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1 About This Service Manual

This service manual conforms with the International Standard IEC 601-1.

This service manual does not replace the relevant Instructions for Use.

The service procedures described in this service manual must be performed by qualified service personnel only.

Carefully read through all instructions and safety precautions (DANGER, CAUTION, and IMPORTANT statements) which appear throughout this service manual.

Carefully read through each step in a procedure before starting the procedure. Always use the proper tools and the specified test equipment. If you deviate from the instructions and/or safety precautions given in this service manual, you may cause the equipment to operate incorrectly or unreliably, or cause damage to the equipment. Use only genuine spare parts manufactured or sold by Dräger Medizintechnik GmbH as listed in the spare parts list (see Section 5 "Spare Parts List").

The test list in Section 3 of this service manual does not replace inspections and servicing by Dräger Medizintechnik GmbH.

1.1 Definitions



DANGER

A DANGER statement refers to conditions with a possibility of critical injury or death if disregarded.



CAUTION

A CAUTION statement refers to conditions with a possibility of personal injury and/or damage to the equipment if disregarded.



IMPORTANT

An IMPORTANT statement provides hints and additional information intended to avoid inconvenience during operation or maintenance.

Inspection	=	examination of actual condition
Service	=	measures to maintain specified condition
Repair	=	measures to restore specified condition
Maintenance	=	inspection, service, and repair, where necessary

2 For Your Safety and That of Your Patients

For correct and effective use of the equipment and to avoid hazards it is essential to read the following recommendations and to act accordingly.

2.1 Strictly Follow the Instructions for Use

This service manual does not replace the Instructions for Use. Any use of the equipment requires full understanding and strict observation of the relevant Instructions for Use. The equipment may only be used for the purposes specified therein.

2.2 Maintenance

The equipment must be inspected and serviced by qualified service personnel at six-month intervals (and a record kept). Repair and general overhaul of the equipment may only be carried out by qualified service personnel. We recommend that a service contract be obtained with DrägerService and that all repairs be carried out by them. Use only genuine Dräger parts for maintenance.

Follow the instructions under "Maintenance Intervals" in this Section.

2.3 Power Connection

The equipment shall be used only in rooms with mains power supply installations complying with applicable national safety standards.

The requirements laid down in the IEC 601-1 "Safety of Medical Electrical Equipment" are applicable for electrically powered equipment.

2.4 Not for Use in Explosion-Hazard Areas

The equipment has not been approved or certified for use in areas where combustible or explosive gas mixtures are likely to occur.

2.5 Safe Connection With Other Electrical Equipment

Electrical connections to equipment which is not listed in the Instructions for Use should only be made following consultations with the respective manufacturers or an expert.

2.6 Liability for Proper Function and/or Damage

Liability for proper functioning of or damage to the equipment is irrevocably transferred to the owner or the operator if the equipment is serviced or repaired by personnel not employed or authorized by DrägerService and/or if the equipment is used in a manner not conforming to its intended use.

Dräger Medizintechnik GmbH cannot accept responsibility for any damage caused by non-compliance with the above recommendations. The warranty and liability provisions of the Terms of Sale and Delivery of Dräger Medizintechnik GmbH are likewise not modified by the above recommendations.

Dräger Medizintechnik GmbH

3 Intended Use

The Evita is a time-cycled, constant-volume long-term ventilator for intensive care (for adults and children with a body weight of at least 3 kg).

The Evita comprises the following ventilation modes (see also 'Function Description'):

- IPPV – Intermittent Positive Pressure Ventilation
- SIMV – Synchronized Intermittent Mandatory Ventilation
- MMV – Mandatory Minute Volume Ventilation
- SB – Spontaneous Breathing
- CPAP – Continuous Positive Airway Pressure
- ASB – Assisted Spontaneous Breathing
- BIPAP – Biphasic Intermittent Positive Airway Pressure
- APRV – Airway Pressure Release Ventilation

Special modes:

- Apnoea ventilation – For switching over automatically to volume-controlled mandatory ventilation, if breathing stops.
- ILV (optional) – Independent Lung Ventilation

Diagnostics:

- Intrinsic PEEP measurement
- Occlusion pressure measurement

Monitoring:

- Airway pressure, P_{aw}
- Expiratory minute volume, MV
- Inspiratory O_2 concentration, FiO_2
- Inspiratory breathing gas temperature, T
- Expiratory CO_2 concentration, $etCO_2$
- Inspiratory breathing volume, V_{Ti}
- Apnoea time
- Tachypnoea monitoring to detect rapid, shallow spontaneous breathing

Automatic gas switch-over:

- In the event of a gas failure, the change-over to another gas is automatic.

DANGER

The patient's safety may be at risk in case the equipment does not operate properly. Therefore the Evita must only be used under the supervision of qualified medical staff, so that help will immediately be available, if any faults or malfunctions occur.

DANGER

Risk of fire or explosion in the presence of flammable or explosive gas mixtures or anaesthetic agents. Do not use the unit in areas where flammable or explosive gas mixtures are likely to occur.

DANGER

Mobile telephones may impair the functioning of electromedical equipment and be a risk for the patient's safety. Do not use mobile telephones within 10 metres of ventilators.

4 Maintenance Intervals

IMPORTANT

Clean and disinfect the equipment and/or components prior to any maintenance procedure – and before shipping it for repair – according to approved hospital procedures and the instructions given in this service manual.

Inspection and servicing	Every six months by qualified service personnel.
Safety checks	Every six months by qualified service personnel.
O ₂ sensor capsule	To be replaced in case a “O ₂ measurement inop” message is displayed and when it is no longer possible to calibrate the O ₂ sensor. Dispose of the sensor capsule according to your local waste disposal regulations.
Ambient-air filter Cooling-air filter	Clean or replace after 4 weeks. Replace every year.
Lithium battery for data protection	To be replaced every 2 years by qualified service personnel.
Real-time clock	To be replaced after 6 years or if the clock does no longer function.
Pressure regulator	To be replaced every 6 years by qualified service personnel.

5 Cleaning/Disinfecting/Sterilizing

Use surface disinfectants. For reasons of material compatibility we recommend using only disinfectants based on

- aldehydes;
- alcohol; or
- quaternary ammonium compounds.

DANGER

Ethylene oxide is hazardous to your health. Never sterilize using ethylene oxide.

CAUTION

Damage to materials may occur if any disinfectants are used that are based on

- phenols;
- halogen-releasing compounds;
- strong organic acids
- oxygen-releasing compounds; or
- ethylene oxide.

CAUTION

Using alcoholic disinfectants to clean the plexiglass window of the control unit may cause fissuring of the window. Do not use alcohol nor alcoholic disinfectants for cleaning.

5.1 CO₂ Cuvette

Wipe off dirt, in particular inside and outside the windows, using a disposable cloth and a cotton bud.

Disinfect the cuvette with moist heat (at 93 °C for 10 minutes) in a cleaning or disinfecting machine using detergent only.

Or:

Disinfect in bath of disinfectant based on the listed active substances, e.g. Cidex (Johnson & Johnson, Norderstedt/Germany).

Or:

Steam-sterilize at 134 °C.

5.2 CO₂ Sensor

Wipe off dirt with cotton buds, in particular on the windows of the CO₂ sensor.

Disinfect by wiping, e.g. with 70% ethanol.

5.3 Basic Unit Without Ventilation Hoses, Gas Connection Hoses, and Temperature Sensor

- Disinfect by wiping with e.g. Buraton 10 F or Terralin (Schülke & Mayr, Norderstedt/Germany).

IMPORTANT: Strictly follow the manufacturer's instructions.

5.4 Ventilation Hoses, Water Traps Including Collection Containers, Y-Piece, Expiration Valve (or Component Parts in case the valve is heavily soiled)

- Disinfect with moist heat (93 °C for 10 minutes) in a cleaning or disinfecting machine using detergents only.

CAUTION

After disinfecting the expiration valve or its component parts with moist heat, steam-sterilize these items at 134 °C. There may still be liquid present in the pressure measuring line which may impair the unit's proper functioning.

Or:

In case no cleaning or disinfecting machine is available:

- Disinfect by immersion in e.g. Sekusept (Henkel).
IMPORTANT: Strictly follow the manufacturer's instructions.
- Rinse with clear water – preferably from a soft water supply – and shake water out thoroughly.
- Then dry components thoroughly. We recommend that this be done in conjunction with sterilization in an autoclave at 134 °C to make sure that no water remains in the control and measuring lines and possibly cause malfunctioning.

Or:

Rinse the expiration valve with clear water – preferably from a soft water supply – and shake water out thoroughly. Dry the expiration valve thoroughly.

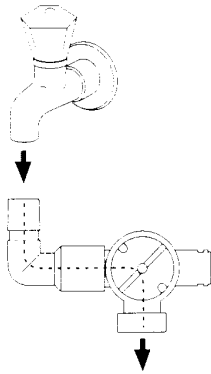


Fig. 1: Rinsing the expiration valve

- Sterilize the expiration valve after drying in an autoclave at 134 °C.
- Sterilize ventilation hoses, water traps and collection containers, Y-piece, expiration valve, and temperature sensor in an autoclave at 134 °C.

6 Device Check

Immediately before using the Evita 4 on the patient, check that the machine is working properly and is ready for operation. To perform this check, the Evita 4 has an integrated checklist which guides you through the check in an interactive mode.

The following functions are performed during this device check:

- Checking that the machine assembly is complete
- Testing the alarm tone
- Testing the AIR/O₂ change-over valve
- Testing the safety valve
- Calibrating the flow sensor
- Calibrating the O₂ sensor
- Calibrating the CO₂ sensor
- Testing the hose system for leaks
- Checking the compliance of the hose system.

The test results obtained from this device check and the calibration and zero-checking values of the sensors remain stored until the next calibration – even if the device is switched off.

6.1 Preparing the Device Check

6.1.1 Adult Test Lung

Prepare the adult test lung for the adult hose system. The adult test lung consists of the following components:

- Elbow connector for connection to the Y-piece
- Catheter connection for simulating the airway resistance
- 2 litre breathing bag to simulate the compliance.

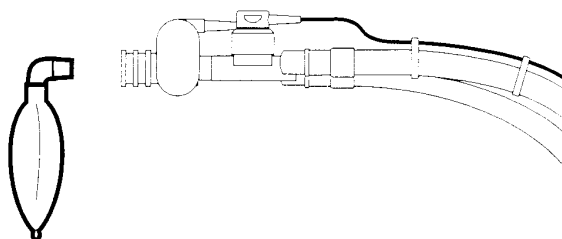


Fig. 2: Adult test lung

Child Test Lung

Prepare the child test lung for the paediatric hose system. The child test lung consists of the following components:

- Tracheal tube CH 12 to simulate the airway resistance
- Small bellows to simulate the compliance.

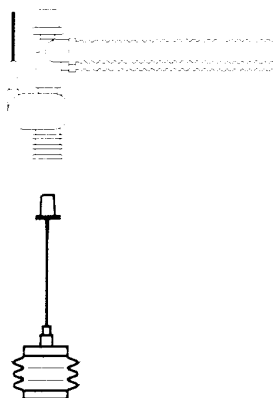


Fig. 3: Child test lung

6.2 Performing the Device Check

- Switch the Evita 4 on by pressing the power switch on the back panel until it clicks into position.

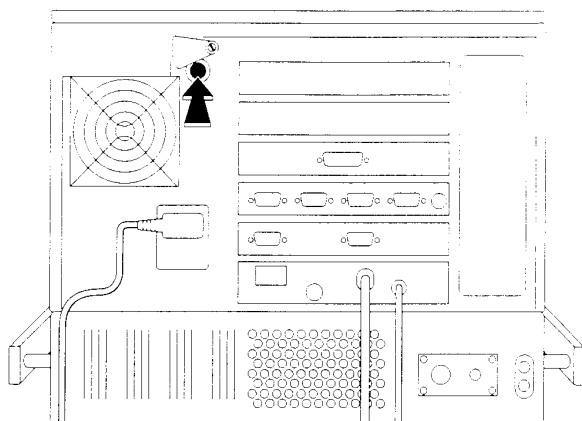


Fig. 4: ON/OFF switch

The Evita 4 runs through its self-test procedure which lasts about 10 seconds.

After the self-test:

- Press the "Standby" button (1) and keep it pressed for about 3 seconds.
- Press the "Reset" button (2).

The alarm tone is silenced.

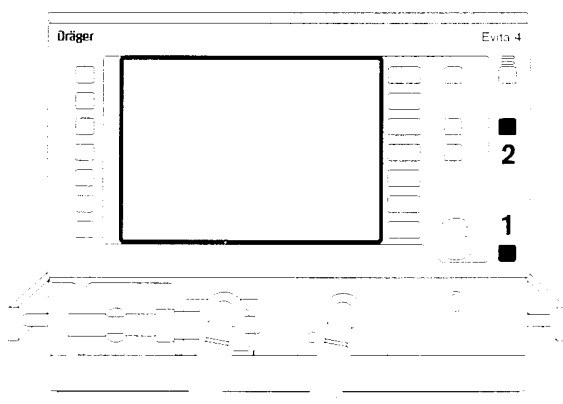


Fig. 5: Standby button and reset button

- Touch the "Device check" screen key.
- Touch the "Check" screen key.

The Evita 4 starts running through the device check. This device check is semi-automatic.

- Follow the instructions given by the Evita 4.

On completion of the device check, a checklist will be displayed on the screen to show the results of the check.

- ✓ = correct result
- F = incorrect result
- -- = check not performed.

Last device check: 29.07.14:41		Check	Patient
Back-up alarm:	✓	Device check	
Expiration valve:	✓		
Flow sensor:	✓	Repeat check	
Humidifier:	✓		
Patient hoses fitted:	✓		
AIR-O ₂ switchover valve:	✓		
Safety valve:	✓		
Supply pressures:	✓		
Calibration flow sensor:	✓		
Calibration O ₂ sensor:	✓		
Leak test hose system:	✓		

Fig. 6: Device check results

In the event of incorrect results, do the following:

- Correct the fault.
- Touch the "Repeat check" screen key.

Only the tests with incorrect results will now be repeated.

After successful completion of the device check, the Evita 4 is ready for operation.

- You can now start up the machine. To do so, press the "Standby" key.
- You can leave the Evita 4 in standby mode.
- Switch the Evita 4 off for later use. Press the switch on the back panel of the Evita 4.

The following tests are performed during the device check:

- Expiration valve seating
- Flow sensor seating
- Thermometer seating
- Complete hose system
- CO₂ sensor seating
- Humidifier level
- Alarm tone test
- AIR/O₂ change-over valve test
- Safety valve test
- Gas supply pressure test
- O₂ sensor calibration
- Flow sensor calibration
- CO₂ sensor calibration
- Leak tightness of the hose system

7 Technical Data

7.1 Environmental Conditions

In operation

Temperature	10 to 40 °C
Atmospheric pressure	700 to 1060 hPa
Rel. humidity	0 to 90%

In storage and transport

Temperature	–20 to 60 °C
Atmospheric pressure	500 to 1060 hPa
Rel. humidity	0 to 100%

7.2 Settings

Ventilatory frequency f 0 to 100/min

Inspiratory time T_{insp} 0.1 to 10 s

Tidal volume V_T

Paediatrics	0.02 to 0.3 L, BTPS (body temperature, pressure, saturation. Measured values relating to the conditions of the patient lung, body temperature 37 °C, steam-saturated gas, ambient pressure.)
Accuracy	±10% of the set value, or ±10 mL, whichever is greater.
Adults	0.1 to 2.0 L, BTPS
Accuracy	±10% of the set value, or ± 25 mL, whichever is greater.

Inspiratory flow

Paediatrics	6 to 30 L/min
Adults	6 to 120 L/min

Inspiratory pressure P_{insp}	0 to 80 mbar
Inspiratory pressure limit P_{max}	0 to 100 mbar
O ₂ concentration (O ₂)	21 to 100 vol. %
Accuracy	±5% of the set value, or ± 2 vol. %, whichever is greater.
Positive end-expiratory pressure PEEP or interm. PEEP	0 to 35 mar
Trigger sensitivity	1 to 15 mbar
Pressure assist P_{ASB}	0 to 80 mbar
Rise time for pressure assist	0 to 2 s
Independent Lung Ventilation ILV (optional)	
Master	with trigger/without trigger
Slave	synchr./asynchr./inverse I:E

7.3 Performance Data

Control principle	time-cycled, constant-volume, pressure-controlled
Intermittent PEEP frequency	2 cycles every 3 minutes
Medicament nebulization	for 30 minutes during inspiratory flow phase
Bronchial suction	
Disconnection detection	automatic
Reconnection detection	automatic
Oxygen enrichment	3 minutes max.
Active suction phase	2 minutes max.
Final oxygen enrichment	2 minutes
Valve response time T 0...90	≤5 ms

Supply system for spontaneous breathing and ASB

adaptive CPAP system with high initial flow

Max. flow rate 2 L/s in 8 ms

Max. inspiratory flow 180 L/min

Equipment compliance

with Aquapor humidifier and patient tubing system ≤ 2 mL/mbar

with Fischer & Paykel MR730 humidifier and paediatric tubing system (K) ≤ 1 mL/mbar

Additional functions

Inspiratory relief valve opens if medical air supply fails (pressure < 1.2 bar), allows spontaneous breathing with filtered ambient air.

Safety valve opens the breathing system at 100 mbar.

7.4 Measured Value Displays

Airway pressure measurement

Max. airway pressure P_{peak}

Plateau pressure P_{plat}

Pos. end-exp. pressure PEEP

Mean airway pressure P_{mean}

Min. airway pressure P_{min}

Range: 0 to 99 bar

Resolution: 1 mbar

Accuracy: ± 2 mbar

O₂ measurement in main flow (inspiratory side)

Inspiratory O₂ concentration FiO₂

Range: 15 to 100 vol. %

Resolution: 1 vol. %

Accuracy: ±3 vol. %

Flow measurement

Minute volume MV

Spontaneously breathed
minute volume MV_{spn}

Range: 0 to 99 L/min, BTPS

Resolution: 0.1 L/min

Accuracy: ±8% of measured value

T 0...90 approx. 35 s

Tidal volume V_{Te}

Spontaneously breathed
tidal volume V_{Tspn}

Range: 0 to 3999 L/min, BTPS

Resolution: 1 mL/min

Accuracy: ±8% of measured value

Frequency measurement

Respiratory rate f_{tot}

Spontaneous respiratory rate f_{spn}

Range: 0 to 39999 mL/min, BTPS

Resolution: 1/min

Accuracy: ±1/min

T 0...90 approx. 35 s

Breathing gas temperature measurement

Range: 18 to 51 °C

Resolution: 1 °C

Accuracy: ± 1 °C

CO₂ measurement in main flow

End-exp. CO₂ concentration etCO₂

Range: 0 to 100 mmHg or
0 to 13.3 vol.% or
0 to 13.3 kPa

Resolution: 1 mmHg or
0.1 vol.% or
0.1 kPa

Accuracy:

for 0 to 40 mmHg ± 2 mmHg
for 40 to 100 mmHg $\pm 5\%$ of measured value

T 10...90: ≤ 25 ms

Warm-up time: 3 minutes max.

CO₂ production \dot{V} CO₂

Range: 0 to 999 mL/min, BTPS

Resolution: 1 mL/min

Accuracy: $\pm 9\%$ of measured value

T 10...90: 12 minutes

Serial dead space V_{ds}

Range: 0 to 999 mL, BTPS

Resolution: 0.1 mL

Accuracy: $\pm 10\%$ of measured value or ± 10 mL,
whichever is greater

Dead space ventilation V_{ds}/V_T

Range:	0 to 99%
Resolution:	1%
Accuracy:	$\pm 10\%$ of measured value

Computed value displays

Compliance C

Range:	0 to 250 mL/mbar
Accuracy:	$\pm 10\%$ of measured value

Resistance R

Range:	0 to 99 mbar/L/s
Accuracy:	$\pm 10\%$ of measured value

Curve displays

Airway pressure P_{aw} (t)	-10 to 100 mbar
Flow (Flow) (t)	-150 to 180 L/min
Volume V (t)	0 to 2000 mL
Exp. CO_2 concentration FCO_2	0 to 100 mmHg or 0 to 13 kPa or 0 to 13 vol. %

7.5 Monitoring

Expiratory minute volume MV

Upper alarm limit alarm	when MV exceeds the upper alarm limit.
Setting range	41 to 0.5 L/min, in 0.1 L/min steps
Lower alarm limit alarm	when MV falls below the lower alarm limit.
Setting range	0.1 to 40 L/min, in 0.1 L/min steps

Airway pressure Paw

Upper alarm limit alarm	if the "Paw high" value is exceeded.
Setting range	10 to 100 mbar
Lower alarm limit alarm	if the "PEEP +5 mbar" value (coupled with the PEEP setting) is not exceeded for at least 96 ms in 2 successive breaths.

Insp. O₂ concentration FiO₂

Upper alarm limit alarm	if FiO ₂ exceeds the upper alarm limit for at least 20 seconds.
Lower alarm limit alarm	if FiO ₂ falls below the lower alarm limit for at least 20 seconds.
Range:	both alarm limits are automatically allocated to the set value: below 60 vol.% with ± 4 vol.% 60 vol.% and above: ± 6 vol.%

End-expiratory CO₂ concentration etCO₂

Upper alarm limit alarm	if the upper alarm limit has been exceeded
Setting range	0 to 100 mmHg or 0 to 15 kPa
Lower alarm limit alarm	if the etCO ₂ falls below the lower alarm limit
Setting range	0 to 99 mmHg or 0 to 14 kPa

Insp. breathing gas temperature

Upper alarm limit alarm	when the temperature reaches 40 °C. (Evita 4 can also be used without temperature sensor if the sensor has not been connected on switching on.)
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Tachypnoea monitoring

Alarm	during spontaneous breathing, when the spontaneous respiratory rate has been exceeded.
Setting range	5 to 120/min

Volume monitoring

Lower alarm limit alarm	if the set tidal volume V_T (coupled with the V_T setting) has not been supplied.
Upper alarm limit alarm	if the applied tidal volume exceeds the value of the alarm limit, inspiration is interrupted and the expiration valve is opened.
Setting range	30 to 4000 mL

Apnoea alarm time

Alarm	if no breathing activity is detected.
Setting range	15 to 60 s, adjustable in 1 second steps.

7.6 Operating Data

Mains power connection	100 V to 240 V
Current	
at 230 V	1.3 A max.
at 100 V	3.2 A max.
Power consumption	typically approx. 125 W
Machine fuses	
Range of 100 V to 240 V	T 5 H 250 V IEC 127-2/V (2x)
Protection class	
Machine	I, type B ⚡
CO ₂ sensor	Type BF ⚡
Temperature sensor	Type BF ⚡

Gas supply

O ₂ gauge pressure	3 bar –10% to 6 bar
O ₂ connection thread	M 12 x 1, female
AIR gauge pressure	3 bar –10% to 6 bar
AIR connection thread	M20 x 1.5, male. The gases must be dry, free from oil and dust.

Gas consumption of control system

Medical air or O ₂	approx. 3.5 L/min
Output for pneumatic medicament nebulizer	Medical air or O ₂ 2 bar max. 10 L/min max.

Automatic gas switch-over

if one gas fails (inlet pressure < 1.5 bar), the machine switches to the other gas.

Sound pressure level

47 dB (A) max. (for free-field measurement over a reflecting surface)

Dimensions (W x H x D)

Basic unit	530 x 290 x 450 mm
Unit with trolley	580 x 1335 x 660 mm

Weight

Basic unit	approx. 27 kg
Unit with trolley including cabinet 8H	approx. 69 kg

7.7 Machine Outputs

Digital output	Output and reception via an RS 232 C interface
Digital output	Output for independent lung ventilation (ILV)
Digital output (optional)	For output and reception via two RS 232 C interfaces
Digital output (optional)	For output and reception via a CAN interface
Analog output (optional)	For output of analog data

7.8 Electromagnetic Compatibility EMC

Radio interference suppression in accordance with EN 55011 and EN 55014

Interference immunity in accordance with Directive 89/336/EEC

7.9 Materials Used

Part	Appearance	Material
Ventilation hose	milky, transparent	silicone rubber
Water traps	yellow, transparent	polysulphone
Y-piece with connector for temperature measurement	yellow, transparent	polysulphone
	milky, transparent	silicone rubber
Expiration valve housing, closure	white	polyamide
Diaphragm	whitish and grey	silicone rubber and aluminium
CO ₂ cuvette	yellow, transparent	polysulphone with glass windows
Temperature sensor/cable	milky / green	silicone rubber
CO ₂ sensor/cable	grey / grey	polyurethane

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1 General

The Evita 4 is a time-cycled, constant-volume long-term ventilator for adults and children with a minimum body weight of 3 kg.

The Evita 4 can be used for the following ventilation modes:

IPPV	<p>Intermittent Positive Pressure Ventilation, controlled and assisted constant-volume ventilation with the following options:</p> <ul style="list-style-type: none">• CPPV = (Continuous Positive Pressure Ventilation) Controlled ventilation at a continuous positive airway pressure.• PLV = (Pressure Limited Ventilation) Pressure-limited, constant-volume ventilation.• AutoFlow® = for automatic optimizing of the inspiratory flow.• IRV = (Inversed Ratio Ventilation) Ventilation at a reversed I:E ratio.
SIMV	<p>Synchronized Intermittent Mandatory Ventilation, weaning method for spontaneously breathing patients with the following options:</p> <ul style="list-style-type: none">• PLV = (Pressure Limited Ventilation) Pressure-limited, constant-volume ventilation.• AutoFlow® = for automatic optimizing of the inspiratory flow.
MMV	<p>Mandatory Minute Volume Ventilation, spontaneous breathing with automatic synchronizing of mandatory ventilation and required minute volume of the patient. With the following options:</p> <ul style="list-style-type: none">• PLV = (Pressure Limited Ventilation) Pressure-limited, constant-volume ventilation.• AutoFlow® = for automatic optimizing of the inspiratory flow.
SB	<p>Spontaneous Breathing, spontaneous breathing at atmospheric pressure conditions.</p>
CPAP	<p>Continuous Positive Airway Pressure, spontaneous breathing at a positive airway pressure.</p>
ASB	<p>Assisted Spontaneous Breathing, pressure-assisted spontaneous breathing.</p>

BIPAP Biphaseic Intermittent Positive Airway Pressure, pressure-controlled ventilation combined with free spontaneous breathing during the entire respiratory cycle and adjustable pressure assistance on CPAP level.

APRV Airway Pressure Release Ventilation, spontaneous breathing on two pressure levels with extended time ranges, independently variable.

Special methods:

Apnoea-Ventilation For automatic change-over to volume-cycled mandatory ventilation in the event of apnoea. In this case the Evita 4 gives an alarm upon expiry of the set alarm time ($T_{\text{apnoea}} >$) and activates constant-volume ventilation.

ILV (optional) Independent Lung Ventilation, bilateral, differentiated, synchronized ventilation with two Evita 4 units.

Diagnosis:

Intrinsic PEEP measurement For determination of the intrinsic PEEP in air trapping.

Occlusion pressure measurement For assessment of the respiratory drive during spontaneous breathing.

Monitoring:

- Airway pressure (P_{aw})
- Expiratory minute volume (MV)
- Inspiratory O_2 concentration (FiO_2)
- Inspiratory breathing gas temperature (T)
- Expiratory CO_2 concentration ($etCO_2$)
- Inspiratory tidal volume (V_T)
- Apnoea time
- Tachypnoea monitoring to detect dead-space-intensive spontaneous breathing.

2 Basic Principle

The Evita 4 consists of three components which communicate via a CAN (fast serial interface):

- Control unit
- Electronics
- Pneumatics

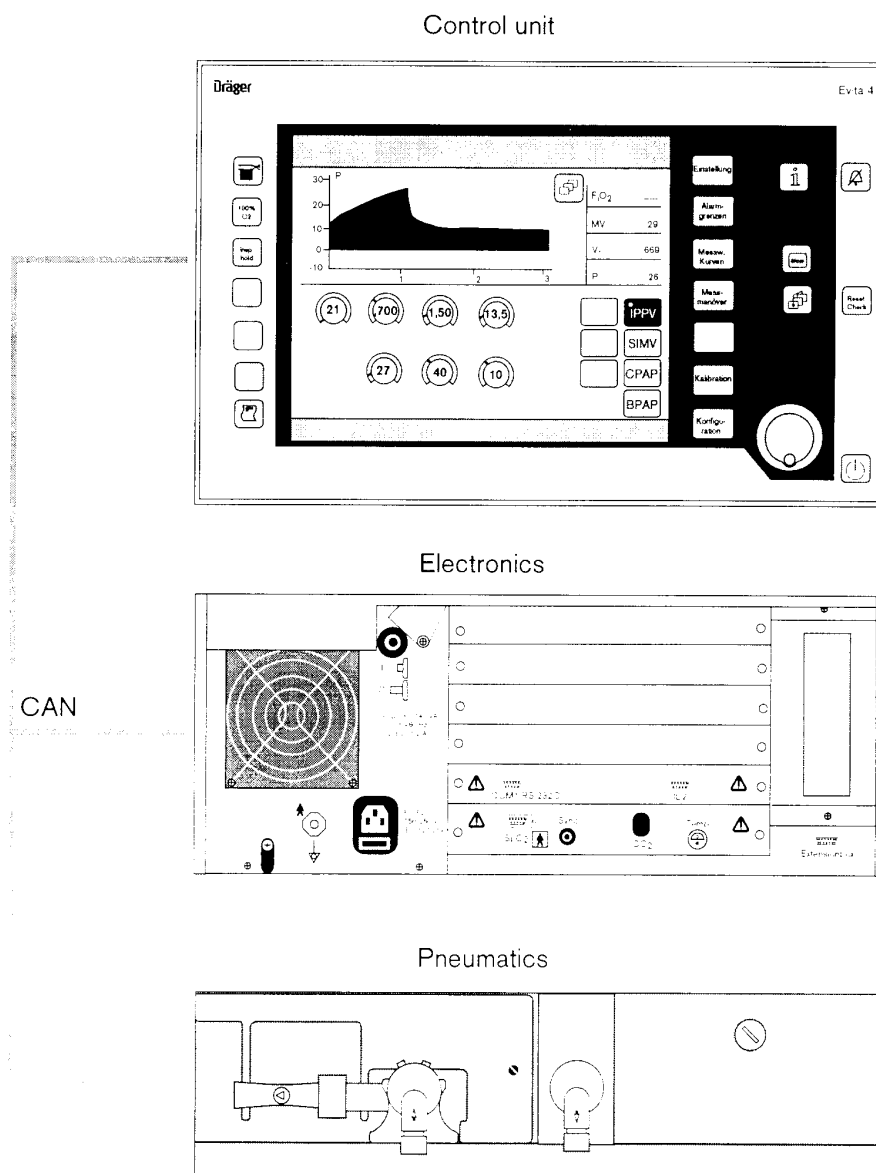


Fig. 1: Basic components

2.1 Control Unit

The control unit is the interface between the machine and the operator. The control unit serves to make adjustments, to display measured values and to activate alarms. In the control unit the display, membrane keypad, touch screen and Graphics Controller PCB are accommodated.

2.2 Electronics

The electronics is the central control unit of the Evita 4. It includes the CPU 68332 PCB, the CO₂-Carrier PCB with the Processor Board PCB and Power Supply PCB and the power supply unit (Communication PCB, Paediatric Flow PCB and the optional SpO₂ PCB).

2.3 Pneumatics

The pneumatics controls the pneumatic valves following preset ventilation parameters. It includes an independent microprocessor system and the valve control. In the pneumatics the Pneumatics Controller PCB, the HPSV Controller AIR/O₂ PCB, the PEEP valve, the mixer, the pressure connection, the flow sensor and the O₂ sensor are accommodated.

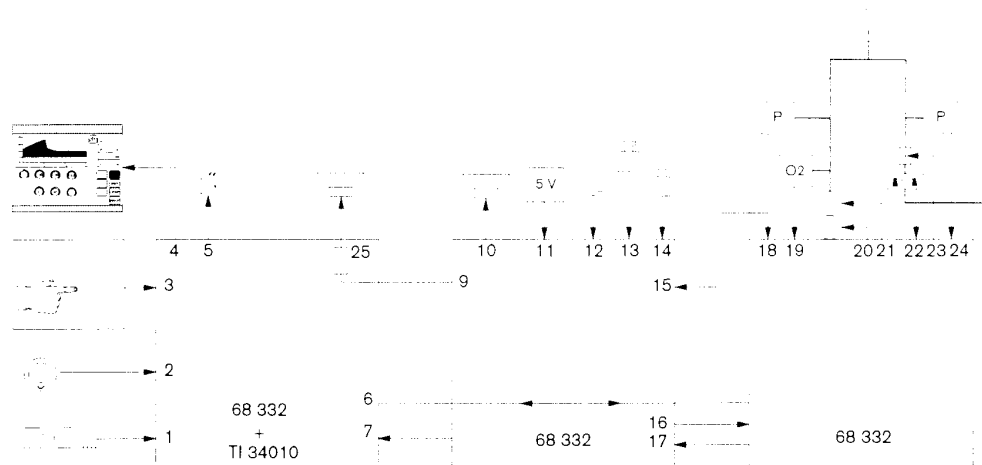


Fig. 2: Basic principle

- | | | | |
|----|---|----|---|
| 1 | Keys | 13 | Supply voltages |
| 2 | Rotary knob including
acknowledgement (by pressing knob) | 14 | Mains switch |
| 3 | Touchscreen | 15 | Second inspiratory P_{aw} |
| 4 | EL display 640 x 480 | 16 | Reset pneumatics processor and
venting |
| 5 | Information LEDs and Alarm LEDs | 17 | Electronics processor reset and
second loudspeaker alarm |
| 6 | CAN bus | 18 | Inspiratory P_{aw} |
| 7 | Graphics processor reset | 19 | O_2 sensor |
| 8 | not applicabel | 20 | FiO_2 (HPSV mixer) |
| 9 | Loudspeaker with sound chip | 21 | AIR (HPSV mixer) |
| 10 | Second loudspeaker (piezo) | 22 | Flow sensor |
| 11 | Voltage monitoring (activates reset of
the processors and the piezo) | 23 | Expiratory valve with PEEP |
| 12 | Rechargeable battery (Goldcap
capacitor) | 24 | Expiratory P_{aw} |
| | | 25 | Loudspeaker with current monitoring |

3 CPU 68332 PCB

The CPU 68332 PCB is integrated in the electronic unit of the Evita 4. The board includes an independent processor system, two external interfaces, three internal interfaces, the loudspeaker control and a serial EEPROM.

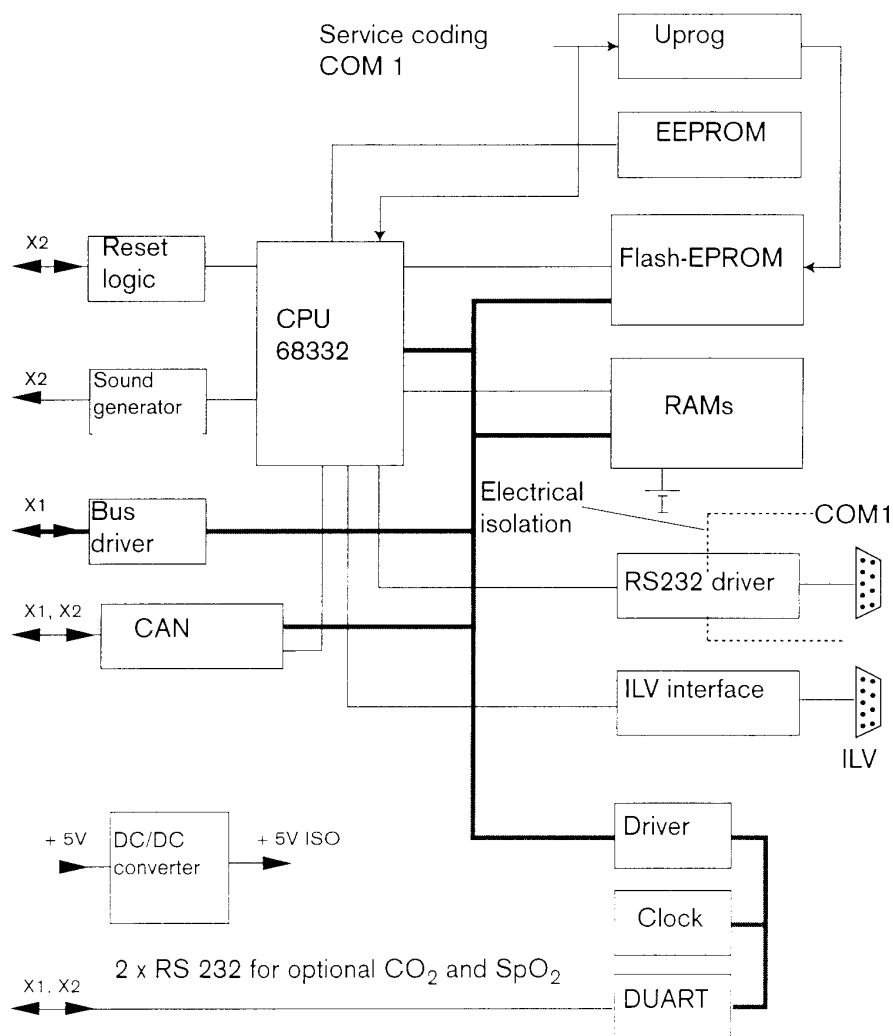


Fig. 3: Block diagram CPU 68332 PCB

3.1 EEPROM

The EEPROM is connected to the synchronized, serial interface 68332. The EEPROM characterizes the Evita 4 (enabled options, serial number, etc.). When replacing the CPU 68332 PCB the EEPROM has to be transferred to the new printed circuit board.

3.2 Processor System

The processor system comprises a 68332 CPU, a 512 kByte RAM and a 1 MByte flash EPROM (electrically programmable and erasable read-only memory). The RAM has a battery back-up. When the battery is being replaced a Goldcap capacitor ensures voltage supply of the RAMs. Programming of the flash EPROMS is only possible if the system identifies the "SERVICE-Q" signal.

3.3 RS232 Interface

The CPU 68332 PCB provides an RS232 interface in the Evita 4. This interface, referred to as COM1, is electrically isolated from the Evita 4 by means of optocouplers.

3.4 ILV Interface

The ILV interface is required for bilateral ventilation with two Evita 4 units. The ILV interface is not electrically isolated. Pin 3 of the ILV interface is provided with a filler plug to prevent confusion with the RS232 interface.

3.5 Driver

The driver adjusts the access times between the 68332, the clock and the DUART.

3.6 Clock

The clock gives the current time. It has a battery back-up and continues to operate even after the Evita 4 has been switched off.

3.7 DUART

The DUART (Dual Universal Asynchronous Receiver/Transmitter) has two serial interfaces and digital inputs and outputs. The serial interfaces are intended for connection of the SpO₂ and CO₂ modules.

3.8 DC/DC Converter

The DC/DC converter provides the voltage supply (+5 V ISO) required for the interface. The input voltage of the DC/DC converter is +5 V.

3.9 CAN

The CAN interface is a fast, serial interface (Controller Area Network). The control unit, electronics and the pneumatics communicate via a CAN interface at a transmission rate of 1 MBit/s.

3.10 Bus Driver

The address bus, the data bus and the check-back signals are transferred by the bus driver to the motherboard. The 68332 CPU communicates with the printed circuit boards located on the motherboard via the bus driver.

3.11 Sound Generator

The sound generator controls the loudspeaker in the control unit. The sound generator incorporates the volume control and sound generation for the loudspeaker. The volume is controlled by the DUART.

3.12 Reset Logic

The CPU 68332 can reset the control unit and the pneumatics. A reset can also be activated if the voltage falls below or exceeds +5 V. The pneumatics can also be reset by the CPU 68332 PCB. The reset logic controls and displays the resets.

4 CO₂ Carrier PCB

The CO₂ Carrier PCB is located in the electronic unit of the Evita 4. The printed circuit board includes the mount and electrical isolation of the CO₂ module and the SpO₂ module, the mains failure logic, the temperature measurement and the voltage monitoring.

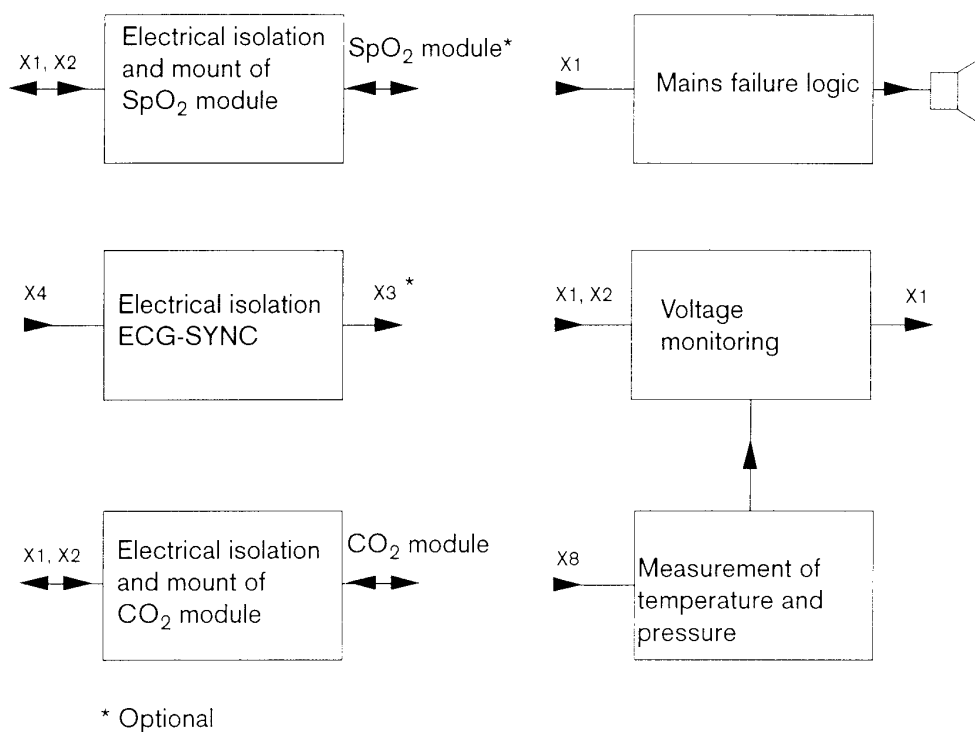


Fig. 4: CO₂ Carrier PCB block diagram

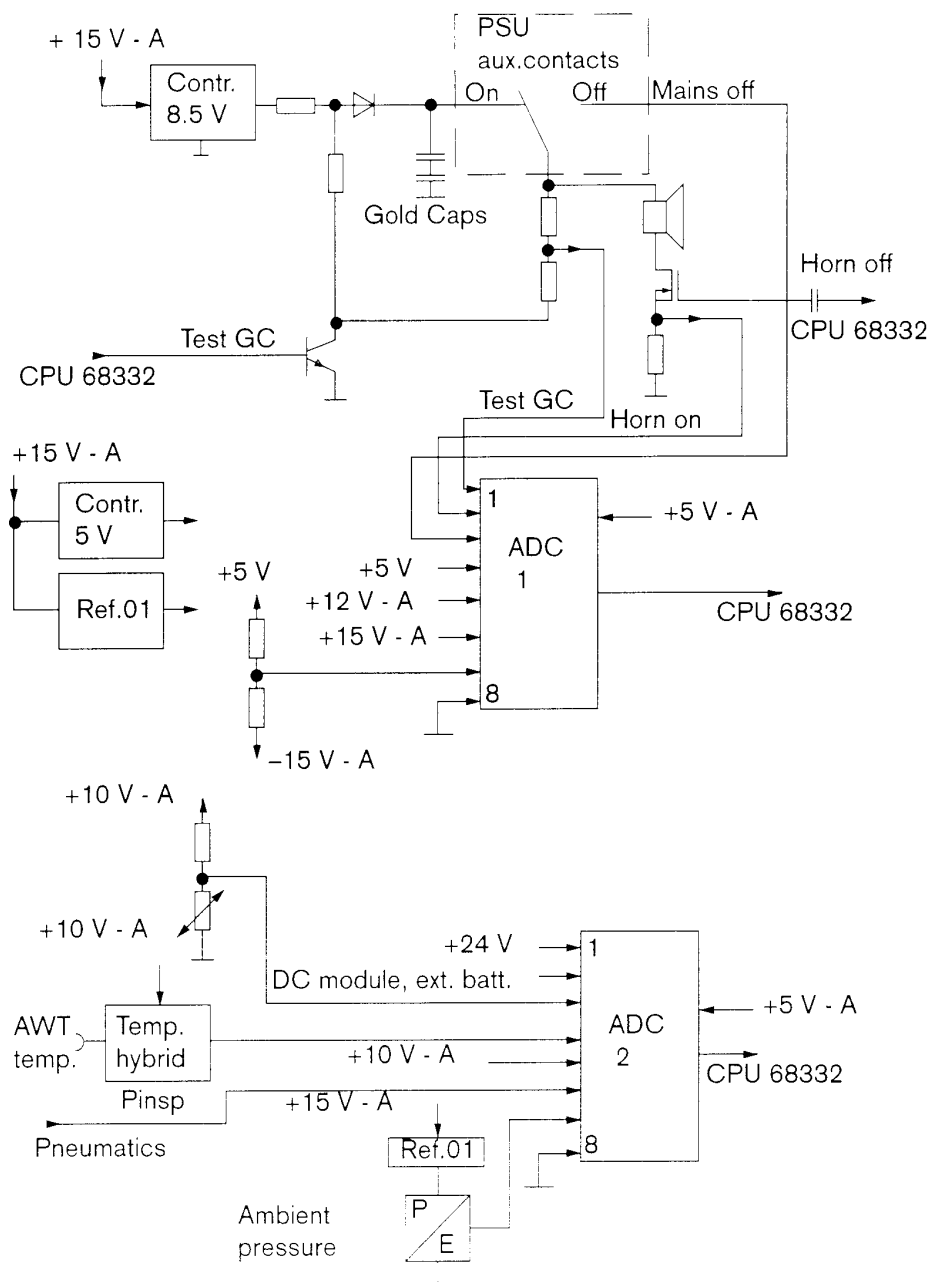


Fig. 5: CO₂ Carrier PCB (part 1) block diagram

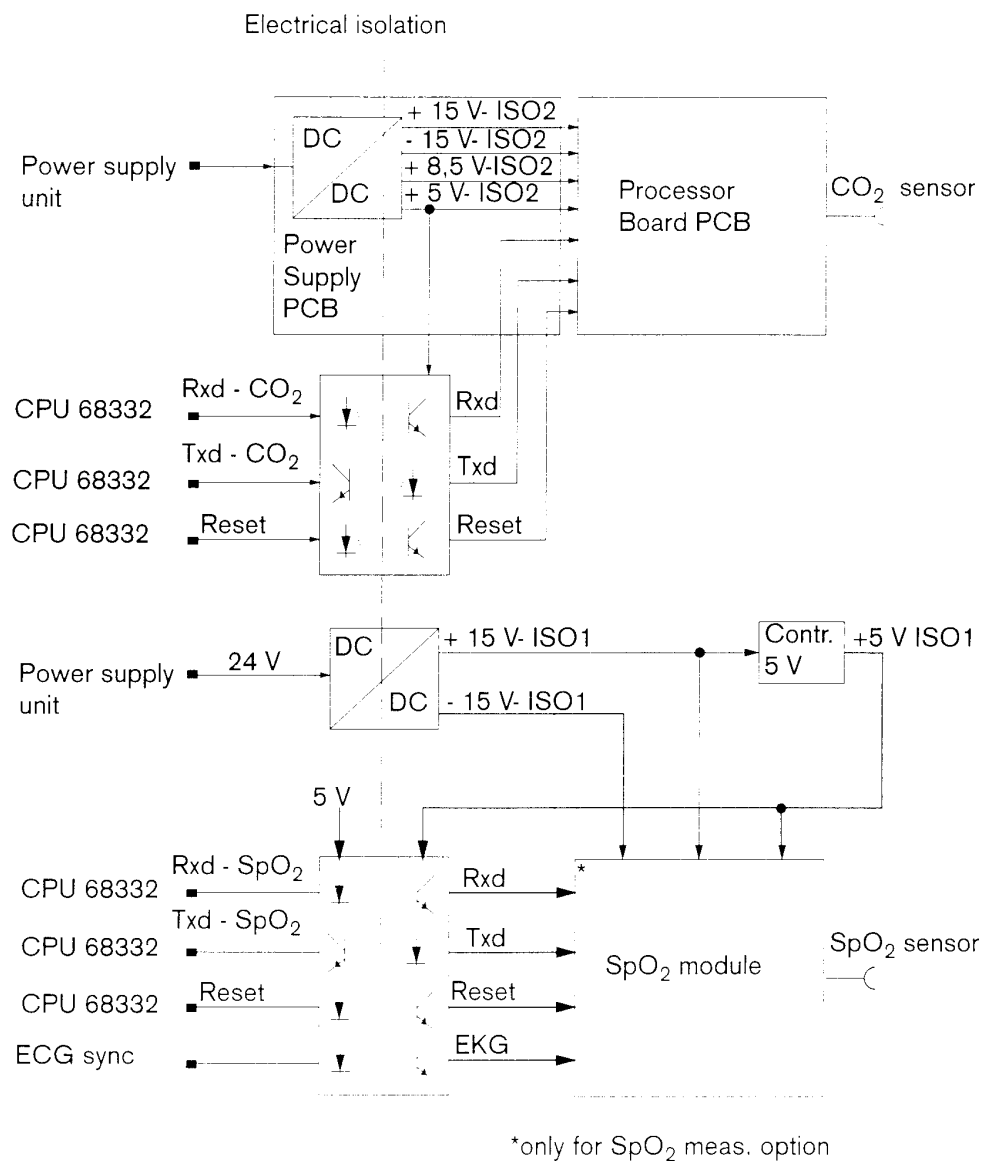


Fig. 6: CO₂ Carrier PCB (part 2) block diagram

4.1 Electrical Isolation

Electrical isolation is made by means of optocouplers. The printed circuit board is coupled with the SpO₂ and CO₂ modules by plug-in contacts. The X3 connector is part of the optional SpO₂ module and is not fitted.

4.2 Power Failure Logic

The power failure logic monitors the power supply. In the event that a power failure occurs while the Evita 4 is operating an audible alarm will sound.

4.3 Voltage Monitoring

Monitoring is provided for the voltages ± 15 V, +10 V, +24 V, +12 V and +5 V. The relevant voltages are transmitted to a voltage divider and read out by an A/D converter which in turn is read out by the CPU 68332 PCB.

4.4 Measurement of Temperature and Pressure

The temperature is measured by an NTC thermistor detector. The signals are processed in a temperature hybrid. The output signal of the temperature hybrid is transmitted to an A/D converter which is read out by the CPU 68332 PCB.

A pressure sensor measures the ambient pressure and transmits the values to the A/D converter.

5 CO₂ Measurement

The CO₂ measuring system comprises three modules:

- Sensor
- Processor Board PCB
- Power Supply PCB.

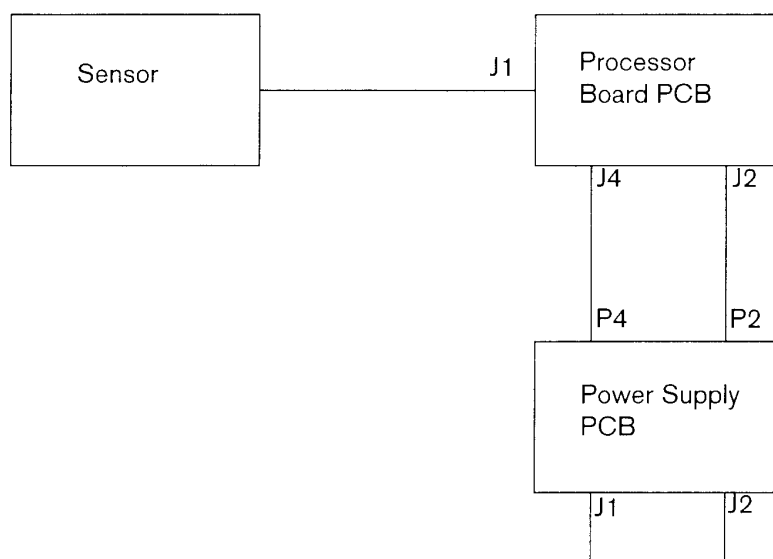


Fig. 7: CO₂ measurement block diagram

5.1 CO₂ Sensor

A CO₂ metering unit and a microprocessor system are integrated in the CO₂ sensor. A lamp generates a light spectrum up to 4.5 μm . This light spectrum is transmitted via the cuvette and two sapphire lenses to detectors. The detectors emit electrical signals depending on the CO₂ concentration. These signals are analyzed by the microprocessor and transmitted to the Processor Board PCB via a RS232 interface. Build-up of condensation is prevented by keeping the temperature of the CO₂ metering unit at a constant level.

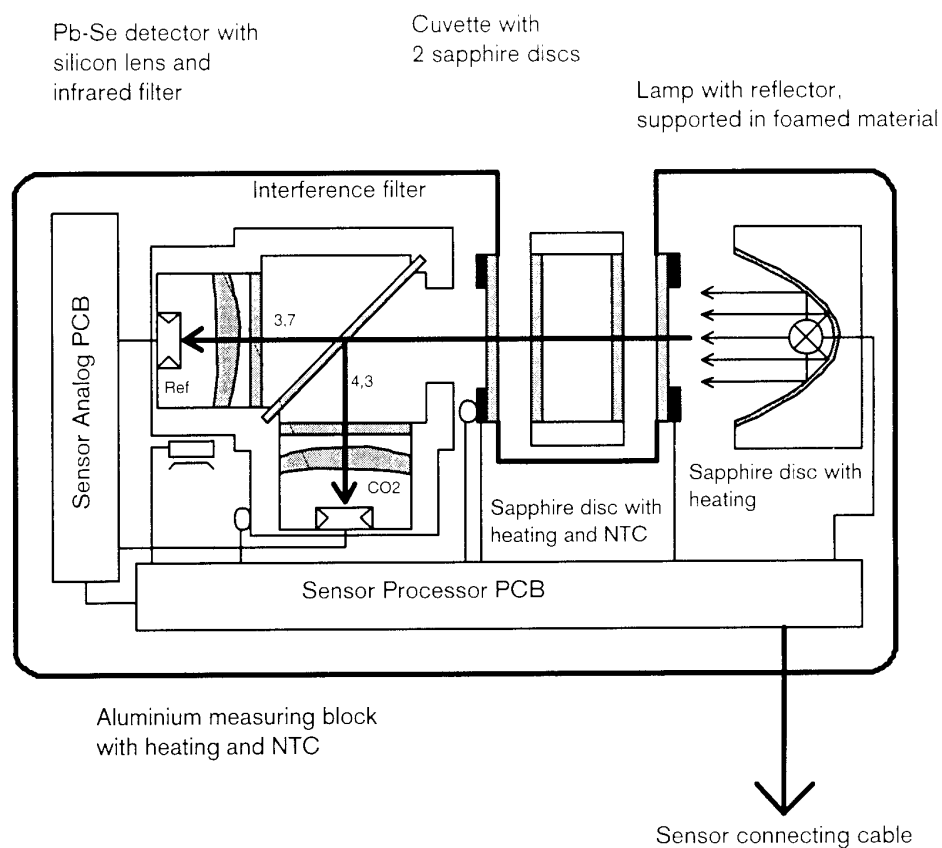


Fig. 8: Sectional view of CO₂ sensor

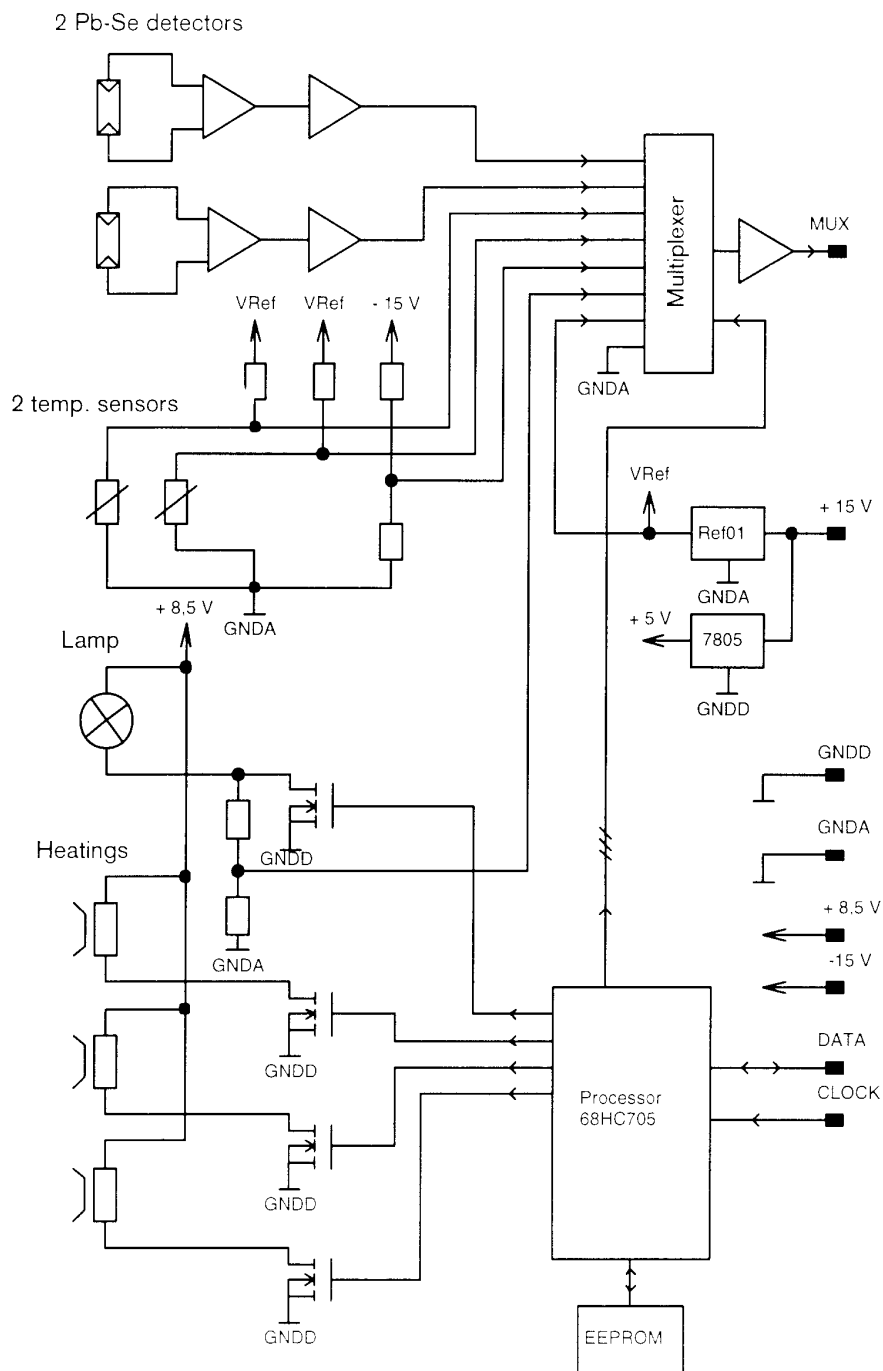


Fig. 9: CO₂ sensor block diagram

5.2 Processor Board PCB

The Processor Board PCB controls the heating of the CO₂ metering unit and the measured-data transfer of the CO₂ sensor.

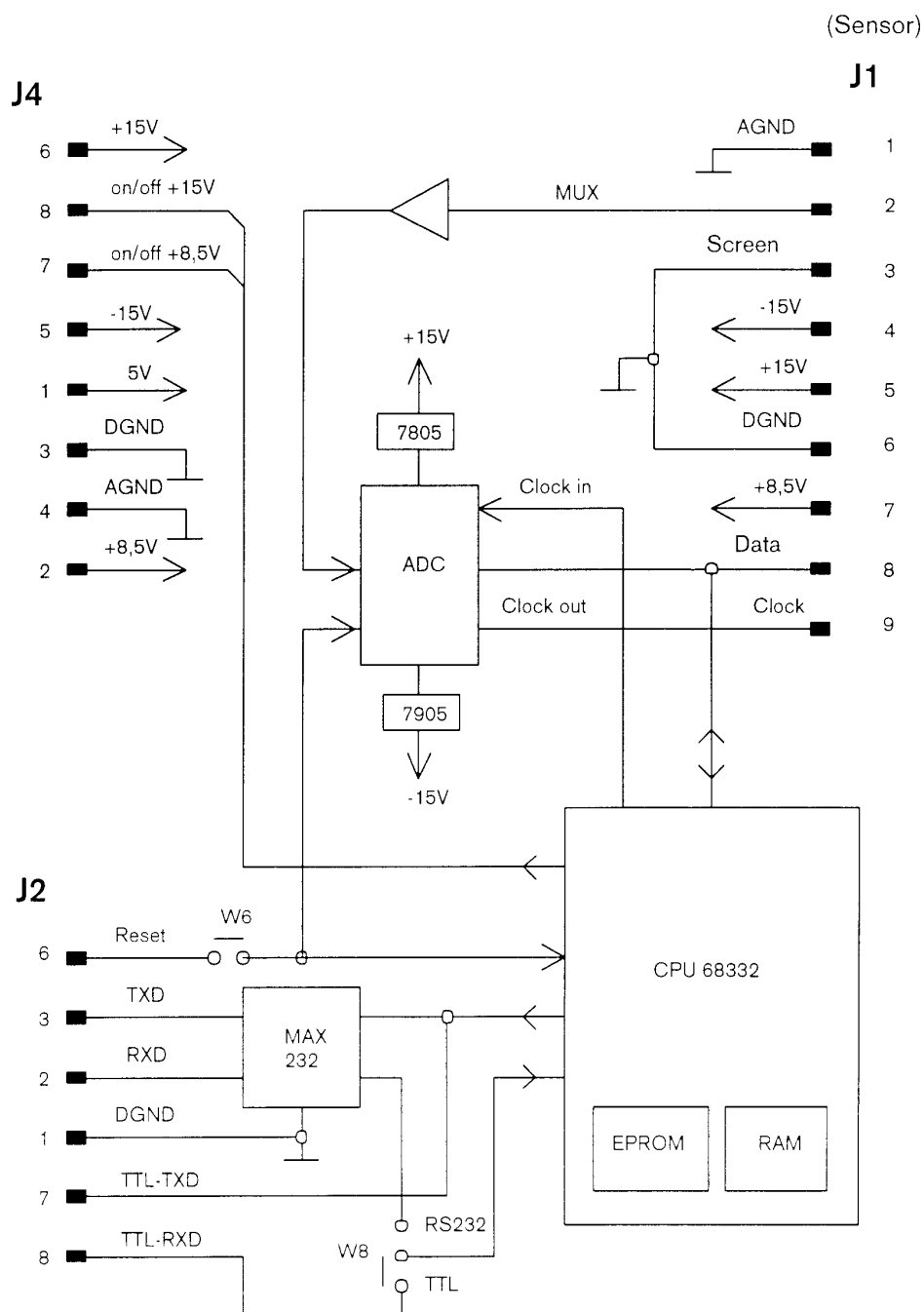


Fig. 10: Processor Board PCB

5.3 Power Supply PCB

The Power Supply PCB provides the supply voltages for the Processor Board PCB and the CO₂ sensor. The supply voltages are electrically isolated from the Evita 4. The measured CO₂ values are transferred to the CPU 68332 PCB via the Power Supply PCB.

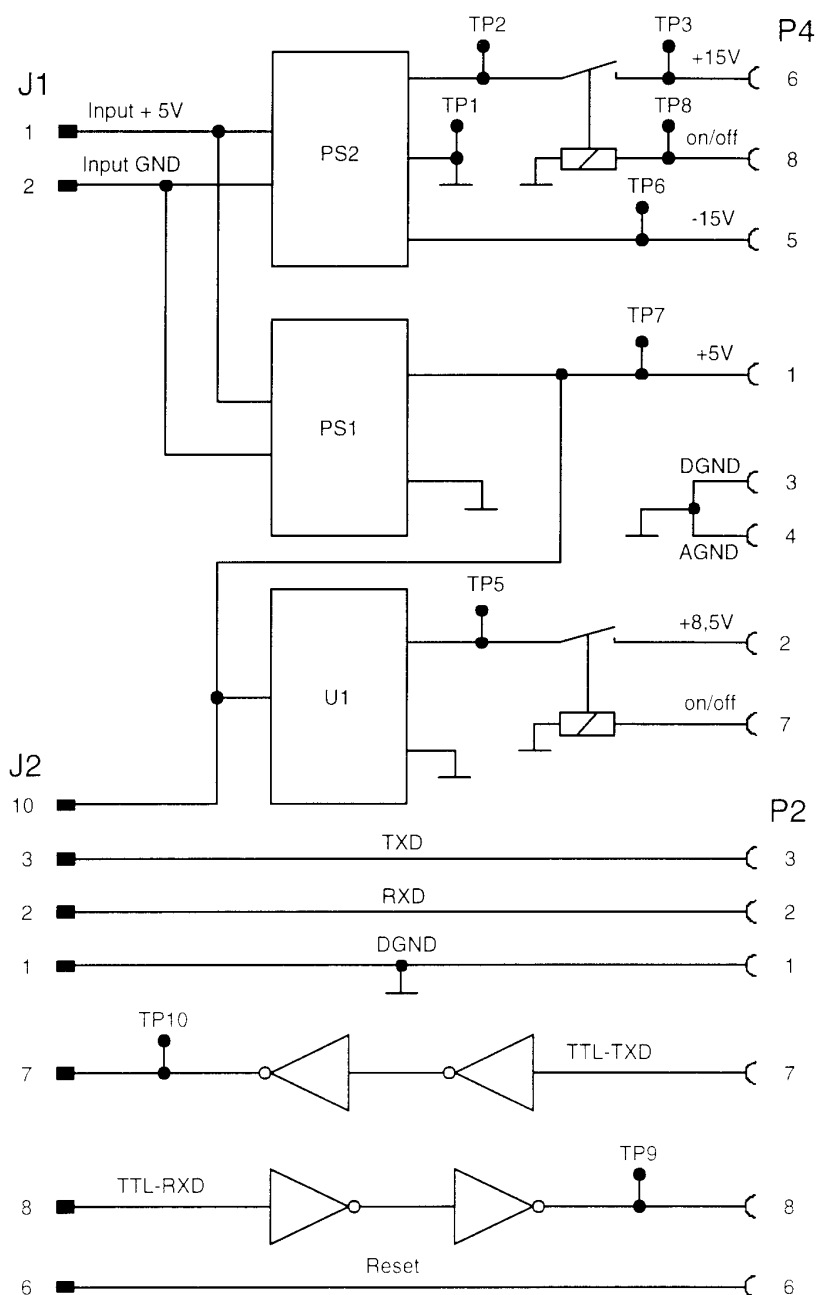


Fig. 11: Power Board block diagram

6 Power Supply Unit

The power supply unit provides the following output voltages:

- +24 V
- +15 V
- -15 V
- +12 V
- +5 V

The Evita 4 power supply unit is a switched-mode power supply unit. The output voltages are short-circuit-proof. A DC module is optionally available ensuring voltage supply in case of power failure or short duration transport of the Evita 4.

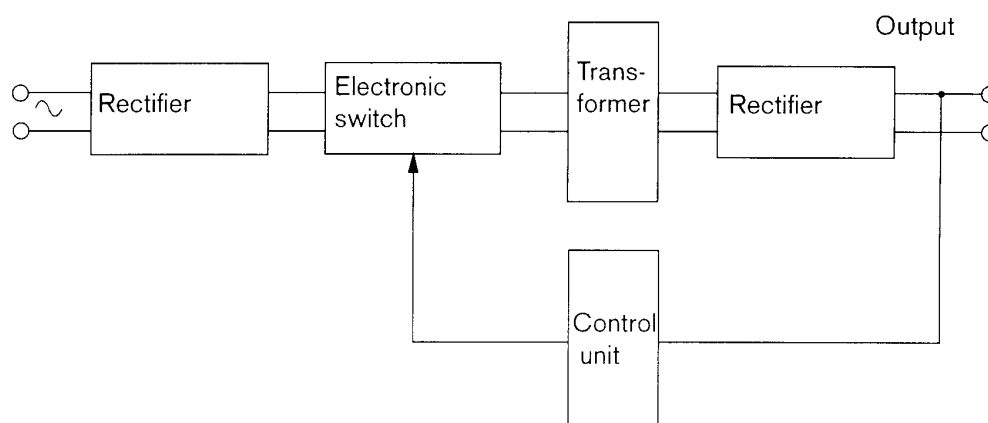


Fig. 12: Functional diagram of a switched-mode power supply unit

7 Graphics Controller PCB

The Graphics Controller PCB is located in the Evita 4 control unit. The printed circuit board includes an independent processor system, the voltage supply of the control unit, the interface to the electronics and the display control.

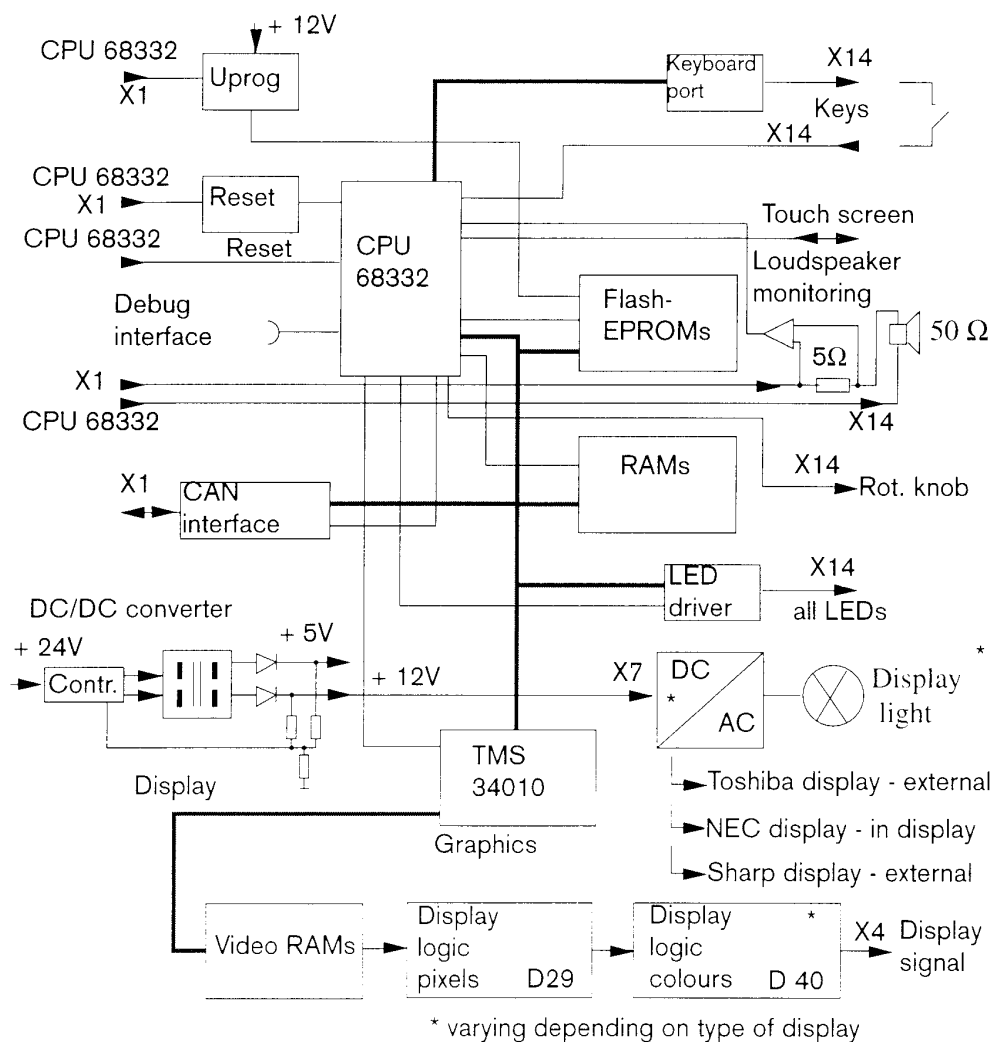


Fig. 13: Graphics Controller PCB block diagram

7.1 Processor System

The processor system comprises a 68332 CPU, a 256 kByte RAM and a 2 MByte flash EPROM (electrically programmable and erasable read-only memory).

7.2 Uprog

Uprog generates the voltage required for programming the flash EPROMs. An enable logic prevents unintentional supply of the programming voltage to the flash EPROMs.

7.3 Reset

The Graphics Controller PCB operates independently and is fitted with its own reset generator. The display can be reset by the CPU 68332 PCB.

7.4 Loudspeaker Monitoring

The loudspeaker monitoring checks the loudspeaker function. The current passing through the loudspeaker is measured by a resistor and then analyzed.

7.5 Keyboard Port and LED Driver

The keyboard and the LEDs are arranged in a 3x8 matrix array. The LEDs are controlled by transistors which also select the keyboard columns. A driver module controls the selection of lines of the LEDs in the matrix. The 68332 CPU scans the keyboard using Schmitt trigger.

7.6 Display Control

The video processor TMS 34010 controls the image processing, generates the synchronized signals for the display and displays the image to be represented by means of the display logic. The video RAM is the video processor memory having a capacity of 512 kByte. The video RAM stores the video processor program, the video processor data and the displayed image.

7.7 CAN Interface

The CAN interface is a fast serial interface (Controller Area Network). The control unit, the electronics and the pneumatics communicate via a CAN interface. The transmission rate is 1 Mbit/s.

7.8 DC/DC Converter

The DC/DC converter supplies +5 V and +12 V for the voltage supply of the control unit. The input voltage of the DC/DC converter is +24 V. Since the +5 and +12 V voltages are generated directly on the Graphics Controller PCB there is a tolerance of $\pm 2.5\%$. The maximum power consumption of the control unit is 1.5 A for +5 and 2.2 A for +12 V.

8 Communication PCB (Optional)

The Communication PCB is located in the electronic unit of the Evita 4. The printed circuit board includes an independent processor system, the voltage supply of the interfaces, an internal CAN interface, an external CAN interface, two RS232 interfaces and two analog outputs.

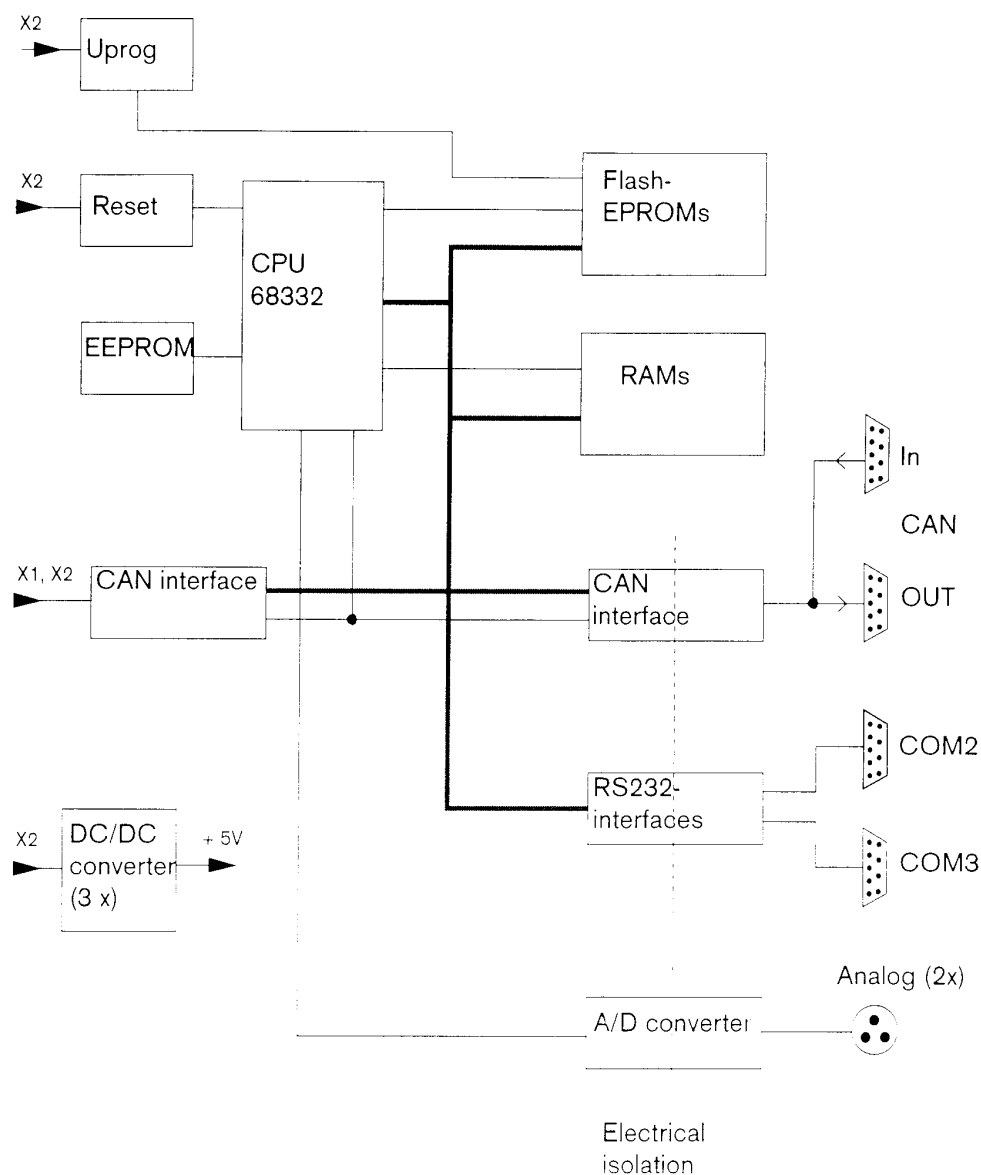


Fig. 14: Communication PCB block diagram

8.1 Processor System

The processor system comprises a 68332 CPU, a 512 kByte RAM and a 1 MByte flash EPROM (electrically programmable and erasable read-only memory).

8.2 Uprog

Uprog generates the programming voltage for the flash EPROMs. An enable logic ensures that the programming voltage is not accidentally supplied to the flash EPROMs.

8.3 Reset

The reset logic generates a defined reset after power-up. The CPU 68332 can be reset by the CPU 68332 PCB.

8.4 CAN Interfaces

The Communication PCB is not connected to the data bus of the CPU 68332 PCB. The data are transmitted via an internal CAN interface (Controller Area Network – fast, serial interface). The external CAN interface is electrically isolated from the Evita 4 by optocouplers.

8.5 RS232 Interfaces

The Communication PCB is provided with two RS232 interfaces additionally available in the Evita 4. These interfaces are referred to as COM2 and COM3 and are electrically isolated from the Evita 4 by optocouplers.

8.6 Analog Outputs

The analog outputs supply voltages between 0 V and 4.095 V. The assignment of analog outputs is freely selectable. The resolution of the output voltage is 1 mV per bit.

8.7 DC/DC Converter

The DC/DC converters supply +5 V ISO each for the voltage supply of the interfaces. The input voltages of the DC/DC converters are +5 V.

8.8 EEPROM

The EEPROM stores internal data of the interface and has a capacity of 2 kByte.

9 Paediatric Flow PCB (Optional)

The Paediatric Flow PCB is located in the electronic unit of the Evita 4. The printed circuit board includes 2 flow measuring channels to connect the Babylog flow sensor, 1 four-channel multiplexer, 1 twelve-bit A/D converter, 1 interface to the CPU 68332 PCB.

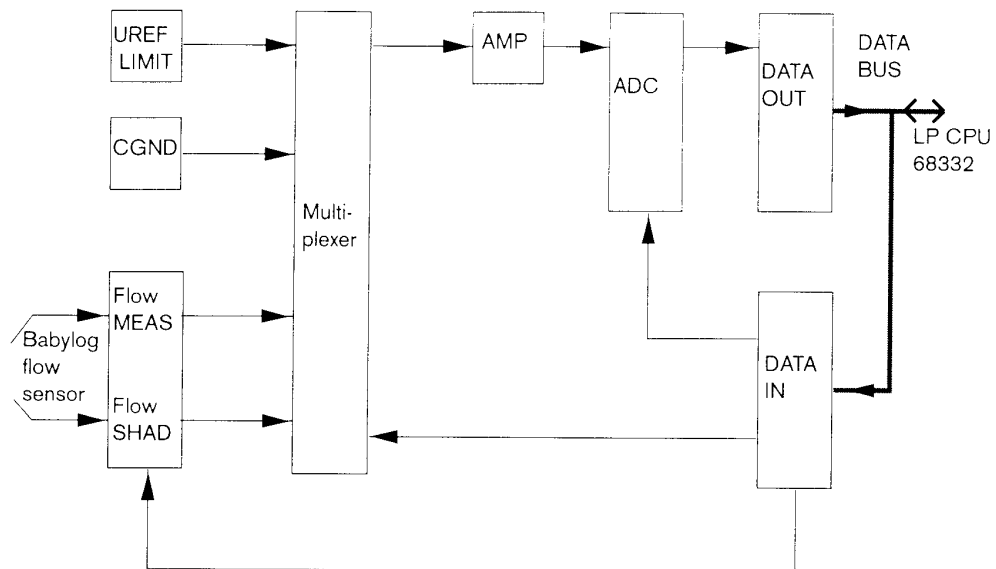


Fig. 15: Paediatric Flow PCB block diagram

9.1 Flow Measurement

The flow is measured with the Babylog flow sensor which has two measuring wires. One measuring wire is covered by a plastic bar. The Babylog flow sensor recognizes the direction of the flow which is analyzed by a measuring bridge.

9.2 Multiplexer

The multiplexer consists of four analog-value selectors. The analog-value selectors are controlled by the software. The multiplexer transmits the flow sensor measurement signals, CGND and UREF LIMIT via a buffer (AMP) to an A/D converter (ADC).

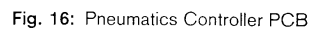
9.3 A/D Converter

The input voltage of the A/D converter ranges from 0 V to 10 V. The A/D converter converts the flow measurement values into digital data. The CPU PCB controls the A/D converter and the multiplexer via an interface (DATA OUT; DATA IN). The voltage drop across the multiplexer, the buffer and the A/D converter is measured using the UREF LIMIT reference voltage and can be taken into account when measuring the flow.

10 Pneumatics Controller PCB

The Pneumatics Controller PCB is located in the pneumatics of the Evita 4. The printed circuit board comprises the following features:

- Supply pressure measurement
- Inspiratory and expiratory airway pressure measurement
- Oesophageal pressure measurement
- Flow measurement
- Measurement of the O₂ concentration in the breathing gas
- Fan monitoring
- Solenoid valve control
- PEEP valve control
- Interface to the HPSV Controller PCBs
- CAN interface
- 68332 CPU with RAM and flash EPROM
- Serial EEPROM for storage of device configuration.



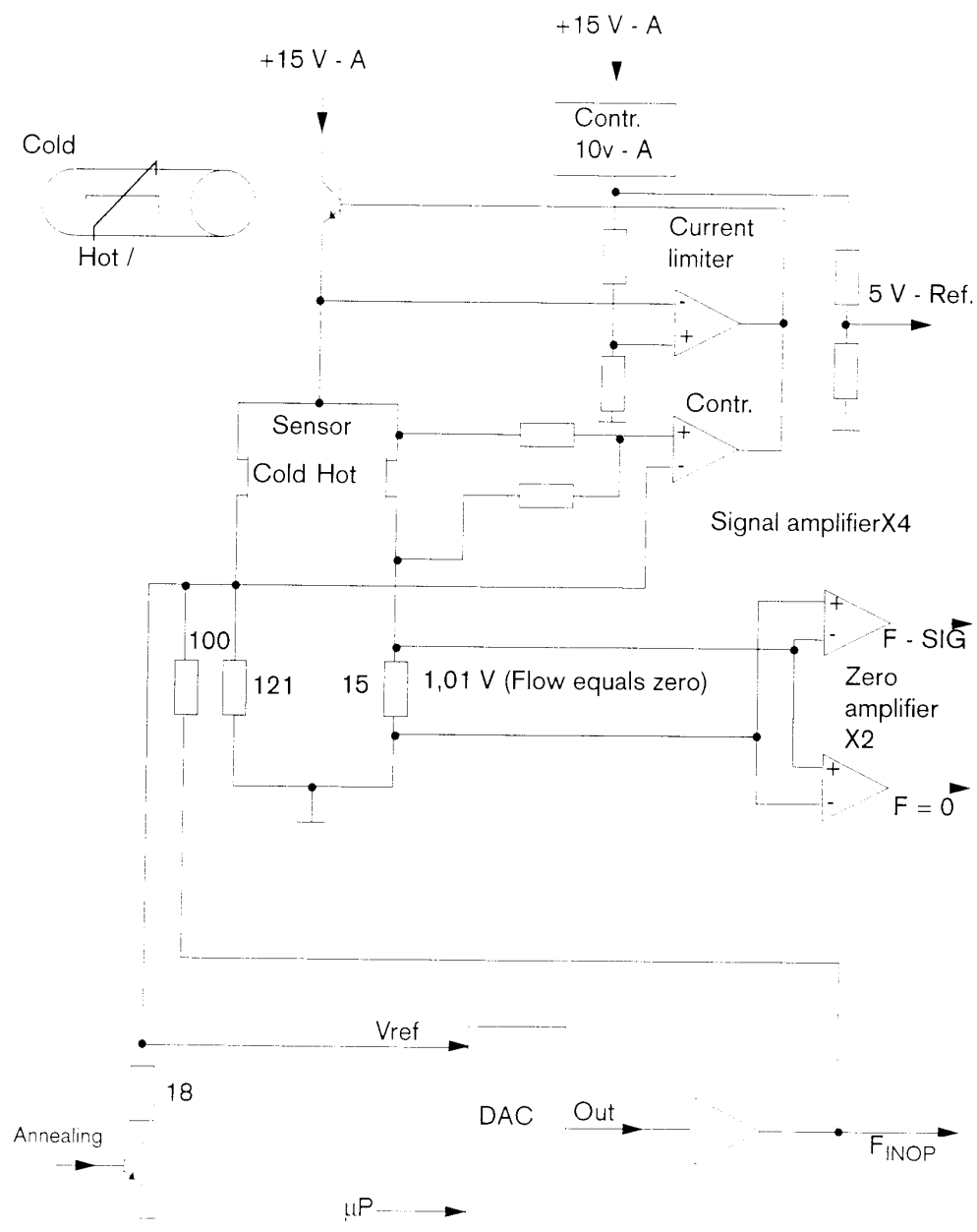


Fig. 17: Pneumatics Controller PCB flow measurement

10.1 Pressure Measurement

The pressure is measured with two pressure sensors. During the inspiratory phase and the expiratory phase, the pressure is measured by the respective pressure sensor. The airway pressure signals are transmitted to the multiplexer. The pressure sensors are automatically zero-calibrated every 3 minutes.

10.2 Flow Measurement

The sensor works according to the principle of a constant-temperature hot-wire anemometer. Respiratory gas flows along a very thin, electrically heated platinum wire in a measuring tube. The wire is heated to a temperature of 180 °C and kept at this temperature with a closed-loop control system. If gas flows past this wire, heat is dissipated. The larger the gas volume per time unit flowing past, the higher the heat dissipation. The heating power required to keep the wire at a constant temperature is a measure of the gas flow.

10.2.1 Cleaning the Flow Sensor

The control for cleaning or glowing of the sensor supplies a defined current to both measuring wires. During calibration the measuring wires begin to glow and burn any impurities. The sensor is cleaned when pressing the "flow calibration" key or automatically after medicament nebulization. The cleaning process occurs during the next inspiratory phase or after 15 seconds at the latest.

10.3 O₂ Measurement

The O₂ sensor works according to the galvanic cell principle. Oxygen molecules contained in the gas mixture to be measured diffuse through a plastic diaphragm into the electro-chemical cell and are reduced at the noble metal electrodes. At the same time a base electrode is being oxidized. The base electrode is spent by the oxidation process and thus determines the life of a sensor. The current flowing through the cell is proportional to the oxygen partial pressure in the gas mixture to be measured.

Provided the pressure and temperature of the gas mixture to be measured are kept constant, the measured value will be directly proportional to the oxygen partial pressure. The O₂ amplifier on the O₂ Top PCB is mounted externally on the inspiratory block. The output signal is transmitted to the O₂ Contact PCB via spring contacts and transferred to the Pneumatics Controller PCB. The O₂ cell is also connected to the O₂ Top PCB via spring contacts.

10.4 Fan Monitoring

At the front panel of the machine a fan is mounted to limit the temperature and the O₂ concentration in the electronic unit of the pneumatics in case of failure. This fan is monitored by the electronics.

10.5 Multiplexer

The multiplexer consists of four analog-value selectors which are controlled by the software. The multiplexer routes the measurement signals from the pressure sensors, the O₂ amplifier, the FAN UREF and the flow sensor to an A/D converter via a buffer (AMP).

10.6 Solenoid Valves

The solenoid valves are controlled by two power drivers. The power driver outputs for the nebulizer and the O₂/Air switchover are monitored by a comparator. The power drivers can be switched off by the electronic unit.

10.7 PEEP Valve Control

The PEEP valve is controlled by a voltage-controlled current source with power MOS FET. A quad operational amplifier serves to adapt the D/A converter output signal to the current range of the PEEP valve. The CPU controls the D/A converter. The PEEP valve control is calibrated to the PEEP valve. The calibration data are stored in the serial EEPROM.

10.8 HPSV Interface

The status lines of the HPSV Controller PCB are led to the Pneumatics Controller PCB via the Pneumatics motherboard. Two bus drivers transmit the data to the data bus of the CPU. The data are transmitted to the HPSV Controller PCB by two power drivers. The data are accepted by power swing of the respective Chip-Select-Pins.

10.9 CAN Interface

The CAN interface comprises a CAN controller and a series-connected driver. The CAN controller is directly connected to the data bus of the CPU. The control unit, the electronics and the pneumatics communicate via the CAN interface at a transmission rate of 1 Mbit/s.

10.10 Processor System

The processor system on the Pneumatics Controller PCB consists of a 68332 CPU, a 256 kByte flash EPROM (electrically programmable and erasable read-only memory) and a 256 kByte RAM.

10.11 Serial EEPROM

The serial EEPROM stores the data of the pneumatics. The EEPROM has a capacity of 1 kByte.

11 Pneumatics

Compressed air (AIR) and compressed oxygen (O_2) must be available at a supply pressure of 2.7 to 6 bar to drive the machine.

The pneumatics consists of the following components:

- Gas connection block
- Parallel mixer or mixer block
- Pressure sensors
- PEEP/PIP valve
- Inspiratory block
- Patient system

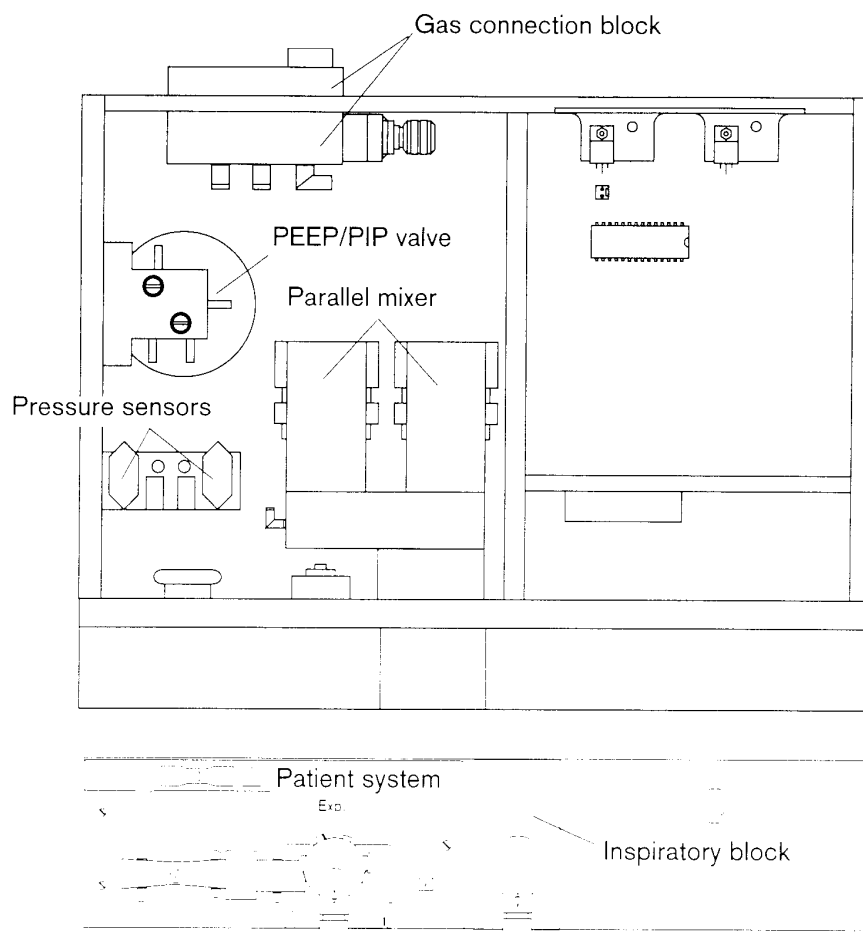


Fig. 18: Layout of the pneumatic components

11.1 Function Diagram

Legend

AIR	Compressed air connection	Y3.1	Emergency air valve
O ₂	Compressed oxygen connection	Y3.3	Inspiratory valve
		Y4.1	PEEP/PIP valve
F1.1	Filter	Y5.1	Expiratory valve
F1.2	Filter	Y6.1	3/2-way solenoid valve, insp.
F3.2	Filter	Y6.2	3/2-way solenoid valve, exp.
D1.1	Check valve	S2.1	AIR pressure sensor (HPSV)
D1.2	Check valve	S2.2	O ₂ pressure sensor (HPSV)
D3.1	Check valve	S6.1	Inspiratory pressure sensor
D3.2	Check valve ≈ 10 mbar	S6.2	Expiratory pressure sensor
D3.3	Check valve ≈ 100 mbar	S3.1	O ₂ sensor
D5.1	Check valve	S5.1	Flow sensor
DR1.1	AIR pressure regulator	R1.1	Flow control 0.08 L/min/2 bar
DR1.2	O ₂ pressure regulator	R1.2	Flow control 9 L/min/2 bar
		R1.3	Flow control 0.4 L/min/2 bar
		R3.1	Flow control (hole in the diaphragm in Y3.3) 0.25 L/min/1.4 bar
		R4.1	Flow control 3.5 L/min/2 bar
Y1.1	3/2-way solenoid valve, O ₂ /AIR		
Y1.2	3/2-way solenoid valve calibration O ₂ -Sensor		
Y1.3	3/2-way solenoid valve, venting		
Y1.4	3/2-way solenoid valve, nebulizer		
Y2.1	HPSV AIR (high-pressure servo-valve) parallel mixer		
Y2.2	HPSV O ₂ (high-pressure servo-valve) parallel mixer		

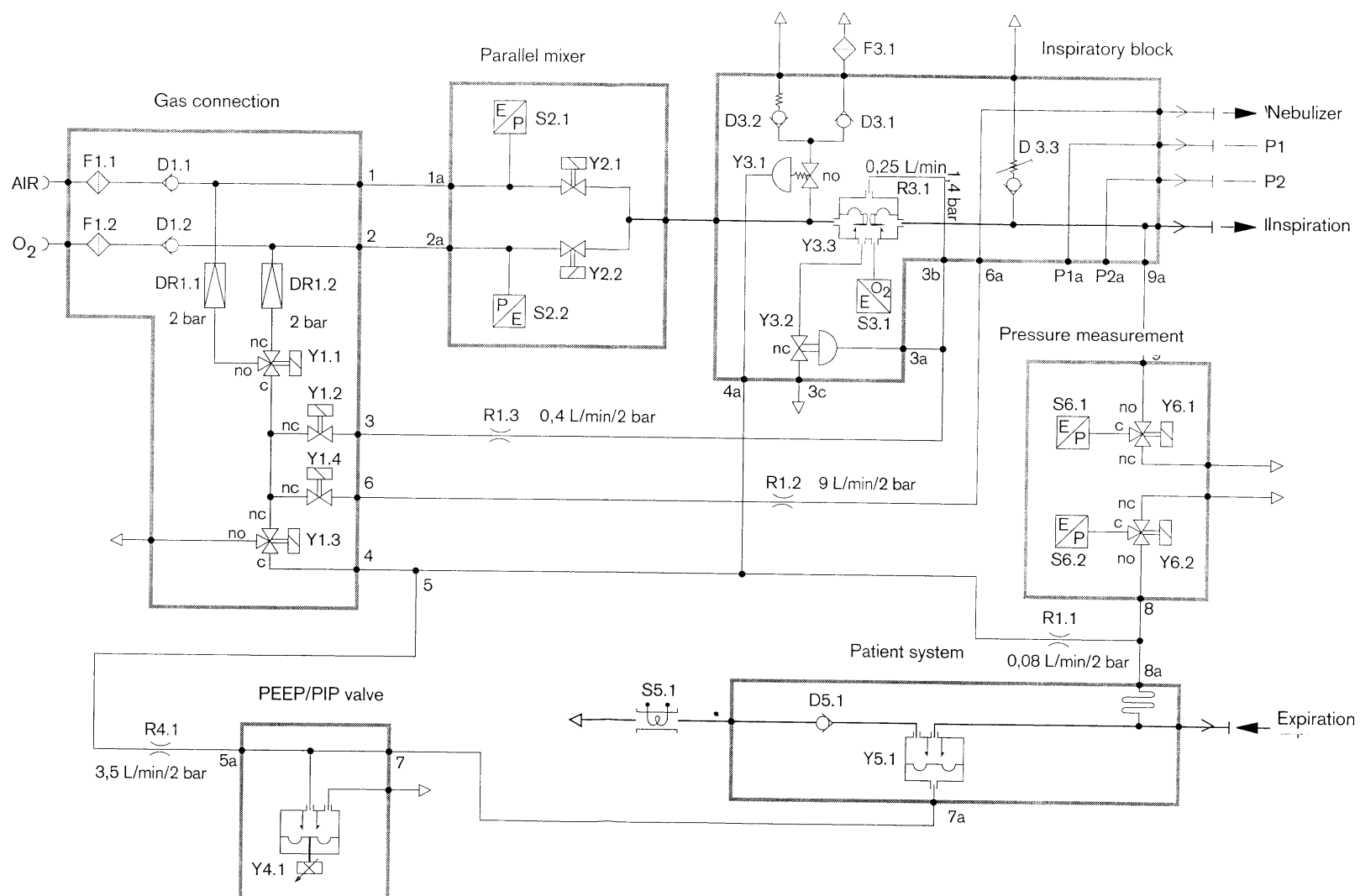


Fig.18a: Pneumatics function diagram

11.2 Gas Connection Block

The gas connection block comprises the O₂ gas connection (M 12x1 female) and the compressed air connection (M 20x1.5 male). In the future, the gas connections for NIST, DISS (USA) and DIN will be available. The connections are fitted with filters F1.1 and F1.2 (metal fibre web). The diodes or check valves D1.1 (AIR) and D1.2 (O₂) prevent the gas from flowing back into the central gas supply system.

The pressure regulators DR1.1 and DR1.2 are set to 2 bar. The control gas flows past the DR1.1 to the 3/2-way valve Y1.1, from there to the emergency valve Y1.3, to the PEEP/PIP valve Y4.1 and finally to the emergency valve Y3.1.

The gas also flows to the expiratory pressure sensor S6.2 (purge flow) via the restrictor R1.1 (0.08 L/min).

Gas flows to the nebulizer via the 3/2-way valve Y1.4, if appropriately adjusted.

In the event of AIR supply failure, the machine will switch over to O₂ supply (O₂ switchover function).

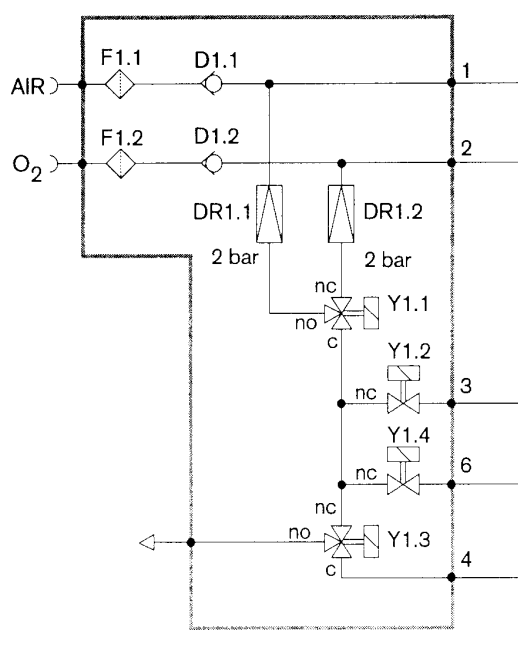


Fig. 19: Gas connection function diagram

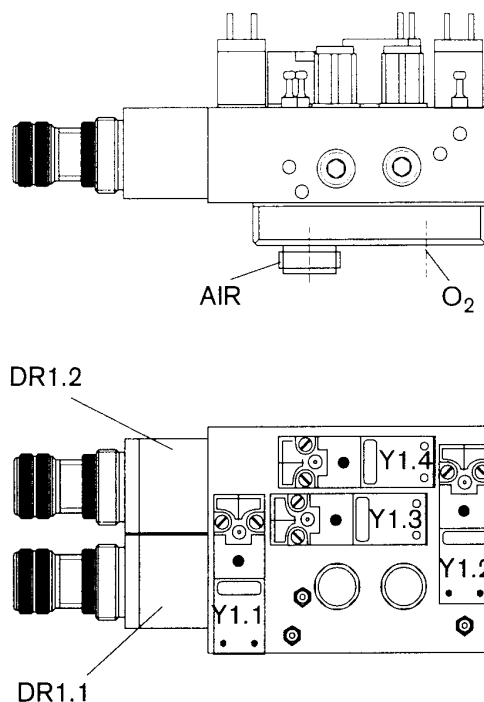


Fig. 20: Gas connection block

Legend

DR1.1	AIR pressure regulator
DR1.2	O ₂ pressure regulator
Y1.1	3/2-way solenoid valve, O ₂ /AIR
Y1.2	3/2-way solenoid valve pressure, sensor calibration inspiration
Y1.3	3/2-way solenoid valve, venting
Y1.4	3/2-way solenoid valve, nebulizer

11.3 Parallel Mixer or Mixer Unit

The parallel mixer is a fast, electrically controllable proportional valve for gas flows between 5 and 180 L/min at supply pressures of 3 to 6 bar. Partial flows of less than 5 L/min are pulsed at a constant flow of 5 L/min. The supply gases compressed air (AIR) and oxygen (O₂) available at the parallel mixer have a supply pressure of 2.7 bar to 6 bar. In the parallel mixer the two gases are mixed in accordance with the set parameters. The parallel mixer supplies the inspiratory gas to the patient.

The parallel mixer consists of the following components:

- Mixer connection block
- 2 cartridge valves with displacement sensor system for compressed air (AIR) and oxygen (O₂).
- 2 supply pressure sensors measuring the inlet pressure of the supply gases.

The HPSV Controller PCB controls the parallel mixer electrically. The control signals are transmitted to the parallel mixer via the Pneumatics Motherboard PCB and the Pneumatics Controller PCB.

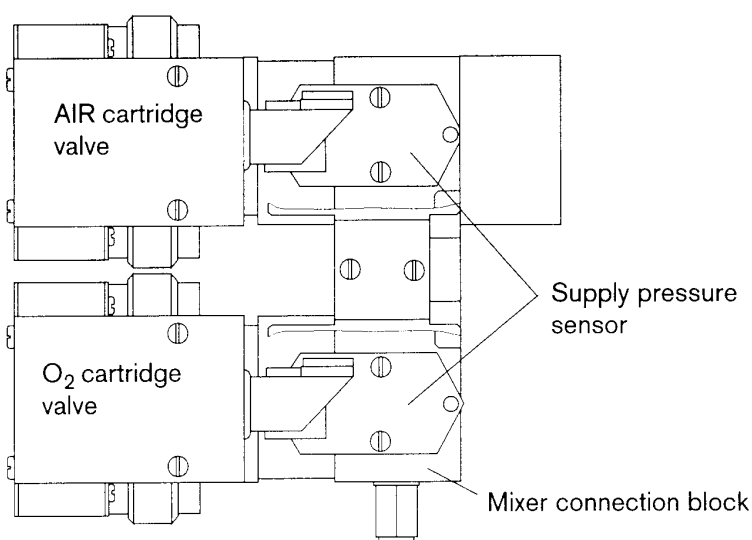


Fig. 21: Parallel mixer

11.4 Mixer Connection Block

The two cartridge valves are mounted to the mixer connection block. The inspiratory gases in the mixer connection block are supplied to the respective cartridge valve. The respiratory gas available at the outlet of the cartridge valves is mixed in the mixer connection block and supplied to the inspiratory unit.

11.5 Cartridge Valves or O₂ and AIR HPS Valves

The cartridge valve or HPS valve (HPSV = high-pressure servo-valve) supplies a defined amount of gas to the patient in accordance with the preset adjustment parameters for e.g. inspiration, trigger pressure, leak flow compensation.

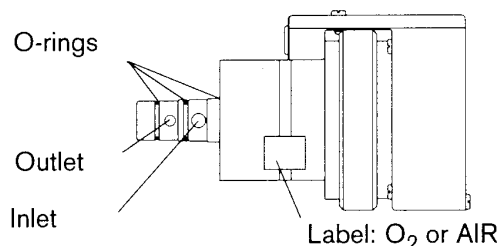


Fig. 22: Cartridge valves or O₂, AIR HPS valves

During expiration the supply gas is available at the cartridge valve and at the supply pressure sensor. In the HPS valve ball A is pressed into the valve seat B. This action closes the valve.

During inspiration, current is supplied to the drive system which is equipped with a coil working according to the principle of a moving coil of the type used e.g. in loudspeakers. The plunger is deflected in proportion to the supplied current and pushes ball A out of valve seat B causing an annular gap. This action opens the cartridge valve and gas flows to the patient.

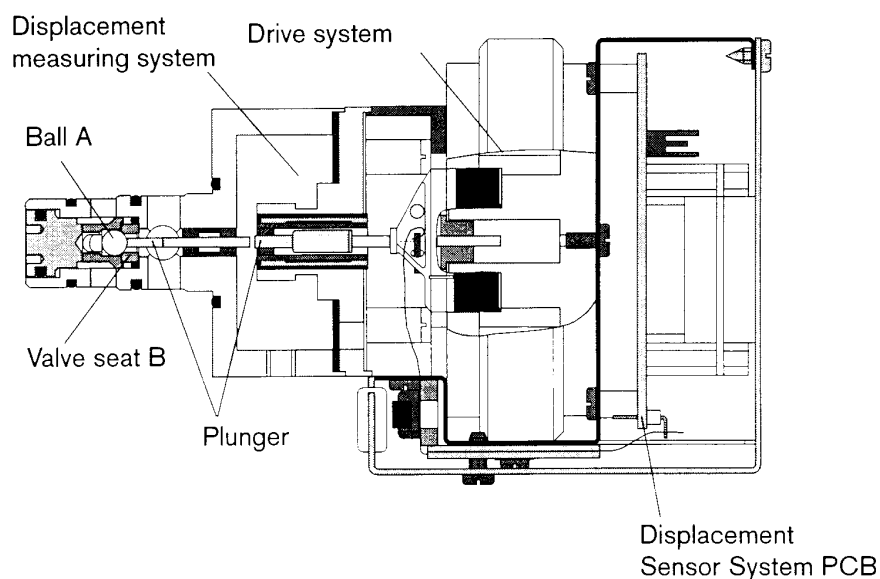


Fig. 23: HPS valve cross-section

Consequently, the size of the annular gap determines the gas flow. The annular gap between the ball and the valve seat is determined by the deflection of the plunger. This deflection is measured and controlled by the displacement measuring system. At the same time a supply pressure sensor at the cartridge valve measures the supply pressure of the gas to be dosed. The supply pressure therefore also determines the gas flow, i.e. twice the pressure for the same width of gap will produce twice the flow.

Width of gap (annular gap) ↑ or supply pressure ↑ = gas flow ↑

The gas flow in valves used to dose and mix the respiratory gas is not measured but determined indirectly by the displacement signal and the supply pressure. The valves supply a flow of 5 – 180 L/min. The plunger movement (displacement) depends on the supply pressure varying between 3–6 bar absolute. For a flow requirement of 120 L/min and a supply pressure of 5 bar the displacement will be approx. 0.2 mm or 0.6 mm for a supply pressure of 1.5 bar.

As the mixer must permanently operate with high precision it is measured and the data (non-linearities) are stored in an EEPROM on the Displacement Sensor PCB. Therefore no calibration is required when the cartridge valves are replaced. The cartridge valves must not be interchanged since they are specifically dimensioned and fitted for each individual gas.

11.5.1 Displacement Sensor System

The displacement sensor system measuring the position of the plunger in the valve is integrated in the cartridge valve and consists of the displacement measuring system and the Displacement Sensor PCB.

The displacement measuring system is a differential transformer. The a.c. voltage applied to the primary winding of the transformer has a frequency of approx. 1 MHz. The two secondary winding are switched such that their output voltage balance out. If the ferrite core (plunger of the cartridge valves) moves in the differential transformer, the output voltage of the displacement sensor system will change.

As the displacement output signal is not linear to the gas flow, the characteristic of the cartridge valves is measured and stored in the EEPROM. The micro-controller on the HPSV PCB thus balances the non-linearity of the cartridge valves.

The two circuits of the cartridge valves of parallel mixers are operated asynchronously in parallel (AIR, O₂). To avoid beat interferences, the frequencies of the two oscillators must differ by a minimum of 200 kHz. To do so, the two cartridge valves are measured at two different frequencies. The cartridge valves can only be measured at a special test stand.

11.5.2 Supply Pressure Sensors

The supply pressure sensors are calibrated to absolute pressure (0 bar). They measure the inlet pressure of the supplied gas. The supply pressure sensor is fitted with a P/U converter supplying a pressure-dependent output pressure.

Measuring range: 0–7 bar
Sensitivity: 1.58 V/bar ± 8 mV/bar
Offset voltage: 300 mV ± 30 mV

The supply pressure sensors are linked via a flex-strip to the Displacement Sensor PCB which is installed in the HPS valves.

11.6 Pressure Sensors

The pressure sensor mount comprises the airway pressure sensors S6.1 for the inspiratory side and S6.2 for the expiratory side. S6.1 monitors the inspiratory P_{aw} high and P_{aw} low.

Measuring range: 140 mbar
Sensitivity: 36.5 mV/mbar ± 0.3 mV/mbar
Offset voltage: 1.74 V ± 0.04 V

11.6.1 Pressure Sensor Calibration

The solenoid valves Y6.1 and Y6.2 expose the relevant pressure sensors to atmospheric pressure at specific time intervals. Consequently, the sensors are automatically calibrated. The pressure sensors S6.1 and S6.2 are zero-calibrated every 3 minutes (calibration of the possible electronic zero drift). To do so, the solenoid valves Y6.1 and Y6.2 are subsequently exposed to atmospheric pressure and the pressure sensors automatically calibrated.

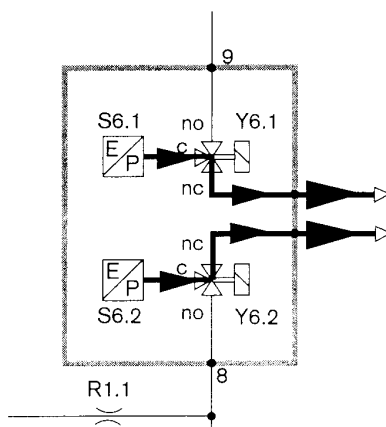


Fig. 24: Pressure sensors function diagram

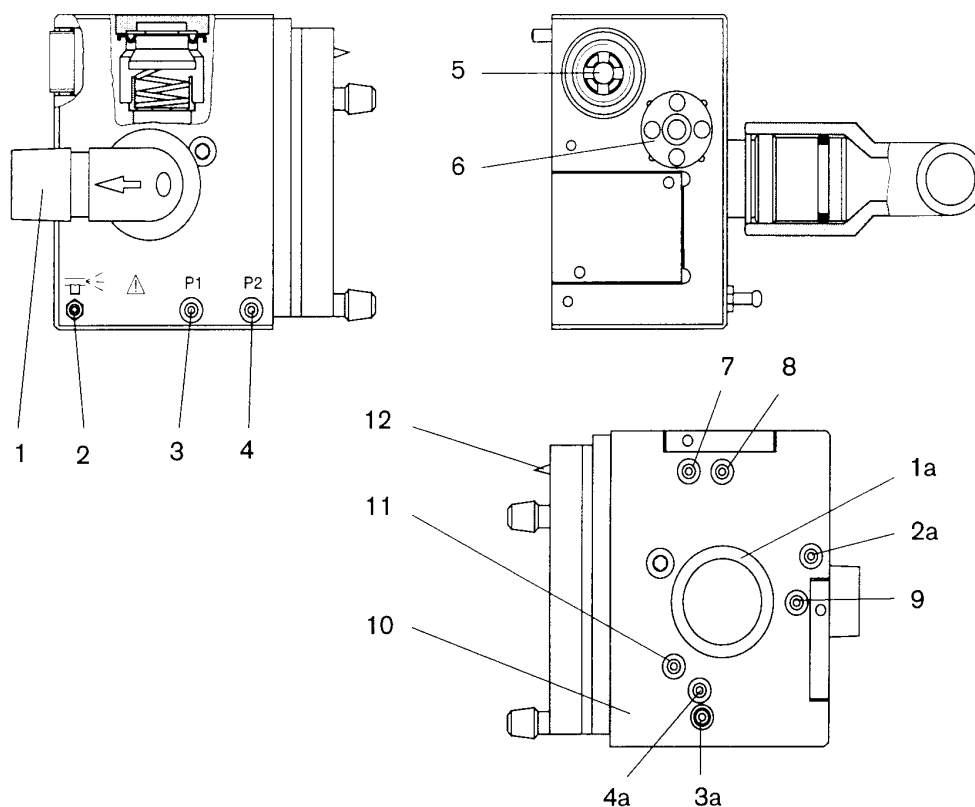


Fig. 26: Inspiratory unit

Legend

- | | |
|------|--|
| 1-1a | Patient connection (inspiration) |
| 2-2a | Nebulizer connection |
| 3-3a | Oesophageal pressure P1 |
| 4-4a | Oesophageal pressure P2 |
| 5 | 10 mbar pressure relief valve |
| 6 | 100 mbar pressure relief valve |
| 7 | Emergency pressure relief mechanism control |
| 8 | Pressure measurement (inspiration) |
| 9 | O ₂ calibration control |
| 10 | O ₂ sensor chamber |
| 11 | O ₂ calibration purge flow outlet |
| 12 | Emergency air check valve |

11.8 Patient System

The expiratory gas flows from the patient directly to the expiratory valve Y5.1. The copper measuring line at the 8a connection has a germicidal effect and connects the expiratory side to the pressure sensor S6.2.

The expiratory valve has a transmission ratio of approx. 1:1. The check valve D5.1 allows flow in one direction only and makes sure that gases do not travel backwards. The expiratory flow is measured with flow sensor S5.1.

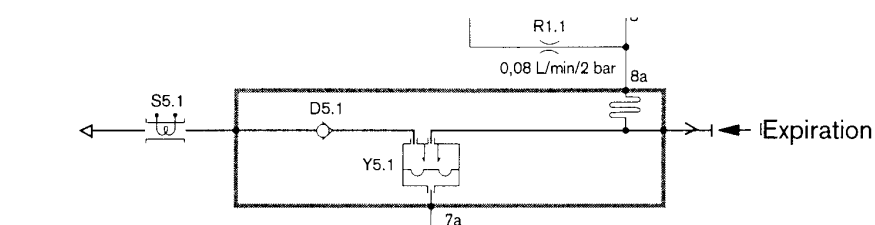


Fig. 27: Patient system function diagram

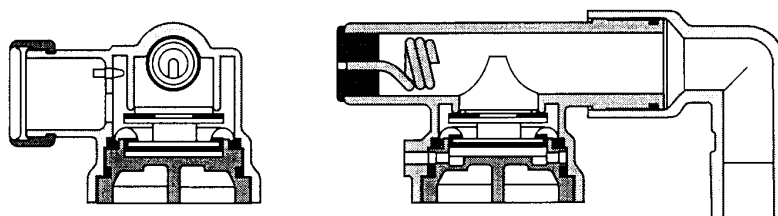


Fig. 28: Patient system cross-section

The ratio between the control pressure at the 7a connection of the PEEP/PIP valve and the resulting pressure at the expiratory port is linear to the following values:

Control pressure of 3 mbar \Rightarrow expiratory pressure of 0 mbar
 Control pressure of 33 mbar \Rightarrow expiratory pressure of 33 mbar

11.8.1 Patient System with Water Trap

The water trap avoids flow measurement faults caused by water droplets. Such faults may occur if the water traps on the ventilation hoses are not positioned at the lowest possible point. In this case the condensation water is collected in the water trap of the patient system.

The collector jar of the water trap can be removed during operation. The opening to the patient system is sealed automatically.

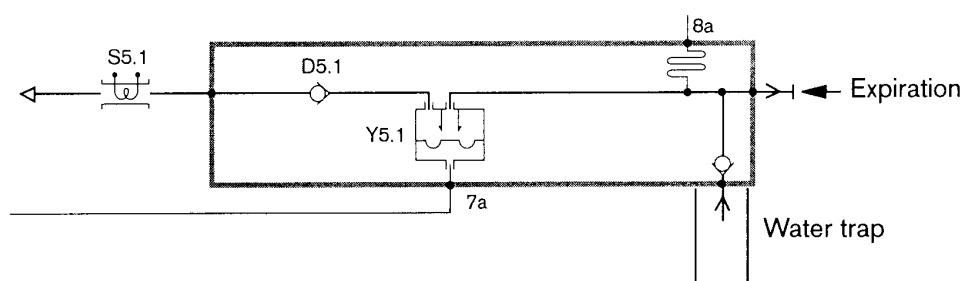


Fig. 29: Function diagram of the patient system with water trap

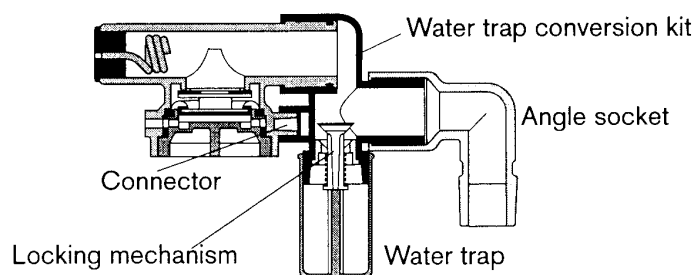


Fig. 30: Sectional view of the patient system with water trap

11.9 PEEP/PIP Valve

The PEEP valve Y4.1 consists of a diaphragm valve acting as a flow-control device and the linear drive whose plunger closes the diaphragm valve. A coil drives the PEEP valve Y4.1. The preset ventilation parameters are processed by a computer program and the coil is driven by an appropriate current. The PEEP valve opens and adjusts a pressure proportional to the adjusted electric current. A current of 0 mA will correspond to -1 mbar, 600 mA to 120 mbar.

A servo-line in the valve Y4.1 controls the expiratory valve Y5.1 in the patient system. The solenoid valve Y1.3 and the restrictor R4.1 supplies the patient system with control gas. The non-adjustable restrictor R4.1 is set to a flow of 3.5 L/min.

Depending on the setting the plunger coil is activated causing an appropriate servo-pressure to be applied to the expiratory valve.

The software compares the preset and measured airway pressures. This comparison is a measure of the Pneumatic-Controller PCB's control action on the PEEP/PIN valve. The PEEP/PIN valve is calibrated to the electronics. The calibration data are stored on the Pneumatic-Controller PCB.

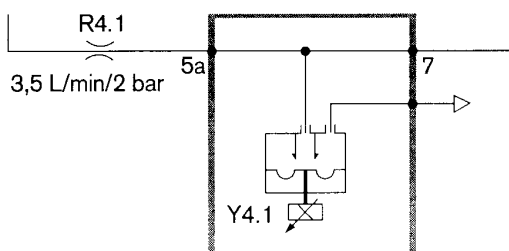


Fig. 31: PEEP valve function diagram

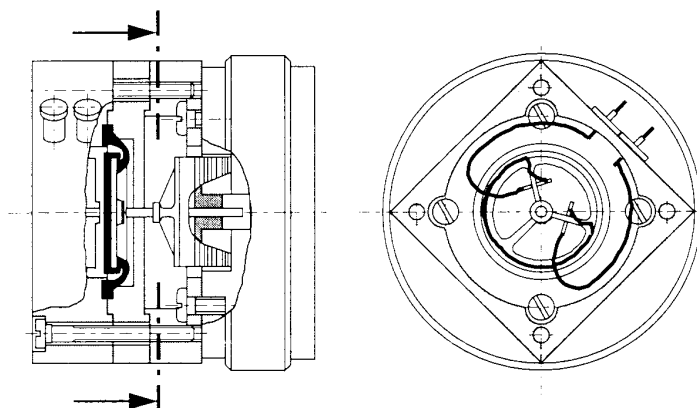


Fig. 32: PEEP valve cross-section

11.10 AIR Supply

AIR flows through the filter F1.1 passing the check valve D1.1 reaching the mixer and flow control unit (pressure sensor S2.1 and HPSV Y2.1). At the same time, AIR flows to the 3/2-way solenoid valve Y1.1 passing the pressure regulator DR1.1 which is set to 2 bar. From here the gas flows through the 3/2-way solenoid valve Y1.3 to the emergency air valve Y3.1 which closes. Furthermore, AIR passes the restrictor R4.1 to reach the PEEP/PIP valve Y4.1 and from there – depending on the setting – to the expiratory valve Y5.1. Finally, AIR passes the restrictor R1.1 to flow to the expiratory pressure sensor S6.2 connecting line on the patient side. At this point, expiratory humidity is prevented from reaching the pressure sensor S6.2.

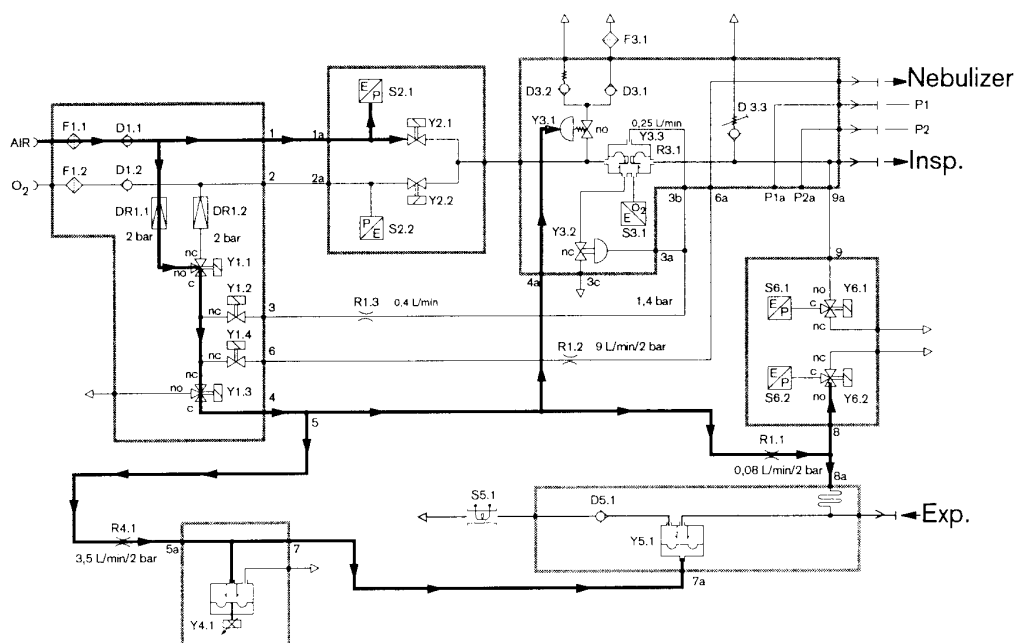


Fig. 33: AIR supply function diagram

11.11 O₂ Supply

Compressed oxygen flows through the filter F1.2 via the check valve D1.2 to the mixer and flow control unit (pressure sensor S2.2 and HPSV Y2.2). At the same time, O₂ flows to the 3/2-way solenoid valve Y1.1 via the pressure regulator which is set to 2 bar.

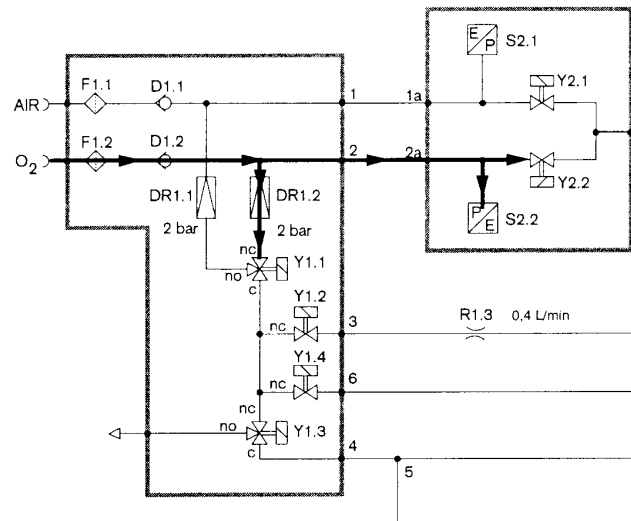


Fig. 34: O₂ supply function diagram

11.11.1 O₂/AIR Switchover Valve

In the event that compressed air fails, in the course of O₂ sensor calibration and when controlling the nebulizer function (depending on the FiO₂ setting) the 3/2-way solenoid valve Y1.1 switches over. The servo-system will then be supplied with O₂.

11.12 Inspiration

Depending on the settings (O_2 concentration, inspiratory volume, frequency, T_I , inspiratory flow, inspiratory pressure) the HPSVs Y2.1 and Y2.2 open. The gas flows via the inspiratory connector to the patient. At the same time, gas flows to the O_2 sensor S3.1 and to the safety valve D3.3. From there, it flows through the 3/2-way solenoid valve Y6.1 to the inspiratory pressure sensor S6.1.

The safety valve D3.3 is fixed to 100 mbar and serves as an additional safety device in the event of a complete failure of the electronic control.

When calibrating the O_2 sensor S3.1 the sensor will be disconnected with valve Y3.3 from the inspiratory gas. The O_2 sensor S3.1 is purged with calibration gas via valve Y1.2, the restrictor R1.3, the restrictor R3.1 and the valve Y3.2. The O_2 concentration and the flow will not be influenced by the inspiratory gas.

The pressure sensors S6.1 and S6.2 monitor the inspiratory pressure. During the entire inspiratory time the PEEP/PIP valve Y4.1 provides pressure to the expiratory valve Y5.1.

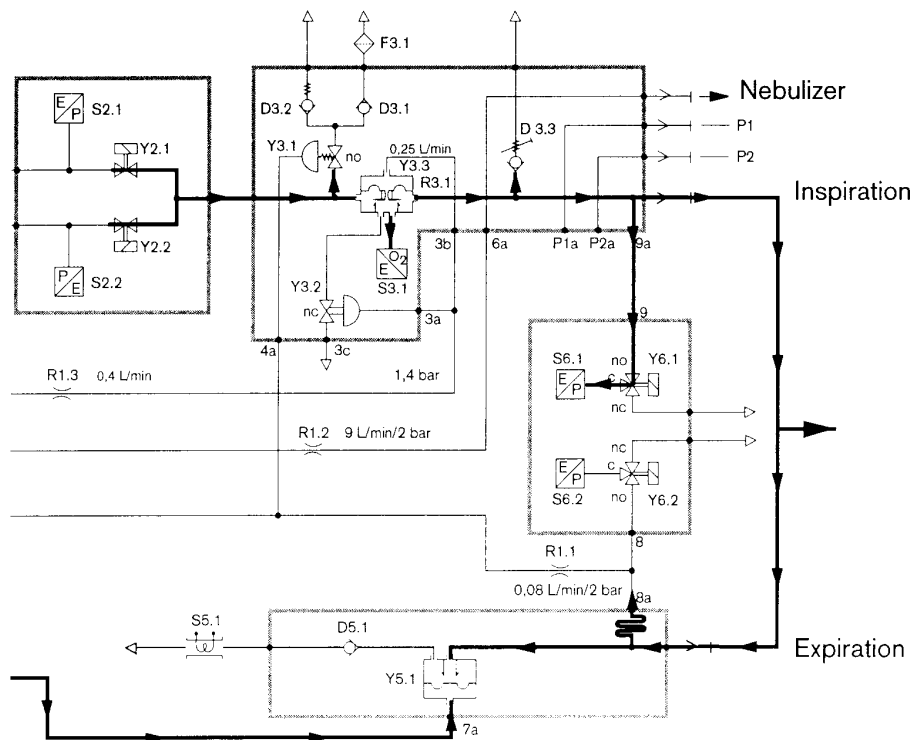


Fig. 35: Inspiration function diagram

11.13 P_{aw} High

In case the P_{aw} high alarm limit is exceeded during inspiration, the HPSV Y2.1 and Y2.2 interrupt the gas flow. The PEEP/PIP valve Y4.1 is switched to expiration and the patient can exhale.

11.14 Emergency Pressure Relief Mechanism

In case the P_{aw} high alarm limit is exceeded by 5 mbar, an additional pressure relief valve Y1.3 will open. This will cause the emergency air valve Y3.1 to open and the pressure can additionally be reduced via check valve D3.2.

11.15 Expiration

At the start of expiration the HPSV Y2.1 and Y2.2 are closed and no gas will be supplied to the patient. The PEEP/PIP valve Y4.1 is switched to the set PEEP value. The expiratory valve Y5.1 will also be relieved and the patient can exhale via check valve D5.1 and the flow sensor S5.1. The flow sensor S5.1 measures the expiratory volume.

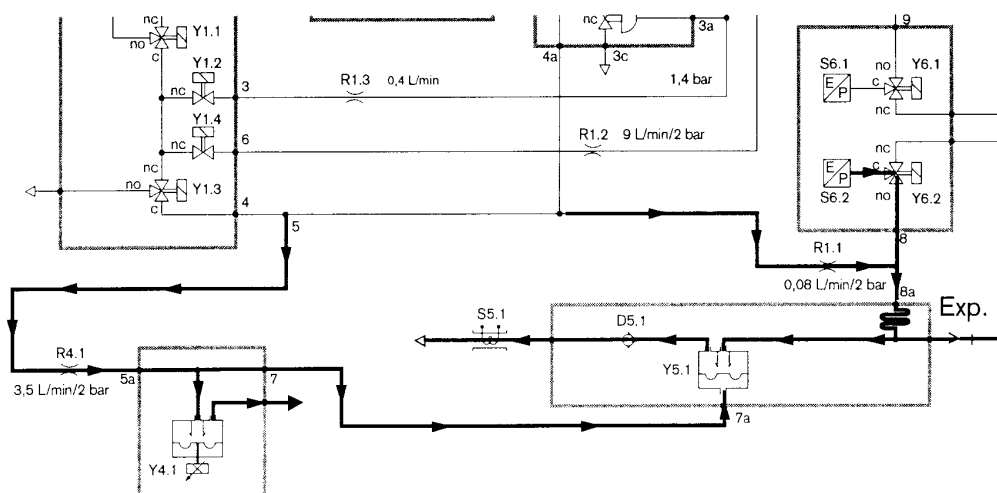


Fig. 36: Expiration function diagram

12 Ventilation Modes

12.1 Volume-Controlled Ventilation with PLV and Auto-Flow

Auto-Flow is a new feature optimizing the flow control during the mandatory breath in the constant-volume ventilation modes IPPV, SIMV and MMV. To understand the differences you will find below an explanation of the conventional functions.

12.2 Classic Constant-Volume Mandatory Breath

In mandatory breaths without Auto-Flow the "insp. flow" parameter limits the inspiratory flow. If the inspiratory flow is so high that the set tidal volume V_T is attained prior to the end of the inspiratory time T_{insp} , the inspiratory valve will close and the supply of breathing gas will cease. The expiratory valve will remain closed until the inspiratory time T_{insp} has ended. This phase, also referred to as the inspiratory pause, can be seen as plateau pressure P_{plat} in the $P_{\text{aw(t)}}$ waveform.

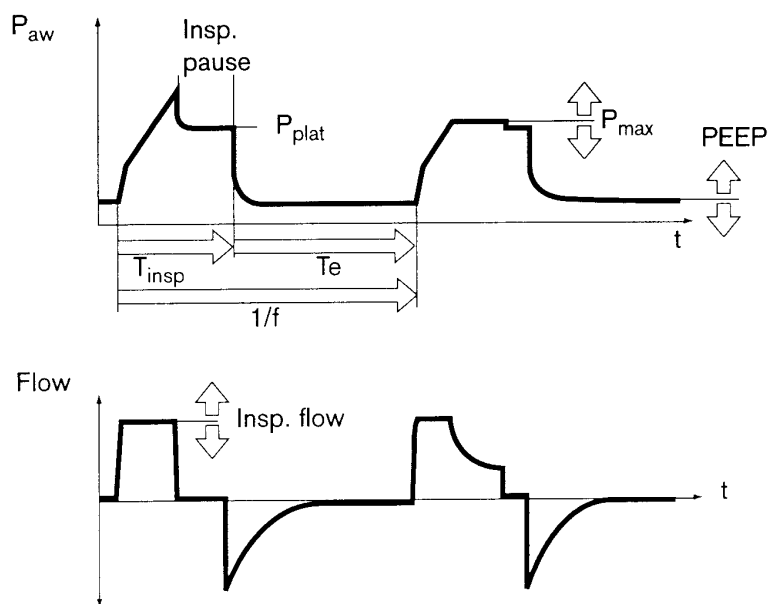


Fig. 37: IPPV waveform

This type of mandatory breaths found in virtually all intensive care ventilators for technical reasons has two important disadvantages:

- The pressure peak can lead to overinflation of individual pulmonary areas in inhomogeneous lungs, and
- the limited inspiratory flow and the inspiratory and expiratory valves closed during the inspiratory pause will cause the patient to work against the machine unless the respiratory pattern is regularly adapted to the requirements of the spontaneously breathing patient.

12.3 Manual Pressure Limitation P_{\max}

The P_{\max} pressure limitation function in Evita 4 serves to avoid the pressure peak while maintaining the set tidal volume V_T . The tidal volume V_T remains constant as long as a pressure plateau P_{plat} can still be recognized and the flow waveform still shows a short zero flow between inspiration and expiration.

Evita 4 meets this requirement by reducing the inspiratory flow as soon as the P_{\max} setting has been attained. In the event that the tidal volume V_T at the preset pressure P_{\max} can no longer be applied due to a reduced compliance, an "inconstant volume" alarm will automatically be given. The manual pressure limitation function is available on all units of the Evita 4 series.

12.4 Auto-Flow

The Auto-Flow function can be activated from the "Extended Settings" menu. Auto-Flow ensures adjustment of the inspiratory flow and Pmax parameters as the relevant adjusting knobs no longer appear on the "Settings" menu.

The inspiratory flow automatically adapts to the changes of the pulmonary conditions (C, R) and the respiratory requirements of the patient.

IMPORTANT:

Make sure to always set the „P_{aw} \sqrt{x} “ alarm limit so that an alarm will be given as soon as the airway pressure increases while the patient's compliance is reduced.

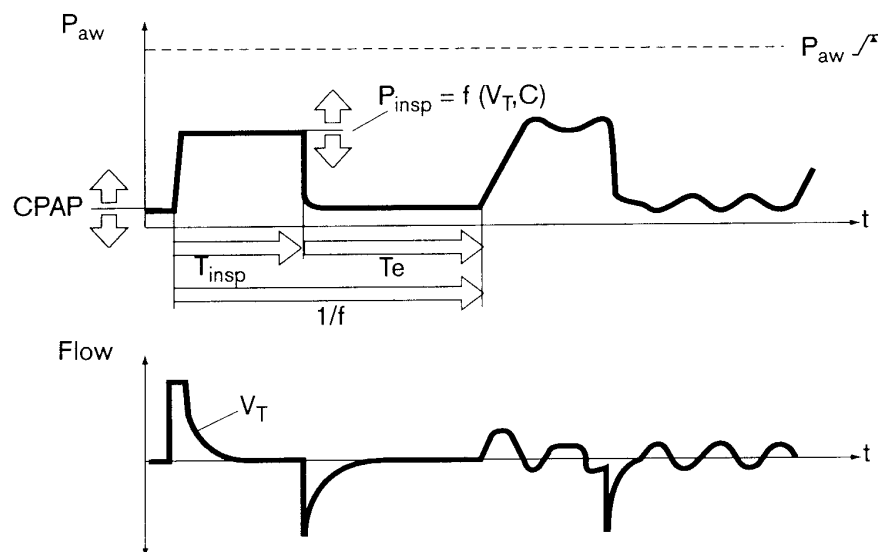


Fig. 38: Auto-Flow waveform

The selected inspiratory time T_{insp} is typically much longer than the filling phase of the lungs. The inspiratory pressure P_{insp} is equivalent to the minimum value resulting from the tidal volume V_T and the lungs' compliance C .

The inspiratory flow is automatically controlled to avoid any pressure peaks which may result from the tube and airway resistances. The plateau pressure P_{plat} changes with the compliance C changing, which is common in constant-volume respiratory breaths. In the Auto-Flow mode these changes occur in steps of 3 mbar max. from one breath to another.

When the tidal volume V_T is attained (inspiratory flow = 0) before the inspiratory time T_{insp} has expired, the control of the inspiratory and expiratory valves ensures that the patient can inspire and expire during the remaining inspiratory time even if the plateau pressure P_{plat} remains constant.

If the patient inspires or expires during mandatory inspiration, the plateau pressure will not change but the inspiratory and expiratory flows will adapt to the patient's demand. It may occur that the individually applied tidal volume in some breaths differs from the adjusted tidal volume. However, on the average the tidal volume V_T applied will be constant.

Exceeding of the tidal volume V_T can be limited with the " $V_{T_i} \nearrow$ " alarm limit. When the set alarm limit is exceeded for the first time, the Evita 4 will give a message (!). In case the limit is exceeded three times in a row an alarm (!!!) will be given. If necessary, the volume can be limited to the " $V_{T_i} \nearrow$ " alarm limit by switching to the PEEP level.

The flow waveform indicates if the set inspiratory time T_{insp} is shorter than the filling time of the lungs, i.e. at the end of the inspiratory time the flow will not yet be zero. In this case a decision must be taken if the current condition of the patient allows extending the inspiratory time T_{insp} in order to lower the peak pressure further.

This effect may also be caused during ventilation, e.g. by congestion of secretions. In this situation the " $P_{\text{aw}} \nearrow$ " alarm limit limits the pressure. The pressure increase stops at a level 5 mbar below the " $P_{\text{aw}} \nearrow$ " alarm limit and the "inconstant volume" alarm will only be activated if the set tidal volume V_T is no longer applied.

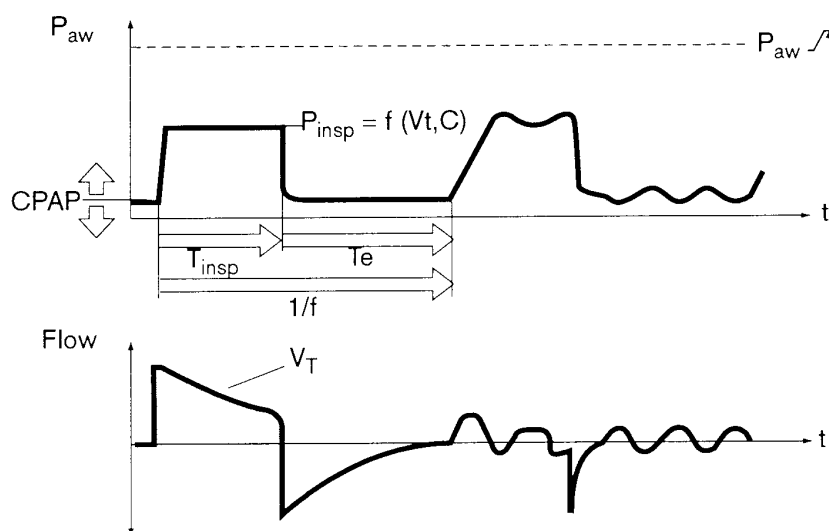



Fig. 39: Auto-Flow waveform

It is possible to synchronize the start of the mandatory inspiration with the patient's spontaneous respiratory effort using the variable flow trigger. The flow trigger can only be completely turned off in the IPPV mode (IPPV Assist -> IPPV).

Furthermore, it is possible to adapt the rate of pressure increase from PEEP level to the inspiratory level even better to the patient's requirements with the „“ pressure increase time ventilation parameter in the SIMV and MMV modes.

12.4.1 Starting Performance in Auto-Flow

When starting the Auto-Flow function Evita 4 applies a constant-volume breath with a subsequent inspiratory pause. The plateau pressure calculated for this breath serves as a starting value for the inspiratory pressure in the Auto-Flow function.

12.5 Artificial Sighs

An artificial sigh is an intermittent PEEP in the IPPV, IPPV Assist and ILV ventilation modes.

The expiratory sigh during ventilation is designed to open collapsed pulmonary areas or to keep “slow” pulmonary areas open.

Since atelectatic alveoli have a higher time constant i.a. due to stenosed bronchioli, it is necessary that the airway pressure is higher for a longer period of time to open the bronchioli.

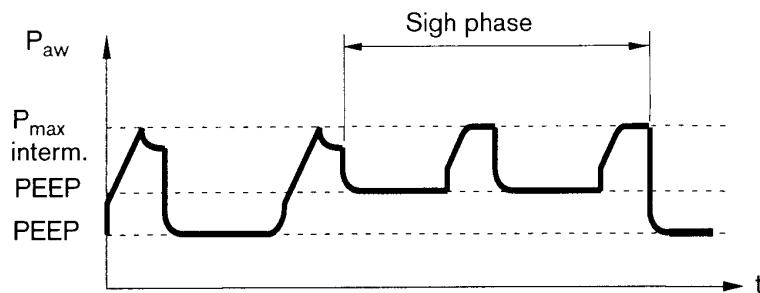


Fig. 40: Sigh waveform

The sigh function is often achieved by increasing the ventilatory breath. However, as only little time is available the “slow” alveoli will not fill much more easily.

In Evita 4 the artificial sigh is an intermittent PEEP during expiration.

The average airway pressure is higher, and normally the available filling time is longer.

In order to avoid overinflation of the lungs, the pressure peaks during the sigh phase can be limited using the P_{max} pressure limitation function without reducing the efficiency of the sigh function.

The “inconstant volume” alarm is not activated during the sigh phase.

12.6 SIMV (Synchronized Intermittent Mandatory Ventilation)

SIMV is a mixed ventilation mode combining mechanical ventilation and spontaneous breathing.

In the SIMV mode, the patient can breathe spontaneously at specified regular intervals while mandatory breaths provided by the machine ensure a minimum amount of ventilation. This minimum ventilation is defined by two ventilation parameters, i.e. the tidal volume V_T and the frequency f and is the result of $V_T \times f$.

The ventilation pattern is defined by the settings for the tidal volume V_T , the inspiratory flow, the frequency f and the inspiratory time T_{insp} . To avoid that the mandatory breath is applied during spontaneous expiration, the machine's flow trigger ensures that a mandatory breath is synchronized with the patient's spontaneous inspiration within a "trigger window".

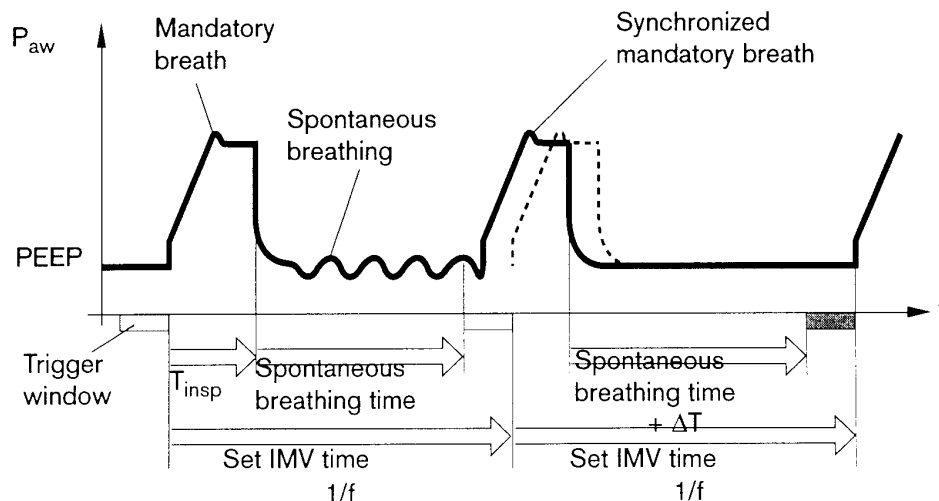


Fig. 41: SIMV waveform

The "trigger window" lasts 5 seconds and thus over the entire expiratory time if this is less than 5 seconds.

Since the synchronization of the mandatory breath reduces the effective SIMV time thus increasing the effective frequency, Evita 4 extends the subsequent spontaneous breathing time by the missing time difference ΔT . Consequently, the SIMV frequency will not become too high. The second factor determining the minimum ventilation, namely the frequency f , remains unchanged. Once the patient has inspired a considerable volume at the start of the trigger window, the machine reduces the subsequent mandatory breath by decreasing the inspiratory flow phase and the inspiratory time. The tidal volume V_T remains constant and overinflation of the lungs is avoided.

During spontaneous breathing the patient will receive pressure assistance (ASB).

In the course of weaning the patient from the ventilator the frequency f is reduced further thus extending the spontaneous breathing time until the required minute volume is completely covered by spontaneous breathing.

12.7 ASB (Assisted Spontaneous Breathing)

ASB is used to supply pressure support if spontaneous breathing is insufficient.

The machine supports the patient's insufficient spontaneous breathing effort in a similar way as the anaesthetist does when he or she observes the patient's recurring spontaneous breathing on the breathing bag and supports it by squeezing the bag.

The machine assumes part of the inspiratory work while the patient keeps control over his or her spontaneous breathing.

The CPAP system supplies breathing gas to the spontaneously breathing patient irrespective of how strong or weak his or her breathing effort may be.

The ASB pressure support will be activated

- when the spontaneous inspiratory flow has attained the set flow trigger value, or
- when the spontaneously inspired volume exceeds 25 mL (or 12 mL in paediatric application).

The machine will in this case increase the pressure to the preset ASB pressure (P_{ASB}) which has been adapted to the patient's respiratory requirements.

The time for the pressure increase can be adjusted from 64 ms up to 2 s.

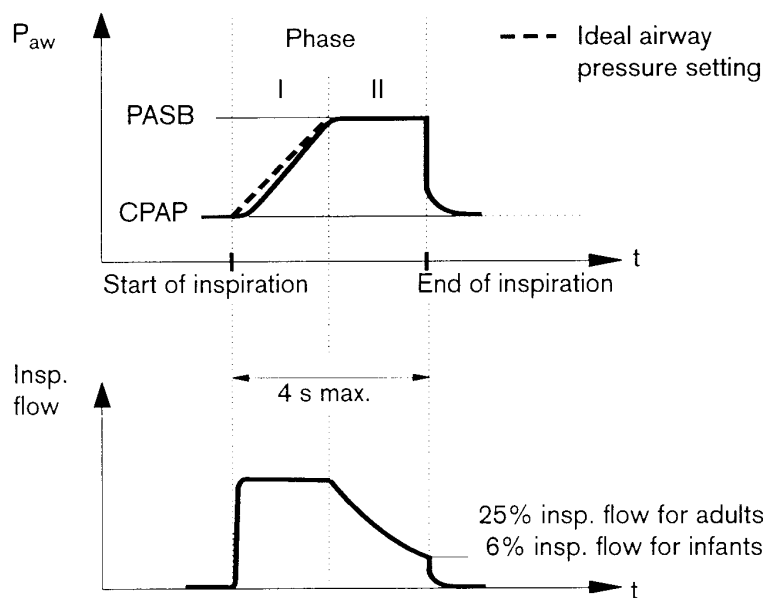


Fig. 42: ASB waveform

Evita 4 supports the patient's insufficient spontaneous breathing with a high peak flow in the ASB mode with fast pressure increase \nearrow .

In the ASB mode with slow pressure increase \nearrow Evita 4 supplies a uniform inspiratory flow. The patient has to do more work of breathing so that the respiratory muscles have to exercise.

In the ASB mode with adapted pressure increase \nearrow and ASB pressure P_{ASB} the patient determines the required inspiratory flow with his or her breathing activity. The flow may rise to 2 L/s within 8 ms.

ASB is terminated

- when the inspiratory flow drops to 0 in phase I, i.e. when the patient exhales or breathes against the machine, or
- when the inspiratory flow in phase II falls by a certain ratio below the maximum value supplied before:
ventilation of adults: 25% inspiratory flow; ventilation of infants: 6% inspiratory flow;
or
- at the latest after 4 seconds (or 1.5 seconds in paediatric application) provided the two other criteria did not apply. If the time criterion applies three times in a row, Evita 4 will give an alarm that the breathing system may be leaky.

12.8 BIPAP (Biphasic Intermittent Positive Airway Pressure)

BIPAP is a pressure/time-cycled ventilation mode in which the patient can always breathe spontaneously. BIPAP is therefore also often described as time-controlled change between two CPAP levels.

The time-controlled pressure change ensures controlled ventilation equivalent to the pressure-controlled ventilation mode PCV. As spontaneous breathing is permanently possible, however, the change-over from controlled ventilation to weaning and eventually completely spontaneous breathing is smooth so that there is no need to switch from one ventilation mode to another. To adapt the ventilation to the spontaneous breathing behaviour of the patient the change from the expiratory pressure level to the inspiratory pressure level and vice versa is synchronized with the patient's spontaneous breathing.

The frequency of the change-over is also kept constant during synchronization by the trigger windows.

As recent clinical experience has shown, this way of adapting ventilation to the patient's spontaneous breathing activity requires less sedation thus enabling the patient to return to spontaneous breathing at a much faster rate.

As in all pressure-controlled ventilation modes the tidal volume delivered to the patient is not fixed but results primarily from the difference in pressure between the PEEP and P_{insp} settings.

The tidal volume will change if the lung compliance and the airways change or if the patient breathes against the machine.

Knowing that the tidal volume and consequently the minute volume will not always be constant, the user has to make sure that the minute volume alarm limits are properly adjusted.

The required difference in the two pressure levels is adjusted on the basis of the expiratorily measured tidal volume V_{T_e} displayed. Increasing the difference causes a higher BIPAP breath.

12.8.1 Applying BIPAP

As in IPPV, the time pattern is adjusted with the parameters of the basic frequency and $T_I:T_E$ ratio settings. Evita 4 calculates the inspiratory and expiratory times and displays the results on the bottom screen below the waveform. The lower pressure level is adjusted with the PEEP parameter, the upper pressure level with the P_{insp} parameter. When switching from IPPV to BIPAP, only the $P_{\text{max}}/P_{\text{insp}}$ needs to be changed while the time pattern remains unchanged.

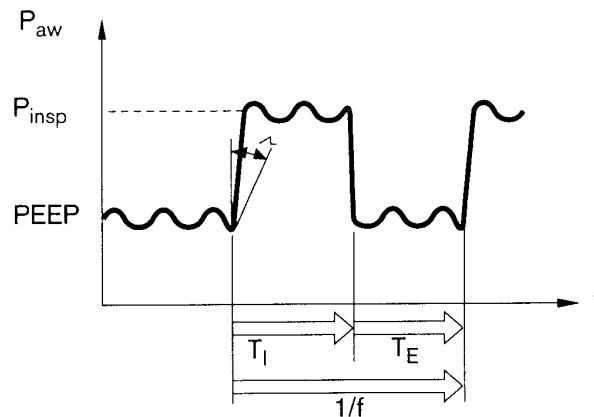


Fig. 43: BIPAP waveform

The rate of pressure increase from the lower pressure level to the upper pressure level is adjusted with the \triangle setting. The effective time for the pressure increase cannot exceed the set inspiratory time T_{insp} . This ensures that the upper pressure level P_{insp} is always attained during inspiration. The change-over from controlled ventilation to weaning and eventually completely spontaneous breathing is achieved by gradually reducing the inspiratory pressure P_{insp} and/or the frequency f until the patient breathes spontaneously.

12.9 APRV (Airway Pressure Release Ventilation)

APRV is a ventilation mode for spontaneous breathing at a continuously positive airway pressure with short-time pressure release. This ventilation mode is suitable for patients with a disturbed gas exchange function. The patient breathes spontaneously at a high pressure level P_{high} for an adjustable period of time T_{high} . In case the expiratory time T_{low} is very short, Evita 4 will switch over to a low pressure level P_{low} . The normal pulmonary areas will be evacuated, the "slow" ones will change their volume insignificantly.

This mode serves to improve the ventilation/perfusion ratio in case of a disturbed gas exchange function.

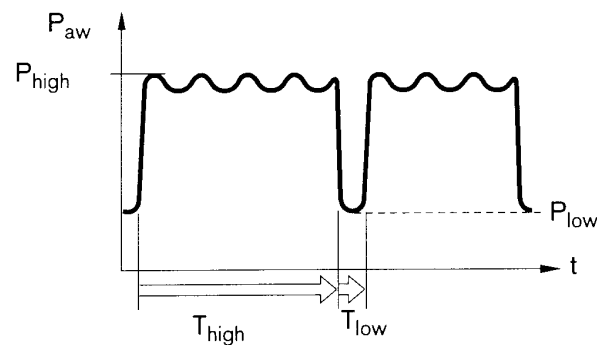


Fig. 44: APRV waveform

12.10 MMV (Mandatory Minute Volume)

In the MMV ventilation mode a mandatory breath will only be applied in case of insufficient spontaneous breathing falling below a preset minimum ventilation (unlike in SIMV). This minimum ventilation is defined by the tidal volume V_T and frequency f settings and is the product of $V_T \times f$.

Unlike SIMV, in MMV mandatory breaths will not be applied at regular intervals but only when insufficient ventilation is likely to occur.

The frequency of the mandatory breaths depends on the extent of spontaneous breathing:

- No mandatory breaths will be applied if the spontaneous breathing activity is sufficient.
- If the spontaneous breathing activity is insufficient, mandatory breaths will be applied in accordance with the set tidal volume V_T . If there is no spontaneous breathing activity at all, the mandatory breaths will be applied at the set frequency f .

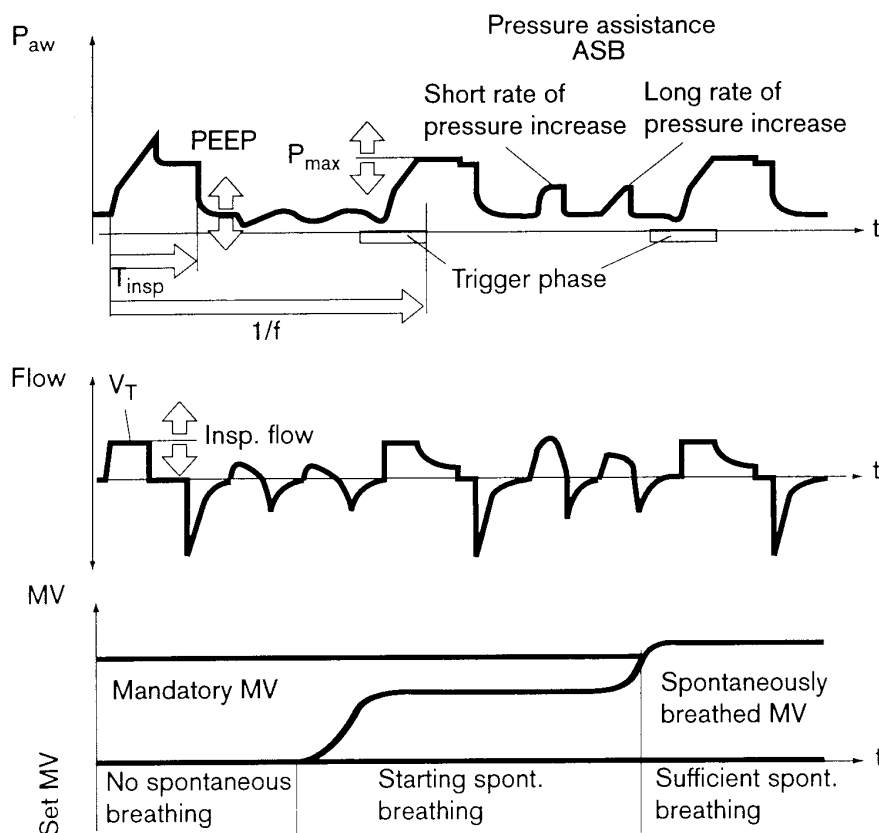


Fig. 45: MMV waveform and diagram

Evita 4 continuously balances the difference between spontaneous breathing and the set minimum ventilation. As soon as the balance is negative due to insufficient spontaneous breathing, Evita 4 will apply a mandatory breath with the set tidal volume V_T and the balance will be positive again.

Experience has shown that patients usually breathe very irregularly. Phases of weak and heavy respiration alternate. In order to account for such individual fluctuations, the balance also includes the portion exceeding the set minimum ventilation. Evita 4 reduces this value within 7.5 seconds max. after apnoea.

Consequently, the response time of Evita 4 between the incidence and application of the mandatory breaths automatically adapts to the previous spontaneous breathing:

If spontaneous breathing was approximately the same as the set minimum ventilation, the machine's response time will be within the IMV time. If, however, the previous spontaneous breathing of the patient was significantly higher than the set minimum ventilation, Evita 4 will tolerate a longer respiratory pause. In extreme situations such as the case of sudden apnoea after a period of intensive spontaneous breathing, the response time will be approx. 7.5 seconds plus the trigger time, however, 1 IMV time minimum.

Response times greater than 15 seconds can only occur if the minimum ventilation was set to a very small value at a very low frequency f .

In this case Evita 4 will give an apnoea alarm which is silenced upon the onset of the mandatory breaths. If the set IMV time is longer than the $T_{\text{apnoe}} \sqrt{x}$ alarm limit and if there is no spontaneous breathing between the mandatory breaths, apnoea alarm will be given at regular intervals.

Example:

$$f = 3/\text{min} = \text{IMV time} = 20 \text{ seconds}$$
$$T_{\text{apnoe}} > = 15 \text{ seconds}$$

This method serves to prevent that during irregular spontaneous breathing a mandatory breath is applied too early while an alarm will be given in case ventilation is insufficient for a longer period of time.

12.11 Measurement Manoeuvres

12.11.1 Occlusion Pressure

The pressure in the mouth measured under short-term occlusion at the start of inspiration is the basis for measuring the respiratory drive since the pressure is not influenced by physiological processes of compensation, e.g. reflex apnoea, increase of drive, within 100 ms. This pressure does not in any way depend on the relevant muscular power of the diaphragm. Therefore, the negative pressure in the mouth P 0.1 after 0.1 seconds is a direct measure of the neuromuscular respiratory drive.

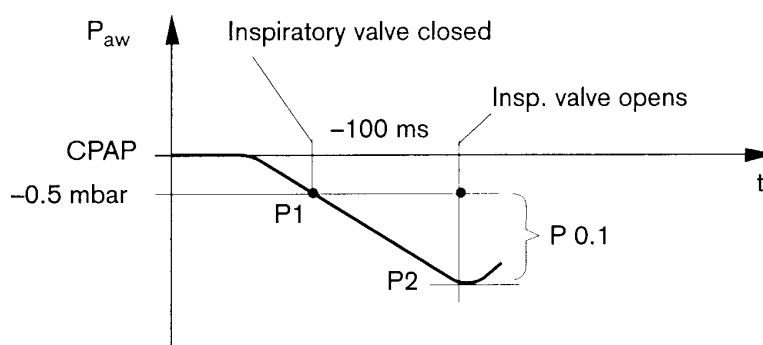


Fig. 46: Occlusion pressure waveform

In patients with healthy lungs the pressure P 0.1 will be approx. 3 to 4 mbar during regular respiration. A high P 0.1 value signifies an elevated respiratory drive which can only be sustained for a limited period of time. P 0.1 values in excess of 6 mbar, e.g. in a COPD patient, are indicative of the expected fatigue („Respiratory Muscle Fatigue”).

Measuring the P 0.1 pressure in COPD-ventilated patients helps to define the time when weaning should be started.

Evita 4 keeps the inspiratory valve closed after the expiratory phase and measures the airway pressure built up by the inspiratory effort in 100 ms. The 100 ms time interval starts when the inspiratory effort of the patient has produced a negative pressure of -0.5 mbar.

The second pressure value is determined after the 100 ms time interval. At the same time, the inspiratory valve opens and the patient continues to breathe normally.

The difference between the two pressure values $P2 - P1$ defines the occlusion pressure P 0.1.

12.12 Intrinsic PEEP

Evita 4 keeps the inspiratory and expiratory valves closed for a period of measurement period 1 so that neither inspiratory gas can enter nor can gas escape from the ventilation system. In the course of this period pressure compensation will occur between the lungs and the ventilation system. Evita 4 measures the pressure waveform.

The initial pressure value is equivalent to PEEP, the value at the end of the closing period is the intrinsic PEEP.

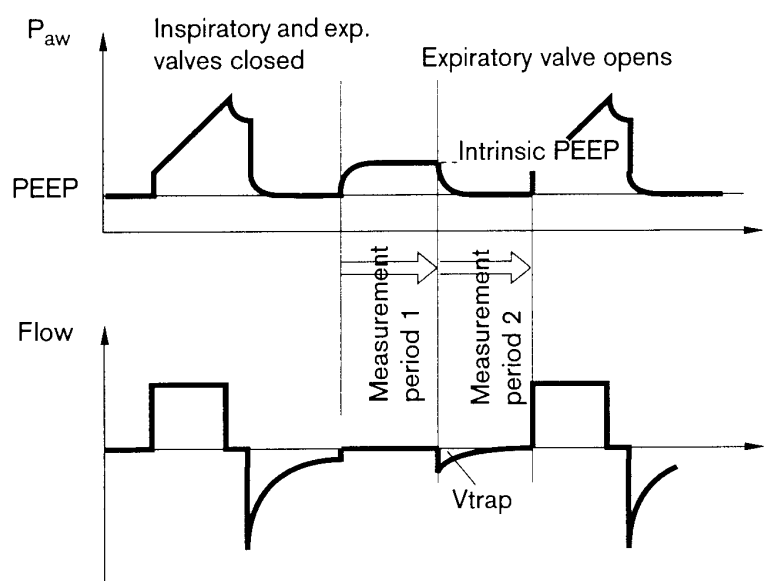


Fig. 47: Intrinsic PEEP waveform

As soon as measurement period 1 is over, Evita 4 opens the expiratory valve and measures the expiratory flow generated by the intrinsic PEEP during a defined measurement period 2. The pressure in the lungs will drop to PEEP level. The measurement will be terminated:

- when the expiratory flow has dropped to 0,
- at the latest after 7 seconds max. (or 3.5 seconds in paediatric application).

The integrated flow is equivalent to the volume V_{trap} gathered in the lungs on account of the intrinsic PEEP.

Measurement periods 1 for intrinsic PEEP:

- For ventilation of adults: 3 seconds max.
- For ventilation of infants: 1.5 seconds max.

Measurement periods 2 for Vtrap:

- For ventilation of adults: 7 seconds max.
- For ventilation of infants: 3.5 seconds max.

12.13 Inspiratory O₂ Concentration During Medicament Nebulization

CAUTION:

The use of other medicament nebulizers may lead to considerable deviations in the tidal volume and the inspiratory O₂ concentration!

Use medicament nebulizer 84 12 935 (white centre piece) only.

In order to compensate for minor deviations from the set O₂ concentration, the Evita 4 provides mixed gas to drive the medicament nebulizer. This mixed gas is produced when compressed air and oxygen are switched synchronously with inspiration. Consequently, the drive gas of the medicament nebulizer is virtually equivalent to the set FiO₂ concentration.

The diagram shows the possible deviations in the applied O₂ concentration as a function of the set FiO₂ concentration for a minimum inspiratory flow (15 L/min).

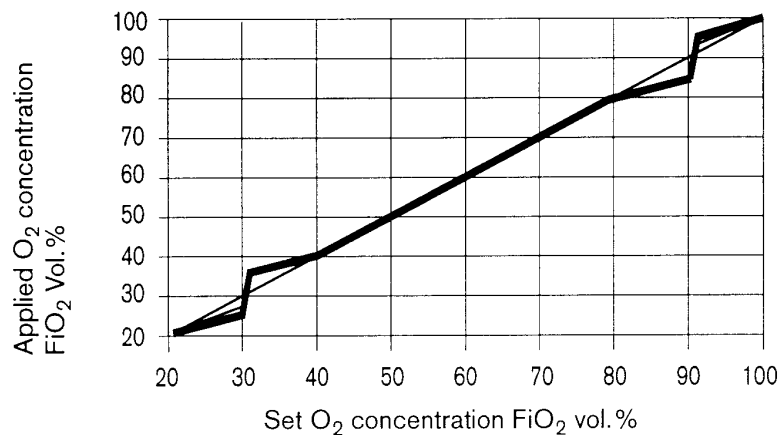


Fig. 48: Diagram of deviations in the applied O₂ concentration

12.13.1 Medicament Nebulizer

After pressing the button the medicament nebulizer is switched on for 10 minutes. At the same time the solenoid valve Y1.4 is switched through in the flow-active inspiratory phase. The medicament nebulizer is supplied with drive gas by the restrictor R1.2. After completion of the inspiratory gas supply phase the solenoid valve Y1.4 is also switched back. The minute volume remains constant while the flow setting is being corrected. After termination of the medicament nebulization the flow sensor S5.1 is automatically glowd clean.

IMPORTANT:

The minimum inspiratory flow is 16 L/min.

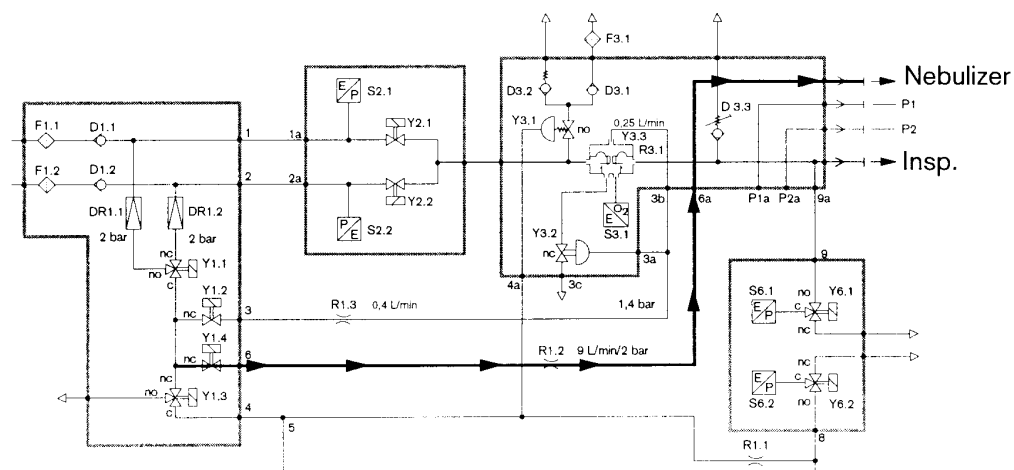


Fig. 49: Nebulizer function diagram

13 HPSV-Controller PCB

The pneumatics of the Evita 4 contain 2 identical HPSV-Controller PCBs. The board slot determines which of the boards is assigned to O₂ and AIR. The PCB comprises the following functions:

- Microcontroller with EPROM and RAM
- ADC for measurement of supply pressure
- DAC for setpoint entry of current
- Control loop for current control
- Power transistor (power source)
- NOTE: The characteristic of the HPSV cartridge is stored in the cartridge and is read out by the HPSV Controller PCB. The PCB can be replaced without calibration.

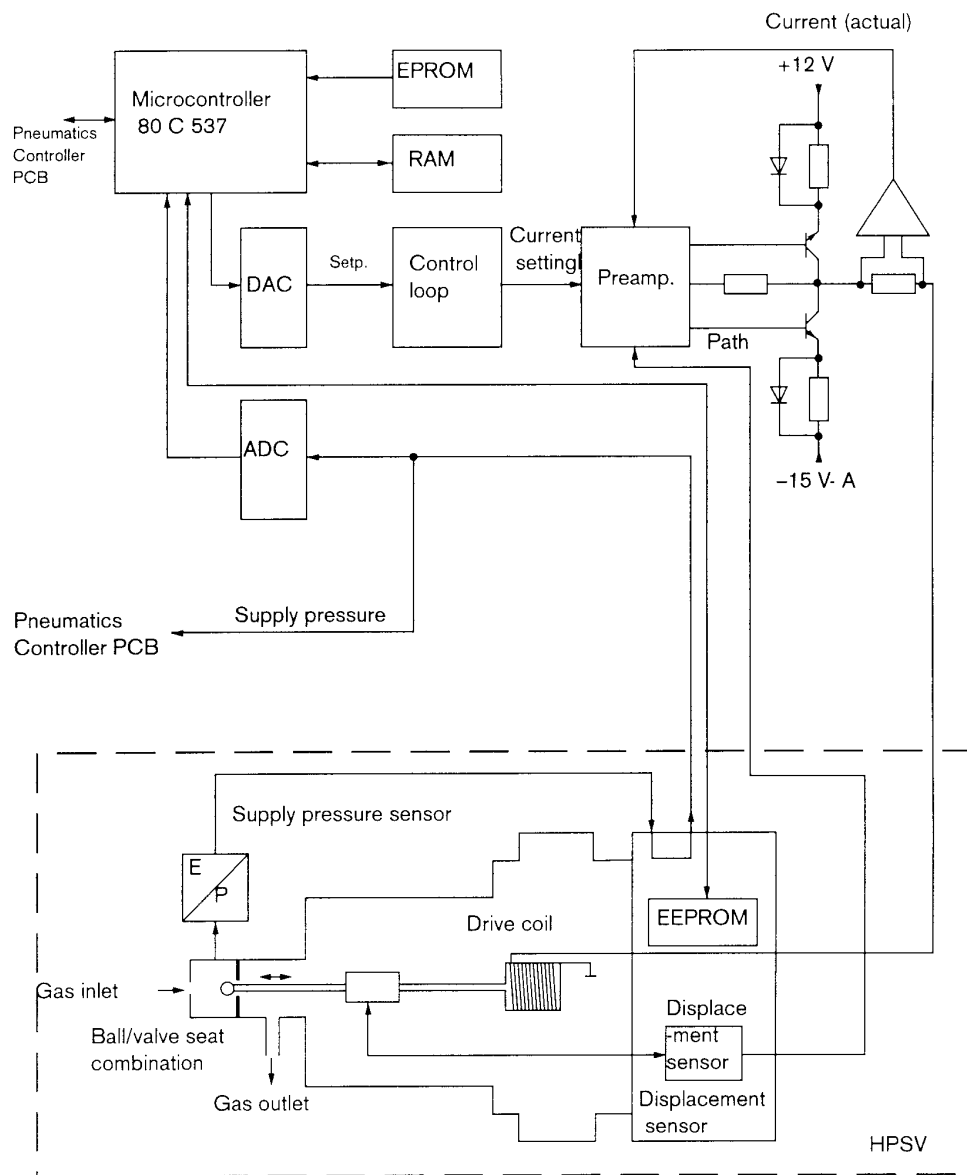


Fig. 50: HPSV Controller PCB with HPSV

14 Gas mixture

14.1 Operating principle

The air flow and the oxygen flow are metered directly out of the supply lines with one HPSV each. Both sub-flows flow together to the inspiration block in the so-called parallel mixer. Depending on the set FiO_2 (0.21 to 1.00), the total flow to be metered is split into an air sub-flow and an oxygen sub-flow. Sub-flows of less than 5 L/min are no longer metered continuously, but in pulses lasting at least 8 ms and with a constant flow value of 5 L/min. This results in a pulse/pause ratio that corresponds to the sub-flow value.

14.2 Correcting the oxygen HPSV

Corresponding to its operating principle, the HPSV meters a mass flow. Owing to the differing gas density values of the compressed air and the oxygen, different volume flows would therefore be applied if these values were not corrected. Owing to the different gas density values, the portion of the inspiration flow demanded of the oxygen HPSV is therefore boosted by 5%.

14.3 Dependence on the input pressure

With regard to the gas supply, the operating range of the Evita 4 is specified from 2.7 bar to 6 bar gauge pressure. Evita 4 monitors this operating range with the aid of the absolute pressure sensors on the HPSVs on the basis of the following criteria:

1. Input pressure always higher than 1.2 relative/absolute
2. When the flow obtained is low, input pressure higher than 2.5 bar relative

At low input pressures (below 3 bar gauge pressure), the HPSV can no longer apply high flow demands without errors, i.e. the actually supplied flow is less than the demanded flow.

The inspiration flow must be limited for reasons of flow accuracy and thus also for oxygen concentration accuracy reasons.

How this is implemented in the Evita 4:

Prior to the start of an inspiration, the maximum inspiration flow for spontaneous inspiration of the HPSV is defined on the basis of the measured supplied gauge pressure:

Pinput > 4 bar absolute -> max. inspiration flow = 180 L/min
Pinput < 4 bar absolute -> max. inspiration flow = 150 L/min

For mandatory inspirations, the inspiration flow is limited by the setting to 120 L/min.

14.4 BTPS/NTPD conversion

The HPSV is a mass source and therefore supplies the flow under NTPD conditions. Nevertheless, the user setting of the inspiration flow or the demand by the demand flow generator is based on BTPS conditions. Prior to control of the HPSVs, the BTPS flow demands must be converted to an NTPD flow supply.

$$\text{Flow_NTPD} = \text{Flow_BTPS} * \frac{P_Ambient + P_Insp_Final - 63 \text{ mbar}}{1013 \text{ mbar}} * \frac{293K}{310K}$$

P_Ambient : value measured by the ambient pressure sensor

P_Insp_Final : measured airway pressure at the end of the last inspiration

15 Alarm Messages

Alarm messages in the alarm display field are displayed in hierarchical order. If, for example, two faults are detected at the same time, the more critical of the two will be displayed.

The priority for alarm messages is marked by exclamation marks:

- Warning = Message with top priority !!!
- Caution = Message with medium priority !!
- Advisory = Message with low priority !

In the table below, the messages are listed in alphabetical order. The table will help you to identify the cause of any alarm, and to ensure rapid remedy of the problem.

Message	Cause	Remedy
Air supply down !!!	Air supply pressure too low.	Make sure pressure is greater than 3 bar.
Air supply down !!!	Air supply pressure too low. Air supply pressure not required when $\text{FiO}_2 = 100\%$ vol.	Make sure pressure is greater than 3 bar.
Air supply pressure high!!	Air supply pressure too high.	Ensure pressure is less than 6 bar.
Air supply pressure high !	Air supply pressure too high. Air supply is not needed for $\text{FiO}_2 = 100\%$ vol.	Ensure pressure is less than 6 bar.
Airway pressure high !!!	The upper alarm limit for the airway pressure has been exceeded. The patient is "fighting" the ventilator, cough.	Check patient condition and ventilation pattern. Correct alarm limit, if necessary.
Airway pressure low !!!	Leaking cuff.	Inflate cuff and perform leak test.
	Leak or disconnection.	Check hose system for tight connections. Check that the expiration valve is properly engaged.

Message	Cause	Remedy
Apnoea !!!	Patient's spontaneous breathing has stopped.	Apply controlled ventilation.
	Flow sensor not calibrated or faulty.	Calibrate flow sensor. Replace if necessary.
Apnoea ventilation !!!	Due to detected apnoea, the system has switched over automatically to mandatory ventilation.	Check ventilation procedure. To return to the original ventilation procedure, press the Reset button.
ASB > 1,5 s !	Only appears in paediatric mode. The ASB cycle has been switched off 3 times due to time limitations.	Test ventilation system for leaks.
ASB > 4 s !!!	Only appears in adult mode. The ASB cycle has been switched off 3 times due to time limitations.	Test ventilation system for leaks.
Check settings !!	Power interruption while setting a ventilation pattern or the alarm limits.	Check pattern of ventilation and alarm limits. Confirm message with reset.
Clean CO ₂ cuvette !!!	Cuvette window dirty.	Use clean cuvette.
CO ₂ measurement inop!!!	CO ₂ sensor faulty.	Replace faulty CO ₂ sensor.
	CO ₂ measurement incorrect.	Call DrägerService.
CO ₂ monitoring off !	CO ₂ monitoring is switched off.	
CO ₂ sensor !!!	Probe of CO ₂ sensor withdrawn during operation.	Reinsert probe.
	CO ₂ sensor not positioned on cuvette.	Place CO ₂ sensor on cuvette.
	CO ₂ sensor faulty.	Replace defective CO ₂ sensor.
CO ₂ zero? !!!	Zero outside the permitted tolerance.	Perform zero calibration.

Message	Cause	Remedy
Device failure !!!	Device faulty.	Call DrägerService.
etCO ₂ high !!!	End-expiratory CO ₂ concentration above upper alarm limit.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
etCO ₂ low !!!	End-expiratory CO ₂ concentration below lower alarm limit.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
Execute checklist !!	Equipment check not performed.	Perform equipment check. Confirm message with "Reset Check" key.
Expiration valve inop !!!	Expiration valve not properly connected to socket.	Push expiration valve firmly into socket until it clicks into place.
	Flow sensor not calibrated or defective.	Calibrate flow sensor, and replace, if necessary.
	Expiration valve faulty.	Replace expiration valve.
Fan failure !!!	Fan failure.	Call DrägerService.
FiO ₂ high !!!	O ₂ sensor not calibrated.	Calibrate O ₂ sensor.
	Faulty mixer function.	Call DrägerService.
FiO ₂ low !!!	O ₂ sensor not calibrated.	Calibrate O ₂ sensor.
	Faulty mixer function.	Call DrägerService.
Flow measurement inop !!!	Flow sensor faulty.	Calibrate flow sensor, and replace, if necessary.
	Flow measurement malfunction.	Call DrägerService.
Flow monitoring off !	Flow monitoring is switched off.	

Message	Cause	Remedy
Flow sensor? !!!	Flow sensor not fully inserted in rubber lip of expiration valve.	Insert flow sensor correctly.
Hard key xx failed !!	Key xx (e.g. "Horn off") can no longer be pressed.	Call DrägerService.
High frequency !!!	Patient is breathing at a high spontaneous frequency.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
Insp. hold interrupted !	The "Insp. hold" key was held down longer than 15 s.	Release "Insp. hold" key.
Insp/Exp cycle failure !!!	No gas supplied by device.	Check Pmax/PEEP settings.
	Device faulty.	Call DrägerService.
Key xx overused? !!	Key has been pressed several times in a short period (e.g. "Horn off").	Confirm message with "Reset" key. If this message occurs repeatedly, call DrägerService.
Loss of data !!!	Lithium battery discharged.	Call DrägerService.
Malfunction fan !	Temperature in machine too high.	Check fan function, clean cooling-air filter or call DrägerService.
Mixer inop !!!	Mixer malfunction. FiO ₂ can deviate significantly.	Immediately ventilate with separate manual ventilation device! Call DrägerService.

Message	Cause	Remedy
MV high !!!	The minute volume has exceeded the upper alarm limit.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
	Flow sensor not calibrated or faulty.	Calibrate flow sensor and replace, if necessary.
	Water in flow sensor.	Drain water trap in hose system.
	Machine malfunction.	Call DrägerService.
MV low !!!	The minute volume has fallen below the lower alarm limit.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
	Leak in breathing system.	Establish leakproof breathing system.
	Flow sensor not calibrated or faulty.	Calibrate flow sensor and replace, if necessary.
	Machine malfunction.	Call DrägerService.
Nebulizer on !	The medicament nebulizer is switched on.	
O ₂ measurement inop !!!	O ₂ sensor provides invalid measured values.	Calibrate O ₂ sensor. Replace, if necessary.
	O ₂ measurement malfunction.	Call DrägerService.
O ₂ monitoring off !	O ₂ monitoring is switched off.	
O ₂ supply down !!!	O ₂ supply pressure too low.	Make sure pressure is greater than 3 bar.
O ₂ supply down !	O ₂ supply pressure too low. O ₂ supply pressure is not required when FiO ₂ = 21% vol.	Make sure pressure is greater than 3 bar.

Message	Cause	Remedy
O ₂ supply pressure high !!	O ₂ supply pressure too high.	Make sure pressure is less than 6 bar.
O ₂ supply pressure high !	O ₂ supply pressure too high. O ₂ supply pressure is not required when FiO ₂ = 21% vol.	Make sure pressure is less than 6 bar.
PEEP high !!!	Expiratory system obstructed.	Check hose system and expiration valve.
	Machine faulty.	Call DrägerService.
PEEP valve inop !!!	Internal PEEP valve faulty.	Call DrägerService.
Pressure limited !!	Pmax pressure limit is active.	
Pressure measurement inop !!!	Fluid in expiration valve.	Replace expiration valve, then clean and dry.
	Pressure measurement malfunction.	Call DrägerService.
Standby activated !!!	Evita 4 has been switched to standby.	Confirm standby with "Reset" key.
Temperature high !!!	Breathing gas temperature higher than 40 °C.	Switch off humidifier.
Temperature measurement inop !!!	Temperature sensor faulty.	Fit new temperature sensor.
Temperature sensor ? !!!	Temperature sensor probe has been disconnected during operation.	Reconnect probe.
	Sensor cable broken.	Fit new temperature sensor.
Tidal volume high !!!	The inspiratory tidal volume V _T has exceeded the upper alarm limit.	Check condition of patient, check pattern of ventilation, correct alarm limit, if necessary.
	Leak or disconnection.	Check that hose system connections are leakproof.

Message	Cause	Remedy
Volume not constant !!!	Due to pressure limit or time limit, the set tidal volume V_T has not been applied.	Prolong inspiratory time " T_{insp} "; increase inspiratory flow "Flow"; increase pressure limit "Pmax".

16 Service diagnosis mode

The service diagnosis mode enables on-line information to be read out at any time during operation.

The diagnosis pages are split up as follows:

“Front”:	Readout of control panel data:
	“Microprocessor”: Display type Touchscreen Keypad Loudspeaker monitoring RAM test
“Electronic”:	Readout of electronics section data:
	“Sensors”: Ambient pressure measurement SpO2 measurement CO2 measurement Paediatric flow measurement
	“Microprocessor”: Power supply internal unit temperature AWT sensor Ambient pressure sensor Inspiration pressure RAM/ROM test results Service connector CAN SW options
“Pneumatic”:	Readout of pneumatics section data:
	“Valves”: Setting of switching valves HPSV (supply pressure, status, O2 measurement, flow) PIP/PEEP valve (calibration values))
	“Sensors”: 4 airway pressure sensors Flow measurement O2 measurement

"Microprocessor": RAM/ROM test results
Fan monitoring
Reference voltages

"Other": Special functions - error list and SW options:
"Logbook": Readout of error list

16.1 Call-up of service diagnosis mode

Service diagnosis mode can be called up at any time in the course of operation. This mode only involves data readout; settings are not altered.

- Press "Configuration" key.
- Select "Basic setting" menu
- Select "Service diagnosis" menu
- Enter the numeral combination "4 6 5 5"
- Select the relevant menu

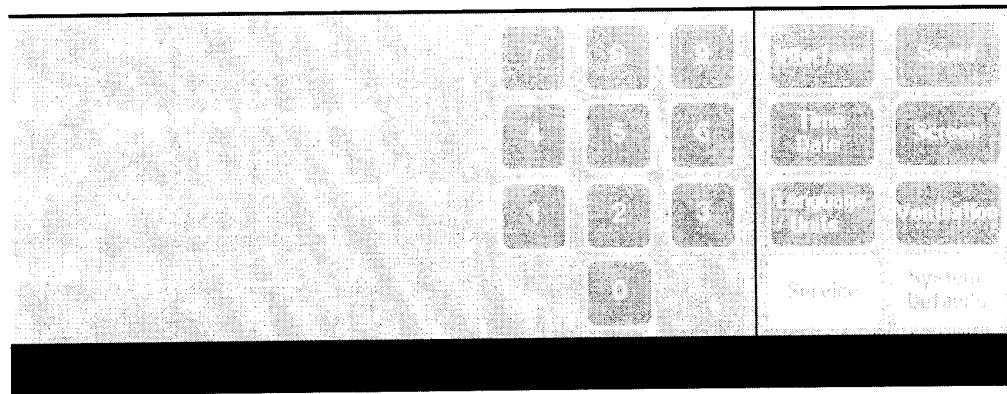


Fig. 51: Entering the service diagnosis mode

16.2 “Front” diagnosis

16.2.1 Diagnosis page “Microprocessor” of “Front”

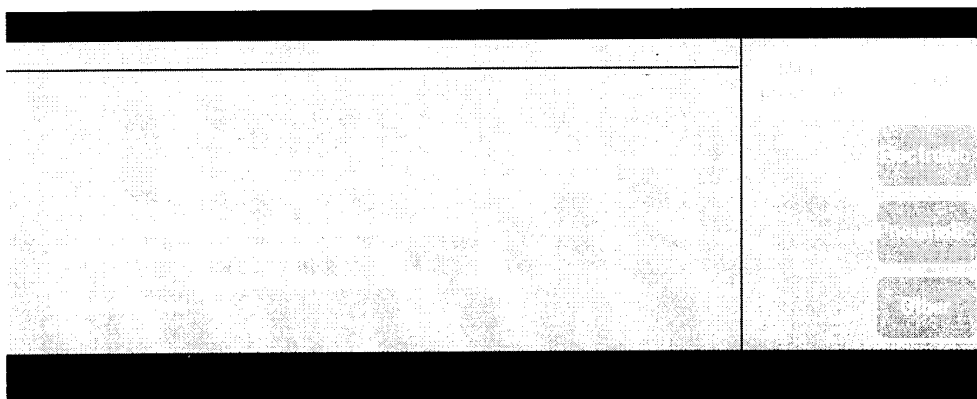


Fig. 52: Diagnosis page “Microprocessor” of control panel

Display type Readout of display in control panel. This information is of importance for renewal of background illumination, as this differs from display to display.

Important: In the event of display fault, use must always be made of the current display type. The display accessory set contains all the components required for installation, e.g. display, decoders D29 and D40, wiring harnesses, DC/AC converter (if not integrated into display) and mechanical assembly components.

Evita 4

IR-Touch: Touchscreen data. These data are determined once in BOOT after switching on Evita. The important touchscreen information is listed below:

Errors: Output 00 (OK, no error) or output of error number plus error code

Error codes:

- 01 EPROM error
- 02 RAM error
- 04 Broken beams in BOOT, refer to "broken beams"
- 0a Invalid command
- 0c Input buffer overflow
- 0e Incorrect parameter number for command
- 0f Value range parameter exceeded

Broken Beams: Output of broken beams, detected following switch-on of Evita

- X beams for columns (40 from left to right)
- Y beams for lines (30 from bottom to top)

Output 0 (OK, not broken) or 1 (not OK, broken). Check the following if one or more beams shown as being broken:

- Was there something in the touch window on switch-on?
- Touch window surround dirty?

Important: Defective light barriers are allowed, provided that the function during operation is not effected, i.e. all screen keys are functional.

Keys pressed: Keypad test, determined by Graphics Controller PCB:

- 0 key not pressed
- 1 key pressed

Important: Keys which affect screen content switch Evita out of diagnosis mode.

Sound detected: Result of current measurement through loudspeaker in control panel. Detected flow of current through loudspeaker (= yes) continues to be displayed for 10 seconds.

RAM: Output of result of RAM test, Graphics Controller PCB

16.3 “Electronic” diagnosis

16.3.1 Diagnosis page “Sensors” of “Electronic”

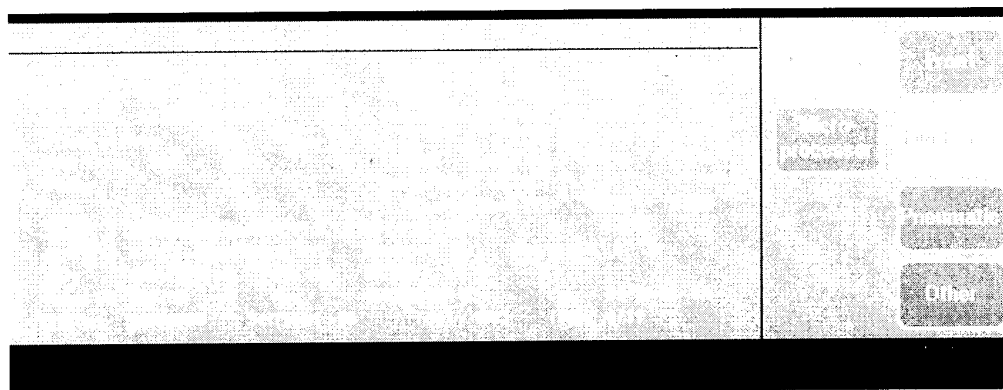


Fig. 53: Diagnosis page “sensors” of “electronics”

Ambient press. Output of ambient pressure measurement values.

Pambient:	Air pressure used in Evita
Raw:	Current raw voltage from air pressure sensor with calculated air pressure.
Preference:	Air pressure established as air-pressure reference value when Evita is switched on. If the deviation from PAir or PO2 is more than 8 %, the message “Perform apparatus check” is given.
PAir/O2:	Air pressure of supply pressure sensors PAir and PO2 determined in last apparatus check.

Pinsp: Second channel of inspiration pressure sensor.

SpO2: SpO2 measurement values. Valid values are only provided if option has been fitted and released and SpO2 measurement has been activated. The PCB version and the measured values are output.
Note: The bar graph value is not displayed on the Evita in operation.

CO2: CO2 measurement values. A list of important CO2 measurement data is given below:

CO2:	Output of Signal Processor PCB type for CO2 measurement on CO2 Carrier PCB, e.g. "Andros 4210" or "Dräger HL".
SW rev:	Output of SW version on Signal Processor PCB, e.g. "68 70 277 1.1" for Dräger software version 1.1.
Tdet / Twin:	<p>Output of decimal value of detector (Tdet) and window (Twin) temperature in CO2 sensor. Approx. 43°C should have been attained in each case after 3 minutes.</p> <p>40°C = 5326 41°C = 5116 42°C = 4916 43°C = 4725 44°C = 4543 45°C = 4368 46°C = 4201 48°C = 3888 50°C = 3602</p>

Pediatric-Flow: Paediatric flow measurement values. Valid values are only provided if option has been fitted. Option is not yet available.

16.3.2 Diagnosis page "Microprocessor" of "Electronics"

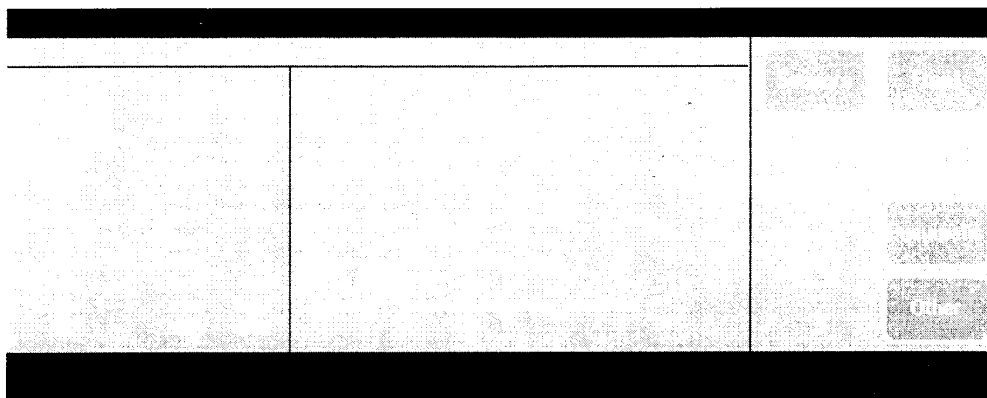


Fig. 54: Diagnosis page "microprocessor" of "Electronics"

5 V/12 V/15 V / -15 V/24 V : Power pack supply voltages measured on CO2 Carrier PCB. Output of voltages and decimal values of AD conversion. There are no apparatus error messages with the following values:

5 V	=	4.5 V to 5.5 V
12 V	=	9.6 V to 14.4 V
15 V	=	14 V to 18 V
-15 V	=	-12 V to -18 V
24 V	=	19.2 V to 28.8 V

Important: The power pack is specified as follows:

5 V	=	5.07 V to 5.23 V
12 V	=	11.76 V to 12.24 V
15 V	=	4.55 V to 15.45 V
-15 V	=	-14.55 V to -15.45 V
24 V	=	22.32 V to 24.72 V

10 V: 10V reference voltage generated from 15V supply voltage. Output of voltage and decimal value of AD conversion.
Error message is given in the event of deviation > 4 %.
Set value = 9.65V to 10.35V

GoldCap: Output of GoldCap voltage. The GoldCap capacitor supplies the substitute horn with current. Output of voltage and decimal value of AD conversion.
Set value = 8V to 11V

Piezo:	<p>The current through the substitute horn is measured on the CO₂ Carrier PCB.</p> <p>Piezo detected (30 decimal (0.018V)</p> <p>Piezo off < 30 decimal</p>
PowerSW:	<p>Output of voltage at mains-switch auxiliary contact. Voltage is important for detecting mains failure. Output of voltage and decimal value of AD conversion.</p> <p>Mains switch on < 164 decimal (0.100V)</p> <p>Mains switch off > 512 decimal (0.312V)</p>
Batt ext.:	<p>Output of voltage of externally connected DC power supply (option DC module). Output of voltage and decimal value of AD conversion.</p>
AD1:	<p>Output of AD converter reference voltage 1. Output of voltage and decimal value of AD conversion.</p> <p>Set value approx. 2.500V</p>
AD2:	<p>Output of AD converter reference voltage 2. Output of voltage and decimal value of AD conversion.</p> <p>Set value approx. 2.500V</p>
Tcpu:	<p>Temperature inside unit; measured on CO₂ Carrier PCB. Output of temperature in °C and voltage.</p> <p>Permissible temperature range < 65°C.</p> <p>As of 65°C info "fan fault!" (reset at 60°C) and as of 70°C alarm "fan defective!!!" (reset at 65°C).</p>
Tair:	<p>AWT-sensor breathing-gas temperature. Output of temperature in °C and voltage.</p>
Pinsp:	<p>Second channel of inspiration pressure sensor.</p>
Pambient:	<p>Air pressure currently being used in Evita (filtered). Output of air pressure in mbar and voltage.</p> <p>Perm. measuring range: 600 - 1100 mbar</p>
ILV in/out:	<p>Outputs only defined with ILV ventilation.</p>
EEPROM:	<p>Result of EEPROM test. EEPROM D22 is located on CPU 68332 PCB.</p>
RAM:	<p>Result of RAM test on CPU 68332 PCB.</p>
Loss of data:	<p>Output of data loss of RAM and EEPROM D22 on CPU 68332 PCB.</p> <p>No - OK, no data loss</p> <p>Yes - data loss</p> <p>A loss of data in the RAM may be due to a flat battery on the CPU 68332 PCB.</p> <p>Following data loss, the Evita attempts to restore the data. If this proves possible, the red alarm "data loss" disappears from the screen. The Evita is OK if this alarm is no longer present when the unit is next switched on.</p>
RAM-Comm:	<p>Result of RAM test on Communication PCB. Valid values are only output if PCB fitted (option).</p>

Service connector:	<p>Output of whether or not RS 232 cable with service encoding is connected to COM1 on CPU 68332 PCB.</p> <p>No - service encoding not recognised, normal operation</p> <p>Yes - service encoding recognised, download of operating software or external service mode via PCB possible.</p>
CAN components:	<p>Output of PCBs connected to internal CAN at CPU 68332 PCB (0 = not fitted, 1 = fitted).</p> <p>Sequence is as follows from left to right:</p> <p>Graphics Controller PCB/Pneumatic Controller</p> <p>PCB/Communication PCB/5x undefined</p>
SW options:	<p>The released options are output in the following form:</p> <p>"1"_(Option 0 - 7)_(Option 8 - 15)_(Option 16 - 23)_(Option 24 - 31)</p> <p>Significance:</p> <p>"1" = Block 1 with 32 options (1 = Option fitted, 0 = Option not fitted)</p> <p>The following options are currently envisaged in block 1:</p> <p>Option 7 = SpO2 measurement</p> <p>Option 8 = CO2 measurement</p> <p>Option 9 = DC power pack</p> <p>Option 10 = Comfort Breath (Ventilation mode PPS and tube compensation)</p>

16.4 “Pneumatic” diagnosis

16.4.1 Diagnosis page “Valves” of “Pneumatics”

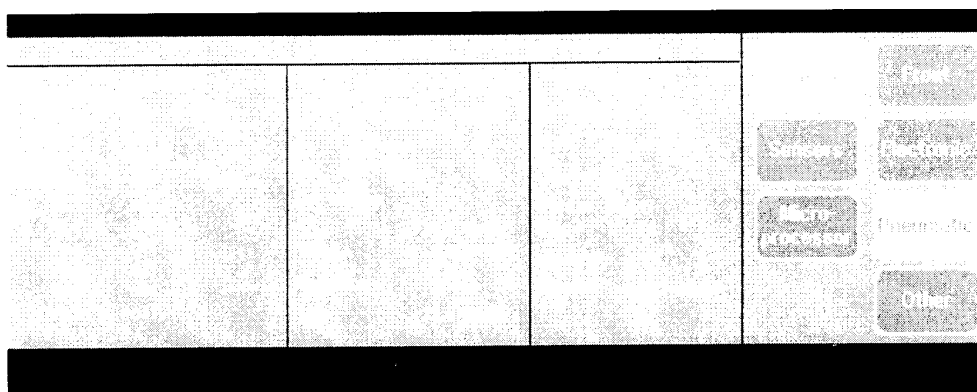


Fig. 55: Diagnosis page “valves of ”pneumatics”

Valves:	Actuation of switching valves in pneumatics section. For the valves Y1.1 and Y1.4 the actuation voltage is read back and output in the second value. Actuation and checkback must be identical.	
off	Valve deenergised	
on	Valve actuated	
Y1.1	O2/air switching valve, off = air	
Y1.2	O2 measurement calibration valve, on = O2 measurement calibration	
Y1.3	Safety valve, on = ventilation; off = safety shutdown active	
Y1.4	Nebuliser valve, off = nebuliser off	
Y6.1	Calibration valve for inspiration pressure sensor S6.1, on = calibration	
Y6.2	Calibration valve for expiration pressure sensor S6.2, on = calibration	
Yx.x	Future option; a total of 10 valves can be connected to the Pneumatic Controller PCB	
HPSV:	Supply pressures and status of cartridges for O2 and air. Settings for flow and FiO2 are additionally output, as is the measured FiO2 value.	

Pressure	<p>The absolute air and O₂ pressures are output. Absolute pressure = rel. supply pressure + ambient pressure. Measuring range of supply pressure sensors = 0 - 7 bar Sensitivity = 1.58 V/bar +/- 8 mV/bar Offset voltage = 300 mV +/- 30 mV</p>
Status:	<p>Status messages of respective HPSV Controller PCB for O₂ and air. 0 - OK, no error 2 - supply pressure less than 2 bar absolute, failure of pressure supply 1, 3 to 15 - errors on HPSV Controller PCB or in HPSV cartridge.</p>

PEEP:	Values for PEEP/PIP valve Y4.1
Set values:	PEEP setpoint input in mbar
Cal. values:	Calibration values for actuation of PEEP/PIP valve. Valve or PCB replacement must be followed by calibration.
Measure	PEEP measured by airway pressure measurement in mbar

16.4.2 Diagnosis page "Sensors" of "Pneumatics"

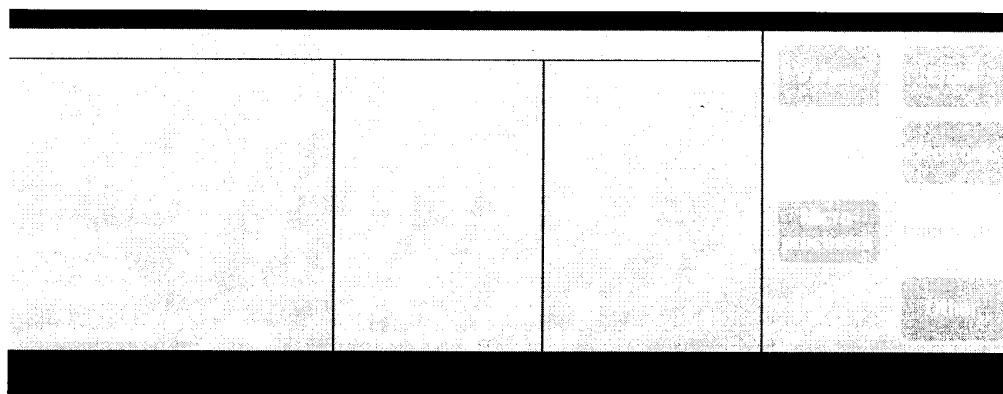


Fig. 56: Diagnosis page "sensors" of "pneumatics"

Pressure sensors:

Output of measured values from the 4 airway pressure sensors insp., exp., oes and aux (oes and aux are envisaged for future options).
3 values are output for each sensor:

(mbar):	Pressure in mbar of calibrated sensor
(V):	Output voltage of sensor; read in by Pneumatic Controller PCB. Voltage = Calibration voltage + sensitivity Sensitivity = 36.5 +/- 0.3 mV/mbar Measuring range = 140 mbar
Cal(V):	Calibration voltage of sensor (zero at ambient pressure) Set value = 1.74 +/- 0.50 V

The pressure at the Y-piece (Paw) is also calculated:

Paw (mbar)	Pressure Paw calculated in each case by insp. and exp. pressure sensor with allowance for tubing resistance. Perm. difference between the two values = 5 mbar.
(PCP CPU)	Comparison value in mbar. Output voltage of insp. pressure sensor is additionally read in on CO2 Carrier PCB. Max. difference with respect to Paw insp. = 5 mbar.

R: Tubing resistance in mbar/L/s
 Insp.: Tubing resistance between insp. socket and Y-piece
 Exp.: Tubing resistance between Y-piece and exp. socket
 Top row: Measured in operation by safety software
 Bottom row: Determined in apparatus check
 These values differ as they are measured at different flow rates.

C: Inspiratory tubing compliance in mL/mbar

Flowsensor: Expiratory flow measurement values. Note: All values are displayed under BTPS conditions unless otherwise stated.

Explanatory notes:

BTPS Based on 37°C, ambient pressure + insp. pressure, 100 % rel. humidity. All Evita measured values and settings are based on BTPS.

NTPS Based on 20°C, 1013 mbar, 100 % rel. humidity. Corresponds to raw value of measured exp. flow.

NTPD Based on 20°C, 1013 mbar, dry. The mixer supplies the flow under these conditions. The Evita setting under BTPS is converted to NTPD for the mixer.

(L/min): Measured expiratory flow converted to BTPS. Corresponds to displayed value.

(L/min)NTPD/S Raw flow value measured under NTPS or NTPD conditions

(V) Flow measurement voltages in V

Uinop:

Voltage set value (0.1 V, sensor probably OK if F0 and Fsig OK.

"Flow measurement fault" is displayed if voltage < 0.1 V

F0:

Flow-measurement bridge voltage with 4-fold amplification.

Set value in no-flow condition = 4.04 V

	Fsig: Flow-measurement bridge voltage with 2-fold amplification. Set value in no-flow condition = 2.02 V
Cal DA:	Decimal DA converter value for calibration of flow sensor Set value = 2200 - 3200
Switch:	Microswitch for detecting position of flow sensor On - Flow sensor in right-hand operating position Off - Flow sensor not ready for operation in replacement position
NTPS→ BTPS:	Factor for converting raw value of measured flow NTPS to displayed flow BTPS value Permissible deviation from "quotient" = 5 %
Quotient:	NTPS/BTPS conversion factor calculated in a different way.
BTPS→NTPD:	Factor for converting flow BTPS to NTPD
Mvinsp:	Inspiratory minute volume calculated from actuation signals of mixer. The measured expiratory minute volume may be max. 20 % more than this value. "Flow measurement fault" is displayed if the difference is greater. The problem may be due to the following: - Flow measurement defective - Impermissible feed-in of external flow (e.g. by nebuliser) - Mixer supplying excessive flow rate

O2 Sensor: Measured values and calibration values for inspiratory O2 measurement. Output voltage of O2 sensor is amplified directly at the sensor.

FiO2 (Vol%):	Measured O2 concentration with pressure compensation
(V):	Amplified sensor voltage at Pneumatic Controller PCB input. This voltage is read in twice on this PCB. Refer to Cal(V) for permissible voltage range.
Pmean:	Current mean pressure in tubing system in mbar. Required for pressure compensation of O2 measurement.

Cal (V)	<p>Amplified sensor voltage on calibration with 100 vol. O₂</p> <p>Permissible range: 1.257 to 5.644 V</p> <p>Voltage too low: End of sensor service life</p> <p>Voltage too high: O₂ measurement defective (O₂ amplifier or Pneumatic Controller PCB)</p>
Cal P (mbar)	<p>Air pressure allowance in mbar on calibrating O₂ measurement</p>

16.4.3 Diagnosis page "Microprocessor" of "Pneumatics"

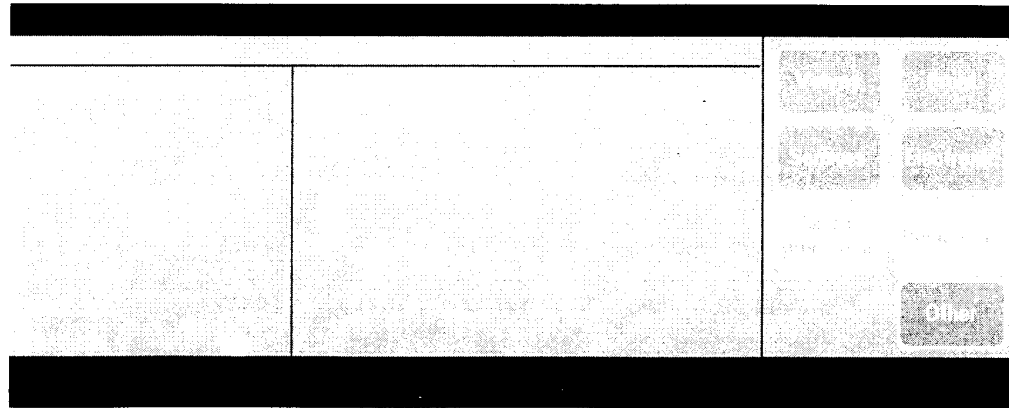


Fig. 57: Diagnosis page of "microprocessor" of "pneumatics"

Periphery of processor:

Status of processor system of Pneumatic Controller PCB and fan for cooling electronics in pneumatics section. Error message is given in the event of deviation. Fan must be detected within 1 minute.

ADC:

POutput of reference voltages of Pneumatic Controller PCB. Error message is given in the event of deviation.

Set values:

Uref5V = 4.9V to 5.1V

ADCref = 2.9V to 3.1V

DACref = 2.9V to 3.1V

16.5 Error list

16.5.1 Diagnosis page "Logbook" (error list)

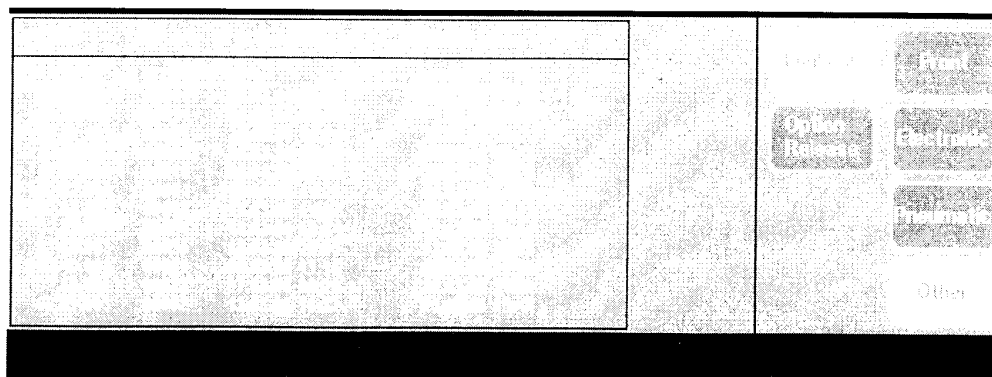


Fig. 58: Diagnosis page "logbook"

16.6 Structure of the Error List

All system errors (software and hardware) of the safety software are stored in the error list. The system errors are stored as follows:

Code	Number	First Occurrence	Last Occurrence
LL – NN – MMM	1	24.11.96 16:45	24.11.96 16:45
LL – NN – MMM	4	24.11.96 16:55	25.11.96 07:25

The error messages are stored in chronological order. The most recent error message will appear at the bottom of the error list. If a specific error message is already on the list, only the most recent event will be updated and the error number will be incremented. In this case, no line will be added to the error list.



16.7 Error Number Definition

LL	=	Allocation to a specific component, board, or software
NN	=	Type of error
MMM	=	More detailed description or enumeration

LL	NN	MMM	Description
00	XX	XXX	Normal monitoring. Stored in the user log only.
01	XX	XXX	Settings, etc. Stored in the user log only.
02	01 to 61	001 to 999	Errors detected by the safety software.
		71	Loudspeaker not detected.
	71	002	The flow measurement is faulty.
		003 to 006	Gold Cap capacitor.
		007	BOOT test is faulty.
		008	Generation of auxiliary alarm.
		009	The current through the piezo alarm generator is too high.
		010	The current through the piezo alarm generator is too low.
		011	The nebulizer valve monitoring is faulty.
		012	The loudspeaker monitoring circuit has detected an error.
		013	The loudspeaker monitoring circuit has detected an error.
		014	The +15 V voltage is too low.
		015	The +10 V voltage is too low.
		016	The A/D conversion for the O ₂ measurement is faulty.
		017	The O ₂ /AIR changeover valve control is faulty.
		018	Wrong nebulizer gas.
		019	The cold start recognition is faulty.
		020	The hardware initialization is faulty.
		021	Different quartz times.
	72	000 to 006	Errors that are detected by the safety software.

LL	NN	MMM	Description
		007 to 070	Errors that are detected by the ventilation software.
03	XX	XXX	Control unit components.
04	XX	XXX	Electronic assembly components. Components which are not located on the printed circuit boards.
	01	XXX	Power supply unit.
05	XX	XXX	Pneumatics components.
	01	XXX	Fan
	02	001	Reset-up line.
		002	Reset-down line.
		003	Disable line.
	04	001 to 004	O ₂ /AIR changeover valve.
06	XX	XX	Extensionbox components
07	XX	XXX	Software error (ROSI = operating system software)
08	XX	XXX	Future Expansion
09	XX	XXX	Miscellaneous
10	XX	XXX	Pneumatics Controller PCB
11	XX	XXX	HPSV Controller AIR PCB
12	XXX	XXX	HPSV Controller O ₂ PCB
13	XX	XXX	CPU 68332 PCB
	98	001	BOOT error.
14	XX	XXX	CO ₂ Carrier PCB
15	XX	XXX	Communication PCB
16	XX	XXX	Paediatric Flow PCB
17	XX	XXX	Grafik Controller PCB
18	XX	XXX	Pneumatics Motherboard PCB
19	XX	XXX	Electronics Motherboard PCB

Test List

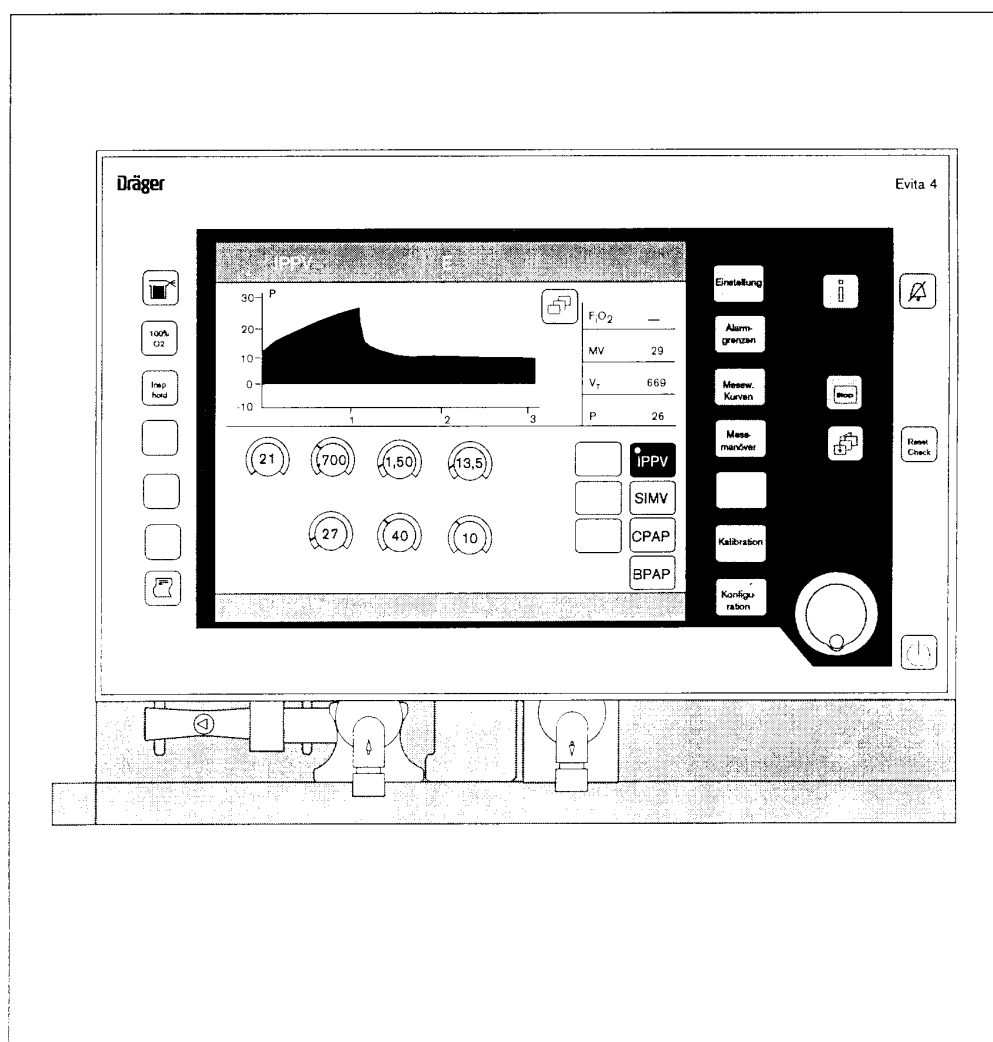
Evita 4

Folder no.:
5664.500

Revision:
11/95

Serial no.: _____

Installation site: _____



Test Equipment Required to Perform the Steps in the Test List

Pressure gauge –10 mbar to 10 mbar	Class 1.6
Pressure gauge 0 mbar to 160 mbar	Class 1.6
Flowmeter 10 L/min to 120 L/min	Class 1.6
Flowmeter 0.01 L/min to 14 L/min	Class 1.6
Syringe 50 mL	
T-piece or Y-piece	
Thermometer	
Test pressure regulator	

1 General Condition

Rear panel	<input type="checkbox"/>
Interface connection	<input type="checkbox"/>
Sensors with sensor cable	<input type="checkbox"/>
Sensor mount	<input type="checkbox"/>
Cooling air filter	<input type="checkbox"/>
Ambient-air filter	<input type="checkbox"/>
Lip seals and/or sealing washers	<input type="checkbox"/>
Inspiratory block	<input type="checkbox"/>
Locking function of the expiratory valve mount	<input type="checkbox"/>
Expiratory valve	<input type="checkbox"/>
Hose systems according to Instructions for Use	<input type="checkbox"/>
Instrument tray (if available)	<input type="checkbox"/>

1.1 Control Unit with Fastening

Housing	<input type="checkbox"/>
Labelling is legible	<input type="checkbox"/>
Screen keys	<input type="checkbox"/>
Synchro-generator	<input type="checkbox"/>
Control unit swivels and locks into place	<input type="checkbox"/>
Control unit is detachable	<input type="checkbox"/>
Rail fastening with mechanical interlock	<input type="checkbox"/>
Cable take-up reel	<input type="checkbox"/>
Control unit connection cable	<input type="checkbox"/>

1.2 CO₂ Sensor

- | | |
|---|--------------------------|
| Housing including anti-kink sleeve | <input type="checkbox"/> |
| Cable | <input type="checkbox"/> |
| Connector | <input type="checkbox"/> |
| Is the window in the sensor clean and undamaged | <input type="checkbox"/> |
| Has the span-check filter been fastened to the connecting cable | <input type="checkbox"/> |
| Is the window in the sensor of the cuvette for adults clean and undamaged | <input type="checkbox"/> |
| Is the window of the paediatric cuvette clean and undamaged | <input type="checkbox"/> |
| Holder for parking the CO ₂ sensor | <input type="checkbox"/> |
| Socket on the back panel of Evita 4 | <input type="checkbox"/> |

1.3 Accessories (if available)

- | | |
|------------------------|--------------------------|
| Trolley | <input type="checkbox"/> |
| Castors | <input type="checkbox"/> |
| Holder for humidifier | <input type="checkbox"/> |
| Cabinet | <input type="checkbox"/> |
| Multiple socket outlet | <input type="checkbox"/> |
| Fuses T 3.15A | <input type="checkbox"/> |

1.4 Special Accessories (if available)

- | | |
|-----------------------------|--------------------------|
| Resutator 2000 | <input type="checkbox"/> |
| Resutator 2000 for children | <input type="checkbox"/> |
| Baby Resutator | <input type="checkbox"/> |
| Hooks for Resutator | <input type="checkbox"/> |

2 Checking Accompanying Documents

Check that the set of accompanying documents is complete (Instructions for Use, etc.).

☐

3 Safety Check

Check the power cable for damage.

☐

Check the fuses which are accessible from outside. The fuses must conform to the specifications on the rear panel of the Evita 4.

☐

3.1 Protective Conductor Resistance

Perform a protective conductor test according to VDE 0751. $R \leq 0.2 \, \Omega$.

☐

3.2 Equivalent Device Leakage Current

Test the equivalent device leakage current according to VDE 0751. The first measured value should be $\leq 1,0 \, \text{mA}$. All subsequent measurements may exceed the first measured value by no more than 50% and should at the same time be $\leq 1,0 \, \text{mA}$.

☐

The battery of units provided with a DC module must be discharged.

4 Checking the Safety Valves

4.1 Checking the Emergency Breathing Valve

Connect the Evita 4 to the central gas supply.
Operate the Evita 4 without the test lung according to the following settings:

- CPAP mode
- Set O₂ to 21 vol.%
- Set PEEP to 4 mbar
- Set ASB to 0 mbar
- Set alarm limit "Paw high" to 10 mbar

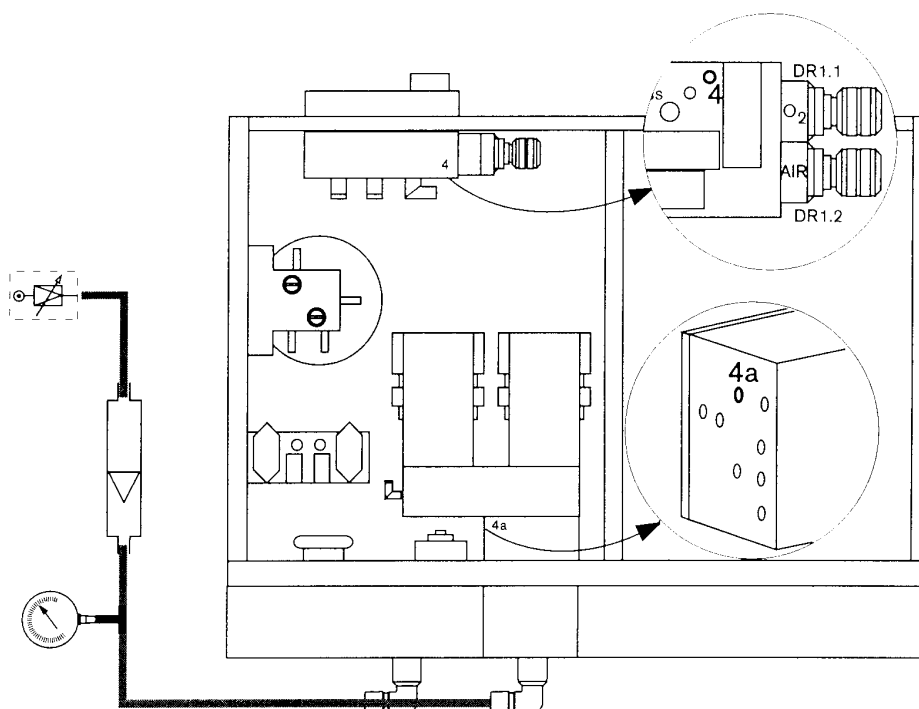
Supply a flow of approx. 50 L/min through the inspiratory port.

The flow should be blown off by the safety valve in the inspiratory block.



4.2 Checking the 100 mbar Safety Valve

Connect the Evita 4 to the central gas supply without switching it on. Open the unit.



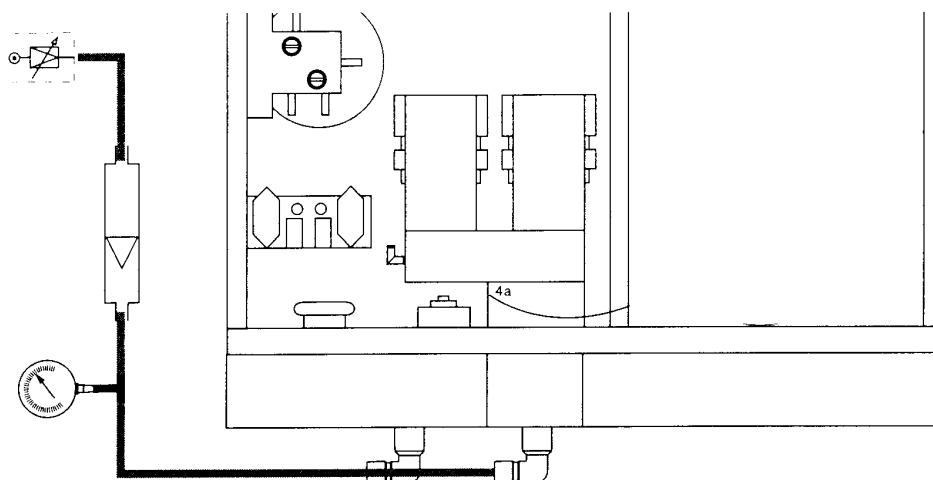
- Disconnect the hose from the connection (4a). Supply a pressure of 2 bar to the connection (4a).
- Supply a flow of 1L/min to the inspiratory port.

The pneumatic safety valve should open at a pressure of $(100 + 5)$ mbar. The pressure must not increase any further.



4.3 Checking the 10 mbar Safety Valve

Connect the Evita 4 to the central gas supply without switching it on.

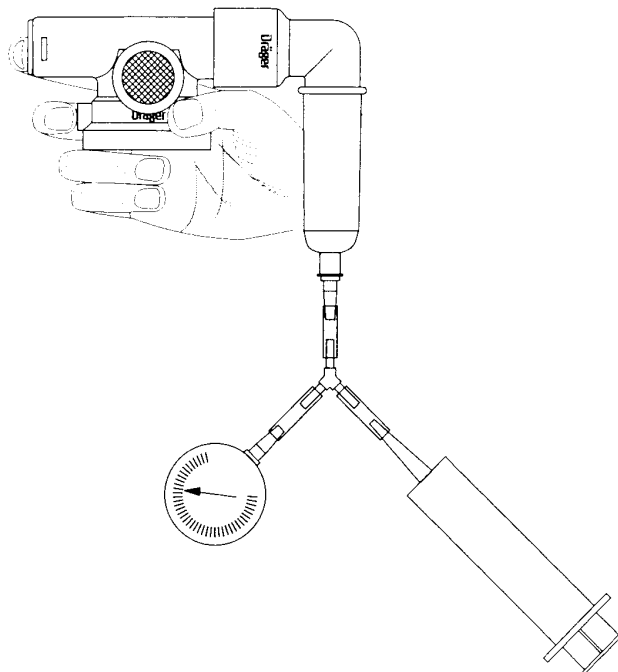


Supply a flow of $(1 \pm 0,2)$ L/min to the inspiratory port. The measured pressure should exceed 5 mbar.



4.4 Checking the Check Valve

Check the check valve without the expiratory diaphragm. Seal the openings with your fingers.



Build up a negative pressure of -4 mbar in the expiratory port using a syringe. After 10 seconds, the negative pressure should not have fallen below -1 mbar.



5 Checking the Temperature Measurement

Connect the temperature sensor which will indicate the room temperature.



6 Checking the CO₂ Sensor

Connect the test gas cylinder and the cuvette with the hose from the calibration set. Plug the CO₂ sensor onto the cuvette and enter the concentration of the test gas cylinder in the Evita 4. Calibrate the CO₂ sensor and check the concentration.



7 Power-On Test

Assemble the Evita 4 ready for operation and switch the unit on.

The Evita 4 runs a self-test. At the end of the self-test all LEDs come on for approx. 2 s.

After the power-on test, set the Evita 4 to the standby mode.

7.1 Checking in Accordance with the Internal Device Checklist

Carry out the internal "device check".



8 Mains Failure Alarm Without the DC Module

Switch the Evita 4 to any mode of ventilation.
Disconnect the unit from mains. The unit will give an audible mains failure alarm.

☐

Reconnect the unit to mains. After a brief self-test, the Evita 4 should start with the previously set mode of ventilation.

☐

In case the unit is equipped with a DC module, there will be no mains failure alarm. The Evita 4 must be operated without mains supply until the internal battery will be discharged. Only then will a mains failure alarm be given.

9 Place unit at the user's disposal ready for operation.

10 Test performed

Date: _____

Name: _____

Contents

1	Replacing the O ₂ Sensor	1
2	Replacing the Ambient-Air Filter	2
3	Replacing the Cooling-Air Filter	3
4	Replacing the Battery for Data Protection	4
5	Replacing the Real-Time Clock	7
6	Pressure Regulator	9
6.1	Replacing the AIR Pressure Regulator	9
6.2	Adjusting the AIR pressure regulator.....	14
6.3	Replacing the O ₂ Pressure Regulator	15
6.4	Calibrating the O ₂ Pressure Regulator	15

1 Replacing the O₂ Sensor

The O₂ sensor must be replaced when the "O₂ measurement inop" message appears and when it is no longer possible to calibrate the O₂ sensor.

- Fold up the control unit.
- Remove the screw **A** of the cover **B**.
- Remove the cover **B**.

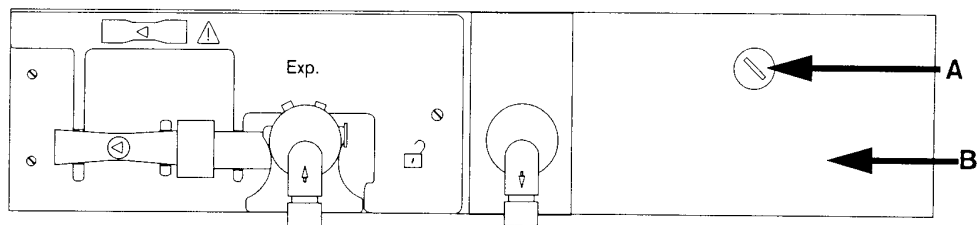


Fig. 1: Front view pneumatics

- Remove the knurled screws **C** and the sensor housing **D**.

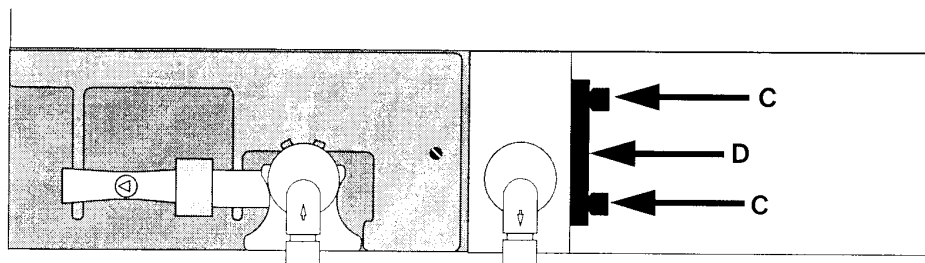


Fig. 2: Front view pneumatics (dismounting the O₂ sensor)

- Remove the O₂ sensor.



Important

The O₂ sensor is special waste. Dispose of the O₂ sensor according to your local waste disposal regulations.

- Place the new O₂ sensor with the ring-form printed conductors on the contacts of the sensor housing.
- Assemble the new O₂ sensor in reverse order.
- Calibrate the new O₂ sensor.

2 Replacing the Ambient-Air Filter

The ambient-air filter must be cleaned or replaced after 4 weeks. The ambient-air filter must be replaced after 1 year.

- Fold up the control unit.
- Remove the screw **A** of the cover **B**.
- Remove the cover **B**.

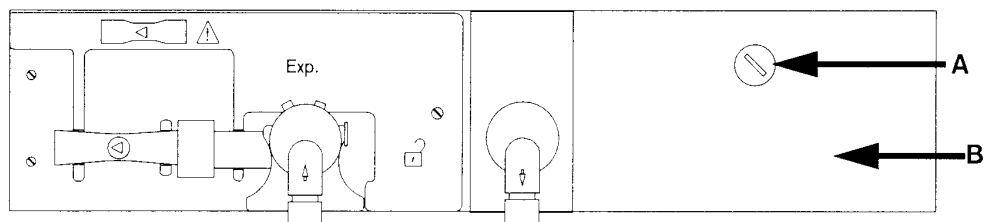


Fig. 3: Front view pneumatics

- Remove the ambient-air filter from the cover.
- Assemble the new ambient-air filter in reverse order.

3 Replacing the Cooling-Air Filter

The cooling-air filter must be cleaned or replaced after 4 weeks. The cooling-air filter must be replaced after 1 year.

- Remove the cooling-air filter from the mount.

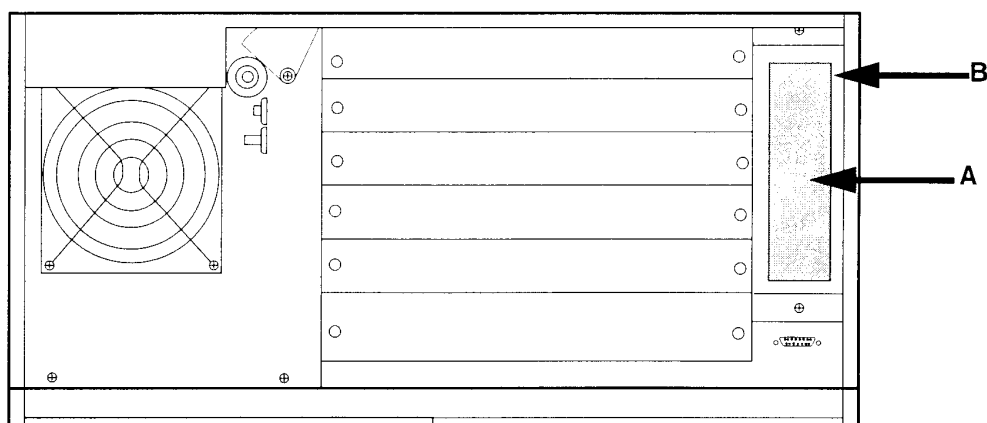


Fig. 4: Rear view (dismounting the cooling-air filter)

- Replace the cooling-air filter or clean the cooling-air filter with warm water (warm water with detergent).
- Dry the cooling-air filter.
- Place the cooling-air filter into its mount avoiding any creases.

4 Replacing the Battery for Data Protection

The battery for data protection must be replaced every 2 years.



Caution

Electrostatic discharges can damage the electronic components. Use an ESD protection mat and a wrist strap when handling electronic modules.

- Switch the Evita on and allow it to warm up for 2 minutes (in order to charge the capacitor for power supply to the RAMs).



Important

Data loss will occur if the RAM supply voltage is not present. Replace the battery within one minute's time. Pay attention to correct polarity when installing the battery.

- Write down the customer-specific settings (alarm limits, screen layout, etc.) for later entry in case they got lost.
- Switch the Evita off.

- Remove the fixing screws of the CPU 68332 PCB.

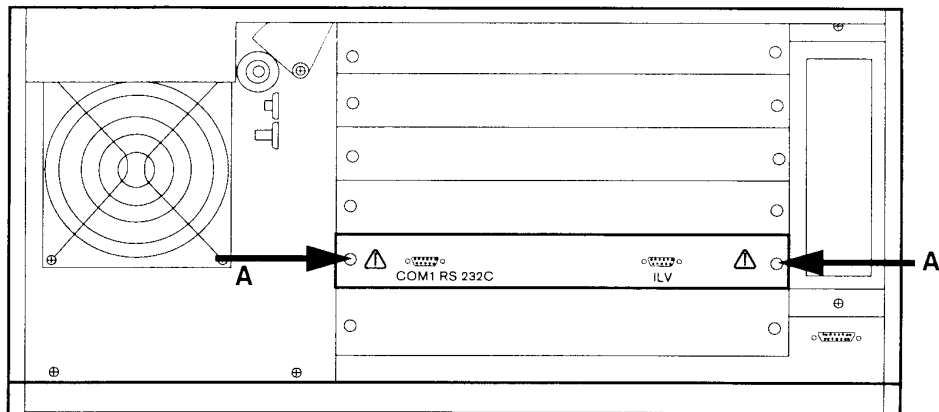


Fig. 5: Rear view (dismounting the CPU 68332 PCB)

- Remove the CPU 68332 PCB.
- Remove the battery.

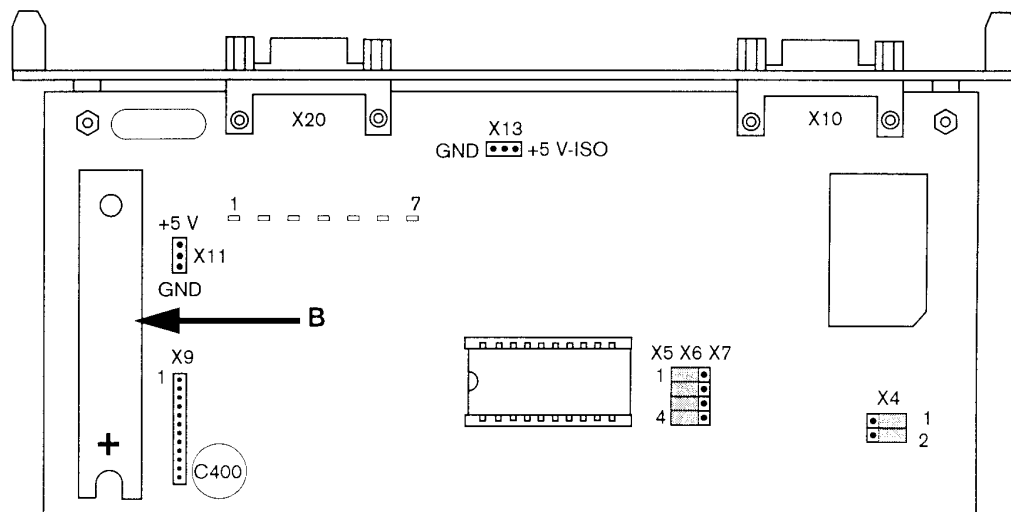


Fig. 6: Component mounting diagram CPU PCB (replacing the batteries)



Important

The battery is special waste. Dispose of the battery according to your local waste disposal regulations.

- Place the new battery into the battery mount.
- Install the CPU 68332 PCB in the Evita.
- Secure the CPU 68332 PCB with the screws.
- Check the Evita according to the corresponding test list.

5 Replacing the Real-Time Clock

The real-time clock must be replaced every 6 years or if the clock of the Evita is no longer operational.



Caution

Electrostatic discharges can damage the electronic components.
Use an ESD protection mat and a wrist strap when handling electronic modules.

- Switch the Evita off.
- Remove the CPU 68332 PCB (see "Replacing the Battery for Data Protection").
- Remove the real-time clock (D35).

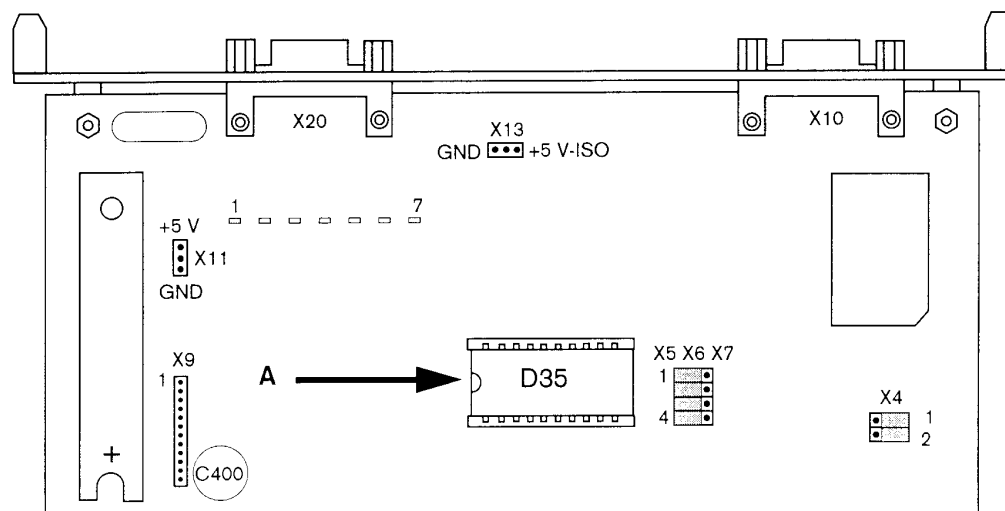


Fig. 7: Component mounting diagram CPU PCB (replacing the real-time clock)



Important

The real-time clock contains a battery. Batteries are special waste. Dispose of the real-time clock according to your local waste disposal regulations.



Caution

Polarity-reversed ICs will be destroyed. Insert the real-time clock into the IC header with correct polarity.

- Insert the new real-time clock into the IC header on the CPU 68332 PCB.
- Install the CPU 68332 PCB in the Evita.
- Secure the CPU 68332 PCB with the screws.
- Switch the Evita on.
- Set the time and the date.
- Check the Evita according to the corresponding test list.

6 Pressure Regulator

6.1 Replacing the AIR Pressure Regulator

The pressure regulators must be replaced every 6 years.

- Switch the Evita off.
- Remove the pressure connections of the Evita from the central gas supply.
- Remove you the Phillips screws **A**.
- Remove the rear panel **B**.

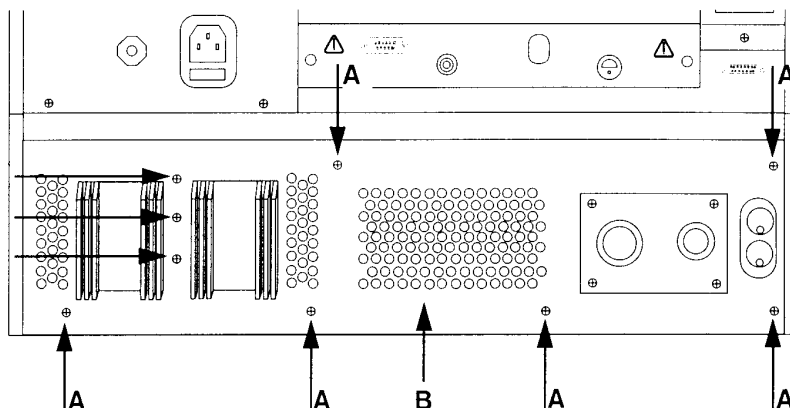


Fig. 8: Rear view (rear panel fitted)

- Remove the screw **C** on the left side panel of the Evita.
- Loosen the screw **D** from the inside of the left side panel of the Evita.

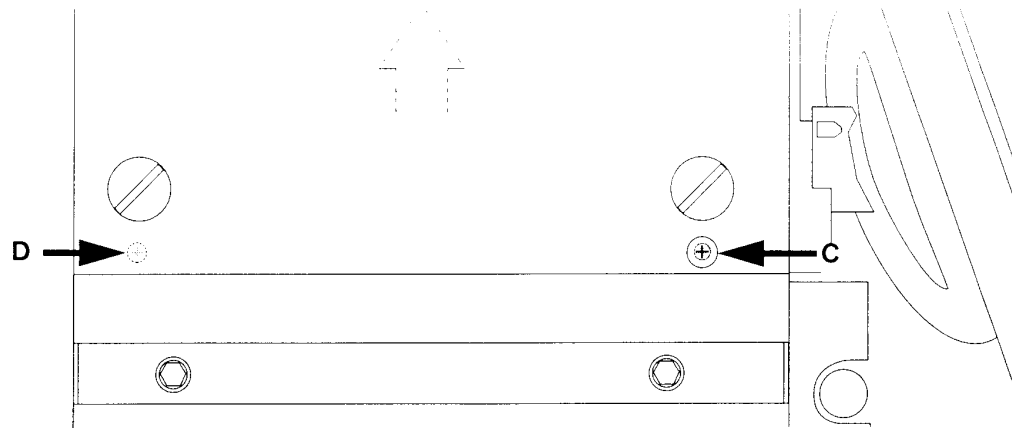


Fig. 9: Side view with control unit

- Remove the control unit and suspend it from the left rail.
- Secure the control unit using the retaining clamp. The retaining clamp is located on the back of the control unit.

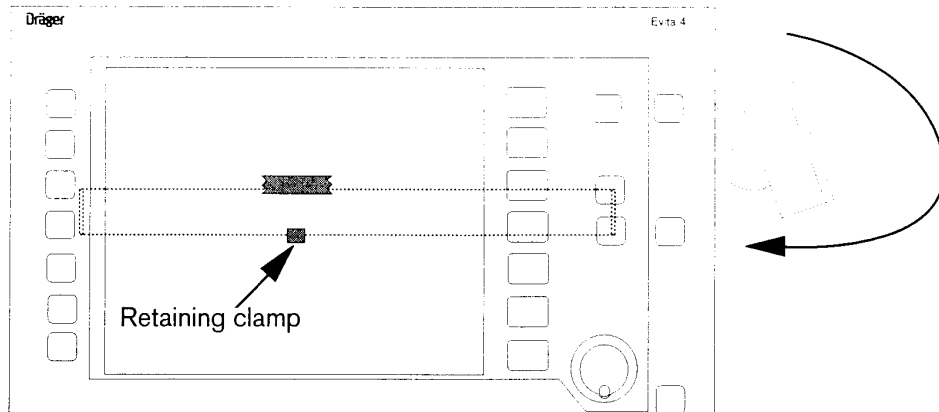


Fig. 10: Side view with control unit

- Fold up the electronics assembly until the mount locks into place. The mount is located at the bottom of the Evita.
- Remove the flat-head screws **E**.

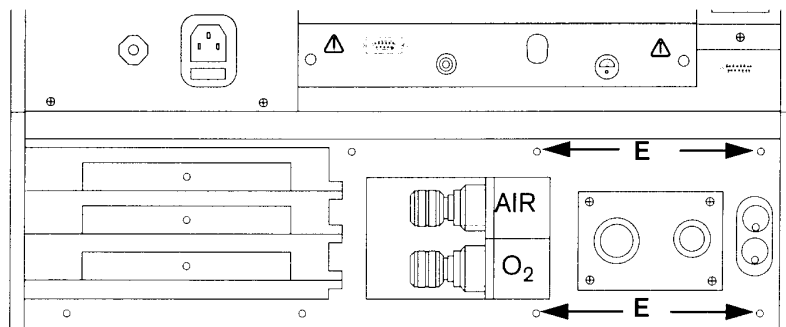


Fig. 11: Removing the gas connection block

- Disconnect the supply hoses **F** from the gas connection block.
- Remove the gas connection block from the rear panel.
- Turn the gas connection block until the pressure regulator shows upwards.

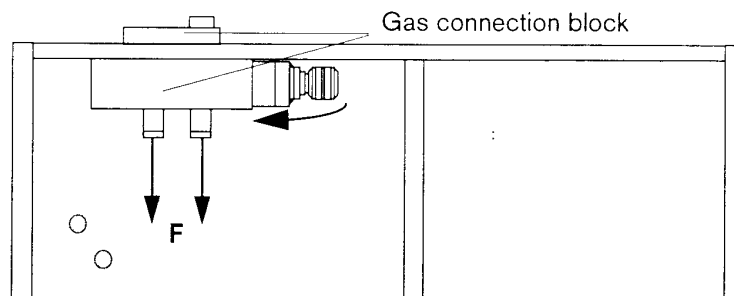


Fig. 12: Dismounting the gas connection block

- Remove the slotted-head screws **G** from the AIR pressure regulator.

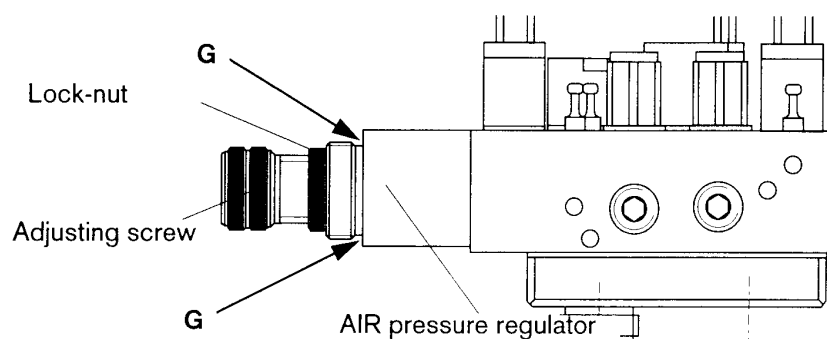


Fig. 13: Gas connection block with AIR pressure regulator

- Remove the AIR pressure regulator.
- Loosen the lock-nuts of the adjusting screw on the new pressure regulator.
- Rotate the adjusting screw on the new pressure regulator three turns counterclockwise. This action closes the pressure regulator.



Important

Used sealing washers may cause leaks. When replacing the pressure regulator, always replace the sealing washers with new ones.



Important

An incorrectly mounted pressure regulator may damage the device. The coding (e.g. 1) at the bottom of the pressure regulator and at the gas connection block identify the inlets. The inlets must be mounted on top of each other.

- Mount the new pressure regulator by following the reverse method used for dismantling.
- Adjust the new pressure regulator (see "Adjusting the Pressure Regulator").
- Check the Evita according to the corresponding test list.

6.2 Adjusting the AIR pressure regulator

Adjust the pressure regulator as follows:

- Fold up the electronics assembly (see "Replacing the AIR pressure regulator")
- Prepare the following test setup.

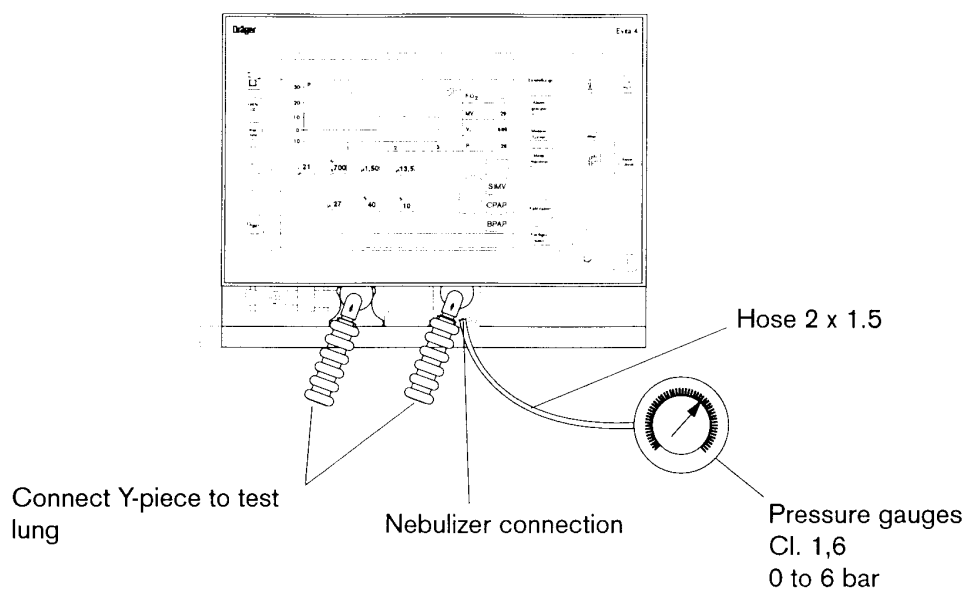


Fig. 14: Test setup

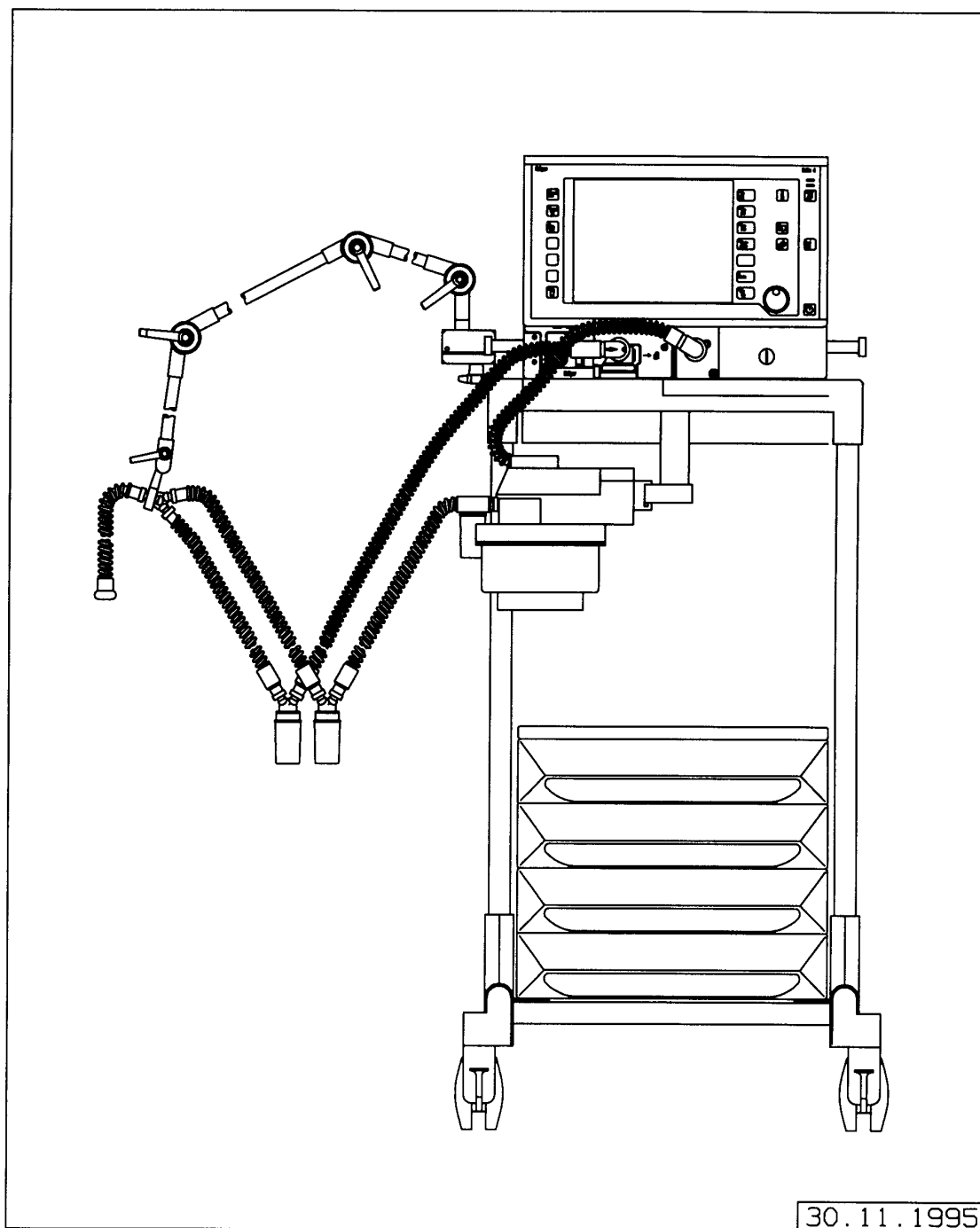
- Open the AIR gas supply only.
- Switch the Evita on.
- Select the „IPPV" mode with extended inspiratory time.
- Switch the nebulizer on.
- Set the pressure on the pressure gauge to $P = 2 \text{ bar} \pm 0.2 \text{ bar}$ by turning the adjusting screw on the pressure regulator clockwise.
- Lock the adjusting screw with the lock-nut.
- Secure the lock-nut with locking varnish.
- Check the Evita according to the corresponding test list.

6.3 Replacing the O₂ Pressure Regulator

- To replace the O₂ pressure regulator, follow the same method used for replacing the AIR pressure regulator.

6.4 Calibrating the O₂ Pressure Regulator

- To calibrate the O₂ pressure regulator, follow the same method used for calibrating the AIR pressure regulator but open the O₂ gas supply only.



Diese Ersatzartikelliste gilt für Sachnummer:
This spare parts list is valid for part no.:

Sach-Nr. Part No.	Benennung Description
8411740	EVITA 4 CE EVITA 4 CE
8412800	EVITA 4 INTERNATIONAL EVITA 4 INTERNATIONAL
8412970	EVITA 4 FRANKREICH EVITA 4 FRANCE
8412980	EVITA 4 USA EVITA 4 USA
8412990	EVITA 4 JAPAN EVITA 4 JAPAN
8413563	RUESTSATZ NEO-FLOW KIT NEO-FLOW

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Inhaltsverzeichnis der Bilder

Summary of pictures

Bild Picture	Bezeichnung Description	Sach-Nr. Part No .	E-Liste Spare parts list
1	EVITA 4 MIT AQUAPOR EVITA 4 WITH AQUAPOR		
2	EVITA 4 MIT ANF.-GRUNDEINHEIT MR730 EVITA 4 W.HUMID.BAS.UNIT MR730		
3	GRUNDGERAET BASIC UNIT		
4	EVITA 4 INTERNATIONAL EVITA 4 INTERNATIONAL		
5	EVITA 4 INTERNATIONAL EVITA 4 INTERNATIONAL		
6	PNEUMATIK, (GASANSCHLUSS,GEHÄUSE) PNEUMATIC (GAS SUPPLY,HOUSING)		
7	PNEUMATIK, (PLATINENFUEHRUNG) PNEUMATIC (BOARD GUIDE)		
8	PNEUMATIK,(PEEP-VENTIL,DRUCKMESSBLOCK) PNEUMATIC(PEEP VALVE,PRESS.REDUCER BLOCK)		
9	PNEUMATIK, (INSPIRATIONSBLOCK,PARALLELM.) PNEUMATIC (INSPIRATION BLOCK)		
10	PNEUMATIK, (SEITENTEIL 2 H) PNEUMATIC (SIDE PART 2H)		
11	PNEUMATIK, (SEITENTEIL 2 H) PNEUMATIC (SIDE PART 2 H)		
12	RUESTSATZ SPO2 MODIFICATION KIT SPO2	8413035	
13	RUESTSATZ CO2 MODIFICATION KIT CO2	8411720	
14	SCHLAUCHPLAN TUBING PLAN	8412319	
15	GEHAEUSE, KPL. HOUSING, CPL.	8412356	
16	ZWISCHENPLATTE, KPL. DISTANCE PLATE, CPL.	8412633	
17	HEIZUNGSHALTER, KOMPL. HEATING SUPPORT, CPL.	8412734	
18	INSPIRATIONSBLOCK, KOMPL. INSPIRATION BLOCK, CPL.	8412981	
19	PARALLELMISCHER PARALLEL MIXER	8411550	
20	GASANSCHLUSS (EVITA 4)	8412313	

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Bild Picture	Bezeichnung Description	Sach-Nr. Part No .	E-Liste Spare parts list
	GAS SUPPLY (EVITA 4)		
21	DRUCKMESSBLOCK, KPL. PRESSURE METERING BLOCK, CPL.	8412210	
22	PAT.-SYST.EVITA NEUE PNEUMATIK PAT.SYST.EVITA NEW PNEUMATIC	8410580	
23	ELEKTRONIK (LEITERPLATTEN) ELECTRONIC (PRINTED BOARDS)	8412835	
24	ELEKTRONIK (SEITENTEIL 4 H) ELECTRONIC (SIDE PART 4 H)		
25	FRONTPLATTE, KPL. FRONT PANEL, CPL.	8411661	
26	BEDIENTEIL OPERATING DEVICE	8412720	
27	BEDIENTEIL (VERRIEGELUNG) OPERATING DEVICE (LOCK)		
28	BEDIENTEIL (DREHGEBER) OPERATING DEVICE(SHAFT ENCODER)		
29	DISPLAY TOSHIBA, KOMPL. DISPLAY TOSHIBA, CPL.	8411718	
30	DISPLAY SHARP, KOMPL. DISPLAY SHARP, CPL.	8411767	
31	DISPLAY NEC, KOMPL. DISPLAY NEC, CPL.	8411714	
32	GELENKARM 240-GRD. HINGED BRACKET 240-DEGREE	8409609	
33	HALTER SUPPORT	8412219	
34	FAHRGESTELL CARRIAGE	8411680	
35	FAHRGESTELL (UNTERGESTELL) CARRIAGE (UNDERCARRIAGE)		
36	AUFNAHME, KOMPL. RECEIVER, CPL.	8408901	
37	AUFNAHME, KOMPL.(HALTER) RECEIVER, CPL. (SUPPORT)		
38	AUFNAHME, KOMPL.(KLAPPE) RECEIVER, CPL. (FLAP)		
39	SEITENTEIL, RECHTS SIDE PART, RIGHT	8409012	
40	SEITENTEIL, LINKS SIDE PART, LEFT	8409011	
41	RUESTSATZ STECKDOSENLEISTE	8409021	

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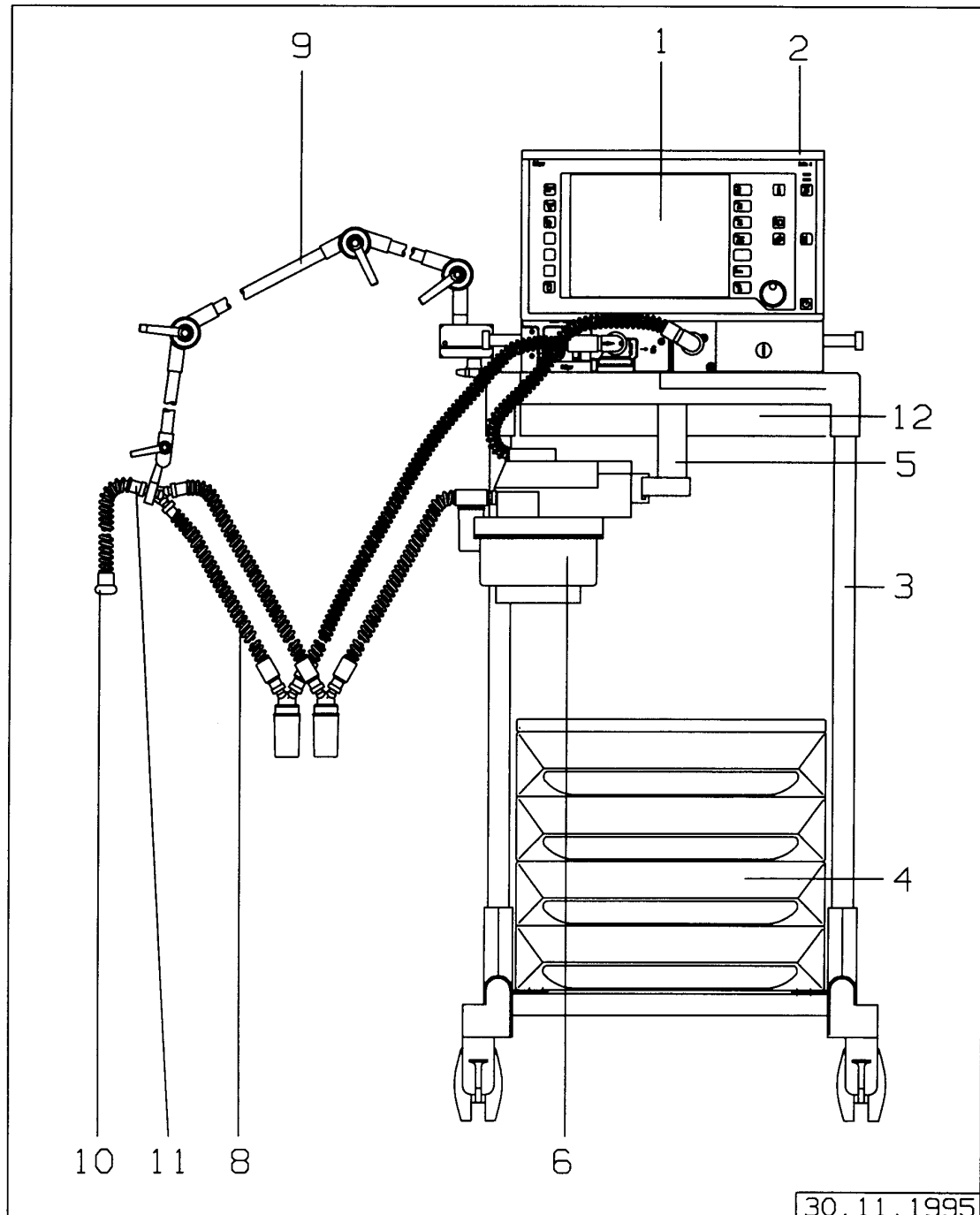
EVITA 4

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Bild Picture	Bezeichnung Description	Sach-Nr. Part No.	E-Liste Spare parts list
	MODIFICATION KIT MULTIPLE SOCKET		
42	O2-VERTEILER RUESTSATZ EVITA O2-DISTRIBUTOR MOD.KIT EVITA	8409010	
43	SET SCHRANKBEFESTIGUNG EVITA FIXING SET FOR CUPBOARD EVITA	8409018	
44	SCHLAUCHSET K F+P HOSE SET F+P	8412081	
45	SCHLAUCHSET E "DIE BLAUEN" HOSE SET E "BLUE"	8412092	
46	SCHLAUCHSYSTEM E F+P "BLAUE" HOSE SYSTEM E F+P "BLUE"	8412108	
47	BEFEUCHTERKAMMER MR 340 HUMIDIFIER CHAMBER MR 340	8411047	
48	BEFEUCHTERKAMMER MR 370 HUMIDIFIER CHAMBER MR 370	8412217	
49	HEIZPLATTE 230V, VOLLST. HOT PLATE 230V, CPL.	8411054	
50	ANFEUCHTER-GRUNDEINHEIT MR 730 RESPIRATORY HUMIDIFIER MR 730	8411046	
51	SCHLAUCHSET F.+P. HOSE SET F.+P.	8411041	
52	ATEMGASANFEUCHTER AQUAPOR HUMIDIFIER AQUAPOR	8405020	
53	PNEUM.MED.VERNEBLER (EVITA 4) PNEUM.MEDIC.NEBULIZER EVITA 4	8412935	
54	HOCHDRUCK-WASSERFALLE AIR HIGH PRESSURE WATER TRAP AIR	8412628	
55	WASSERABSCHEIDER, KOMPL. WATER SEPARATOR, CPL.	8413225	
56	FAHRGESTELL (MSU-TIEF) MOBILE TROLLEY (MSU)	8411965	
57	FAHRGESTELL (MSU-TIEF) MOBILE TROLLEY (MSU)	8411965	
58	FAHRGESTELL (MSU-HOCH) MOBILE TROLLEY (MSU-HIGH)	8411950	
59	FAHRGESTELL (MSU-HOCH) MOBILE TROLLEY (MSU-HIGH)	8411950	
60	ANFEUCHTERHALTER, KOMPL. HUMIDIFIER RACK, COMPL.	8411956	
61	FLASCHENHALTER, KOMPL. CYLINDER SUPPORT, CPL.	8411970	

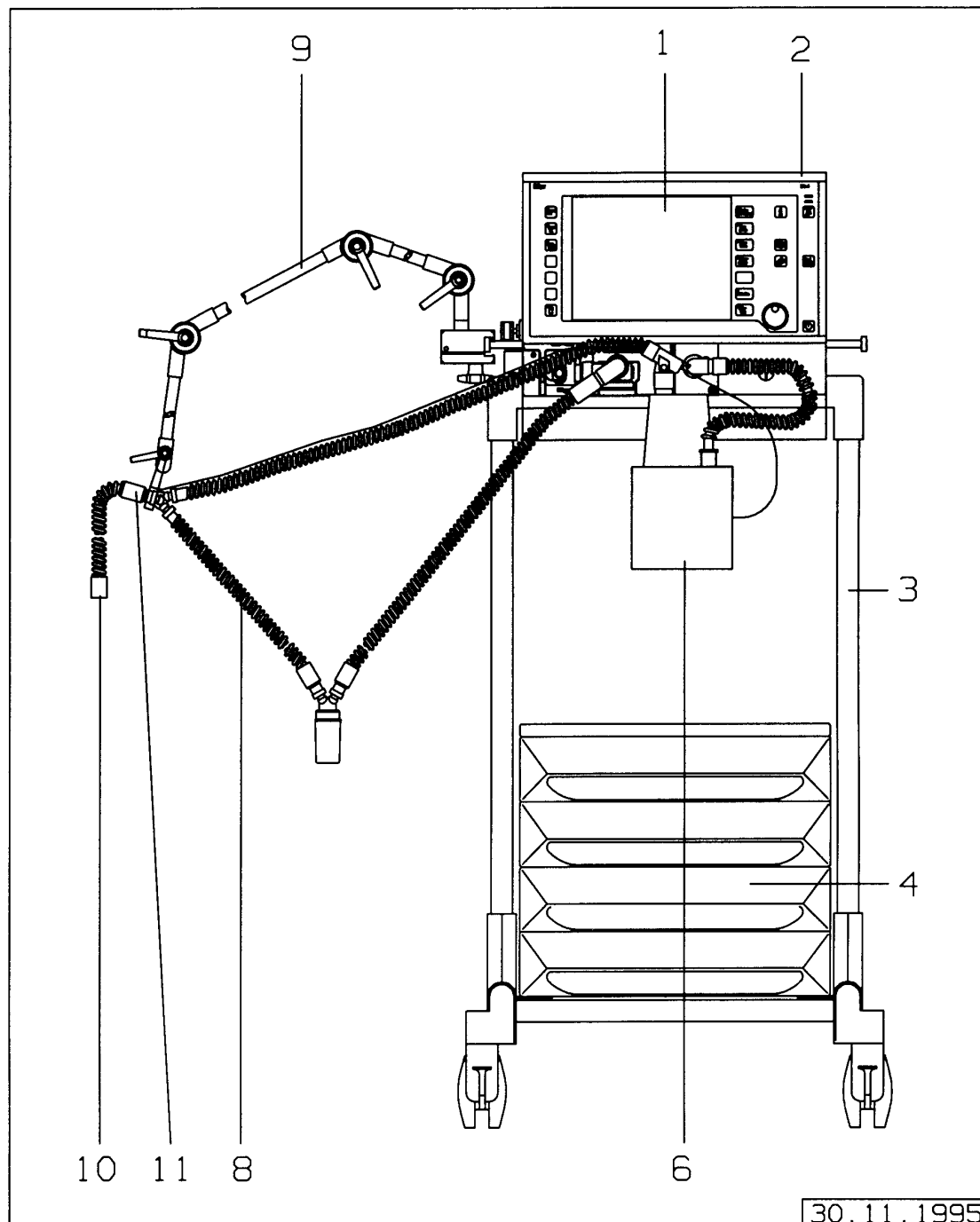
EVITA 4 MIT AQUAPOR
EVITA 4 WITH AQUAPOR

Bild/Picture 1



EVITA 4 MIT ANF.-GRUNDEINHEIT MR730
EVITA 4 W.HUMID.BAS.UNIT MR730

Bild/Picture 2



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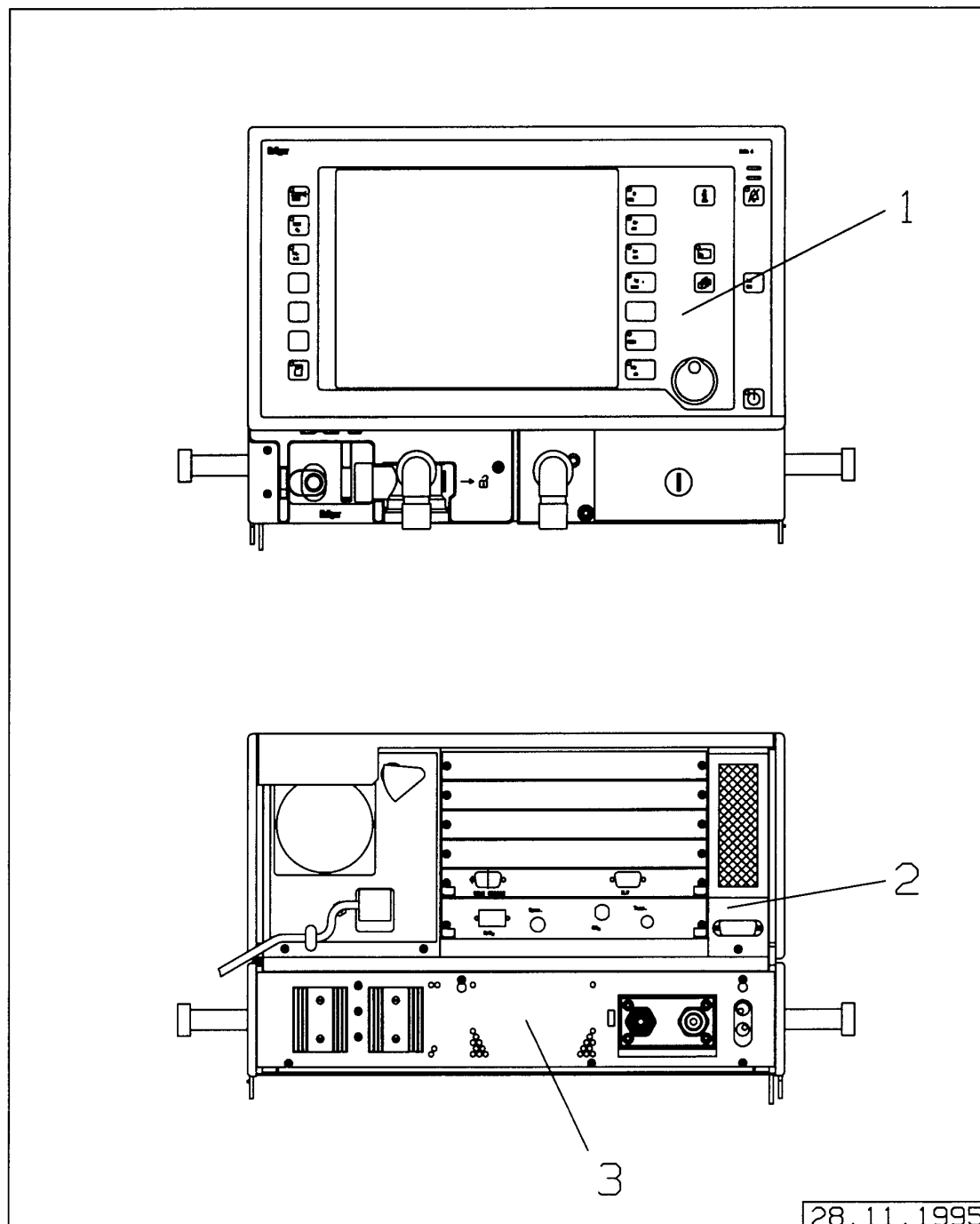
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	EVITA 4 INTERNATIONAL EVITA 4 INTERNATIONAL	8412800		
	EVITA 4 FRANKREICH EVITA 4 FRANCE		8412970	
	EVITA 4 USA EVITA 4 USA		8412980	
	EVITA 4 JAPAN EVITA 4 JAPAN		8412990	
	EVITA 4 CE EVITA 4 CE		8411740	
2	ABLAGESCHALE EVITA 4 TRAY EVITA 4		8412723	
3	FAHRGESTELL CARRIAGE		8411680	
4	SCHRANK 4H (2 SCHUBLADEN) CUPBOARD 4H (2 DRAWERS)		M31795	
	SCHRANK 8H (4 SCHUBLADEN) CUPBOARD 8H (4 DRAWERS)		M31796	
5	HALTERUNG FIXING DEVICE		8408959	
6	ANFEUCHTER-GRUNDEINHEIT MR 730 RESPIRATORY HUMIDIFIER MR 730		8411046	
	ATEMGASANF. AQUAPOR (220-240V) HUMIDIFIER AQUAPOR (220-240V)		8405020	
8	SCHLAUCHSET E "DIE BLAUEN" HOSE SET "BLUE" ADULTS		8412092	
9	GELENKARM 240-GRD. HINGED BRACKET 240 DEGR.		8409609	
10	KAPPE (11 MM) CAP (11 MM)		8401644	5
11	12ER-SATZ NORMKONNEKTOR,E,KSTF SET 12 STAND.CONE E PLASTIC		8403685	

GRUNDGERAET
BASIC UNIT

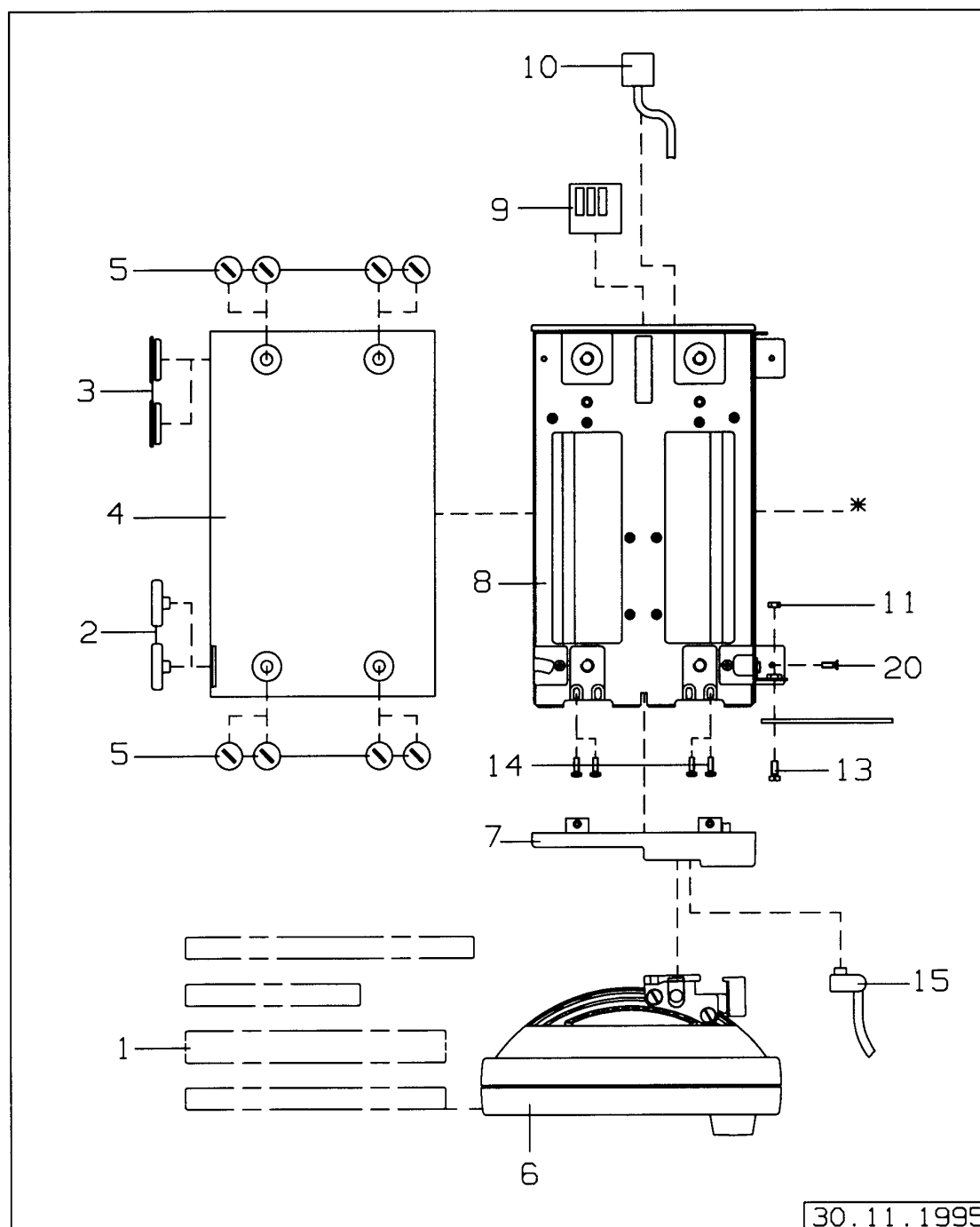
Bild/Picture 3



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	BEDIENTEIL (EVITA 4) OPERATING DEVICE (EVITA 4)		8412720	
2	ELEKTRONIK ELECTRONIC	8412835		
3	PNEUMATIK PNEUMATIC (EVITA 4)	8412360		

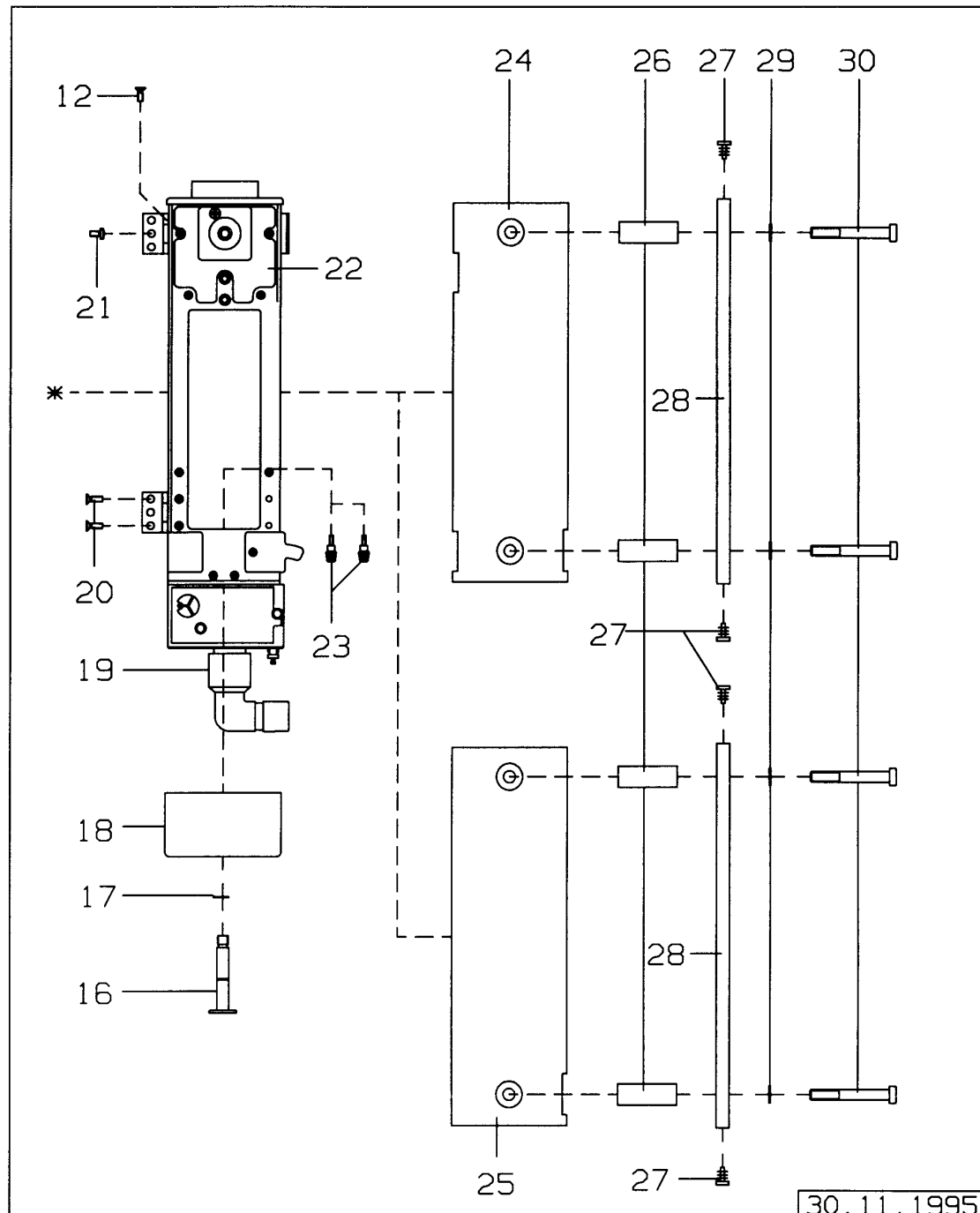
EVITA 4 INTERNATIONAL
EVITA 4 INTERNATIONAL

Bild/Picture 4



EVITA 4 INTERNATIONAL
EVITA 4 INTERNATIONAL

Bild/Picture 5



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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-30	EVITA 4 INTERNATIONAL EVITA 4 INTERNATIONAL	8412800		
1	EINSCHUBSTREIFEN (INTERN.) PLUG-IN STRIPE (INTERN.)	8412380		
2	VERSCHLUSS-STOPFEN VENT PLUG	8412857		
3	VERSCHLUSS-STOPFEN VENT PLUG	8412858		
4	HAUBE 4H, 1B HOOD 4H, 1B	8412379		
5	SCHRAUBE SCREW		2M17288	20
6	BEDIENTEIL (EVITA 4) OPERATING DEVICE (EVITA 4)		8412720	
7	FRONTPLATTE,KPL. FRONT PANEL, CPL.	8411661		
8	ELEKTRONIK ELECTRONIC	8412835		
9	TYPENSCHILD TYPE PLATE	8411677		
10	NETZLEITUNG, 3M SUPPLY MAIN, 3M		1824481	
11	MUTTER M 5 DIN 934 NUT M5 DIN 934-M, A4/051		1283081	
12	SCHRAUBE AM4X10DIN965 SCREW AM 4X10 A4/051-H DIN 965		1315803	
13	DIN 84-AM5X12-A2 DIN 84-AM5X12-A2	1333836		
14	LINSENSCHRB.DIN7985-M4X12-A2-H OVAL HEAD SCR.DIN7985-M4X12-A2		1341790	20
15	VERBINDUNGSKABEL LV02147 CONNECTING CABLE LV02147	1839780		
16	SCHRAUBE SCREW	8412378		
17	SICHERUNGSSCHEIBE 7 DIN6799 NG LOCK WASHER 7 DIN 6799	1309773		
18	HAUBE HOOD	8412375		
19	PAT.-SYST.EVITA NEUE PNEUMATIK PAT.SYST.EVITA NEW PNEUMATIC		8410580	
20	DIN 965-M4X12-A4-H	1339966		

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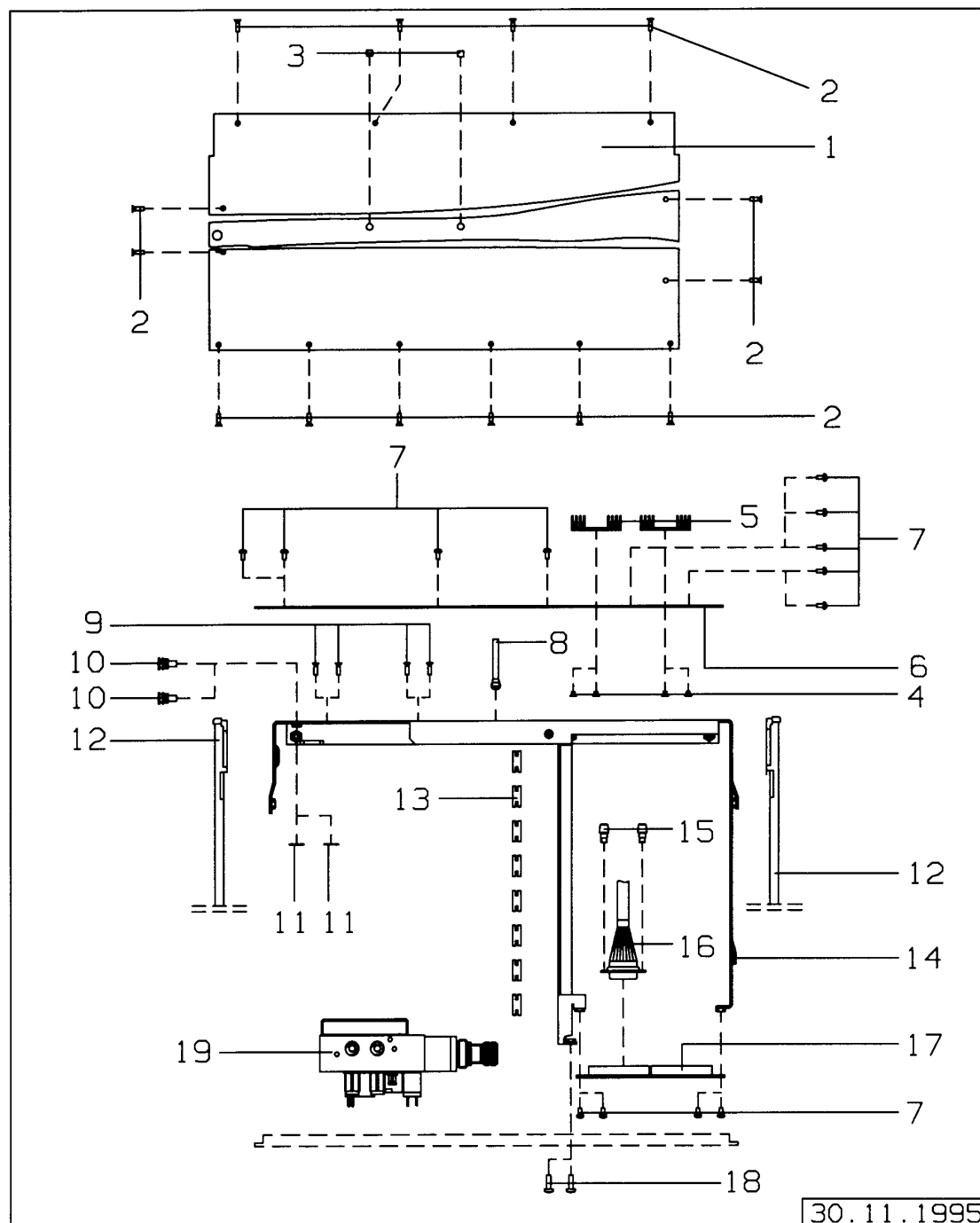
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	DIN 965-M4X12-A4-H			
21	DIN 7985-M4X8-A2-H DIN 7985-M4X8-A2-H	1340778		
22	PNEUMATIK PNEUMATIC (EVITA 4)	8412360		
23	RAENDELSCHRAUBE NG KNURLED SCREW	8306225		
24	SEITENWAND 2 H SIDE PANEL 2 H	8408369		
25	SEITENWAND 2H,RECHTS SIDE WALL 2H, RIGHT	8412355		
26	BUCHSE SOCKET	8406504		
27	VERSCHLUSS-STOPFEN VENT PLUG		G60455	10
28	SCHIENE RAIL		8406763	
29	FEDERRING 8 DIN7980-X12CRNI SPLIT WASHER 8 DIN7980-X12CRNI		1314440	20
30	SCHRAUBE M 8X60 DIN 6912-A2 SCREW M 8X60 DIN 6912-A2		1329952	5

PNEUMATIK, (GASANSCHLUSS,GEHÄUSE)
PNEUMATIC (GAS SUPPLY,HOUSING)

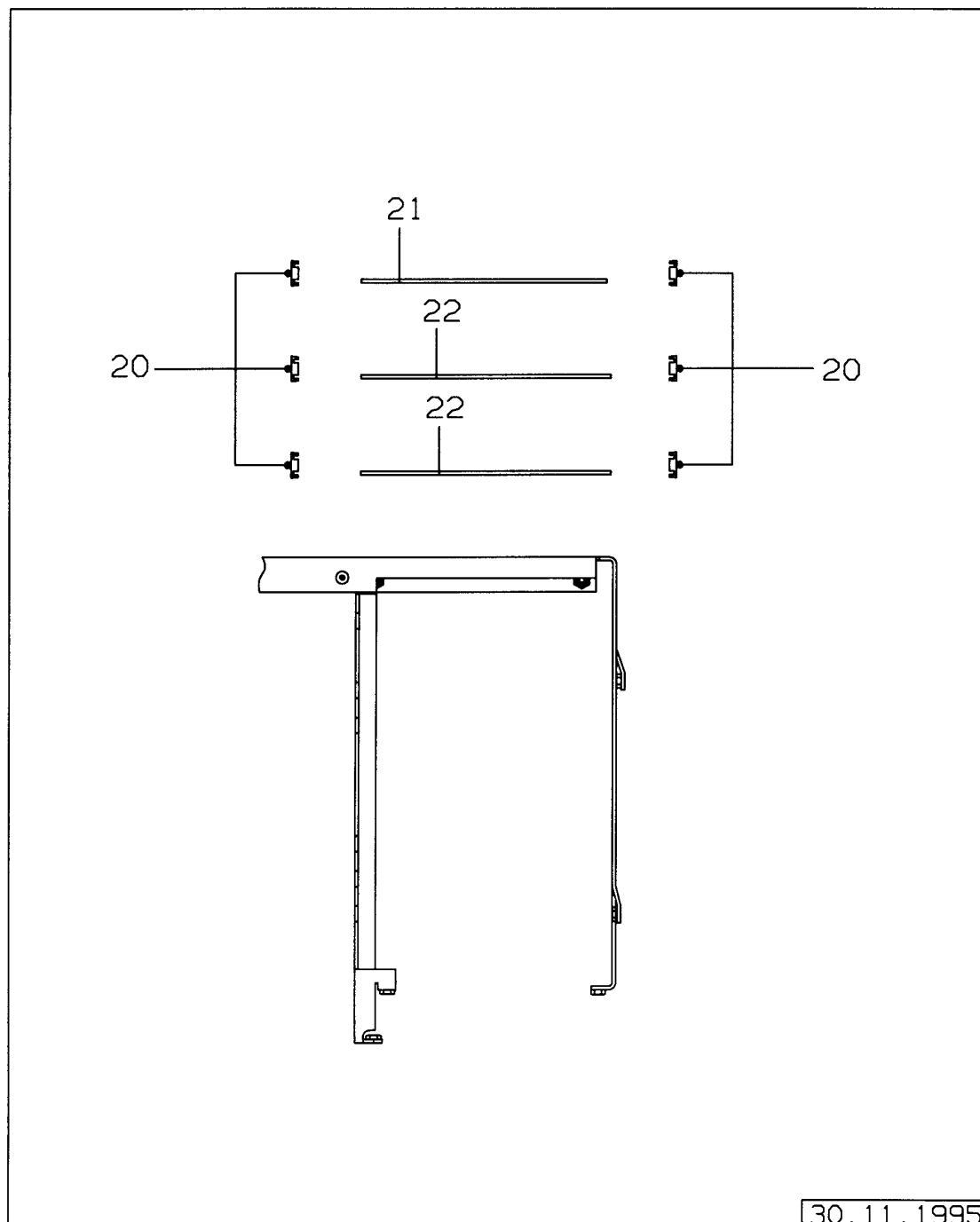
Bild/Picture 6



30.11.1995

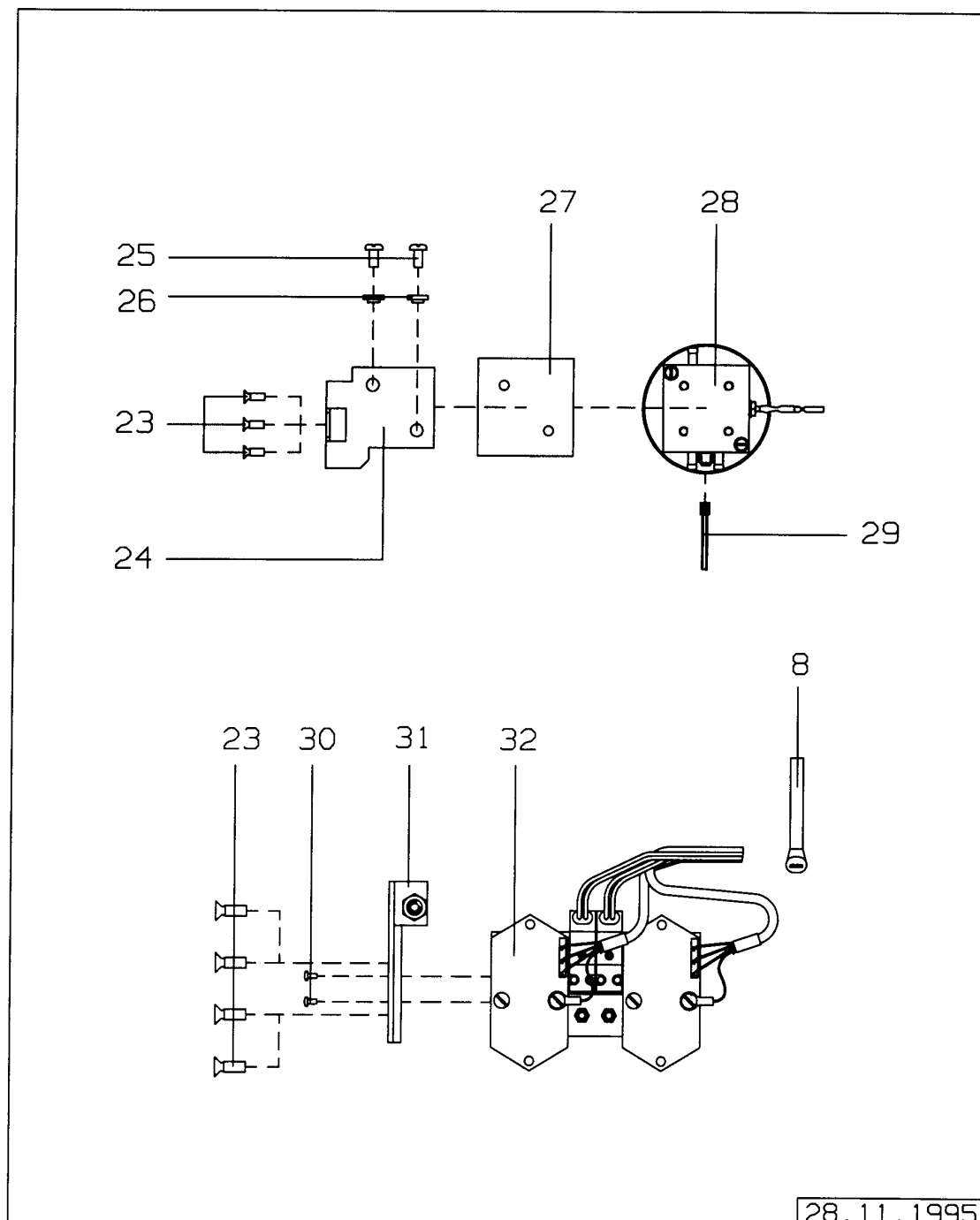
PNEUMATIK, (PLATINENFUEHRUNG)
PNEUMATIC (BOARD GUIDE)

Bild/Picture 7



PNEUMATIK,(PEEP-VENTIL,DRUCKMESSBLOCK)
PNEUMATIC(PEEP VALVE,PRESS.REDUCER BLOCK)

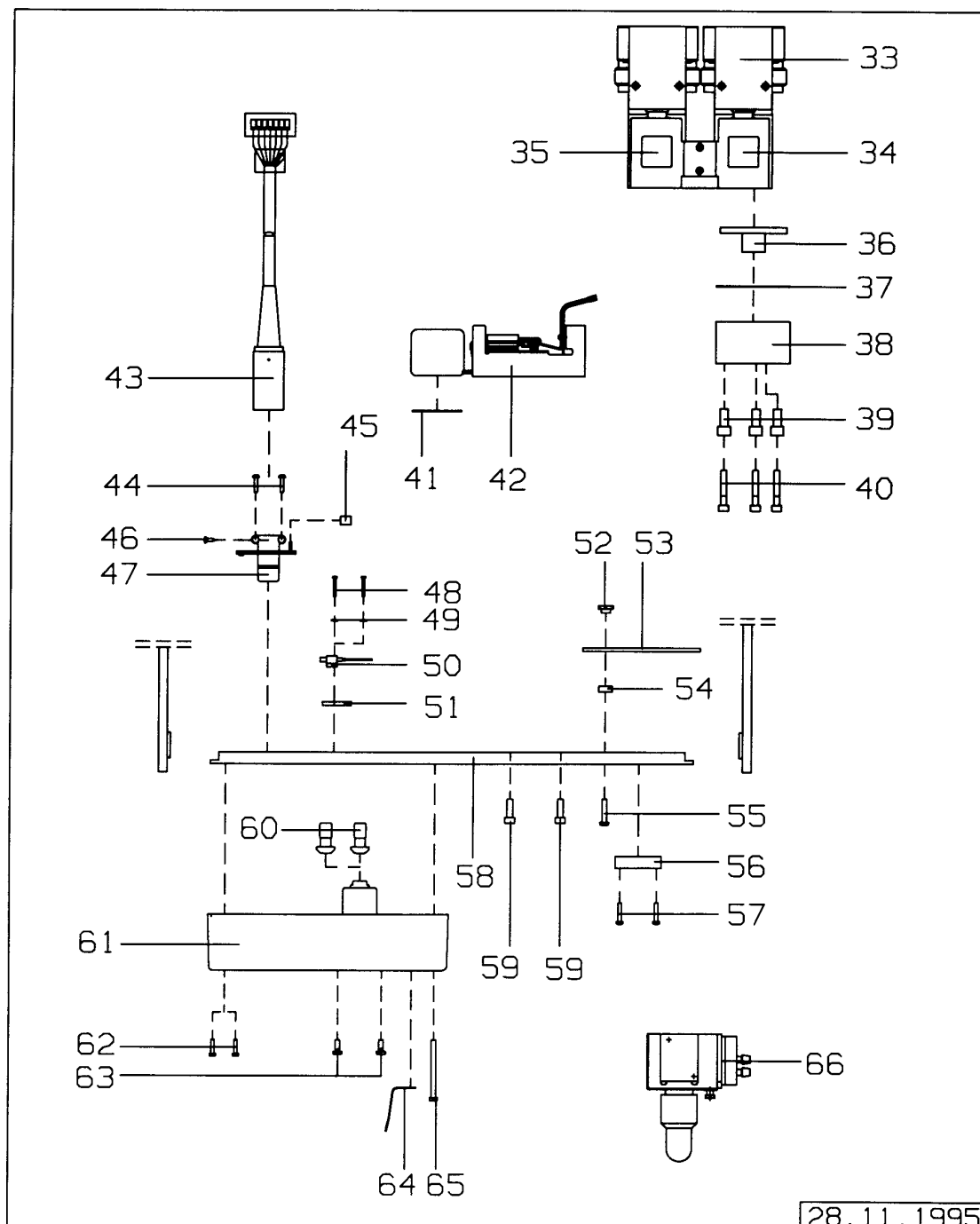
Bild/Picture 8



PNEUMATIK, (INSPIRATIONSBLOCK,PARALLELM.)

PNEUMATIC (INSPIRATION BLOCK)

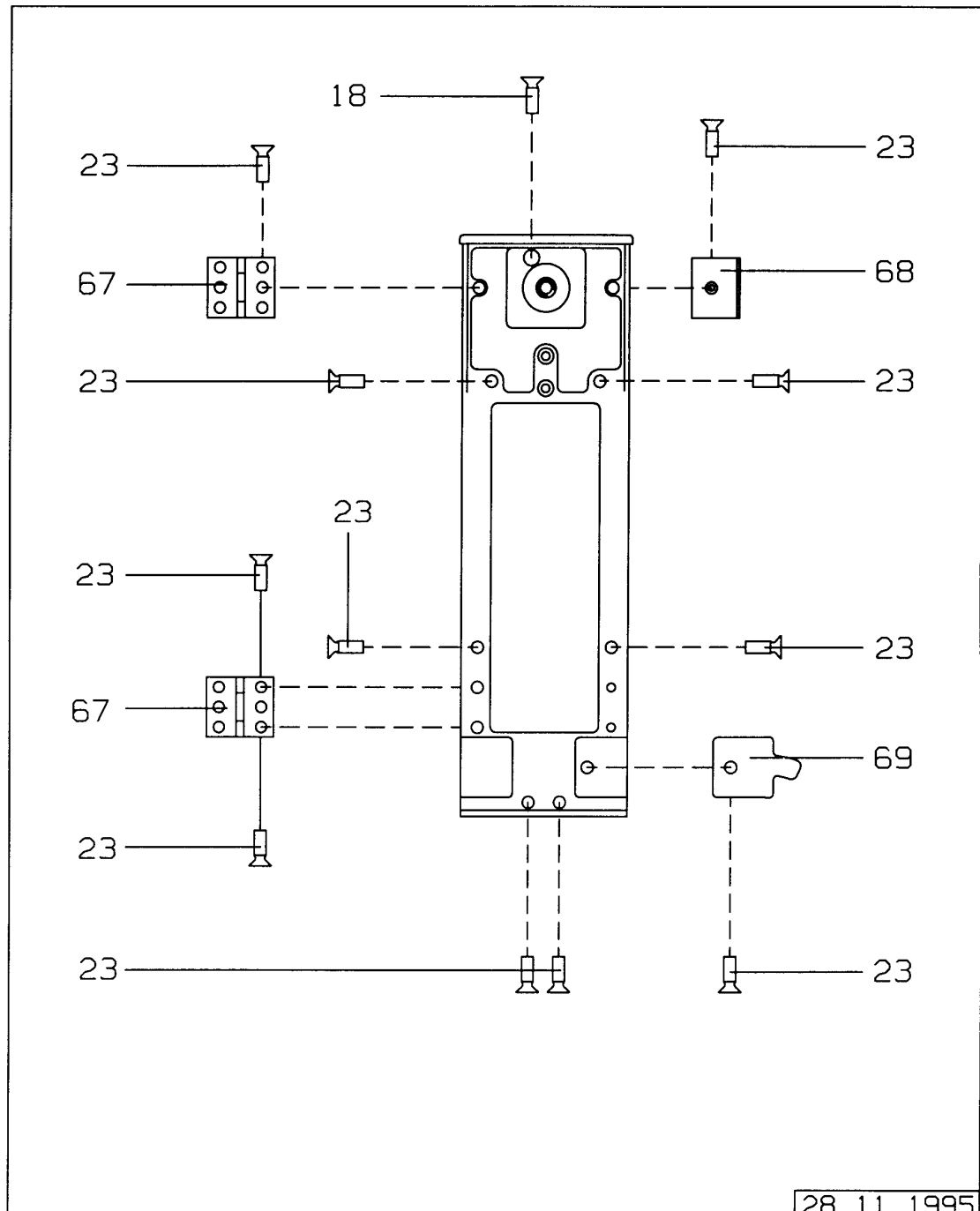
Bild/Picture 9



28.11.1995

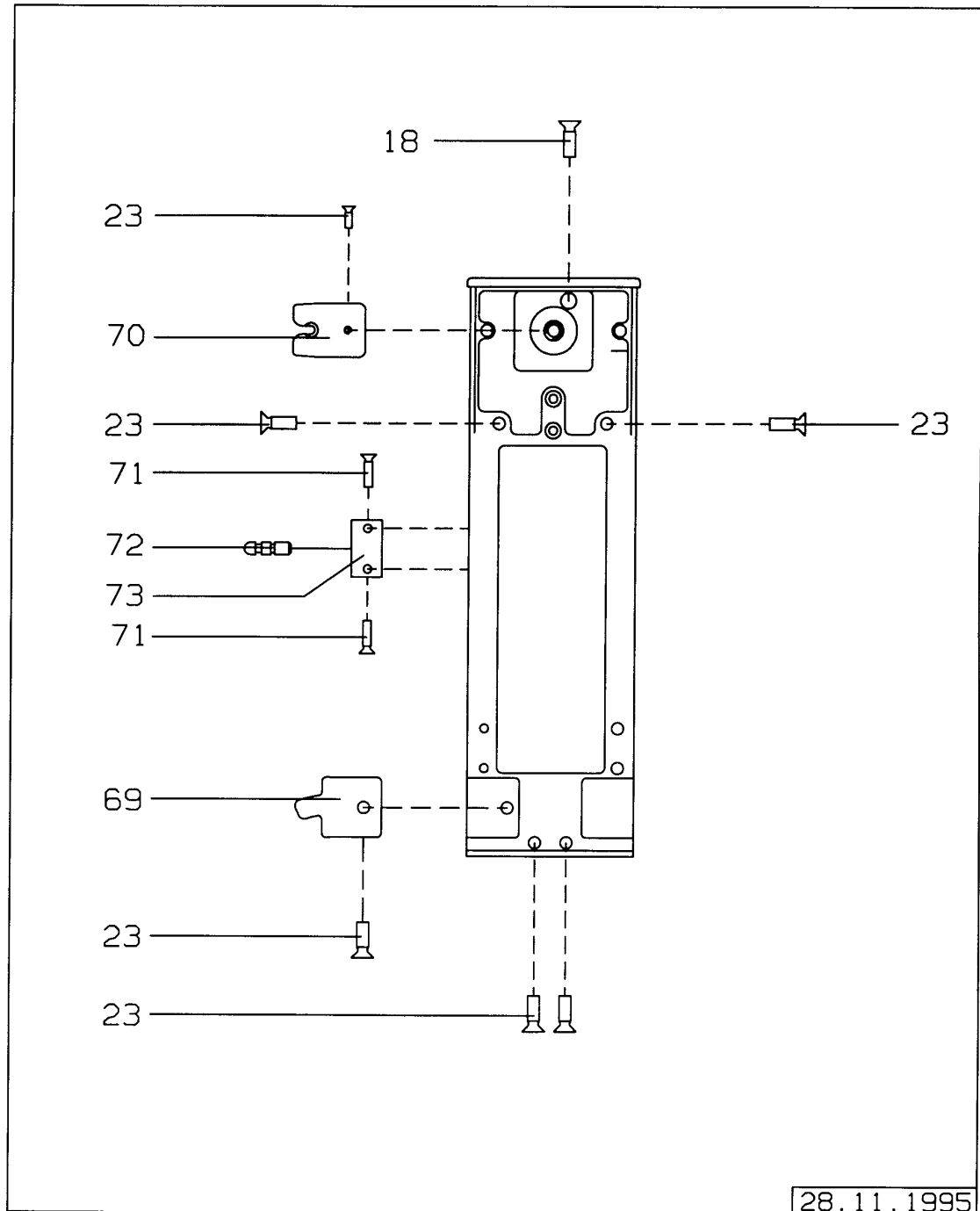
PNEUMATIK, (SEITENTEIL 2 H)
PNEUMATIC (SIDE PART 2H)

Bild/Picture 10



PNEUMATIK, (SEITENTEIL 2 H)
PNEUMATIC (SIDE PART 2 H)

Bild/Picture 11



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-73	PNEUMATIK PNEUMATIC (EVITA 4)	8412360		
1	BODENBLECH BASE PLATE	8412376		
2	DIN 965-M3X6-A4-H DIN 965-M3X6-A4-H	1339931		
3	GUMMIPUFFER RUBBER BUFFER		2M04819	10
4-6	ABDECKBLECH RUECKWAND,KPL. COVER PLATE BACK PANEL, CPL.	8412718		
4	SENKSCRAUBE AM 3X4 DIN 63 COUNTERSUNK SCREW AM 3X4DIN963		1308459	
5	KUEHLKOERPER DISSIPATOR	8412383		
6	ABDECKBLECH,RUECKWAND COVER PLATE, BACK PANEL	8412342		
7	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
8	KABELBINDER (2,4X92LG) CABLE CLIP (2,4X92)		8712007	25
9	DIN 965-M3X10-A2-H DIN 965-M3X10-A2-H	1343246		
10	TUELLE SOCKET	8412361		
11	SICHERUNGSSCHEIBE 6 DIN6799 NG LOCK WASHER 6 DIN 6799		1301489	
12	SEITENTEIL 2H SIDE PART 2H	8412354		
13	KABELDURCHFUEHRUNG CABLE BUSHING	8412377		
14	CHASSIS PNEUMATIK CHASSIS PNEUMATIC	8412339		
15	RAENDELSCHRAUBE NG KNURLED SCREW	8306225		
16	KABELBAUM HPSV CABLE HARNESS HPSV	8306545		
17	BEST.LP PNEUMATIC-MOTHERBOARD PCB PNEUMATIC-MOTHERBOARD	8306571		
18	LINSENSCHRB.DIN7985-M4X12-A2-H OVAL HEAD SCR.DIN7985-M4X12-A2		1341790	20
19	GASANSCHLUSS	8412313		

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	GAS SUPPLY (EVITA 4)			
20	PLATINENFUEHRUNG BOARD GUIDE	8600527		
21	BEST.LP PNEUMATIK-CONTROLLER PCB PNEUMATIC CONTROLLER		8306601	
22	BEST.LP HPSV-CONTROLLER PCB HPSV-CONTROLLER		8306561	
23	DIN 965-M4X12-A4-H DIN 965-M4X12-A4-H	1339966		
24	HALTER,KOMPL. SUPPORT, CPL.	8412373		
25	DIN 85-AM5X10-A4/051 DIN 85-AM5X10-A4/051	1329065		
26	BUCHSE SOCKET	8408312		
27	PLATTE PLATE	8412341		
28	PEEP/PIP-VENTIL PEEP/PIP VALVE		8410717	
29	KABELBAUM PEEP-VENTIL CABLE HARNESS PEEP-VALVE	8306557		
30	DIN 7985-M4X8-A2-H DIN 7985-M4X8-A2-H	1340778		
31	BEFESTIGUNGSWINKEL,KPL. ANGLE BRACKET, CPL.	8412369		
32	DRUCKMESSBLOCK,KPL. PRESSURE METERING BLOCK, CPL.	8412210		
33	PARALLELMISCHER 4 PARALLEL MIXER 4	8411550		
34	SCHILD NG LABEL	8412803		
35	SCHILD NG LABEL	8412802		
36	ZWISCHENPLATTE,KPL. DISTANCE PLATE, CPL.	8412633		
37	ISOLIERPLATTE INSULATING PLATE	8412211		
38	GEHAEUSE,KPL. HOUSING, CPL.	8412356		
39	BUCHSE SOCKET	8407712		
40	SCHRAUBE 00003		1335901	

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	SCREW 00003			
41	PLATTE PLATE	8412605		
42	HEIZUNGSHALTER, KOMPL. HEATING SUPPORT, CPL.	8412734		
43	KABELBAUM FLOWSSENSOR CABLE HARNESS, FLOWSSENSOR	8306549		
44	ZYLINDERSCHRB.BZ2,9X13DIN7971 CHEESE HEAD SCR.DIN7971 2,9X13		1334948	20
45	SCHLAUCH 4X1,5-SI 50 SH A NF HOSE 4X1,5-SI 50 SH A NF		1190520	
46	LINS.SENKBL.SCHR.B2,9X9,5 NG PAN-HEAD TAPP.SCREW B2,9X9,5	1311514		
47	STECKERAUFNAHME CONNECTOR RECEIVER	8410663		
48	SCHRAUBE AM 2X16 DIN 84-A4 SCREW AM 2X16 DIN 84-A4		1333763	10
49	SCHEIBE DISC		8300841	
50	KABELBAUM-FLOW-SCHALTER CABLE HARNESS FLOW-SWITCH	8306556		
51	GUMMIPLATTE NG RUBBER PLATE	8410917		
52	GEWINDEBUCHSE THREADED SOCKET	8408348		
53	HALTER SUPPORT	8412365		
54	BUCHSE SOCKET	8412362		
55	KREUZSCHLITZSCHRAUBE M4X20 RECESSED HEAD SCREW M4X20		1341308	10
56	LUEFTER PNEUMATIK,KOMPL. FAN PNEUMATIC, CPL.		8306560	
57	DIN 7985-M3X16-A2-H DIN 7985-M3X16-A2-H	1340735		
58	PLATTE (EVITA 4) PLATE (EVITA 4)	8412222		
59	M5X16 DIN 912-A4/051 M5X16 DIN 912-A4/051	1329227		
60	LIPPENDICHTUNG LIP SEAL		8407689	
61	ANSCHLUSSGEHAEUSE		8410570	

Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

13.02.97

EVITA 4

EVITA 4

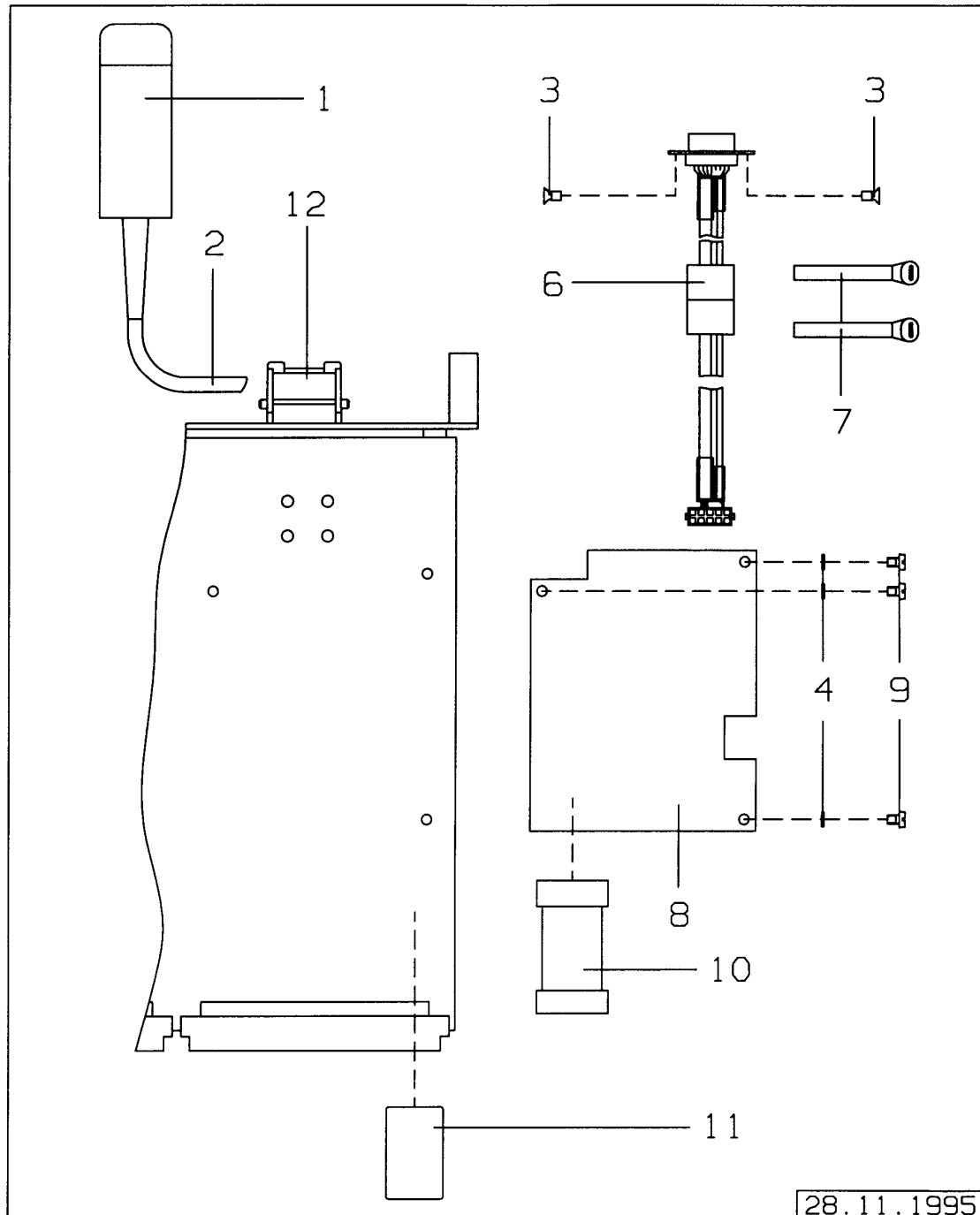
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	CONNECTING HOUSING			
62	ZYLINDERSCHRAUBE AM 3X12 DIN84 CHEESE HEAD SCREW AM3X12 DIN84	1304232		
63	SCHRAUBE 00001 SCREW 00001		1330055	20
64	FEDER SPRING		8410631	5
65	DIN 84-AM4X50-A4 DIN 84-AM4X50-A4	1287753		
66	INSPIRATIONSBLOCK,KPL. INSPIRATION BLOCK, CPL.	8412981		
67	SCHARNIER,KPL. HINGE, CPL.	8412707		
68	BLECH KOMPL. SHEET METAL, CPL.	8412382		
69	KLINKE CATCH		2M17303	2
70	LASCHE LINK	8412363		
71	DIN 965-M4X16-A4-H DIN 965-M4X15-A4-H	1339974		
72	STIFT PIN	8408902		
73	BEFESTIGUNGSLEISTE FIXING STRAP	8406526		
	FUSS NG ohne Abbildung BASE without illustration		2M17302	
	PUFFER ohne Abbildung BUFFER without illustration		6800478	20
	SCHR.SH 3,2-1,6X0,5-8301798 NG ohne Abbildung SHR.D.PLAST.TUB.3,2-1,6X0,5 without illustration	1200186		
	KLEBEBD 12X1,6 PVC-SCHAUM SW X ohne Abbildung ADH. TAPE 12X1,6 PVC-FOAM SW X without illustration	1202421		
	KANTENSCHUTZPROF 1-2CH15956 SW ohne Abbildung HEADER PROFILE 1-2CH15956 SW without illustration	1191640		

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	KLEBEBD 10X4-PUE-SCHAUM SW X ohne Abbildung ADH.TAPE 10X4-PUE-FOAM SW X without illustration	1209310		
	SCHILD ohne Abbildung LABEL without illustration	8409569		

RUESTSATZ SPO2
MODIFICATION KIT SPO2

Bild/Picture 12



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

13.02.97

EVITA 4

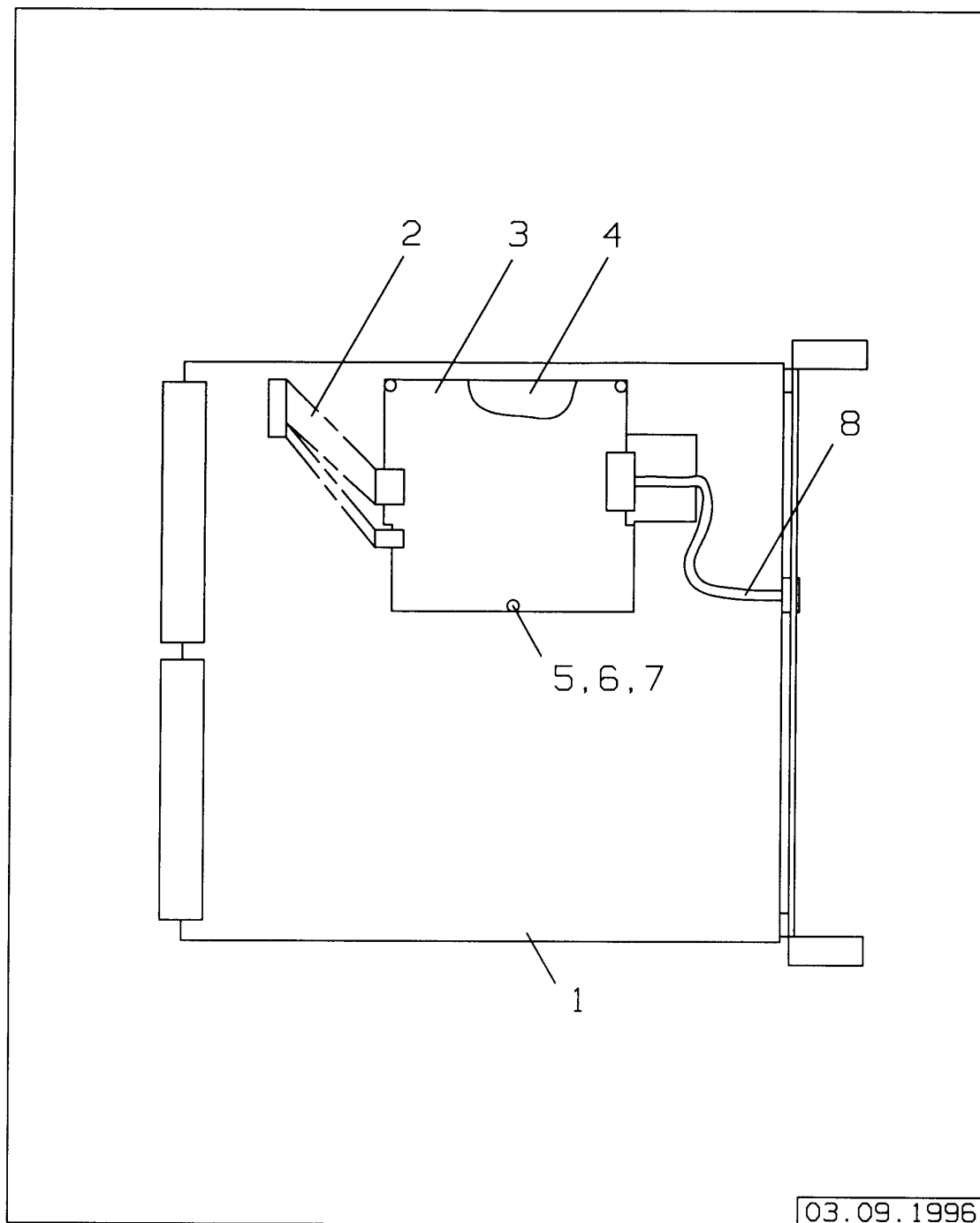
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-12	RUESTSATZ EVITA 4 SAT KIT EVITA 4 SAT		8413035	
1	DURASENSOR DS-100A DURASENSOR DS-100A		8201001	
2	SENSOR-VERLAENGERUNGSKABEL 2,6 EXTENSION CABLE SENSOR 2,6M		8600859	
3	SCHRAUBE M3X5 PA SCREW M3X5 PA	8411753		
4	FIBERRING FIBRE RING		D04766	50
6	KABELBAUM SPO2 CABLE HARNESS SPO2	8600787		
7	KABELBINDER (2,4X92LG) CABLE CLIP (2,4X92)		8712007	25
8	SAO2-MODUL SAO2 MODULE		8600481	
9	ZYL.SCHRAUBE M3X4 DIN84-A4 CHEESE HEAD SCREW M3X4DIN84-A4		1321609	
10	KABELBAUM SPO2-POWER CABLE HARNESS SPO2 POWER	8411728		
11	DC/DC-WANDLER+-15V LV01895 DC/DC TRANSFORM. +-15V LV01895	1837869		
12	KLAPPE/BEFESTIGUNG SPO2-KABEL FLAP/MOUNTING SPO2-CABLE		8600677	

RUESTSATZ CO2
MODIFICATION KIT CO2

Bild/Picture 13



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Spare parts list

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EVITA 4

EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-13	OPTION CAPNO PLUS OPTION CAPNO PLUS		8411720	
1	BEST.LP CO2-CARRIER PCB CO2-CARRIER		8306611	
1	RAT-BEST.LP CO2-CARR. (8306611 REP.EXCH.PCB CO2-CARR.(8306611		8306613	
2	KABELBAUM CO2-POWER RS232 CABLE HARNESS CO2-POWER RS 232	8306567		
3	BEST.LP POWER PCB POWER		8350411	
4	LP SIGNALPROZESSOR (CO2-MAIN) PCB SIGNAL PROCESSOR(CO2-MAIN)		6870296	
4a	PROCESSOR BOARD NG PROCESSOR BOARD		6870133	
4b	RUESTSATZ SW 1.11 CO2 MODIF.KIT SW 1.11 CO2		8413085	
5	ZYL.SCHRB.AM3X8 DIN84-A4/051 CH.HEAD SCR.AM3XDIN84-A4/051	1330799		
6	FIBERRING FIBRE RING		D04766	50
7	DISTANZBOLZEN DISTANCE BOLT	8305182		
8	KABELBAUM CO2-SENSOR CABLE HARNESS CO2 SENSOR	8306766		
	XFL KURZSCHLUSSBUCHSE 2POL. ohne Abbildung XFL SHORT CIRCUIT SOCKET 2POL. without illustration		1814508	10
	CO2 KUEVETTE E DW ohne Abbildung CUVETTE CO2 A DW without illustration		6870279	
	CO2-HAUPTSTROMSENSOR DW ohne Abbildung MAINSTREAMSENSOR CO2 DW without illustration		6870300	
	PRUEFFILTER ohne Abbildung TEST FILTER without illustration		6870281	
	ETIKETT ohne Abbildung LABEL without illustration	8710912		

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Spare parts list

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EVITA 4

EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	PARKHALTER, KOMPL. PARKING SUPPORT, CPL.		8412840	
	CO2-KUEVETTE P DW ohne Abbildung CUVETTE CO2 P DW without illustration		6870280	
	MAINSTREAMSENSOR CO2 EVITA 2 ohne Abbildung MAINSTREAMSENSOR CO2 EVITA 2 without illustration	6870127		
	RAT-CO2-HAUPTSTROMSENS(6870127 ohne Abbildung REP.EXCH.MAINSTR.SENS.(6870127 without illustration		6870119	
	SET BESCHRIFTETE CLIPS ohne Abbildung SET OF INSCRIPTED CLIPS without illustration		6870343	

Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

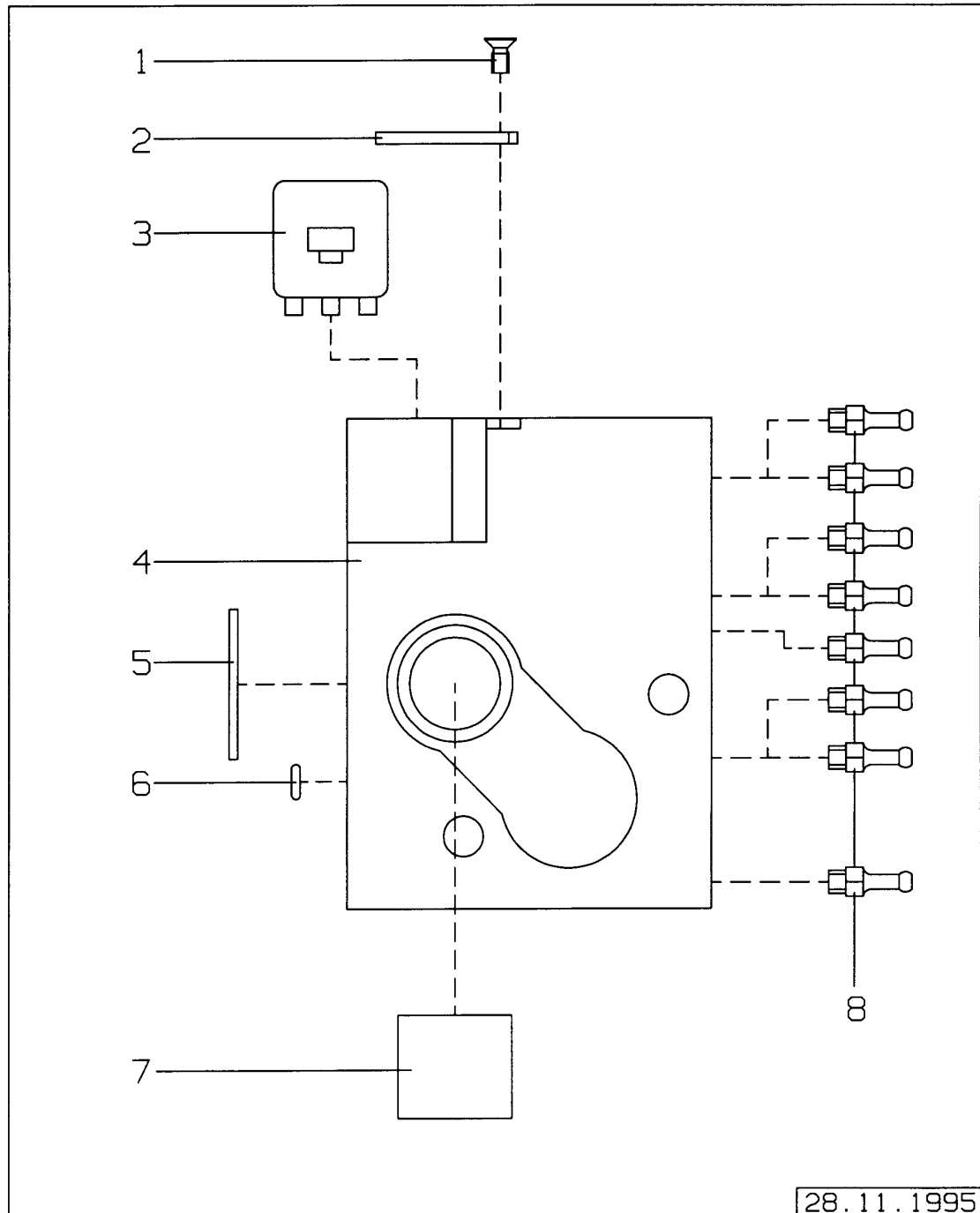
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-15	SCHLAUCHPLAN TUBING PLAN	8412319		
1	SCHLAUCH 4X1 PAE WS HOSE 4X1 PAE WS		1210165	
2	SCHLAUCH 4X1PAE SW/WS M31989 HOSE 4X1PAE SW/WS M31989		1210203	
3	SCHLAUCH 2X1,5 SI NF 8403323 HOSE 2X1,5 SI NF 8403323		1203622	
4	SCHLAUCH 2X1-SIGN GN HOSE 2X1-SIGN GREEN		1204807	
5	SCHLAUCH 2X1-SIGN OR HOSE 2X1-SIGN ORANGE		1204823	
6	SCHLAUCH 2X1-SIGN RT HOSE 2X1-SIGN RED		1204793	
7	SCHLAUCH 2X1-SIGN BR HOSE 2X1-SIGN BROWN		1204815	
8	SCHLAUCH 2X1-SIGN BL HOSE 2X1-SIGN BL		1204785	
9	SCHLAUCH 4X1,5-SI 50 SH A NF HOSE 4X1,5-SI 50 SH A NF		1190520	
10	ROHR TUBE	2M17645		
11	T-TUELLE T-SOCKET		6800187	5
12	T-STUECK T-PIECE		8401083	
13	DOSIERUNG NG DOSAGE	8408222		
14	DOSIERUNG NG DOSAGE	8412201		
15	DOSIERUNG DOSAGE	8412998		

GEHÄUSE, KPL.
HOUSING, CPL.

Bild/Picture 15



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

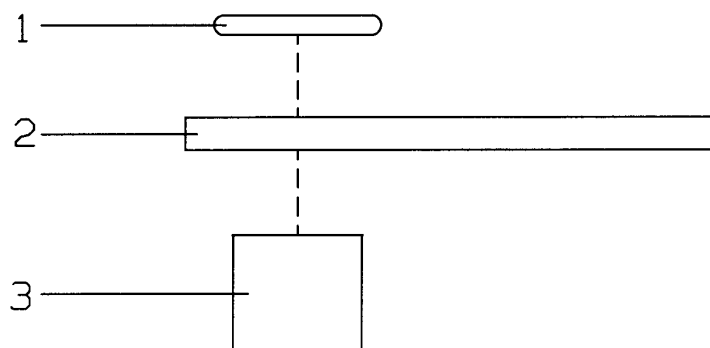
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-8	GEHAEUSE,KPL. HOUSING, CPL.	8412356		
1	DIN 965-M3X6-A4-H DIN 965-M3X6-A4-H	1339931		
2	BLECH SHEET METAL		8409177	
3	MIKROSCHALTER MICROSWITCH		8407265	
4	GEHAEUSE (HPSV-ANSCHLUSS) HOUSING (HPSV CONNECTION)	8412976		
5	O-RING O-RING SEAL		2M08777	5
6	O-RING O-RING SEAL		E20567	10
7	SINTERFILTER SINTERED FILTER		8407827	
8	TUELLE NG SOCKET	8408197		

ZWISCHENPLATTE, KPL.
DISTANCE PLATE, CPL.

Bild/Picture 16

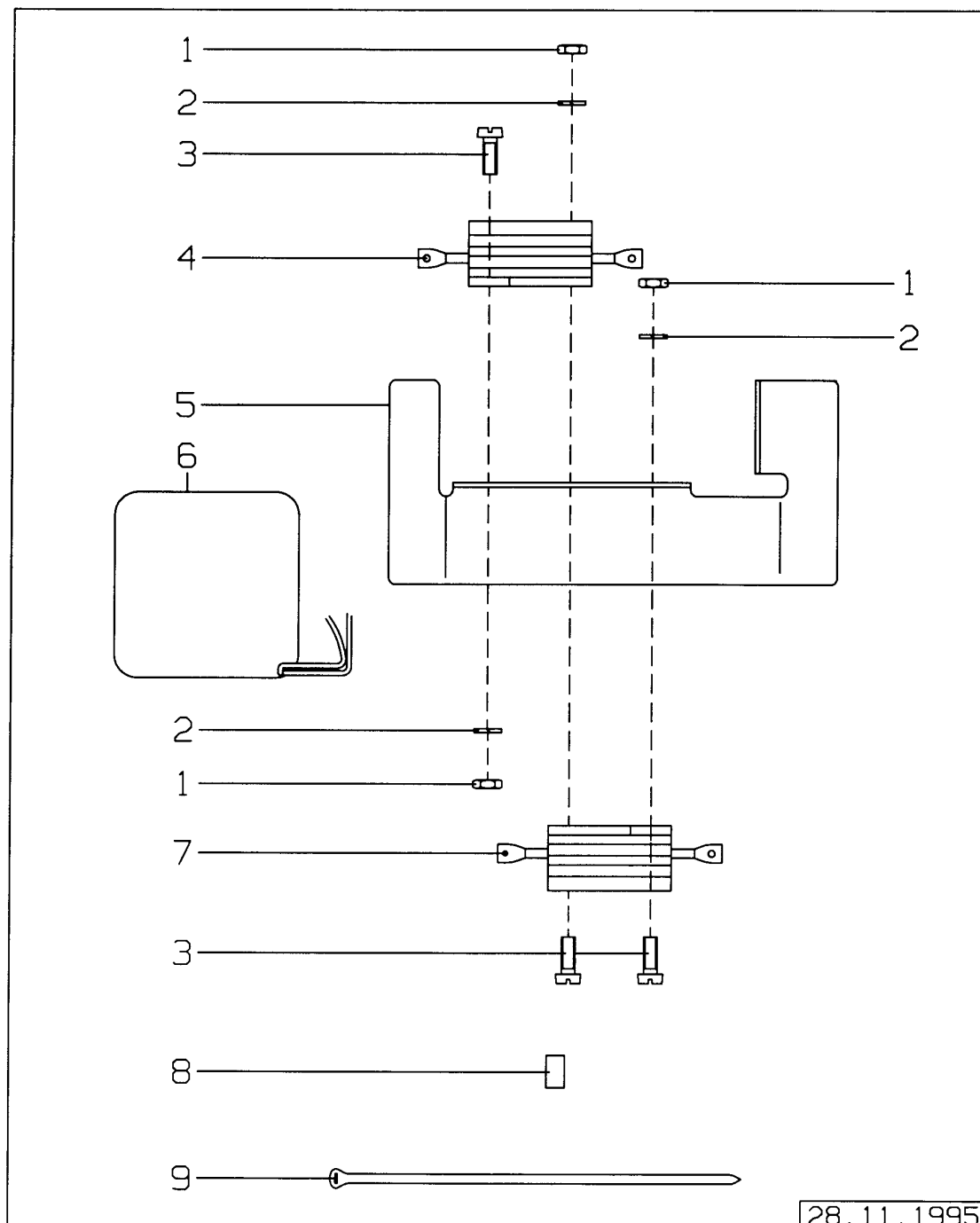


28.11.1995

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-3	ZWISCHENPLATTE,KPL. DISTANCE PLATE, CPL.	8412633		
1	O-RING O-RING SEAL		2M08777	5
2	ZWISCHENPLATTE DISTANCE PLATE	8412212		
3	SINTERFILTER SINTERED FILTER		8407827	

HEIZUNGSHALTER, KOMPL.
HEATING SUPPORT, CPL.

Bild/Picture 17



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

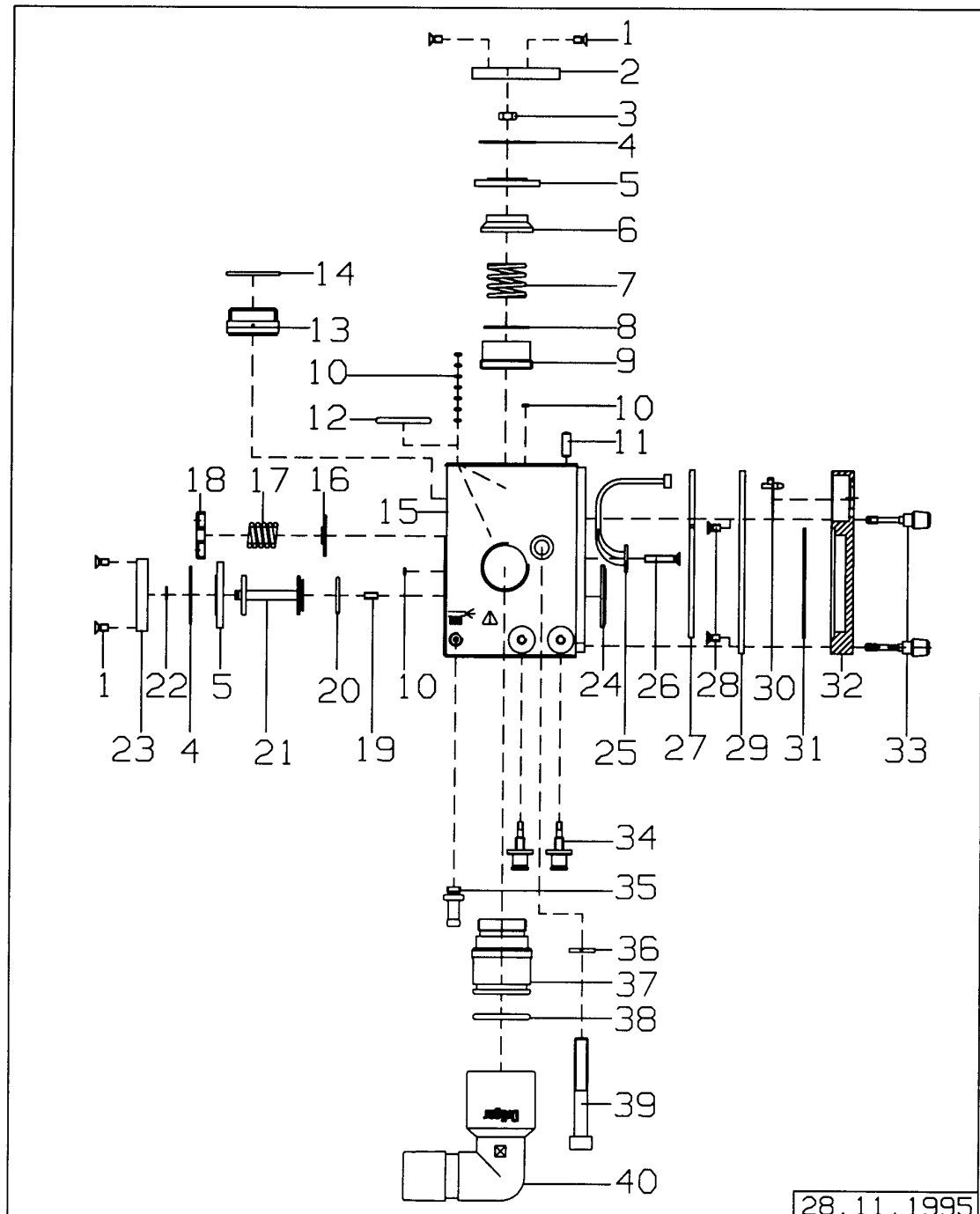
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-14	HEIZUNGSHALTER, KOMPL. HEATING SUPPORT, CPL.	8412734		
1	MUTTER BM3 DIN 439-A4/051 NUT BM3 DIN 439-A4/051		1334743	
2	FEDERRING B3 DIN127-X12CRN NG SPLIT WASHER B3 DIN127-X12CRNI		1309749	
3	ZYL.SCHRB.AM3X8 DIN84-A4/051 CH.HEAD SCR.AM3XDIN84-A4/051	1330799		
4	RFDR 39 1% 25W LV01885 RFDR 39 1% 25W LV01885	1837710		
5	HALTER SUPPORT	8412606		
6	LUEFTER 12V FAN 12V		1837702	
7	RFDR 33 1% 25W LV01886 RFDR 33 1% 25W LV01886	1837729		
8	XLPSK BUL2 AWG24 LV01882 XLPSK BUL2 AWG24 LV01882	1838318		
9	KABELBINDER (2,4X92LG) CABLE CLIP (2,4X92)		8712007	25
10	SCHR.SH 3,2-1,6X0,5-8301798 NG ohne Abbildung SHR.D.PLAST.TUB.3,2-1,6X0,5 without illustration	1200186		
11	SCHALTDR YV 1X0,5/1,1 BL ohne Abbildung JUMPER WIRE YV 1X0,5/1,1 BLUE without illustration	1187929		
12	SCHRUMPFISH 4,8-2,4 GE 6850508X ohne Abbildung SHR.D.PL.TUB.4,8-2,4YE6850508 without illustration		1205234	
13	LITZE AWG24/7 1X0,22 GN UL X ohne Abbildung CORD AWG24/7 1X0,22 GREEN UL X without illustration	1837990		
14	LITZE 0,5 M ohne Abbildung CORD 0,5 M without illustration		1837994	

INSPIRATIONSBLOCK, KOMPL.
INSPIRATION BLOCK, CPL.

Bild/Picture 18



28.11.1995

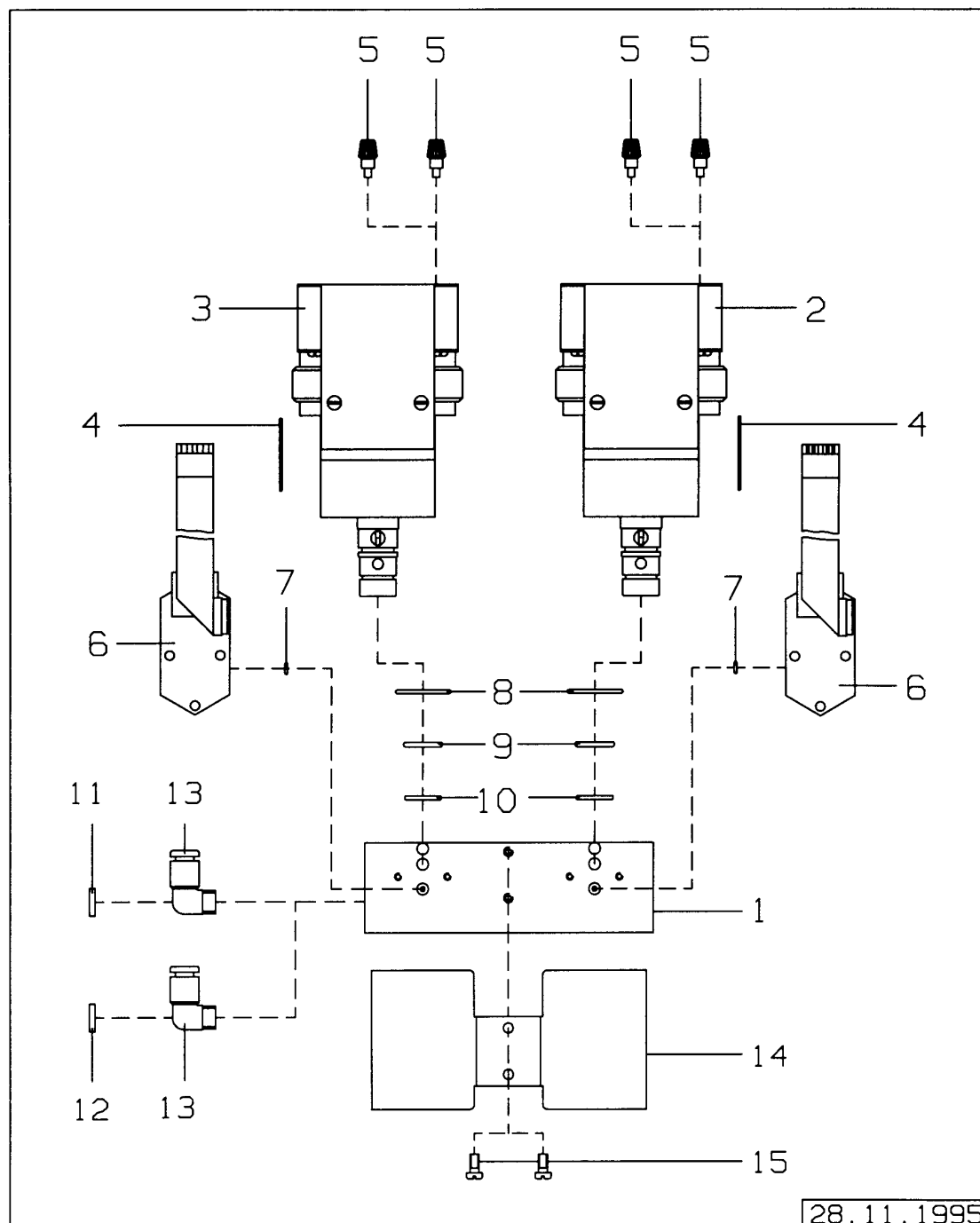
Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-40	INSPIRATIONSBLOCK,KPL. INSPIRATION BLOCK, CPL.	8412981		
1	DIN 965-M3X6-A4-H DIN 965-M3X6-A4-H	1339931		
2	DECKEL 1 COVER 1	8412955		
3	6KT.MUTTER M4 DIN934-A4/051 HEXAGON NUT M4 DIN 934-A4/051		1328956	20
4	SCHEIBE NG WASHER	8400812		
5	MEMBRAN DIAPHRAGM		8403352	4
6	AUFNAHME NG RECEIVER	8404257		
7	SCHLISSFEDER CLOSING SPRING		D13509	
8	O-RING O-RING SEAL		R27696	10
9	AUFNAHME RECEIVER	8412951		
10	O-RING O-RING SEAL		E20567	10
11	4M6X10 DIN 7-A4 4M6X10 DIN 7-A4	1322753		
12	O-RING O-RING SEAL		2M08777	5
13	UEBERDRUCKVENTIL PRESSURE CONTROL VALVE	8411745		
14	O-RING O-RING SEAL		R26807	5
15	INSPIRATIONSBLOCK INSPIRATION BLOCK	8412940		
16	DICHTSCHEIBE SEALING WASHER		8410307	
17	FEDER NG SPRING	2M12034		
18	SCHRAUBE SCREW	8412952		
19	DROSSELSCHRAUBE NG CHOKE SCREW	E08481		
20	O-RING		R31296	10

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	O-RING SEAL			
21	VERSCHLUSSBOLZEN CLOSING BOLT	8412953		
22	SICHERUNGSSCHB.3,2 DIN6799 LOCK WASHER 3,2 DIN 6799		1331418	
23	DECKEL 2 COVER 2	8412954		
24	LIPPENDICHTUNG LIP SEAL		8412938	
25	BEST.LP O2-CONTACT (EVITA-4) PCB O2-CONTACT (EVITA 4)	8306671		
26	SCHRAUBE AM3X16 DIN 963-A2 SCREW AM3X16 DIN 963-A2		1334557	20
27	DICHTUNG GASKET		8413031	
28-33	DECKEL, KPL. (EVITA 4) COVER, CPL. (EVITA 4)		8411749	
28	SENKSCHRAUBE AM3X6 DIN963-A4 B COUNTERS.SCREW AM3X6DIN963-A4		1287400	
29	RAHMEN FRAME	8412206		
30	MEMBRAN DIAPHRAGM		8410682	5
31	BEST.LP O2-TOP (EVITA-4) PCB O2-TOP (EVITA 4)	8306661		
32	DECKEL COVER	8412207		
33	RAENDELSCHRAUBE KNURLED SCREW	8412352		
34	LUER-LOCK.WEIBL. LUER-LOCK, FEMALE	8600213		
35	TUELLE SOCKET	8412939		
36	FEDERRING B6 DIN 127-NIRO SPLIT WASHER B6 DIN127-STAINL.		1333941	
37	STUTZEN CONNECTION PIECE	8410557		
38	O-RING O-RING SEAL		M20622	10
39	M6X45 DIN 912-A2 M6X45 DIN 912-A2	1329871		
40	WINKELTUELLE NG	8410676		

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	ANGULAR PORCELAIN BUSH			

PARALLELMISCHER
PARALLEL MIXER

Bild/Picture 19

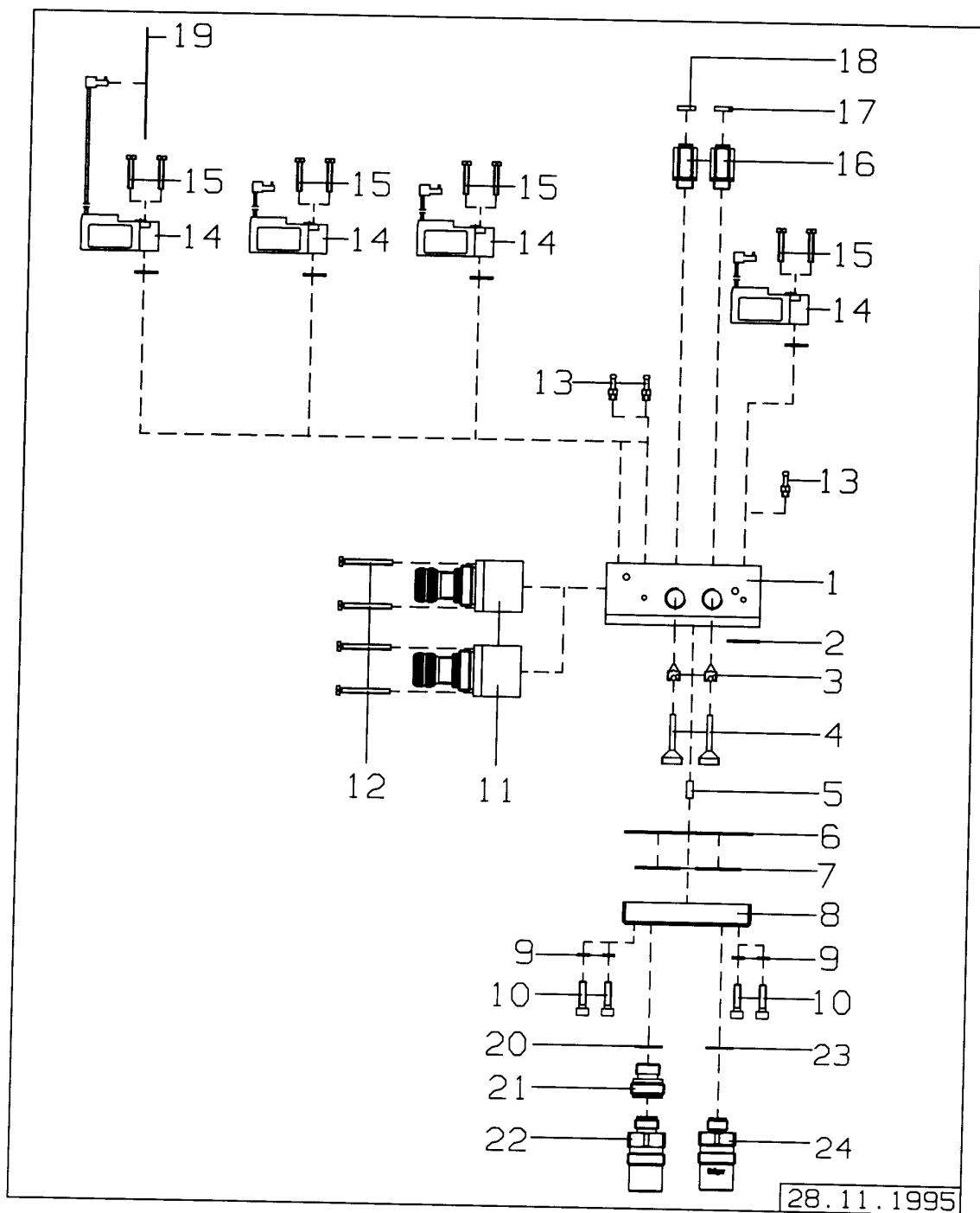


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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-15	PARALLELMISCHER 4 PARALLEL MIXER 4	8411550		
1	GEHAEUSE HOUSING	8411551		
2,4,8-10	KARTUSCHENVENT.AIR(RAT=8412129 VALVE AIR		8412128	
	RAT-KARTUSCHENVENT.AIR(8412128 REP.EXCH.VALVE AIR (8412128		8412129	
3,4,8-10	KARTUSCHENVENTIL O2(RAT8412127 VALVE O2		8412126	
	RAT-KARTUSCHENVENT.O2 (8412126 REP.EXCH.VALVE O2 (8412126		8412127	
4	KALIBRIERAUFKLEBER MULTIWARN ADHESIVE LABEL MULTIWARN		8302721	
5	RAENDELSCHRAUBE NG KNURLED SCREW	8306225		
6	E-SET VORDRUCKSENSOR REP.SET HIGH PRESSURE SENSOR		8306248	
7	O-RING O-RING SEAL		8410713	10
8	RUNDSCHNURRING TOROIDAL SEALING RING		R16442	5
9	O-RING O-RING SEAL		R22344	10
10	O-RING O-RING SEAL	E09548		
11	DRUCKRING DURCHM.6, WEISS THRUST COLLAR 6, WHITE		M31603	10
12	DRUCKRING 6 DURCHM.,SCHWARZ NG THRUST COLLAR 6, BLACK	M31601		
13	WINKELSTECKANSCHLUSS ANGLE CONNECTION		M30961	
14	HAUBE,KOMPL. HOOD, CPL.	8410696		
15	SCHRAUBE AM 4X8 DIN 84-A4 NG CHEESE HEAD SCREW AM4X8 DIN84		1330659	

GASANSCHLUSS (EVITA 4)
GAS SUPPLY (EVITA 4)

Bild/Picture 20



Ersatzartikelliste 5664.500

Spare parts list

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EVITA 4

EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-24	GASANSCHLUSS GAS SUPPLY (EVITA 4)	8412313		
1	GEHAEUSE HOUSING	8412329		
2	AUFKLEBER ADHESIVE LABEL	8303296		
3	VENTILKEGEL VALVE CONE		D21138	
4	SCHRAUBE SCREW	8408198		
5	4M6X10 DIN 7-A4 4M6X10 DIN 7-A4	1322753		
6	FLACHDICHTUNG FLAT PACKING		8408204	
7	FILTER FILTER		8408208	10
8	AUFNAHME RECEIVER	8412871		
9	FEDERRING LOCK WASHER		1293680	
10	M4X16 DIN 912-A4/051 M4X16 DIN 912-A4/051	1329294		
11	DRUCKREGLER PRESSURE REGULATOR		8408205	
12	DIN 84-AM3X30-A2 DIN 84-AM3X30-A2	1333828		
13	TUELLE NG SOCKET	8408197		
14	MIKRO-MAGNETVENTIL MICRO-ELECTROVALVE		8412209	
15	ZYLINDERSCHRB.DIN84-AM3X20-A2 CH.HEAD SCREW DIN84-AM3X20-A2	1333798		
16	STECKANSCHLUSS PLUG-TYPE CONNECTION		M30960	
17	DRUCKRING DURCHM.6, WEISS THRUST COLLAR 6, WHITE		M31603	10
18	DRUCKRING 6 DURCHM.,SCHWARZ NG THRUST COLLAR 6, BLACK	M31601		
19	KLEBESCHILD ADHESIVE LABEL	8412928		
20	A 8X11,5X1 DIN 7603-CU	1343254		

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Spare parts list

Ausgabe/Edition

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EVITA 4

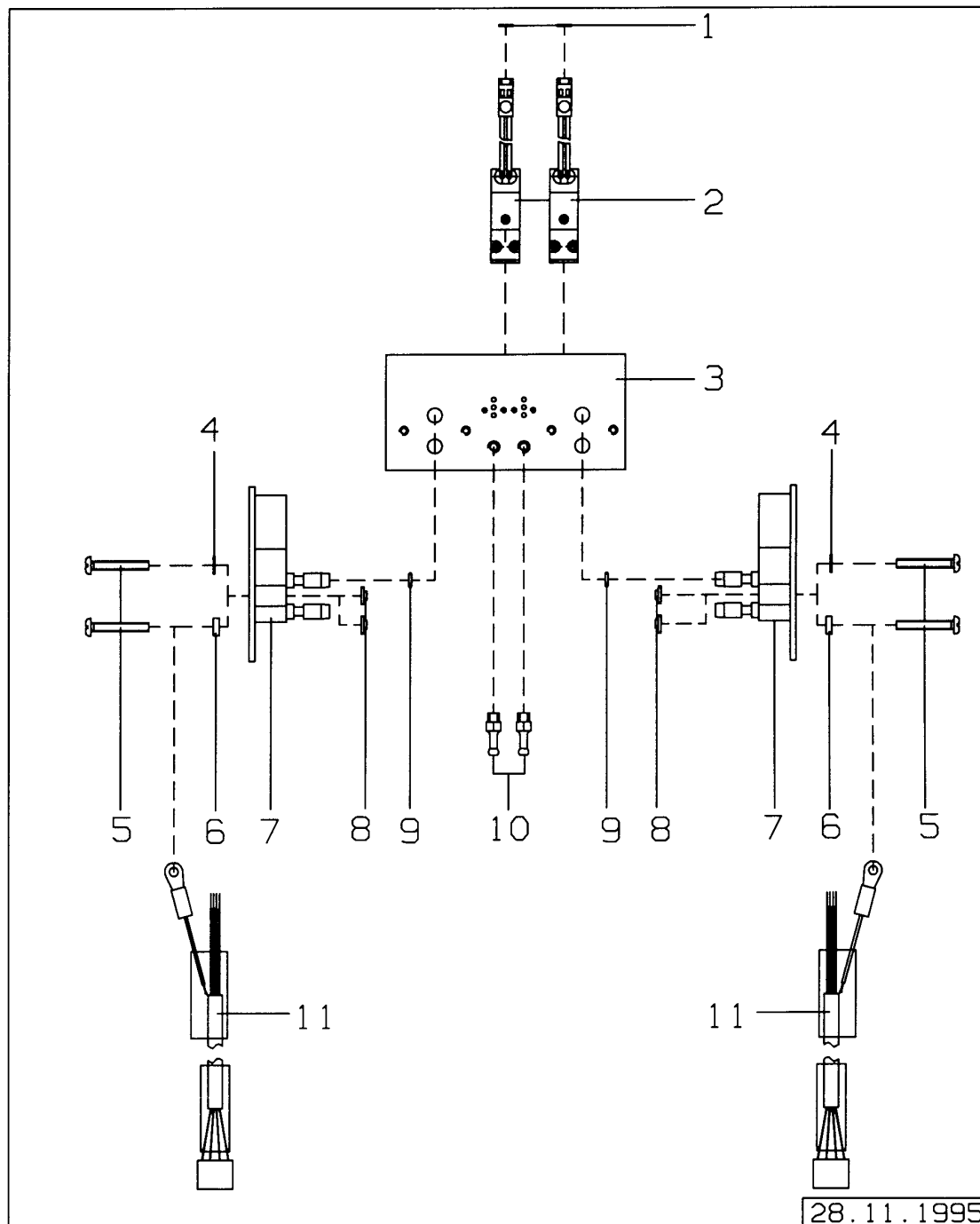
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	A 8X11,5X1 DIN 7603-CU			
21	ANSCHLUSS AIR (DIN) CONNECTION AIR (DIN)	8412873		
22	ANSCHLUSS AIR (NIST) CONNECTION AIR (NIST)	8412872		
23	SCHEIBE DISK		M19311	10
24	ADAPTER O2 ADAPTER O2	M32489		

DRUCKMESSBLOCK, KPL.
PRESSURE METERING BLOCK, CPL.

Bild/Picture 21



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Spare parts list

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EVITA 4

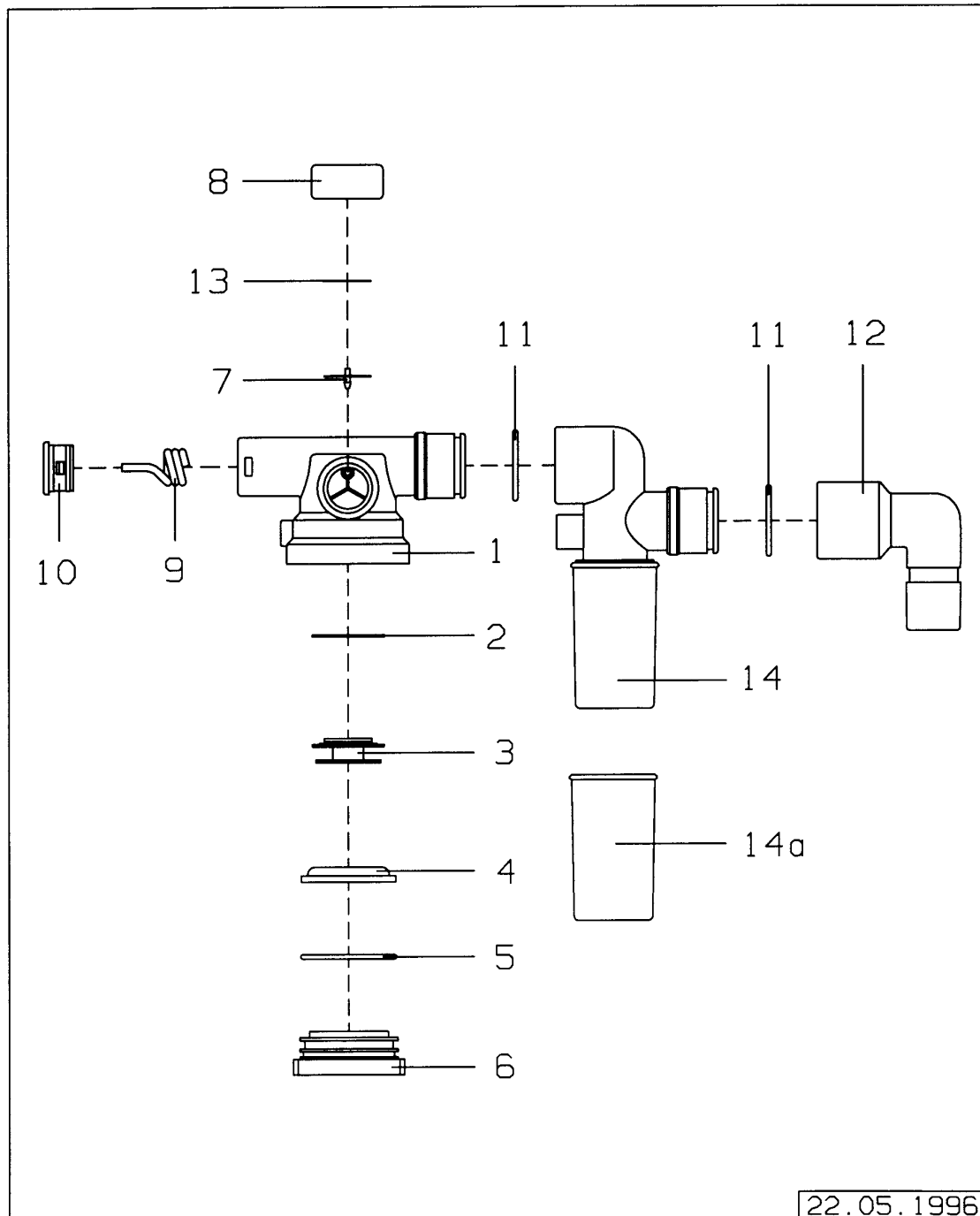
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-11	DRUCKMESSBLOCK,KPL. PRESSURE METERING BLOCK, CPL.	8412210		
1	KLEBESCHILD ADHESIVE LABEL	8412928		
2	MAGNETVENTIL ELECTROVALVE		8412993	
3	GEHAEUSE DRUCKMESSBLOCK HOUSING F.PRESSURE GAUGE BLOCK	8412358		
4	FIBERRING FIBRE RING		D04766	50
5	FLACHKOPFSCHRB.AM3X20DIN85 COUNTERSUNK SCREW AM3X20 DIN85		1334026	
6	SCHEIBE DISC	8305747		
7	ATEMWEGDRUCKSENSOR SENSOR		8305623	
8	ISOLIERBUCHSE INSULATING BUSH	6804141		
9	O-RING O-RING SEAL		8410713	10
10	TUELLE NG SOCKET	8408197		
11	KABELBAUM DRUCKAUFNEHMER CABLE HARNESS PRESS.ABSORPT.	8306538		

PAT.-SYST.EVITA NEUE PNEUMATIK
PAT.SYST.EVITA NEW PNEUMATIC

Bild/Picture 22



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

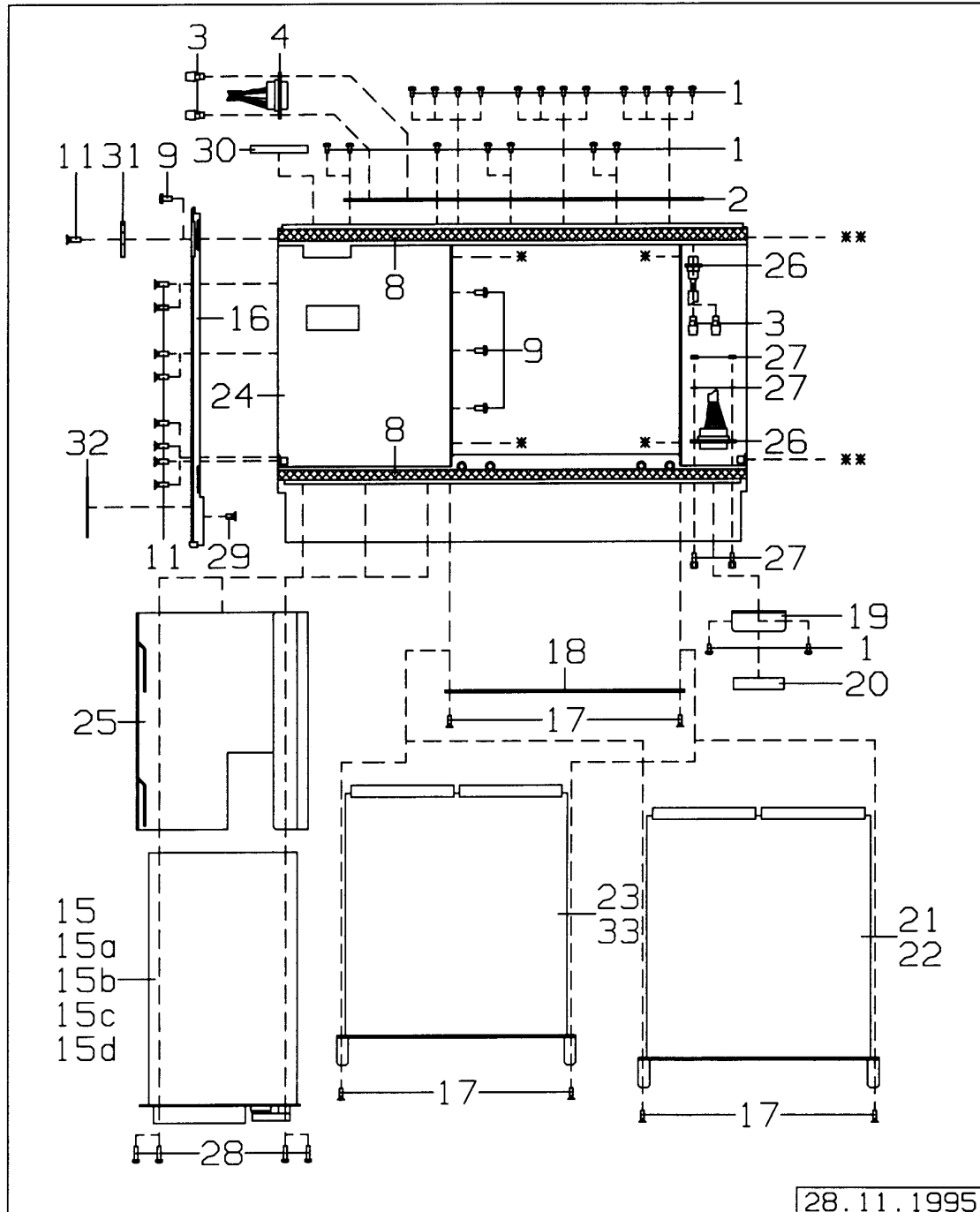
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EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-13	PAT.-SYST.EVITA NEUE PNEUMATIK PAT.SYST.EVITA NEW PNEUMATIC		8410580	
1	VENTILGEHAEUSE VALVE HOUSING	8410571		
2-4	MEMBRANVERBAND DIAPHRAGM		8412015	
2	DICHTSCHEIBE SEALING WASHER		8407979	10
3	TELLER PLATE	8412016		
4	MEMBRAN DIAPHRAGM		8410181	2
5	O-RING O-RING SEAL		E22651	5
6	VENTILDECKEL VALVE COVER		8410572	
7	MEMBRAN DIAPHRAGM		8410682	5
8	DICHTUNG GASKET		8410576	
9	ROHR TUBE		8410574	
10	ANSCHLUSSKAPPE CONNECTING CAP		8410672	
11	O-RING O-RING SEAL		M20622	10
12	WINKELTUELLE NG ANGULAR PORCELAIN BUSH	8410575		
13	SIEB SIEVE		8412202	10
14	RUESTSATZ WASSERFALLE MODIFICATION KIT WATER TRAP		8413125	
14a	TOPF POT		8403976	

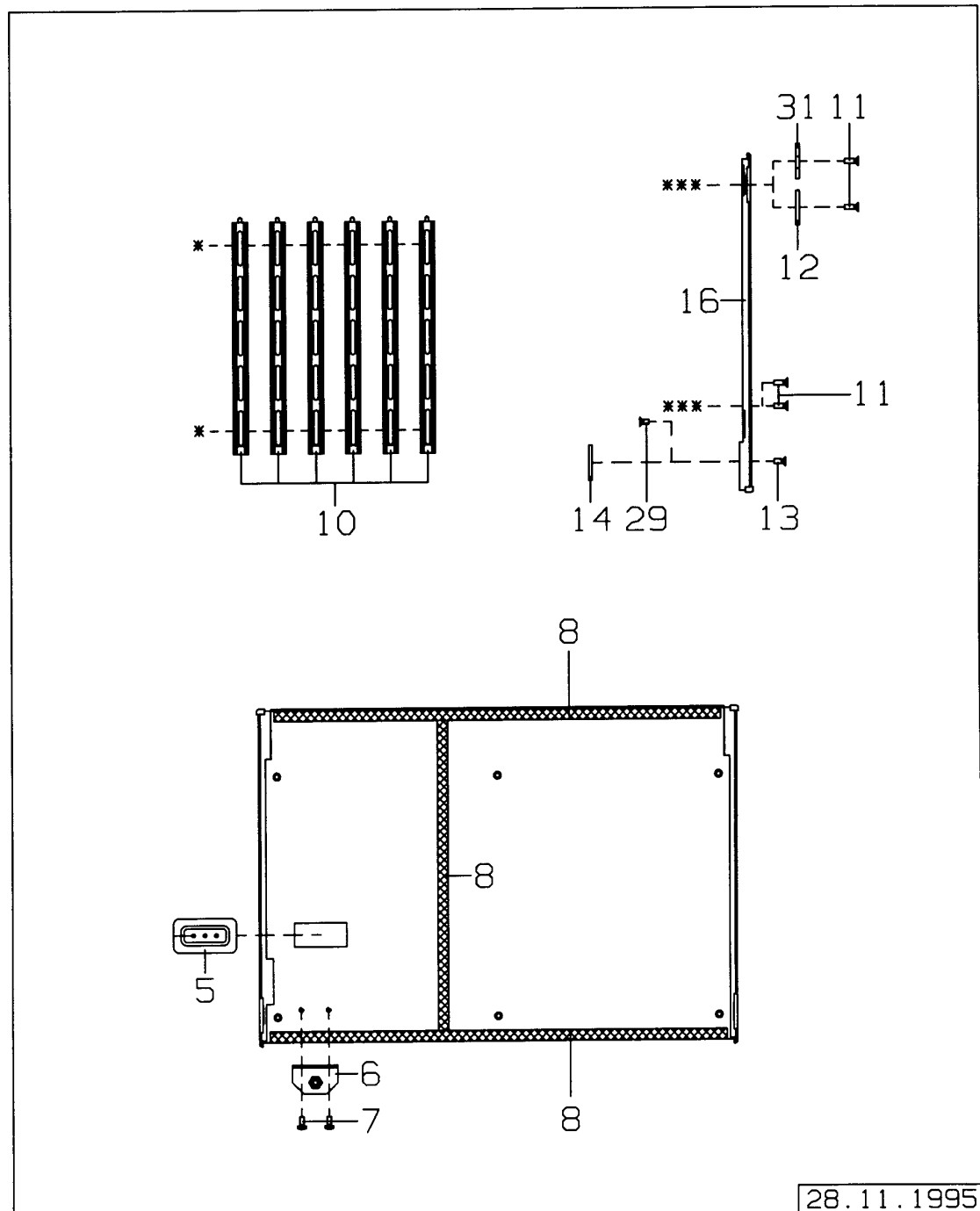
ELEKTRONIK (LEITERPLATTEN)
ELECTRONIC (PRINTED BOARDS)

Bild/Picture 23



ELEKTRONIK (SEITENTEIL 4 H)
ELECTRONIC (SIDE PART 4 H)

Bild/Picture 24



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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-33	ELEKTRONIK ELECTRONIC	8412835		
1	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
2	BEST.LP MOTHERBOARD PCB MOTHERBOARD		8306581	
3	RAENDELSCHRAUBE NG KNURLED SCREW	8306225		
4	KABELBAUM PNEUMATIK CABLE HARNESS PNEUMATIC	8306546		
5	DURCHFUEHRUNG DUCT	M32376		
6	WINKEL,KPL. ANGLE, CPL.	8412367		
7	DIN 7985-M4X8-A2-H DIN 7985-M4X8-A2-H	1340778		
8	EMI-ABDICHTUNG EMI-SEALING	8600784		
9	DIN 7985-M4X8-A2-H DIN 7985-M4X8-A2-H	1340778		
10	PLATINENFUEHRUNG BOARD GUIDE	8600527		
11	DIN 965-M4X12-A4-H DIN 965-M4X12-A4-H	1339966		
12	LASCHE LINK	2M17310		
13	SCHRAUBE AM4X10DIN965 SCREW AM 4X10 A4/051-H DIN 965		1315803	
14	LASCHE LINK	8412363		
15	AC-MODUL NETZTEIL (EVITA 4) AC-MODULE POWER PACK (EVITA 4)		8306520	
15a	RAT-NETZTEIL EVITA 4 (8306520) REP.EXCH.POWER P.EVIT4(8306520)		8411747	
15b	RUESTSATZ EVITA 4 DC MOD.KIT DC-MODULE EVITA 4		8413034	
15c	RAT-DC-MODUL NETZTEIL (8306530) REP.EXCH.DC-MOD.POW.P.(8306530)		8411748	
15d	AKKU 12V 3,5AH(DC-MODUL EVITA4) ACCU 12V 3,5AH(DC-MOD.EVITA 4)		1841416	
16	SEITENTEIL 4H,UGR.		8304117	

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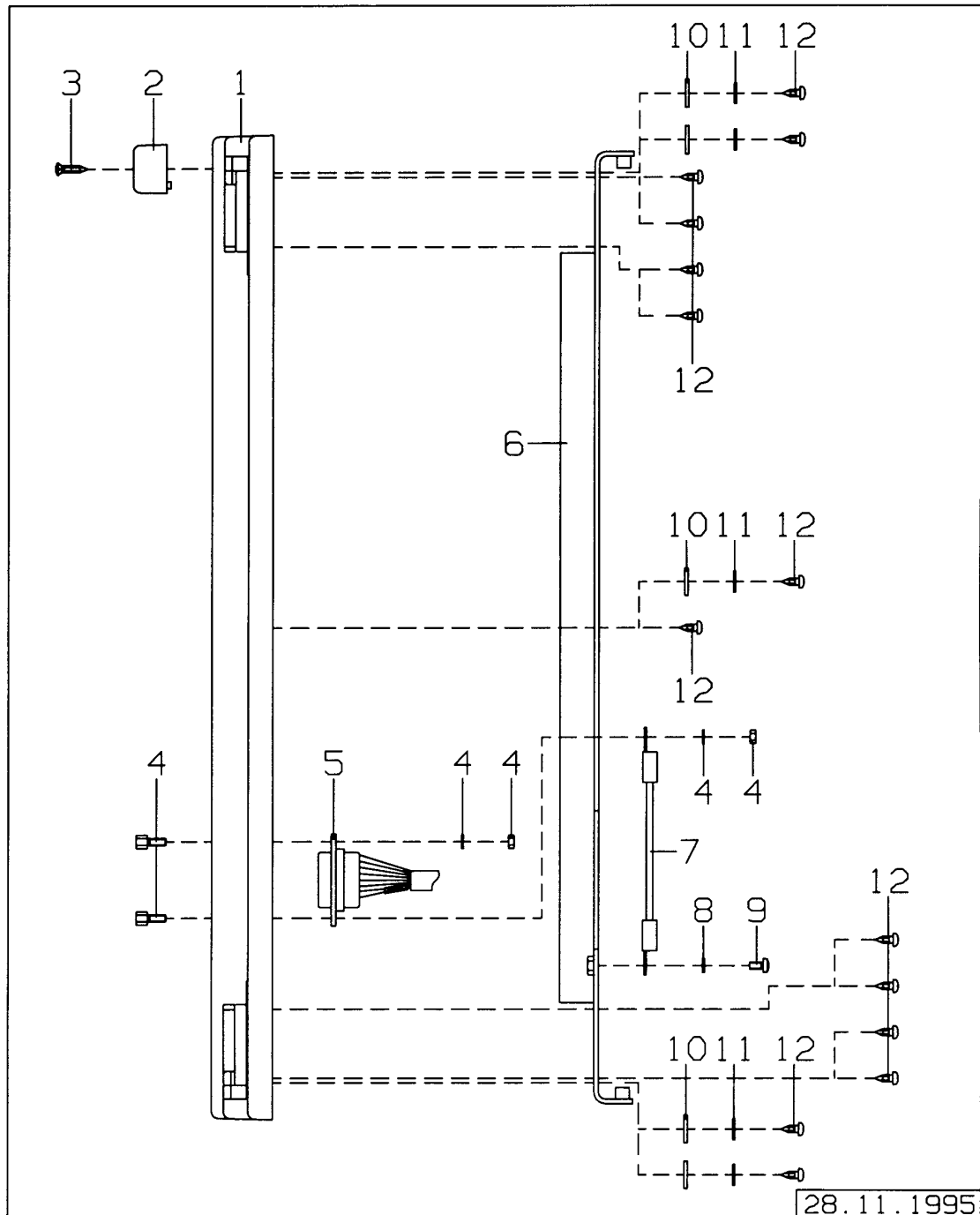
EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	SIDE PART 4H			
17	DIN 965-M3X10-A2-H DIN 965-M3X10-A2-H	1343246		
18	BLINDPLATTE DUMMY PLATE	8306547		
19	FILTERHAUBE FILTER HOOD	8412385		
20	FILTER FILTER		8412384	5
21	BEST.LP CPU 68332 PCB CPU 68332		8306591	
21	RAT-BEST.LP CPU 68332 (8306591 REP.EXCH.PCB CPU 68332(8306591		8306593	
22	LITHIUM-BATTERIE 3V/1400MAH LITHIUM STOR.BATTERY 3V/1400		1835343	
22a	REAL-TIME-CLOCK REAL-TIME-CLOCK		1837087	
23	BEST.LP CO2-CARRIER PCB CO2-CARRIER		8306611	
23	RAT-BEST.LP CO2-CARR. (8306611 REP.EXCH.PCB CO2-CARR.(8306611		8306613	
24	CHASSIS ELEKTRONIK CHASSIS ELECTRONIK	8412374		
25	WANNE,KPL. TUB, CPL.	8412706		
26	KABELBAUM EXTENSIONBOX CABLE HARNESS	8306559		
27	XDSUB VERR-BOLZEN LV00575 XDSUB LOCK BOLT LV00575		1822357	10
28	DIN 7985-M3X12-A2-H DIN 7985-M3X12-A2-H	1342142		
29	DIN 965-M4X8-A4-H DIN 965-M4X8-A4-H	1339958		
30	KANTENSCHUTZPROF 1-2CH15956 SW HEADER PROFILE 1-2CH15956 SW	1191640		
31	HALTER SUPPORT		2M17304	
32	SCHILD LABEL	8409569		
33	OPTION CAPNO PLUS OPTION CAPNO PLUS		8411720	
33a	RUESTSATZ SW 1.11 CO2		8413085	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	MODIF.KIT SW 1.11 CO2			
33b	LP SIGNALPROZESSOR (CO2-MAIN) PCB SIGNAL PROCESSOR(CO2-MAIN)		6870296	
33c	BEST.LP POWER PCB POWER		8350411	
	SAO2-MODUL ohne Abbildung SAO2 MODULE without illustration		8600481	

FRONTPLATTE, KPL.
FRONT PANEL, CPL.

Bild/Picture 25

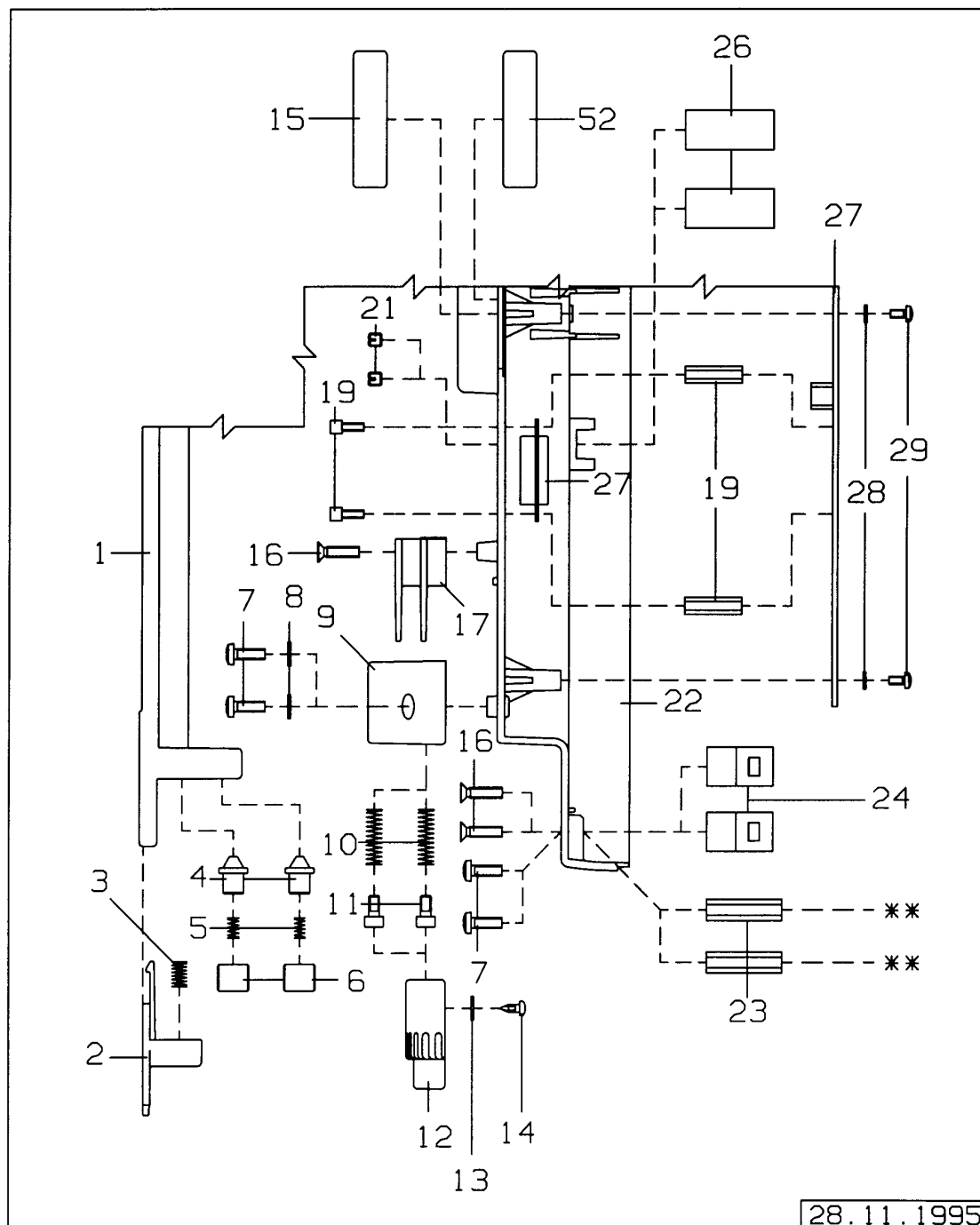


Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-12	FRONTPLATTE,KPL. FRONT PANEL, CPL.	8411661		
1	FRONTPLATTE FRONT PANEL	8412639		
2	KLEMME BINDER	8412884		
3	B2,9X13 DIN 7973-A2 B2,9X13 DIN 7973-A2	1311522		
4	XDSUB VERR-BOLZEN LV00575 besteht aus: Bolzen, Mutter, Fächerscheibe XDSUB LOCK BOLT LV00575 consisting of: bolt, nut, serrated lock washer		1822357	10
5	KABELBAUM FRONT (EVITA 4) CABLE HARNESS,FRONT (EVITA 4)		8306775	
6	FRONTBLECH KPL. FRONT PLATE, CPL.	8412839		
7	MASSEKABEL EARTH CABLE	8306786		
8	FEDERRING B3 DIN127-X12CRN NG SPLIT WASHER B3 DIN127-X12CRNI		1309749	
9	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
10	A7,4 DIN 125-1.4301/1.4303 A7,4 DIN 125-1.4301/1.4303	1343386		
11	SCHEIBE 00003 DISC 00003	1335359		
12	SCHRAUBE DWN562-3X8-F-ST/A4P-H SCREW DWN 562-3X8-F-ST/A4P-H	1338544		

BEDIENTEIL

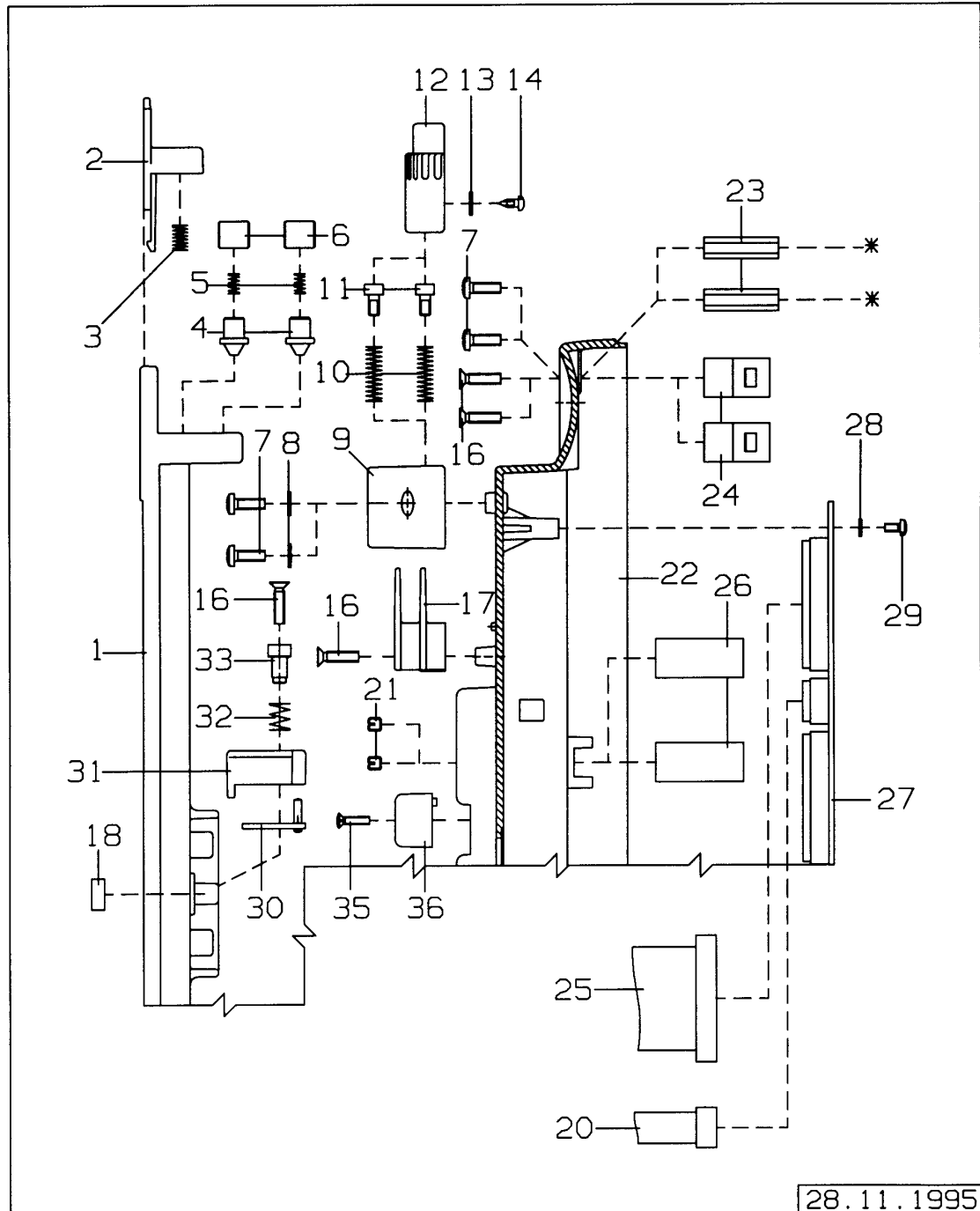
OPERATING DEVICE

Bild/Picture 26



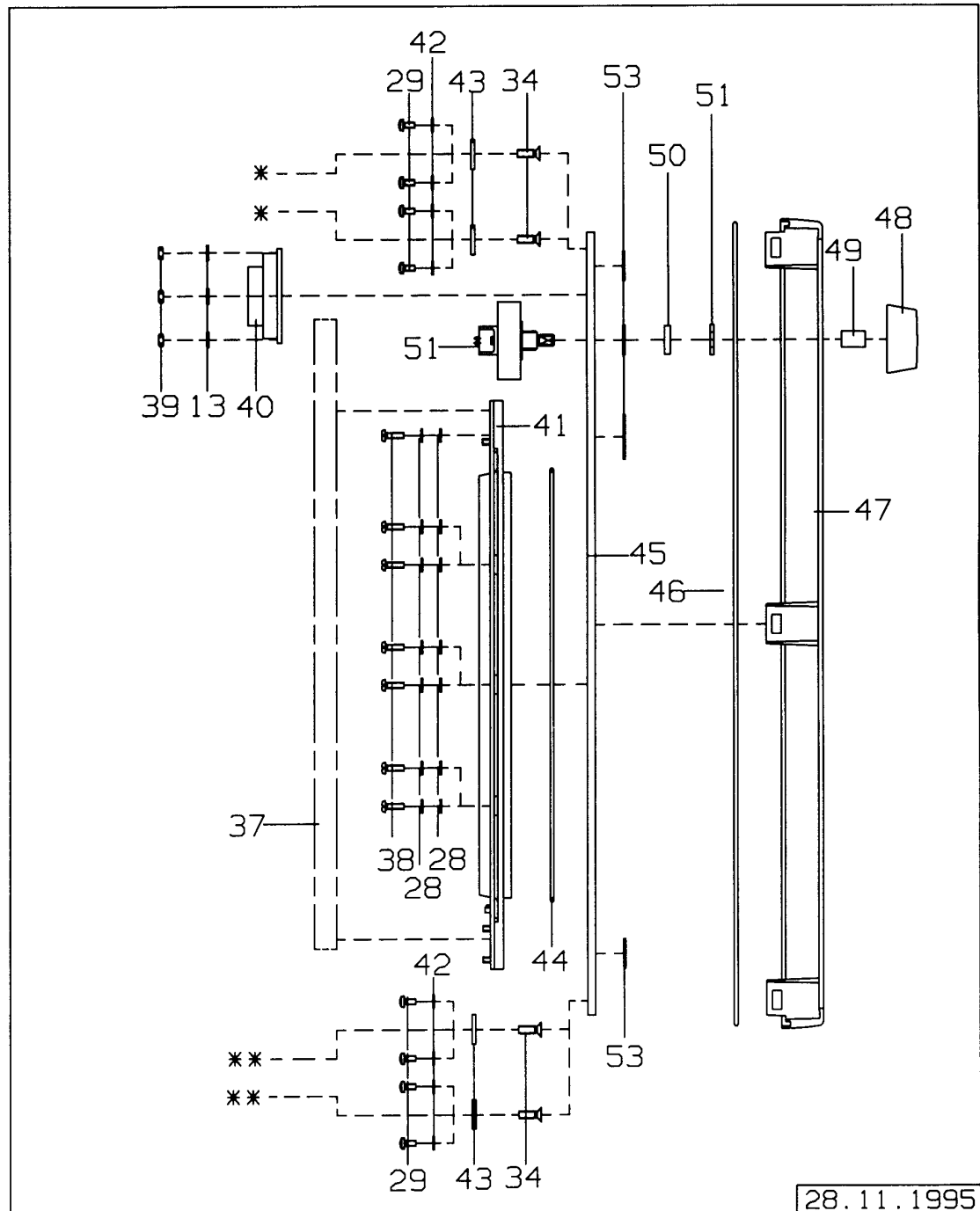
BEDIENTEIL (VERRIEGELUNG)
OPERATING DEVICE (LOCK)

Bild/Picture 27



BEDIENTEIL (DREHGEBER)
OPERATING DEVICE(SHAFT ENCODER)

Bild/Picture 28



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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-53	BEDIENTEIL (EVITA 4) OPERATING DEVICE (EVITA 4)		8412720	
1-53	RAT BEDIENTEIL 8412720 REP.EXCH.OPERATING DEV(8412720	8411683		
1	HALTESCHIENE RAIL	8412627		
2	BUCHSE SOCKET	8412362		
3	FEDER SPRING	M14362		
4	FUEHRUNGSZAPFEN GUIDING PIN	8412625		
5	FEDER SPRING	M09360		
6	GEWINDEBUCHSE INSERT NUT	8412626		
7	LINSENSCHRB.DIN7985-M4X12-A2-H OVAL HEAD SCR.DIN7985-M4X12-A2		1341790	20
8	SCHEIBE A 4,3 DIN 125-A2 WASHER A 4,3 DIN 125-A2		1327542	
9	GEHAEUSE (GELENK) HOUSING (LINK)	8412611		
10	SCHLISSFEDER NG CLOSING SPRING	M14164		
11	ZYLINDERSCHRAUBE M 4X8 DIN 912 CH.HEAD SCREW M4X8 DIN912		1263056	
12	VERRIEGELUNG LOCK	8412622		
13	SCHEIBE 00003 DISC 00003	1335359		
14	SCHRAUBE DWN562-3X8-F-ST/A4P-H SCREW DWN 562-3X8-F-ST/A4P-H	1338544		
15	SCHILD LABEL	8409569		
16	DIN 965-M4X16-A4-H DIN 965-M4X15-A4-H	1339974		
17	WICKELROLLE ROLLER	8412631		
18	PUFFER BUFFER		6800478	20
19	XDSUB VERR-BOLZEN LV00575		1822357	10

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	XDSUB LOCK BOLT LV00575			
20	KABELBAUM TOUCH-SCREEN(EVITA 4 CABLE HARNESS TOUCH-SC(EVITA 4		8412898	
21	GEWINDESTIFT M 5X5 DIN 551 TV SET SCREW M 5X5 DIN 551	1311360		
22	GEHAEUSE (BEDIENTEIL) HOUSING (OPERATING DEVICE)	8412601		
23	DISTANZSTUECK SPACER	8412808		
24	FEDERBLECH,KPL. SPRING STEEL SHEET, CPL.	8412890		
	FEDERBLECH SPRING STEEL SHEET	8412703		
	VIERKANTMUTTER SQUARE NUT	8412883		
	SICHERUNGSSCHEIBE 5 DIN 6799 THRUST WASHER		1326406	50
25	KABELBAUM TASTATUR CABLE HARNESS, KEY PAD	8412897		
26	PLATTE PLATE	8412885		
27	BEST.LP GRAFIKCONTROLLER PCB GRAPHIC CONTROLLER		8306641	
27	RAT-BEST-LP GRAFIKCONT(8306641 REP.EXCH.PCB GRAPH.CON(8306641		8306643	
28	FIBERRING FIBRE RING		D04766	50
29	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
30	BLECH,VOLLST. SHEET METAL, CPL.	8412843		
	BLECH SHEET METAL	8412842		
	STIFT 3X12 DIN 1472 PIN 3X12 DIN 1472		1326155	
31	KNEBEL TOGGLE	8412637		
32	FEDER SPRING	E24916		
33	BUCHSE SOCKET	8412844		
34	DIN 965-M4X12-A4-H	1339966		

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	DIN 965-M4X12-A4-H			
35	LINSENSENKSCHRB.AM3X12DIN964NG RAIS.COUNTERS.SCR.AM3X12DIN964		1328379	
36	KLEMME BINDER	8412884		
37	RUESTSATZ DISPLAY (EVITA 4) bestehend aus: MODIF.KIT DISPLAY (EVITA 4) composed of:		8411711	
	DISPLAY TOSHIBA,KOMPL. DISPLAY TOSHIBA, CPL.	8411718		
	DISPLAY NEC,KOMPL. DISPLAY NEC, CPL.	8411714		
	DISPLAY SHARP, KOMPL. DISPLAY SHARP, CPL.	8411767		
38	AM3X10 DIN 85-A2 SCREW AM3X10 DIN 85-A2	1333984		
39	SECHSKT.MUTTER M3 DIN934-M A4 HEXAGON NUT M3 DIN934-M A4		1334913	10
40	LAUTSPRECHER,KOMPL. LOUDSPEAKER, CPL.		8306558	
	LAUTSPR.50OHM 0,5W LV01912 LOUDSPEAK. 50 OHM 0,5W LV01912	1838024		
	XLPSK BUL2 AWG24 LV01882 XLPSK BUL2 AWG24 LV01882	1838318		
41	TOUCHSCREEN TOUCHSCREEN		8306638	
41a	TOUCHRAHMEN,KPL. (EVITA 4) ohne Abbildung FRAMED SCREEN, CPL. (EVITA 4) without illustration		8411746	
42	A3,2 DIN125-A4 A3,2 DIN125-A4	1341782		
43	STEBOLZENBLECH STUD BOLT PLATE	8411636		
44	O-RING O-RING SEAL		8412941	
45	ANZEIGEFELD, KOMPL. DISPLAY, CPL.		8412137	
46	DICHTSCHNUR, ERS.D.1212184 SEALING PROFILE	8412914		
47	BLENDRAHMEN SCREEN	8412602		

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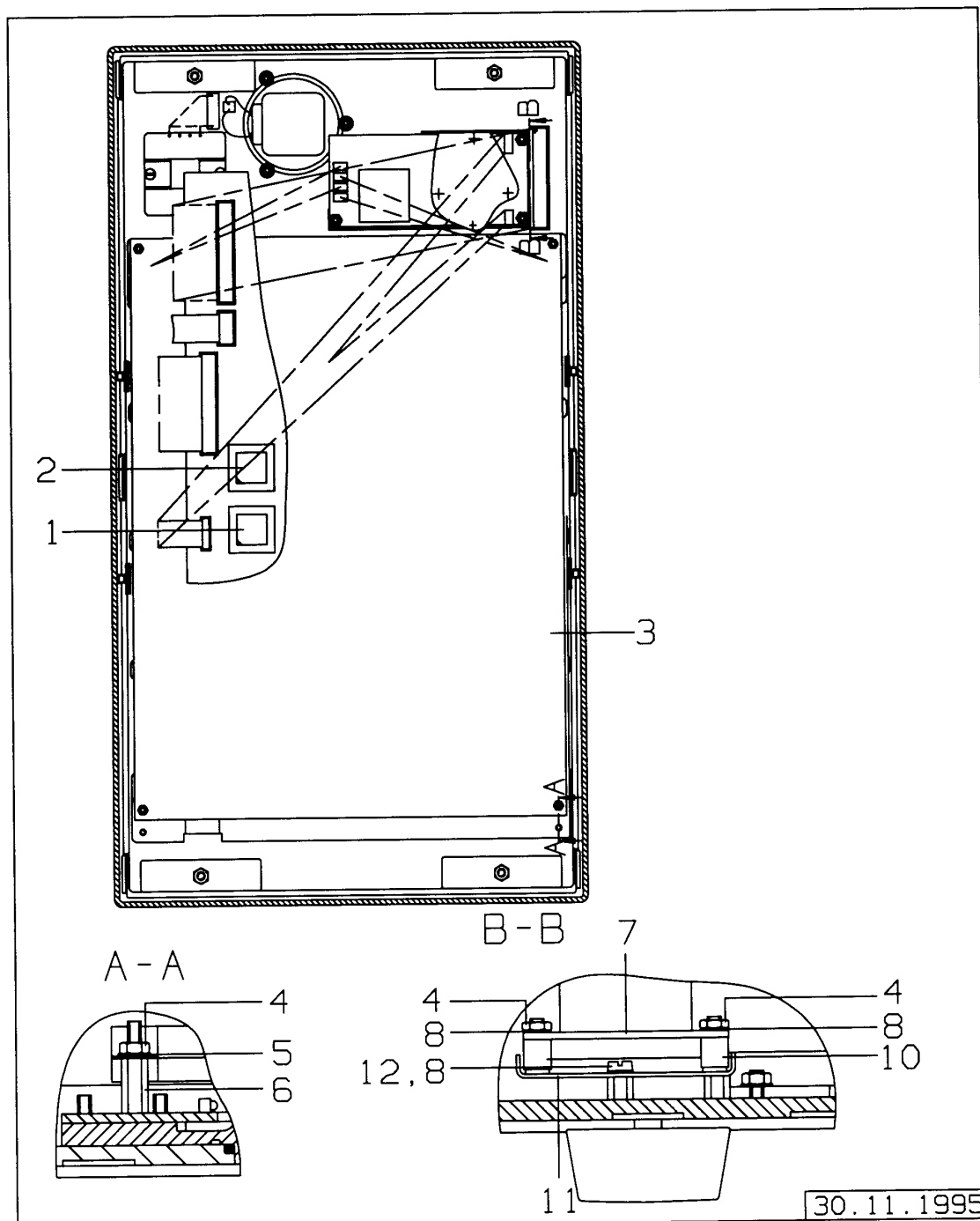
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
48	DREHKNOFF CONTROL KNOB	M29655		
49	BLATTFEDER LEAF SPRING	M29952		
50	HUELSE BUSH	8412893		
51	DREHGEBER,KOMPL. SHAFT ENCODER, CPL.	8306565		
	DREHGEBER SHAFT ENCODER		8500088	
	XLPSK BUL7 AWG24 LV01882 XLPSK BUL7 AWG24 LV01882	1838296		
52	AUFKLEBER ADHESIVE LABEL	8303296		
53	EINSCHUBSTREIFEN (INTERN.) PLUG-IN STRIPE (INTERN.)	8412380		

DISPLAY TOSHIBA, KOMPL.
DISPLAY TOSHIBA, CPL.

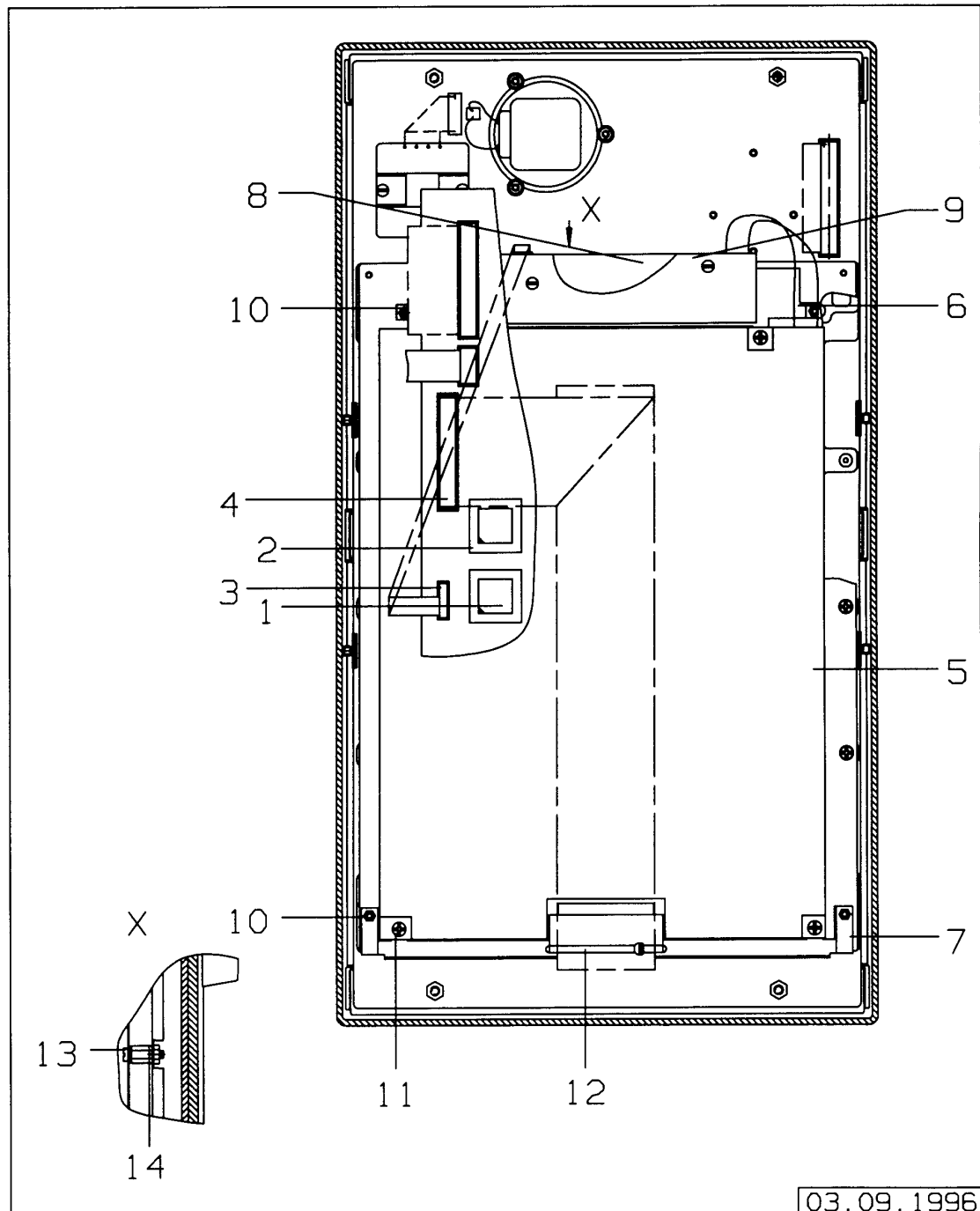
Bild/Picture 29



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-12	DISPLAY TOSHIBA,KOMPL. DISPLAY TOSHIBA, CPL.	8411718		
1	PIXELMUXER FARBE TOSHIBA PIXEL MULTIPLEXER COLOUR TOSH.	8306640		
2	LOOKUP TFT-TOSHIBA LOOKUP TFT-TOSHIBA	8306795		
3	LCD-DISPLAY 640X480X512LV01960 LCD-DISPLAY 640X480X512LV01960	1838288		
4	SECHSKT.MUTTER M3 DIN934-M A4 HEXAGON NUT M3 DIN934-M A4		1334913	10
5	A3,2 DIN125-A4 A3,2 DIN125-A4	1341782		
6	DISTANZBOLZEN DISTANCE BOLT	8304715		
7	DC-AC KONVERTER,KOMPL. DC-AC CONVERTER, CPL.	8411719		
8	FIBERRING FIBRE RING		D04766	50
9	DISTANZBUCHSE DISTANCE BUSH	6803595		
10	BOLZEN BOLT	8411689		
11	ZYL.SCHRAUBE M3X4 DIN84-A4 CHEESE HEAD SCREW M3X4DIN84-A4		1321609	
12	HALTER,KPL. SUPPORT, CPL.	8411688		
	LCD-HINTERLEUCHTE LV02392 (TOSHIBA) ohne Abbildung LCD REAR LIGHTING LV02392 (TOSHIBA) without illustration	1841424		

DISPLAY SHARP, KOMPL.
DISPLAY SHARP, CPL.

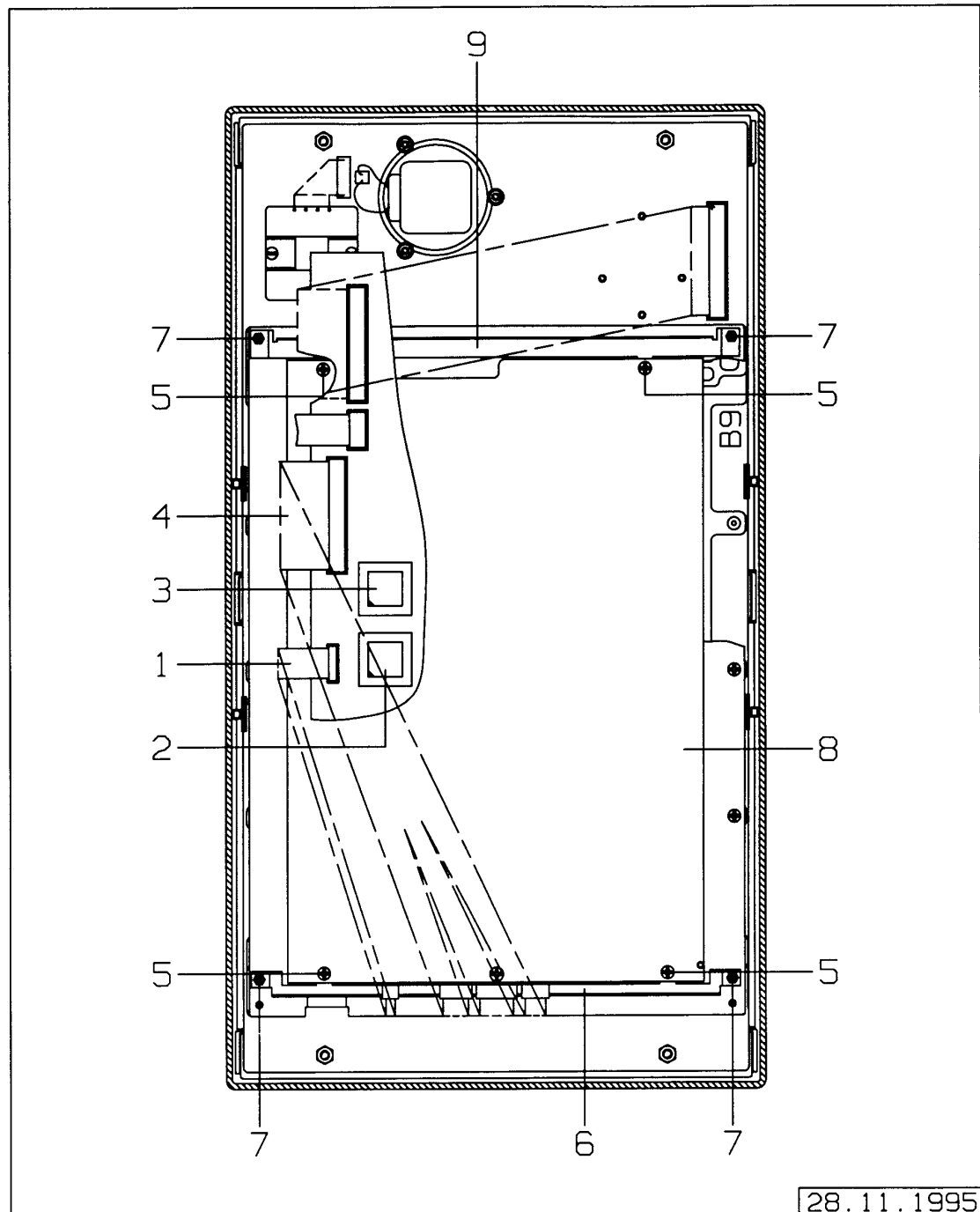
Bild/Picture 30



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-14	DISPLAY SHARP, KOMPL. DISPLAY SHARP, CPL.	8411767		
1	PIXELMUXER SHARP PIXEL MULTIPLEXER SHARP	8411776		
2	LOOKUP TFT-TOSHIBA LOOKUP TFT-TOSHIBA	8306795		
3	KABELBAUM INVERTER SHARP CABLE HARNESS INVERTER SHARP	8411731		
4	KABELBAUM SHARP CABLE HARNESS SHARP	8411727		
5	LCD-DISPLAY 640X480TFT LV02416 LCD-DISPLAY 640X480TFT LV02416	1841629		
6	HALTER,RECHTS(SHARP) SUPPORT, RIGHT (SHARP)	8411752		
7	HALTER,LINKS(SHARP) SUPPORT, LEFT (SHARP)	8411751		
8	INVERTER SHARP INVERTER SHARP	8411732		
9	ISOLIERPLATTE INSULATING PLATE		8411768	
10	DISTANZSTUECK SPACER	8300428		
11	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
12	KABELBINDER CABLE CLIP		8712065	20
13	SCHRAUBE M3X5 PA SCREW M3X5 PA	8411753		
14	DISTANZBOLZEN DISTANCE BOLT	8411765		

DISPLAY NEC, KOMPL.
DISPLAY NEC, CPL.

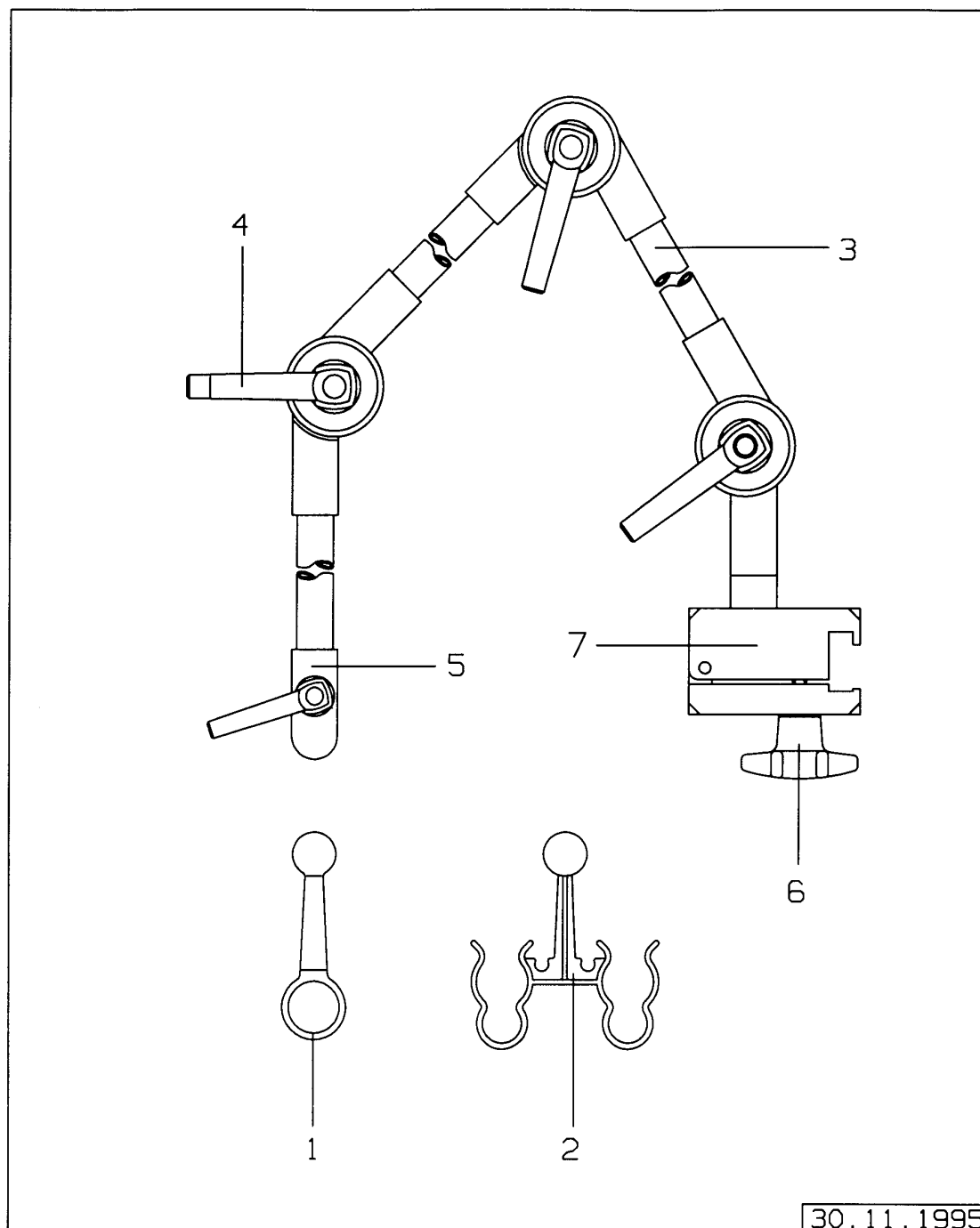
Bild/Picture 31



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-9	DISPLAY NEC,KOMPL. DISPLAY NEC, CPL.	8411714		
1	KABELBAUM DISPLAY NEC DIMMER CABLE HARNESS DISPLAY NEC DIMM	8411717		
2	PIXELMUXER NEC PIXEL MULTIPLEXER NEC	8411686		
3	LOOKUP TFT-TOSHIBA LOOKUP TFT-TOSHIBA	8306795		
4	KABELBAUM DISPLAY NEC CABLE HARNESS DISPLAY NEC	8411713		
5	LINSENSCHRB.DIN7985-M3X6-A2-H OVAL HEAD SCR.DIN7985-M3X6-A2		1340727	20
6	HALTER LINKS,KOMPL. SUPPORT LEFT, CPL.	8411715		
7	DISTANZSTUECK SPACER	8300428		
8	LCD-DISPLAY 640X480 LV02247 LCD-DISPLAY 640X480 LV02247	1840436		
9	HALTER,RECHTS,KOMPL. SUPPORT RIGHT, CPL.	8411716		
	LCD-HINTERLEUCHTUNG LV02415 (NEC) ohne Abbildung LCD REAR LIGHTING LV02415 (NEC) without illustration	1841610		

GELENKARM 240-GRD.
HINGED BRACKET 240-DEGREE

Bild/Picture 32



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Spare parts list

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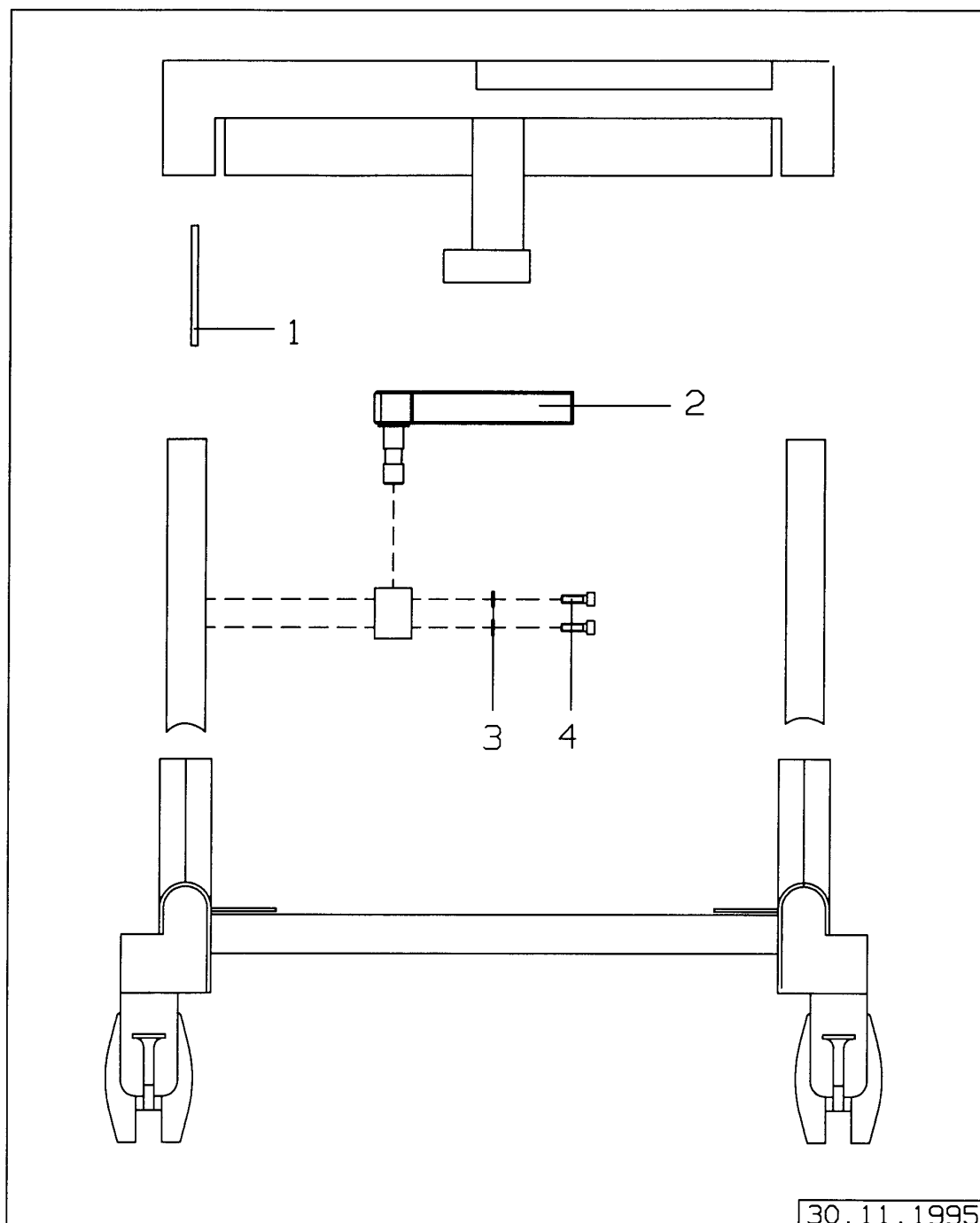
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-7	GELENKARM 240-GRD. HINGED BRACKET 240 DEGR.		8409609	
1	HALTER FUER GELENKARM E SUPPORT FOR HINGED BRACKET E		8409746	
2	SCHLAUCHKLEMME FUER GELENKARM HOSE CLAMP FOR HINGED BRACKET		8409841	
3-7	GELENKARM HINGED BRACKET	8409825		
4	SET KLEMMHEBEL SET CLAMPING LEVER		8410383	
5	KLEMME, KOMPL. BINDER, CPL.		8410075	
6	STERNGRIFF MIT SCHEIBE STAR GRIP WITH DISC		8410382	
7	SCHIENENKLAUE RAIL CATCH		8411424	

HALTER
SUPPORT

Bild/Picture 33



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Spare parts list

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EVITA 4

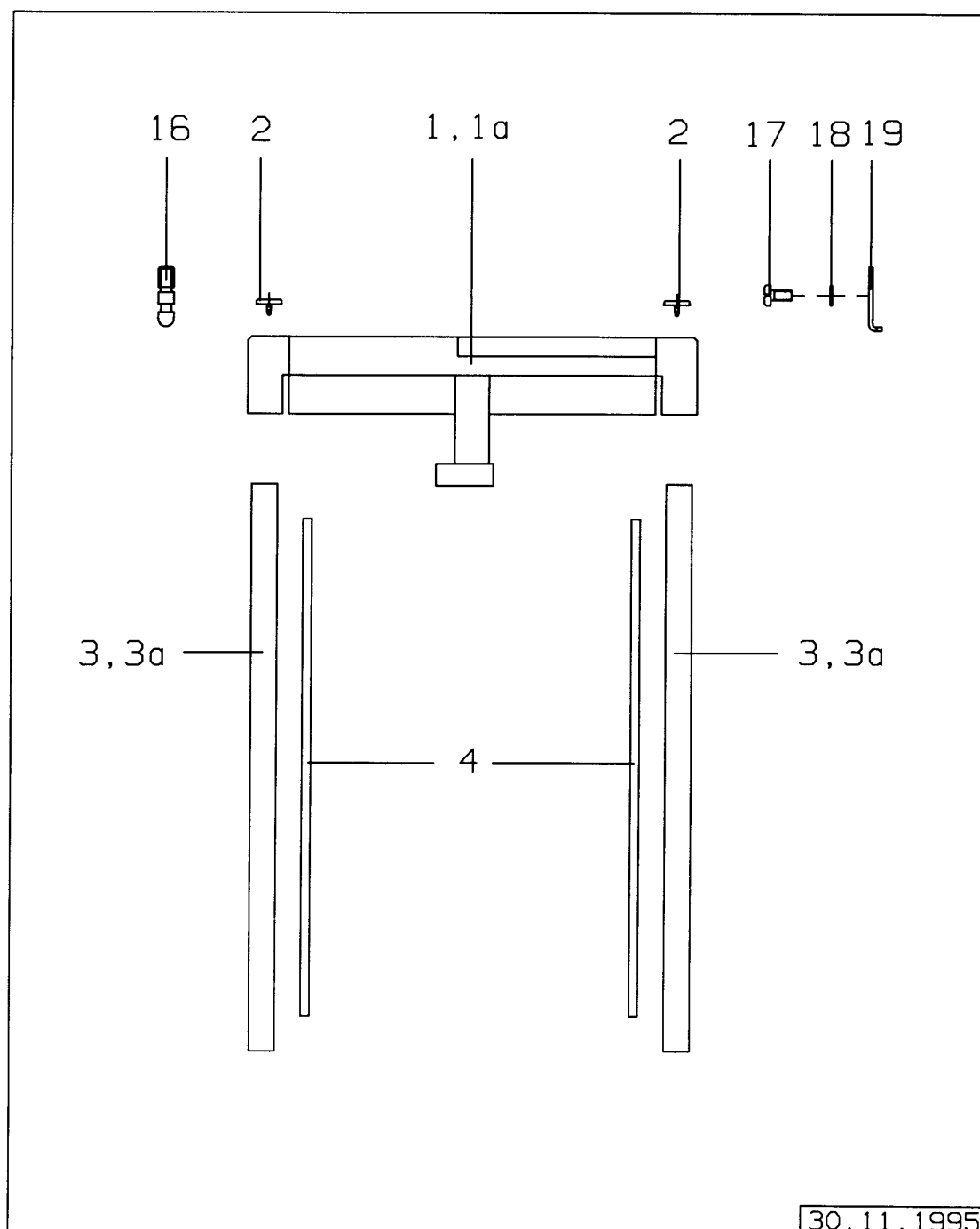
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-4	HALTER SUPPORT		8412219	
1	PLATTE PLATE		M29110	
2	HALTER, VOLLST. SUPPORT, CPL.	8412317		
3	B6 DIN 127-BZ AMAGNETISCH/086X B6 DIN 127-BZ ANTIMAGN./086X		1321986	
4	M6X20 DIN 912-A2 M6X20 DIN 912-A2	1330853		

FAHRGESTELL
CARRIAGE

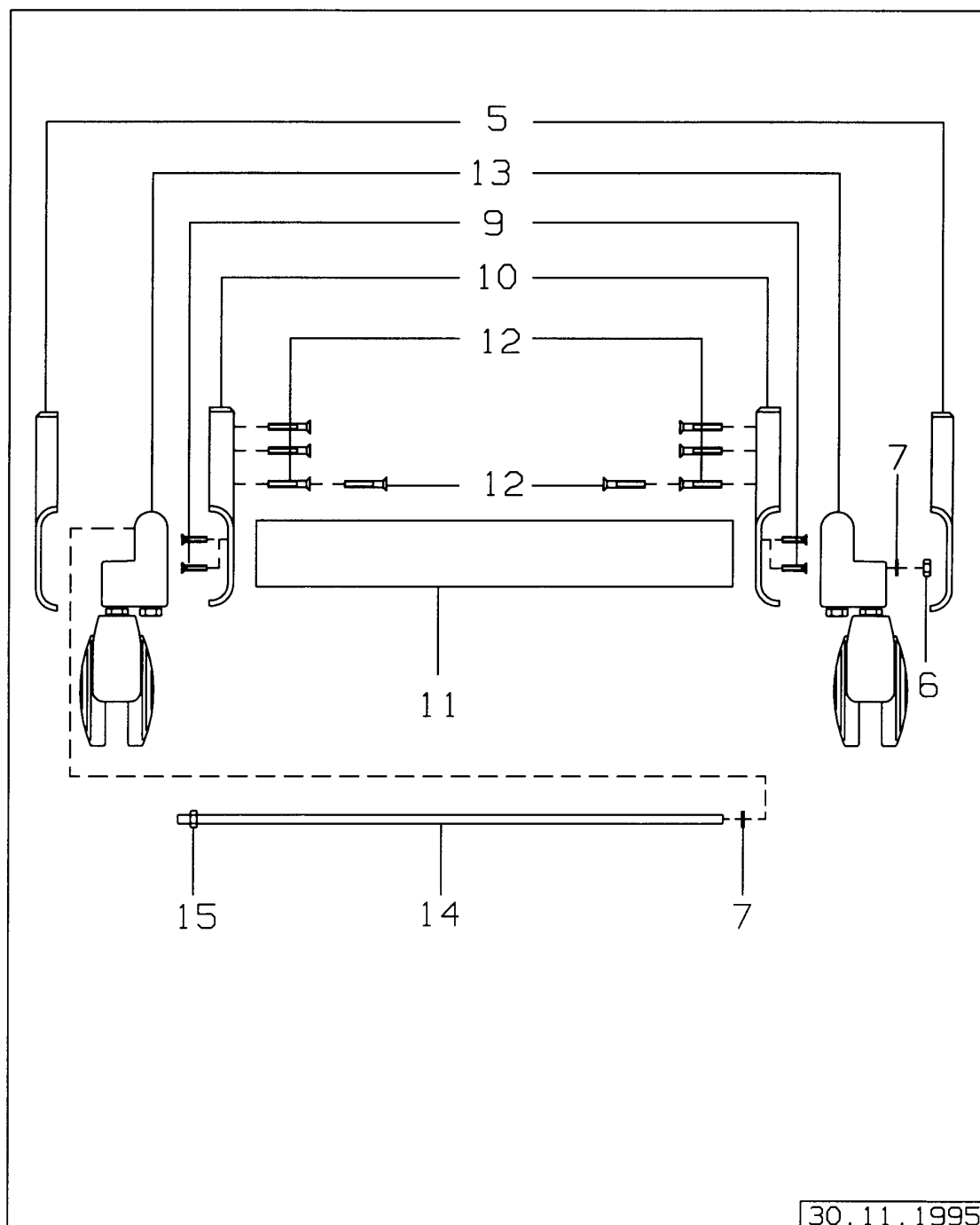
Bild/Picture 34



FAHRGESTELL (UNTERGESTELL)

Bild/Picture 35

CARRIAGE (UNDERCARRIAGE)

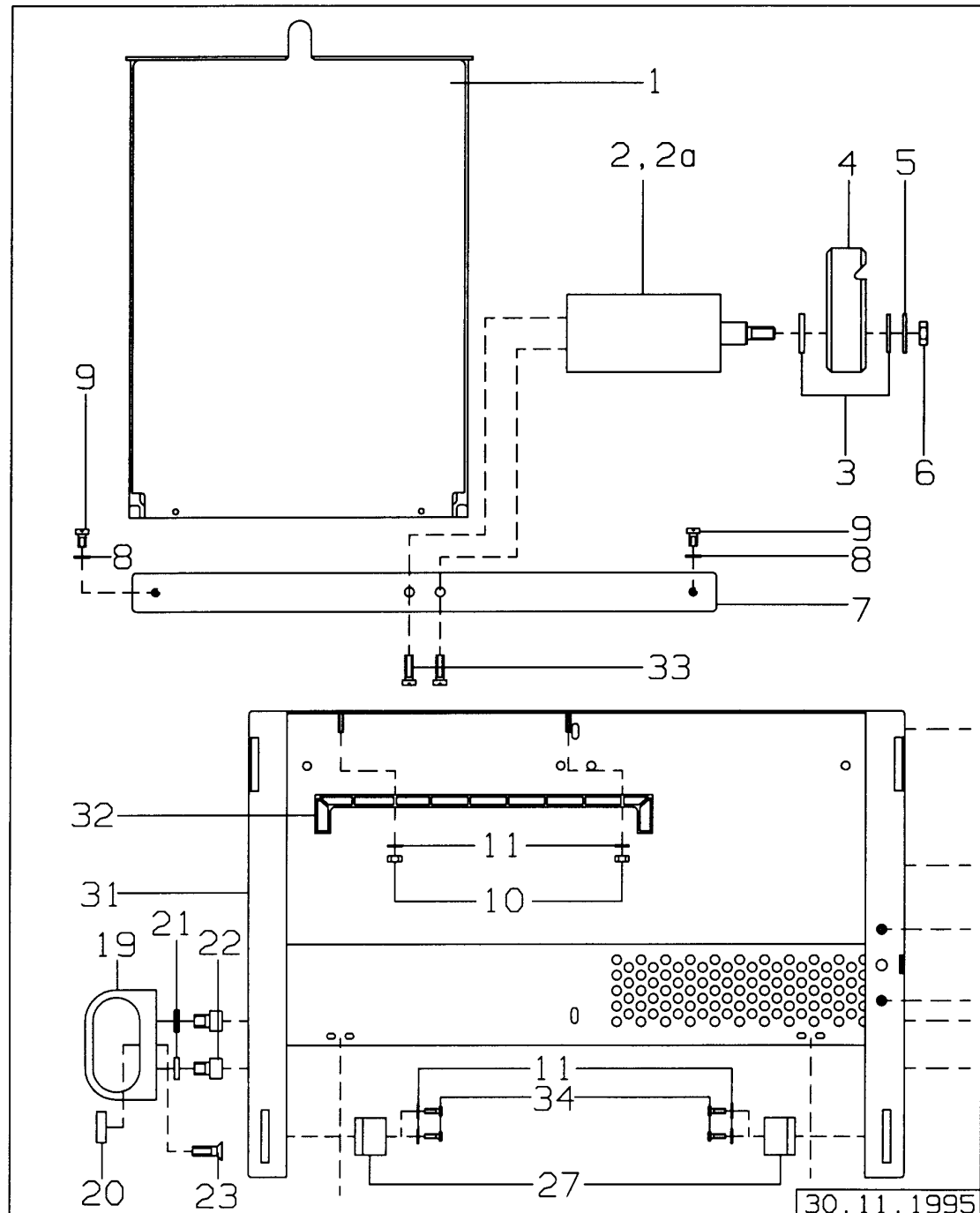


Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-19	FAHRGESTELL CARRIAGE		8411680	
1	AUFNAHME KPL. RECEIVER, CPL.	8411692		
2	KLAPPE FLAP	8412744		
3	PROFILROHR SECTION TUBE	8408850		
4	PROFIL PROFILE		M29336	4
5	SCHALE TRAY	M29200		
6	MUTTER M8 DIN 934-M A4/051 NUT M8 DIN 934-M A4/051		1267582	10
7	FEDERRING B 8,DIN127-NIRO SPLIT WASHER B8 DIN127-STAINL.		1333739	
8	SEITENTEIL,RECHTS SIDE PART, RIGHT	8409012		
9-11	VERBINDUNG CONNECTION	8409013		
9	SENKSCHRB.AM5X20 DIN963-A4 NG FLAT HEAD SCREW AM5X20 DIN963		1305506	
10	SCHALE TRAY	M29201		
11	VERBINDUNGSPROFIL CONNECTING PROFILE	8408852		
12	M6X35 DIN 7991-A4 M6X35 DIN 7991-A4 SCREW	1338838		
13	SEITENTEIL,LINKS SIDE PART, LEFT	8409011		
14-15	GEWINDESTANGE,UGR. THREADED ROD	8409494		
14	DIN 976-BM8X500-5.8/155 DIN 976-BM8X500-5.8/155	1339303		
15	SECHSKT.MUTTER M 8 DIN 985 HEXAGON NUT M 8 DIN 985	1268686		
16	STIFT PIN	8408902		
17	SCHRAUBE AM 4X8 DIN 85-A2/051 SCREW AM4X8 DIN85-A2/051		1329103	20
18	FEDERRING B 4 DIN 127		1331345	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	SPLIT WASHER B4 DIN 127			
19	BLECH SHEET METAL	8408904		

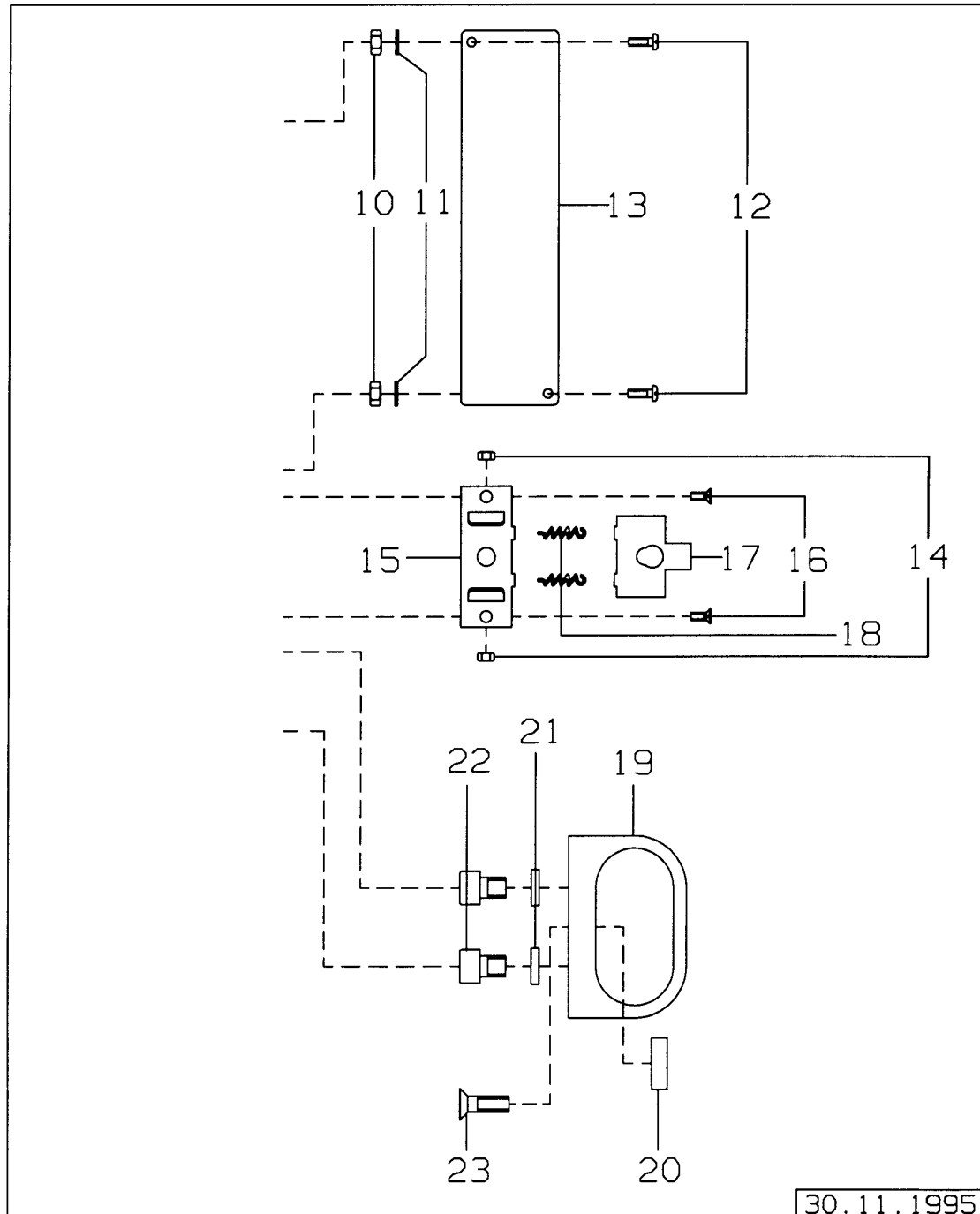
AUFNAHME, KOMPL.
RECEIVER, CPL.

Bild/Picture 36



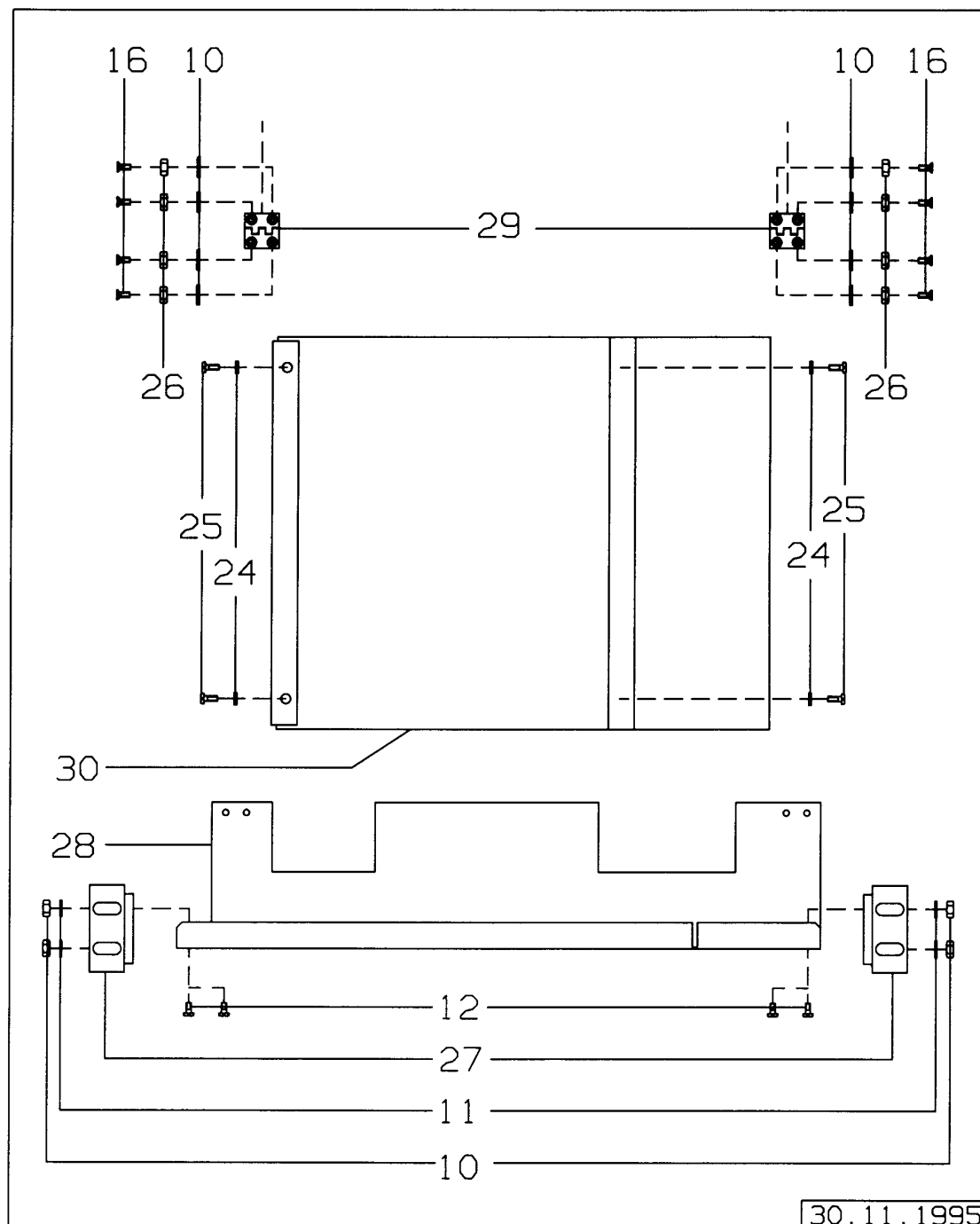
AUFNAHME, KOMPL.(HALTER)
RECEIVER, CPL. (SUPPORT)

Bild/Picture 37



AUFNAHME, KOMPL.(KLAPPE)
RECEIVER, CPL. (FLAP)

Bild/Picture 38



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-34	AUFNAHME KPL. RECEIVER, CPL.	8411692		
1	SCHUBLADE,KPL.UGR. DRAWER, CPL.		8409015	
2-6+33	HALTERUNG FIXING DEVICE		8408959	
2	ZAPFEN TAPPET	8409268		
2a	ZAPFEN TAPPET	8413079		
3	AUSGANGSDICHTUNG OUTPUT WASHER		R12674	
4	ANSCHLUSS-STUECK CONNECTOR	8409133		
5	B8,4 DIN 9021-A4 B8,4 DIN 9021-A4	1335367		
6	SECHSKT.MUTTER M 8 DIN 985 HEXAGON NUT M 8 DIN 985	1268686		
7	STREBE BRACE	8408984		
8	SCHEIBE A 5,3 DIN 125-A4 WASHER A 5,3 DIN 125-A4		1326279	
9	DIN 84-AM5X8-A2 DIN 84-AM5X8-A2	1327658		
10	SECHSKT.MUTTER M3 DIN934-M A4 HEXAGON NUT M3 DIN934-M A4		1334913	10
11	DICHTRING 00001 WASHER 00001		1330233	
12	LINS.ZYL.SCHRB. AM 3X6 DIN 85 RAISED CHEESE HEAD SCREW AM3X6		1288091	
13	BLECH SHEET METAL	8408972		5
14	SETZMUTTER NUT	CH17646		
15	HALTERUNG SUPPORT	8408935		
16	SENKSCRAUBE AM3X6 DIN963-A4 B COUNTERS.SCREW AM3X6DIN963-A4		1287400	
17	SCHIEBER SLIDE	8408905		
18	ZUGFEDER	M16452		

Ersatzartikelliste 5664.500

Spare parts list

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EVITA 4

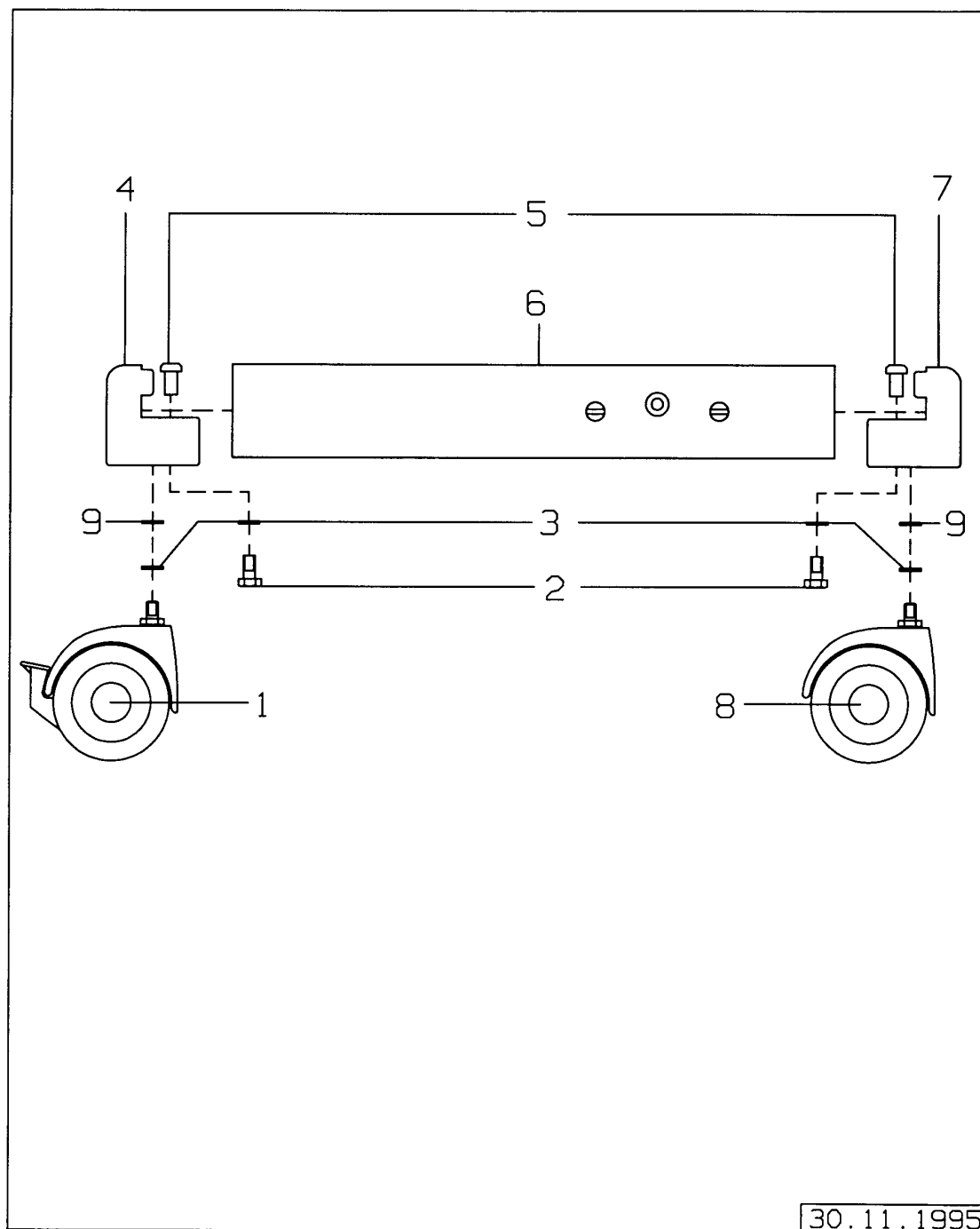
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	MAIN SPRING			
19	HALTER,FERTIGTEIL SUPPORT, ASSEMBLY UNIT	8409008		
20	MUTTER NUT	8409002		
21	B8 DIN 137-NICHTROST.ST B8 DIN 137-STAINLESS STEEL	1335324		
22	ZYLINDERSCHRAUBE M8X10 8,6/160 CH. HEAD SCREW M8X10 8,6/160	1282182		
23	SENKSCHRAUBE M6X16 DIN7991-A4 COUNTERS.SCR.M6X16 DIN7991-A4		1338811	10
24	SCHEIBE A 4,3 DIN 125-A2 WASHER A 4,3 DIN 125-A2		1327542	
25	SCHRAUBE AM 4X8 DIN 85-A2/051 SCREW AM4X8 DIN85-A2/051		1329103	20
26	FEDERRING B3 DIN127-X12CRN NG SPLIT WASHER B3 DIN127-X12CRNI		1309749	
27	MAGNETVERSCHLUSS MAGNETIC LOCK	E20935		
28	KLAPPE FLAP	8412744		
29	SCHARNIER HINGE		2M12994	
30	PLATTE,UGR. PLATE	8409020		
31	AUFNAHME,UGR. RECEIVER	8409128		
32	HALTER SUPPORT	8408845		
33	AM 5X16 DIN 84-A2 AM 5X16 DIN 84-A2		1335820	
34	SCHRAUBE BZ 2,9X9,5 DIN7971-A2 SCREW BZ 2,9X9,5 DIN 7971		1326619	

SEITENTEIL, RECHTS
SIDE PART, RIGHT

Bild/Picture 39



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Spare parts list

Ausgabe/Editor

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EVITA 4

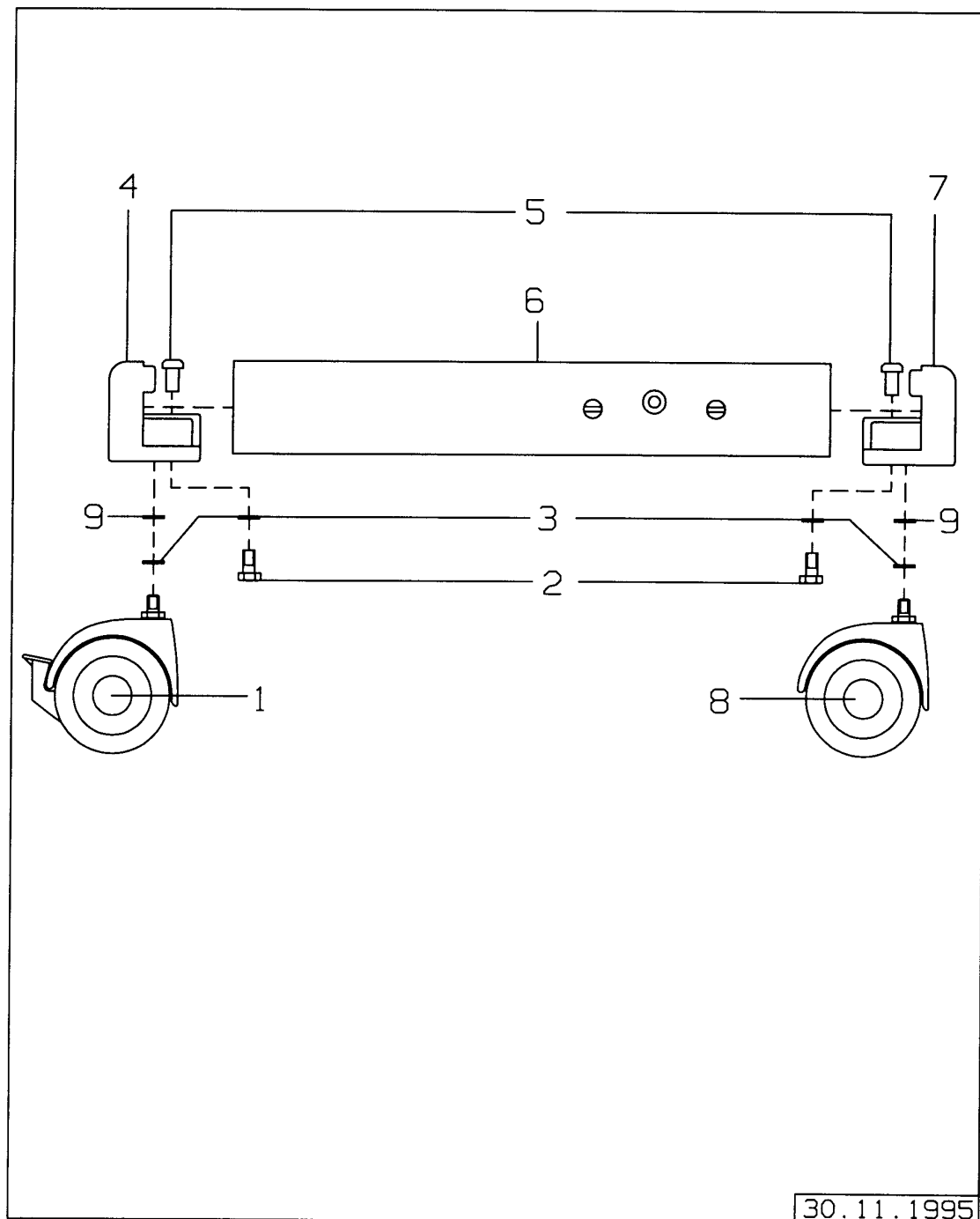
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-9	SEITENTEIL,RECHTS SIDE PART, RIGHT	8409012		
1	FESTSTELL-LENKROLLE FIXING GUIDE ROLL		2M19140	
2	M10X20 DIN 933-5.6/155 M10X20 DIN 933-5.6/155	1309102		
3	FEDERRING B10 DIN 127-NIRO SPLIT WASHER B10 DIN127-STAINL		1335219	
4	ABDECKKAPPE COVER CAP	8409065		
5	DIN 508-M10X12-10.9/VERZINKT X DIN 508-M10X12-10.9/GALVANIZED	1338846		
6	PROFILROHR,RECHTS SPECIAL SECTION TUBE, RIGHT	8408936		
7	ABDECKKAPPE COVER CAP	8409067		
8	LENKROLLE GUIDE ROLL		2M19130	
9	SPANNSCHEIBE M10 DIN6796-FST X CONIC.SPR. WASHER M10 DIN6796		1341146	100

SEITENTEIL, LINKS
SIDE PART, LEFT

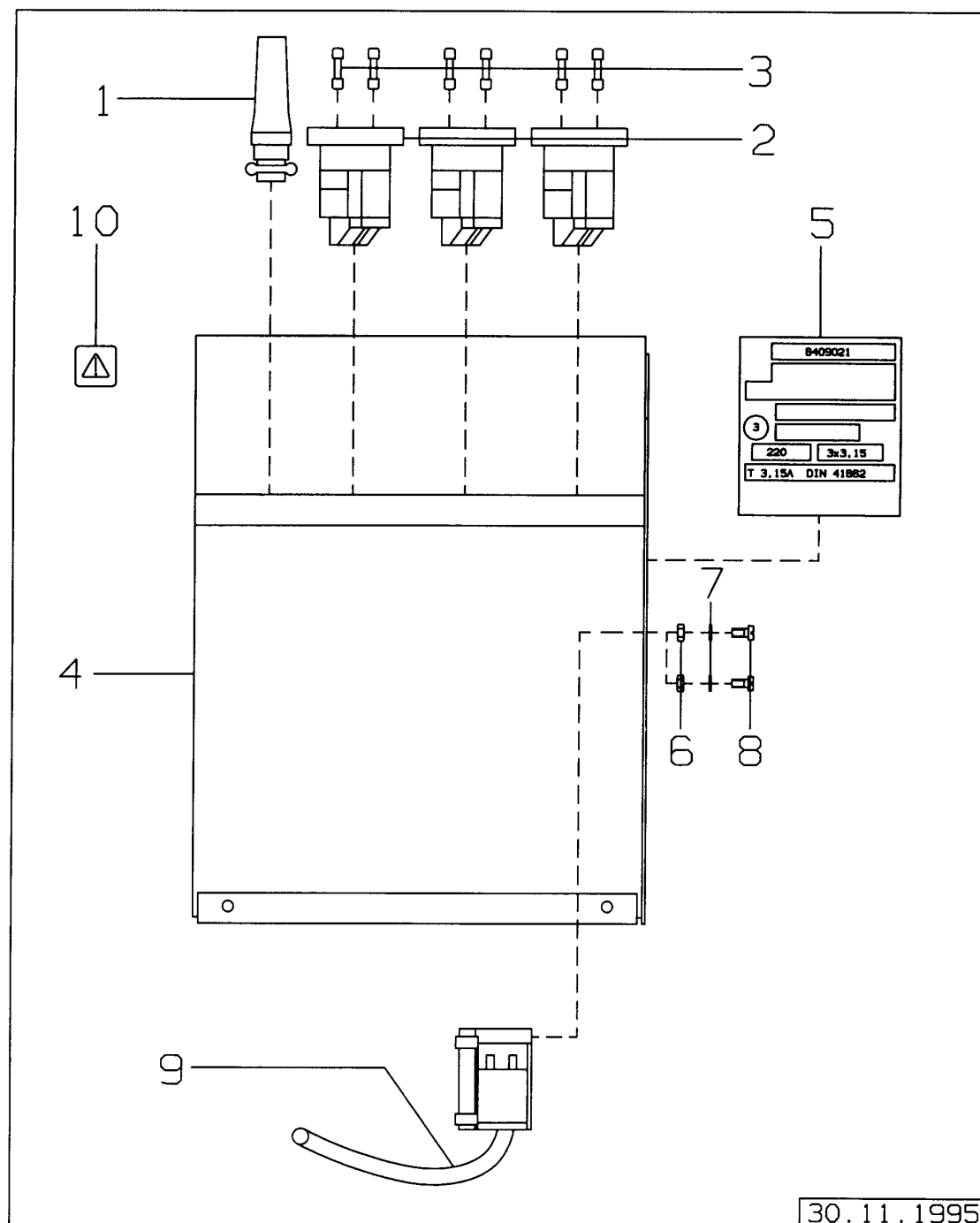
Bild/Picture 40



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-9	SEITENTEIL,LINKS SIDE PART, LEFT	8409011		
1	FESTSTELL-LENKROLLE FIXING GUIDE ROLL		2M19140	
2	M10X20 DIN 933-5.6/155 M10X20 DIN 933-5.6/155	1309102		
3	FEDERRING B10 DIN 127-NIRO SPLIT WASHER B10 DIN127-STAINL		1335219	
4	ABDECKKAPPE COVER CAP	8409067		
5	DIN 508-M10X12-10.9/VERZINKT X DIN 508-M10X12-10.9/GALVANIZED	1338846		
6	PROFILROHR,LINKS SPECIAL SECTION TUBE, LEFT	8408849		
7	ABDECKKAPPE COVER CAP	8409065		
8	LENKROLLE GUIDE ROLL		2M19130	
9	SPANNSCHEIBE M10 DIN6796-FST X CONIC.SPR.WASHER M10 DIN6796		1341146	100

RUESTSATZ STECKDOSENLEISTE
MODIFICATION KIT MULTIPLE SOCKET

Bild/Picture 41



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition
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EVITA 4

EVITA 4

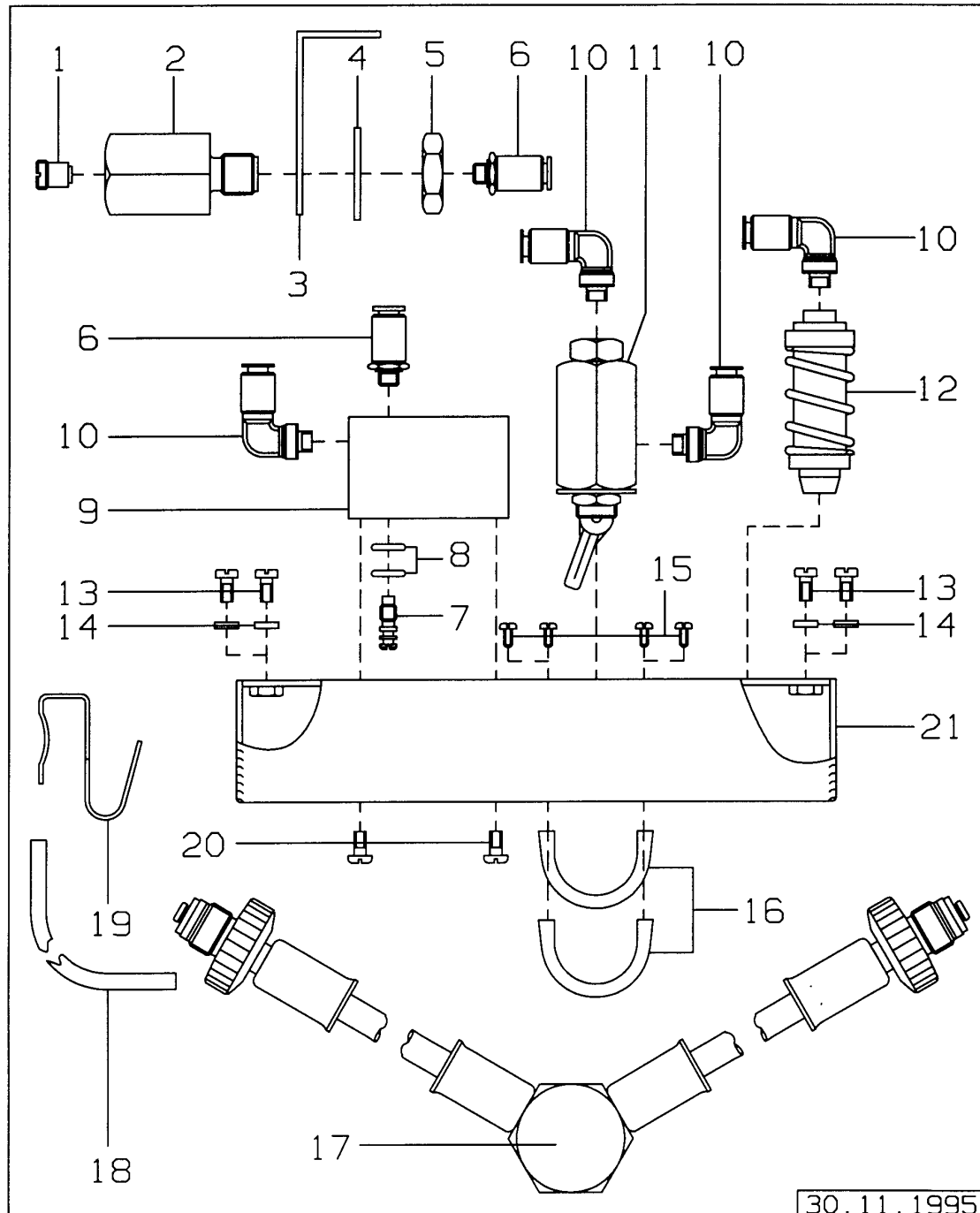
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-10	RUESTSATZ STECKDOSENLEISTE MODIFICAT.KIT MULTIPLE SOCKETS		8409021	
1	NETZKABELDURCHFUEHRUNG MAINS CABLE BUSHING		2M18642	
2-3	STECKDOSE NG SOCKET	8409288		
3	SICHERUNGSEINS.DIN41662 T3,15A FUSE LINK DIN 41662 T3,15A		1815148	10
4	PLATTE,UGR. PLATE	8408828		
5	LEISTUNGSSCHILD NAME PLATE	8304340		
6	SECHSKANTMUTTER M4 DIN934-M8 HEXAGON NUT M4 DIN934-M8/155		1267418	
7	FEDERRING B 4 DIN 127 SPLIT WASHER B4 DIN 127		1331345	
8	SCHRAUBE AM 4X8 DIN 84-A4 NG CHEESE HEAD SCREW AM4X8 DIN84		1330659	
9	SATZ KABEL FAHRGESTELL SET OF CABLES, CARRIAGE	8305276		
10	SCHILD PLATE	8409242		

O2-VERTEILER RUESTSATZ EVITA

O2-DISTRIBUTOR MOD.KIT EVITA

Bild/Picture 42



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Spare parts list

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EVITA 4

EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-21	O2-VERTEILER RUESTS. EVITA O2-DISTRIBUTOR INST.SET EVITA		8409010	
1	SIEBEINSATZ MESH BOTTOM		D11521	5
2	ANSCHLUSS CONNECTION	8406756		
3	WINKEL ELBOW	8408981		
4	B10 DIN 137-NICHTROST.ST B10 DIN 137-STAINLESS STEEL	1335332		
5	MUTTER BM 10X1 DIN 439-A4 NUT BM 10X1 DIN 439-A4		1318039	
6	EINSCHRAUBSTECKANSCHLUSS SCREW-IN PLUG-TYPE CONNECTION		M25210	
7	SCHRAUBE SCREW	8403322		
8	O-RING O-RING SEAL		RM07823	10
9	ANSCHLUSS,UGR. CONNECTION	8406785		
10	L-SCHWENKANSCHLUSS L-SWIVEL CONNECTION		G12065	
11	3/2-WEGE-VENTIL 3/2-PORT DISTRIBUTING VALVE		8402441	
12	RUESTSATZ SCHAUZEICHEN MODIFICATION KIT DROP SIGNAL		8410859	
13	DIN 84-AM3X6-A4 SCREW M3X6 DIN 84-A4	1330810		
14	DICHTRING 00001 WASHER 00001		1330233	
15	BLECHSCHR.B2,2X4,5DIN7971-A4 SCREW B 2,2X4,5 DIN 7971		1330217	20
16	BUEGEL BOW		8403058	5
17	VERBINDUNGSLEITUNG CONNECTING LINE		8405629	
18	SCHLAUCH 4X1,5-SI 50 SH A NF HOSE 4X1,5-SI 50 SH A NF		1190520	
19	HAKEN HOOK		M26349	
20	LINS.ZYL.SCHR.B. AM 3X6 DIN 85		1288091	

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Spare parts list

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EVITA 4

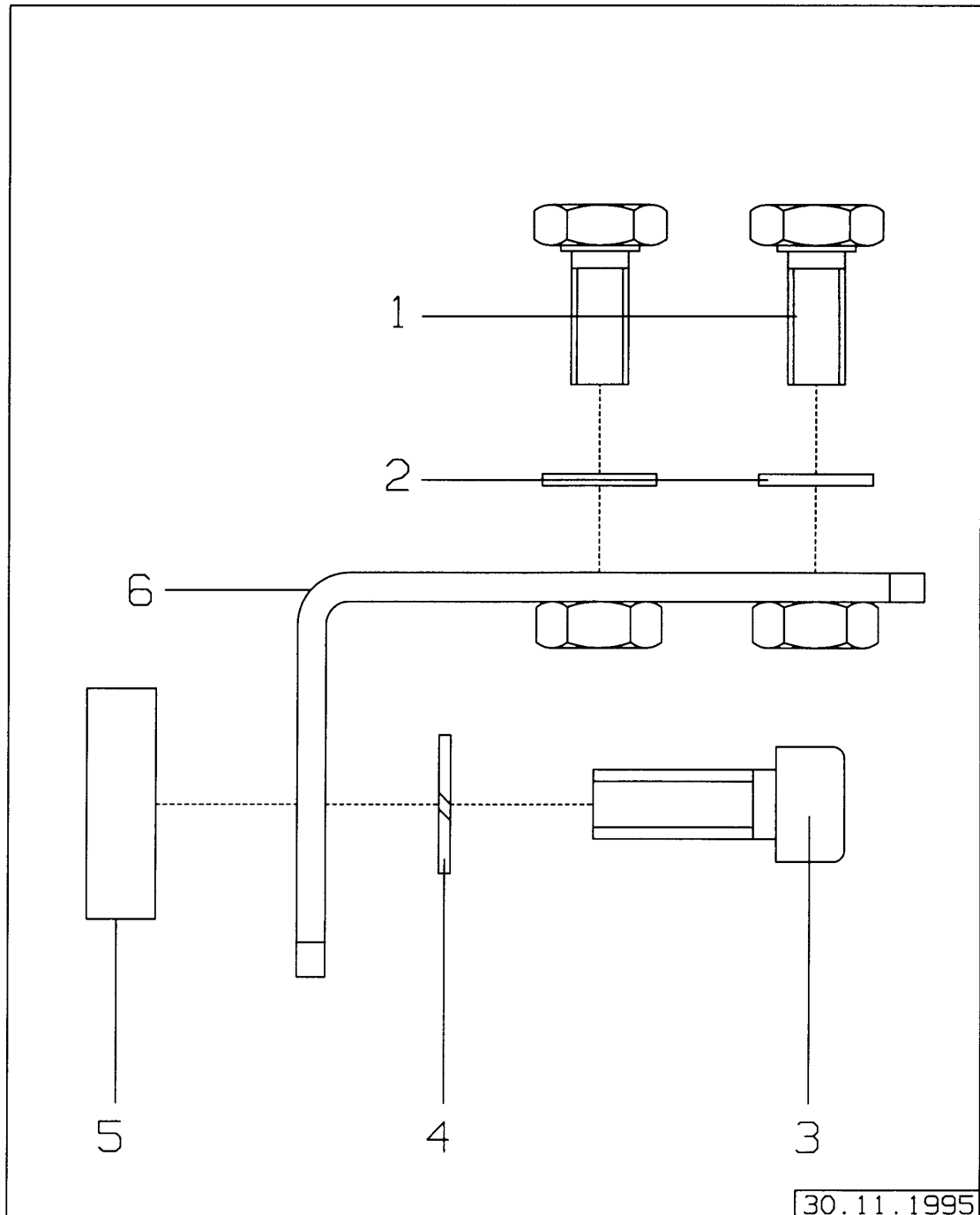
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	RAISED CHEESE HEAD SCREW AM3X6			
21	GEHAEUSE,UGR. HOUSING	8409004		

SET SCHRANKBEFESTIGUNG EVITA
FIXING SET FOR CUPBOARD EVITA

Bild/Picture 43



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

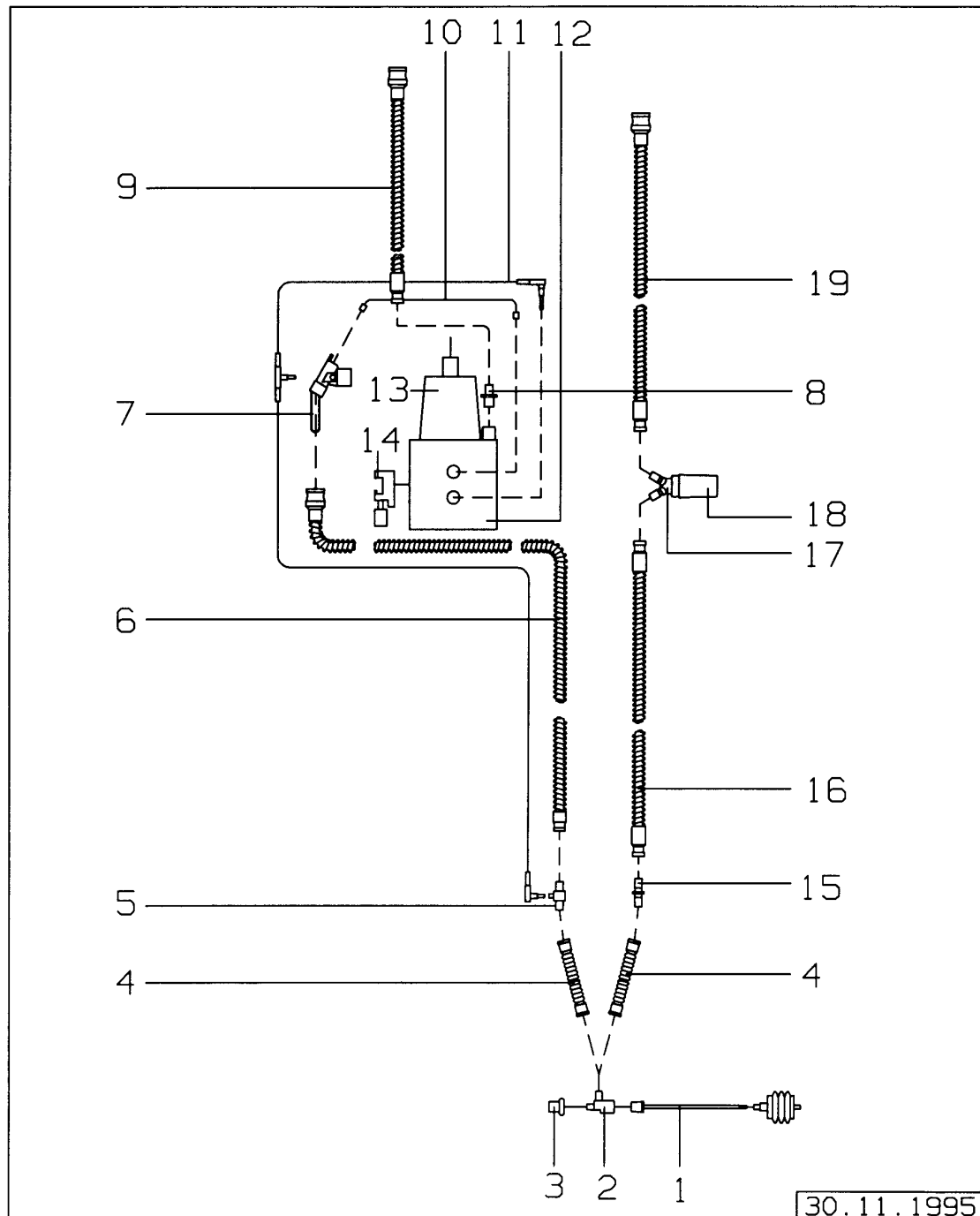
EVITA 4

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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-6	SET SCHRANKBEFESTIGUNG EVITA FIXING SET FOR CUPBOARD EVITA		8409018	
1	M5X12 DIN 933-A4/051 M5X12 DIN 933-A4/051	1329235		
2	SCHEIBE B 5,3 DIN 9021-A4 WASHER B 5,3 DIN 9021-A4	1329472		
3	M6X16 DIN 912-A4 M6X16 DIN 912-A4 SCREW	1331922		
4	FEDERRING 6 DIN 7980-X12 SPLIT WASHER 6 DIN 7980-X12		1329898	
5	MUTTER NUT	8409002		
6	WINKEL,UGR. ANGLE	8408982		

SCHLAUCHSET K F+P
HOSE SET F+P

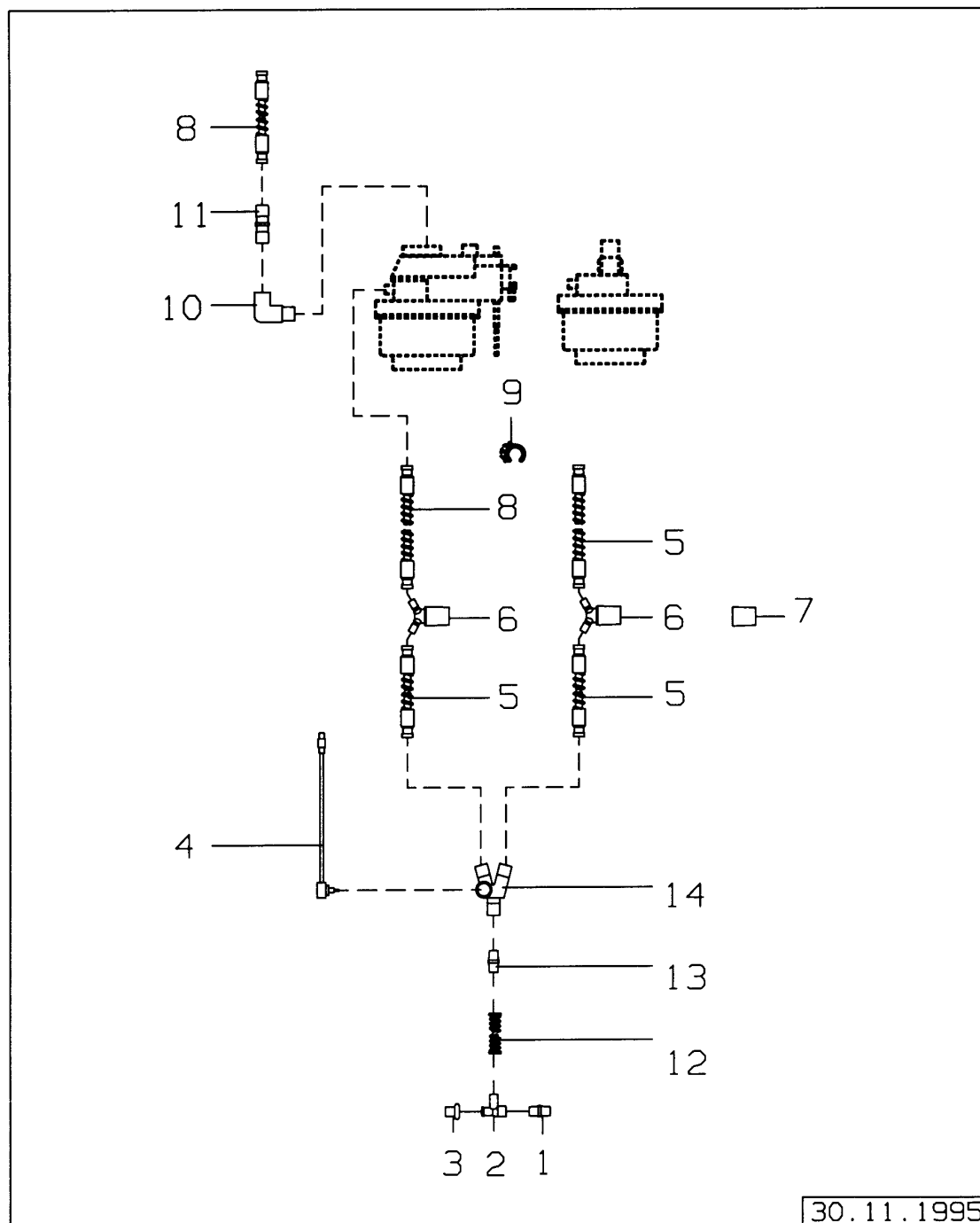
Bild/Picture 44



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-19	SCHLAUCHSET K F+P HOSE SET F+P CHILDREN		8412081	
1	FALTENBALG K, KOMPL. CORRUGATED BELLOWS K, CPL.		8409742	
2	ADAPTER K 90 ADAPTER K 90		8403075	
3	KAPPE (7 MM) CAP (7 MM)		8401645	5
4	FALTENSCHLAUCH FLEX 20CM TUBE FLEX 20 CM		8410709	
5	SENSORAUFNABME DRAEGER PROBE-THERMOMETER HOUSING DRAE		8411044	
6	ATEMSCHLAUCH K ISO 110CM,1MUF. BREATHING HOSE 1 CUFF		2165651	
7	F&P 900 MR 511 SCHLAUCHHEIZUNG F&P 900 MR 511 HEATING		2347020	
8	KATHETERSTUTZEN 11 CATHETER CONNECTOR 11		M19351	6
9	ATEMSCHLAUCH K22/10 0,4M BREATHING HOSE K22/10 0,4M		2165856	
10	ADAPTER-SCHLAUCHHEIZUNG MR558 ADAPTER-DUAL SERVO HOSE HEATER		8411097	
11	F&P 900 MR 568 SONDE F&P 900 MR 568 PROBE		2347007	
12	F&P MR 730 AGM BEFEUCHTER F&P MR 730 AGM HUMIDIFIER		2347000	
13	F&P MR 340 KAMMER F&P MR 340 CHAMBER		2347002	
14	F&P 900 MR 088 SPANNSTUECK F&P 900 MR 088 SPANNER		2347010	
15	DOPPELKONUS 11A DOUBLE CONE 11A		8409897	
16	ATEMSCHLAUCH K10/10 0,6M BREATHING HOSE K10/10 0,6M		2165848	
17	KONDENSATABSCHEIDER EX CONDENSATE TRAP EX.		8409627	
18	TOPF POT		8403976	
19	ATEMSCHLAUCH K22/10 0,6M BREATHING HOSE K22/10 0,6M		2165821	

SCHLAUCHSET E "DIE BLAUEN"
HOSE SET E "BLUE"

Bild/Picture 45

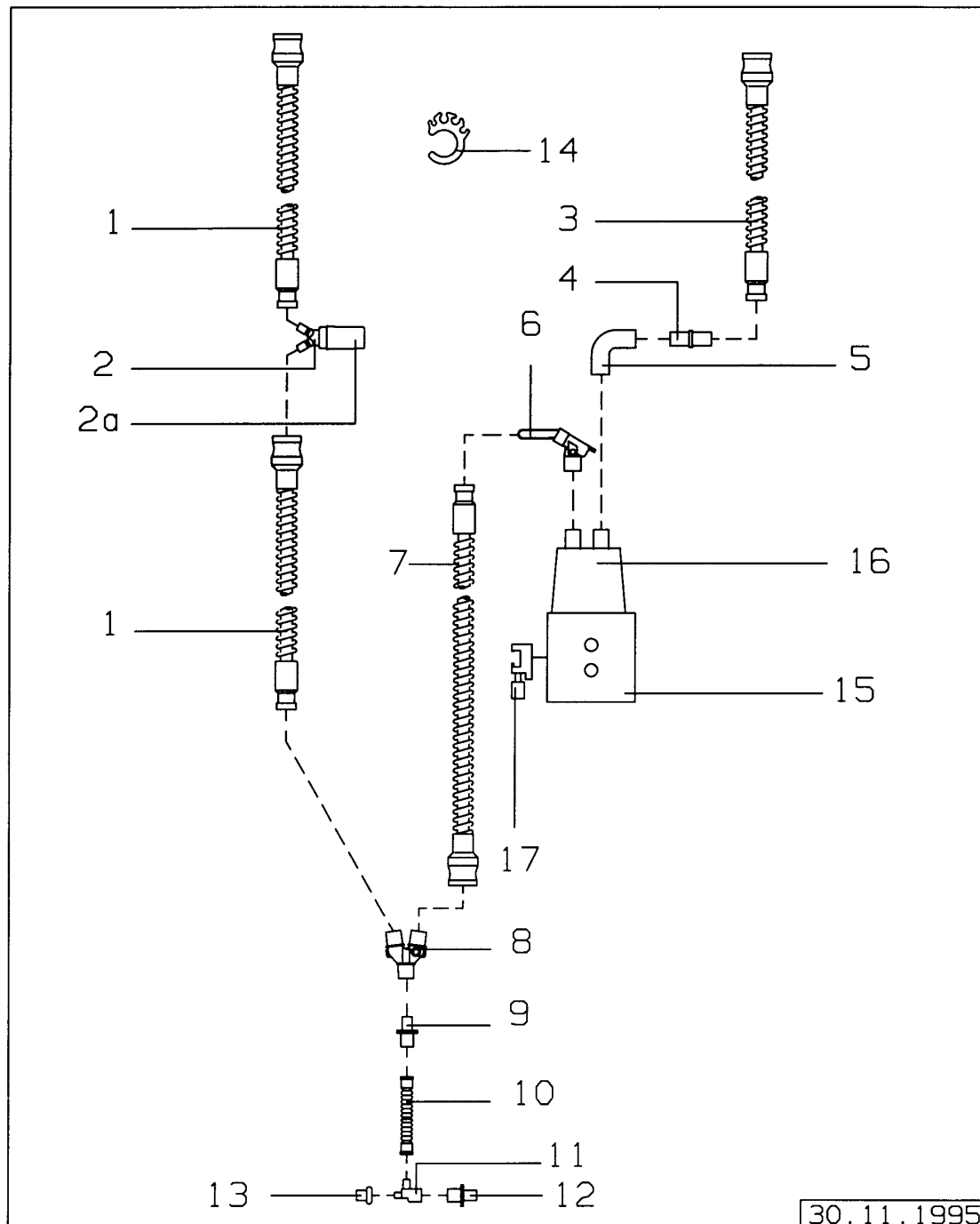


Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-14	SCHLAUCHSET E "DIE BLAUEN" HOSE SET "BLUE" ADULTS		8412092	
1	12ER-SATZ NORMKONNEKTOR,E,KSTF SET 12 STAND.CONE E PLASTIC		8403685	
2	ADAPTER E ADAPTER E		8403076	
3	KAPPE (11 MM) CAP (11 MM)		8401644	5
4	TEMPERATUR-SENSOR TEMPERATURE SENSOR		8405371	
5	ATEMSCHLAUCH E ISO 60CM BREATHING HOSE E ISO 60CM		2165627	
6	WASSERFALLE WATER SEPARATOR		8404985	
7	TOPF POT		8403976	
8	ATEMSCHLAUCH E ISO 35CM BREATHING HOSE E ISO 35CM		2165619	
9	SCHLAUCHKLAMMER HOSE CLIP		8403566	10
10	MASKENKRUEMMER F.Y-STCK.-ISO MASK ELBOW F.Y-PIECE-ISO		M25649	
11	TUELLE NOZZLE		M25647	
12	FALTENSCHLAUCH CORRUGATED HOSE		8402041	
13	10ER-SET NORMKONN.,12,5 KSTFF. SET 10 STAND.CONE 12,5 PLASTIC		M23841	

SCHLAUCHSYSTEM E F+P "BLAUE"

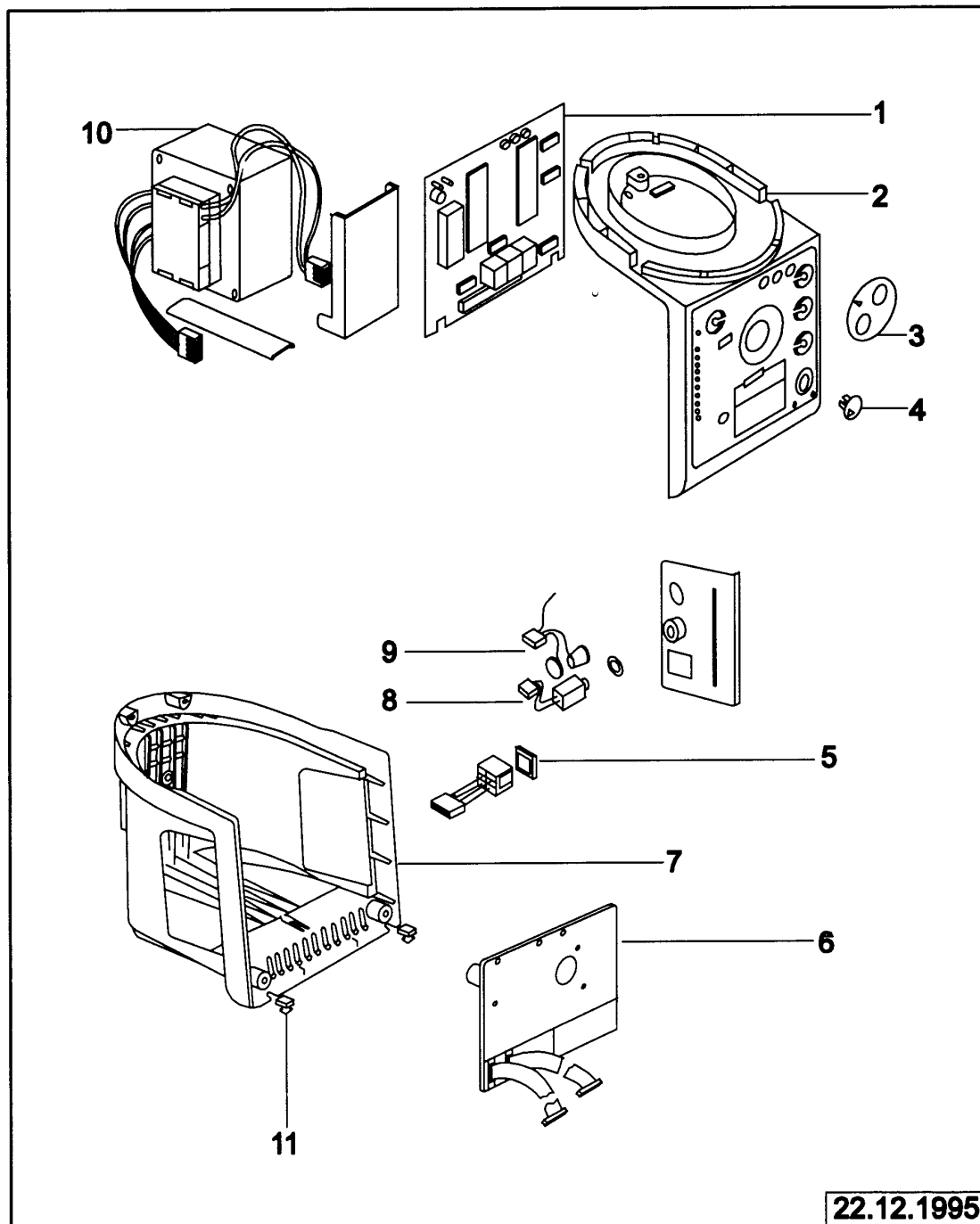
Bild/Picture 46

HOSE SYSTEM E F+P "BLUE"



ANFEUCHTER-GRUNDEINHEIT MR 730
RESPIRATORY HUMIDIFIER MR 730

Bild/Picture 50



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Spare parts list

Ausgabe/Edition

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EVITA 4

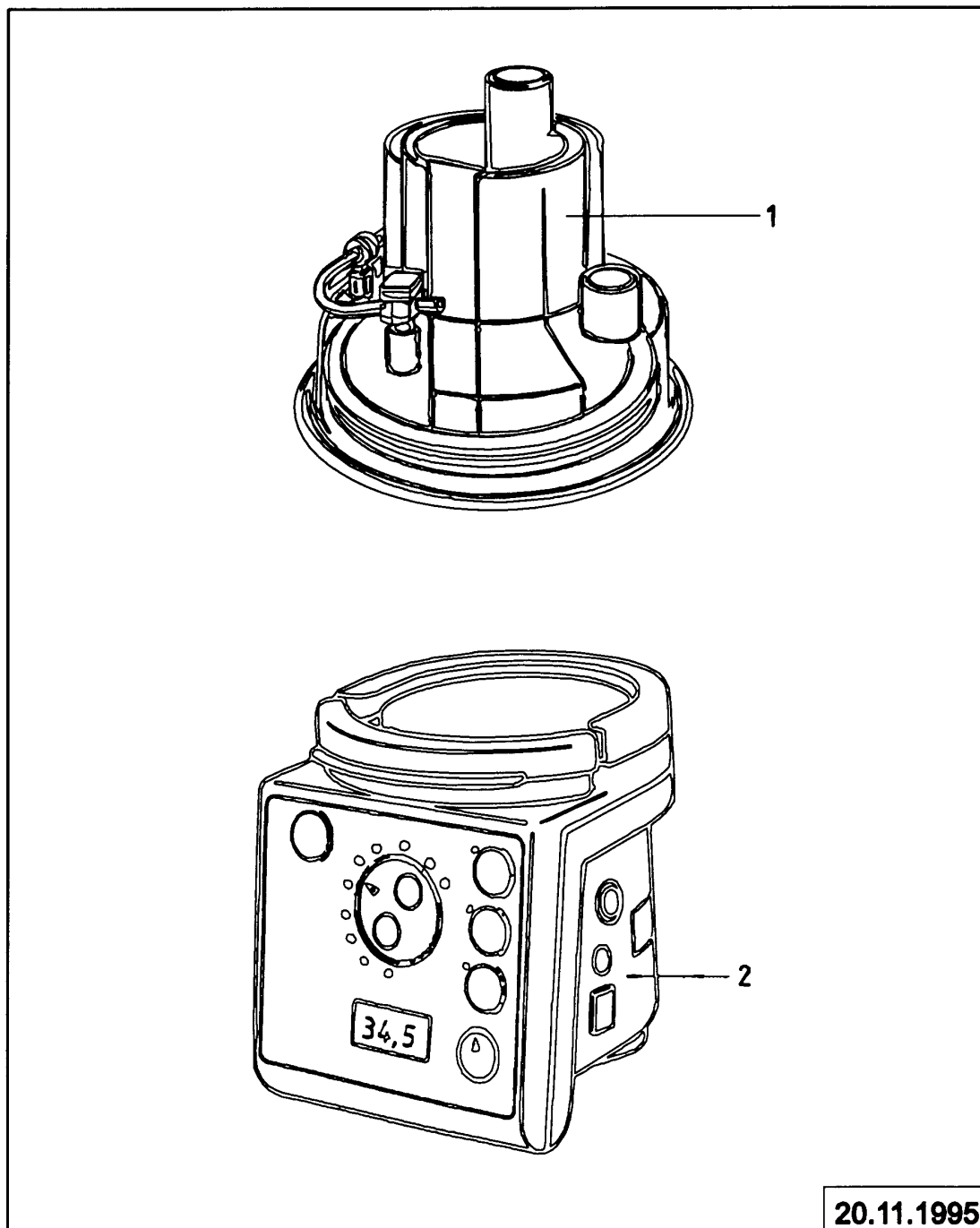
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EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-17	SCHLAUCHSYSTEM E F+P "BLAUE" HOSE SYSTEM ADULTS F+P BLUE		8412108	
1	ATEMSCHLAUCH E ISO 60CM BREATHING HOSE E ISO 60CM		2165627	
2	WASSERFALLE WATER SEPARATOR		8404985	
2a	TOPF POT		8403976	
3	ATEMSCHLAUCH E ISO 35CM BREATHING HOSE E ISO 35CM		2165619	
4	TUELLE NOZZLE		M25647	
5	MASKENKRUEMMER F.Y-STCK.-ISO MASK ELBOW F.Y-PIECE-ISO		M25649	
6	F&P 900 MR 511 SCHLAUCHHEIZUNG F&P 900 MR 511 HEATING		2347020	
7	ATEMSCHLAUCH E ISO 110CM BREATHING HOSE E ISO 110CM		2165635	
8	F&P 900 MR 127 Y-STUECK F&P 900 MR 127 Y-PIECE		2347015	
9	10ER-SET NORMKONN.,12,5 KSTFF. SET 10 STAND.CONE 12,5 PLASTIC		M23841	
10	FALTENSCHLAUCH CORRUGATED HOSE		8402041	
11	ADAPTER E ADAPTER E		8403076	
12	12ER-SATZ NORMKONNEKTOR,E,KSTF SET 12 STAND.CONE E PLASTIC		8403685	
13	KAPPE (11 MM) CAP (11 MM)		8401644	5
14	SCHLAUCHKLAMMER HOSE CLIP		8403566	10
15	F&P MR 730 AGM BEFEUCHTER F&P MR 730 AGM HUMIDIFIER		2347000	
16	F&P MR 370 KAMMER F&P MR 370 CHAMBER		2347003	
17	F&P 900 MR 088 SPANNSTUECK F&P 900 MR 088 SPANNER		2347010	
	F&P 900 MR 568 SONDE ohne Abbildung F&P 900 MR 568 PROBE without illustration		2347007	

BEFEUCHTERKAMMER MR 340
HUMIDIFIER CHAMBER MR 340

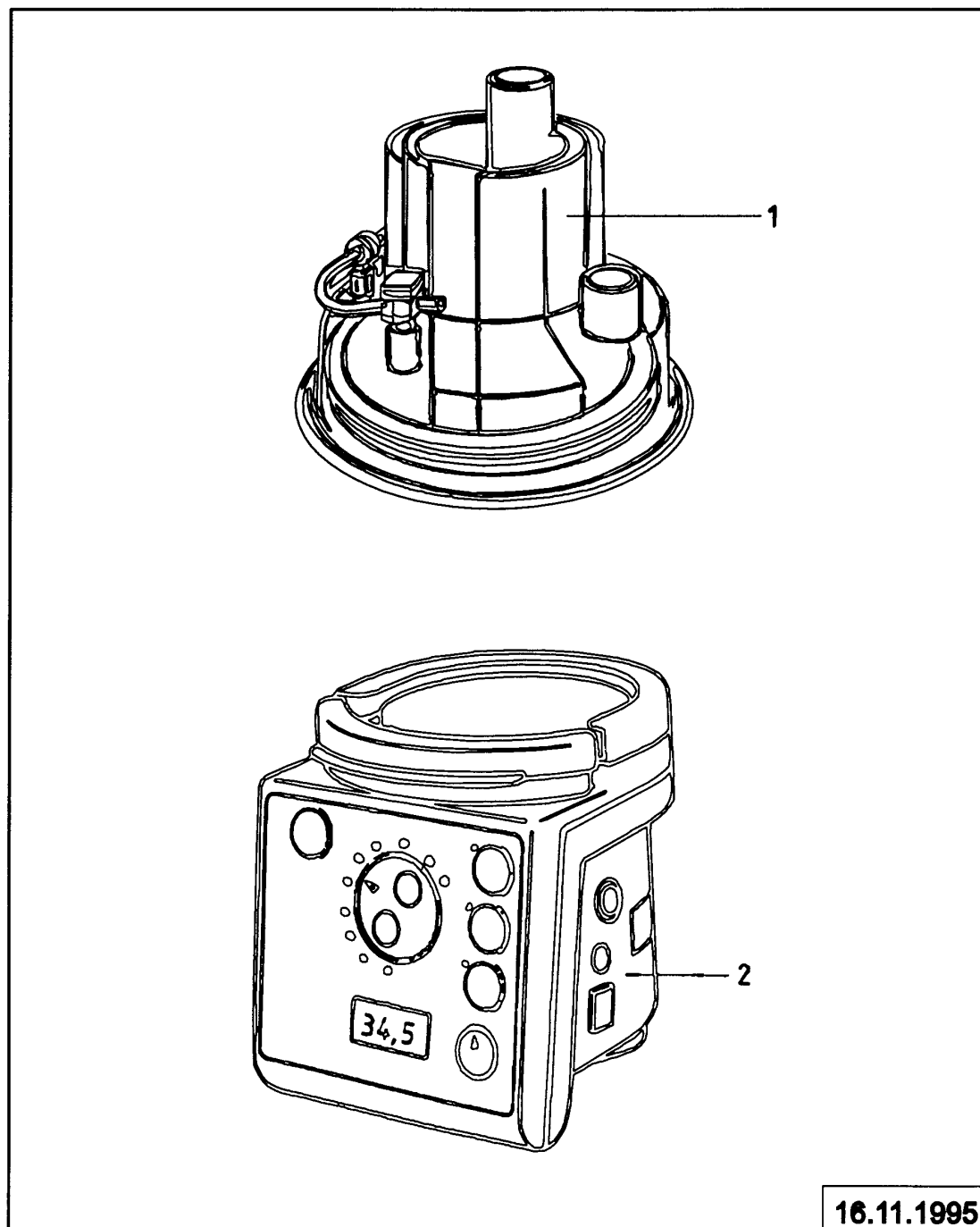
Bild/Picture 47



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	BEFEUCHTERKAMMER MR 340 HUMIDIFIER CHAMBER MR 340		8411047	
2	ANFEUCHTER-GRUNDEINHEIT MR 730 RESPIRATORY HUMIDIFIER MR 730		8411046	
	FILTERPAPIER 900 MR 065 ohne Abbildung ABSORBENT PAPER REFILL PACK without illustration		8411073	
	BEFESTIGUNGSSET DRAEGER ohne Abbildung MOUNTING KIT DRAEGER without illustration		8411074	

BEFEUCHTERKAMMER MR 370
HUMIDIFIER CHAMBER MR 370

Bild/Picture 48

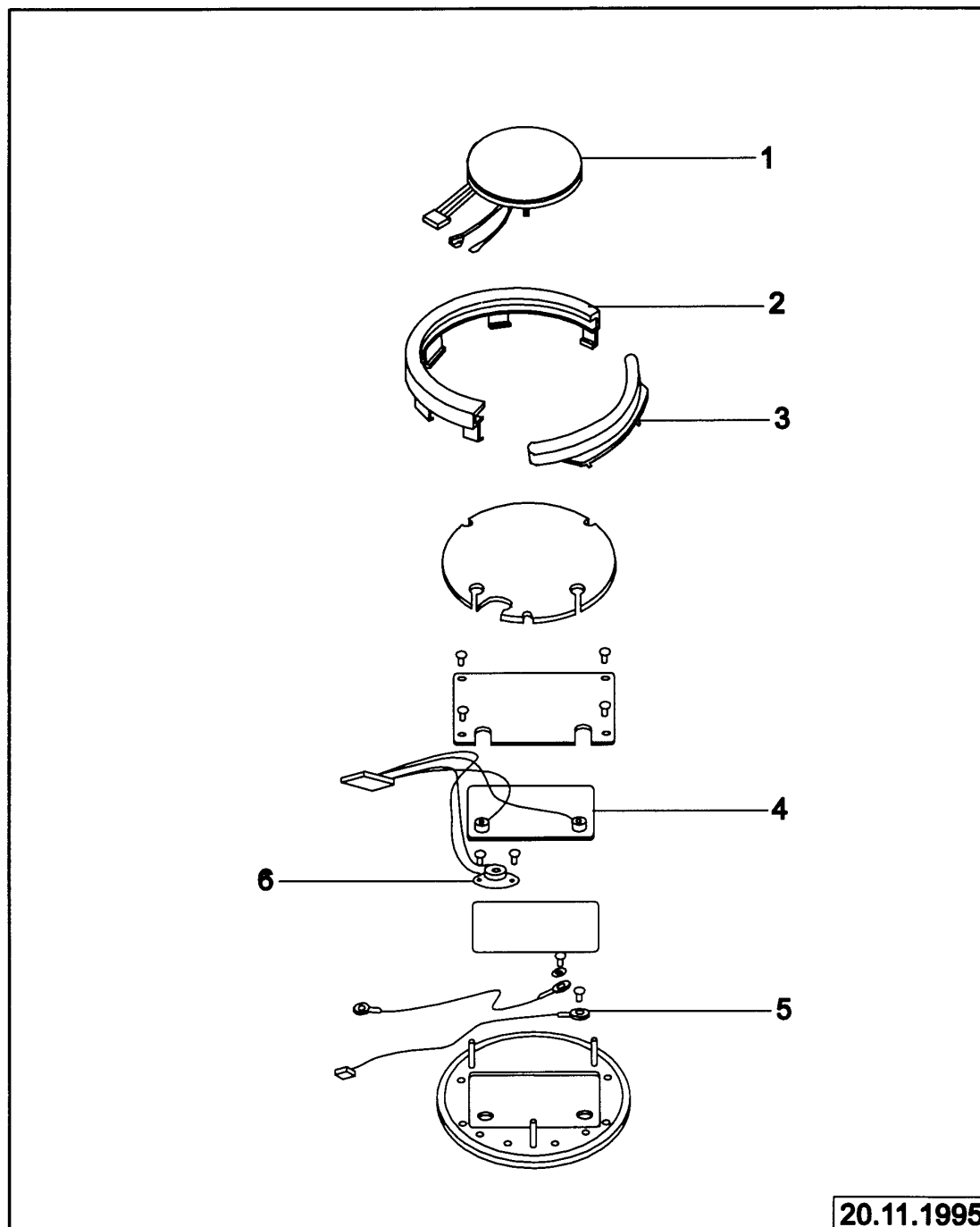


16.11.1995

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	BEFEUCHTERKAMMER MR 370 HUMIDIFIER CHAMBER MR 370		8412217	
2	ANFEUCHTER-GRUNDEINHEIT MR 730 RESPIRATORY HUMIDIFIER MR 730		8411046	
	FILTERPAPIER-SET ohne Abbildung SET OF FILTER PAPER without illustration	8412218		
	BEFESTIGUNGSSET DRAEGER ohne Abbildung MOUNTING KIT DRAEGER without illustration		8411074	

HEIZPLATTE 230V, VOLLST.
HOT PLATE 230V, CPL.

Bild/Picture 49



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Spare parts list

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EVITA 4

EVITA 4

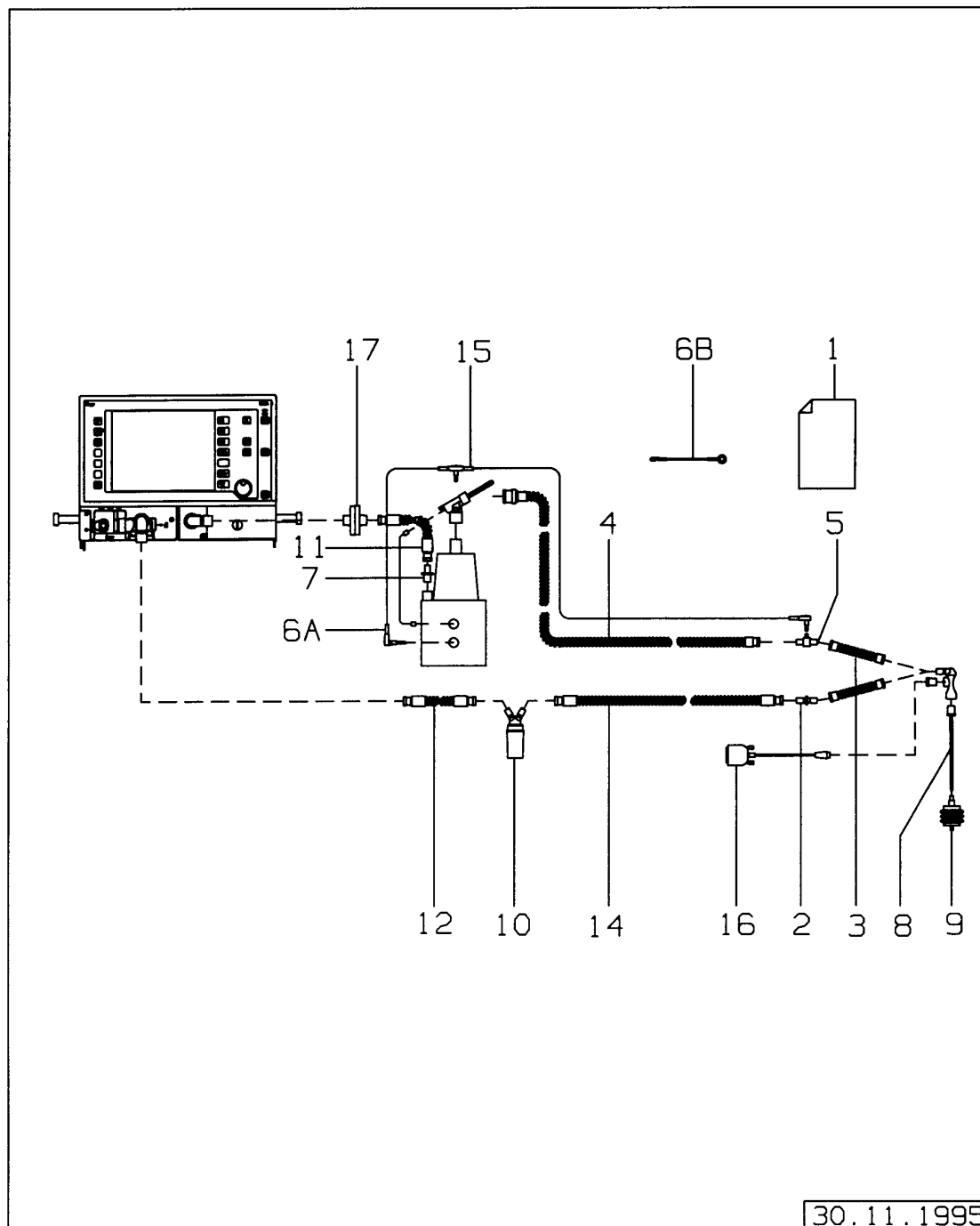
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1,4-6	HEIZPLATTE 230V, VOLLST. HOT PLATE 230V, CPL.		8411054	
2	KAMMERHALTERUNG CLAMP CHAMBER		8411066	
3	KAMMER-VERRIEGELUNGSSET GUARD CHAMBER KIT		8411057	
4	EINSATZ/HEIZPLATTE 230V,150W ELEMENT ASSEMBLY 230V,150W		8411051	
5	THERMISTOR MIT ANSCHLUSSKABEL THERMISTOR AND HARNESS ASSEMBL		8411061	
6	THERMOSTAT 118GRD.C THERMOSTAT 118 DEGREE		8411063	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-11	ANFEUCHTER-GRUNDEINHEIT MR 730 RESPIRATORY HUMIDIFIER MR 730		8411046	
1	KONTROLLPLATINE MR730(O.EPROM) PCB ASSEMBLY MR730 CONTROL		8411053	
2	GEHAEUSE FRONTTEILSET DEUTSCH CASE FRONT PANEL KIT, GERMAN		8411058	
2a	GEHAEUSE FRONTTEILSET ENGLISCH CASE FRONT PANEL KIT, ENGLISH		8411059	
3	EINSTELLKNOPF ADJUSTING KNOB		8411062	
4	FEUCHTE-EINSTELLKNOPF HUMIDITY ADJUSTING KNOB		8411064	
5	HAUPTSCHALTER MAIN SWITCH		8411055	
6	VERSORGUNGSPLATINE, VOLLST. PCB ASSEMBLY POWER, CPL.		8411049	
7	GEHAEUSESET CASE BODY (KIT)		8411060	
8	TEMP.SENSOR-BUCHSE PROBE SOCKET HARNESS ASSEMBLY		8411056	
9	BUCHSE SOCKET		8411096	
10	TRANSFORMATOR 230V TRANSFORMER 230V		8411052	
11	GEHAEUSEFUSS HOUSING BASE		8411065	
	SICHERUNG F1-1A ohne Abbildung FUSE F1-1A without illustration		8411067	10
	SICHERUNG F3,F4-2A(FLINK 230V) ohne Abbildung FUSE F3,F4-2A(FAST ACTING 230V without illustration		8411068	10
	SICHERUNG F2-4A, FLINK ohne Abbildung FUSE F2-4A FAST ACTING without illustration		8411069	10

SCHLAUCHSET F.+P.
HOSE SET F.+P.

Bild/Picture 51



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Spare parts list

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EVITA 4

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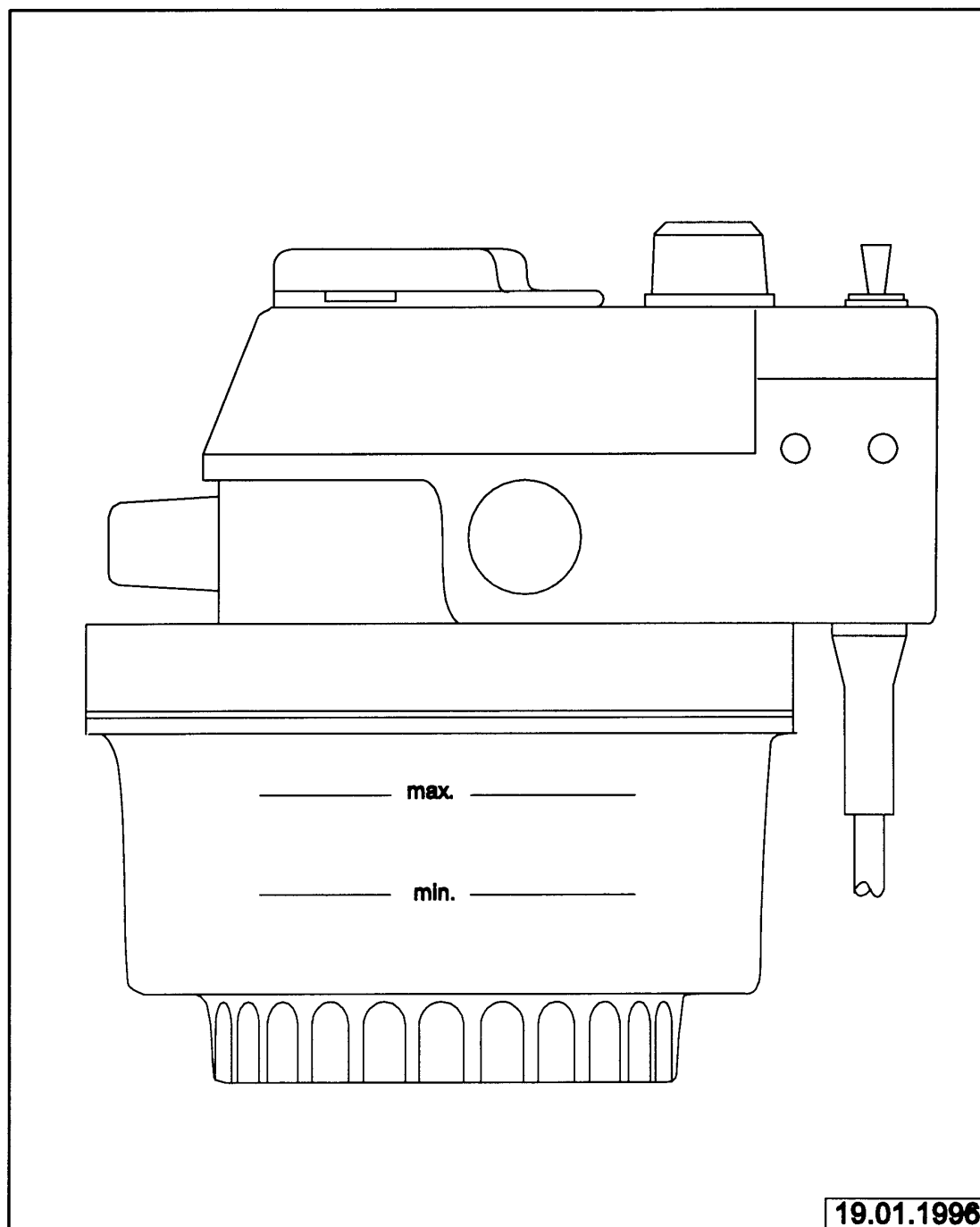
EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-17	SCHLAUCHSET F.+P. HOSE SET F.+P.		8411041	
2	DOPPELKONUS 11A DOUBLE CONE 11A		8409897	
2a	FALTENSCHLAUCH FLEX 20CM TUBE FLEX 20 CM		8410709	
3	ATEMSCHLAUCH E ISO 35CM BREATHING HOSE E ISO 35CM		2165619	
4	SILIKONSCHLAUCH 22F/11F/1,10M SILICONE HOSE 22F/11F/1,10M		8411043	
5	SENSORAUFNABME DRAEGER PROBE-THERMOMETER HOUSING DRAE		8411044	
6	SCHLAUCHHEIZUNG 1,10 M900MR511 DUAL SERVO HOSE HEATER ASSEMB.		8411045	
6a	ADAPTER-SCHLAUCHHEIZUNG MR558 ADAPTER-DUAL SERVO HOSE HEATER		8411097	
6b	EINZUGSDRAHT 1,50 M 900 MR 070 DRAW WIRE 1,50 M 900 MR 070		8411050	
7	KATHETERSTUTZEN 11 CATHETER CONNECTOR 11		M19351	6
8-9	FALTENBALG K, KOMPL. CORRUGATED BELLOWS K, CPL.		8409742	
9	FALTENBALG K CORRUGATED BELLOWS K		8410079	
10	KONDENSATABSCHEIDER EX CONDENSATE TRAP EX.		8409627	
10a	TOPF POT		8403976	
10b	FEDER B SPRING		E20373	10
11	SILIKONSCHLAUCH K 0,25 M SILOCONE HOSE K 0,25 M		8409636	
11-17	ANSCHLUSS BAKTERIENFILTER BO. CONNECTION BACTERIAL FILTER		8410230	
12	SILICONSCHLAUCH K 0,35 M SILICONE HOSE K 0,35 M		8403070	
13	SILICONSCHLAUCH K 0,6 M SILICONE HOSE K 0,6 M		8403073	
14	SILICONSCHLAUCH K 1,0 M SILICONE HOSE K 1,0 M		8403080	
15	DOPPEL-TEMPERATUR-SENSOR 1,45M		8411048	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	DUAL AIRWAY TEMP. SENSOR 1,45M			
16	ANSCHLUSSKABEL FLOWSENSOR CONNECTOR CABLE FLOW SENSOR		8409626	
17	BAKTERIENFILTER EV800/801 BACTERIA FILTER EV800/801	8409716		

ATEMGASANFEUCHTER AQUAPOR
HUMIDIFIER AQUAPOR

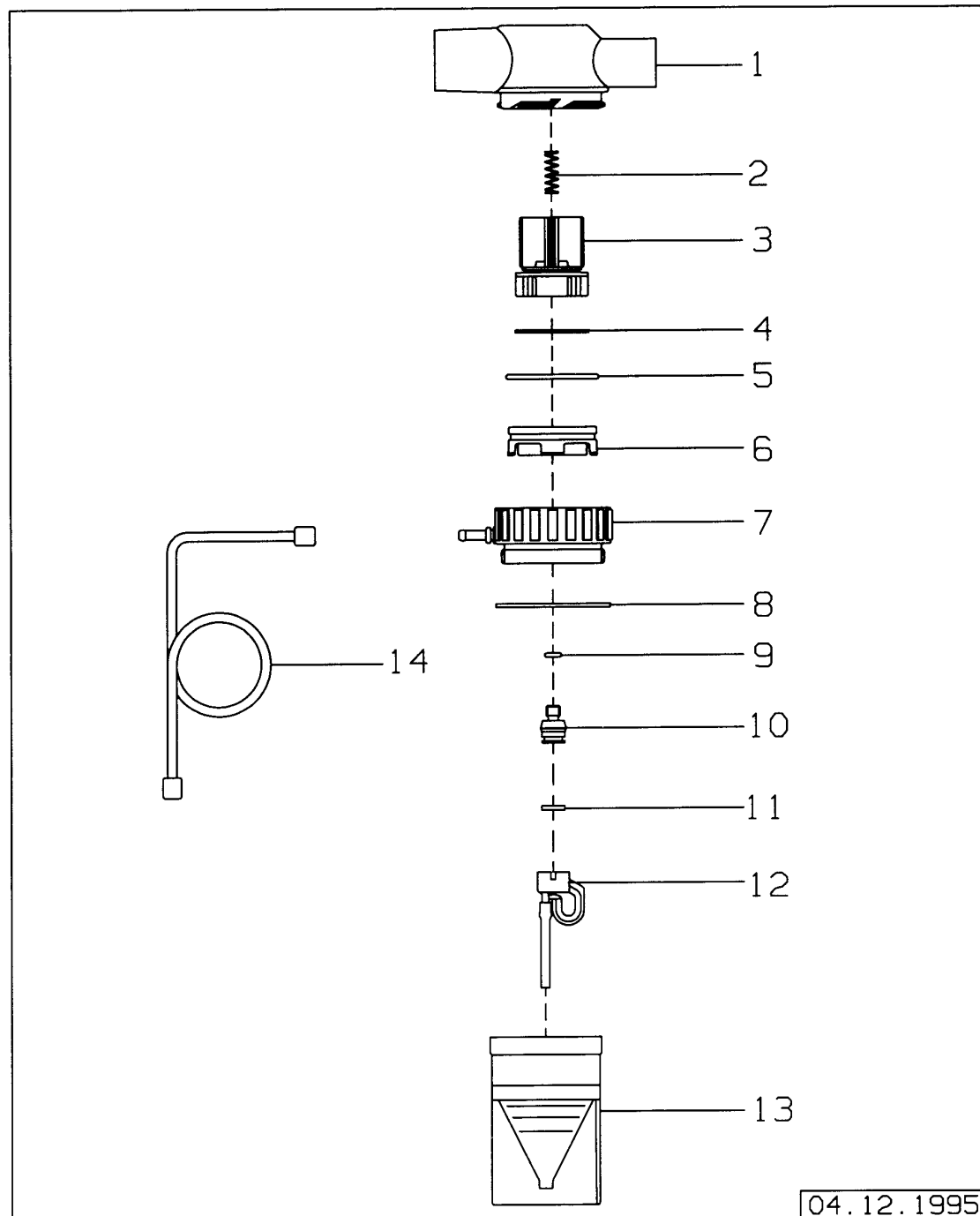
Bild/Picture 52



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	ATEMGASANF. AQUAPOR (220-240V) siehe E-Liste 5697.2 HUMIDIFIER AQUAPOR (220-240V) see spare parts list 5697.2		8405020	

PNEUM.MED.VERNEBLER (EVITA 4)
PNEUM.MEDIC.NEBULIZER EVITA 4

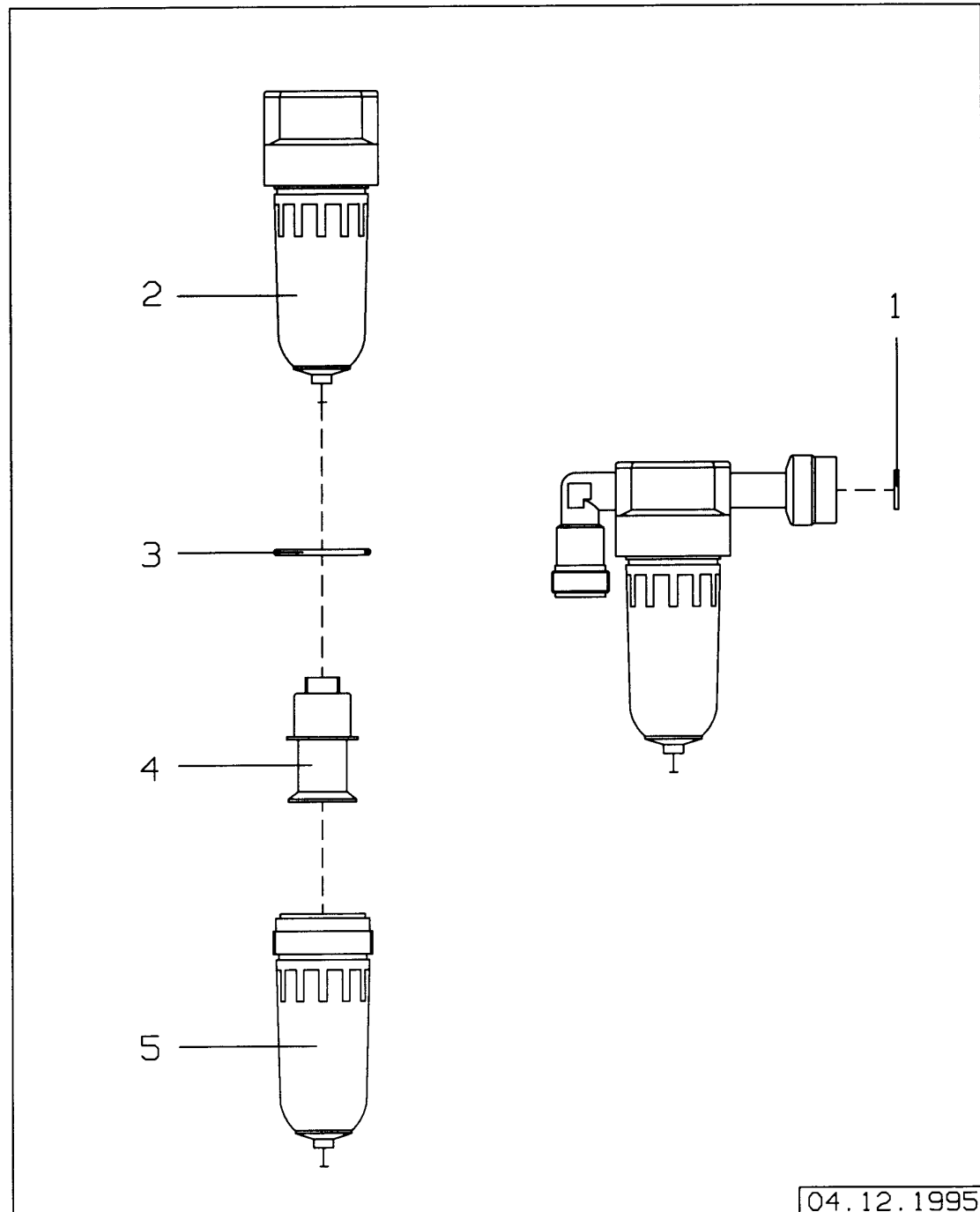
Bild/Picture 53



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-14	PNEUM.MED.VERNEBLER EVITA 4 PNEUM.MEDIC.NEBULIZER EVITA 4		8412935	
1-6	KAPPE,UGR. CAP		8405046	
1	KAPPE CAP	8404973		
2	FEDER SPRING		2M07198	
3	VERSCHLUSS LOCK	8404969		
4	DICHTUNG NG GASKET	8405047		
5	O-RING O-RING SEAL		2M10633	5
6	KRATEREINSATZ CRATER INSERT	8404974		
7	VERNEBLERGEHAEUSE,KPL. ATOMIZER HOUSING, CPL.		8412934	
8	DICHTUNG GASKET		8407291	5
9	RUNDSCHNURRING TOROIDAL SEALING RING		R27810	10
10	DUESE NOZZLE		8412932	
11	O-RING O-RING SEAL		E20566	5
12	ZERSTAEUBER,UGR. ATOMIZER		8404979	5
13	BEHAELTER RECEPTACLE		8406584	
14	VERNEBLERSCHLAUCH ATOMIZER HOSE		8412985	

HOCHDRUCK-WASSERFALLE AIR
HIGH PRESSURE WATER TRAP AIR

Bild/Picture 54



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

13.02.97

EVITA 4

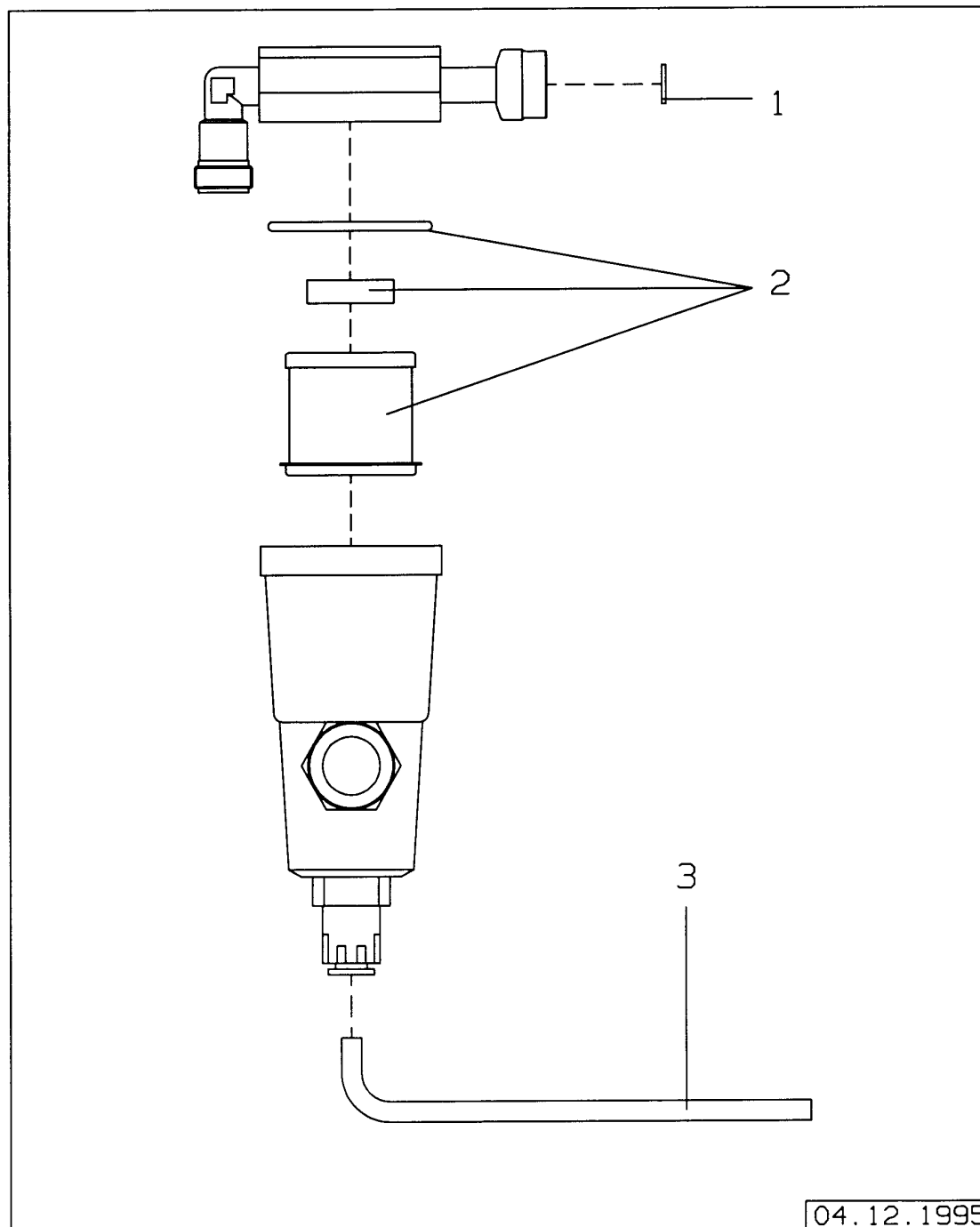
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EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-5	HOCHDRUCK-WASSERFALLE AIR HIGH PRESSURE WATER TRAP AIR		8412628	
1	DICHTRING PACKING RING		M05128	20
2	FILTER FILTER	8412805		
3	O-RING NG O-RING SEAL	8412809		
4	FILTER FILTER		8412810	
5	TOPF POT		8412811	

WASSERABSCHEIDER, KOMPL.
WATER SEPARATOR, CPL.

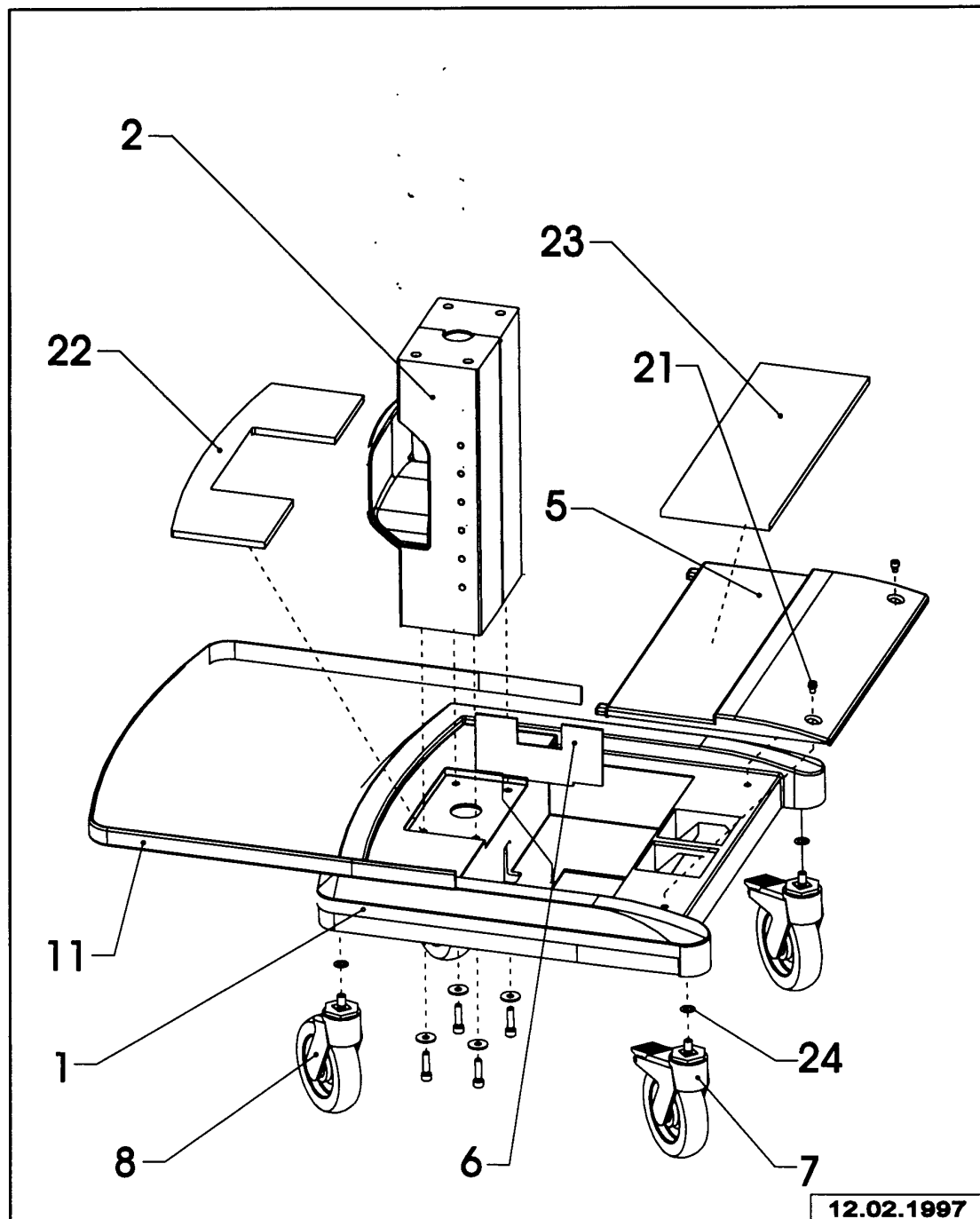
Bild/Picture 55



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-3	WASSERABSCHEIDER, KOMPL. WATER SEPARATOR, CPL.		8413225	
1	DICHTRING PACKING RING		M05128	20
2	SET FILTERELEMENT SET FILTER ELEMENT		8413235	
3	SCHLAUCH 4X3-PVC/RAU-PVC006 NG HOSE 4X3-PVC/RAU-PVC006 CLEAR		1181017	

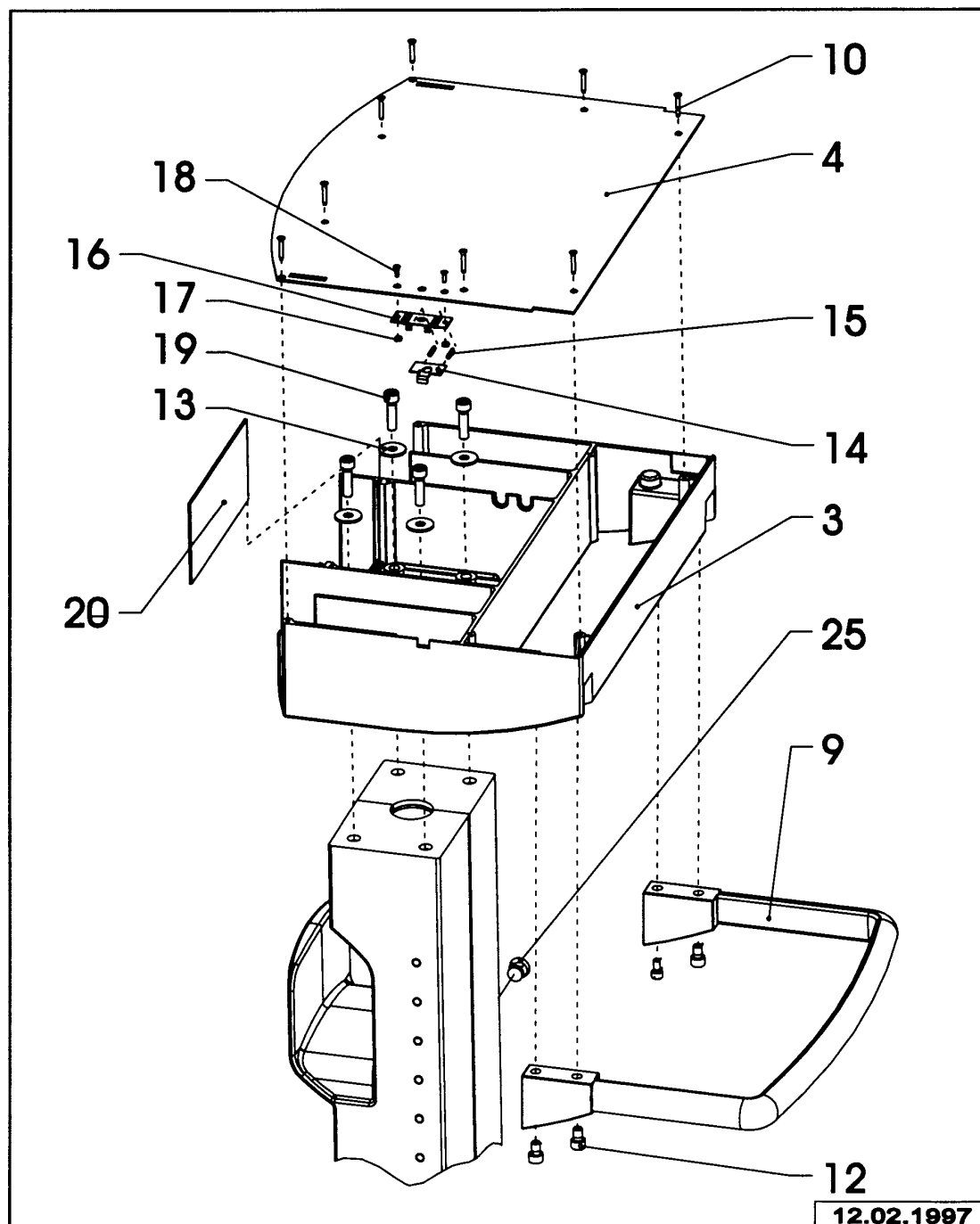
FAHRGESTELL (MSU-TIEF)
MOBILE TROLLEY (MSU)

Bild/Picture 56



FAHRGESTELL (MSU-TIEF)
MOBILE TROLLEY (MSU)

Bild/Picture 57



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

13.02.97

EVITA 4

EVITA 4

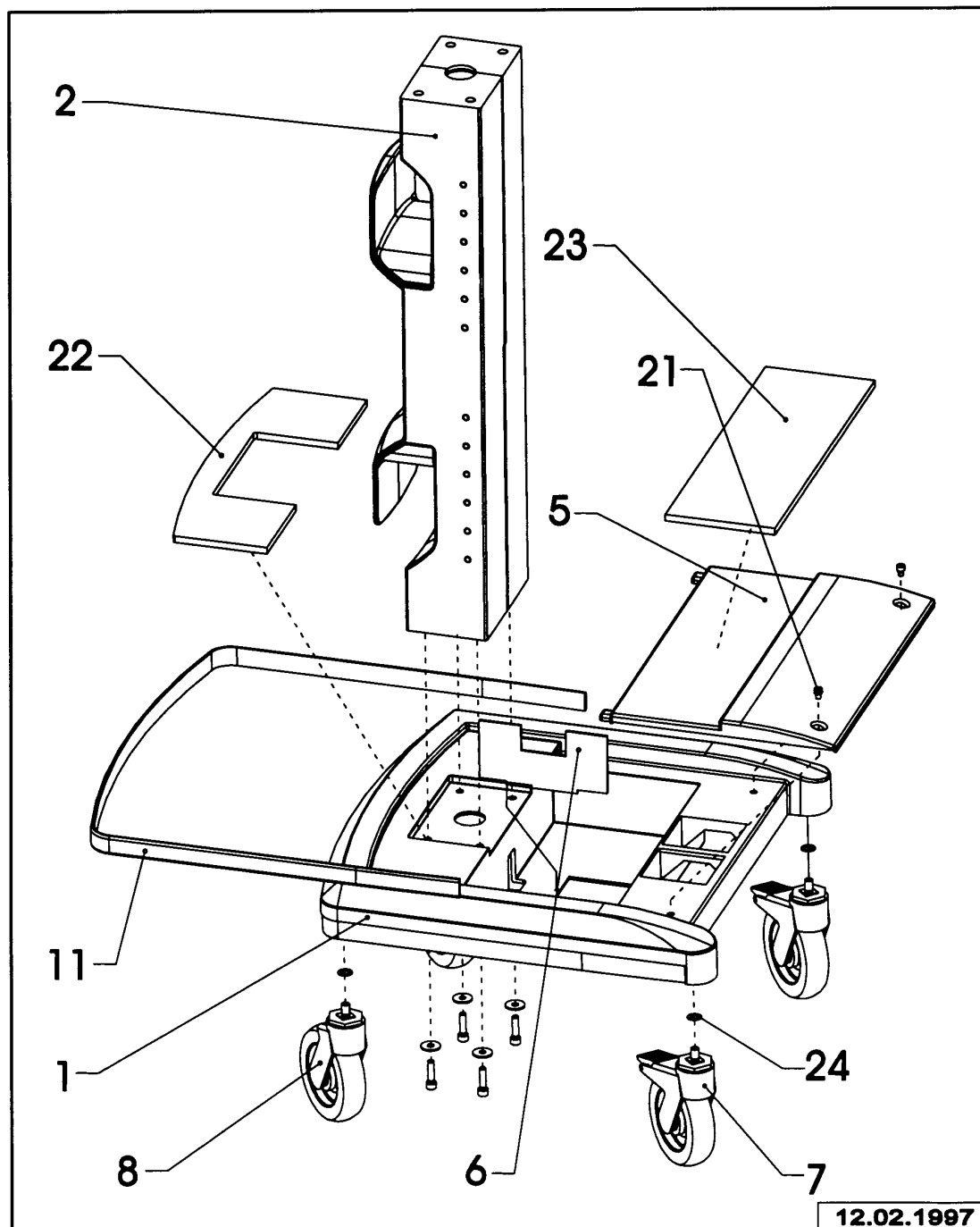
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Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-25	FAHRGESTELL (MSU-TIEF) MOBILE TROLLEY (MSU)		8411965	
1	UNTERTEIL LOWER PART	8411951		
2	SAEULE, NIEDRIG, KOMPL. COLUMN, LOW, CPL.	8411966		
3	OBERTEIL UPPER PART	8411953		
4	ABDECKBLECH FUER OBERTEIL COVER PLATE FOR UPPER PART	8411954		
5	ABDECKUNG FUER BATTERIEN COVERING FOR BATTERIES	8411955		
6	TRENNWAND DIVIDING WALL	8411987		
7	LAUFROLLE M.FESTSTELLER CASTOR WITH FIXING		M34523	
8	LAUFROLLE CASTOR		M34524	
9	HANDGRIFF HANDLE	8411957		
10	SENKSCHRAUBE KB30X20WN1413 COUNTERS. SCREW KB30X20WN1413	8411967		
11	KANTENSCHUTZPROFIL 25X5 HEADER PROFILE 25X5	8411958		
12	ZYLINDERSCHRB. M 6X12 DIN 912 CHEESE HEAD SCREW M6X12 DIN912		1263196	
13	B8,4 DIN 9021-A4 B8,4 DIN 9021-A4	1335367		
14	SCHIEBER SLIDE	8408905		
15	ZUGFEDER MAIN SPRING	M16452		
16	HALTERUNG SUPPORT	8408935		
17	SETZMUTTER NUT	CH17646		
18	DIN 965-M3X10-A2-H DIN 965-M3X10-A2-H	1343246		
19	ZYL.SCHRAUBE M8X30DIN912 CU NI CHEESE HEAD SCREW M8X30 DIN912		1282123	
20	ABSCHLUSSBLECH	8411959		

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	CLOSING PLATE			
21	DIN912-M6X8-10.9/155 DIN912-M6X8-10.9/155	1342762		
22	UNTERLAGE, HINTEN SUPPORT, BACKSIDE	8411973		
23	UNTERLAGE, VORN SUPPORT, FRONT	8411974		
24	SPANNSCHEIBE M10 DIN6796-FST X CONIC.SPR.WASHER M10 DIN6796		1341146	100
25	ABDECKKAPPE COVER	M29763		

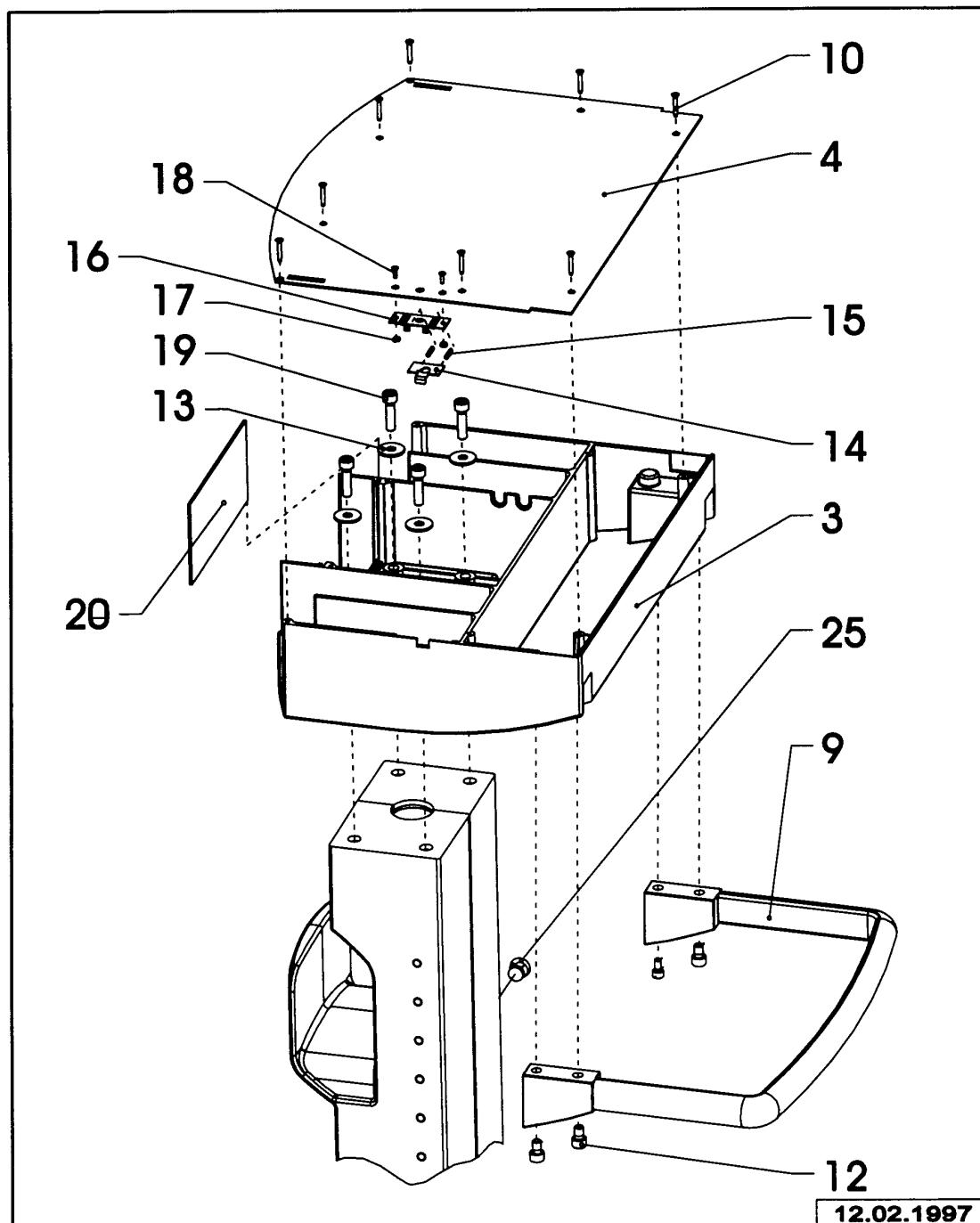
FAHRGESTELL (MSU-HOCH)
MOBILE TROLLEY (MSU-HIGH)

Bild/Picture 58



FAHRGESTELL (MSU-HOCH)
MOBILE TROLLEY (MSU-HIGH)

Bild/Picture 59



Ersatzartikelliste 5664.500

Spare parts list

Ausgabe/Edition

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EVITA 4

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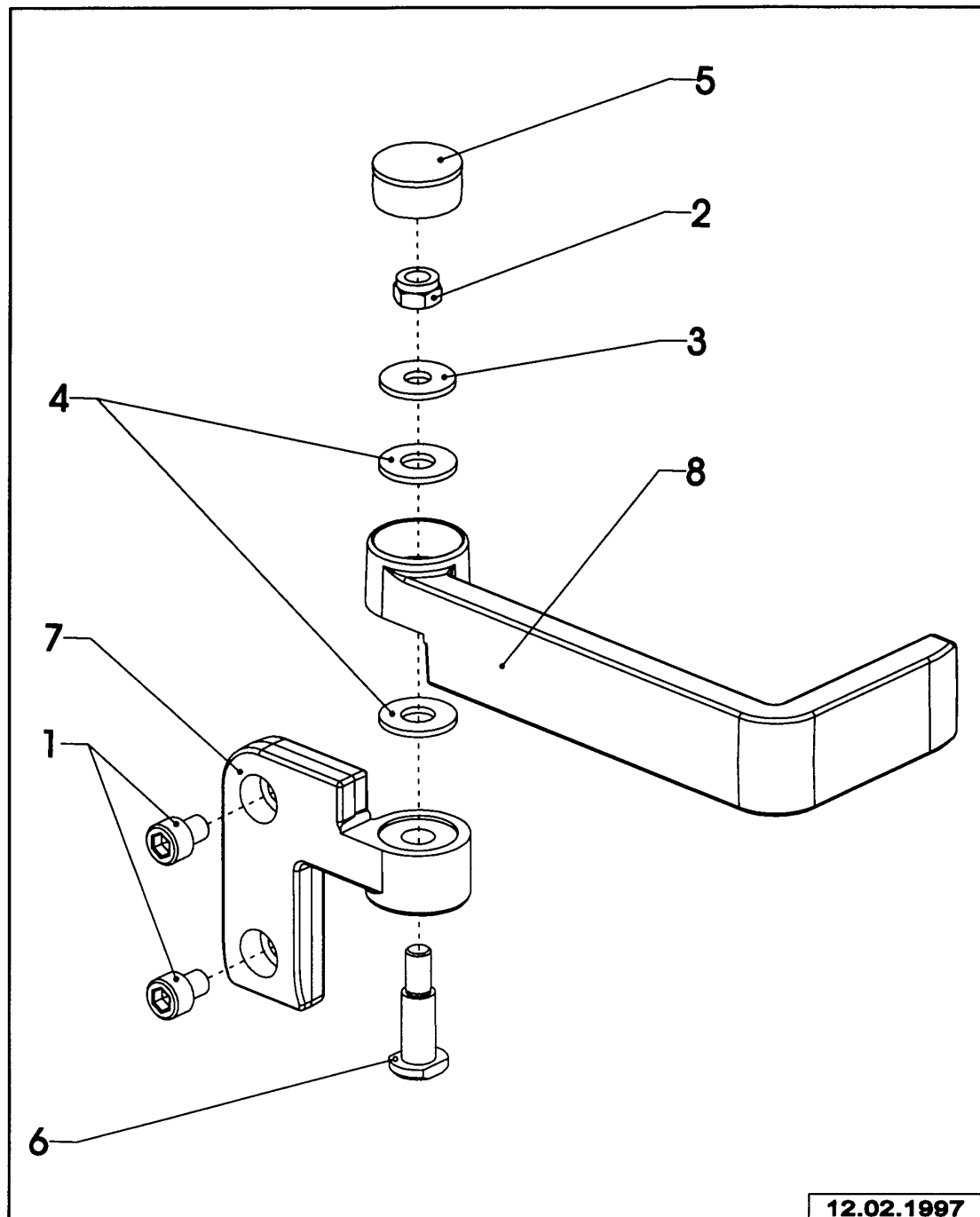
EVITA 4

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-25	FAHRGESTELL (MSU-HOCH) MOBILE TROLLEY (MSU-HIGH)		8411950	
1	UNTERTEIL LOWER PART	8411951		
2	SAEULE, HOCH, KPL. COLUMN, HIGH, CPL.	8411952		
3	OBERTEIL UPPER PART	8411953		
4	ABDECKBLECH FUER OBERTEIL COVER PLATE FOR UPPER PART	8411954		
5	ABDECKUNG FUER BATTERIEN COVERING FOR BATTERIES	8411955		
6	TRENNWAND DIVIDING WALL	8411987		
7	LAUFROLLE M.FESTSTELLER CASTOR WITH FIXING		M34523	
8	LAUFROLLE CASTOR		M34524	
9	HANDGRIFF HANDLE	8411957		
10	SENKSCRAUBE KB30X20WN1413 COUNTERS. SCREW KB30X20WN1413	8411967		
11	KANTENSCHUTZPROFIL 25X5 HEADER PROFILE 25X5	8411958		
12	ZYLINDERSCHRB. M 6X12 DIN 912 CHEESE HEAD SCREW M6X12 DIN912		1263196	
13	B8,4 DIN 9021-A4 B8,4 DIN 9021-A4	1335367		
14	SCHIEBER SLIDE	8408905		
15	ZUGFEDER MAIN SPRING	M16452		
16	HALTERUNG SUPPORT	8408935		
17	SETZMUTTER NUT	CH17646		
18	DIN 965-M3X10-A2-H DIN 965-M3X10-A2-H	1343246		
19	ZYL.SCHRAUBE M8X30DIN912 CU NI CHEESE HEAD SCREW M8X30 DIN912		1282123	
20	ABSCHLUSSBLECH	8411959		

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
	CLOSING PLATE			
21	DIN912-M6X8-10.9/155 DIN912-M6X8-10.9/155	1342762		
22	UNTERLAGE, HINTEN SUPPORT, BACKSIDE	8411973		
23	UNTERLAGE, VORN SUPPORT, FRONT	8411974		
24	SPANNSCHEIBE M10 DIN6796-FST X CONIC.SPR.WASHER M10 DIN6796		1341146	100
25	ABDECKKAPPE COVER	M29763		

ANFEUCHTERHALTER, KOMPL.
HUMIDIFIER RACK, COMPL.

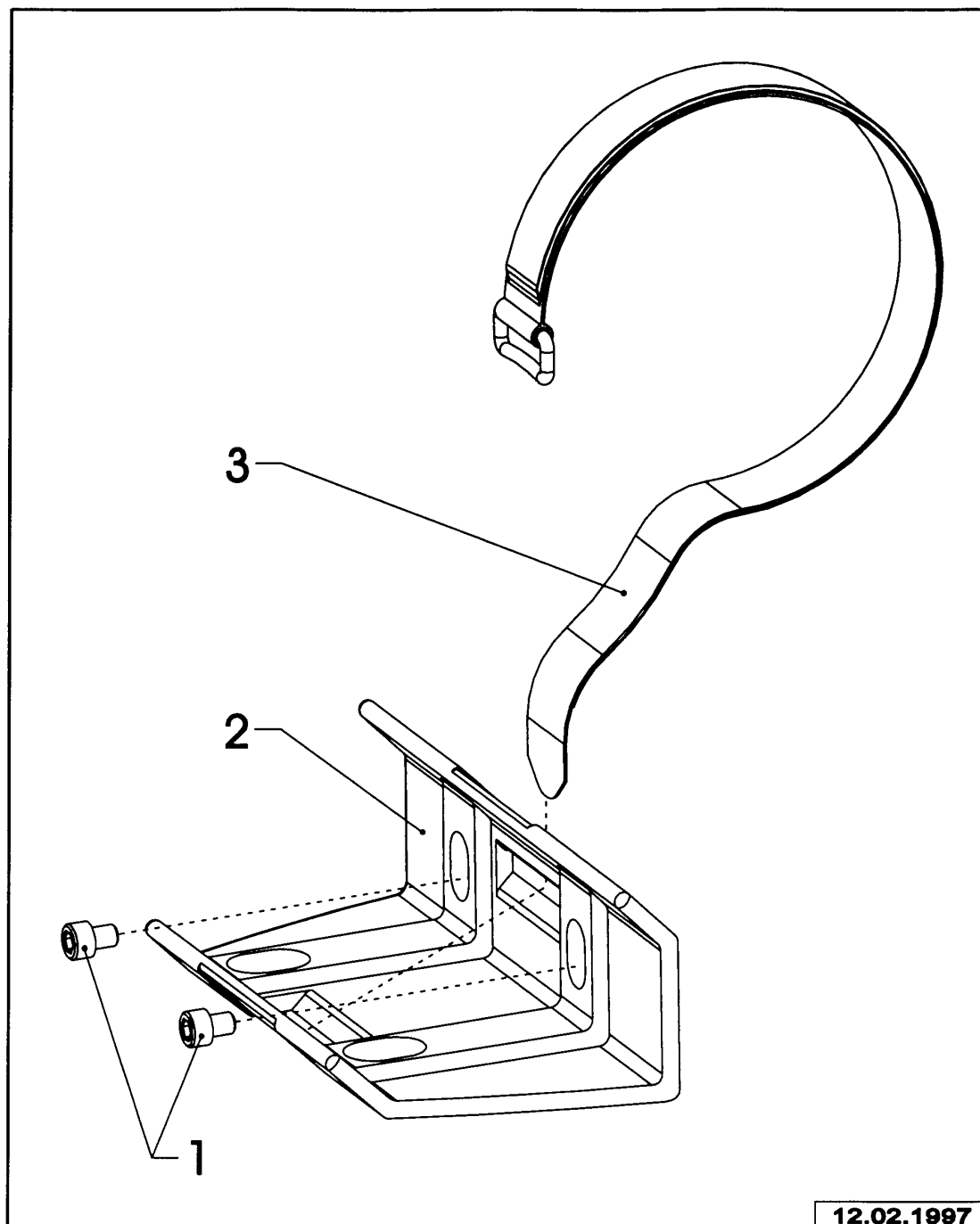
Bild/Picture 60



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-8	ANFEUCHTERHALTER, KOMPL. HUMIDIFIER RACK, COMPL.		8411956	
1	DIN912-M6X8-10.9/155 DIN912-M6X8-10.9/155	1342762		
2	SICHERUNGSMUTT.N M6 DIN 980-A2 HEXAGON NUT M6 DIN 985-A2		1333062	50
3	SCHEIBE B6,4 DIN 9021-A4 WASHER B6,4 DIN 9021-A4	1292358		
4	ISOLIERSCHEIBE GRUMMET	M16323		
5	VERSCHLUSS-STOPFEN VENT PLUG	8411985		
6	BOLZEN 8H11X19X28 DIN 1445 BOLT 8H11X19X28 DIN 1445	8411984		
7	SCHARNIER HINGE	8411980		
8	HEBEL LEVER	8411982		

FLASCHENHALTER, KOMPL.
CYLINDER SUPPORT, CPL.

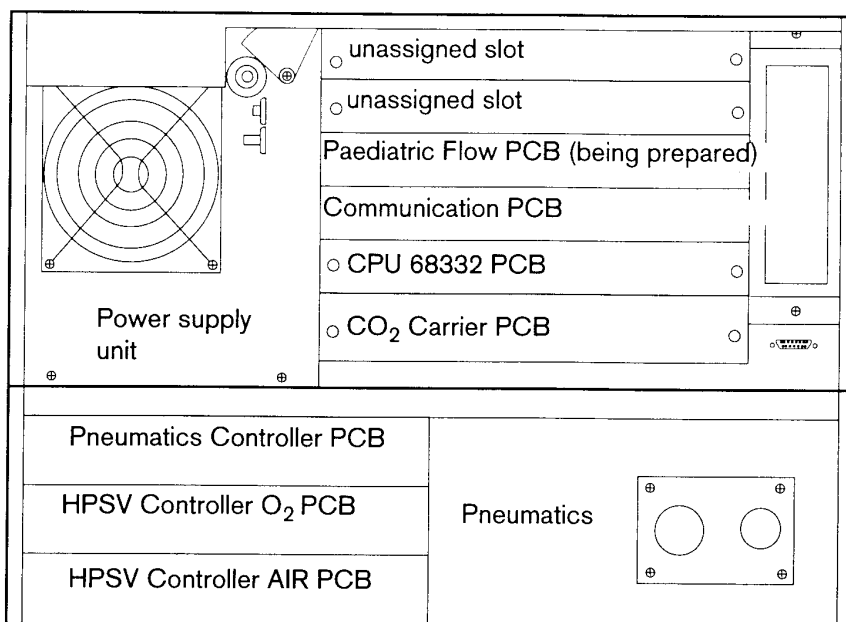
Bild/Picture 61



12.02.1997

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-3	FLASCHENHALTER, KOMPL. CYLINDER SUPPORT, CPL.		8411970	
1	DIN912-M6X8-10.9/155 DIN912-M6X8-10.9/155	1342762		
2	FLASCHENHALTER CYLINDER SUPPORT	8411971		
3	KLETTBAND ADHESIVE CLOTH TAPE	8411972		

Slots for the PCBs



The Power Supply PCB, the Processor Board PCB and the optional SpO₂ Module are located on the CO₂ Carrier PCB.

Important:

This technical documentation is valid for the technical equipment status 08/95.

[illegible]

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