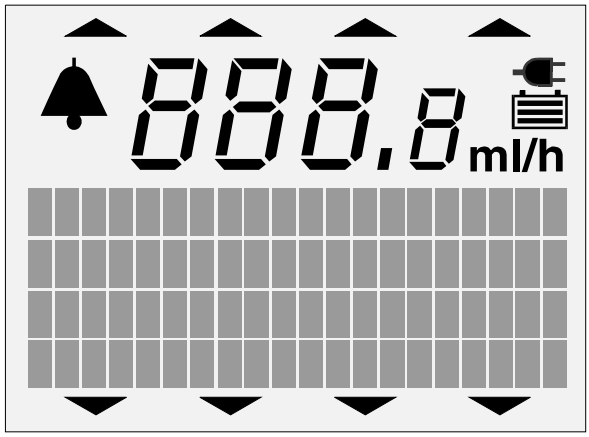


Fig.: 8 - 1

Switch-on Test

Switch-on test keypad and display: check correct procedure. Alarm tone, display: rate 000.0, VOL, TIME etc., display of all pixel, contrast, display light, alarm and operating LED.

Battery Test

Switch mains/battery/mains: Interrupt mains supply twice in intervals of 1 second. Pay attention to the switch-over in the display. The unit must not switch to malfunction.

Note

Running time minimum 30 minutes after charging of 16 hours.

Air Sensor

Set rate to 400 ml/h.

Then inject 0.4 ml air bubble (inject piece). An alarm must be activated.

Drop Sensor

Set rate to 400 ml/h.

- Simulate occlusion: Clamp infusion line in front of the pump to prevent any drops. Alarm in less than 5 sec.
- Simulate free flow: Press the bottom part of the drop chamber together, to generate a jet. Immediate alarm.

Staff Call

- Connect MFC test plug
- Generate an alarm (e.g. open pump cover during operation), red LED is on in the test plug
- If "dynamic" is set, 1 sec.
- If "static" is set, until the alarm is acknowledged

Alarm Suppression

Press the alarm key. The current alarm is suppressed for 2 minutes.

4. Pump Unit Inspection

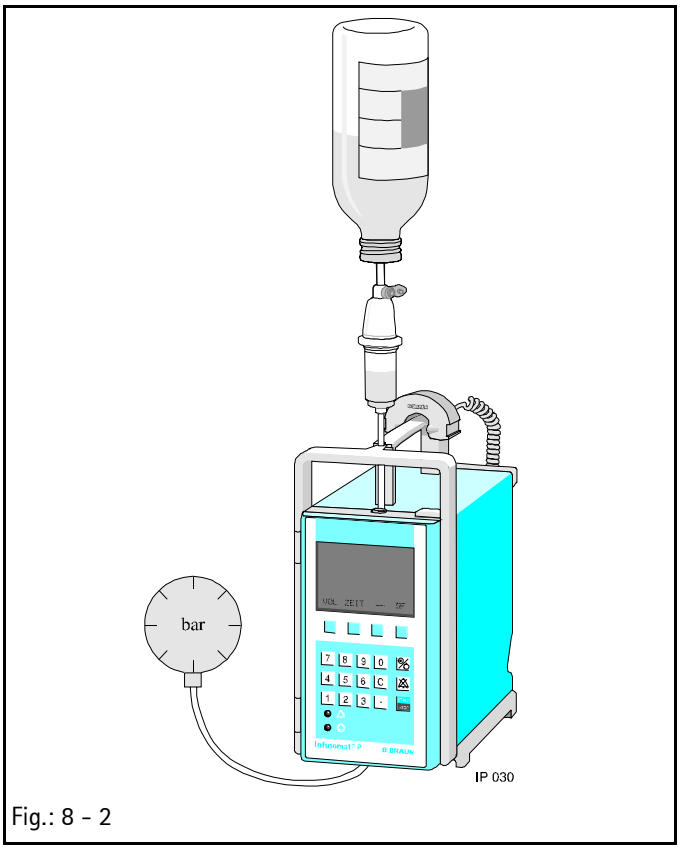


Fig.: 8 - 2

General

- Room temperature 20 - 28° C
- Use infusion line Intrafix AIR P (PVC) only once.
- Connect manometer to the outlet side of the pump and position the manometer approx. to medium height of the Infusomat P.
- Vent manometer (filled with water) ϕ100 mm or 160 mm.
- Measurement range: 4 bar

The results differ according to different measurement procedures. With electronic measurement devices the values may be approx. 0.1 bar higher than indicated.

Electronic Occlusion Pressure (Occlusion Sensor)

Switch off drop control.

Set 600 ml/h and deliver in an open system for one minute.

Close the system and build-up pressure against a manometer with 100 ml/h.

Occlusion sensor threshold low. . . . . 400 to 1000 mbar

Occlusion sensor threshold high . . . . . 1000 to 1600 mbar

Note

The pressure threshold can be changed in the service program (not recommended).
Default setting:
- low pressure: 0.6 bar
- high pressure: 1.2 bar

Tolerance range:
- set value: ± 0.3 bar.

Mechanical Occlusion Pressure

- Set occlusion sensor threshold to mechanical (test plug).
- Switch off drop control.
- Build up pressure with 600 ml/h. Then measurement with 100 ml/h.
- Read 90 seconds after start of delivery:

Measurement upper pressure value

Measurement lower pressure value

Measured values (see „Technical Safety Inspection TSI" ➡ pg. 7 - 1).

After the measurement inspection the mechanical setting must be switched off! The electronic occlusion pressure is not automatically activated again when the service plug has been disconnected.

Mechanical Pressure Setting

Check pump pressure. If the deviation is max. ± 0.3 bar from set range, the pump can be calibrated.

Perform pressure measurement. Calibrate the pressure range at the set screw with an Allen key 2.5 mm. to the upper pressure value of 2.4 bar.

After the measurement inspection the mechanical setting must be switched off! The electronic occlusion pressure is not automatically activated again when the service plug has been disconnected.

Flow Inhibitor

Switch to stop at high pressures. Then open unit door. The pressure must stay above 0.8 bar.

Delivery Accuracy

Temperature 22° C

Rate > 1 ml/h

Typically ± 5% at a measurement of more than 8 hours.

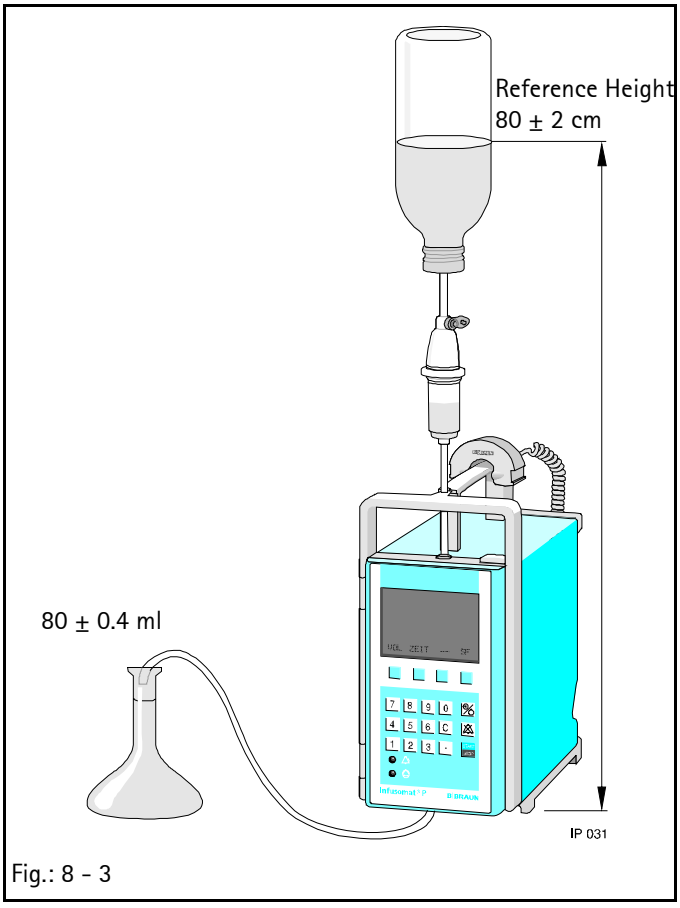


Fig.: 8 - 3

Determination of Delivery Rate

Alternative procedure (12 minutes short measurement)

Temperature 20 - 28° C

Measurement Equipment:

- 500 ml glass bottle, vented
- Intrafix AIR P (PVC), drop chamber filled 2/3
- Graduated cylinder 25 ml, accuracy ± 0.4 ml
- Infusion solution NaCl or distilled water .

Procedure:

- Use a new infusion line for every measurement.
- Check the system for narrow sections or kinks.
- Delivery rate 125 ml/h.
- The system run-in time is 1 - 2 minutes, but not longer than 2 minutes.
- Insert the outlet cannula in the graduated cylinder.
- Measurement rate: 125 ml
- Measured volume: 25 ml
- Simultaneously start stop watch and Infusomat P.
- Stop when the 25 ml mark is reached and read time.

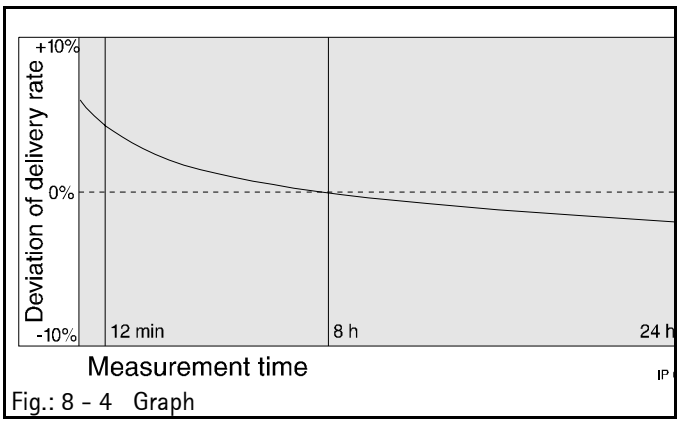


Fig.: 8 - 4 Graph

- As shown in the graph the delivery behaviour slightly changes over the infusion time. Consequently the tolerances must be in the upper range when the delivery accuracy (± 5% over 8 hours) is checked with a short measurement over 12 minutes.
- Expected rate deviation due to the short time method:
  Software IFPC:+4.5%
  tolerance range -0.5% bis +9.5% of the set rate.
  Software IFPe / IFPE:+2.5%
  tolerance range -2.5% bis +7.5% of the set rate.

Measurement Time		Deviation %	Rate ml/h
12 min	37.9 sec	-5	118,75
12 min	30.0 sec	-4	120,00
12 min	22.3 sec	-3	121,25
12 min	14.7 sec	-2	122,50
12 min	7.3 sec	-1	123,75
12 min	0.0 sec	0	125,00
11 min	52.9 sec	+1	126,25
11 min	45.9 sec	+2	127,50
11 min	39.0 sec	+3	128,25
11 min	32.3 sec	+4	130,00
11 min	25.7 sec	+5	131,25
11 min	19.7 sec	+6	132,50
11 min	12.9 sec	+7	133,75
11 min	6.7 sec	+8	135,00
11 min	0.6 sec	+9	136,25
10 min	54.5 sec	+10	137,50
10 min	48.5 sec	+11	138,75
10 min	42.9 sec	+12	140,00
10 min	26,1	+15	143,75

Table 8 - 1 Measurement Examples

The inspection and calibration - if required - must be performed with the infusion line Intrafix AIR P (PVC)!

Alternative Measurement Procedure

Inspection of the delivery rate with a weight measurement. Avoid errors due to evaporation!

Measurement Equipment:

- Scales

Accuracy 0.1 g ..... 12 min

Delivery Rate Determination:

- Set the delivery rate to 125 ml/h.
- The run-in time is 1 - 2 minutes.
- Insert the outlet cannula in container and simultaneously start stop watch and Infusomat P.
- After the time has expired stop Infusomat P and stop watch.
- Immediately determine the delivery rate.

Test Equipment and Special Tools 9

Test Equipment and Special Tools

For Repair / for Technical Safety Inspection (TSI)

	Order No.
Test equipment case Infusomat fm (complete)	0770 1527
with:	
Template 4 mm (for adjustment after exchange of the pump cover) (for Infusomat fmS)	0770 1489
Pin punch 1.8 mm x 160 mm (for hinge pin/ disassembly of the pump cover)	0770 1446
Pin punch 6 mm x 125 mm (for hinge pin/ assembly of the pump cover)	0770 1454
Flat tool 100 x 20 mm (for assembly/ disassembly of the tube adapter of the Infusomat fmS)	0770 1462
Special socket spanner M18 (for disassembly of the recessed plug)	0770 1497
Manometer 0 - 4 bar	0770 1357
Service plug (red)	0770 0709
MFC service plug	3450 1215
OIL test infusion line (for Infusomat fmS)	0770 1500
Template 2.2 mm	0770 5034
Calibration device	0770 501A
Screw driver Torx T6	
Screw driver Torx T10	

9 Test Equipment and Special Tools

For your notes:

Spare Parts List 10

Unit Elements

Designation	Ord. No.
Mains Fuses	
Fuse T 0.16 A for 200 / 230 / 240 V (10 pcs.)	3477 2847
Fuse T 0.315 A for 100 / 110 / 120 V (10 pcs.)	3477 0534
Fuse holder	3450 0979
Battery	
Battery incl. connector plug 1.2 Ah / 7.2 V and holder	3450 2556
Door Lock	
Door lock complete with push button	3450 5601
Spring holder for door lock	3450 5440
Mounting for door lock	3477 2790
Pump Cover	
Pump cover with lock	3450 1916
Blind plug 7.1 mm (10 pcs.)	3477 3207
Torsion spring in lever/pump cover (5 pcs.)	3477 3363
Torsion spring for pump cover (5 pcs.)	3477 3355
Lever (pump cover)	3477 4092
Hinge pin for pump cover	3477 3967
Hinge pin for pump cover lever	3450 5725
Pump Housing	
Pump housing, (cpl.)	3450 3390
Housing	
Housing Labelling	
German	3450 1851
French	3450 1851
Dutch	3450 1851
Italian	3450 1851
English	3450 3382
Spanish	3450 3382
Danish	3450 3404
Norwegian	3450 3404
Swedish	3450 3404
Finnish	3450 3404
Portuguese	3450 3382
Czech	3450 3358
Polish	3450 3358
Turkish	3450 3382
Foot stand complete with rubber feet	3450 5415
Rubber feet (20 pcs.)	3477 3096
Unit handle with O-rings and PT screws	3450 3450
Controller Board	
Distance sleeve	3450 3366
Buzzer	3450 3447
Loudspeaker	3450 8848
Rear Panel	
Rear panel with screws (M3) and seal	3450 1860
Cover for optical interface	3477 3164
Strip seal for rear panel	3477 3142
MFC connector board	3450 3374
Potential equalization bolt	3477 0550
fm recessed plug (3 pin)	3477 3177
Screw 30x8 for fm recessed plug (20 pcs.)	3477 3185
U Washer 3.2 (20 pcs.)	3477 3193
Mains module 200/230/240 V	3450 1886
Mains module 100/110/120 V	3450 1894
Mains module 230 V	3450 190A
Drop sensor socket incl. cable and plug	3450 1878
Front Panel	
Front panel without clamp lever and torsion spring	3450 2092
Circular seal 571 mm / 45 mm	3477 3126
Tamper-proof caps 10 mm (50 pcs.)	3477 3134
Pump housing, cpl.	3450 3390
Cover Ø 6.4	3450 3412
Clamp lever with torsion spring and pin 4x20	3450 3420
Torsion spring	3450 3439
Reed sensor	3450 1754

Designation	Ord. No.

Pump Unit

Note

When replacing the finger pump adhere to Table 4 - 1 „Compatibility List" ➨ pg. 4 - 6.

Finger pump (without motor) including pump, pump cover, seal membrane and occlusion sensor board, software IFPC (installed up to unit serial no. 5505)	3450 1746
Finger pump (without motor) including pump, pump cover, seal membrane and occlusion sensor board, software IFPe, IFPE (installed from unit serial no. 5506)	3452 0481
Finger pump (without motor and board) incl. pump, pump cover, and seal membrane	3452 0597
Motor with pinion for finger pump	3450 1924

Occlusion Sensor

Occlusion sensor (cpl.) Software IFPC (installed up to unit serial no. 5505)	3450 7353
Occlusion sensor (cpl.) Software IFPe, IFPE (installed from unit serial no. 5506) (only delivered when a pressure adjusting device is available)	3452 0589

Air Sensor

Air sensor incl. connector	3450 193A

Designation	Ord. No.

Operating Unit

Membrane keypad with support plate and seal	3450 1800
LCD module	3450 1819
Flex cable, preformed	3450 8830
Frame incl. pressure spring and magnet	3450 1835
Flexible cable 42 mm (5 pcs.)	3477 3347
Hinge unit	3450 5571
Hinge pin (3 mm)	3450 5580
Magnet	3450 5849

Barcode Label

Barcode label (see „Order Form" ➨ pg. A - 2)	3450 9070

Frame with Seal

Frame with seal plate	3450 1770

Colours

Touch-up pen RAL 9001 (white)	3450 6977
Touch-up pen RAL 7032 (grey)	3450 6985

Miscellaneous

Assembly screw for display board PT 2.5x14 (10 pcs.)	3477 3100
Screw PT 3x10 Torx (self-forming)	3450 0960
Rubber feet grey (20 pcs.)	3477 3096
Attention label fuse T 0.16 A (5 pcs.)	3450 0898
Screw M 6x8 for fm recessed plug (20 pcs.)	3477 3185
U Washer 3.2 (20 pcs.)	3477 3193

Accessories

Universal Clamp

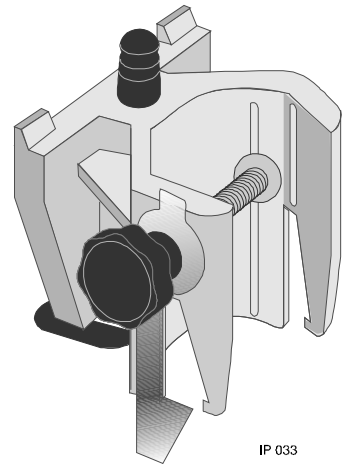


Fig.: 10 - 1 Universal Clamp

Designation	Ord. No.
Universal clamp, complete	3450 5857
Universal clamp base body	3450 8325
Threaded rod	3450 8333
Star handle body for universal clamp	3450 8384
Safety bow	3450 8341
Safety hook	3450 5865
Plate (2 pcs.)	3450 2610
Connection cap D12 mm (5 pcs.)	3477 4149
Bellows (5 pcs.)	3477 3274
Pressure spring (5 pcs.)	3477 4165

Note

For installation of the plate an appropriate press-in tool is required.

Software Update

Update-Kit IFPC02002	3450 6462
Update-Kit IFPe02003	On request
Update-Kit IFPE13003 (only units with controller board with loudspeaker)	On request
MFC interface line	0871 1661

For your notes:

Appendix

A

ESD Recommendations

Semiconductors can be destroyed by electrostatic discharge. Especially MOS components can be damaged by interference from electrostatic fields, even without discharge via contact. This type of damage is not immediately recognizable. Unit malfunctions can even occur after a longer period of operation.

Every workstation must be equipped according to the recommendations with the necessary static protective measures, if ESD components or boards are handled.

Workstation

Each workstation must be equipped with a conductive table surface. The conductive surface, the soldering iron or the soldering stations must be grounded via protective resistors.

Chairs must be of antistatic design. The floor or floor mats should be of electrically conductive material.

Personnel must wear conductive wristbands which are connected to a central ground potential via protective resistors, e.g. the ground contact of a wall outlet. Furthermore it is recommended that personnel wear cotton clothing and electrically conductive shoes to prevent electrostatic charge.

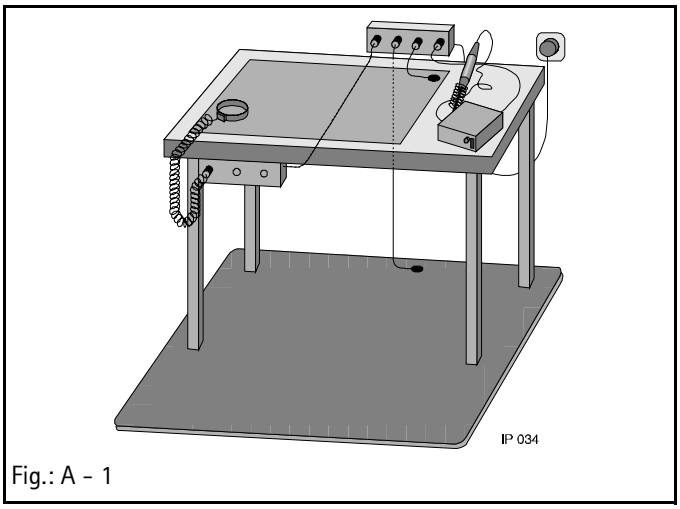


Fig.: A - 1

A Appendix

Revision Service-Documentation

Version 2.0

This manual has been completely revised. The most important changes are listed below:

- Changed manual structure
- New TSI list with new air alarm value
- New paragraph occlusion sensor (exchange / calibration)
- New test equipment for occlusion sensor
- New software
- New spare parts
- Total list of spare parts

Current Information

Order Form

The following form can be used as master to order type plates or barcode labels.

FAX

(Master)

B. Braun Melsungen AG

attn. Mr. Lohr
MT-PR-DE08C
P.O. Box 1120
34 209 Melsungen

email: ingo.lohr@bbraun.com

Fax-No: (05661) 75 - 38 09

Hospital: .....
Ward: .....
Street: .....
zip code / town: .....
Person responsible: .....
Tel.: .....

Order Barcode Label Order No. 3450 9070

for Infusomat P (DIANET-Type-Number **00203**)

We herewith order the barcode label / type plate with the following serial numbers (the serial number is indicated on the type plate of the pump).

Serial Number	Serial Number	Serial Number	Serial Number

We guarantee that we will fix the barcode label / type plates to the corresponding pumps in accordance with the Service Manual and its enclosures and will carry out the necessary test steps. Barcode labels or type plates that are not required will be destroyed.

Date: _____

Signature:

A Appendix

For your notes: