Service Instructions

Dräger

Incubator 8000

Mappen Nr. File no.:
6141.20

Ausgabe Edition:

DrägerService
Medizintechnik
Medical Systems

Inspektionsdienst-Mitteilung

11.87 Lenke No.1

Incubator 8000 service strategy

Service at customers by Inspection Service engineer:
- Checking of unit in accordance with Test Card and fault list
- Replacement of assemblies/p.c. board replacement if necessary

Service at Branch/Agency:
- P.c. board replacement
- Repair at component level following corresponding training.

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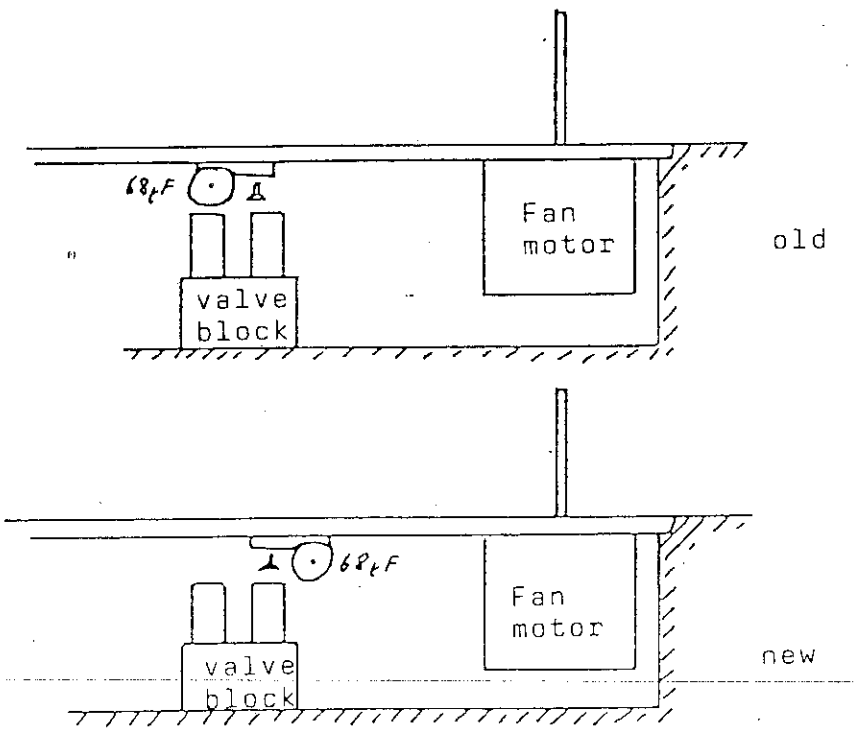
11.87 Lenke No.2

Shifting of motor capacitor

As a result of unfavourable dimensional tolerances, the 68 µF motor capacitor of the unit may make contact with the valve block and cause a short-circuit in the 24 V circuit. The 24 V circuit supplies the valves, the load relays for the heaters, the safety relay and the motor with voltage. In the event of such a fault, the incubator would assume the INOP status and give an audio and visual alarm; there is thus no danger for the patient.
When you next have access to the incubator, please move the 68 µF motor capacitor towards the fan motor (see sketch).



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Following parts will be sent free of charge and refering to device to each subsidary from VM-DS-PB:

1	Conversion instruction		
1	EPROM	83 00963	
1	Operating instruction, German, 90 27300, 5th edition/January'88		
1	Diode	83 00251 (1N5625)	for reduction of the vaporizer performance
1	Shrink hose		
2	Hinge assembly	2M 19542	
3	Sealing ring	2M 8777	for water bottle holder
1	Sealing	CH 9039	for water pipe
1	Ring	M 16206	
2	Diodes	83 00021 (1N4148)	Horn suppression
1	Capacitor	18 01376 (Tantalum 10µF)	
1	Spring	V 4647	for brief operating instruction
1	Metal screw	B 4.8 x 9.5	for water bottle holder
1	Steel-water pipe	2M 19619	(does not concern all devices)
1	Hose	2M 19620	(- " -)
1	Screw	2M 17288	(Hose holder, does not concern all devices)
1	Report form		
1	Description of software modification		

Additionally with costs if exported

1	Folio keyboard for skin temperature	
1	P.c. board Display	
1	Enclosure, English, to the operating instruction (only for English-speaking countries)	

The possible difference between delivered Incubators and Incubators converted with skin temperature regulation is seperately charged by the sales department.
We would like to ask you to perform the conversion until the end of march.

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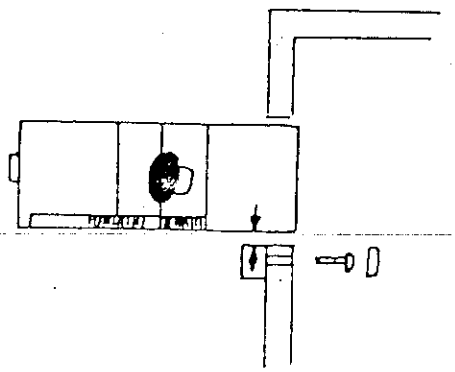
Faulty O_2 calibration 02.88 Lenke No. 4

Cause: When effecting calibration with high oxygen concentrations inside the Incubator, oxygen-enriched air from the interior may flow past the O_2 sensors if there is a gap between the climate sensor and the metal block below the climate sensor. This will bias the calibration value for 21 vol. % O_2.



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Inspektionsdienst-Mitteilung

Precise working instructions:
1. Loosen the two socket-head cap screws and fold down the flap beneath the electronics unit.
2. Detach the cable and pneumatics connections and the remove the electronics unit.
3. Strip incubator down to unit module.
4. Unscrew water pipe to unit module.
5. Detach power cord at terminals (bottom left) on p.c. board "unit".
6. Loosen the two screws (from above) and then remove the unit.
7. Move the capacitor holders towards the fan motor and secure with 2 tie bands.
8. Installation is to be performed in the reverse order.

This measure affects the first 25 incubators with the serial nos. 2043-1 to 2043-25, delivered as of the 42nd calendar week.

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01.88 Lenke No.3

Conversion

All 170 Incubators 8000 delivered up to now are converted to latest state. The conversion contains following items:

- New software (version no. 0.3) with improved regulation for temperature and humidity, possibility of skin temperature regulation and changed warning philosophy. There are 3 additional Service-modes for the Service:
  Mode 6 = Measuring value of the air temperature sensor.
  Mode 7 = Measuring value O_2-sensor A (outer sensor)
  Mode 8 = Measuring value O_2-sensor B (inner sensor)
  The valid range for 21 Vol.% of the sensors is 306 - 812

- New operating instruction (German)
- New hinge assembly for front flap
- Reduction of vaporizer performance by an additional diode in the heating circuit (concerns 75 devices)
- Set regulating thermostat of the vaporizer from 135°C to approx. 120°C, in order to prevent the non-desired switching off of the vaporizer-heating by the safety thermostat.
- New steel water pipes with hose for devices which were deliverd still with alloy water pipe (conversion concerns 75 devices)
- Horn suppression in 10-minutes-check by soldering in 2 additional diodes and one capacitor on the p.c. board "power supply" (concerns 75 devices)
- Slimming down a housing edge using a file in the interior of the Incubator to prevent motor noise
- Additional sealing rings and conversion of the bottle holder to prevent water leakages.
- Stronger spring for the flap of the brief operating instruction
- Retrofitting of the skin temperature regulation
- Retrofitting of the screwing on of the hose holder (concerns 75 devices)

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Inspektionsdienstmitteilung

cont. of IDM No. 4

Remedy: Set the gap between the climate sensor and the metal block to a minimum. This may involve enlarging the two holes in the Plexiglas hood using a needle file.

Please check the climate sensor when you next visit hospitals. Only a few units are affected by this measure.

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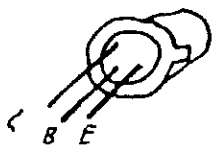
INOP-LED 02.88 Lenke No. 5

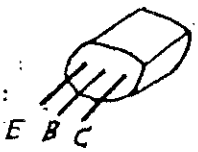
Reason: Lightening up of INOP-LED without audio alarm and during normal operation of the unit.

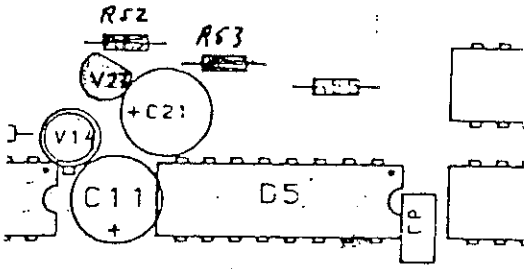
Cause: Unfavourable tolerances of several elements on the p.c. board "motherboard".

Remedy: In the event of a fault, the transistor V 27 on the p.c. board "motherboard" is to be replaced with a different type of transistor.

old: BCY59/IX
new: 2N3904 (Order No. 1801805)

BCY59: 

2N3904: 



The resistance of R52 and R53 are likewise to be changed:

R52: old 14.7 k Ω
new 7.5 k Ω (order No. 1806882)

R53: old 38.3 k Ω
new 10.0 k Ω (order No. 1805339)

This modification has been incorporated into series production. General retrofitting is not necessary.

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INOP due to CPU reset 02.88 Lenke No. 6

Reason: The Incubator sporadically assumes the INOP status. The Incubator usually functions normally again once it has cooled down and been switched on again.

Cause: The 5 V voltage monitoring on the p.c. board "CPU" is incorrectly calibrated and, although there is no undervoltage, triggers a reset if the electronics heat up. A particular characteristic feature of this fault is that the LED on the p.c. board "CPU" lights up.

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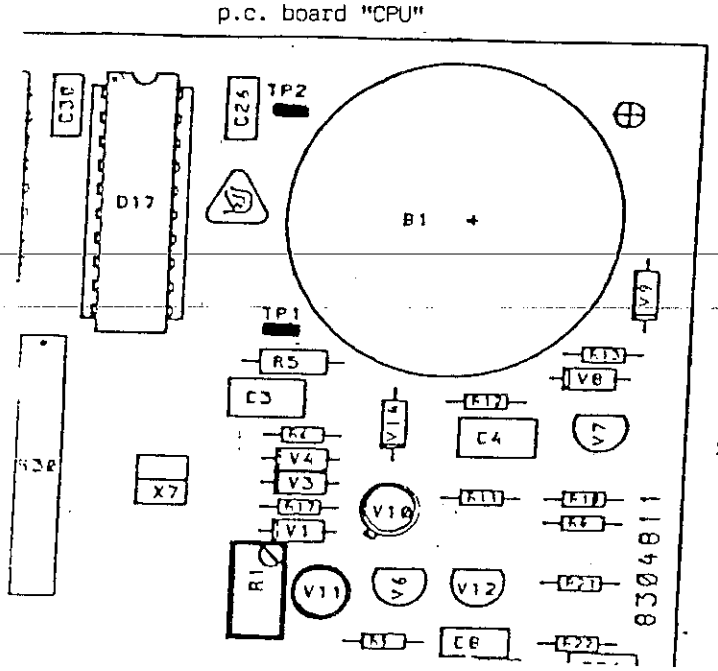
Inspektionsdienstmitteilung

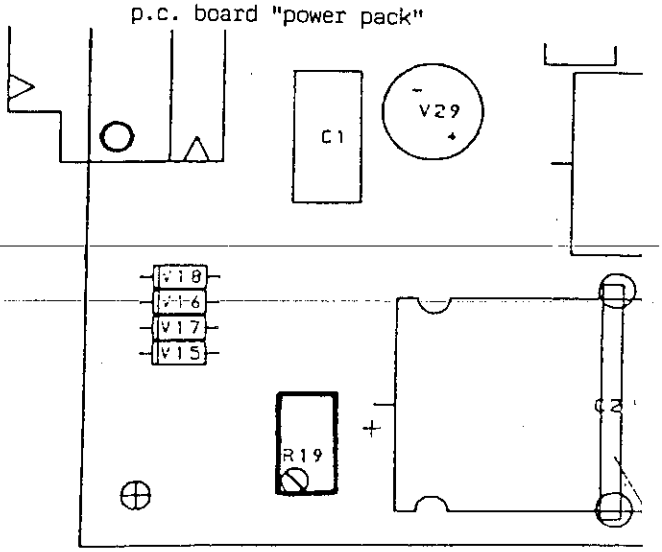
cont. of IDM No. 6

Remedy: Re-calibrate 5 V voltage monitoring on p.c. board "CPU".
Tools and aids required: Voltmeter, small screwdriver for potentiometers and locking compound.
Working instructions:
- Fold down flap beneath electronics module after loosening the two hexagon socket-head screws. The p.c. boards required for calibration are now accessible from below.

p.c. board "CPU"



p.c. board "power pack"



- Using potentiometer R19 on the p.c. board "power pack" adjust the supply voltage - measured between TP1 (+) and TP2 (GND) on the p.c. board "CPU" - from approx. 5 V to 4.75 V ± 0.02 V. Caution: Never adjust to a setting in excess of 5.5 V!!!
- Two initial conditions are possible for calibration of the voltage monitoring on the p.c. board "CPU":

  a) If the LED V11 lights up, turn potentiometer R1 in a clockwise direction until the LED V11 goes out or only lights up faintly. Then turn in the opposite direction until the LED V11 just lights up again.

  b) If the LED V11 does not light up or only lights up faintly, turn potentiometer R1 in an anticlockwise direction until the LED V11 just lights up.

- Using potentiometer R19 (p.c. board "power pack"), now slowly increase the operating voltage (caution: never to a setting in excess of 5.5 V!) until the LED V11 goes out or lights up faintly.
  Test value: U = 4.89 V ± 0.03 V.
- Set operating voltage with R19 (p.c. board "power pack") to 5.0 ± 0.05 V.
- Secure both potentiometers with locking compound.

This measure affects just a few units from the serial number range 2030-XX to 2080-XX. There is no need to re-calibrate units where this fault has not yet occured. Repair units from the a.m. range of serial numbers must always be re-calibrated.

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Inspektionsdienstmitteilungen

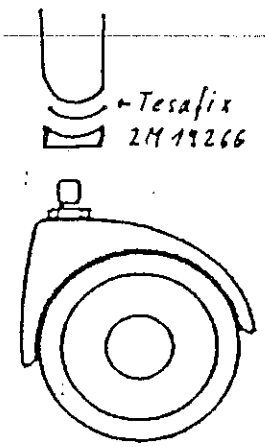
3.88 Lenke No. 7

Castors for Incubator 8000

Reason: Fracture of castor pins

Cause: Bending stress caused by slipping of block 2M 19266

Remedy: To reduce the bending stress, the block 2M 19266, which previously was only placed in position, should be bonded to the trolley and thus prevented from slipping. Bonding is to be effected by using double-sided adhesive tape "Tesafix 4968". This requires a piece 50 x 35 mm with a hole of approx. 12 mm dia. in the centre. The threaded pin of the castor is to be secured with Loctite 221.



This work applies to all Incubators up to serial no. 2140-0000 and also to 2140-0008. The necessary work has already been performed on 2130-0011, -0022, -0023, -0024, -0028 and -0030 in Lübeck. All Branches/Subsidiaries will automatically be receiving sufficient "Tesafix 4968" from VM-DS-PB. The work outlined above should be performed at the next opportunity or on the occasion of the conversion compaign II (new water jar mount and noise attenuation for swivel windows).

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3.88 Lenke No. 8

Retrofitting of new swivel-window seal

Reason: The old swivel-window seal does not make allround contact with the swivel window.

Cause: The swivel-window seal is round and becomes corrugated when fitted in the non-round opening in the hood.

Remedy: Pre-shaped seals:
Seal, left 2M 19469
Seal, right 2M 19470
The new seals are white (previously: transparent)

This retrofitting work affects all Incubators up to serial no. 2140-0000 and also 2140-0008. New seals have already been fitted on 2130-0011, -0022, -0023, -0024, -0028 and -0030.

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Inspektionsdienstmitteilung

Continuation IDM no. 8

All Branches/Subsidiaries will automatically be receiving sufficient quantities of new seals from VM-DS-PB (left 2M 19469, right 2M 19470).

This retrofitting work should be performed at the next opportunity or on the occasion of conversion compaign II (new water jar mount and noise attenuation for swivel windows).

The urgency of this work is to be agreed upon with Sales.

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3.88 Lenke No. 9

Temperature safeguard for air heater

Repair of the temperature safeguard 18 23 809 is not envisaged. In the event of a fault a new temperature safeguard is always to be fitted.

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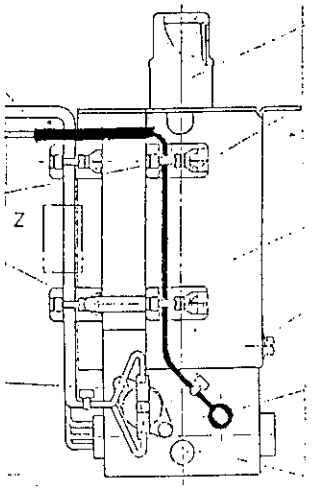
Regulating thermostat for water deficiency signal

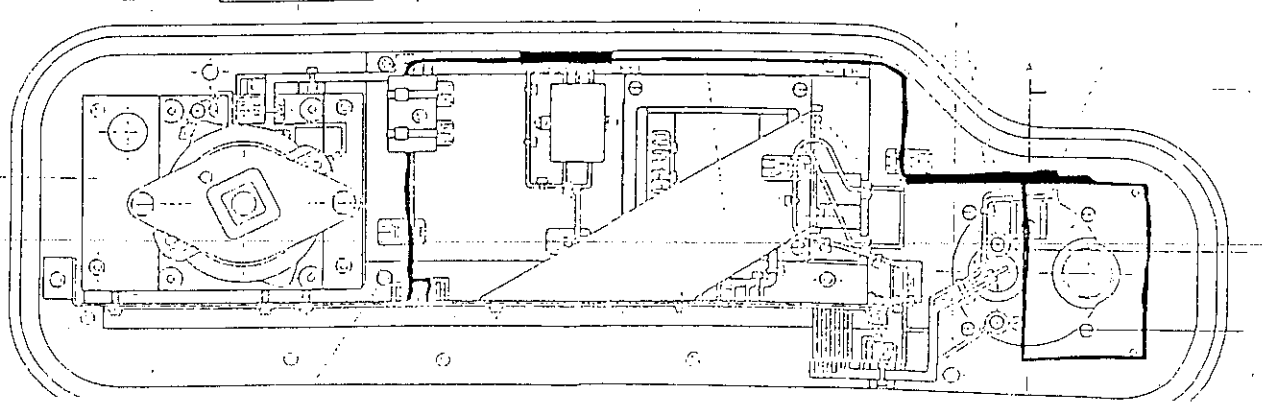
6.88 Lenke No. 10

The adjsutable capillary thermostat for water deficiency signal is replaced by the thermostat 115°C (18 25 992). A conversion is always then necessary if in case of repair a new heater (subassembly) 2M 19 709 (aluminium block and heating cartridge) is fitted.



All units are prepared for the installation of the new thermostat. During installation attention is absolutely to be paid to the following:

- Screw in thermostat only lightly by hand
- The connecting cables have to be coated with a PVC-hose (per m 11 97 797), see diagram) in the range of the air heating and the mains filter because of the 4 KV-potential voltage.



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Continuation IDM no. 10

The overlap is bigger with the new thermostat than with the old one. After releasing of the water deficiency signal and subsequent filling of the water supply several minutes may pass, until the water deficiency signal switches off. This will be incorporated into the new Test Card.

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6.88 Lenke Nr. 11

Conversion compaign II

All Incubators 8000 which were delivered up to now, are retrofitted to latest state during this last retrofitting compaign.

The retrofitting includes the following items:

- new water jar mount
- noise attenuation for swivel windows

Each subsidiary/agency will receive free of charge and referring to device from VM-DS-PB following parts:

1 x Conversion instruction

1 x Water jar mount 2M 19 806

1 x Lock washer for water distributor

4 or 6 x Retainer with buffer (according to number of swivel windows)

We like to ask you to agree upon with sales the urgency of this work and to perform this retrofitting compaign, including the measures in accordance with IDM no. 7 and 8, until the end of October at the latest.

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Retrofitting Package III on Incubator 8000

Retrofitting work consists of the following:

1. Improved cooling behaviour by means of additional fan. Whenever the air heating is not switched on, an additional fan is switched in - irrespective of the processor - which dissipates excess heat from the electronics. The installation of such an additional fan does not lead to an increase in the noise level inside the incubator.

2. New software (EPROM) and larger data memory (8K-RAM). The most important improvements brought about by the new software are as follows:

   - Improved control loops for all parameters without permanent, steady-state system deviations.

   - No calibration prompt for O_2 measurement function following power failure.

   - Switching of valves in 10 minute test dispensed with.

   - No evaluation of difference voltage between the two O_2 capsules as criterion for used-up sensor capsule. Different O_2 capsules are also accepted, as long as the voltages of the individual sensors are within the specified voltage window when calibrating with 21 vol. %.

   - Monitoring of O_2 concentration following switch-off of O_2 module. If the O_2 concentration then increases by 3 vol. % within 3 minutes, this results in an INOP alarm (fault 67) with additional flashing of the instantaneous O_2 value.

- O_2 setpoint adjustment expanded to 75 vol. %.

- The humidity control is active even under 27° C and with warning + 1.5° C air temperature.
  The humidity display range is now 0 % to 99 %. The instantaneous humidity level is indicated in the additional service mode 9.

- The initial air-temperature setpoint after switch-on of the incubator is now 33.0° C.

- ~~RAM test expanded for 8K-RAMs. 8K-RAMs (previously 2K-RAM)~~ are mandatory with the new software.

- Alarms for setpoint deviations (± 1.5° C for air temperature, ± 0.5° C for skin temperature, ± 5 vol. % O_2) are only given if the permissible deviation is exceeded. Previously, the alarm was given if the permissible deviation was reached.

- Following switch-on of the incubator or one of the modules, the lettering "SEt" flashes alternately with the instantaneous actual-value display (with O_2 module following calibration) as a prompt for acknowledging the setpoints. Acknowledgement is effected by pressing the button "+ setpoint" or "- setpoint" in the respective module. If no acknowledgement is given, the module continues to function as before; the flashing of "Set" is merely informative.

- The following initial conditions apply when switching from air to skin temperature:

- a) Cold start (initial warm-up, audio alarm tone suppression -1.5° C is still active)
  The instantaneous skin-temperature actual value is taken over as setpoint. An air-temperature setpoint of 33.0° C is set as zero crossing for the skin-temperature characteristic curve.

b) Warm start

The instantaneous skin-temperature actual value is taken as setpoint. The instantaneous air-temperature set value is taken as zero crossing for the skin-temperature characteristic curve.
It is therefore advisable to first set the correct temperature via the air temperature and then to switch to skin-temperature regulation. No or only minor setpoint changes for the skin temperature are then necessary and the skin-temperature characteristic curve is automatically in the right temperature range.

As regards the skin-temperature sensor alarm, the following are set irrespective of starting mode (cold or warm):
A skin-temperature setpoint of 36.3° C when switching, a setpoint of 35.0° C in the case of skin-temperature actual values $< 35.0°$ C and a setpoint of 37.0° C for skin-temperature actual values $> 37.0°$ C.

- When switching from skin to air-temperature regulation, the air temperature specified by the skin-temperature controller is taken as setpoint for the air-temperature regulation.

- After swivelling in the climate sensor, the heating is switched off for 90s and the audio alarm $\pm$ 1.5° C is suppressed for 10 minutes.

3. Renewal of evaporator connection (see IDM No. 14)

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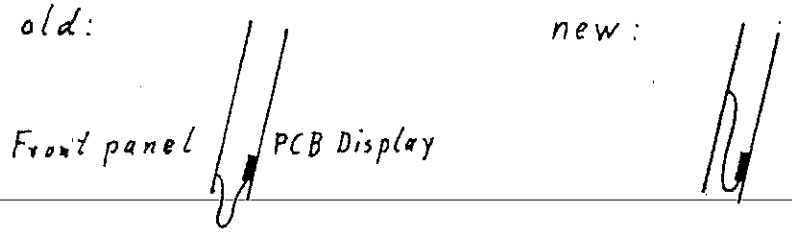
4. Wind insulating tape around connecting cables of keypads to provide protection against moisture and mechanical damage. This is no longer necessary with newer incubators where the connecting cables are laid internally between keypad and p.c. board "display" and thus do not project.



5. Assorted new miscellaneous items such as 2 new stickers, replacement of a screw at the climate sensor hinge and a new hose for the evaporator.

The following tools and auxiliary items are required for retro-fitting purposes:

- various screwdrivers and hexagon-socket wrenches
- 8 mm pipe wrench
- caliper gauge
- drill with 3.5 mm bit
- soldering iron and tin-lead solder
- Wacker Silicon E 41 transparent or heat-sealing adhesive
- various tie bands
- waterproof fibre-tipped pen

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Incubator 8000

Mappen-Nr./File no.:
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Ausgabe/Edition:
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Retrofitting instructions

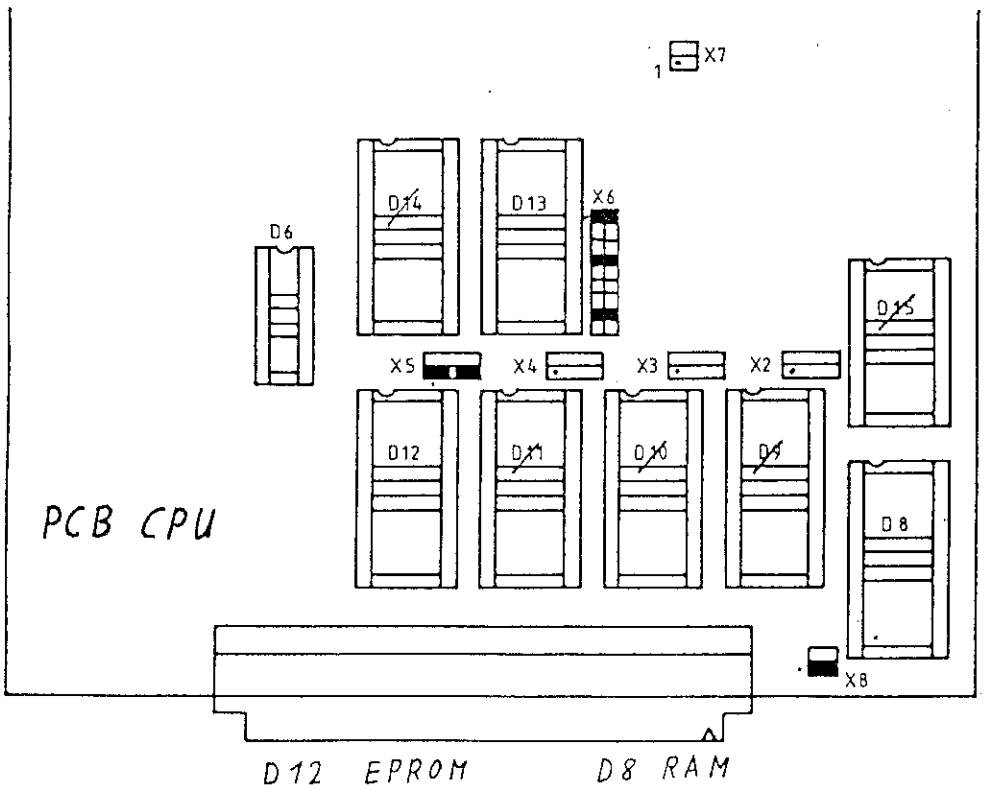
These retrofitting instructions describe the retrofitting sequence.

1. Note down data from service modes 1, 2 and 3.
   (For description refer to Test Card, item 3.). The subsequent replacement of the RAM would otherwise cause the data to be lost.

2. Fold down flap beneath slide-in electronics module after loosening the 2 screws or the 4 screws in the case of newer models.

3. Remove slide-in electronics module.

4. Remove p.c. board "CPU" from slide-in electronics module.
   - Replace EPROM
   - Replace RAM
   - Reconnect jumper next to RAM



5. Unscrew left side panel (next to p.c. board "CPU") from electronics slide-in module.

6. Drill side panel with the aid of the drilling template 82 90 387 in accordance with drawing "conversion kit, p.c. board fan" 82 90 390. Alter type number of electronics slide-in module on side panel:

   82 00 901 = 82 90 401 or
   82 00 902 = 82 90 402

7. Screw on p.c. board "fan" on inside of side panel.

8. Remove humidity keypad (only if connecting cable of keypad protudes) and wind insulating tape around connecting cable; in doing so, do not wind more than twice around connector. Then install humidity keypad again.

9. Solder on wiring harness 82 90 389 on motherboard and on p.c. board "fan" in accordance with drawing "conversion kit, p.c. board fan" 82 90 390. To do so:

   - Scrape off protective lacquer (transparent) and solder resist (green) on conductor for connection of red and black cable and tin conductor.

   - Scrape off protective lacquer on IC connection for connection of green cable and tin.

   - Solder on wiring harness.

   - Fit side panel and solder on wiring harness on p.c. board "fan"; in doing so, secure soldering points with shrink-down tubing.

   - Secure soldering points on p.c. board "motherboard" with Wacker Silicon E 41 or hot-sealing adhesive.

10. Fit CPU using module location in centre of p.c. board "motherboard".

11. Wind adhesive tape around connecting cables of other keypads (as Item 8).
Exception: Do not remove calibrated skin-temperature keypad (West Germany only) as otherwise the calibration seal would be broken.
Then install keypads again.

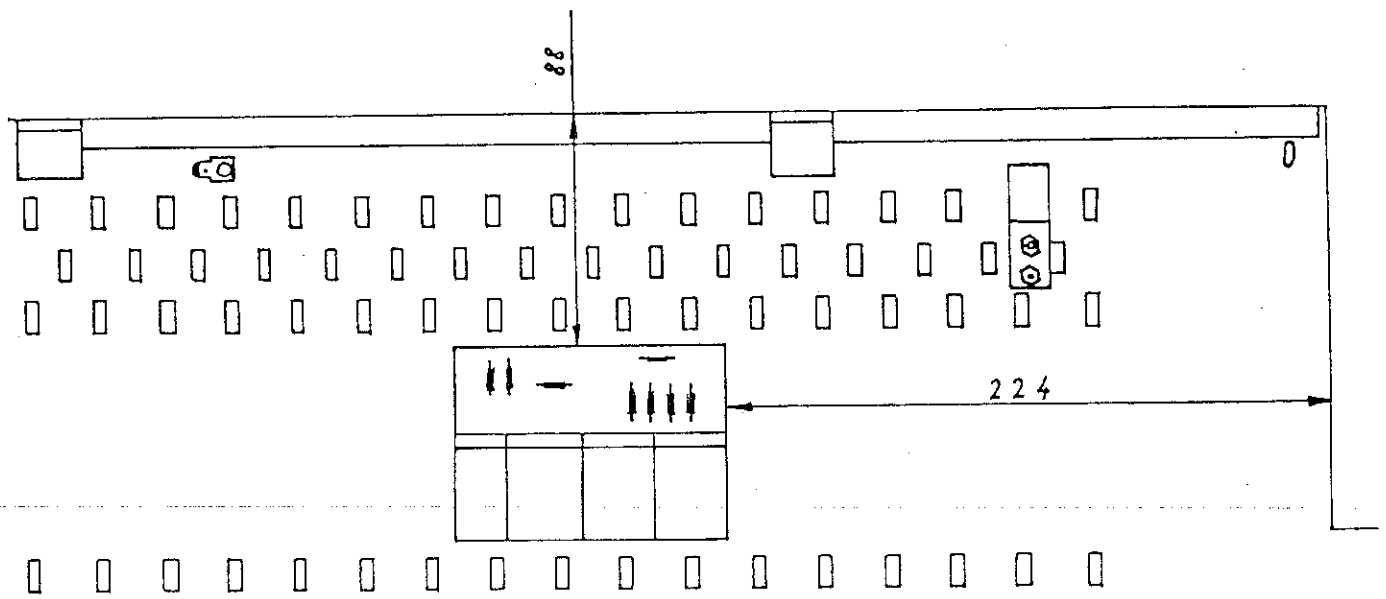
12. Remove unit.

13. Renew cap on evaporator of unit (old cap white, new cap black).

14. Unit fuses
Move F6 = 200 mA to position F5 and renew F6 with 500 mA.
Please also refer to "fuses" sticker in retrofitting set.

To date:	New:
F5 = 125 mA	F5 = 200 mA
F6 = 200 mA	F6 = 500 mA

Stick "fuses" sticker from inside onto panel beneath electronics slide-in module (see diagram)



15. Installation of additional fan

- Unscrew plate with connector for climate sensor.
- Unscrew sensor plug with wiring harness from plate.
- Screw sensor plug with wiring harness to new plastic section; in doing so, make use of the longer countersunk screws provided.
- Screw on plastic section with fan in place of plate; the black protective cap can be dispensed with.
- Re-attach any loosened tie bands.

16. Install unit. New seals and a new hose are provided in the retrofitting set for the water pipe.

17. Install slide-in electronics module and connect all cables. The plug connection of the fan is polarized.
On account of the checks to be performed in accordance with the new Test Card do not close the flap beneath the slide-in electronics module.

18. Renew hexagon socket-head screw at hinge of climate sensor. The new screw is made of stainless steel (does not apply to all units).

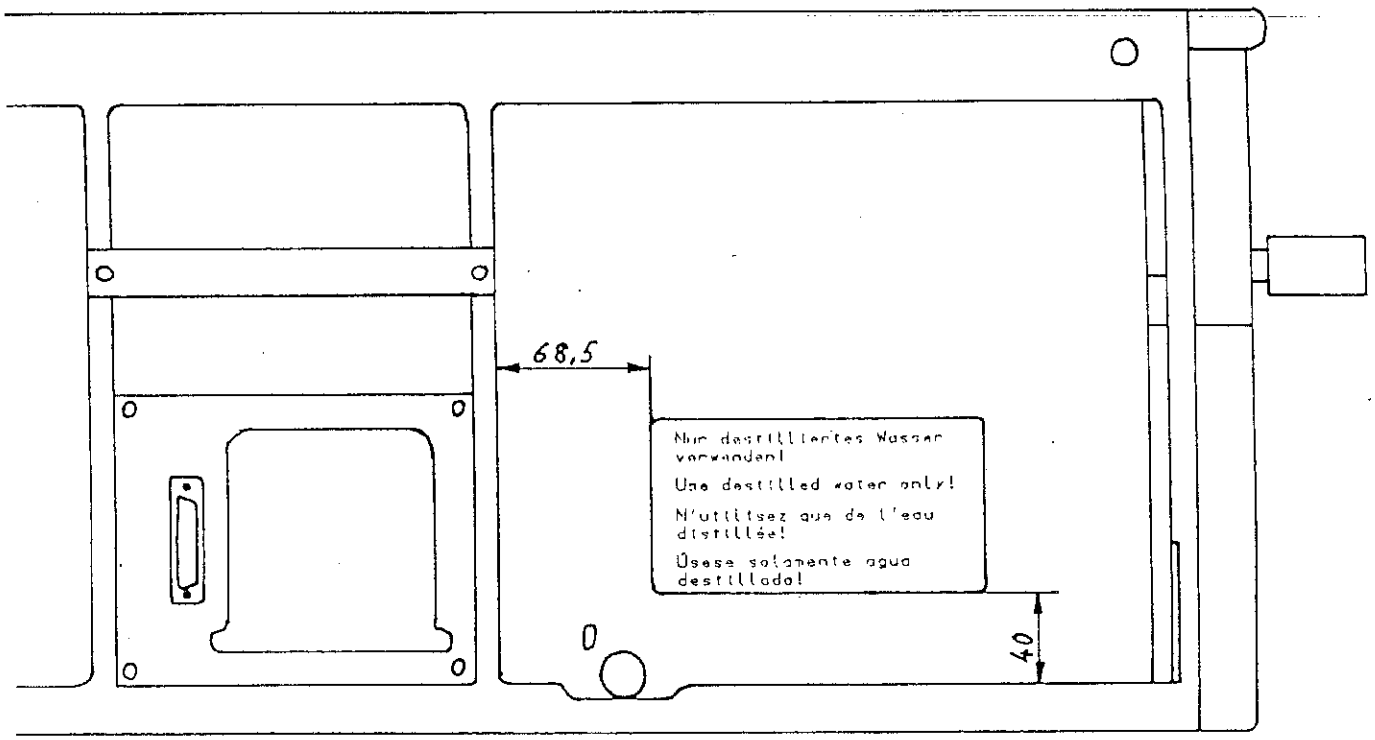
19. Assemble unit (with exception of flap beneath slide-in electronics module) ready for operation.

20. Check engaging function of swivel window
The swivel windows must close securely even in the event of slight closing pressure and subsequently pulling hard on the outer edge of the swivel window. If this function is not guaranteed:

- Remove washer beneath rubber cone of swivel-window latch if there is one and check function again.

- If there is no washer beneath rubber cone of swivel-window latch, or if removing the washer does not lead to any improvement, gradually shorten rubber cone until secure engaging is guaranteed.

21. Stick on sticker "distilled water" next to jar holder.



22. Enter data from service modes 1, 2 and 3 into unit again (refer also to R in microfiche).

23. Check incubator in accordance with new Test Card.

24. Enter serial no. of incubator in new operating instructions (last page) and destroy old operating instructions.

25. Instruct customer on the basis of the description of software modifications given in these retrofitting instructions and the new operating instructions.

26. Document retrofitting of incubator and provision of instruction in customer's equipment manual (form D/1 or A/1). (Applies only to West Germany and West Belin)

- Existing EPROM replaced with new EPROM 82 90 370
- New operating instructions 90 27 341
- Additional fan fitted
- New sticker 2M 19 841
- New sticker 2M 20 056

27. Fill in acknowledgement sheet for retrofitting work and send it to VM-DS-PB (absolutely necessary on account of need for registration).

Dräger

Incubator 8000

Mappen-Nr./File no.:
6141.20

Ausgabe/Edition:
1.89

DrägerService
Medizintechnik
Medical Systems

VM-DS-PB-le
10.01.89

Drägerwerk Aktiengesellschaft
Abtlg. VM-DS-PB
Postfach 13 39

2400 Lübeck 1
West Germany

Acknowledgement sheet for retrofitting of Package III in Incubator 8000

1. Customer's address:

2. Date on which retrofitting work performed:

3. Equipment data, rating plate:

Item No.: _ _ _ _ _ _ _ _ _

Serial No.: _ _ _ _ _ – _ _ _ _

4. Equipment data following retrofitting:

Serial No. EPROM 82 90 370: _ _ _ _ _ – _ _ _ _

Serial No.,
operating instructions 90 27 341: _ _ _ _ _ – _ _ _ _

5. The old EPROM is to be destroyed.

6. Branch/Agency, Subsidiary, Sales Partner:

Date _____ Signature _____

Dräger

DrägerService

Test Certificate
Incubator 8000
with Software-Version 0.4

File No.: 6141.20

Edition: 2.89

Location of apparatus: _____

_____

_____

Serial No.: _____

Date of delivery Startup: _____

Invoice No. or delivery No.: _____

Others: _____

Explanation of symbols:

— OK
| Defect
◯ Spare parts used
/ Report

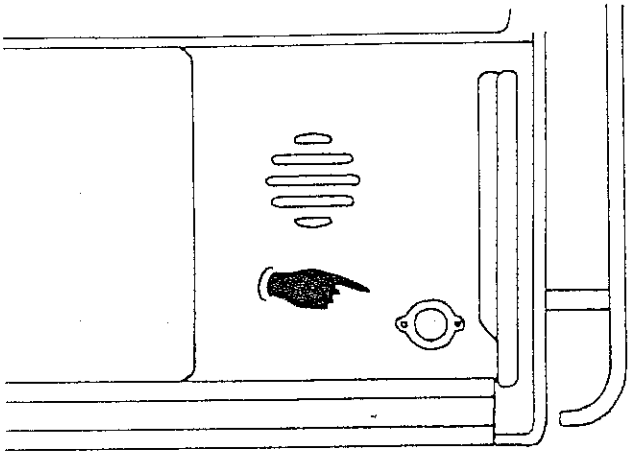
C = Check condition
O = Check function
L = Check for leakage
V = Enter test value

1.	Checking of accompanying documents (only in West Germany)	
1.1.	Operating instructions for Incubator 8000 GA 6141.21 - 9027341	C
1.2.	Equipment manual	C
1.3.	Operating instructions for special accessories. Operating instructions must be present in appropriate combination in line with entry in equipment manual	C
2.	General condition	
2.1.	Trolley	C
2.1.1.	2 castors without brake 2M 19130	C O
2.1.2.	2 lockable castors 2M 19140	C O
2.1.3.	Protective caps (orange) 2M 19267	C
2.2.	Cabinet (if applicable)	
2.2.1.	Cabinet, right 2M 19580	C O

2.2.2.	Cabinet, left 2M 19480	C O
2.3.	Column with facing	C
2.3.1.	Doors with hinge, compl. 2M 19729 and magnetic catch 2M 19718	C O
2.3.2.	Mains connection with equipment socket 18 09 822, power-cord feed-through 2M 18642 and mains lead 2M 13126	C
2.3.3.	Mains switch (thermal automatic overload protection) opposite equipment socket	C
2.3.4.	O_2 connection socket for an external flowmeter in top of column facing	C
2.4.	Back of incubator	
2.4.1.	Flap, compl. 2M 19626 with catch 2M 19271 and retaining strap 2M 12045	C O
2.4.2.	Plate 2M 19538 ahead of filters with screws 2M 19616 and lock washers 1331418	C O
2.4.2.1.	Seal 2M 19642 for plate	C
2.4.2.2.	Seals R 28225 behind filters	C
2.4.2.3.*	Replace particulate filter 84 02 926 (set of 5: 67 24 965)	C
2.4.3.	Sticker 2M 20056 "Dest.Water"	C
2.5.	Handles 2M 19541 on end faces of incubator	C
2.6.	Incubator hood	C
2.6.1.	Climate sensor with holder	C
2.6.1.1.	Swivel out climate sensor -> there must not be a gap in excess of 0.5 mm between sensor housing and block located transversely beneath the climate sensor.	C O
2.6.1.2.	Remove climate sensor from retainer and examine connector, cable and connecting socket for external damage	C

2.6.2.	Swivel window, 4 x or 6 x (set of swivel windows 2M 19550, consisting of 1 x swivel window, left; 1 x swivel window, right; seal, left 2M 19469 and seal, right 2M 19470). Set swivel window such that pane makes contact with seal. Check engagement and holding; to do so pull fingers on outer edge of swivel window.	C O
2.6.3.	Hose feedthrough 2M 19511, 4 x or 6 x	C
2.6.4.	Double walls with holder (must be present)	C O
2.6.5.	Front flap, compl. 2M 19525 with catch 2M 19482, double wall (must be present) and 2 retainers 2M 19502 with 2 x lock washers in each case.	C O
2.6.5.1.	Spring catches of front flap Check function of reset spring	C O
2.6.5.2.*	Renew spring 2M 19 849 of the spring catches every 6 years.	C
2.6.5.3.	Hinge frame 2M 19542 (Note: Turn hexagon head bolt in clockwise direction when removing hinge frame.)	C
2.6.5.4.	Tappet, compl. 2M 19543, 2 x Function of return spring	C O
2.6.6.	Hood holder	C
	Then remove front flap, climate sensor and hood.	
2.7.	Resting surface, compl. 2M 19632 consisting of resting surface 2M 19596, 2 x holding plate 2M 19631 and mattress 2M 19350. The two holding plates must be firmly screwed on	C
2.7.1.	Hose holder (if applicable) 2M 19630	C
2.7.2.	Resting surface height adjustment The resting surface can be pulled out at any height and in any inclined position. Exert hand force on resting surface in pulled-out position.	C O

2.7.3.	Supports 2M 19654 for resting-surface height adjustment. Then remove resting surface and supports.	C	
2.8.	Intermediate element 2M 19537 (cover surface)	C	
2.9.	Impeller, compl. 2M 19665	C	
2.10.	Trough 2M 19334 with 2 x seal 2M 19595 for supports. Then remove impeller and trough.	C	
2.11.	Unit seal 2M 19637	C	
2.12.	Seal 2M 19638 between impeller and unit.	C	
2.13.	Lubricate motor with oil 2M 07839; to do so unscrew 1.5 mm head bolt next to motor shaft and pour 10 drops of oil into the threaded bore. Lubricate shaft of the air motor with vaseline.	C	
2.14. *	Clean interior of unit (every two years); to do so remove unit. Caution: Disconnect mains lead beforehand! Unscrew metal block of evaporator and check whether any lime has become deposited inside the evaporator. If necessary, scrape off any lime.	C	
2.14.1.	Cap evaporator 2M 20040	C	
2.15.	Valve in the fresh air suction at the bottom surface of the Incubator housing (not applicable with all units) The leak test is to be performed under 6.6.	C	



Important advisory:
If this valve is present, the valve block can be removed without removing the aggregate.

2.16. Fan failure test
to do so, install trough and hood without impeller, connect and swivel in climate sensor, switch on incubator.
-> Following 30 s self-test (dashes only on actual value displays of all modules) fan failure alarm is given by means of a continous tone and visually by the corresponding alarm LED "X" in the air-temperature module lighting up. The audio alarm cannot be suppressed by pressing the button "horn off". O

Then switch off unit and assemble ready for operation.

2.17. Flap in front of touch-sensitive controls.
Legibility of operating instructions in brief. C O

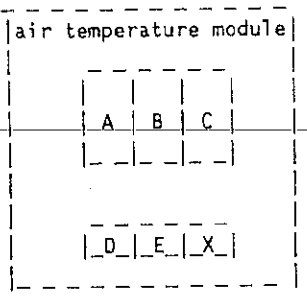
2.18. Touch-sensitive controls C

2.19. Additional fan
The additional fan is on the back side next to the sensor plug with conversion units, below the trough with units as of I.89. C

2.20. Balance (if applicable) C

2.21. Plate for additional units (if applicable) C

3. Record operating data, climate-sensor switch test, comparison of measured values of temperature sensors and assessment of O_2 capsules.
To do so, switch on unit, wait for 30 s self-test to have been complete and press buttons "horn off" and "-air temperature" simultaneously for 8 s:
-> "-S-" is indicated on the actual value displays in the humidity, O_2 and skin temperature (if applicable) modules and the number of the service mode flashes in the air temperatue module on the lower right display.



A, B, C, D, E = Measured values or data

X = Number of service mode (flashing)

The next mode in each case can be obtained by pressing the button "+air temperature".
Exit from the service mode can be effected at any time by pressing one of the "control" buttons.

Mode Ø: Software version A.B
This test card is valid for software version 0.4 V

Mode 1: Operating hours
A B C D E in hours V

Mode 2: Button actuations
"Check ☼"
A B C D E = number of times button pressed V

Mode 3: Button actuations
"Check 36.0°C"
(only if skin temperature module provided) V
A B C D E = number of times button pressed

Mode 4: Sensor switch test in climate sensor.

Climate sensor swivelled in = 1
Climate sensor half swivelled out = 2
Climate sensor swivelled out = 3
Climate sensor detached = 4 V

Mode 5: Measured value of excess-temperature sensor in °C. The deviation with respect to the measured value of the air temperature sensor (Mode 6) may be a maximum of 0.3°C. V

Mode 6: Measured value of air temperature sensor in °C. V

Mode 7: Measured value of O_2 sensor A (outer capsule in climate sensor) A B C = Decimal value of A/D converter. With 21 vol. % O_2, values of between 306 (= 9.5 mV) and 812 (= 25 mV) are permitted for the calibration V

Mode 8: Measured value of O_2 sensor B (inner capsule in climate sensor) A B C = Decimal value of A/D converter. With 21 vol. % O_2, values of between 306 (= 9.5 mV) and 812 (= 25 mV) are permitted for the calibration. V

Difference of 10 mV or 32 units between both measurements Replace Relevant Sensor

Information on O_2 sensor replacement: The replacement of the sensors is recommended in the event of values less than 325 (= 10 mV).

Mode 9: A B,C = Measured value of the humidity sensor in % rel. humidity. 0

---

4. Replacement of wearing parts of electronics
To do so, fold down flap beneath slide-in electronics unit after loosening the two or with newer units the 4 screws.

4.1. * Renew rechargeable battery 8301856 on p.c. board "power pack" every 2 years. 0

4.2. * Renew battery 1817582 on p.c. board "CPU Standard 2" every 6 years. 0
Caution: Electrostatically sensitive components!
Then enter data from service modes 1, 2 and 3 into unit again.

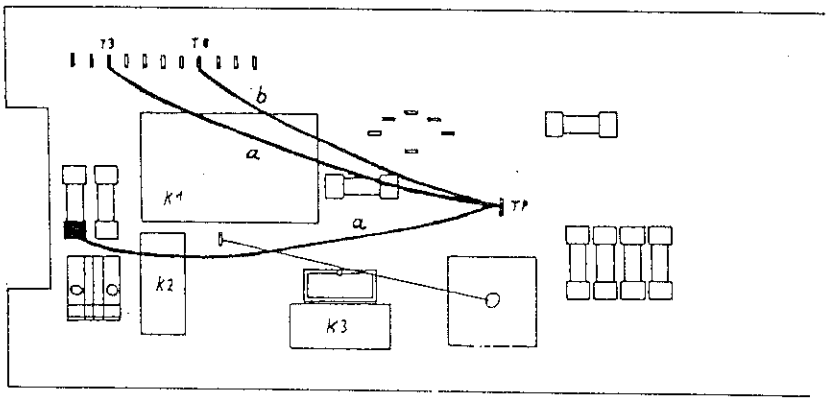
---

5. Technical safety check
To do so, fold down flap beneath slide-in electronics unit after loosening the two 2 or with newer units the 4 screws.

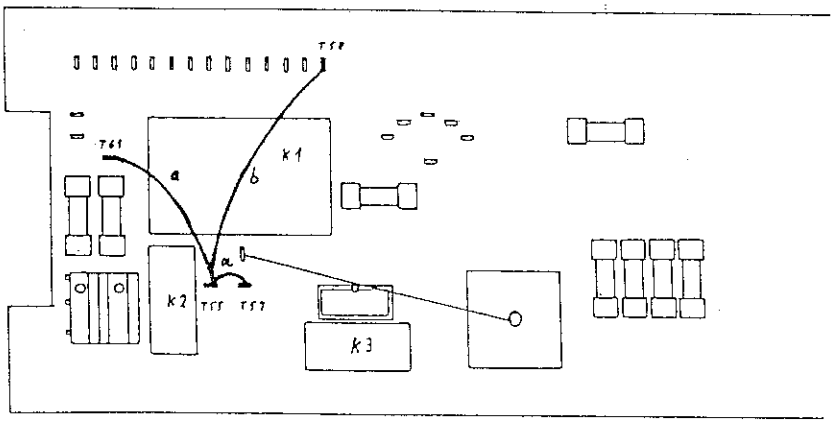
5.1. Protective conductor test
Test points: Protective conductor terminal on left of unit, trolley, screws on height-adjustable column, O_2 connection socket for flowmeter, flap beneath slide-in electronics unit.
Test value: $R \leq 0.2\ \Omega$

5.2. Equivalent leakage current measurement
For measurement purposes the switch-on relay and the safety relay must be jumpered.
Caution: Detach mains connection beforehand!
Without humidity module -> connection a
With humidity module -> connection a + b

p.c. board "unit" 8200600 - 3:

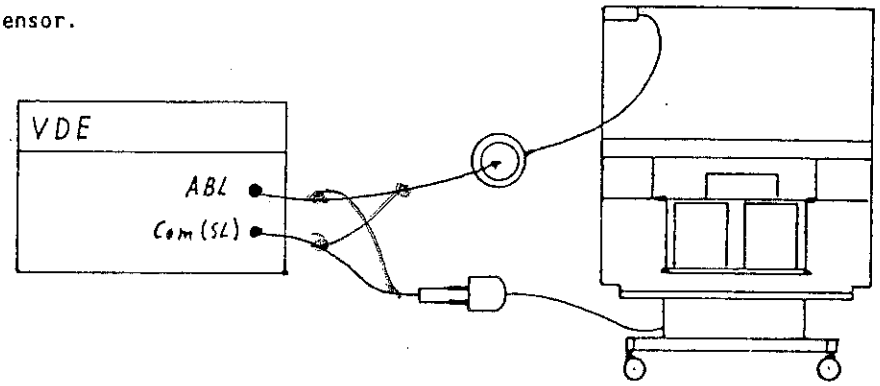


P.c board "unit" 8200600 - 4:



5.2.1. Equivalent unit leakage current measurement
The subsequent measurements may exceed the first-measured value in the test card by max. 100%, however the stated value must not be exceeded.
Test value: I_A < 0.75 mA V
Advisory: The first measured value is to be taken over, when a new test card is started..
First measured value: I_A = ...mA

5.2.2. Equivalent leakage current measurement to the housing of the skin temperatur sensor.
(only with skin temperature regulation)
Connect shortened circuit mains plugs (L and N, not protective conductor) to socket "Abl" and test cable to the socket "Com" of the VDE tester.
(with converted VDE testers socket "SL" instead of "Com").
Equivalent leakage current measurement to the contact surface of the skin temperature sensor.



Test value: I_A = $0.0^{+0.1}$ mA V

If the first measured value exceeds this value, the insulation of the sensor is faulty.

Important: After having performed measurement the connections of the soldering terminals are to be removed again.

5.3. Visual check of the mains voltage conducting cables.
The power cable and all visible connecting cables to the unit must be fixed safely. C

6. Functional check

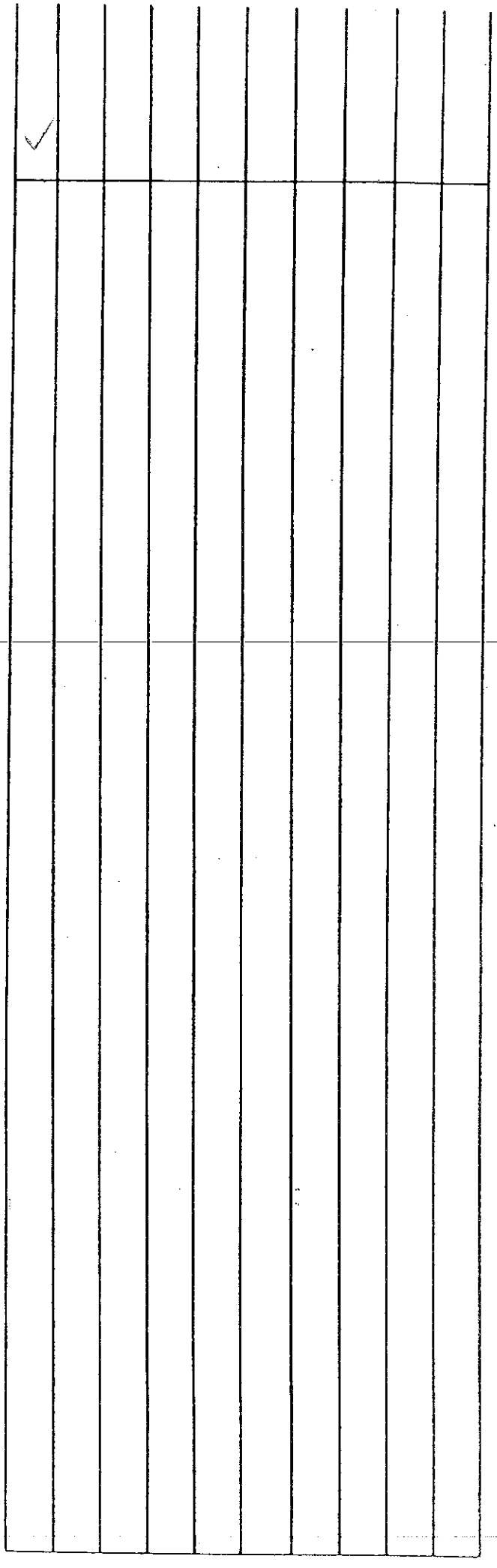
6.1. Function of height adjustment (if applicable) 0

Agreements on subsequent functional checking:
Red alarm LED are located on the front panels of all modules. If one of these LED lights up or flashes, this alarm is transferred to the red central LED "alarm" and an audio alarm is triggered. Intermittent alarm tones can be suppressed by pressing the button "horn off"; this does not apply to continous alarm tones. Pressing the button "horn off" merely suppresses the audio alarm currently active; any additional alarm occuring activates the horn again.
When the incubator is switched on, the audio warning "inadequate air temperature" is suppressed for 30 minutes.

When after calibration of the O_2-measurement function the climate sensor has been swivelled in, the air heating is switched off for 90 s and the audio alarm tone suppression $\pm$ 5 Vol.% O_2 is activated. Additionally the audio alarm tone suppression $\pm$ 1.5°C is activated for 10 minutes.

When the Incubator or one of the modules have been switched on, "SEt" and the actual value display flash alternately for requiring the acknowledgement of the desired values (except for alarms in the respective module). The acknowledgement is performed by pressing the button "+desired value" or "-desired value".
The flashing of "SEt" is only an advisory.

6.2. Basic incubator functions
Switch on incubator:
-> Green operating LED lights up.
Dashes are indicated for 30 s on the actual value display of all modules.
As of software version 0.3 only the air temperature module is then active.
Any excess temperature warning is to be deactivated by pressing the button "reset!". 0



6.2.1. Press button "Check O_2":
-> All LED with the exception of the power failure LED light up; all digital displays indicate 88.8 and a continous tone sounds. LED and displays are then blanked for 1 second and the horn deactivated. 0

6.3. Testing air-temperature module
The desired value of 33.0°C flashes. "SEt" and the actual air temperature flash alternately in the actual value display.
Acknowledge desired value by pressing the button "+air temperature" or "-air temperature":
=> Display of desired value and actual value is continous (except with alarm in the air temperature module). 0

6.3.1. Checking of the desired value setting
Press button "-air temperature once:
=> The desired value drops by 0.1°C
Press button "-air temperature" continously:
=> The desired value drops to 28.0°C
Press button "+air temperature" once:
=> The desired value increases by 0.1°C
Press button "+air temperature" continously:
=> The desired value increases to 37.0°C
Press button ">37°C"
=> Yellow LED ">37°C" lights up
Press button "+air temperature" continously:
=> The desired value increases to 39.0°C
If the actual value is smaller than the desired value:
=> Green heating LED flashes 0

6.3.2. Setting desired value to 36.0°C:
Reference measurement in centre of resting surface at a height of 10 cm with thermometer 2M 11111.
Test value: 36.0 ± 1.5°C 0
Note: Test in heat-up phase of O_2 module => 6.4.

6.3.3. Setting desired value to a level 1.6°C less or higher than actual value:
=> Actual value display, LED "± 1.5°C" and LED "alarm" flash and intermittent alarm tone.
Press button "horn off":
=> Horn off, actual value display flashes, LED "± 1.5°C", "alarm" and "horn off" light up. 0

6.3.4. Functional test of the additional fan
Set desired value 1.0°C higher than the actual value:
=> Heating LED flashes, additional fan stops
Set desired value 1.0°C less than the actual value:
=> Heating LED off, additional fan works, no unnormal noise. 0

6.3.5. Heating fan
No unnormal noises of the fan motor and the impeller. 0

Then set desired value to 37.0°C.

6.3.6. Swivel out climate sensor and pull it from the stop pin:
=> visual and audio sensor alarm, heating off. 0

6.3.7. Pull out plug for climate sensor:
=> visual and audio sensor alarm, heating off. 0

Then connect climate sensor ready for operation.

6.4. Testing O_2 module (if applicable)

6.4.1. Switch on O_2 module by pressing button "control" in O_2 module:
-> Green LED "control" lights up. Following switch-on the desired value is 21 vol. % O_2 and flashes. The yellow LED "Cal." flashes. "CAL" flashes on the actual value display. 0

6.4.2. Swivel climate sensor out of incubator and press button "Cal. 21 vol. %":
-> The LED "cal." light up in the calibration phase and "cal." and "--" flash alternately on the actual value display.

	Once calibration has been completed, "21" and "SEt" flash alternately on the actual value display. Do not swivel in climate sensor: -> Visual and audio sensor alarms are given after 60 s. Swivel in climate sensor: -> No sensor alarm in O_2 module Acknowledge desired value by pressing the button "+desired value" "-desired value" O_2: => Display of desired value and actual value O_2 is continous (except with alarm in O_2 module)	O
6.4.3.	Testing O_2-module	
6.4.3.1.	Unscrew first O_2-sensor => visual and audio sensor alarm Screw in sensor and calibrate again.	O
6.4.3.2.	Unscrew second O_2-sensor: => visual and audio sensor alarm. Screw in sensor and calibrate again.	O
6.4.4.	Checking of the desired value with the buttons "+desired value" and "-desired value" O_2 as for air temperature module. The button ">40 vol.%" must be pressed beforehand for settings in excess of 40 vol.% O_2 and up to 75 vol.% O_2. If the actual value deviates from the desired value by $\pm$ 5 vol.%, audio and visual alarms are given.	O
6.4.5.	O_2 pressure connection	
6.4.5.1.	CS-O_2 connecting hose Blue mark Non-reusable hose clamps	C O
6.4.5.2.*	Replace filter screw 2M 19621 or sintered metal filter D 02316 every 2 years. (3 versions applicable: without filter, with sieve insert at gas connection at the bottom of the trolley or with filter screw at gas connection at the top of the valve block.)	C
6.4.5.3.	Internal O_2 pressure hose in the column (only applicable with the first Incubators).	C L

D. Pressure of 21% O2 opens 1 Valve
D. Pressure of 3% O2 Opens 2 Valves

6.4.6. Flow measurement downstream of valves, to do so, establish O_2 pressure supply, unscrew plate downstream of particulate filters and measure flow at pipe with 8mm hexagon head. Oxygen outlet

6.4.6.1. Specified desired value 21 vol. % O_2:
-> Float must not lift off with smallest flowmeter L

6.4.6.2. Specified desired value 1 % in excess of actual value
(1 valve open)
-> $V = 14^{+1}_{-3}$ l/min 0

6.4.6.3. Specified desired value 4 % in excess of actual value
(Both valves open):
-> $V = 28^{+2}_{-6}$ l/min 0

Assemble unit ready for operation.

6.4.6.4. Flow measurement at O_2 socket for external oxygen supply with valves open.
Specified desired value 4 % in excess of actual value.
-> $V \leq 0.2$ l/min L

This is for Firmware Oxygen Supply.

6.5. Set desired value to 40 vol. % O_2
The set value is attained after max. 4 minutes.
Reference measurement with an Oxydig:
-> Test value: 40 ± 4 vol. % O_2 0

6.6. Testing of external oxygen supply for all incubators
7.5 l/min. O_2 via O_2 socket at valve block.
Reference measurement with an Oxydig after 30 minutes
-> Test value: 40^{+4}_{-6} vol. % O_2 0

No Need to set Valve. As this is regulated

If the test value is not attained, the Incubator is leaky or the fresh air suction is faulty.
Following points have to be checked in case of a fault:
- Does the hood have additional openings.
- Are the seals 2M 19595 at the trough 2M 19334 present (point 2.10. in the test card).
- For checking the leakage of the valve in the fresh air suction (point 2.15. in the test card) stick up the valve and repeat test point 6.6.

Water Valve
Block Valve
interwoven

- Checking the fresh air suction
  Rough check with Volumeter at the drilling downstream of the fresh air filters.

  Test value: $^{+3}_{-5}$ L/min. 30 l/min $^{+3}_{-5}$
  or off

6.7. Testing humidity module (if applicable)

6.7.1. Holder for infusion jars with 3 jars
IS 500 - DIN 58363 - glass 1,
Order No. 13 38 757 O

6.7.1.1. Jar sealing rings 2M 16045 C L

6.7.1.2. Silicone hose between evaporator and jar holder C L

6.7.2. Switch on humidity module by pressing button "control" in humidity module:
-> Green LED "control" lights up.
Following switch-on, the desired value is 60 % rel. humidity and flashes.
The measured rel. humidity and "SEt" flash alternately.
Display range from 0 - 99%. 35-85%
Acknowledge desired value by pressing the button "+desired value" or "-desired value" humidity.
=> Display desired and actual value is continous (except with alarms in the humidity module). O

6.7.3. Checking of the desired value alteration with buttons "+desired value" or "-desired value" humidity as for the air temperature within the limits 35% and 85%, but with 5% increments. O

6.7.4. Set desired value to 85 % rel. humidity
Press the buttons "+desired value" and "-desired value" humidity simultaneously for approx. 3 sec.
=> The "heating LED" of the evaporator flashes in the right-hand digit of the actual value display. O

6.7.5. Testing lack of water alarm
To do so, fold down back wall with water jars full:
-> Visual and audio lack of water alarms are given after several minutes (depending on start temperature of evaporator up to 25 min.). Suppress audio alarm by pressing button "horn off". 0

6.7.5.1. Swing up back wall with water jars
-> H_2O alarm LED off after several seconds. 0

6.7.6. Between 60 % and 85 % rel. humidity water condenses on the top of the hood at an Incubator temperature in excess of 36.0°C and an ambient temperature less than 26°C. 0

6.8. Testing skin-temperature module (if applicable).

6.8.1. Swivel out climate sensor, connect skin-temperature sensor and swivel in climate sensor.
-> The sensor temperature is indicated. If the temperature is outside the measuring range between 33.0°C up to 38.0°C the following is indicated on the actual value display:
-> Above measuring range " "
-> Below measuring range "_ _ _" 0

6.8.2. Press button "check 36°C":
=> Actual value display skin temperature = 36.0 ± 0.1°C 0

All further measurements until point 6.7.6. in 33 up to 38°C water bath with skin temperature sensor.

6.8.3. Reference measurement between skin temperature sensor and thermometer 2M 11111.
Test value:
permissible tolerance 0.4°C
In doing so, check sensor for cable break. 0

6.8.4. Switch on skin-temperature module with button "control" in skin-temperature module:
-> Green LED "control" lights up.
The actual skin temperature value is taken over as desired value and flashes.
Exception:
a) Actual value < 35.0°C => desired value = 35.0°C
b) Actual value > 37.0°C => desired value = 37.0°C
The actual skin temperature value and "SEt" flash alternately.
Acknowledge desired value by pressing the button "+desired value" or "-desired value" skin temperature:
=> Actual and desired value display is continous (except with alarm in the skin temperature module). 0

6.8.5. Checking of the desired value alteration with the buttons "+desired value" and "-desired value" skin temperature within the limits 35.0°C - 37.0°C.
If the actual value deviates by more than 0.5°C with respect to the desired value, visual and audio alarms are given. 0

6.8.6. Pull off plug skin temperature sensor :
=> visual and audio sensor alarm, heating off. 0
Then press button "control" in the skin temperature module and set air temperature desired value to 39.0.

6.8.7. Calibration of skin-temperature sensor and skin-temperature module (West Germany only).
Inform customers if period of validity of calibration is less than six months. 0

6.9. Testing power-failure alarm
Set air-temperature desired value to 39.0°C, set O_2 desired value to 40 vol. % and humidity desired value to 85 %.
Pull mains connection:
-> Visual and audio alarm
Re-establish mains connection:
-> There has been no change in the desired values. 0

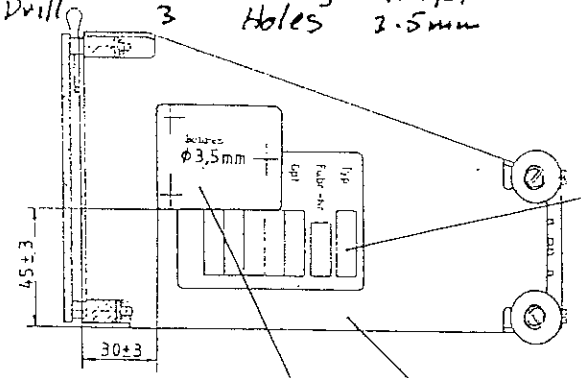
6.10.	Testing software excess-temperature alarm. Set air-temperature desired value to 39°C and allow incubator to warm up. If the display on the air-temperature module is ≥ 38.1°C, set desired value to 37.0°C. -> Visual and audio excess-temperature alarms Switch unit off and on again: -> Excess-temperature alarm is retained Set air-temperature desired value to 39°C and press button "excess-temperature reset". -> No excess-temperature alarm	O
7.	Make unit available to the user in a ready-to-operate condition.	
7.1.	All unit covers and components must have been fixed in position.	C
7.2.	There must be no dirt or tackiness noticeable on the unit which could impair safety.	C
7.3.	Check unit labelling	C
7.4.	The incubator must be standing firmly and steadily.	C
7.5.	Visually inspect unit combination for perfect condition.	C
8.	Confirmation of test: name: date:	

* Expenditure on such work is classed as repair services and not included in the Inspection Service price.

besteht aus:

best. LP Lüfter	8290140 St 8290140
Bohrschablone, LP Lüfter	8290387
Rüstanweisung, LP Lüfter	8290388
Kabelbaum	8290389, St 8290389
Schraube	1330810 (3x)
Schrumpfschlauch 3,2-1,6x0,5-8301798 (10 lg, 3x)	
verpackt in Flachbeutel mind. 220x330 DWN 1210	

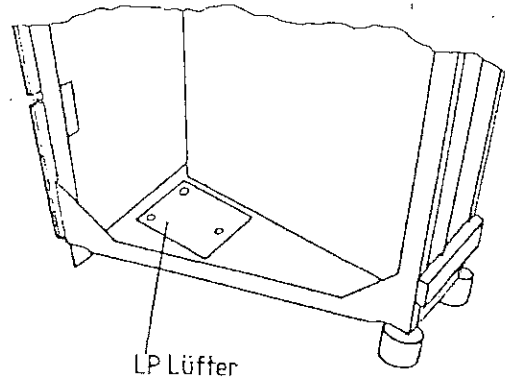
Glue the Drill Pattern on the left side part
Drawer
Aufkleben der Bohrschablone auf das linke Seitenteil des Einschubs (8200901/8200902)
Bohren der 3 Bohrungen (Φ3,5)
Drill 3 Holes 3.5mm



Einschub
8200901 oder
8200902

Bohrschablone, LP Lüfter
(8290387)

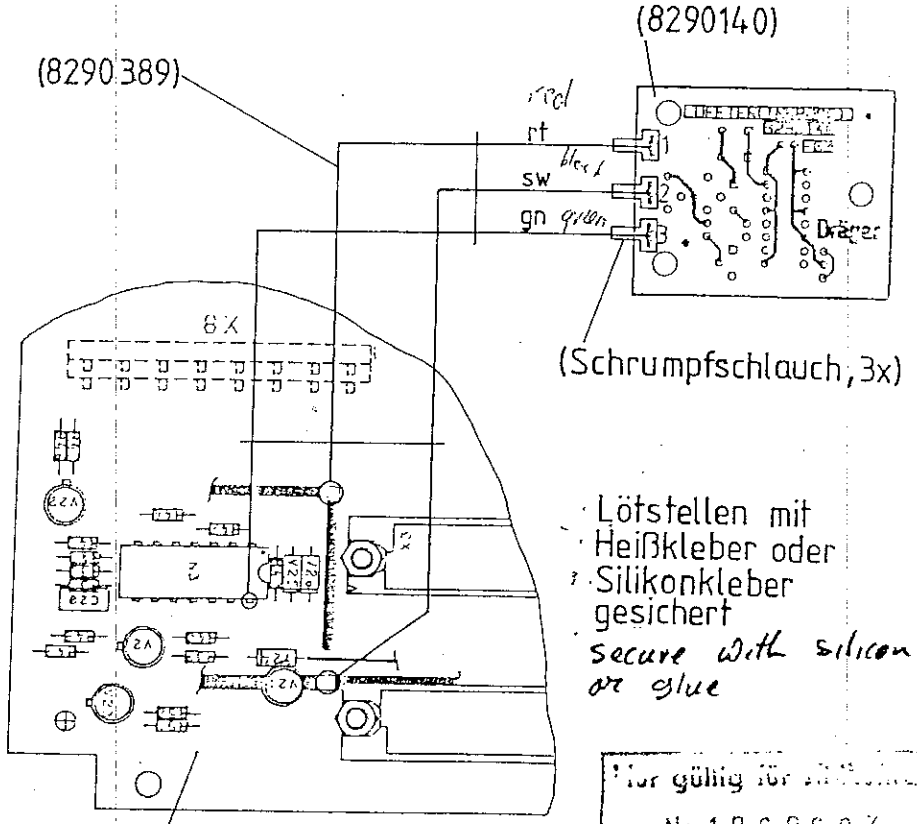
CHANGE Number
Nach Umrüstung
Typ-Nr. ändern:
8200901 → 8290401 oder
8200902 → 8290402



LP Lüfter
(8290140)

Festschrauben der LP Lüfter auf der Innenseite des Seitenteils
Mounting of the PCB to inside of the Drawer

Anschließen der LP Lüfter an das LP Mutterboard



Lötstellen mit
Heißkleber oder
Silikonkleber
gesichert
Secure with silicon or glue

Nr. 1 8 6 8 6 9 3

Hierzu St 8290390

Werkstoff		Änd. Ziffer	kommt vor	Änderung		Tag	Bearb.	Norm
Maßstab	Allgemeintoleranzen	Abteilung	1988	Tag	Name	Dräger		
		op	Bearb.	07.10.	Riepert	Drägerwerk Aktiengesellschaft		
			Gepr.					
			Norm					

Benennung: Rüstsatz, LP Lüfter
CONVERSION KIT
(Inku. 8000)

Zeichnungs-Nr.: 8290390
Ersatz für
Ersetzt durch

96 04 142

MONTAGEANWEISUNG ZUSATZLUEFTER

EINSCHUB ELEKTRONIK

EINSCHUB HERAUSNEHMEN — Exchange I/Cs
CPU-PLATINE ENTFERNEN
LP-LUEFTER MONTIEREN NACH ZEICHNUNG 8290390 — install PCB
(SCHRAUBEN MIT LOCTITE 221 SICHERN) — with Loctite 221
CPU-PLATINE EINSETZEN

HAUPTGEHAEUSE RUECKWAND — Back Casing of 8000

PLATTE MIT SENSORKABELSTECKER LOESEN — loosen plate with sensor Plug
SCHWARZE KAPPE ENTFERNEN — remove Black cap
STECKER ABBAUEN UND AN WEISZEM LUEFTERTIEFZIEHTEIL BEFESTIGEN — Mount Plug on New Fan Plate (Loctite)
(SCHRAUBEN MIT LOCTITE 221 SICHERN)
LUEFTERANSCHLUSZKABEL RECHTS VOM TRANSFORMATOR IN DEN ELEKTRONIKRAUM SCHIEBEN — Put cable To right of Transformer
WEISZES LUEFTERTIEFZIEHTEIL EINBAUEN — Install fan

EINSCHUB ELEKTRONIK

LUEFTERANSCHLUSZKABEL AUF LP-LUEFTER STECKEN — install Wires onto electronics
ELEKTRONIK ANSCHLIESZEN UND EINBAUEN

=QA=	=QB=	=QC=
--	--	--

Werkstoff: SM-PAPIER DIN A4 WS NF 80G/QM

Aend. Ziffer	kommt vor	Aenderungen
1988	Tag	Name
Bearb	20.10.	CONRAD
Gepr.		
Norm		

Maszstab: ---
Allgemeintoleranzen: ---
Abteilung: M2

Dräger
Drägerwerk Aktiengesellschaft

IDEE

Benennung: MONTAGEANWEISUNG ZUSATZLUEFTER

Zeichnungs-Nr.: 2M 20 071

Ersatz fuer

Ersetzt durch

DrägerService
Medizintechnik
Medical Systems

1. General, scope

These testing and adjustment specifications apply to the following equipment:

- Slide-in module, air temperature, Incubator 8000 and air unit or air/water unit.
- Slide-in module, air and skin temperature, Incubator 8000 and air unit or air/water unit.

2. General description

2.1 Intended use, usage conditions

The air-temperature slide-in module is an assembly designed to regulate the air temperature in the Incubator 8000 as well as to optionally regulate the O_2 concentration and humidity level.

The air and skin temperature slide-in module also makes it possible to regulate the air temperature as a function of the child's skin temperature.

2.2 Schematic design, component block diagram

All electrical assemblies can be broken down in 5 basic components:

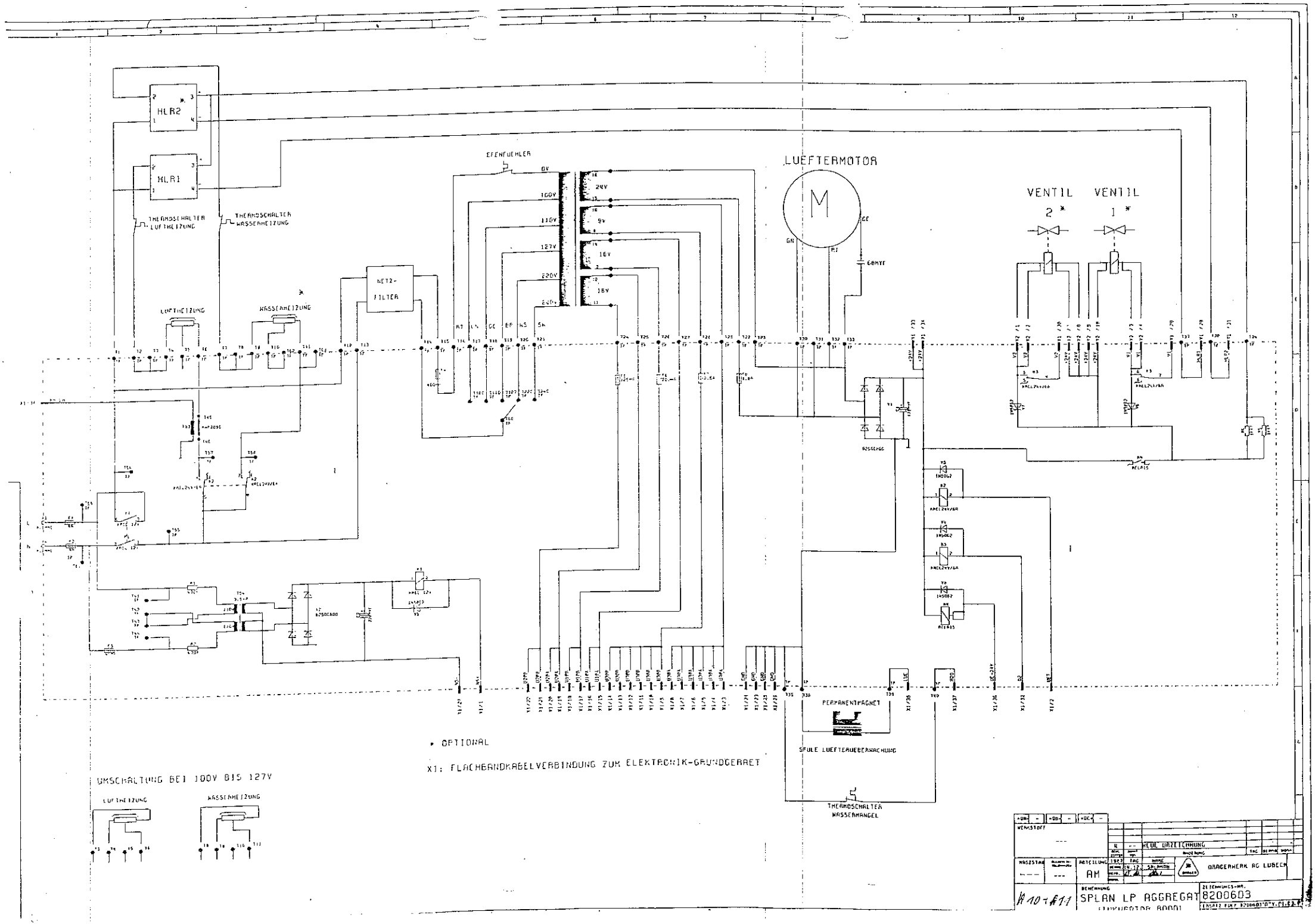
1. Unit

   With mains cut-in relay with auxiliary transformer, mains transformer, fuses, fan motor, air heating with semiconductor relay, evaporator with semiconductor relay and thermostat for lack-of-water alarm (only with humidity regulation option), 2 safety relays and the connection for 2 O_2 valves.

2. Electronics slide-in unit

   Same As EU/TA

   With p.c. board "CPU Standard 2", p.c. board "analog" (2 versions possible - > with and without skin-temperature measurement amplifier), p.c. board "power pack", p.c. board "motherboard", displays and keyboards for air temperature, skin temperature (skin-temperature regulation option), oxygen (oxygen regulation option), humidity (humidity regulation option) and the pneumatic pressure switches for electrical height adjustment (option).


HLR2
HLR1
THERMOSCHALTER LUFTHEIZUNG
THERMOSCHALTER WASSERHEIZUNG
EFENFUEHLER
0V
100V
110V
127V
220V
240V
24V
9V
16V
18V
LUEFTERMOTOR
M
GE
GN
BT
68MYF
VENTIL 2 *
VENTIL 1 *
NETZ-FILTER
LUFTHEIZUNG
WASSERHEIZUNG
BZ550R00
RELAIS
PERMANENTMAGNET
SPULE LUEFTERUEBERWACHUNG
THERMOSCHALTER WASSERMANGEL
* OPTIONAL
X1: FLACHBANDKABELVERBINDUNG ZUM ELEKTRONIK-GRUNDGERAET
UMSCHALTUNG BEI 100V BIS 127V
LUFTHEIZUNG
WASSERHEIZUNG
NEUE ZEICHNUNG
BRAGERWERK AG LUBECK
AM
SPLAN LP AGGREGAT
8200603

3. Climate sensor

With 2 air-temperature sensors, 2 microswitches for detection of sensor setting, 1 connection socket for skin-temperature sensor, 2 O_2 sensors (oxygen regulation option) and a humidity sensor (humidity regulation option).

4. Valve block

With 2 solenoid valves (oxygen regulation option) with fixed metering for 14 L/min. in each case and a check valve for external oxygen supply via a flowmeter.

5. Electrically adjustable height setting

With pneumatic actuation via pressure switch or fixed column.

Both versions feature the mains switch and an overload circuit-breaker in the column.

2.3 Description of Incubator 8000 block diagram

p.c. board designations:

1 Motherboard
2 Analog
3 Unit
4 Powerpack
5 Switch
6 Air display
7 Skin-temperature display
8 O_2 display – identical p.c. boards
9 humidity display
10 Fan

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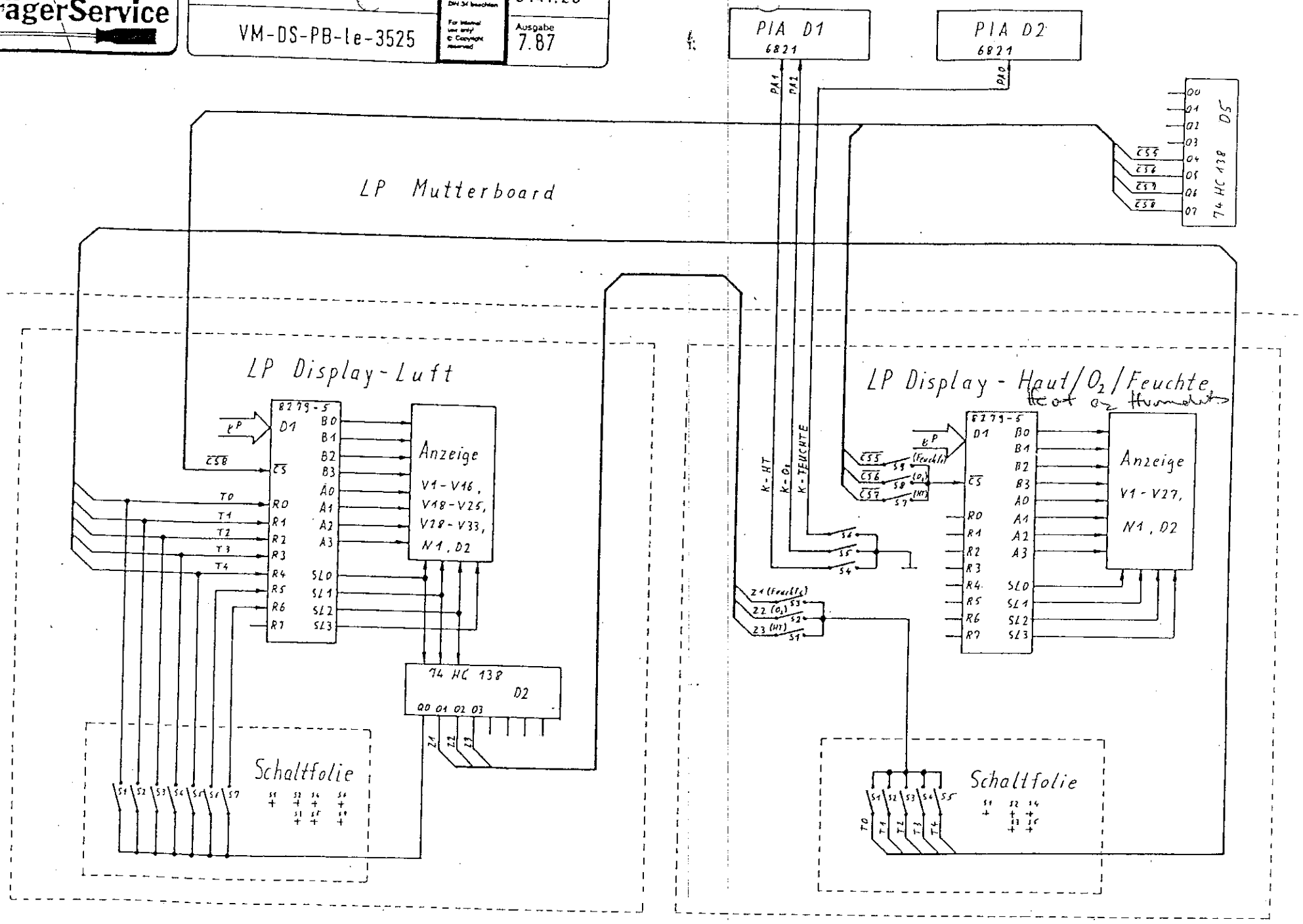
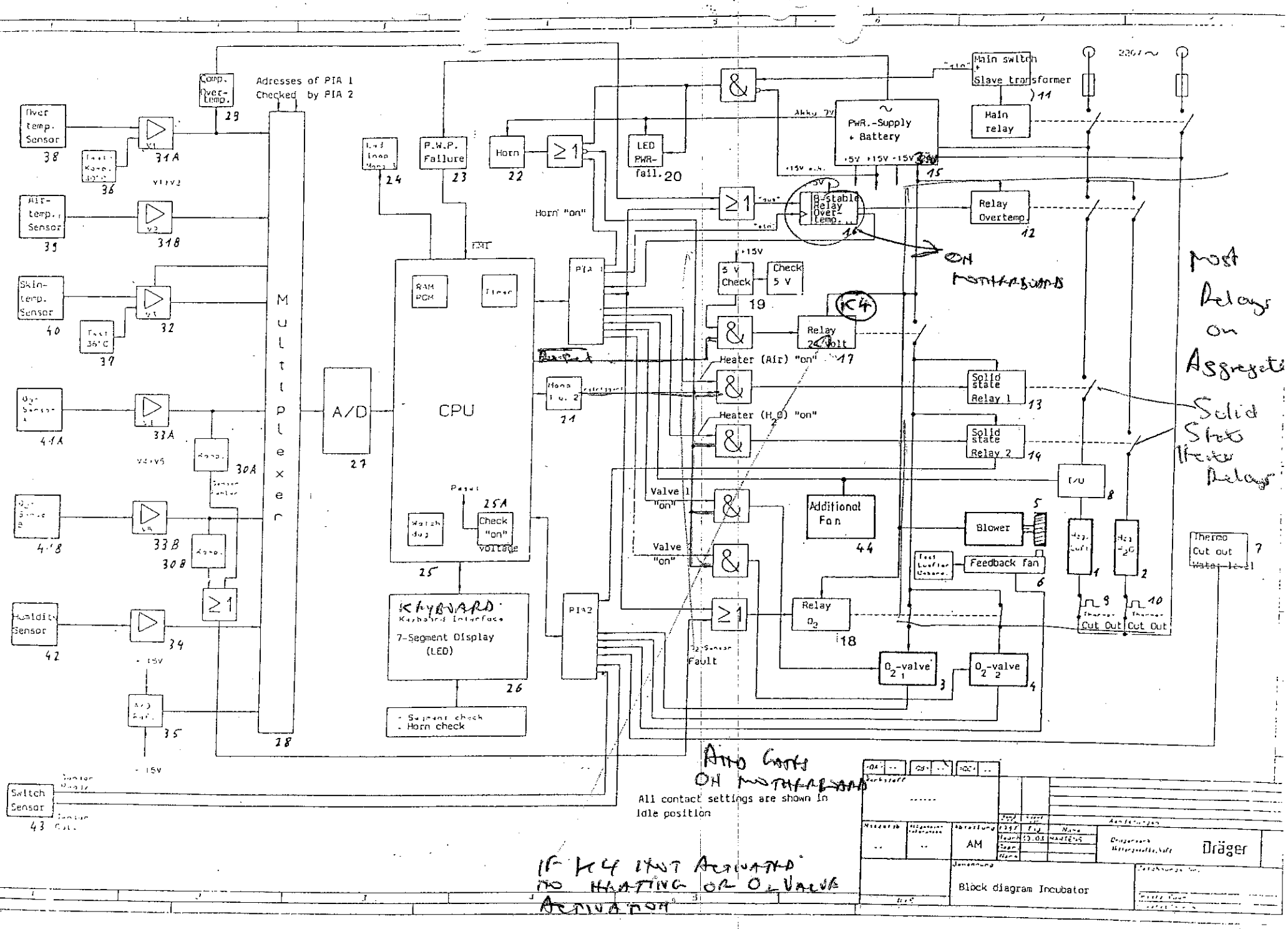
Inkubator 8[illegible]

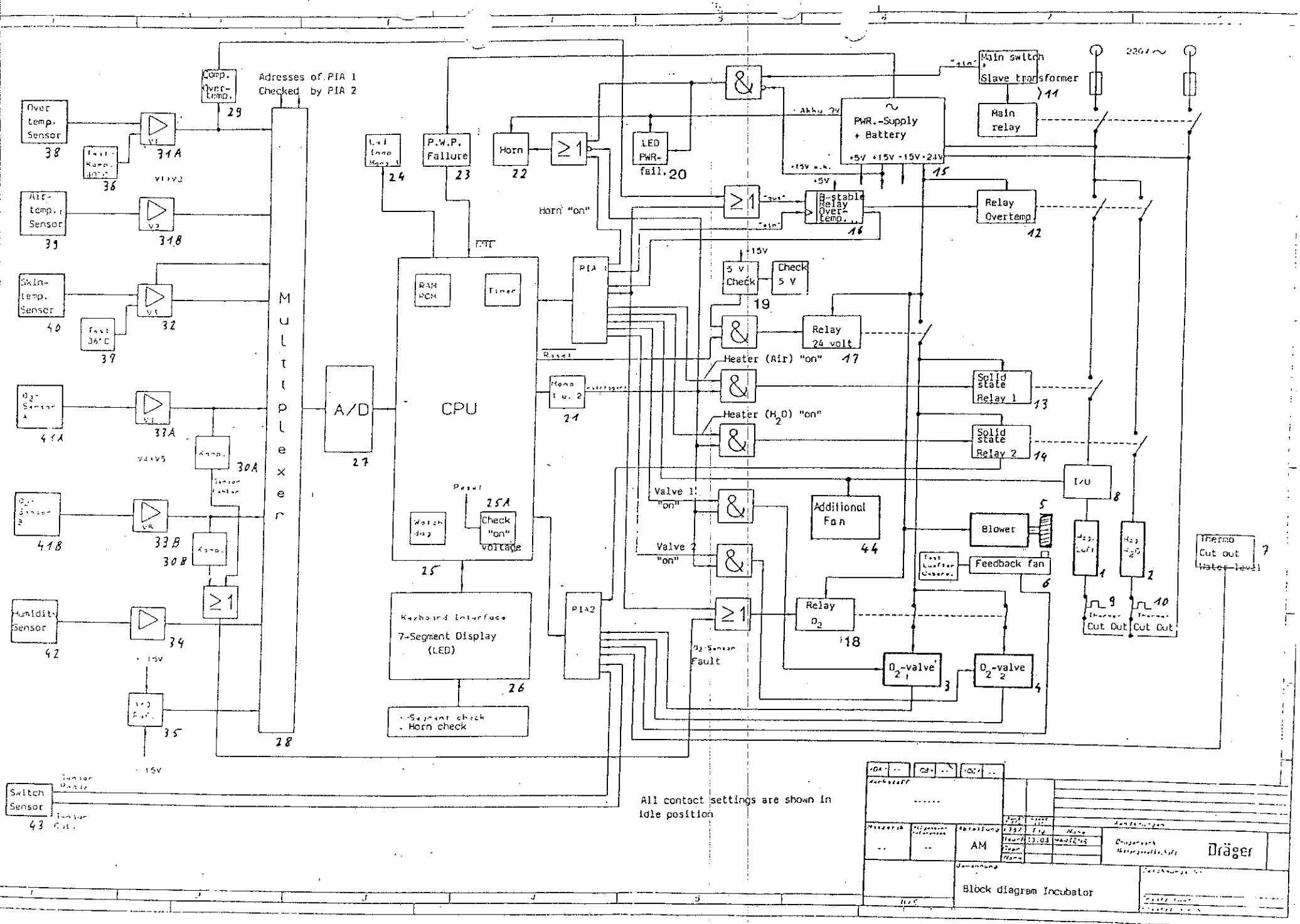
VM-DS-PB-le-3525

Mappen-Nr. 6141.20

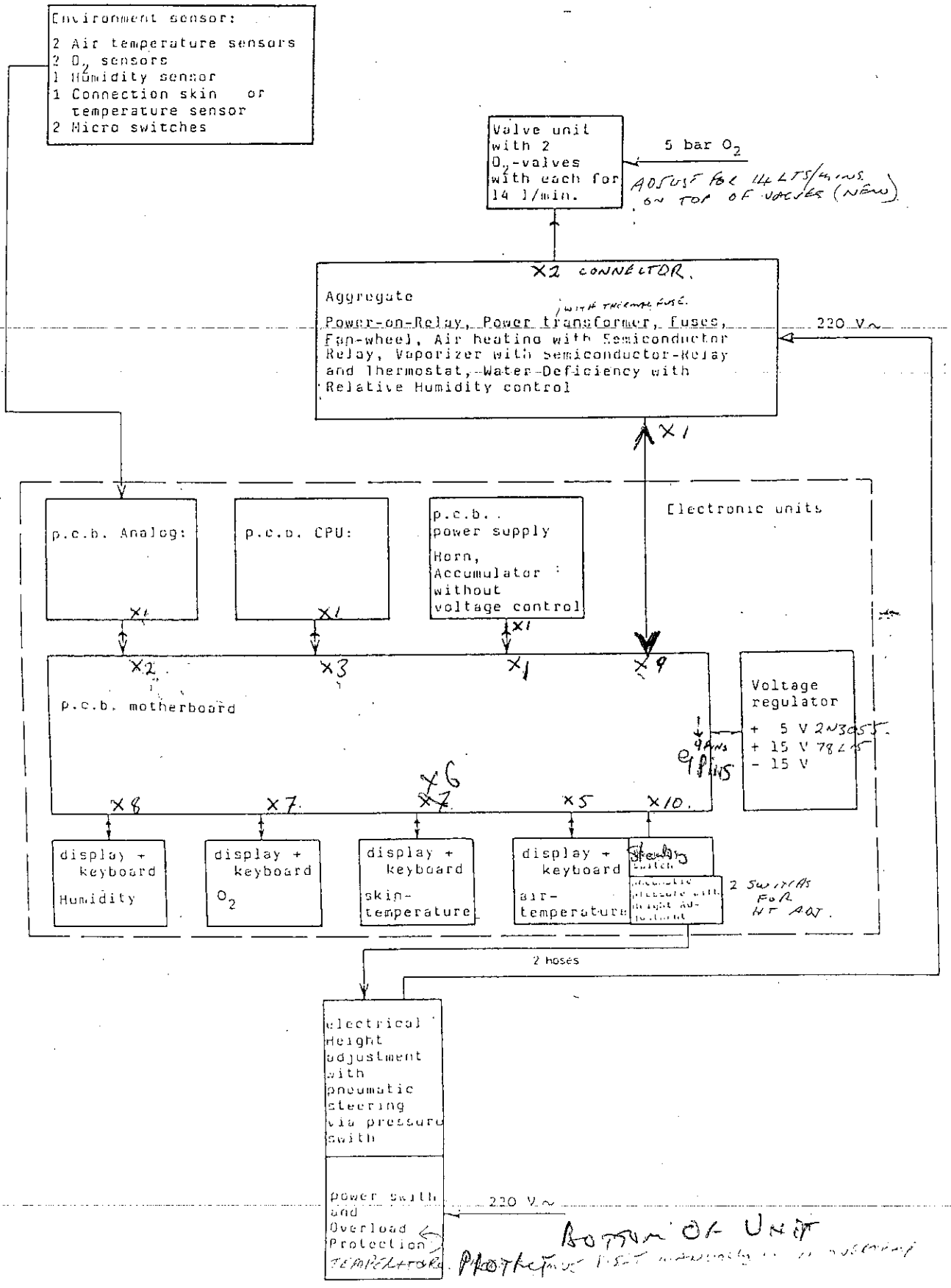
Ausgabe 7.87




Adresses of PIA 1
Checked by PIA 2
Liver temp. Sensor 38
Air-temp. Sensor 39
Skin-temp. Sensor 40
Humidity Sensor 42
Switch Sensor 43
Comp. Over-temp. 29
P.W.P. Failure 23
Horn 22
LED PWR-fail. 20
Horn "on"
PWR.-Supply + Battery
Main switch
Slave transformer 11
Main relay
Relay Overtemp. 12
Bi-stable Relay Over-temp. 16
on motherboard
Most Relays on Aggregate
Solid State Heater Relays
5 V Check 19
Check 5 V
K4
Relay 24 Volt 17
Heater (Air) "on"
Heater (H2O) "on"
Solid state Relay 1 13
Solid state Relay 2 14
Valve 1 "on"
Valve 2 "on"
Additional Fan 44
Blower 5
Feedback fan 6
I/U 8
Thermo Cut out 7
Thermo Cut Out 1
Thermo Cut Out 2
Thermo Cut Out 9
Thermo Cut Out 10
Relay O2 18
O2-valve 1 3
O2-valve 2 4
O2-Sensor Fault
Multiplexer 28
A/D 27
CPU
RAM ROM
Timer
PIA 1
PIA 2
Watch dog
Check "on" voltage 25A
25
KEYBOARD
Keyboard Interface
7-Segment Display (LED)
26
- Segment check
- Horn check
Mono 1 u. 2 21
24
Test 36°C 37
Test Kond. 36
V1 31A
V2 31B
V3 33B
V4 V5 33A
V6 34
V7 35
Kond. 30A
Kond. 30B
41A
41B
- 15V
+15V
+5V
Akku 7V
220V~
All contact settings are shown in Idle position
AND GATES ON MOTHERBOARD
IF K4 IS NOT ACTUATED NO HEATING OR O2 VALVE ACTUATION
Block diagram Incubator
Dräger
AM


Adresses of PIA 1
Checked by PIA 2
Comp. Overtemp.
29
Over temp. Sensor
38
Fault Comp. 36°C
36
31A
Air-temp. Sensor
39
31B
Skin-temp. Sensor
40
Fault 36°C
37
32
O_2 Sensor 1
41A
33A
30A
O_2 Sensor 2
41B
33B
30B
Humidity Sensor
42
34
+15V
-15V
35
Switch Sensor
43
Multiplexer
28
A/D
27
CPU
RAM ROM
Timer
Watch dog
Reset
25A
Check "on" voltage
25
Keyboard Interface
7-Segment Display (LED)
26
. Segment check
. Horn check
Cal. Ingo Mag.
24
P.W.P. Failure
23
Horn
22
≥1
LED PWR-fail.
20
Horn "on"
PIA 1
PIA2
Reset
Mono 1 u. 2
21
5 V Check
Check 5 V
19
Heater (Air) "on"
Heater (H_2O) "on"
Valve 1 "on"
Valve 2 "on"
O_2-Sensor Fault
Relay 24 volt
17
Solid state Relay 1
13
Solid state Relay 2
14
Additional Fan
44
Relay O_2
18
O_2-valve 1
3
O_2-valve 2
4
Blower
5
Feedback fan
6
I/O
8
Heat. Luft
1
Heat H_2O
2
Thermo Cut Out
9
Thermo Cut Out
10
Thermo Cut out Water-level
7
PWR.-Supply + Battery
+5V +15V -15V -24V
15
Main switch
Slave transformer
11
Main relay
Relay Overtemp
12
B-stable Relay Over-temp.
16
2304 ~
All contact settings are shown in idle position
AM
Block diagram Incubator
Dräger

Components of Incubator 8000 with all options



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Component designations:

D IC, digital
N IC, analog
V Individual semiconductor
C Capacitor
R Resistor
S Switch
K Relay
F Fuse
T Transformer

Definition of terms:

Block	:	Numbering as per block diagram
Action in normal operation	:	Function of block when there is no malfunction
Action in the event of malfunction	:	Function of (also not defective) block in the event of a fault
Indication	:	Indication of status

Logic-level definitions:

L = low (= 0 volts)

H = high (= +5 V or +15 V)

Y = high impedance or input

X = don't care

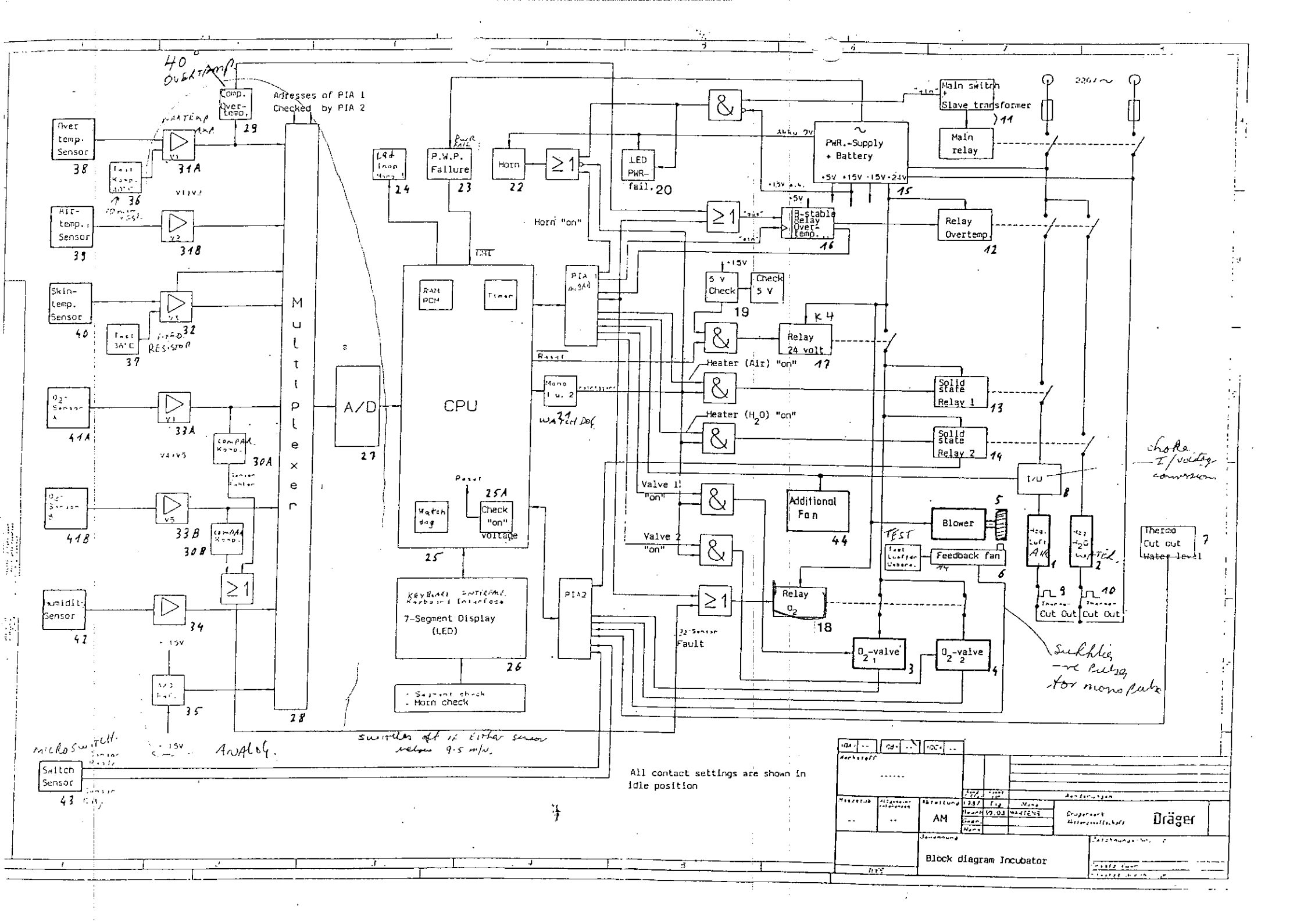
Establishment of "safe condition" in the event of malfunction:

Air heating off

H_2O heating off

O_2 valve 1 off

O_2 valve 2 off


Addresses of PIA 1 Checked by PIA 2
Comp. Over-temp.
29
Over temp. Sensor
38
31A
36
Air-temp. Sensor
39
31B
Skin-temp. Sensor
40
32
37
RESISTOR
Multiplexer
A/D
27
CPU
RAM PCM
Timer
PIA 1
24
P.W.P. Failure
23
Horn
22
LED PWR-fail.
20
Horn "on"
PIA2
Watch dog
Check "on" voltage
25A
25
7-Segment Display (LED)
26
- Segment check
- Horn check
28
Switches off if either sensor below 9.5 m/s
Analog.
Switch Sensor
43
Humidit. Sensor
42
34
35
Main switch + Slave transformer
11
Main relay
PWR.-Supply + Battery
+5V +15V -15V -24V
15
B-stable Relay Over-temp.
16
Relay Overtemp.
12
5 V Check
19
Check 5 V
Relay 24 volt
17
Heater (Air) "on"
Heater (H_2O) "on"
Solid state Relay 1
13
Solid state Relay 2
14
I/U
8
Valve 1 "on"
Valve 2 "on"
Additional Fan
44
Blower
5
Feedback fan
6
TEST
Relay O_2
18
O_2-valve 1
3
O_2-valve 2
4
Thermo Cut out
7
Cut Out
9
10
choke
I/voltage conversion
Switch off in case of mono fault
All contact settings are shown in idle position
Block diagram Incubator
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SEE PART 2.3 - means "UNIT"

Block No. 1 air heating 400 W (3)

Action in normal operation	:	Air heating on/off
Actuated by	:	Mains relay (3/K1) Excess-temperature relay (3/K2), Semiconductor relay 1 (3/HLR1), Air-heating thermoswitch (3), Fuse (3/F1, F2)
Action in the event of malfunction	:	Air heating off
Acutated by	:	a) Switch-off semiconductor relay 1 - by means of PIA, see Item 13 - by means of elapsed monoflop, see Item 21 - by means of switch-off 24 V, see Item 17 b) switch-off by excess temperature, see Item 12 c) Switch-off by air-heating thermoswitch, see Item 9
Indication	:	By way of air-heating current monitoring, see Item 8

Block No. 2 H_2O heating 200 W (3)

Action in normal operation	:	H_2O heating on/off
Actuated by	:	Mains relay (3 K1), Excess-temperature relay (3/K2), Semiconductor relay 2 (3/HLR2), Thermoswitch H_2O (3), Fuse (3/F1, F2)
Action in the event of malfunction	:	H_2O heating off
Acutated by	:	a) Switch-off semiconductor relay 2 - by means of PIA, see Item 14 - by means of elapsed monoflop, see Item 21 - by means of switch-off 24 V, see Item 17

b) Switch-off by excess-temperature relay, see Item 12

c) Switch-off by H_2O thermo-switch, see Item 10

Indication : By way of indication from semiconductor relay 2, see Item 14

Block No. 3 O_2 valve 1

Action in normal operation : Valve on/off

Actuated by : PIA1-PB2 = H (on)
= L (off)
(1/D1, D7C, V5)

Action in the event of malfunction : Valve off

Actuated by : 1) PIA1-PB2 = L
(1/D1, D7C, V5)
2) Monoflop 1 (1/3A) or Monoflop 2 (1/3B) elapsed, see Item 21

3) Switch-off 24 V, see Item 17

Indication : PIA2-PB2 = H (on)
= L (off)
By means of electr. potential at coil (1/V6, D2)

Block No. 4 O_2 valve 2

Action in normal operation : Valve on/off

Actuated by : PIA1-PB3 = H (on)
= L (off)
(1/D1, D7D, V7)

Action in the event of malfunction : Valve off

Acutated by	:	1) PIA1-PB3 = L (1/D1, D7D, V7) 2) Monoflop 1 (1/3A) or Monoflop 2 (1/3B) elapsed, see Item 21 3) Switch-off 24 V, see Item 17
Indication:	:	PIA2-PB3 = H (on) = L (off) by means of electr. potential at coil (1/V8, D2)

Block No. 5 fan (3)

Action in normal operation	:	Air circulation
Actuated by	:	24 V = always runs with "power on"
Indication	:	See Item 6, fan failure alarm

Block No. 6 fan failure alarm

Action in normal operation	:	PIA1-PA6 = L (fan running)
Actuated by	:	Solenoid in impeller induces pulses in coil of fan failure alarm (3/coil) (1/V18, N1, V13, D6A, V14, D1)
Action in the event of malfunction	:	PIA1-PA6 = H
Actuated by	:	No retrigger pulses for monoflop (1/D6A), (1, R25, C11, D6A, V14, D1)
Indication	:	1) Fan running PIA1-PA6 = L 2) Fan running and test: PIA1-PA6 = H 3) Fan not running: PIA1-PA6 = H

Test by : PIA2-CB2 = H
Suppresses fan pulses
(1/D2, V19)

Block No. 7 thermoswitch for lack of water 115 °C (3)

Action in normal operation : Water present:
PIA2-PA1 = L
Lack of water:
PIA2-PA1 = H

Actuated by : H_2O heating and water supply

Block No. 8 current monitoring heating air (3)

Action in normal operation : Heating on:
PIA2-PA7 = L
Heating off:
PIA2-PA7 = H

Actuated by : Current transformer
(3/RWP 209G),
Monoflop (1, N3)

Block No. 9 air thermoswitch (3)

Action in normal operation : "On"

Actuated by : T < 315 °C

Action in the event of malfunction : Air heating "off"

Actuated by : T > 315 °C

Indication : Current monitoring
Heating air, see Item 8

Block No. 10 H_2O thermoswitch (3)

Action in normal operation : "On"

Actuated by : T < 135 °C

Action in the event of malfunction : H_2O heating "off"

Actuated by : T > 135 °C

Block No. 11 mains switch (5/S1), auxiliary transformer (3/T54)

Mains relay (3/K1)

Action in normal operation : 1) Mains switch "on"

a) $\overline{NMI}$ = H
b) Mains relay on (3/K1)
c) Emitter (4/V21) on GND

2) On switch-off
NMI = L

3) Mains switch "off"

a) Mains relay off (3/K1)
b) Emitter (4/V21) open

Acutated by : Re 1)
a) (5/S 1.3) closed (4/V8, V9, V22)

b) (5/S 1.1) closed (3/T54, V2)

c) (5/S 1.2) closed

Re 2) (5/S 1.3) open, (4/V8, V9, V22)

Re 3)
a) (5/S 1.1) open
b) (5/S 1.2) open

Indication : 1) $\overline{NMI}$ = H

PIA2-PB6 = H
and
PIA2-PB7 = H (on)

2) $\overline{NMI}$ = L

PIA2-PB6 = L
and
PIA2-PB7 = L (off),
(5/S 1.3) open,
+ 15 V (4/V7, R4, V9, V22)

Block No. 12 excess-temperature relay (3/K2)

Action in normal operation	:	Enabling of mains voltage for air heating and H_2O heating
Actuated by	:	Excess-temperature relay bistable (1/K1.2), see Item 16
Action in the event of malfunction	:	Switch-off of mains voltage for air heating and H_2O heating
Actuated by	:	Excess-temperature relay bistable (1/K1.2) see Item 16
Indication	:	Current monitoring heating air, see Item 8

Block No. 13 semiconductor relay 1 (3)

Action in normal operation	:	Air heating on/off
Actuated by	:	PIA1-PB0 = H (on) PIA1-PB0 = L (off)
Action in the event of malfunction	:	Air heating off
Actuated by	:	1) PIA1-PB0 = L 2) Monoflop 1 (1/D3A) or Monoflop 2 (1/D3B) elapsed, see Item 21 3) Switch-off 24 V, see Item 17
Indication	:	Current monitoring heating air, see Item 8

Block No. 14 semiconductor relay 2 (3)

Action in normal operation : H_2O heating on/off

Actuated by : PIA1-PB1 = H (on)
PIA1-PB1 = L (off)

Action in the event of malfunction : H_2O heating off

Actuated by :
1) PIA1-PB1 = L
2) Monoflop 1 (1/D3A) or Monoflop 2 (1/D3B) elapsed, see Item 21
3) Switch-off 24 V, see Item 17

Indication : Potential at control input of semiconductor relay 2

PIA1-PB1 = H (on)
PIA2-PB1 = L (off)

Block No. 15 power pack

Action in normal operation : Supplies:
+ 5 V
+ 15 V
- 15 V
+ 24 V
+ 9 V (battery buffered)

Action in the event of malfunction :
1) Switch-off of transformer primary
2) Fusing of secondary

Actuated by :
Re 1)
a) 2-pole fuse (3/F1, F2)
b) Transformer fuse, primary (3/F4)
c) Efen sensor in transformer (3)

Re 2)
a) Fusing +5 V (3/F7)
b) Fusing +15 V (3/F6)
c) Fusing -15 V (3/F5)

Indication	:	Via voltage monitoring: +24 V, see Item 17 + 5 V, see Item 19 +/- 15 V, see Item 35 Mains voltage, see Item 23

Block No. 16 excess-temperature relay, bistable (1/K1A, B)

Action in normal operation	:	Activation of excess-temperature relay by closed contact (1/K 1.2), see Item 12
Actuated by	:	Leading edge of PIA1-PB4 = L > H via (1/C16), (1/V9) to coil (1/K1A)
Action in the event of malfunction	:	Deactivation of excess-temperature relay via open contact of (1/K 1.2), see Item 12
Actuated by	:	1) Excess-temperature comparator = H (2N5) 2) PIA1-PB6 = H on coil (1/K1B)
Indication:		Via 2nd contact of (1/K 1.1) PIA1-PA0 = H (normal) PIA1-PA1 = L (excess temperature) Current monitoring heating air, see Item 8 Indication, semiconductor relay 2, see Item 14

Block No. 17 relay, monitoring 24 V (3/K4)

Action in normal operation	:	24 V actuation voltage for: - Semiconductor relay 1 (heating air) - Semiconductor relay 2 (heating H_2O) - O_2 valve 1 - O_2 valve 2
Actuated by	:	+5 V voltage monitoring, see Item 19

Action in the event of malfunction	:	Disconnection of 24 V actuation voltage for: - Semiconductor relay 1 - Semiconductor relay 2 - O_2 valve 1 - O_2 valve 2
Actuated by	:	a) +5 V voltage monitoring, see Item 19 b) Failure of 24 V voltage supply
Indication	:	a) Current monitoring, heating air, see Item 8 b) Indication Semiconductor relay 2, see Item 14
Test	:	By way of 5 V voltage monitoring, see Item 19

Block No. 18 relay O_2 (3/K3)

Action in normal operation	:	Enabling of 24 V supply for O_2 valves
Actuated by	:	Relay coil (3/K3) de-energized O_2 sensor comparator = L, see Item 30 and PIA1-PB6 = L
Action in the event of malfunction	:	Switch-off of 24 V supply for O_2 valves
Actuated by	:	Relay coil (3/K3) in O_2 sensor comparator = H or PIA1-PB6 = H
Indication	:	Via potential of valve coils, see Items 3 and 4

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Block No. 19 5 V voltage monitoring (1/N3)

Action in normal operation	:	Relay 24 V on (3/K4), see Item 17
Actuated by	:	PIA1-CA2 = L and PIA1-CB2 = H (1/V23, N3, V21)
Action in the event of malfunction	:	Relay 24 V off (3/K4), see Item 17
Actuated by	:	1) 5 V supply: Overvoltage > 5.5 V + 0.2/- 0.1 V 2) 5 V supply: Undervoltage < 4.4 V +/- 0.2 V 3) PIA1-CA2 = H 4) PIA1-CB2 = L 5) Reset
Indication	:	Via current monitoring heating air, see Item 8 Via indication, semiconductor relay 2, see Item 14
Test by	:	1) Test, comparator, under-voltage: PIA1-CB2 = L PIA1-CA2 = L 2) Test, comparator, over-voltage PIA1-CB2 = H PIA1-CA2 = H

Block No. 20 power failure monitoring +15, LED power failure (6/V26)

Action in normal operation	:	Power failure = Y (open collector)
Actuated by	:	+ 15 V OK (4/R11, V13, V25, V26)

Action in the event of malfunction	:	Power failure = L, LED (6/V26) lights up
Actuated by	:	a) Failure +15 V supply (4/rechargeable battery, V25, V26) b) Mains switch "on" and failure of +15 supply (4/V5, R1)
Test by	:	e.g. pulling mains connector

Block No. 21 watchdog 1 and 2 (1/D3A, B)

Action in normal operation	:	Both mono-outputs = H = Enabling of actuation for - Semiconductor relay 1 (heating, air) - semiconductor relay 2 (heating, H_2O) - O_2 valve 1 - O_2 valve 2 (1/D9B, D9C, D7A-D)
Actuated by	:	Punctual retriggering of mono-flops by addressing corresponding address: Mono 1 = 8X3XH Mono 2 = 8X4XH
Action in the event of malfunction	:	One or both mono outputs = L = blocking of actuation for: - semiconductor relay 1 - semicondcutor relay 2 - O_2 valve 1 - O_2 valve 2
Actuated by	:	No punctual retriggering of monos
Indication	:	Current monitoring heating air, see Item 8 Indication semiconductor relay, see Item 14 Indication of potentials of coils of O_2 valves, see Item 3, 4

Block No. 22 horn (4)

Action in normal operation	:	No action
Action in the event of malfunction	:	Sounds
Actuated by	:	1) Power failure and mains switch "on" (4/storage battery, V5, V2), 15 V power supply = 0 V (S 1.3)
		2) Elapse of watchdog 1 and/or 2 (1/D3A, D3B, D9B, R3), (4/V3, R2, V4, V21) see Item 17
		3) PIA1-PB7 = H (1/D1, R2), (4/V3, R2, V4, V21)
Indication	:	Audible

Block No. 23 mains voltage monitoring, monoflop (4/D1)

Action in normal operation	:	$\overline{\text{NMI}}$ = H
Actuated by	:	Retrigger pulses via (4/V15-V18, R12, V27)
Action in the event of malfunction	:	$\overline{\text{NMI}}$ = L
Actuated byq	:	Power failure for more than one half-wave of the rectified voltage
Indication	:	$\overline{\text{NMI}}$ = L PIA2-PB6 = L with power failure and PIA2-PB7 = H (mains on), (5/S 1.3) closed (4/V8, V9, V22) see Item 11

Block No. 24 watchdog 3, INOP-LED (1/D6B)

Action in normal operation	:	INOP-LED off
Actuated by	:	Punctual retriggering of monoflop by addressing address 8X5XH
Action in the event of malfunction	:	INOP-LED lights up
Actuated by	:	No punctual retriggering of monoflop, (1/D6B), (6/R16, V17, V34, R14), +5 V supply
Indication	:	Visual

Block 25 CPU Standard 2

Action in normal operation:

The p.c. board CPU Standard 2 is a microprocessor system featuring the microprocessor 6802, which contains the entire data and program storage area and various peripheral modules. Voltage monitoring and watchdog logic is also provided.

The address, data and control lines of the CPU are connected to the operating voltage by way of pull-up resistance networks, so as to obtain level matching with respect to the subsequent HCMOS modules. The address and control lines are buffered directly at the CPU with D2, D3 and D5, in order to enable the assembly to be operated in DMA mode. These driver modules are controlled by the signal BA.

The address decoder consists of the programmable module D6 and the subsequent decoder D7. Chip select signals for the memory modules D8 ... D12 and one select signal each for the internal I/O modules, the external I/O modules and the data bus driver are generated in D6. The programmability of D6 makes it possible - together with the jumper fields X2 ... X5, X8 - to have extremely flexible assembly with various memory modules (see 3.2.1 and 3.2.2). The signal BA at D7 is used to prevent an external CPU (DMA mode) having memory access to the I/O modules.

A serial interface can be realized with the ACIA D14. The interrupt output of D14 is connected via the diode V2 to the interrupt lines of the other peripheral modules. Moreover, the interrupt lines of D14 is routed via the inverter D28 to the printed circuit connector X1. Such special treatment of the ACIA interrupt makes it possible to have a hardware handshake with rapid data transfer via the serial interface.

The timer module D13 can be operated with an internal and an external block. One of the three clock pulses 100 Hz, 1 kHz, 10 kHz can be supplied (see Table 1) to each clock input C1, C2, C3 via the jumper field X6. The three gate inputs G1, G2, G3 and the timer outputs Q1, Q2, Q3 are routed to the printed circuit board connector X1.

The REAL TIME CLOCK D15 has its own clock generator and is battery-buffered. As this module has a bus interface for a multiplexed address/data bus, it must be addressed in two cycles in each case via the inputs AS and DS. The CS signal must therefore be permanently active and is only deactivated via the transistor V12 in the event of too low an operating voltage. The chip select signal CSRTC is contained in the circuitry of the inputs AS and DS.

The module D22 monitors the operating voltage and generates a RESET pulse for the CPU D1. When the operating voltage U is switched on, the RC-element R5C3 is initially still discharged. As long as U is less than 4.9 V, the output OUT2 of D22 remains on lo and discharges the RC-element R5C3 via V1. Once U is in excess of 4.9 V, OUT2 switches to hi and R5C3 is charged. The buffered RAM is now activated via R7, the operating voltage VCCBAT is switched to RAM via V6 and V10 and the REAL TIME CLOCK is activated via V12. As soon as the voltage at C3 increases to a level in excess of the internal reference voltage of D22 (approx. 1.3 V), the RESET pulse at OUT1 is terminated and the CPU can start.

If the operating voltage drops below 4.75 V, RAM and REAL TIME CLOCK are inhibited and a CPU-RESET is triggered. A RESET pulse can also be triggered during operation via the diodes V3 and V4 due to the discharge of R5C3.

The other timer D19 is reset in exactly the same manner as in mode A.

In the N mode the counter D20 can be set to a defined initial status by way of write access to a fixed address (CLRCNT = low). The sequence of addresses specified by the wiring of D20 and D21 is CSCNT + n, with n = 0, 4, 1, 5, 8, 12, 9, 13, 2, 6, 3, 7, 10, 14, 11, 15.

The free input U7 of D17 has no function and can be used for subsequent expansion.

If the processor is halted with the line HALT, the watchdog oscillator is also stopped.

Action in the event of malfunction: Reset

Action in the event of malfunction	:	Reset
Actuated by	:	No punctual retriggering of the two monoflops D18 and D19 with the addresses 9000H and 9001H

Block No. 25a 5 V voltage monitoring CPU

Action in the event of malfunction	:	Generates reset
Actuated by	:	Undervoltage of 5 V supply of < 4.75 V

Block No. 26a display interface, air (6/D1)

Action in normal operation	:	Read-in of keyboard, Actuation of 7-segment displays and LEDs: Control/operation (6/V18), Alarm (6/V19), Silence (6/V20), Fan failure (6/V21), Deviation > 1.5 °C (6/V22), Air heating (6/V23), > 39 °C (6/V24), > 37 °C (6/V25)
Actuated by	:	Data : 8X00H Control : 8X01H
Indication	:	Data read-back potential from display RAM

Block No. 26b display interface, skin temperature (7/D1)

Action in normal operation	:	Actuation of 7-segment displays and LED: Sensor (7/V17) Control (7/V18) +/-0.5 °C (7/V21)
Actuated by	:	Data : 8X02H Control : 8X03H
Indication	:	Data read-back potential from display RAM

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Block No. 26c display interface O_2 (8/D1)

Action in normal operation	:	Actuation of 7-segment displays and LED: Sensor (8/V17) Control (8/V19) > 40 vol. % (8/V19) Cal. (8/V20) +/-0.5 °C (8/V21)
Actuated by	:	Data : 8X04H Control : 8X05H
Indication	:	Data read-back potential from display RAM

Block No. 26d display interface, humidity (9/D1)

Action in normal operation	:	Actuation of 7-segment displays and LED: Sensor (9/V17) Control (9/V18) H_2O (9/V21)
Actuated by	:	Data : 8X06H Control : 8X07H
Indication	:	Data read-back potential from display RAM

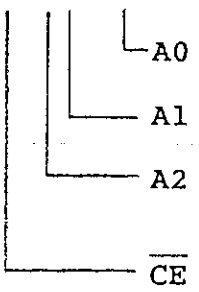
Block No. 27 A/D converter (2/D2)

Action in normal operation	:	12 bit A/D conversion
Actuated by	:	SOC: (CS1) 8XOCH. B0-B7: (CS2) 8X0AH. B8-B11, Busy, Data Valid: (CS3) 8X08H.
Test	:	By way of +/-15 V voltage supply, see Item 35

Block No. 28 Multiplexer (2/D1)

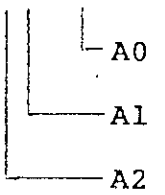
Action in normal operation	:	Switching of voltage to be digitalized to A/D converter.
Actuated by	:	Address PIA1-PA: 8X1XH, (1/D1), (2/V24 to V31)

Channel 0:	Air temperature	- LXLL	LXXX
1:	Excess temperature	- LXLL	HXXX
2:	Skin temperature	- LXLH	LXXX
3:	Skin temperature Sensor alarm	- LXLH	HXXX
4:	O_2-Sensor A	- LXHL	LXXX
5:	O_2-Sensor B	- LXHL	HXXX
6:	Humidity	- LXHH	LXXX
7:	A/D test	- LXHH	HXXX



Indication : Via PIA2-PA: 8X2XH, (1/D2)

Channel 0:	Air temperature	- XXLL	LXXX
1:	Excess temperature	- XXLL	HXXX
2:	Skin temperature	- XXLH	LXXX
3:	Skin temperature Sensor alarm	- XXLH	HXXX
4:	O_2-Sensor A	- XXHL	LXXX
5:	O_2-Sensor B	- XXHL	HXXX
6:	Humidity	- XXHH	LXXX
7:	A/D test	- XXHH	HXXX



Test : By way of +/-15 V voltage supply, see Item 35

Block No. 29 excess-temperature comparator (2/N5)

Action in normal operation : No action, output = L

Actuated by : Air temperature < 39.8 °C

Action in the event of malfunction : Comparator output = H (+15 V) switches off the excess-temperature relay (see Item 12) and thus the valves and heating via the relay UET (see Item 16)

Actuated by	:	Air temperature > 40.0 °C
Indication	:	Via relay excess-tmperature, see item 16
Test by	:	Test resistance (2/R107)

Block No. 30a/30b comparator O_2 (2/N10)

Action in normal operation	:	No action
Actuated by	:	O_2 sensor voltages > 9 mV
Action in the event of malfunction	:	Switches off valves via O_2 relay, see Item 18
Actuated by	:	O_2 sensor voltage of one capsule < 9 mV (sensor short-circuit or no O_2 capsule connected)
Indication	:	O_2 valve coil voltage indication, see Item 3, 4
Test by	:	e.g. removing O_2 capsules

Block No. 31a Excess-temperature amplifier (2/N3, N4)

Action in normal operation	:	Bridge amplifier for excess temperature sensor, 35.0 °C = R_{sensor} = 3266Ω = 625 mV at TP ÜT1 = 3.500 V at TP ÜT2

Block No. 31b air-temperature amplifier (2/N1, N2)

Action in normal operation	:	Bridge amplifier for air-temperature sensor, 35.0 °C = R_{sensor} = 3266Ω 625 mV at TP LT1 = 2.917 V at TP LT2

Block No. 32 skin-temperature amplifier (2/N6, N7, N8)

Action in normal operation	:	Bridge amplifier for skin-temperature sensor, 36.0 °C = R_{sensor} = 1412Ω = 308.6 mV at TP HT1 = 2.857 V a t TP HT2

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Block No. 33a sensor amplifier A (2/N10)

Action in normal operation : Amplifies O_2 sensor voltage

Block No. 33b O_2 sensor amplifier B (2/N10)

Action in normal operation : Amplifies O_2 sensor voltage

Block No. 34 humidity amplifier

Action in normal operation : Supplies via (2/V16, R54) the +12 V supply voltage for the humidity module and steps down its output voltage (2/R52, R53)

Block No. 35 +/-15 V voltage monitoring (2/R55, R83)

Action in normal operation : No action

Action in the event of malfunction : Test A/D converter
Test +/-15 V

Actuated by : Voltage divider (2/R55/R83) between + and -15 V,
Check for 4.85 +/-0.75 V

Block No. 36 relay, test comparator, excess temperature (2/K2)

Action in normal operation : Switches a test resistor (2/R107) in accordance with > 40 °C to excess-temperature sensor input

Actuated by : PIA2-PB5 = H (1/D2)

Indication : Current monitoring heating air, see Item 8
Indication semiconductor relay 2, see Item 41
Indiciation by way of electr. potential at valve coils, see Item 3, 4

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Block No. 37 relay test 36 °C (2/K1)

Action in normal operation	:	Switches test resistor (2/R26) in accordance with 36 °C to skin-temperature sensor input
Actuated by	:	PIA1-PB5 = H (1/D1)
Indication	:	Potential at relay coil (2/K1), PIA2-PA6 (1/D2) in test = L otherwise = H and display = 36.0 +/-0.1 °C

Block No. 38 excess-temperature sensor

Action in normal operation	:	Temperature-dependent resistor NTC 25 °C = 5000 Ohm 35 °C = 3266 Ohm 45 °C = 2184 Ohm

Block No. 39 air-temperature sensor

Action in normal operation	:	Temperature-resistant resistor NTC 25 °C = 5000 Ohm 35 °C = 3266 Ohm 45 °C = 2184 Ohm

Block No. 40 skin-temperature sensor

Action in normal operation	:	Temperature-dependent resistor NTC 36 °C = 1412 Ohm
Indication	:	Via short-circuit jumper in sensor by way of (2/D3) Sensor connected: Bit 5 = L Sensor not connected: Bit 5 = H

Block No. 41a/b O_2 sensor A/B

Action in normal operation : Output voltage proportional to oxygen content

Block No. 42 humidity sensor

Action in normal operation : Output voltage of humidity module proportional to relative humidity in limit range between 3.5 V = 30 % rel. humidity and 7.75 V = 90 % rel. humidity

Block No. 43 sensor switch

Action in normal operation : Indicates position of sensor head to PIA2-PB0 and PIA2-PB4

Block No. 44 additional fan

Action in normal operation : Fan on: PIA2-PA7 = H
Fan off: PIA2-PA7 = L

Actuated by : Current transformer (3/RWP 209G)
Monoflop (1, N3),
Monoflop (10, N1)

Action in the event of malfunction : Fan on (except +15 V is missing)

2.4 Alarms

The incubator features, a stepped alarm behaviour.

Faults occuring are indicated as a function of their significance.

The alarms for set-point deviations, overtemperature and lack-of-water feature an intermittend alarm tone which can be deactivated for 10 minutes. A horn with a non-deactivatable continuous tone is assigned to all other faults. The corresponding alarm LED also flash in each case. Each individual alarm likewise leads to an indication on the central alarm LED:

2.4.1 Alarms in the event of set-point deviations, overtemperature and lack of water

- Actual-value display of module concerned flashes.
- The corresponding alarm LED flasches.
- The central alarm LED flashes.
- Intermittend alarm tone (can be deactivated for 10 minutes).

The alarm tone for the set-point difference -1.5 °C air temperature is suppressed automatically for 30 minutes following switch-on of the incubator. If, during this period, the actual value is at least 1.5 °C below the setpoint, the alarm and the running suppression time are indicated by the corresponding LED. In this case the actual-value display does not flash. The alarm suppression time is reset prematurely as soon as the actual air-temperature value attains the set value.

The overtemperature alarm is stored by means of a bipolar relay and must be reset with the reset button following termination of the "overtemperature" status. All other alarms are reset automatically once the cause of the fault has been eliminated.

In the event of a suppressed audio alarm, the corresponding alarm LED and the central alarm LED light up continuously; the horn is off. The yellow LED above the switch-off button indicates that the alarm has been acknowledged.

Should a further alarm situation occur during the course of alarm suppression, the audio alarm is immediately re-activated and the alarm suppression time reset. Depending on the type of fault, this alarm can also be suppressed again. The reactivation time for the first alarm tone is then extended by the difference in time between the two alarms.

2.4.2 Sensor alarms, fan failure alarm

Faults in the sensor for air temperature, skin temperature, oxygen concentration and humidity as well as fan faults result in the following alarm messages:

- Three lines (air and skin temperature) or two lines (O_2, humidity) flash in the respective actual- value display.

- In the event of a fan fault, the air-temperature actual value flashes.

- The corresponding alarm LED flashes.

- Central alarm LED flashes.

- Continuous horn tone (cannot be deactivated).

As regards the sensor alarms for oxygen concentration and humidity, the alarm is reset following switch-off of the module concerned and further operation can be continued with the other functions. The same applies to the skin-temperature module, however, the defective sensor must first be removed in this case.

2.4.3 Module fault

Hardware faults affecting a single module result in the following alarm messages for the skin-temperature, oxygen-concentration and humidity modules:

- The letters "Err" flash up on the corresponding actual-value display if the module is switched on or appear in steady form if the module is switched off.

- INOP-LED lights up if module is switched on.

- Continuous horn tone (non-deactivatable) if module is switched on.

The functions of the other modules which are working properly are retained.

2.4.4 INOP

Serious hardware or software faults result in complete failure of the incubator. The following alarm messages are given:

- The INOP-LED lights up.

- Continuous horn tone (non-deactivatable).

The equipment is not serviceable.

3. Service-Software

3.1 Servicemode

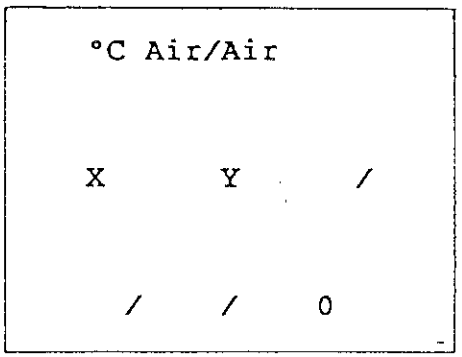
Two different service modes are implemented in the Incubator. The first mode can only be reached by actuating simultaneously the buttons "Audial alarm off" and "-Air" and by switching on the device.

For further information see "List of errors".

While the device is operating the second mode can be reached as follows:

Actuate buttons "Audial alarm off" and "-Air" simultaneously for approx. 8 s permanently.

The device then starts service-mode 0:



Service-mode 0 indicates the version number of the software

Version number is X, Y e.g. 0.4

The corresponding number of the service mode is flashing in the right digit of the "Air". Display for the desired value. By actuating button "+Air" the next mode can be activated. Mode 0 re-appears after the last service mode. Escape from service mode can be achieved by pressing a control-button.

-S- appears in the set-value-displays of the modules "Skin" "O_2", "Humidity" where applicable.

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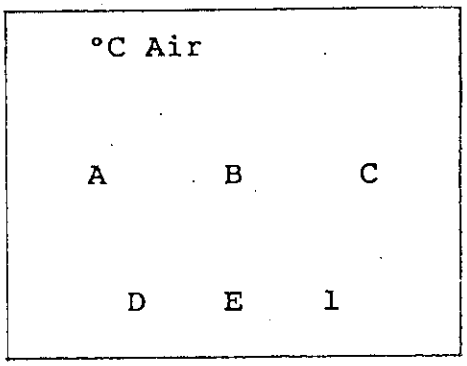
Mode 1:



Service mode 1 indicates the operational hours dar.

Elapsed time meter:
ABCDE in hours

Setting elapsed time meter:

By pressing button "Audible alarm off" the corresponding variable digit is selected (flashing indicator).

Actuating button "› 37 °C", the value of the corresponding digit will increase by 1.

In case of a replacement of the complete electronics or the p.c. board "CPU" the last value of the elapsed time meter has to be transferred on the new unit by calling the set mode as described above. If this figure is not available for some reason, the respective value is to be taken from the last entry in the test certificate.

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Mode 2:

°C Air

A B C

D E 2

Service mode 2 indicates the number of the actuations of button "check".

ABCDE number of actuations

Again Recommend to check once /Reg.

The counter for actuations is variable as described in mode 1.

The value of the elapsed time meter must be entered in the test certificate.

change by Horn cancell and > 5.9 ↑ INCRem NO

↑ 10/100, 1000's.

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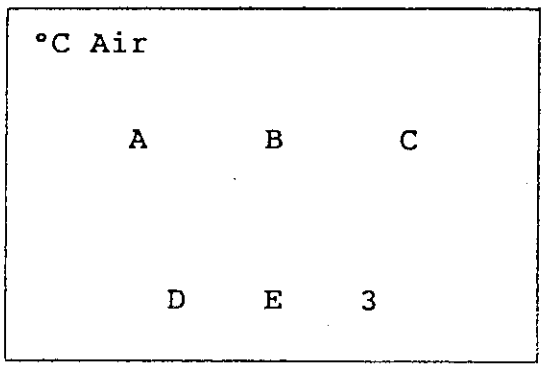
Mode 3:



Service mode 3 indicates the number of the actuations of button "check 36 °C".

ABCDE number of actuations

To check to see if this has been carried out regularly.

The counter for actuations is variable as described in mode 1.

The value of the elapsed time meter must be entered in the test certificates.

on Skin Temp.

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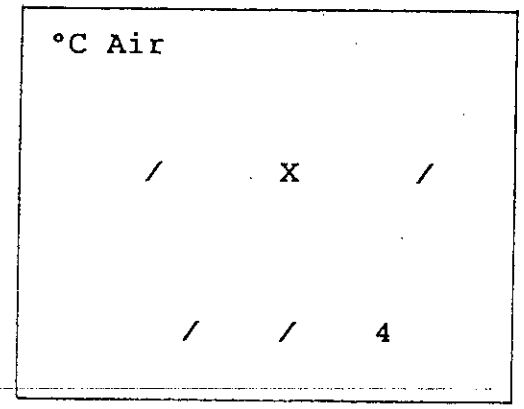
Mode 4:



Service mode 4 indicates the position of the sensor head.

X: 1: Swivelled in
2: Intermidiate position
3: Swivelled out
4: Sensor disconnected

Horn round in 3

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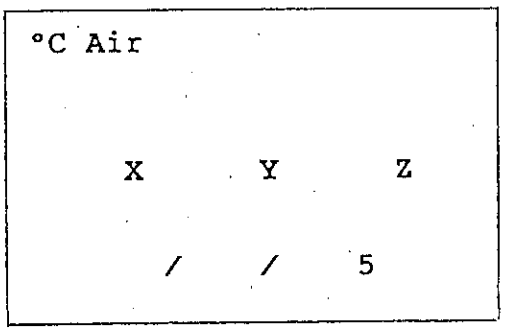
Mode 5:



Service mode 5 indicates set-value of overtemperature sensor

Overtemp.:
XY, Z in °C

30 %
5

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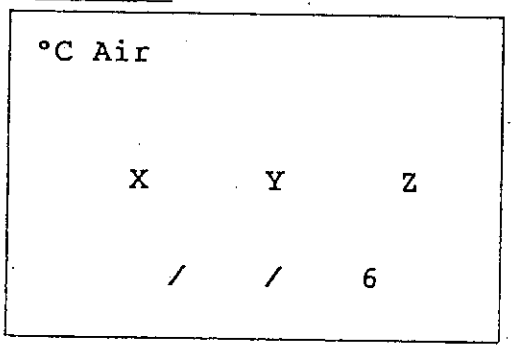
Mode 6:



Service mode 6 Mode means the air temperature sensor

Air temperature
XY, Z in °C

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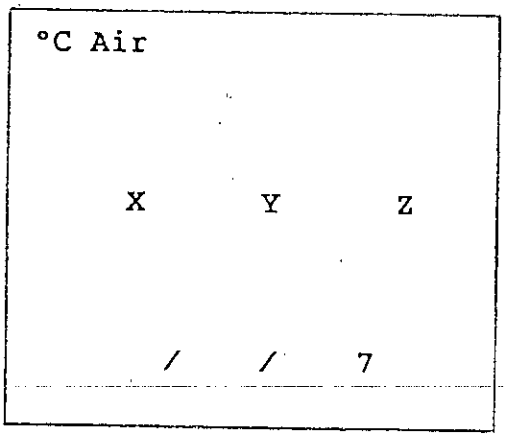
Mode 7:



Service mode 7 indicates the measured value of the O_2-sensor A (outer sensor)

O_2 A-Value:
XYZ measured value of the A/D converter in decimal numbers

Valid range for 21 Vol.% O_2:

306 to 812

= 9.5 mV

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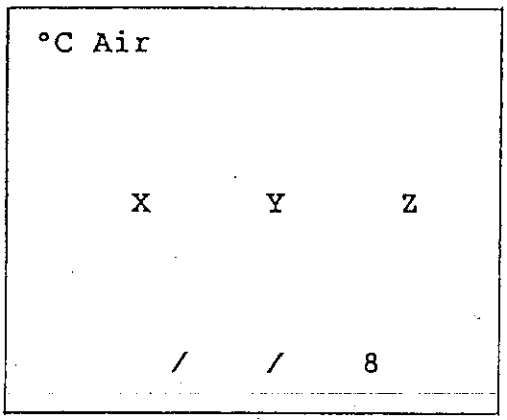
Mode 8:



Service mode 8 indicates the measured value of the O_2-sensor A (inner sensor)

O_2 A-Value:
XYZ measured value of the A/D converter in decimal numbers

Valid range for 21 Vol.% O_2:

306 to 812

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Mode 9:

°C Air

X	Y	Z
/	/	9

Service mode 9 indicates set-value of humidity sensor

humidity:
XY, Z in % relative

3.2 List of errors Incubator 8000

This list of errors contains all possible errors occuring to Incubator 8000, only in case of INOP error it is to be additionally checked, if the Reset-LED on the p.c. board CPU lights. The numbers of errors can be indicated via operating system of Incbuator 8000 as follows:

1. Actuate simultaneously buttons "Audible alarm off" and "Decrement set value air".

2. Switch on Incubator.

3. Keep buttons pressed for approximately 5 sec. perpetually. Premature disengagement will lead to a system cold start.

4. The device responds with Character "F" or the "Air" display for the actual value.

   By actuating button "Inc. air" the search routine continues for further possible errors and their indication.

   If an indicated error is to be cleared, the button "Reset" is to be pressed followed by button "Inc. air" in addition. The respective error is then cleared, and the searching routine continues. If no further error occurs the "Air"-display for the desired value indicates "- - -".

5. The indication of errors is terminated by switching off the Incubator.

   The number of the error is identical with the physical address, e.g.: F1 = $ 000,1, F10 = $ 000A.

   Explanations:

   Column "May occur during operation":
   Indicated errors are concerning internal and external hardware errors. e.g. if an O_2 sensor is worn out, error "F 59" is indicated.

   "Self test": All errors being recognized during self test (5 sec. after power up and then restoring every 10 minutes).

   "Permanent feedback": Errors being discovered in various routines while programme is running.

Column "Result":
Indicates the effects of the error. In the event of INOP-Errors the Incubator cuts off the main line. Errors concerning the optional modules (skin temp., humidity and O_2) can be disabled on the respective unit itself which responds with the display code "ERR". The name of the variable characters written in brackets indicating the programme part where the error (=FF) is stored.

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Number of error	Set in routine	May occur during operation	Reason	Result
1	AD-Manage		A/D converter has not finished conversion after 33 m sec. (permanent feedback)	Inop
2	AD-Manage		A/D converter is active before being started. (permanent feedback)	Inop
3	Test 10 min	x	Water heating unable to be activated. If humidity option does not exist this error code may appear. (self test)	Error Humidity-module
4	Test 10 min	x	Measured value of skin temperature test resistor exceeding specified range from 35.8 °C to 36.2 °C. If skin temperature option does not exist, error code may appear! (self test)	Error Skin-module
5	Test 10 min	x	Valve 1 unable to be activated in spite of existing O_2-sensor If O_2 option error code will appear. Error message 5 is not applicable as of EPROM 8290371 (software 0.4) (permanent feedback)	Error O_2-module
6	Skin sens	x	Skin sensor short-circuit or measuring amplifier faulty. If skin temperature does not exist, error code may appear. (permanent feedback)	Error Sensor Skin-module

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Number of error	Set in routine	May occur during operation	Reason	Result
7	Dis-unit		RAM-Reading of display controller(s) malfunctioning. (permanent feedback)	Inop
8	Test 10 min		Heating of water nebulizer unable to be switched off via PIA.	Inop
9	Test 10 min		Fan failure test unable to be activated. Pulse signals of fanwheel cannot be disabled or Mono faulty. (self test)	Inop
10	Test 10 min		Air heater cannot be activated or feedback-line malfunctioning. (self test)	Inop
11	Test 10 min		Air heater cannot be switched off via PIA. (self test)	Inop
12	Test 10 min		Over-temperature signal via PIA does not cut air heater. (self test)	Inop
13	Test 10 min		Watchdog cycle (Mono 1 or 2) too fast. (30 - 60 ms) (self test)	Inop
14	Test 10 min		Watchdog Background (Mono 1) does not run or runs too slow or does not cut off slow air-heater. (self test)	Inop

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Number of error	Set in routine	May occur during operation	Reason	Result
15	Test 10 min		Watchdog IRQ (Mono 2) does not run or runs too slow or does not cut off slow air-heater. (self test)	Inop
16	Test 10 min		Watchdog IRQ (Mono 2) does ot run or runs too slow or does not cut off heater for water nebulizer (self test)	Inop
17	Test 10 min		Watchdog IRQ (Mono 2) does not run or runs too slow or does not cut off valve 1. (self test)	Inop
18	Test 10 min		Watchdog IRQ (Mono 2) does not run or runs too slow or does not cut off valve 2. (self test)	Inop
19	Test 10 min		A/D reference voltage >4.79 V (self test)	Inop
20	Test 10 min		Test voltage check upper limit: Air-heater does not cut off. (self test)	Inop
21	Test 10 min		Test voltage check lower limit: Water heating does not cut off. (self test)	Inop
22	Test 10 min		Test voltage check lower limit does not cut off valve 1. (self test)	Inop

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Number of error	Set in routine	May occur during operation	Reason	Result
23	Test 10 min		Test voltage check lower limit does not cut off valve 2. (self test)	Inop
24	Test 10 min		Test voltage check lower limit does not cut off air-heater. (self test)	Inop
25	Test 10 min		Inspite of non-resettable overtemperature signal from HW-Comparator (>40 °C) air the heater does not cut off. (self test)	Inop
26	Test 10 min		When using test resistor (40 °) HW-Comparator does not switch off bistable relay. (self test)	Inop
27	Test 10 min		Reset of overtemperature (releasing the actuators) does not work. (self test)	Inop
28	Test 10 min		O_2-valve 1 does not switch off via PIA or feedback wrong (self test)	Inop
29	Test 10 min		Over-temperature signal via PIA does not cut valve 1. (self test)	Inop

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Number of error	Set in routine	May occur during operation	Reason	Result
30	Test 10 min		O_2-valve 2 does not switch off via PIA or feedback wrong. (self test)	Inop
31	Test 10 min		Over-temperature signal via PIA does not switch off valve 2. (self test)	Inop
32	IRQ Timer		Air heater does not switch on. (permanent feedback)	Inop
33	IRQ Timer		Air heater is switched on permanently. (permanent feedback)	Inop
34	IRQ Timer		Valve 1 or valve 2 are permanently switched on, although not desired. (permanent feedback)	Inop
35	IRQ Timer		The humidity boiler is switched on permanently. (permanent feedback)	Inop
36	Fan	x	The fan does not turn due to faulty motor or fuse; fan wheel may not be mounted at all.	Fan Failure
37	AD-Manage		The feedback lines of the multiplexer addressing are not in accordance with the commands. (self test)	Inop

Number of error	Set in routine	May occur during operation	Reason	Result
38	IRQ Timer		The humidity boiler does not switch on. (permanent feedback)	Error Humidity-module
39	IRQ Timer		Valve 1 or Valve 2 does not switch on. (permanent feedback)	Error O_2-module
40	O_2	x	Voltage for sensor 1 too high or corresponding amplifier faulty. (permanent feedback)	Malffunction of sensor O_2
41	O_2	x	Sensor differential voltage O_2 exceeding permitted range; possibly sensor worn out or measuring amplifier faulty. (permanent feedback)	Malfunction of sensor O_2
42	O_2 Cal	x	No valid calibration value was found. Sensor(s) may be worn out or calibration trial when O_2 content was varying. (permanent feedback)	Malfunction of sensor O_2
43	O_2	x	Average value of the two sensors is not in permitted range; possibly sensor(s) worn out or measuring amplifier faulty. (permanent feedback)	Malfunction of sensor O_2
44	Air sensor	x	Air temperature sensor high-resistive. Error code is indicated when sensor is not connected. (permanent feedback)	Malfunction of sensor O_2

Number of error	Set in routine	May occur during operation	Reason	Result
45	Humidity	x	Humidity sensor exceeding the permitted voltage range: Error code is indicated when sensor is not connected. (permanent feedback)	Malfunction of sensor Humidity
46	Air sensor		Difference between over-temperature settings exceed the permitted value. (permanent feedback)	Malfunction of sensor Air
47	Test 10 min	x	The connected skin temperature sensor is changing its values by less than 0.007 °C within 20 min. Possible cause: Contact of reed relay on p.c. board analog is sticking. If skin option does not exist error code may appear. (self test)	Option Error Skin
48	H_2O	x	Humidity boiler indicates lack of water. (permanent feedback)	Lack of water
49	Boot		Logic circuit "boot programme" is faulty.	Dead-end loop back-ground
50	Back-		Logic circuit "background programme controlling" is faulty.	Dead-end loop back-ground
51	CRC 16 Bit		ROM contents faulty.	Dead-end loop ROM-CRC

Number of error	Set in routine	May occur during operation	Reason	Result
52	Walk-Pat		Result of RAM test negative	Dead-end loop RAM-Walkpat
53	PIA Test		PIA's cannot be initialized.	Dead-end loop PIA-Unit
54	Timer Test		Timer cycles are incorrect.	Dead-end loop Timer
55	IRQ Timer		Logic circuit "IRQ controlling" is faulty.	Dead-end loop IRQ
56	RAM Test		Result of RAM test negative	Dead-end loop RAM-CRC
57	Air sensor		Air temperature sensor short circuit. (permanent feedback)	Malfunction of sensor Air
58	Skin sensor	x	Skin temperature sensor high resistive or measuring amplifier faulty. If skin option does not exist, error code may appear. (permanent feedback)	Malfunction of sensor Skin
59	O_2	x	Cell voltage for Sensor 1 not high enough or corresponding amplifier faulty. (permanent feedback)	Malfunction of sensor O_2

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Number of error	Set in routine	May occur during operation	Reason	Result
60	O_2	x	Voltage for Sensor 2 too high or corresponding amplifier faulty. (permanent feedback)	Malfunction of sensor O_2
61	O_2	x	Voltage for Sensor 2 not high enough or corresponding amplifier faulty. (permanent feedback)	Malfunction of sensor O_2
62	Test 10 min	x	Valve 2 does not switch on inspite of existing O_2-sensors. If O_2-option does not exist, this error code appears. Error message 5 is not applicable as of EPROM 8290371 (software 0.4) (self test)	Error Option O_2
63	ROM-Exor		The ROM is faulty. (permanent feedback)	Dead-end loop ROM
64	Reference		Data in ROM is faulty. (self test)	Constants
65	Test 10 min		A/D-reference voltage < 3.99 Volt. (self test)	Inop
66	INOP		Contact of t he power switch is open or PIA D2. Port B7 is faulty. (permanent feedback)	Inop
67			After switching off the O_2 module the O_2 concentration increased within 3 minutes by more than 3 vol. %. Possible malfunction causes: O_2 valve leaky or external O_2 supply	Inop and additional O_2 display

3.3 Description of 10-minute test

10-minute test sequence

A software-controlled check of the hardware of relevance to safety is carried out following switch-on of the incubator, following a mains failure and every 10 minutes.

Sequence in program

- Salvaging of input statuses
- Salvaging of setting of relay, overtemperature, bistable
- Is there an overtemperature situation currently present (> 40 °C)?

Yes: In the event of overtemperature (> 40 °C) the overtemperature comparator switches off the overtemperature relay by way of the relay, overtemperature, bistable. In this case, if an overtemperature reset is not possible on account of the fact that an overtemperature situation is still present (> 40 °C), a 10-minute test cannot be performed and a test is merely carried out to check whether the air heating is switched off.

Check-back signal: current through air heater?
Yes: INOP + fault 25
No: No fault + end of 10-minute test

No: Start of 10-minute test

"Switch-on of air heating" (fault 10)

- Switch on air heating only via PIA
- Check-back signal: current through air heater?
  Yes: No fault + continue
  No: INOP + fault 10 + continue

"H_2O heating on and O_2 valves off" (faults 3, 28, 30)

- Switch on H_2O heating only via PIA
- Check-back signal: current through H_2O semiconductor relay?
  Yes: No fault + continue
  No: Humidity module fault + fault 3 + continue

- Check-back signal: current through valve 1?
  Yes: INOP + fault 28 + continue
  No: No fault + continue
- Check-back signal: current + through valve 2?
  Yes: INOP + fault 30 + continue
  No: No fault + continue

"O_2 valves on and air/H_2O heating off"
(faults 5, 8, 62)

- Switch on O_2 valves 1 and 2 only via PIA (does not apply of EPROM 8290371)
- Check-back signal: current through valve 1? (does not apply as of EPROM 8290371)
  Yes: No fault + continue
  No: O_2 module fault + fault 5 (only if sufficiently large O_2 cell voltages are measured) + continue
- Check-back signal: current through valve 2? (does not apply as of EPROM 8290371)
  Yes: No fault + continue
  No: O_2 module fault + fault 62 (only if sufficiently large O_2-cell voltages are measured) + continue
- Check-back signal: current through H_2O semiconductor relay?
  Yes: INOP + fault 8 + continue
  No: No fault + continue

"Blocking fan pulses (fault 9)

(The fault message "fan not running" is not generated here, but rather during continuous monitoring of the fan in normal operation. This test only checks the monitoring circuit of the fan failure alarm.)

- Block fan pulses via PIA (mono is not retriggered)
- Check-back signal: fan pulses blocked (fan failure)?
  Yes: No fault + continue
  No: INOP + fault 9
- Enable fan pulses

"Air heating off" (fault 11)

- Air heating is still switched off via PIA
- Check-back signal: current through air heater?
  Yes: INOP + fault 11 + continue
  No: No fault + continue

"Testing monoflops" (faults 13, 14)

- Retriggering of monos 1, 2 and 3
- Switch on air heating via PIA
- Waiting loops, monos 1 and 2 must not elapse and block air heating
- Check-back signal: current through air heater?
  Yes: No fault + continue
  No: INOP + fault 13 + continue
- Retriggering of monos 2 and 3
  Mono 1 must elapse 140 ms after retriggering and block air heating.
- Check-back signal: current through air heater?
  Yes: INOP + fault 14 + continue
  No: No fault + continue

"Comparator 40 °C test (overtemperature)" (fault 26)

- Switch off heaters and valves via PIA
- Switch test resistor 40 °C to overtemperature amplifier
- Check-back signal: has relay, overtemperature, bistable switched to overtemperature?
  Yes: No fault + continue
  No: INOP + fault 26 + continue

"Overtemperature by way of PiA" (faults 12, 27, 29, 31)

- Trigger overtemperture and O_2 relay by way of PIA
- Switch off test resistor 40 °C (normal setting), overtemperature relay does however remain switched off.
- Trigger overtemperature and O_2 relay by way of PIA and simultaneously attempt to trigger an overtemperature reset (normally not possible, overtemperature must remain).
- Switch on air heating and valves via PIA (must not switch on)
- Check-back signal: current through valve 1?
  Yes: INOP + fault 29 + continue
  No: No fault + continue
- Check-back signal: current through valve 2?
  Yes: INOP + fault 31 + continue
  No: No fault + continue
- Check-back signal: current through air heater?
  Yes: INOP + fault 12 + continue
  No: No fault + continue
- Switch off air heating and valves via PIA
- Overtemperature reset (enabling of relay, overtemperature, bistable)

- Switch on air heating only via PIA
- Check-back signal: current through air heater?
  Yes: No fault + continue
  No: INOP + fault 27 + continue

"Testing mono 2" (faults 15, 16, 17, 18)

- Retriggering of monos 1, 2 and 3
- Switch on heaters and valves via PIA
- Waiting loop for testing mono 2
- Retriggering of monos 1 and 3
- Waiting loop; mono 2 must elapse 140 ms following last retriggering and block both heaters and valves
- Check-back signal: current through air heater?
  Yes: INOP + fault 15 + continue
  No: No fault + continue
- Check-back signal: current through H_2O semiconductor relay?
  Yes: INOP + fault 16 + continue
  No: No fault + continue
- Check-back signal: current through valve 1?
  Yes: INOP + fault 17 + continue
  No: No fault + continue
- Check-back signal: current through valve 2?
  Yes: INOP + fault 18 + continue
  No: No fault + continue

"Testing A/D converter reference" (faults 19, 65)

- Read-out of reference-channel voltage
- Reference-channel voltage less than 3.99 V?
- Yes: INOP + fault 65 + continue
  No: No fault + continue
- Reference-channel voltage greater than 4.79 V?
  Yes: INOP + fault 19 + continue
  No: No fault + continue

"Testing 5 V voltage monitoring"
(faults 20, 21, 22, 23, 24)

- Switch off heaters and valves via PIA
- Test upper limit of voltage monitoring via PIA (24 V relay must switch off heaters and valves)
- Switch on air heater via PIA
- Check-back signal: current through air heater?
  Yes: INOP + fault 20 + continue
  No: No fault + continue
- Switch off air heater via PIA
- Cancellation of testing of upper limit of voltage monitoring

- Test lower limit of voltage monitoring via PIA (24 V relay must switch off heaters and valves)
- Switch on heaters and valves via PIA
- Check-back signal: current through H_2O semiconductor relay?
- Yes: INOP + fault 21 + continue
  No: No fault + continue
- Check-back signal: current through valve 1?
  Yes: INOP + fault 22 + continue
  No: No fault + continue
- Check-back signal: current through valve 2?
  Yes: INOP + fault 23 + continue
  No: No fault + continue
- Check-back signal: current through air heater?
  Yes: INOP + fault 24 + continue
  No: No fault + continue
- Cancellation of testing of lower limit of voltage monitoring (normal operation)

"Testing 36.0 °C skin-temperature simulation and evaluation of relay contact sticking" (faults 4, 47)

- Switch to 36.0 °C skin-temperature equivalent resistance
- Read-out of skin-temperature-amplifier voltage
- Temperature less than 35.8 °C or greater than 36.2 °C?
  Yes: Skin module fault + fault 4 + continue
  No: No fault + continue
- Has bit 2 switched in the last 20 minutes in normal operation (= change in temperature)?
  Yes: No fault + continue
  No: Skin module fault + fault 47 (only if skin temperature sensor connected and measured value between 33 and 38 °C) + continue

"End of 10-minute test"

- Restore input statuses
- Restore position of relay, overtemperature, bistable
- In the event of INOP fault situation: INOP-LED lights up, permanent horn tone, heaters and valves switched off.

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4. Address ranges

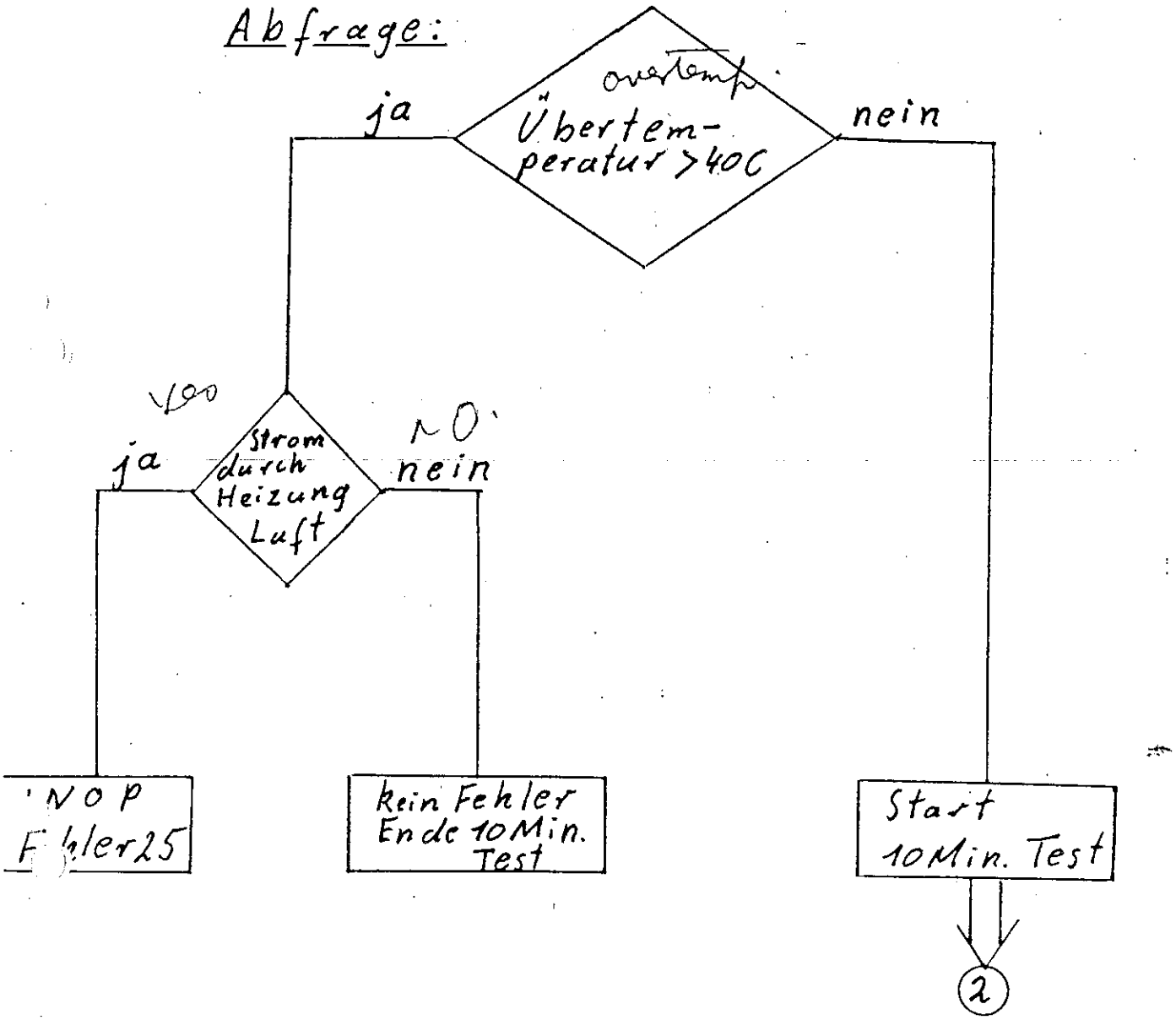
0000	...	04FE	RAM area for fault messages
0500	...	07FF	RAM area, tested and monitored
8000	...	8001	Air-temperature display and keyboard
8002	...	8003	Skin-temperature display
8004	...	8005	O_2 display
8006	...	8007	Humidity display
		8008	A/D converter, high byte
		800A	A/D converter, low byte
		800C	A/D converter, start of conversion
		800E	D/A converter
		8010	Control register
		8010	PIA 1, Port A
		8011	PIA 1, Control register A
		8012	PIA 1, Port B
		8013	PIA 1, control register B
		8020	PIA 2, Port A
		8021	PIA 2, Control register A
		8022	PIA 2, Port B
		8023	PIA 2, Control register B
		8030	Mono 1 (Background)
		8040	Mono 2 (IRQ)
		8050	Mono 3 (INOP-LED)
		9000	CPU-Watchdog (Background)
		9001	CPU-Watchdog (IRQ)
9010	...	9016	Hardware addresses of timer
B000	...	FFFF	ROM area

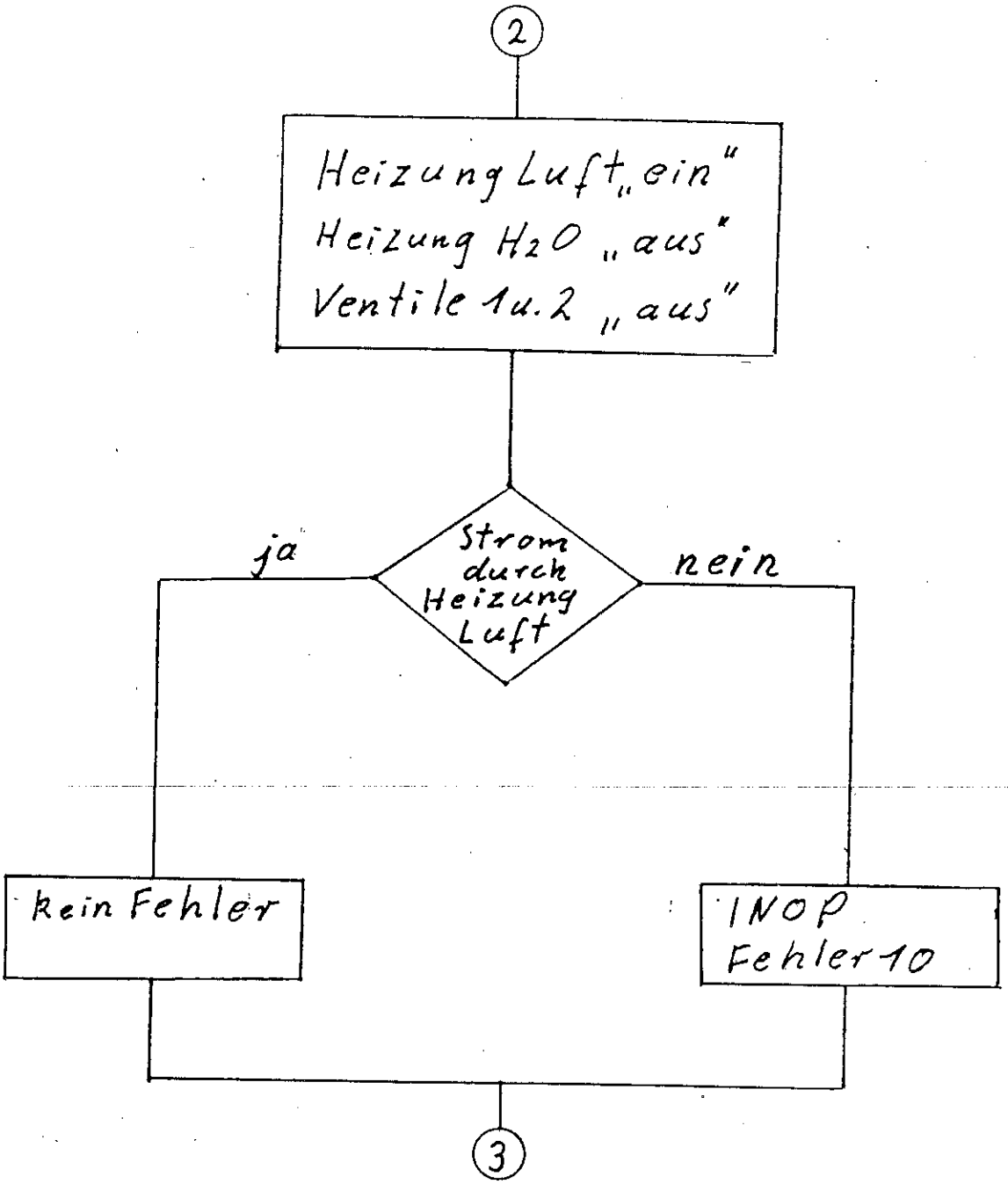
SEE PARA 3.3

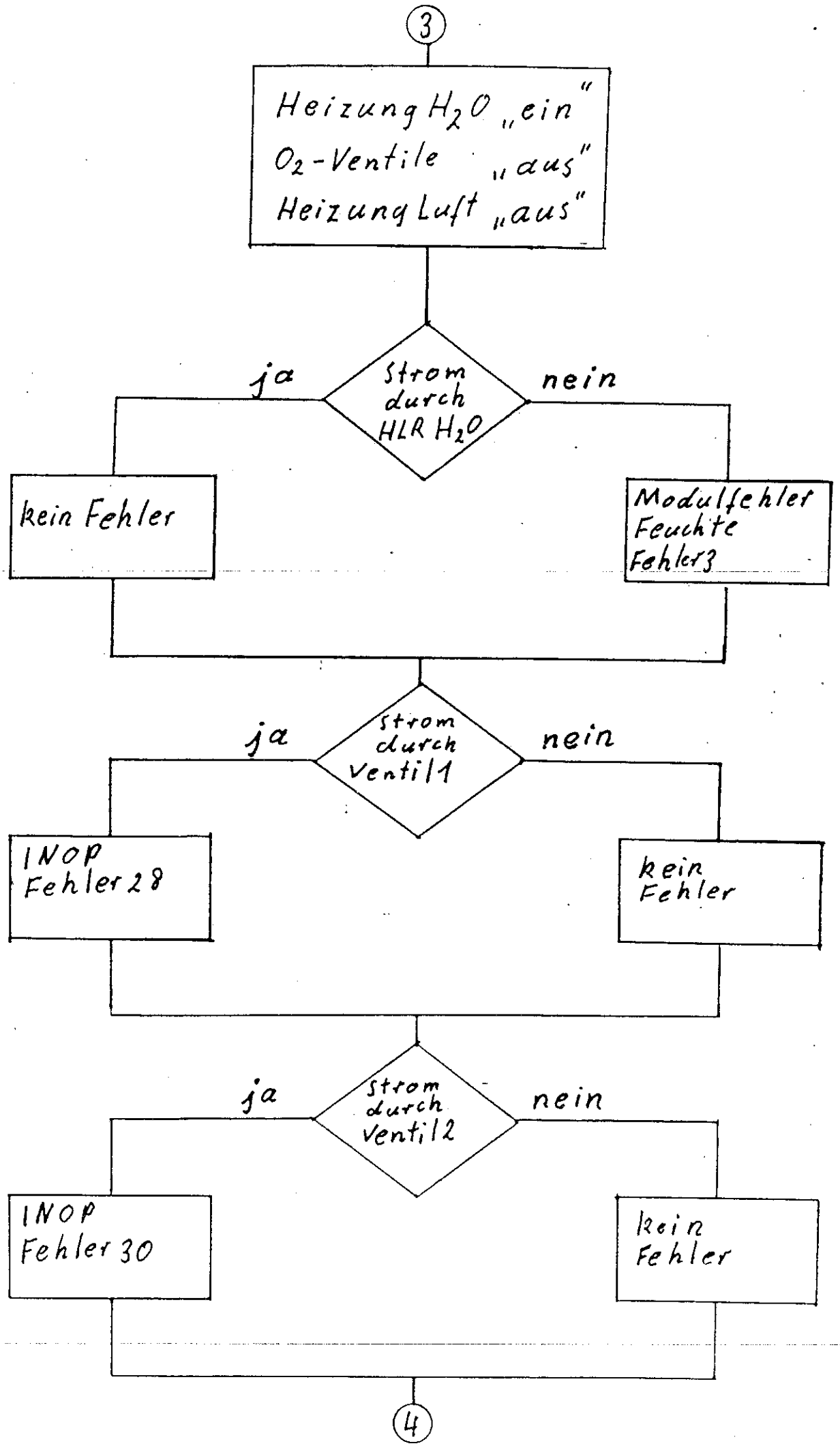
Eingangszustände retten

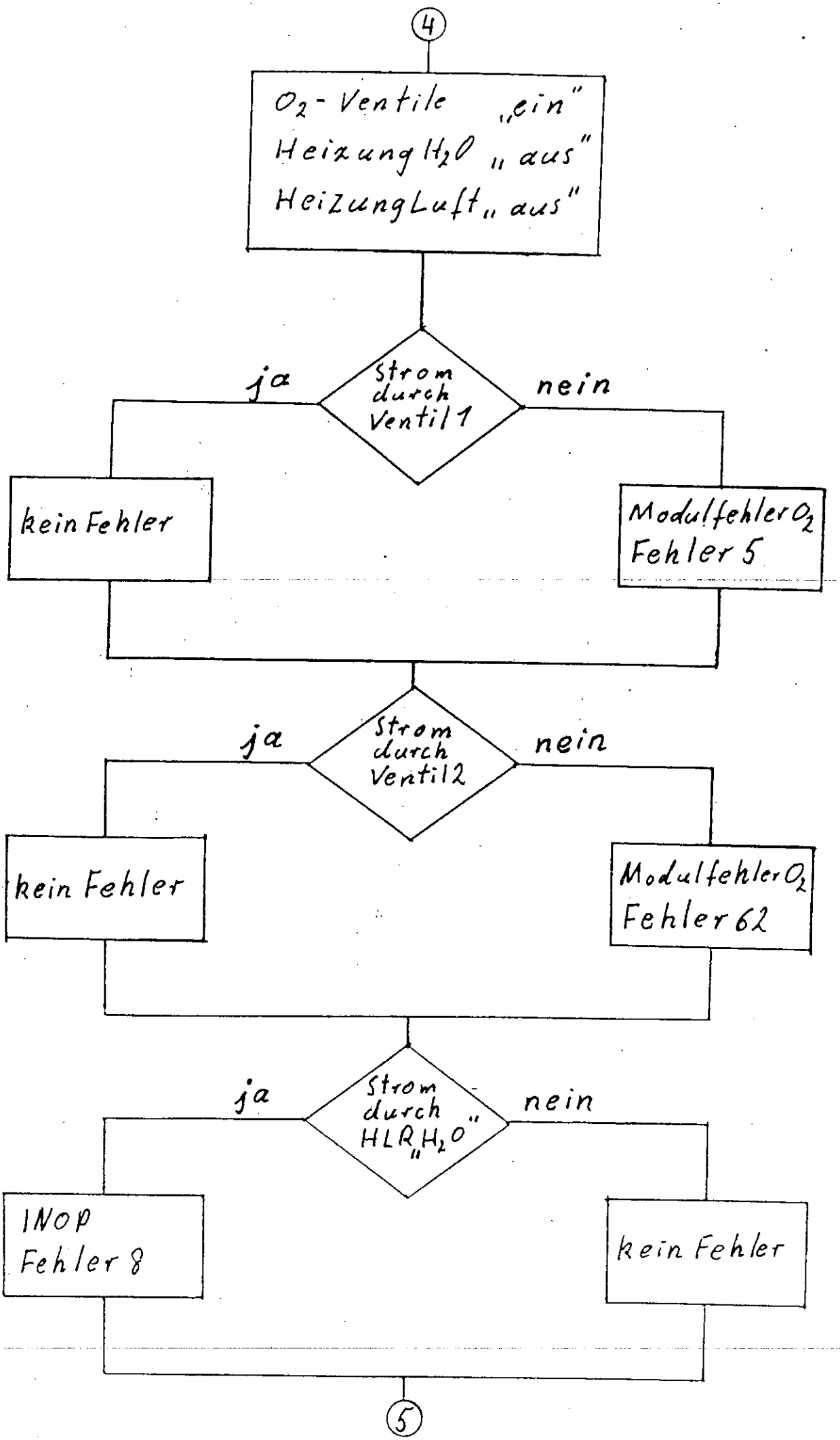
Stellung Relais Übertemperatur bistabil retten

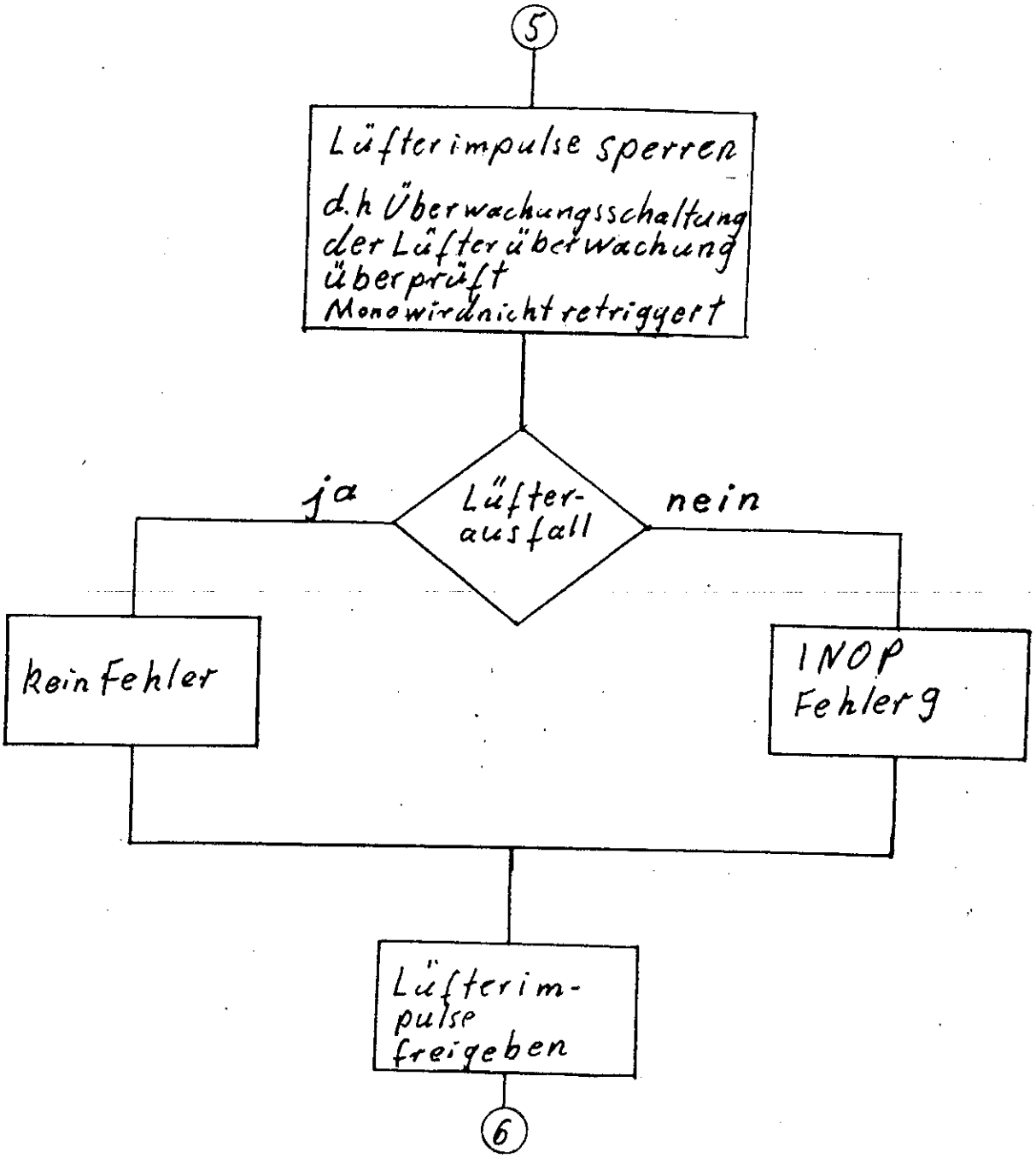
Abfrage:

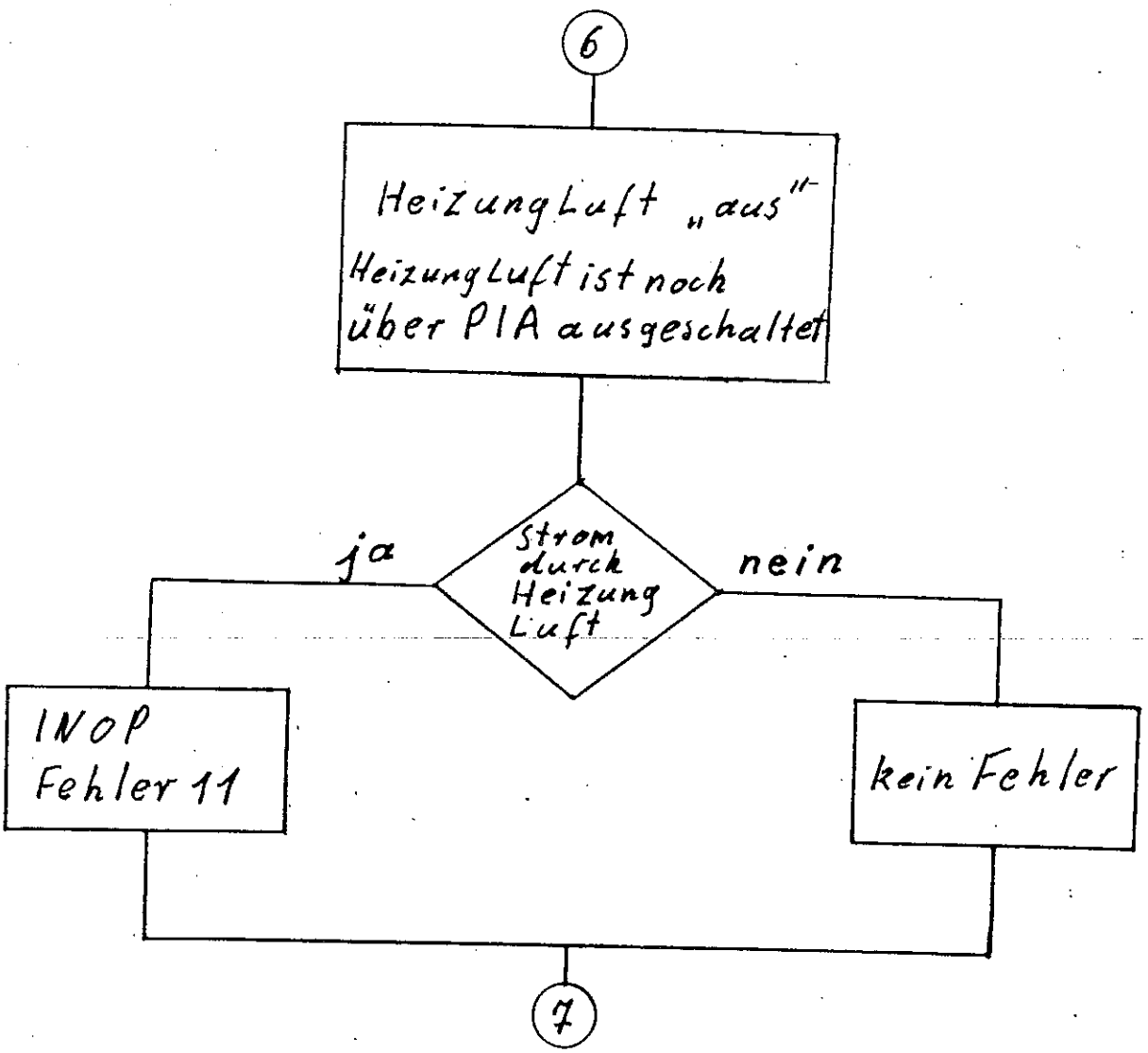


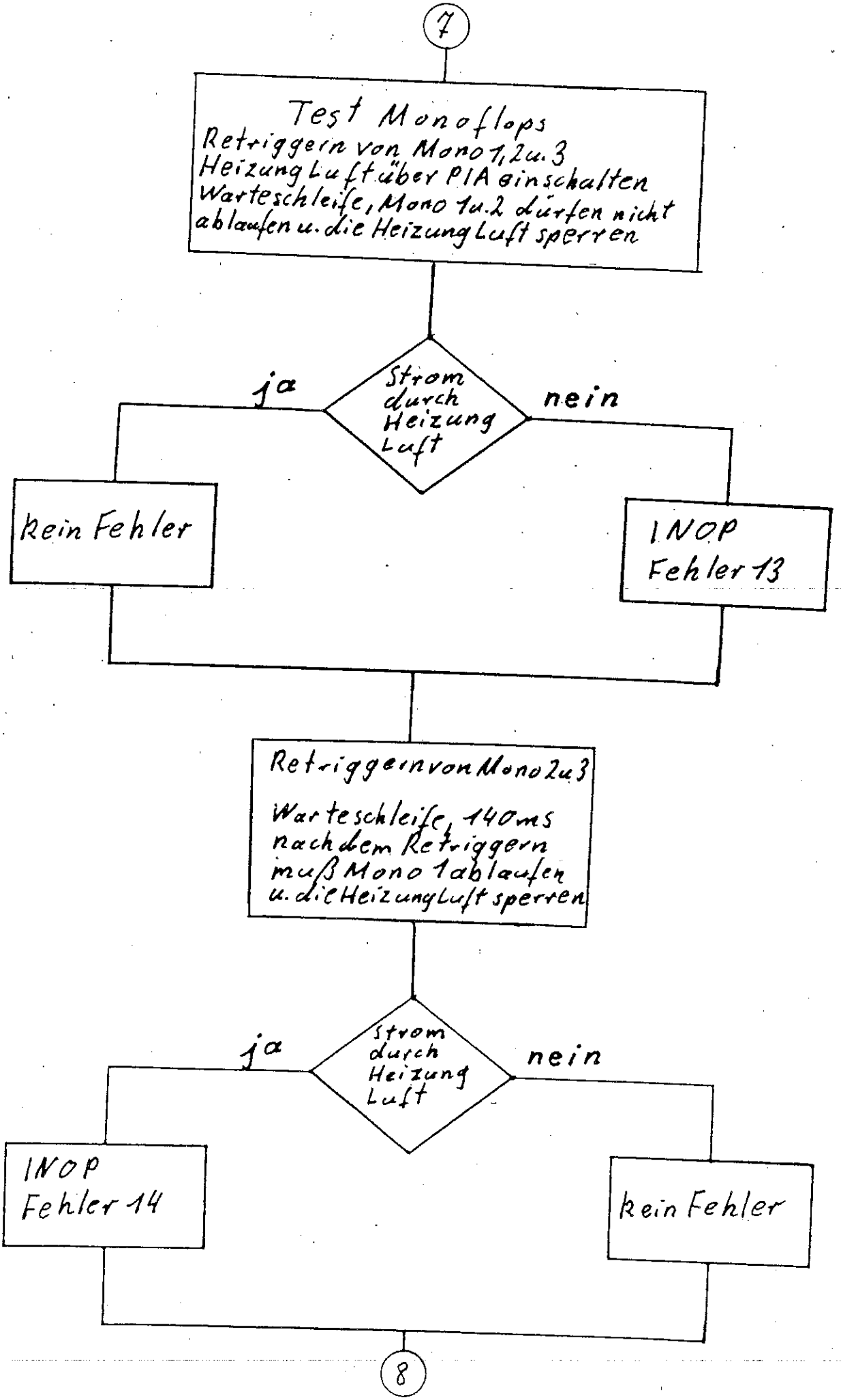

2
Heizung Luft „ein"
Heizung H_2O „aus"
Ventile 1u.2 „aus"
Strom durch Heizung Luft
ja
nein
kein Fehler
INOP Fehler 10
3

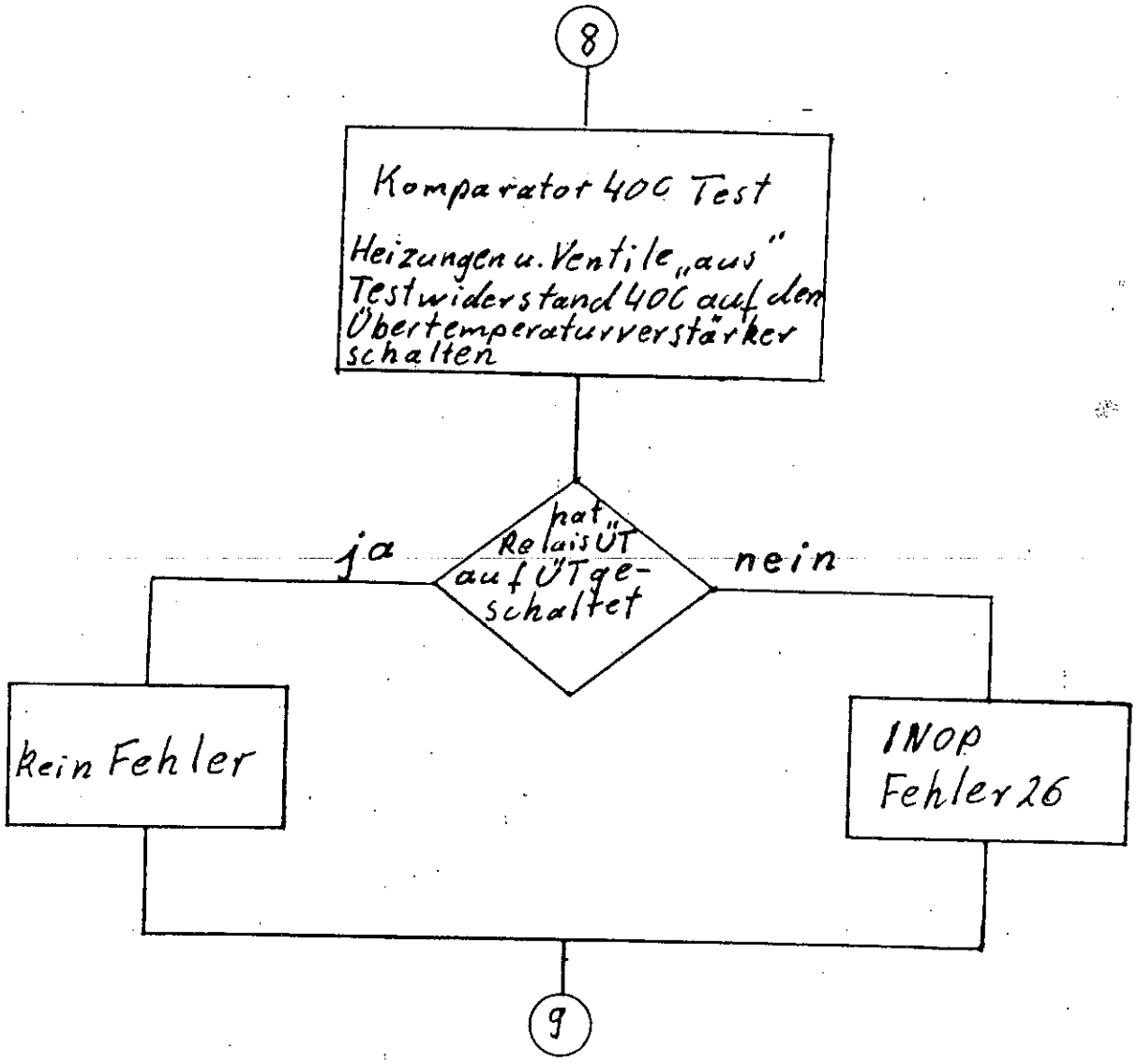

3
Heizung H_2O „ein"
O_2-Ventile „aus"
Heizung Luft „aus"
Strom durch HLR H_2O
ja
nein
kein Fehler
Modulfehler Feuchte Fehler3
Strom durch Ventil1
ja
nein
INOP Fehler 28
kein Fehler
Strom durch Ventil2
ja
nein
INOP Fehler 30
kein Fehler
4

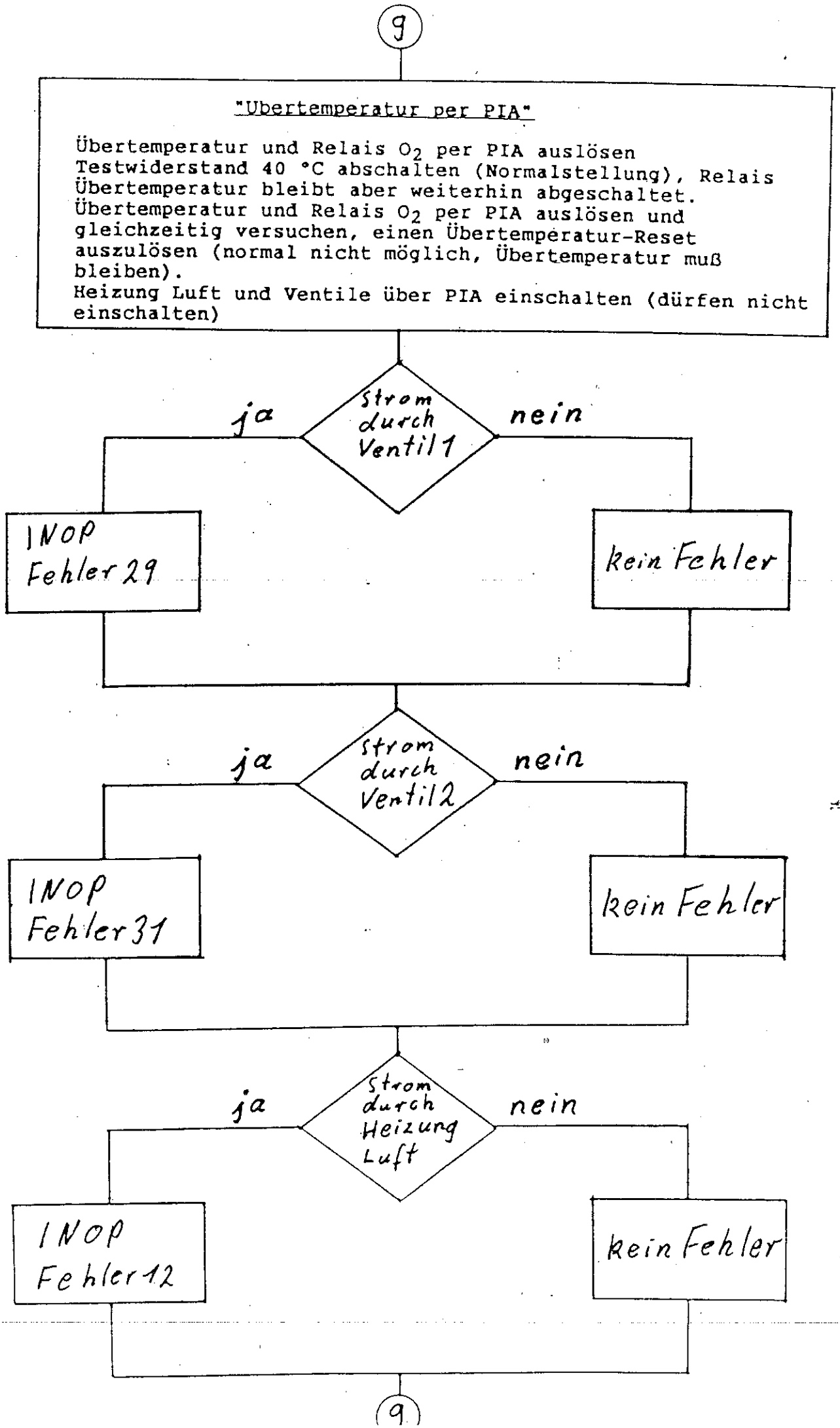

4
O_2 - Ventile „ein"
Heizung H_2O „aus"
HeizungLuft „aus"
Strom durch Ventil 1
ja
nein
kein Fehler
Modulfehler O_2 Fehler 5
Strom durch Ventil 2
ja
nein
kein Fehler
Modulfehler O_2 Fehler 62
Strom durch HLR „H_2O"
ja
nein
INOP Fehler 8
kein Fehler
5

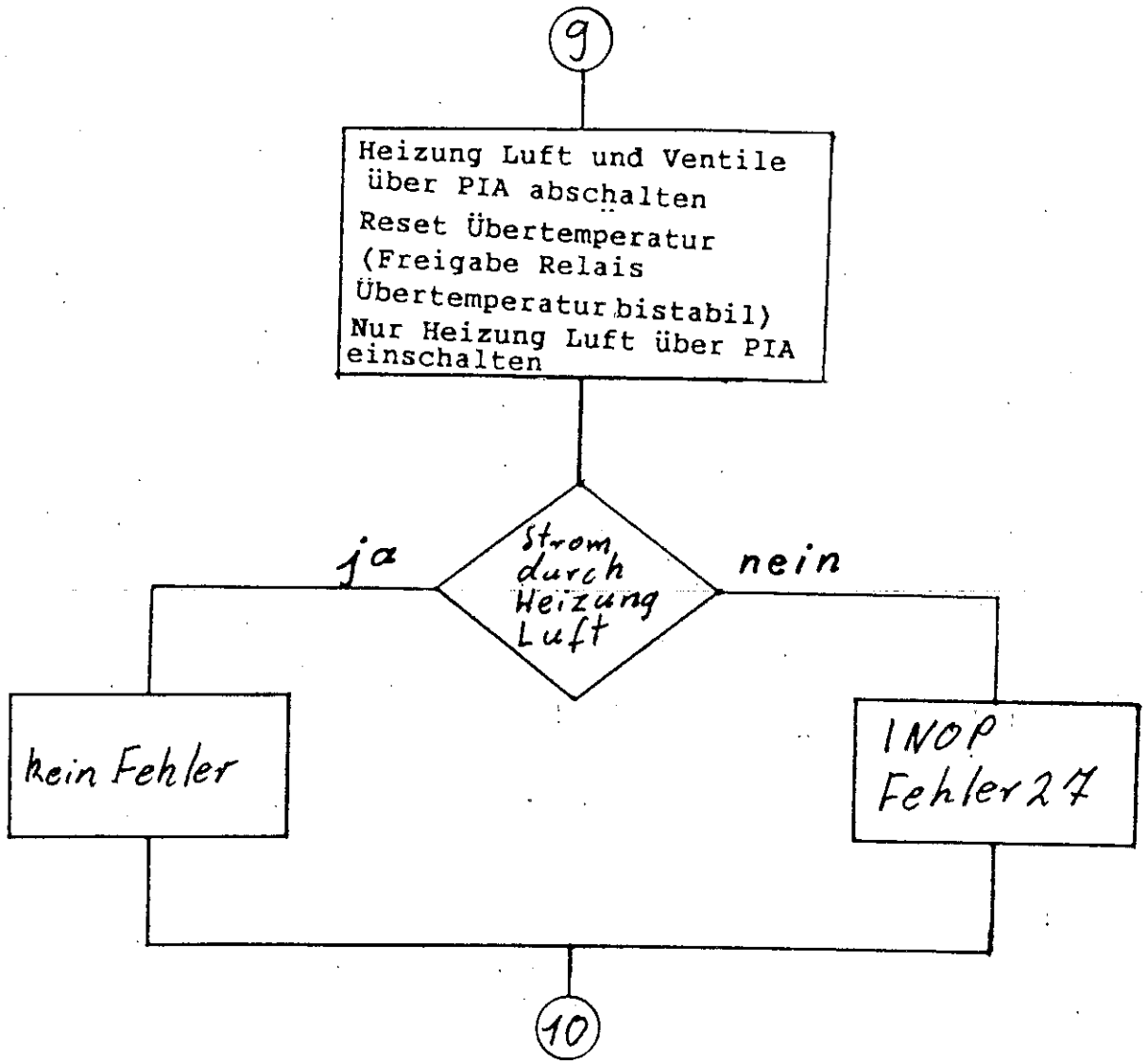

5
Lüfterimpulse sperren
d.h Überwachungsschaltung der Lüfterüberwachung überprüft
Monowird nicht retriggert
Lüfter-ausfall
ja
nein
kein Fehler
INOP Fehler 9
Lüfterim-pulse freigeben
6

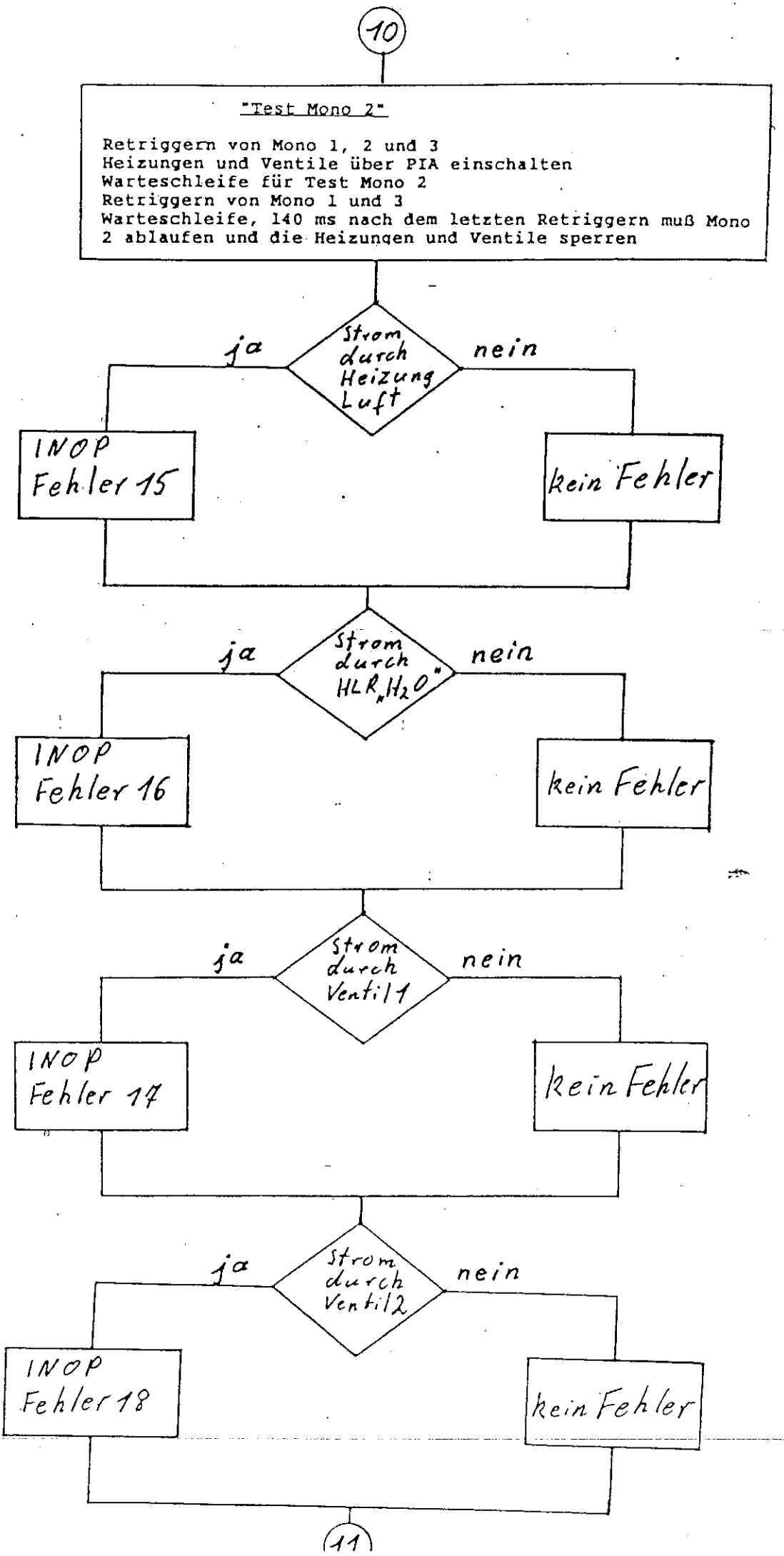

6
Heizung Luft „aus"
Heizung Luft ist noch
über PIA ausgeschaltet
Strom durch Heizung Luft
ja
nein
INOP
Fehler 11
kein Fehler
7

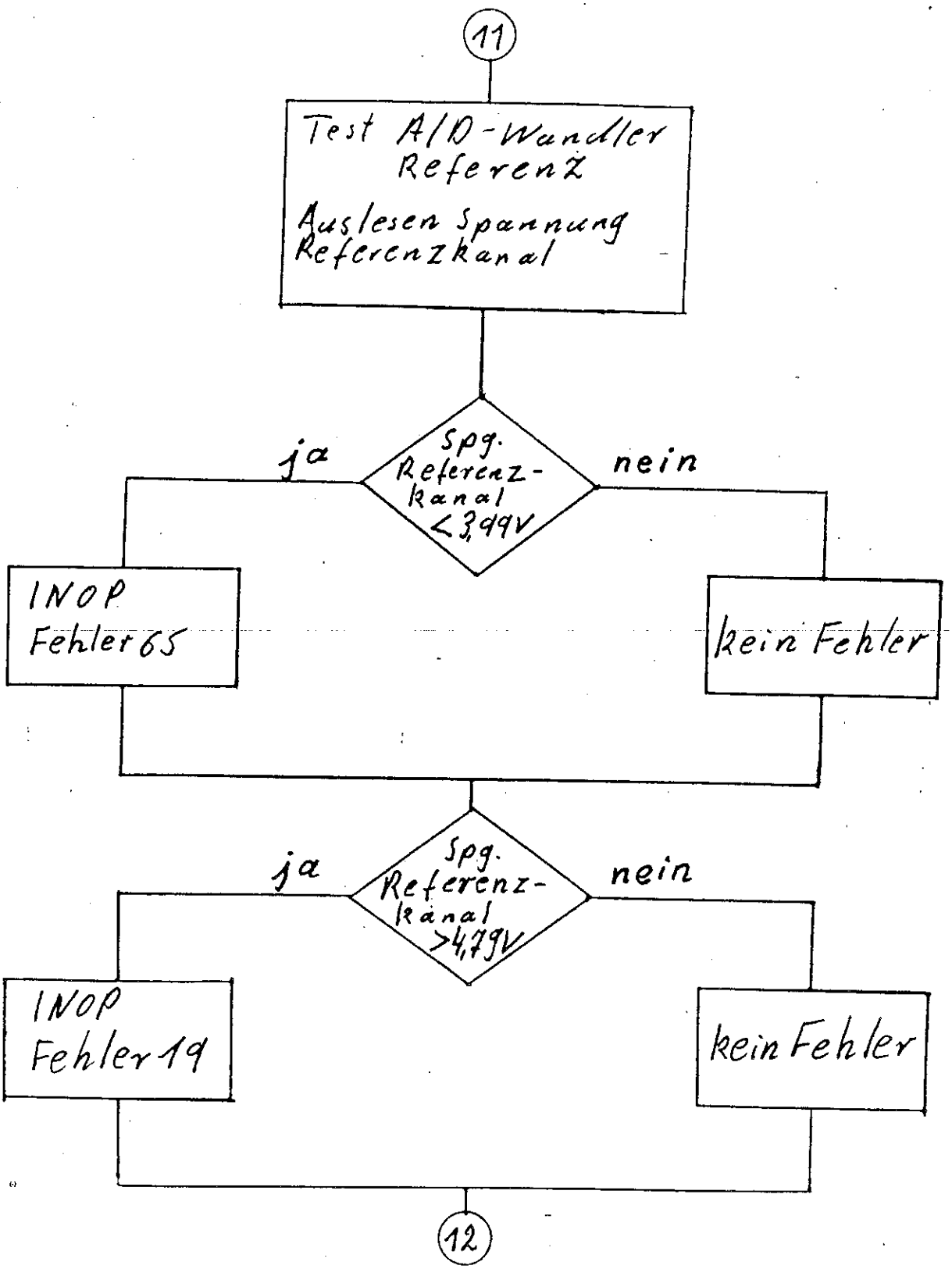

7
Test Monoflops
Retriggern von Mono 1, 2 u. 3
Heizung Luft über PIA einschalten
Warteschleife, Mono 1 u. 2 dürfen nicht ablaufen u. die Heizung Luft sperren
Strom durch Heizung Luft
ja
nein
kein Fehler
INOP Fehler 13
Retriggern von Mono 2 u 3
Warteschleife, 140 ms nach dem Retriggern muß Mono 1 ablaufen u. die Heizung Luft sperren
Strom durch Heizung Luft
ja
nein
INOP Fehler 14
kein Fehler
8

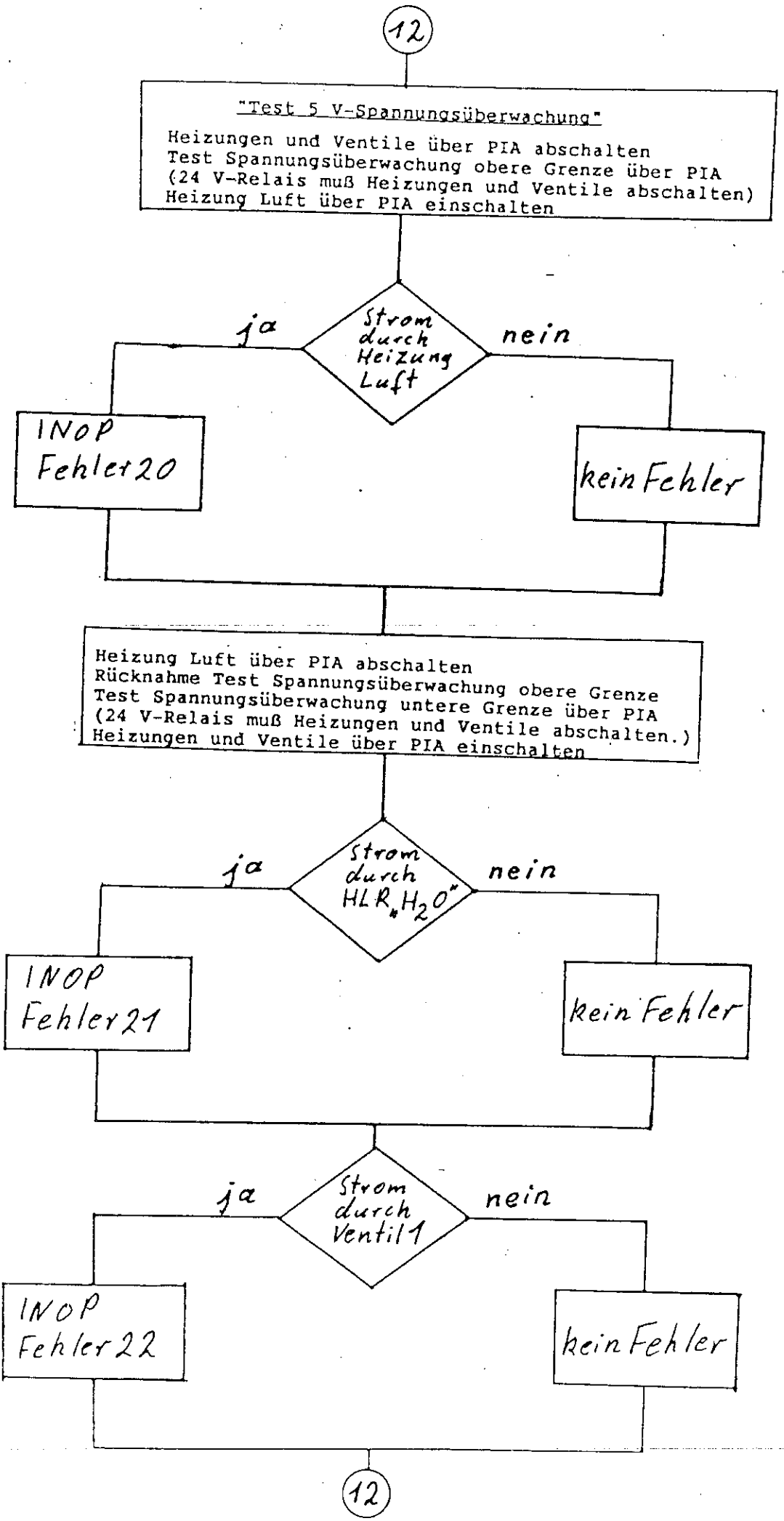

8
Komparator 40C Test
Heizungen u. Ventile „aus"
Testwiderstand 40C auf den
Übertemperaturverstärker
schalten
hat Relais ÜT auf ÜT ge-
schaltet
ja
nein
Kein Fehler
INOP
Fehler 26
9

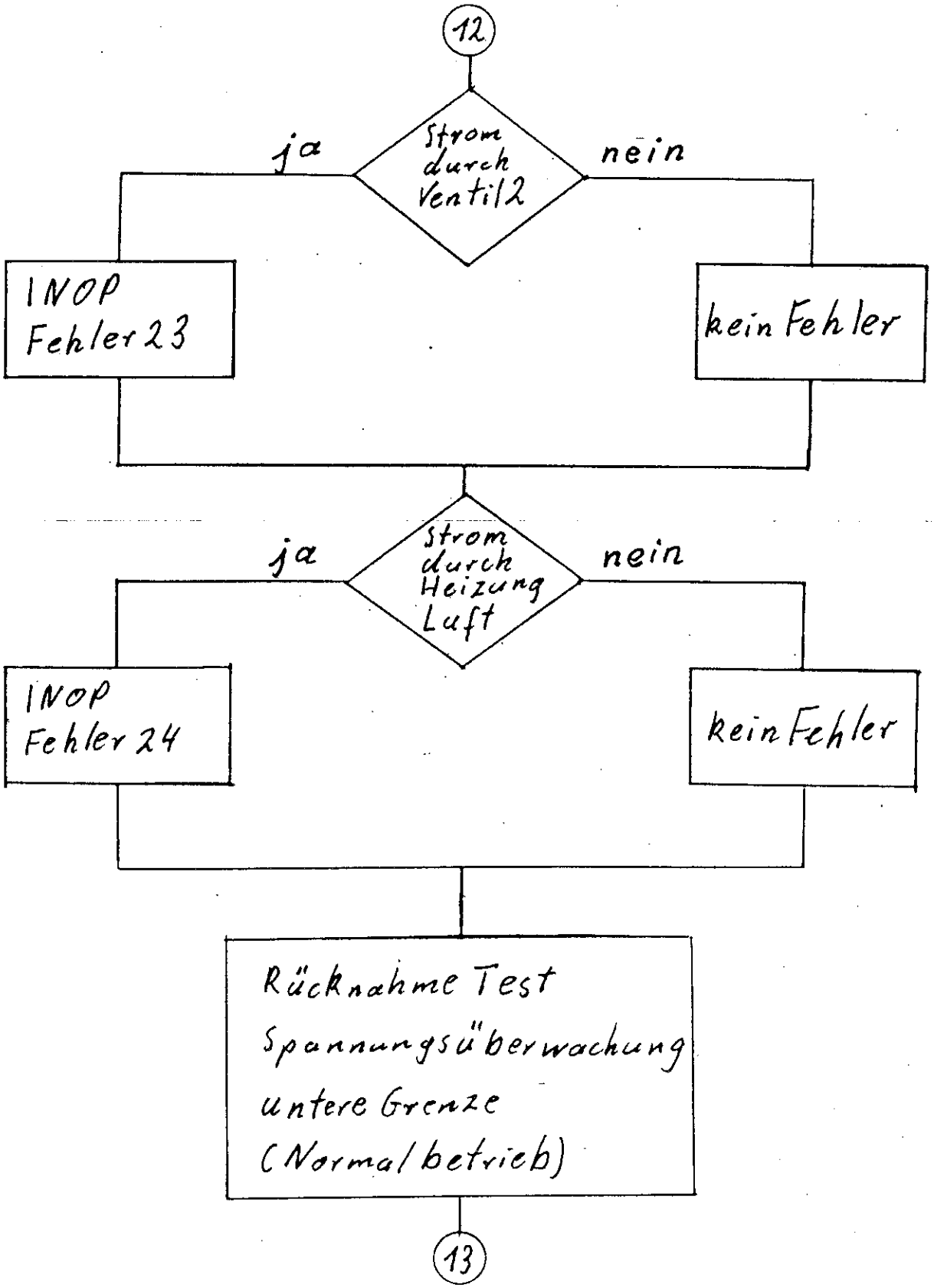

9
"Übertemperatur per PIA"
Übertemperatur und Relais O_2 per PIA auslösen
Testwiderstand 40 °C abschalten (Normalstellung), Relais Übertemperatur bleibt aber weiterhin abgeschaltet.
Übertemperatur und Relais O_2 per PIA auslösen und gleichzeitig versuchen, einen Übertemperatur-Reset auszulösen (normal nicht möglich, Übertemperatur muß bleiben).
Heizung Luft und Ventile über PIA einschalten (dürfen nicht einschalten)
Strom durch Ventil 1
ja
nein
INOP Fehler 29
kein Fehler
Strom durch Ventil 2
ja
nein
INOP Fehler 31
kein Fehler
Strom durch Heizung Luft
ja
nein
INOP Fehler 12
kein Fehler
9

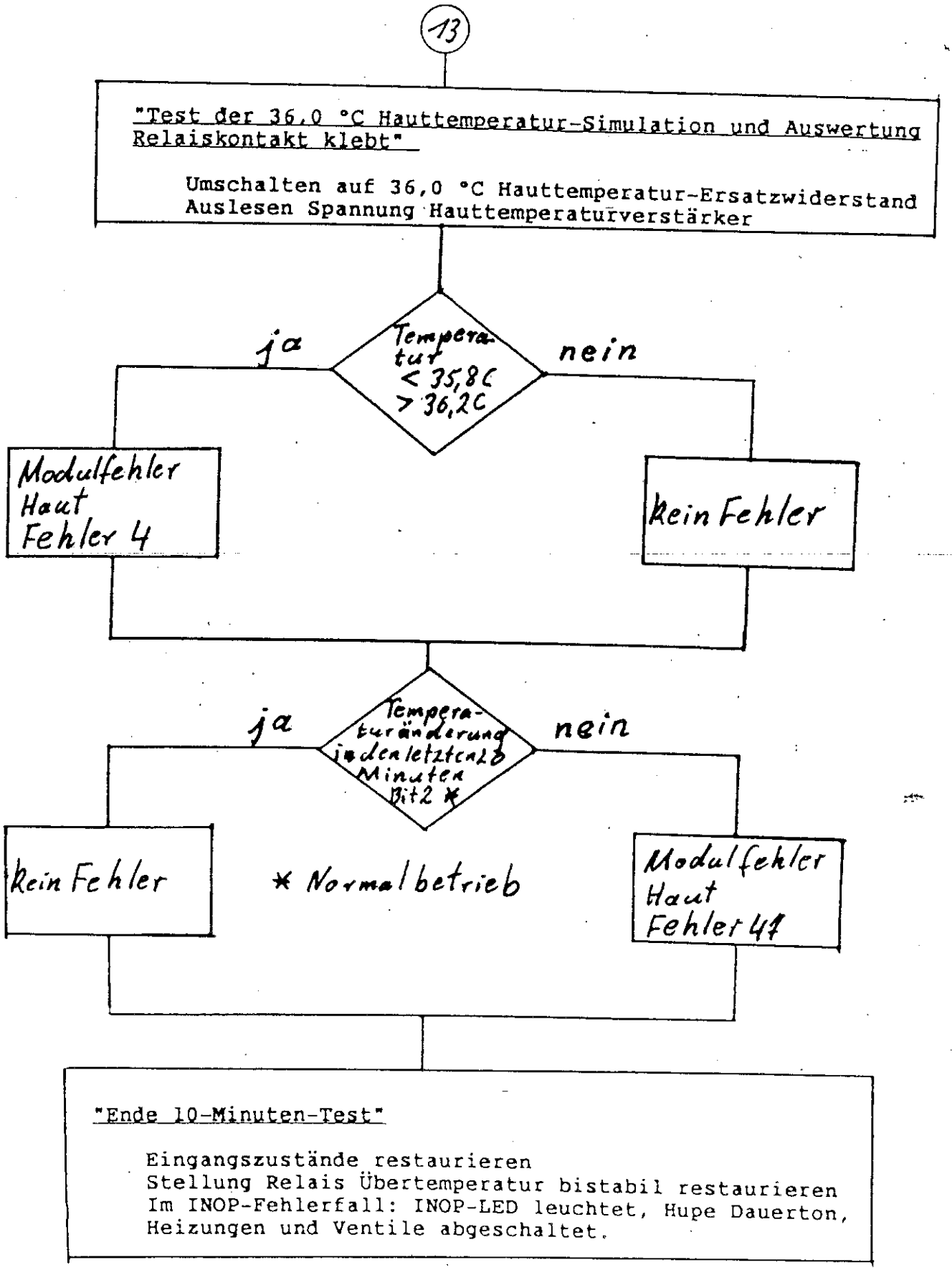

9
Heizung Luft und Ventile über PIA abschalten
Reset Übertemperatur (Freigabe Relais Übertemperatur bistabil)
Nur Heizung Luft über PIA einschalten
Strom durch Heizung Luft
ja
nein
kein Fehler
INOP Fehler 27
10


10
"Test Mono 2"
Retriggern von Mono 1, 2 und 3
Heizungen und Ventile über PIA einschalten
Warteschleife für Test Mono 2
Retriggern von Mono 1 und 3
Warteschleife, 140 ms nach dem letzten Retriggern muß Mono 2 ablaufen und die Heizungen und Ventile sperren
Strom durch Heizung Luft
ja
nein
INOP Fehler 15
kein Fehler
Strom durch HLR „H2O"
ja
nein
INOP Fehler 16
kein Fehler
Strom durch Ventil 1
ja
nein
INOP Fehler 17
kein Fehler
Strom durch Ventil 2
ja
nein
INOP Fehler 18
kein Fehler
11


11
Test A/D-Wandler Referenz
Auslesen Spannung Referenzkanal
Spg. Referenz-kanal <3,99V
ja
nein
INOP Fehler 65
kein Fehler
Spg. Referenz-kanal >4,79V
ja
nein
INOP Fehler 19
kein Fehler
12


12
"Test 5 V-Spannungsüberwachung"
Heizungen und Ventile über PIA abschalten
Test Spannungsüberwachung obere Grenze über PIA
(24 V-Relais muß Heizungen und Ventile abschalten)
Heizung Luft über PIA einschalten
Strom durch Heizung Luft
ja
nein
INOP Fehler20
kein Fehler
Heizung Luft über PIA abschalten
Rücknahme Test Spannungsüberwachung obere Grenze
Test Spannungsüberwachung untere Grenze über PIA
(24 V-Relais muß Heizungen und Ventile abschalten.)
Heizungen und Ventile über PIA einschalten
Strom durch HLR „H2O"
ja
nein
INOP Fehler21
kein Fehler
Strom durch Ventil 1
ja
nein
INOP Fehler22
kein Fehler
12


12
Strom durch Ventil 2
ja
nein
INOP Fehler 23
kein Fehler
Strom durch Heizung Luft
ja
nein
INOP Fehler 24
kein Fehler
Rücknahme Test Spannungsüberwachung untere Grenze (Normalbetrieb)
13


13
"Test der 36,0 °C Hauttemperatur-Simulation und Auswertung Relaiskontakt klebt"
Umschalten auf 36,0 °C Hauttemperatur-Ersatzwiderstand
Auslesen Spannung Hauttemperaturverstärker
Temperatur < 35,8C > 36,2C
ja
nein
Modulfehler Haut Fehler 4
Kein Fehler
Temperaturänderung in den letzten 20 Minuten Bit 2 *
ja
nein
Kein Fehler
* Normalbetrieb
Modulfehler Haut Fehler 41
"Ende 10-Minuten-Test"
Eingangszustände restaurieren
Stellung Relais Übertemperatur bistabil restaurieren
Im INOP-Fehlerfall: INOP-LED leuchtet, Hupe Dauerton,
Heizungen und Ventile abgeschaltet.

4.1. Beschreibung der PIA-Ports Inkubator 8000

PIA/port	Bit; < Input, > Output; CS: check-back signal	" 0 "	" 1 "
PIA D1 Port A (8010H)	0: < CS, relay, OT, bistable	Overtemperature	o.k.
	1: < Skin-temperature identifier	Skin module present	Version without skin module
	2: < Identifier 02	02 module present	without 02 module
	3: > Multiplexer address A0		
	4: > Multiplexer address A1		
	5: > Multiplexer address A2		
	6: < Fan malfunction	Running	Not running/test
	7: > Multiplexer enable E-transverse	enabled	disabled
PIA D1 Port B (8012H)	0: > Air heater	"Off"	"On"
	1: > H20 heater (evaporator)	"Off"	"On"
	2: > 02 valve 1	"aus"	"On"
	3: > 02 vakve 2	"aus"	"On"
	4: > Relay, OT bistable - RESET -	0 => 1: Air and H20 heater enable	
	5: > Relay, test 36°	Normal operation	Check 36°
	6: > Relay, OT bistable - SET -	Normal operation	Overtemperatue
	7: > Horn	No horn tone	Horn sounds
PIA D2 Port A (8020H)	0: < Humidity identifier	Humidity module present	Version without humidity module
	1: < Thermoswitch, H20 deficiency	o.k.	Lack of water
	2: > DW-ext. alarm	o.k.	ALARM
	3: < CS Multiplexer A0		
	4: < RM Multiplexer A1		
	5: < RM Multiplexer A2		
	6: < CS, relay 36°	Check	Normal operation
	7: < CS, air heater	"Off"	"Off"
PIA D2 Port B (8022H)	0: < Sensor calibration switch		
	1: < CS, H20 heater	"On"	"Off"
	2: < CS, 02 valve 1	"On"	"Off"
	3: < CS, 02 valve 2	"On"	"Off"
	4: < Sensor operating switch		
	5: > Test overtemperature, 40°	Normal operation	Ot test
	6: < NMI-transverse	NMI	No NMI
	7: < Mains	Mains "off"	Mains "on"
PIA-CONTR		Data word	Data word
PIA D1 CA2 (8011H)	> 5 V - Voltage monitoring	Normal operation: 34H Output: 0	Upper limit test: 3CH Output: 1
PIA D1 CB2 (8013H)	> 5 V - Voltage monitoring	Normal operation: 3CH Output: 1	Lower limit test: 34H Output: 0
PIA D2 CB2 (8023H)	< > Fan-pulse suppression	Normal operation: 04H Input (int. pull-up)	Test: 3CH Output: 1

5. Calibration specifications

Contains all calibration specifications for the basic components described under 2.2.

5.1 Unit

5.1.1 Thermostat, lack-of-water alarm

The thermostat of the lack-of-water alarm is to be set to 120 °C in line with the scale. This thermostat must switch off the water heating prior to the safety thermostat (135 °C) via the processor system and it should not switch in normal operation with water to the maximum specified set value. In future, this adjustable thermostat will be replaced by a permanently set thermostat (design similar to that of safety thermostat). Installation potential is provided with all units.

5.1.2 Fan motor

5.1.2.1 Clearance of the motor shaft

Permissible clearance of the motor shaft = 0.1 mm

5.1.2.2 Fan motor removal and installation

- Remove unit.
- Unscrew coil of fan-failure alarm from aluminium block of motor mount.
- Detach cable connection between motor and p.c. board "unit".
- Unscrew retaining bracket of motor.
- Remove motor after loosening the 4 retaining nuts.
- Fit new motor springs to set screws and screw in retaining nuts approx. 3.5 mm measured from upper edge of threaded rod to nuts.

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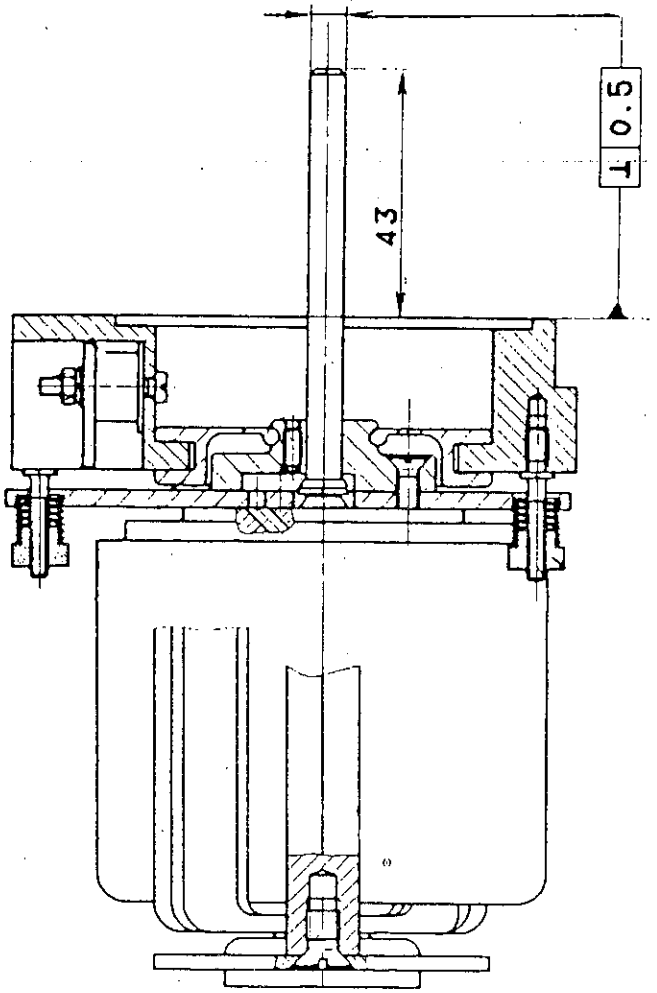
- Find adjustment: The shaft of the motor must protrude 43.0 ± 0.5 mm over the upper edge of the aluminium block and be at right angles to it. The motor must hang freely in the springs. The nuts are then to be secured with Locite 221.



- Installation is to be performed in reverse order.

When connecting the earthing studs, care is to be taken to ensure that these do not protrude over the edge of the spring-mounted motor retaining plate. The countersunk screws of the motor retaining bracket are to be secured with locking compound.

- Following installation, a check is to be made as to whether the impeller catches on the through and as to whether it moves freely in the spring mount.

5.2 p.c. board "CPU Standard 2"

5.2.1 Component configuration

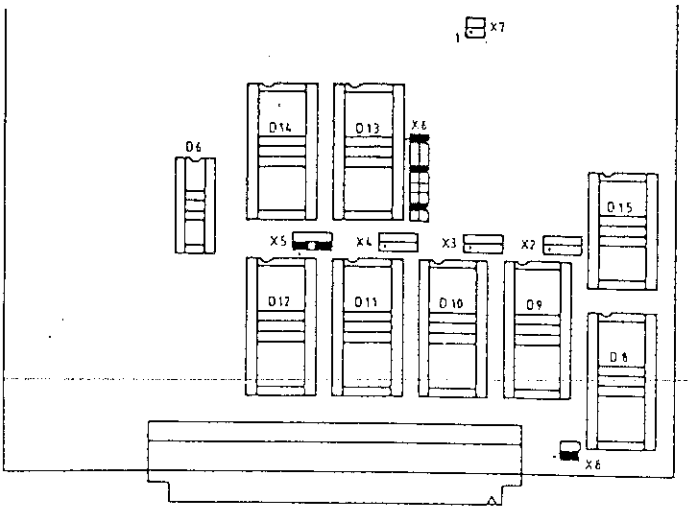
D 9 - Not configured
D 10 - Not configured
D 11 - Not configured
D 12 - EPROM
D 13 - Timer 6840
D 14 - Not configured
D 15 - Not configured
D 6 - Programmable address decoder 8304920
D 8 - RAM (2K x 8) up to software 0.3 or
(8K x 8) as of software 0.4

See 5.2.2 for layout plan

5.2.2 Assignment of jumper fields

Fitting of jumper fields X2 ... X8 with shorting links.
The pin numbering on the p.c. board is counterclockwise.

X 2 - Not fitted
X 3 - Not fitted
X 4 - Not fitted
X 5 - 1-2, 3-4 (32 K x 8) EPROM
X 6 - 1-18, 4-15, 8-11 (ext. clock for timer)
X 7 - Not fitted
X 8 - 3-4 (2 K x 8 RAM) up to software 0.3 or
1-2 (8 K x 8 RAM) as of software 0.4



5.2.3 Adjustment of voltage monitoring

If the operating voltage drops below 4.75 V, the RAM is blocked and a CPU reset is triggered. The voltage monitoring circuit can be adjusted with potentiometer R1 on the p.c. board "CPU".

- Using potentiometer R19 on the p.c. board "power pack" (see 5.3) adjust supply voltage, measured between TP1 (+) and TP2 (GND) on p.c. board "CPU", from approx. 5 V to 4.75 V ± 0.02 V.

  Caution: Never set to in excess of 5.5 V!

- 2 initial statuses are possible for adjustment of the voltage monitoring on the p.c. board "CPU":

a) If the LED V11 lights up, turn potentiometer R1 in a clockwise direction until the LED V11 goes out or glows weakly. Then turn in opposite direction until LED V11 just lights up again.

b) If the LED V11 does not light up or glows weakly, turn potentiometer R1 in an anti-clockwise direction until the LED V11 just lights up.

- Then slowly increase operating voltage with potentiometer R 19 (p.c. board "power pack") (caution: never in excess of 5.5 V!) until the LED V11 goes out or glows weakly.

  Test value: U = 4.89 V ± 0.03 V

- Set operating voltage with potentiometer R 19 (p.c. board "power pack") to 5.00 V ± 0.05 V.

- Secure both potentiometers with locking compound.

5.3 p.c. board "power pack"

The 5 V supply voltage, measured between TP1 (+) and TP2 (GND) on the p.c. board "CPU", is to be set with the potentiometer R19 on the p.c. board "power pack" to U = 5.00 V ± 0.05 V. The potentiometer is then to be secured with locking compound.

Refer also to Item 5.5.3 "Checking of operating voltages".

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5.4 p.c. board "motherboard"

No adjustment necessary.

5.5 p.c. board "analog"

5.5.1 Measuring instruments and auxiliaries required

- Multimeter
- 2 resistance decades (skin-temperature adjustment only)
- Incubator 8000 sensor simulator
  Order No. 7901240
- Skin-temperature sensor simulator
  Order No. 7901236
- Incubator 8000 measurement adapter (not absolutely necessary)
  Order No. 7901473

5.5.2 Important Information

All measuring points of importance for adjustment are combined in a 26-pole plug connector.

X4/1	TP O_2 A	X4/14	TP HT 1B
2	TP Humidity	15	TP HT Analog
3		16	TP D/A Ref.
4	TP LT 2	17	TP HT 1
5	TP O_2 B	18	TP +15 V
6	TP 0T 1	19	TP GNDA
7	TP 0T	20	TP +5 V Ref.
8	TP 0T 2	21	TP GNDA
9	TP LT Analog	22	TP -15 V
10	TP A/D-Converter	23	TP GNDD
11	TP HT 2	24	TP -5V
12	TP O_2 -Alarm	25	TP +5 V
13	TP O_2 -Analog	26	TP GNDD

Dräger

Incubator 8000

Mappen-Nr./File no.:
6141.20

Ausgabe/Edition:
03.89

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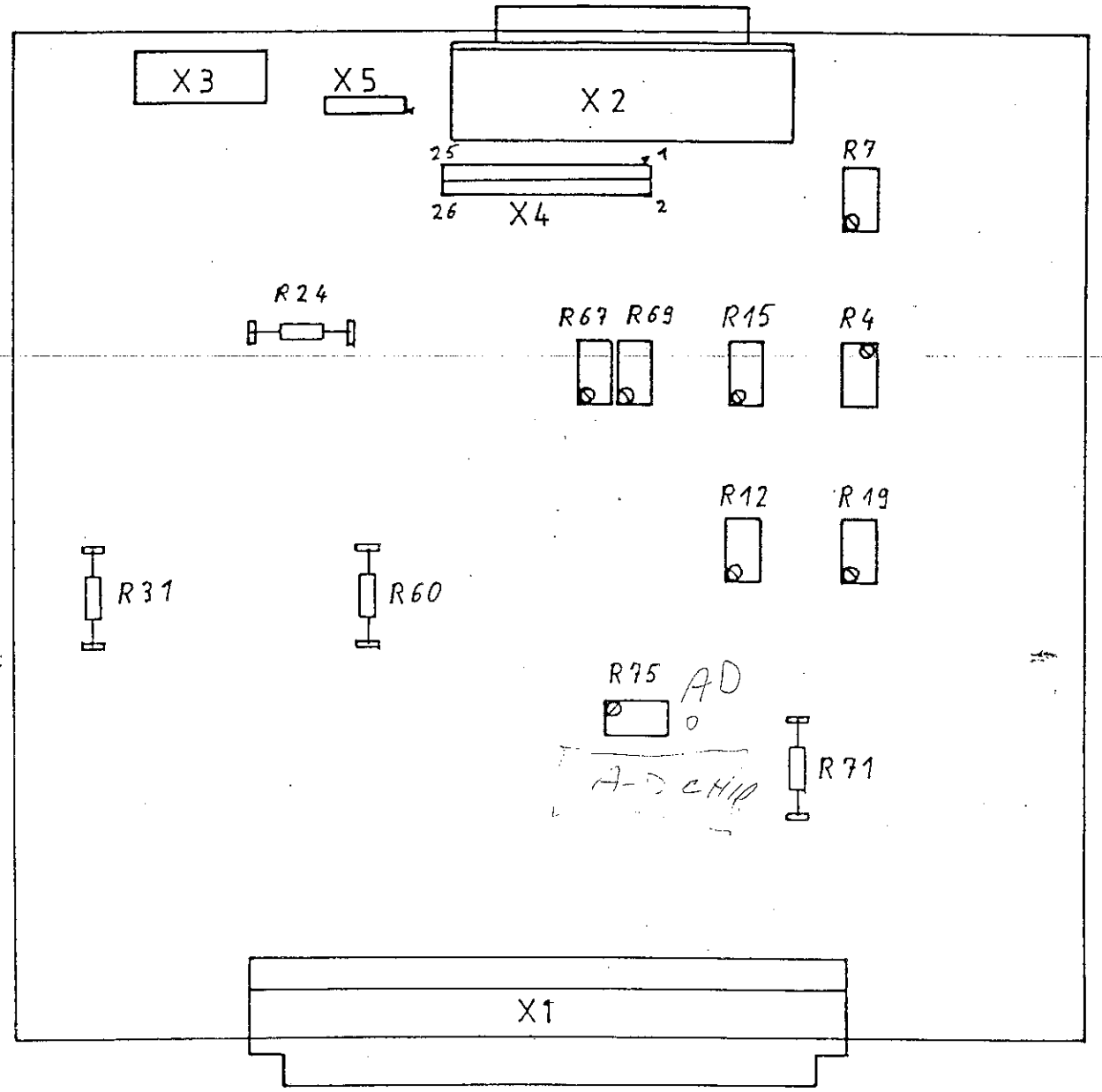


5.5.3 Checking of operating voltages

7901471

Switch on unit.

The supply voltages are checked using a digital voltmeter at the plug connector and the "analog" p.c. board.

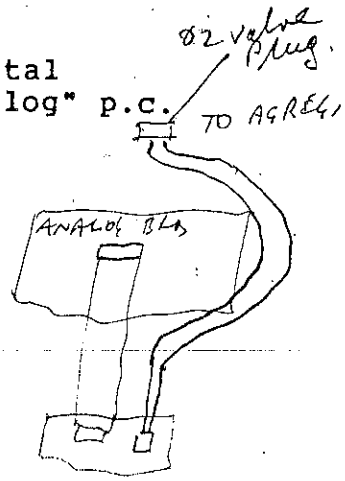
TP 25 -> TP 26 (GNDD): ± 5.0 V ± 0.05 V

TP 18 -> TP 26 (GNDD): + 15.0 V ± 0.6 V

TP 22 -> TP 26 (GNDD): - 15.0 V ± 0.6 V

TP 20 -> TP 21 (GNDA): + 5.0 V ± 0.4 V

TP 24 -> TP 21 (GNDA): - 5.0 V ± 0.4 V



5.5.4 Adjustment of air-temperature amplifier

- Connect Incubator 8000 sensor simulator (7901240) to X2.
- Switch on incubator.
- Wait approx. 35 s for self-test
- Set sensor simulator to 35.0 °C (R = 3266 Ohm).
- Connect digital voltmeter to X4/3 (+) and X4/21 (GNDA).
- Use potentiometer R7 to set voltage to 625 mV ± 0.5 mV.
- Conncet digital voltmeter to X4/4 (+) and X4/21 (GNDA).
- Use potentiometer R4 to set voltage to 2.917 V ± 5 mV.

↑ Temp. Sensor Alarm

- Display on air actual-value display => 35.0 °°C ± 0.1 °C.
- Set sensor simulator to 25.0 °C (R = 5000 Ohm).
- Check voltage at X4/4
  $U_{des.}$ = 2.083 V ± 0.05 V.
- Display on air actual-value display => 25.0 °C ± 0.2 °C.

- Set sensor simulator to 45.0 °C (R = 2184 Ohm).
- Check voltage at X4/4
  $U_{des.}$ = 3,750 V ± 0.05 V.
- Display on air actual-value display => 45.0 °C ± 0.2 °C.

5.5.5 Adjusting overtemperature amplifier

- Connect Incubator 8000 sensor simulator (7901240) to X2.
- Switch on incubator.
- Wait approx. 35 s for self-test.
- Call up service mode 5 = measured value, overtemperature amplifier (see Item 3.1, service mode).
- Set sensor simulator to 35.0 °C (R = 3266 Ohm).
- Connect digital voltmeter to X4/6 (+) and X4/21 (GNDA).
- Use potentiometer R 15 to set voltage to 625 mV ± 0.5 mV.
  Audible alarm when it No LED on overtemp
- Connect digital voltmeter to X4/8 (+) and X4/21 (GNDA).
- Use potentiometer R12 to set voltage to 3.500 V ± 5 mV.
  only alarms because in order of temp set NOT over 40°C
- Display on air actual-value display => 35.0 °C ± 0.1 °C.
- Set sensor simulator to 25.0 °C (R = 5000 Ohm).
- Check voltage at X4/8
  $U_{des.}$ = 2.500 V ± 0.05 V.
- Display on air actual-value display => 25.0 °C ± 0.2 °C.
- Set sensor simulator to 45.0 °C (R = 2184 Ohm).

- Check voltage at X4/8
  $U_{des.}$ = 4.500 V ± 0.05 V.

- Display on air actual-value display => 45.0 °C ± 0.2 °C.

Note: If the measured values between the air-temperature amplifier and the overtemperature amplifier differ by more than 0.5 °C, a sensor alarm is given.

The two measured values may deviate by a maximum of 0.3 °C from one another in the range of adjustment of the sensor simulator and in normal operation.
If OK. on Simulator but more on normal operation the sensors may be faulty

5.5.6 Adjustment of overtemperature comparator

- Connect Incubator 8000 sensor simulator (7901240) to X2.
- Switch on incubator. Take out of Service MODE
- Wait approx. 35 s for self-test.
- Set sensor simulator to 40.0 °C (R = 2663 Ohm).
- Connect digital voltmeter to X4/7 (+) and X4/21 (GNDA).
- Set potentiometer R19 such that voltage switches from negative to positive. A.C.W. → +
- Set sensor simulator to 39.5 °C (39.7 °C)
  U ≤ - 12 V more -ve -14 V
- Set sensor simulator to 40.5 °C (40.2 °C)
  U ≥ +12 V +14

5.5.7 Adjustment of skin-temperature amplifier

- Connect skin-temperature sensor simulator (7901236) to climate sensor or to Incubator 8000 sensor simulator. Plug on to side Simulator
- Set skin-temperature sensor simulator to 36.0 °C (R = 1412 Ohm).
- Connect digital voltmeter to X4/17 (+) and X4/21 (GNDA).

normally around 54 K
50 – 60 K. Range.

- Connect a resistance decade to the soldering terminals of R24 and set such that the voltage at the digital voltmeter is 308.6 mV ± 0.3 mV.

4-4 K

- Measure out the set resistance value to the nearest 10 Ohm and solder in the resistance value determined (if applicable, series or parallel connection of 2 resistors).

- Check adjustment.

- Connect digital voltmeter to X4/11 (+) and X4/21 (GNDA).

4.56 K-Ω

- Connect a resistance decade to the soldering terminals of R31 and set such that the voltage at the digital voltmeter is 2.857 V ± 10 mV.

- Measure out the set resistance value to the nearest 10 Ohm and solder in the resistance value determined (if applicable, series or parallel connection of 2 resistors).

- Check adjustment.

Skin Temp.

- Display on ~~ctr~~ actual-value display => 36.0 °C ± 0.1 °C.

- Press button "check 36.0 °C"
  => Display on skin-temperature actual value display
  => 36.0 °C ± 0.1 °C.

skin temp won't change because skin connected to Rumm

- Set skin-temperature sensor simulator to 33.2 °C
  => Display on skin-temperature actual value display
  => 33.2 °C ± 0.2 °C.

- Set skin-temperature sensor simulator to 37.8 °C
  => Display on skin-temperature actual value display
  => 37.8 °C ± 0.2 °C

5.5.8 Checking of O_2 input amplifiers and O_2connectors

- Connect Incubator 8000 sensor simulator (7901240) to X2.

- Set sensor simulator to 35 °C.

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- Switch on incubator.
- Wait approx. 35 s for selft-test
- Deactivate any overtemperature alarm by pressing the "reset!" button.
- Set voltage for the O_2 amplifiers at the Incubator 8000 sensor simulator to 50 mV with the two O_2 potentiometers. Remove leads and set at least on Test Box.
- Connect digital voltmeter to X4/1 (+) and X4/21 (GNDA) and check output voltage of O_2 amplifier A: U = 1.97 V ± 0.05 V.
- Connect digital voltmeter to X4/5 (+) and X/21 (GNDA) and check output voltage of O_2 amplifier B: U = 0.72 V ± 0.02 V.
- Set voltage for the O_2 amplifiers at the Incubator 8000 sensor simulator to 9.5 mV with the two O_2 potentiometers.
- Connect digital voltmeter to X4/12 (+) and X4/21 (GNDA): U = < 0.1 V.
- Slowly reduce voltage for O_2 amplifier A DVM reading: U = > 11 V.
- Set voltage for O_2 amplifier A to 9.5 mV again DVM reading: U = < 0.1 V. ≃ 7 - 9 mV 100 mV. If Reading 2-8 V Reset overt
- Slowly reduce voltage for O_2 amplifier B DVM reading: U = > 11 V. ≃ 12 V.
- Set voltage for O_2 amplifier B to 9.5 mV again DVM reading: U = < 0.1 V. 100 mV

5.5.9 Adjustment of air-temperature analog output (not used at present)

- Set sensor simulator to 25.0 °C.
- Connect digital voltmeter to X4/9 (+) and X4/21 (GNDA). Not Req'd
- Use potentiometer R67 to set voltage to 2.5 ± 10 mV.

- Set sensor simulator to 40.0 °C.

Not Reqd.

- Use potentiometer R69 to set voltage to 10 V ± 10 mV.
- Set sensor simulator to 35.0 °C
  DVM reading: 7.5 V ± 10 mV.

5.5.10 Adjustment of skin-temperature analog output (not used at present)

- Additionally connect skin-temperature sensor simulator and set to 37.8 °C.
- Connect digital voltmeter to X4/15 (+) and X4/21 (GNDA).

NOT Req'd

- Connect a resistance decade to t he soldering terminals of R60 and set such that the voltage on the DVM is 9.60 V ± 10 mV.
- Measure out set resistance value to the nearest 10 Ohm and solder in the resistance value determined.
- Check adjustment.
- Set skin-temperature sensor simulator to 33.2 °C
  DVM reading: 0.40 V ± 10 mV.
- Set skin-temperature sensor simulator to 36.0 °C
  DVM reading: 6.0 V ± 10 mV.

5.5.11 Adjustment of reference voltage of D/A converter (not used at present)

not used

- Connect digital voltmeter to X4/16 (+) and X4/21 (GNDA).
- Use potentiometer R81 to set voltage to -10 V ± 10 mV.

5.5.12 Adjustment of A/D converter

This is only necessary if the voltage adjustment does not tally with the actual value displays or if the A/D converter or N19 is replaced.

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- Enter service mode 5 (measured value, overtemperature sensor).
- Connect a resistance decade to the sensor simulator for overtemperature and switch to R_{EXT}.
- Connect digital voltmeter to X4/8 and X4/21 (GNDA).
- Set voltage via resistance decade to 0.000 V + 1 mV. 27.92 K.
- Set zero point of A/D converter with potentiometer R 75 such that the actual value display just switches from 0.0 °C to 0.1 °C.
- Set voltage to 5.000 V ± 1 mV. 1.819 K
- Connect a further resistance decade to the soldering terminals of R71 and adjust such that the actual value display just switches from 49.9 °C to 50.0 °C. 43.2K
- Measure out the set resistance and solder in the resistance value determined (if necessary, series or parallel connection of 2 resistors).
- Check adjustment at

  5.00 V = 50.0 ± 0.1 °C
  4.00 V = 40.0 ± 0.1 °C
  3.00 V = 30.0 ± 0.1 °C
  2.00 V = 20.0 ± 0.1 °C
  1.00 V = 10.0 ± 0.1 °C
  0.00 V = 0.0 ± 0.1 °C

Make Sure in Service mode 5

Remove Dummy Sensor.

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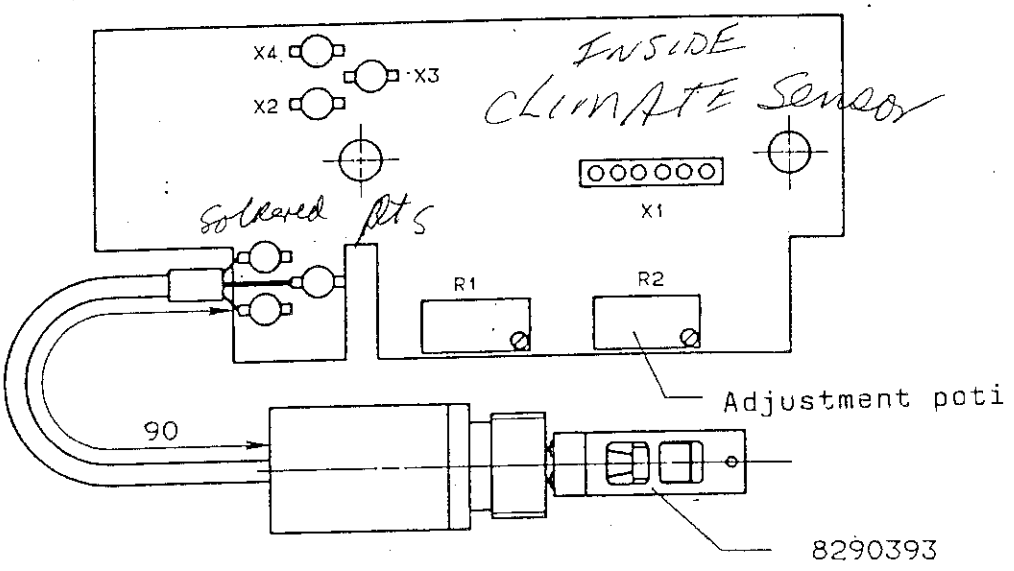
5.6. Adjustment and functional control of humidity sensor

5.6.1. Necessary test tools

- Temperature measuring unit, compl. order no. 79 01 148
- Humidity and temperature sensor order no. 79 01 476

The accuracy of the humidity and temperature sensor must be guaranteed by regular check and adjustment with the adjustment set (order no. 79 01 477)

5.6.2. Humidity sensor, complete



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5.6.3. Adjustment and functional control when assembled

- Unscrew cover from climate sensor
- Connect climate sensor without cover to the Incubator.
- Fasten humidity sensor 79 01 476 max. 60 mm away from the humidity sensor of the Incubator.

  For this, lay the connecting cable of the humidity sensor over the holder of the double side wall and fix humidity sensor at the temperature sensor (black disk) of the climate sensor using adhesive tape or wire.
- Seal the air gap which exists, because the cover of the climate sensor is unscrewed, with adhesive tape.
- Set Incubator to following desired values:

  Air temperature: 33.0 to 36.0°C

  Humidity: 65 to 75% rel. humidity

  The indication of the Testoterm humidity sensor is decisive for the humidity. In case of deviations the desired value at the Incubator is to be changed.
- The desired value at the Incubator must be constant for at least 30 minutes before performing adjustment and functional check.
- Set humidity display at the Incubator to the value of the Testoterm humidity sensor with poti R 2. When performing a functional check the permissible deviation is 6% rel. humidity.
- Secure adjustment poti R 2 with safety lacquer.

5.7. Fresh air suction

A functional check of the fresh air suction is always necessary, if:

a) with external oxygen supply the O_2-concentration is not attained in the Incubator.

b) the basic housing or filter housing 2M 19 592 with metal 2M 19 573 is renewed.

By twisting of the metal 2M 19 573 at the filter housing 2M 19 592 the diameter in the suction port behind the fresh air filters can be changed, this makes an adjustment possible.
By using a sharp thing the metal can almost be changed without disassembling the filter housing. If not, remove filter housing, reduce suction opening and when re-assembled enlarge it so long until the desired value of the fresh air suction is attained.

5.7.1. Functional check and pre-adjustment

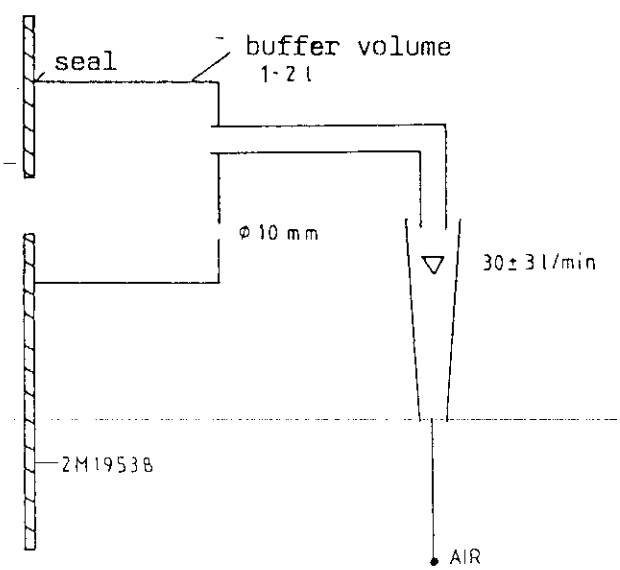
Measurement with a Volumeter at the bore of the metal 2M 19 538 before the fresh air filters.
Assumption: New fresh air filters

Desired value of fresh air suction = 30^{+3}_{-5} L/min.

5.7.2. Final adjustment

Assumption: new fresh air filters

Test set-up:



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Medizintechnik
Medical Systems

This test set-up makes a very accurate adjustment of the fresh air suction possible, without inaccuracy in measurement by power loss of a measuring instrument. For this, measure by changing the flow at the second open bore of the buffer volume with a smoke tube or with the smoke of a glowing cigarette, when the actual value of the fresh air suction falls below or is exceeded. The test value of the fresh air suction is 30 ± 3 L/min.

7. Trouble-shooting with the Penbug system

Basic setting of Penbug system: S1 = 2
S2 = 1
RAM
Penbug

7.1. Read-out of fault list

In addition to keyboard interrogation, the fault list can also be read out via the Penbug.

Work sequence: Basic Penbug setting
Connect and switch on Gercom and Penbug
Switch on incubator

Press "return" button:

=> > - - - - enter start address 0001

Address $0001 corresponds to fault 1,
Address $000A corresponds to fault 10 etc

The address range can be run through with the button " ". A memory content of $FF corresponds to a fault message.

7.2. Actuation of air heating, water heating, valve 1 and valve 2

Prerequisite:

The climate sensor with O_2 sensors must have been connected with adequate voltage. There must be no overtemperature currently present. The Incubator 8000 sensor simulator (79 01 240) can also have been connected in place of the climate sensor.

Actuation is effected via the PIA D1 (address $8X10 - $7X13):

```
PORT B =  Outputs
CA 2   =  Output = low (voltage monitoring)
CB 2   =  Output = high (voltage monitoring)

PB 0   =  Air heating (High = on)
PB 1   =  Water heating (High = on)
PB 2   =  Valve 1       (High = on)
PB 3   =  Valve 2       (High = on)
PB 4   =  Overtemperature reset (high = overtemperature
                                 reset)
```

The following watchdogs (monos) must be retriggered:

```
WD 1 CPU  =  $9000
WD 2 CPU  =  $9001
Mono 1    =  $8X3X    (INOP-LED)
Mono 2    =  $8X4X
Mono 3    =  $8X5X
```

The programm is stored in the battery-buffered RAM of the CPU.

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Address (hex)	Memory unit	Remarks
1. CPU Watchdogs retriggern		
00	F7	STA B
01	90	Address WD1 CPU
02	00	
03	F7	STA B
04	90	Address WD2 CPU
05	01	
2. PIA D1 initialisieren (complete)		
06	C6	LDA B
07	40	01000000 -> without Bit 6 all inputs
08	F7	STA B
09	88	Address Port A
0A	10	
0B	C6	LDA B
0G	34	XX110 1XX | | | Low Output (CA 2)
0D	F7	STA B
0E	88	Address Control register A
0F	11	
10	C6	LDA B
11	FF	11111111 -> all outputs
12	F7	STA B
13	88	Address Port B
14	12	
15	C6	LDA B
16	3C	XX111 1XX | | | High Output (CB 2)
17	F7	STA B
18	88	Address Control register B
19	13	

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Medical Systems

3. Actation of Peripherie (heaters and valves)

1A	C6	LDA B
1B	1F	00011111 |||||Air heater ||||Water heater |||Valve 1 ||Valve 2 |Overtemperature- Reset
1C	F7	STA B
1D	88	Address Port B
1E	12	

4. All Watchdogs retriggern

1F	F7	STA B
20	90	WD1 CPU
21	00	
22	F7	STA B
23	90	WD2 CPU
24	01	
25	F7	STA B
26	88	Mono 1
27	33	
28	F7	STA B
29	88	Mono 2
2A	44	
2B	F7	STA B
2C	88	Mono 3
2D	55	

5. Return to address 001A

2E	7E	JMP
2F	00	Return Address $001A
30	1A	

Over Test-Programm

The heaters and valves can be addressed individually by changing the memory content of address $001B.

1B	11	Air heating only
1B	12	Water heating only
1B	14	Valve 1 only
1B	18	Valve 2 only

The check-back signals from the periphery (see also 6.1., description of PIA ports), which can be measured directly with an oscillograph or a voltmeter at the PIA ports, are very often of importance for trouble-shooting.

7.3. Actuation of display elements

This test program can be used to switch all the display elements of the individual displays on or off.
Exception: The mains failure LED is not actuated by the processor system.

Addresses:

Air display	= $8X00, $8X01
Skin display	= $8X02, $8X03
O_2 display	= $8X04, $8X05
Humidity display	= $8X06, $8X07
INOP-LED	= $8X3X

The test program is stored in the battery-buffered RAM of the CPU.

Example: All display elements of the air display light up with the exception of the INOP and the mains failure LED:

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All displays can be blanked by altering the memory content of address $21 from $00 to $FF. The INOP-LED lights up if the address $8833 is not addressed (e.g. by changing to $8844 or by inserting NOP commands).
The other modules can be addressed with this test program by changing the module addresses.
For example:

Air module	-	O_2 module
Address $8X00	-	$8X04
Address $8X01	-	$8X05

Address (hex)	Memory unit (hex)	Remarks
1. All Watchdogs retriggern		
00	F7	STA B
01	90	Address WD1 CPU
02	00	
03	F7	STA B
04	90	Address WD2 CPU
05	01	
06	F7	STA B
07	88	Address Mono 3
08	55	(INOP-LED)
09	F7	STA B
0A	88	Address Mono 1
0B	33	(Horn)
0C	F7	STA B
0D	88	Address Mono 2
0E	44	(Horn)
2. Initialization of display module and actuation of display elements		
	Air Skin O_2 Humidity	
0F	C6	LDA B
10	0C	= 16x8bit character display-left entry + encoded scan-sensor-matrix
11	F7	STA B
12	88	Address Air-Display
13	01 03 05 07	
14	C6	LDA B
15	20	00100000 = clock-time
16	F7	STA B
17	88	Address Air-Display
18	01 03 05 07	
19	C6	LDA B
1A	90	10010000 = write display
1B	F7	STA B
1C	88	Address Air-Display
1D	01 03 05 07	
1E	86	LDA A
1F	08	= Counter
20	C6	LDA B
21	00	= all Display on
22	F7	STA B
23	88	Address Air-Display
24	00 02 04 06	
25	4A	DEC A (counter-1)
26	26	BNE
27	F8	
28	7E	JMP
29	00	Return to address $0000
2A	00	

Circuit-Diagramms

Circuit and Assemble-Diagramms

- Mainunit Incubator 8000

- Valveblock

- Aggregat

- Electronicinsertion Air + Air/Skin

- PC Motherboard

- PC Powersupply

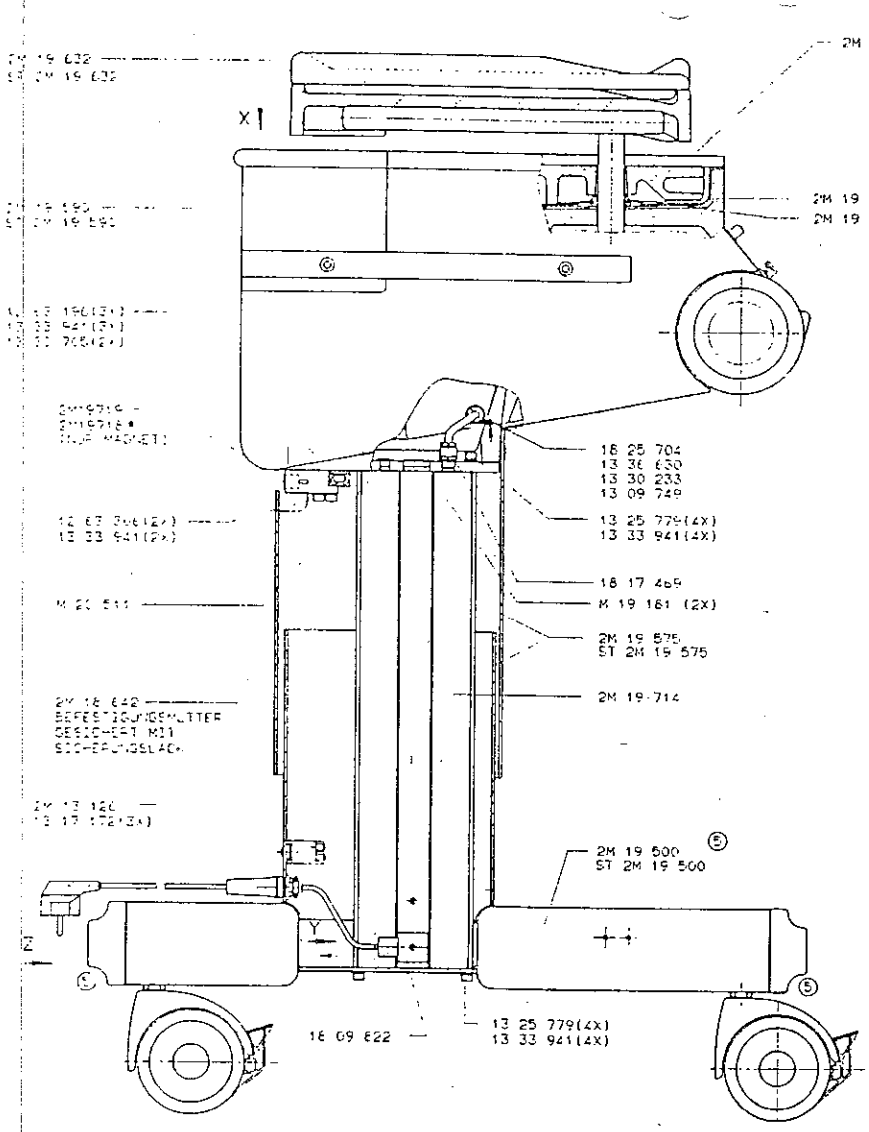
- PC Analog Air + Air/Skin

- PC CPU

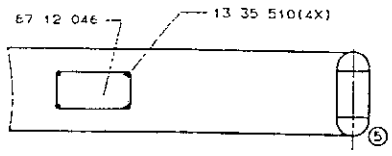
- Indicator + Keyboard

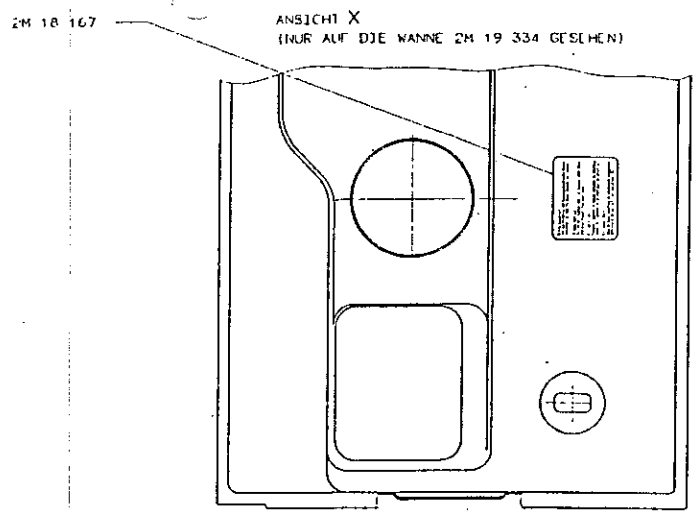
- Climatesensor

Mainunit Incubator 8000



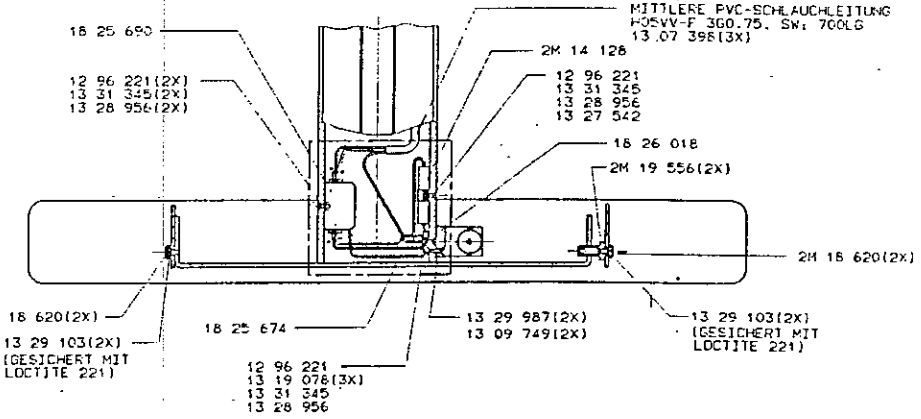
ANSICHT Z
(OHNE VERKLEIDUNG UND LAUFROLLEN DARGESTELLT)



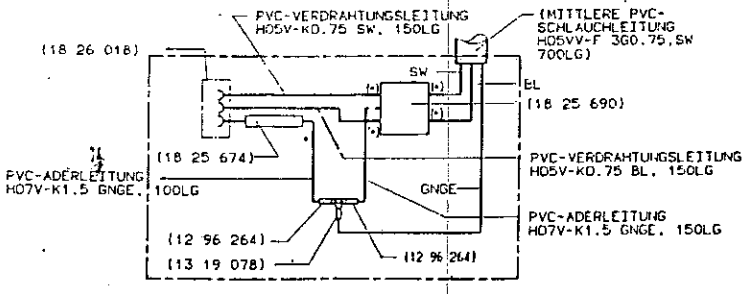


ANSICHT X
(NUR AUF DIE WANNE 2M 19 334 GESEHEN)

ANSICHT Y
(OHNE LAUFROLLEN DARGESTELLT)



VERDRAHTUNGSSCHEMA



* = SCHRUMPFSH 6.35-3.2- 84 04 065, 15LG (5X)

* = IN VERKLEIDUNG, VOLLST. 2M 19 575 ENTHALTEN

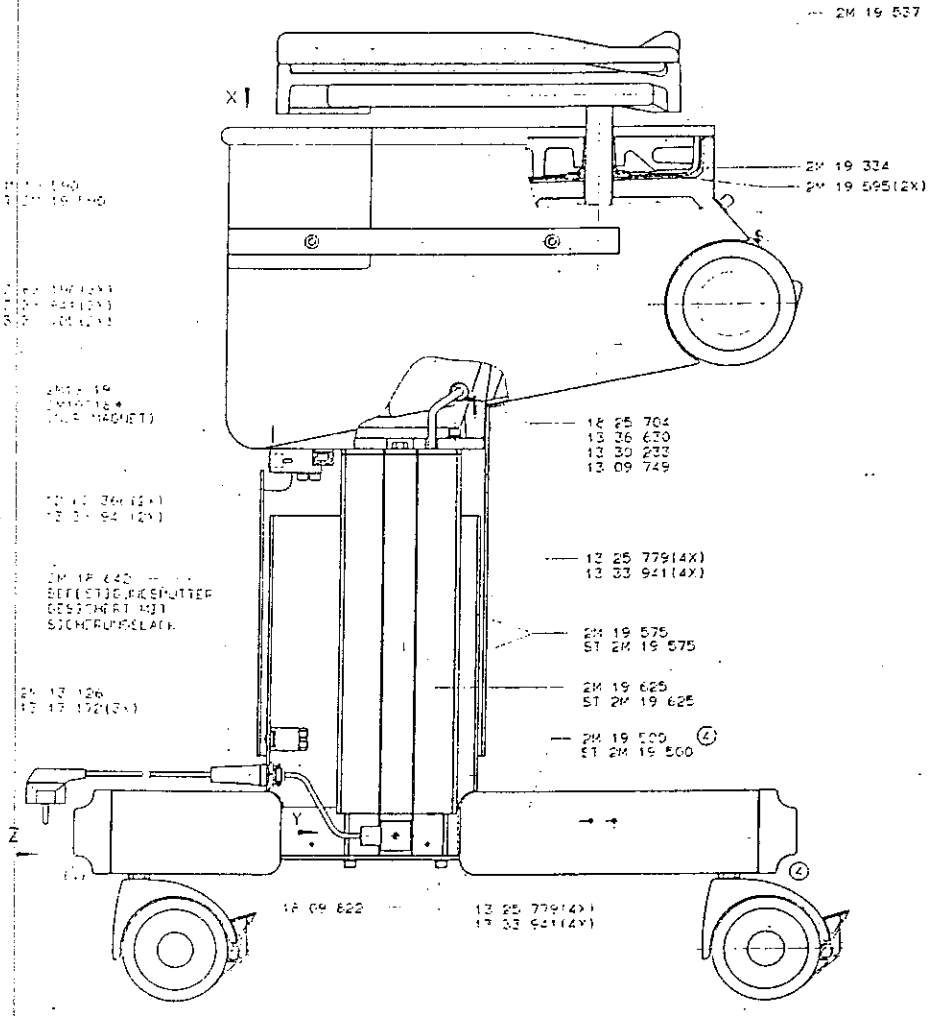
LOSE TEILE:

1 STCK	LAUFTERRAD, VOLLST.	2M 19 665, ST 2M 19 665
1 STCK	SCHUTZHUELLE	M 22 532, M-ST, 2684
1 STCK	VERSANDVERPACKUNG	87 11 878, ST 87 11 878

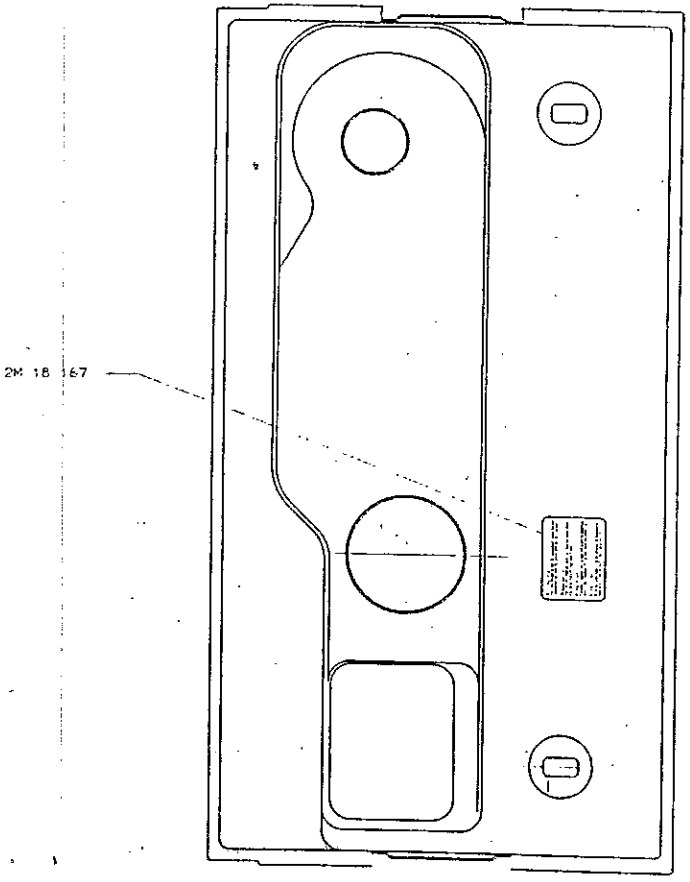
ST 2M 19 686

			5	4X	
1:2,5	—	M2			Dräger

GRUNDEINHEIT INKUBATOR 8000 F — 2M 19 686

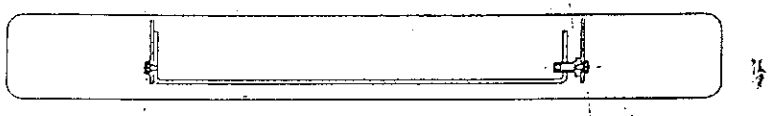


ANSICHT X
(NUR AUF DIE WANNE 2M 19 334 GESETZT)

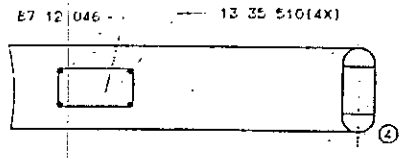


** IN VERKLEIDUNG, VOLLST. 2M 19 575 ENTHALTEN

ANSICHT Y
(OHNE HOEHENVERSTELLUNG UND LAUFROLLEN DARGESTELLT)



ANSICHT Z
(OHNE VERKLEIDUNG UND LAUFROLLEN DARGESTELLT)



LOSE TEILE:

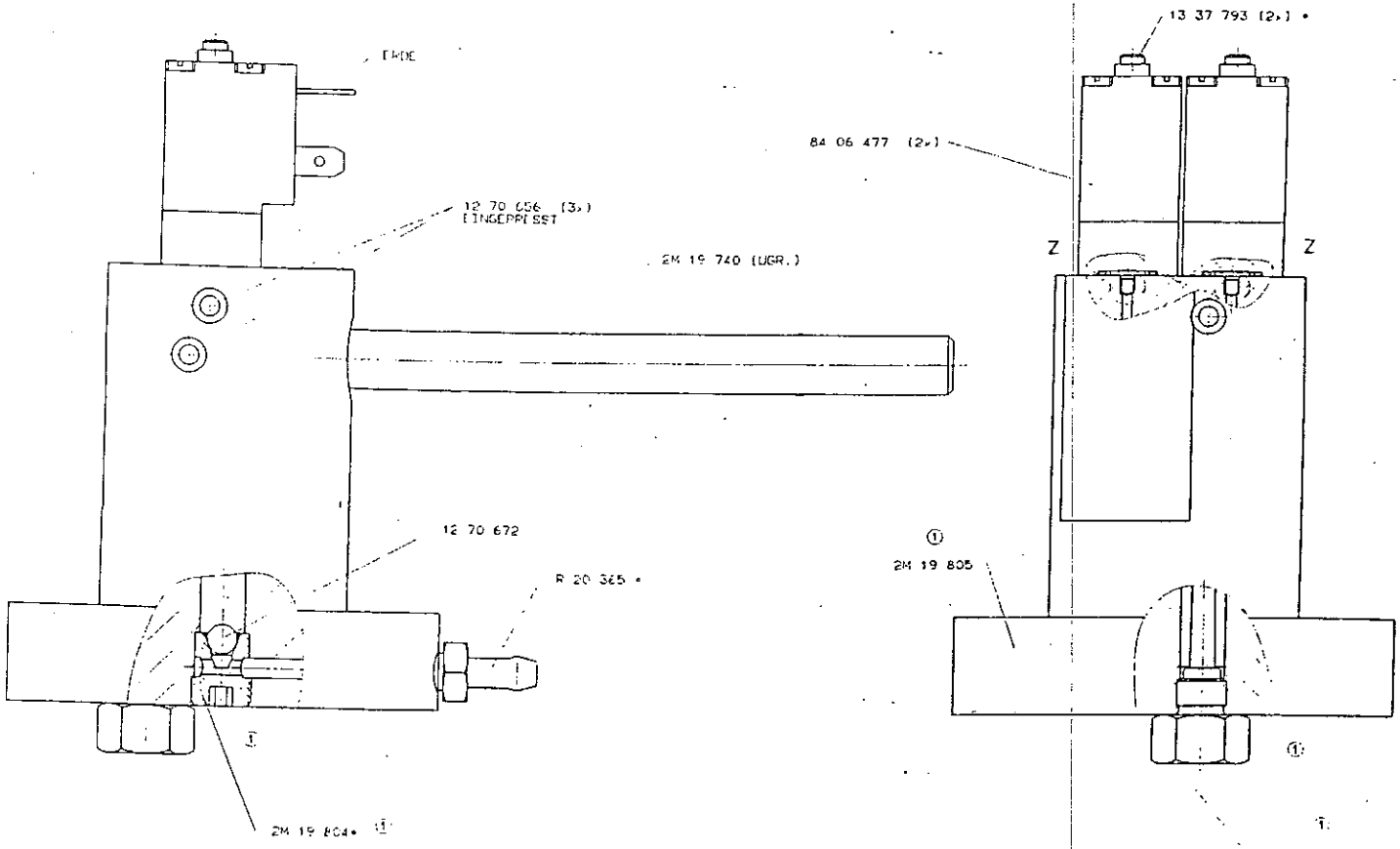
1 STCK	LUEFTERRAD, VOLLST.	2M 19 665, ST 2M 19 6
1 STCK	SCHUTZHUELLE	M 22 532, M-ST 2884
1 STCK	VERSANDVERPACKUNG	87 11 578, ST 87 11 57

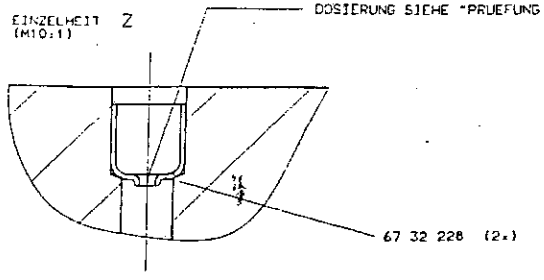
ST 2M 19 720

F6 + F9

1:2,5	—	M2	Dräger
GRUNDGERAET INKUBATOR 8000 W			2M 19 720

Valveblock





PRUEFUNG: nach Prüfkarte

DER VENTILBLOCK IST STEHEND ZU PRUEFEN.
(MAGNETVENTILE OBEN)

1. DRUCKSEITE
SAUERSTOFF IST UEBER DEN M12x1 ANSCHLUSS
MIT 5 BAR ZUZUFUEHREN.

1.A DURCHFLUSS
DIE MAGNETVENTILE WERDEN NACHEINANDER UEBER DIE
UNTEREN FAHNEN AN 24V GLEICHSTROM ANGESCHLOSSEN.
(NICHT AN ERDE)
DER DURCHFLUSS MUSS AM ROHR (UGR.) 2M 19
JEWEILS 14±1 L/MIN +0C% BETRAGEN.

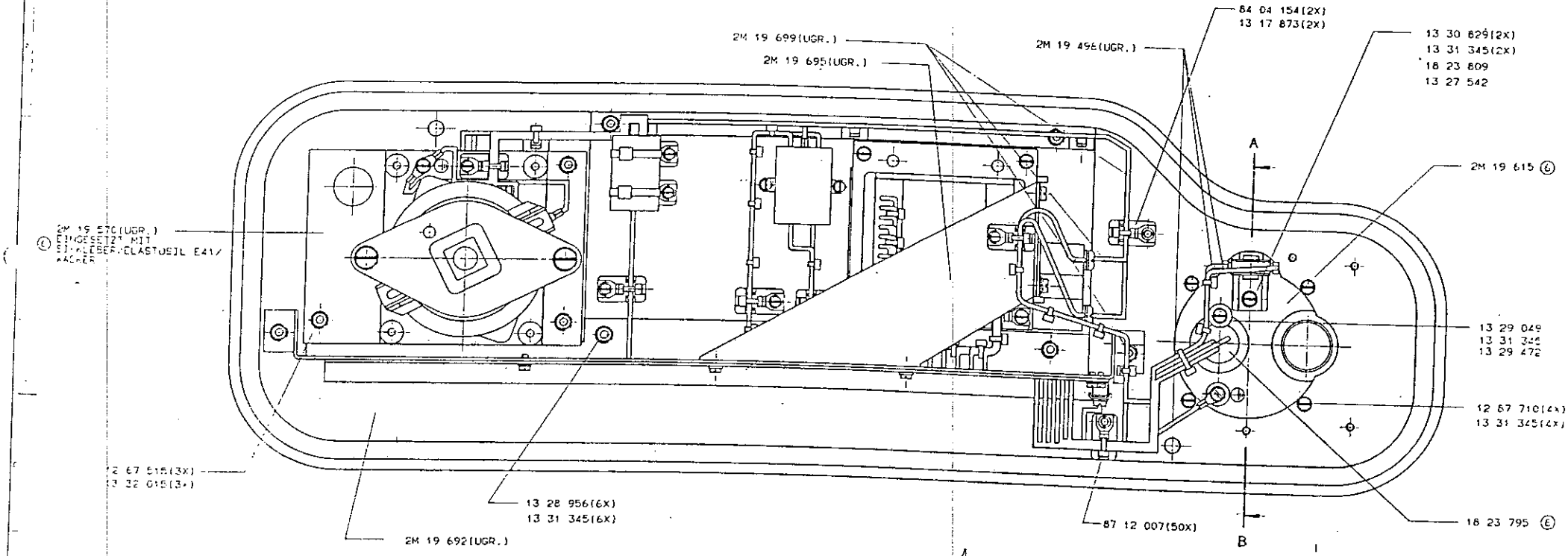
1.B DICHTIGKEIT
BEI NICHT ANGESCHLOSSENEN VENTILEN UND AB
GASZUFUHR DARF DIE LECKRATE NICHT MEHR AL
0,CC5 (MBAR L)/S +0C% BETRAGEN.

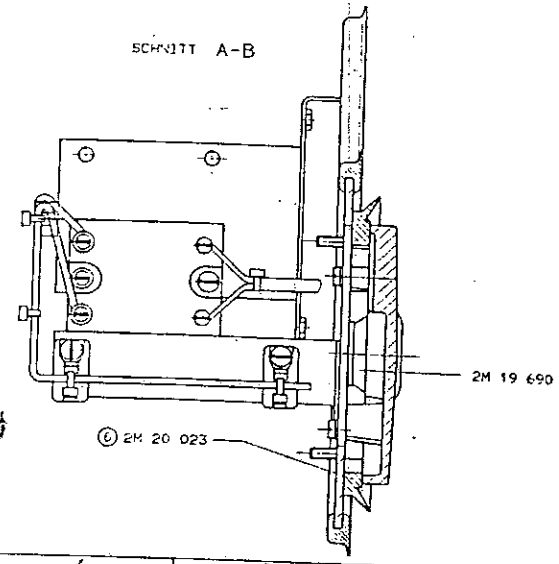
2. DRUCKLOSE SEITE, DICHTIGKEIT
SAUERSTOFF WIRD UEBER DAS ROHR (UGR.) 2M 19 740
MIT 200 MBAR ZUGEFUEHRT.
NACH ABGESTELLTER GASZUFUHR DARF DIE LECKRATE
NICHT MEHR ALS 1 (MBAR L)/S +0C% BETRAGEN.

* GESICHERT MIT LOCTITE 221

2:1 (1:1)	M2	Dräger	
VENTILBLOCK, (UGR.)		2M 19 734	

Aggregat





1. SICHERHEITSPRUEFUNG NACH IEC 601/VDE 0750/1

1.1 ERD-ABLEITSTROM
MESSAUFBAU NACH IEC 601 TEIL 1 BILD 16
IM NORMALBETRIEB I < 0.2 mA
IM 1.FEHLERFALL I < 0.3 mA

1.2 PRUEFUNG AUF SPANNUNGSFESTIGKEIT:
1500 V

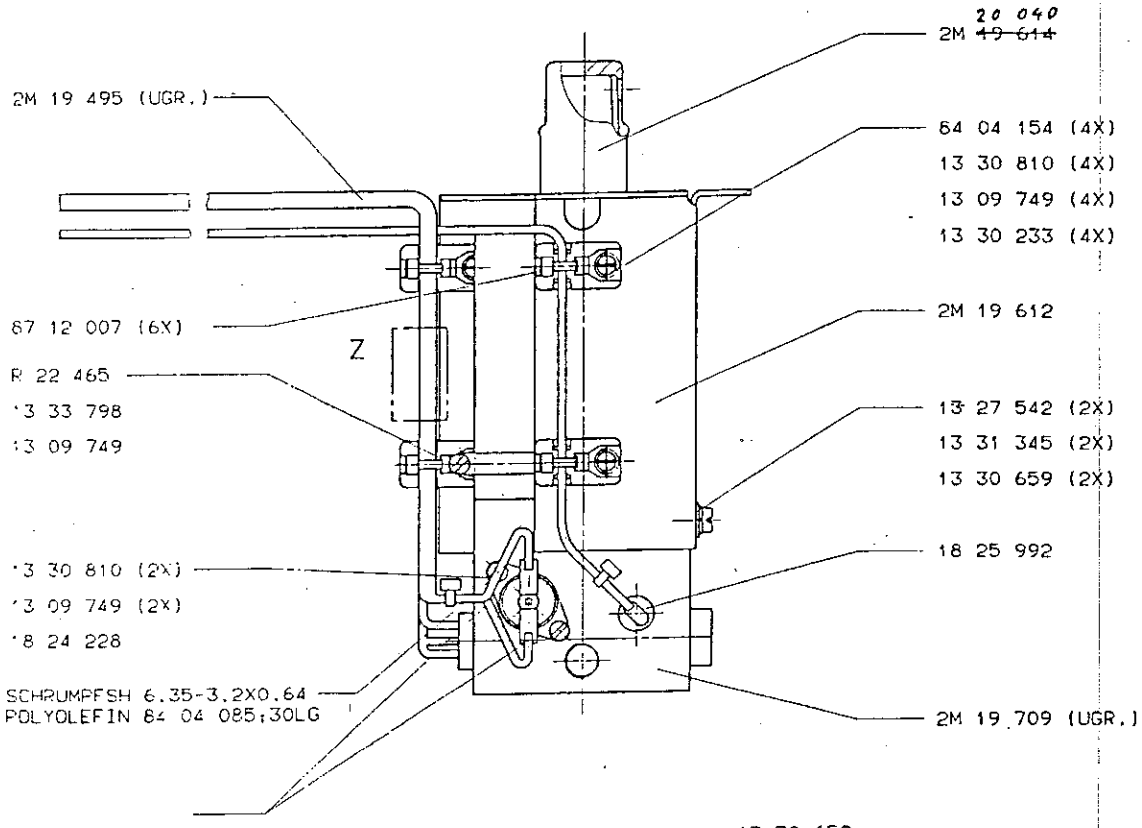
1.3 SCHUTZLEITERANSCHLUSZ
ZWISCHEN SCHUTZLEITERANSCHLUSZ UND ALLEN METALLGEHAEUSEN: MAX. 0.1 Ω

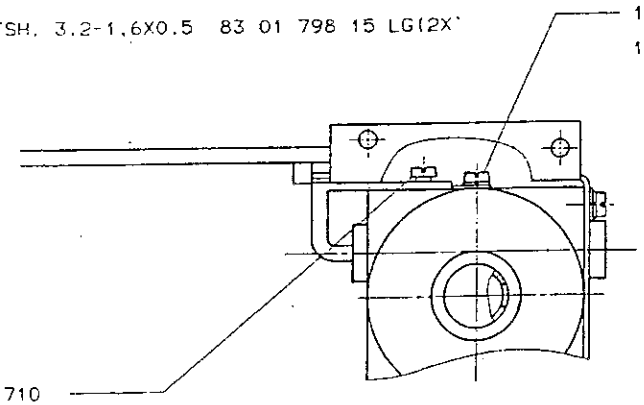
2. FUNKTIONSPRUEFUNG

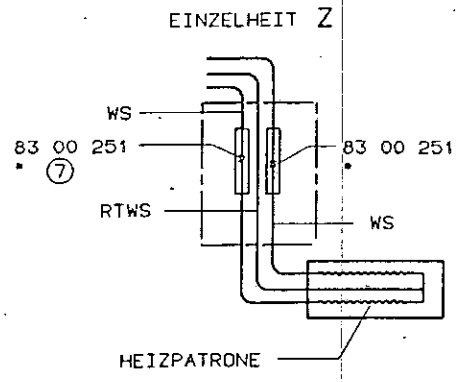
GDE AGGREGAT MIT EINSCHUB 8200901, SENSOR 8200913 UND LUEFTERRAD 2M19665 ZUSAMMENBAUEN.
EINSCHALTTEST DURCHFUEHREN: KEINE INOP-MELDUNG, KEINE SENSORWARNUNG

ST 2M 19 640

			6	4X	
1:1	—	M2			Dräger
A4 nS	GDE AGGREGAT 8000				2M 19 640







LOSE TEILE:

4 STCK MUTTER 13 28 956
5 STCK FEDERRING 13 31 345
1 STCK SCHRAUBE 13 30 659
1 STCK SCHEIBE 13 27 542

20 STCK KABELBINDER 87 12 007

6 STCK SCHRUMPFSCHLAUCH 3.2-1.6X0.5 83 01 798.15MM

1 STCK K REL ELR 3/32 V10A LV 00414 ;18 21 148
1 STCK KABEL (UGR) 2M 19 496
1 STCK KABEL (UGR) 2M 19 497
1 STCK KABEL (UGR) 2M 19 461

ALLES VERPACKT IN:

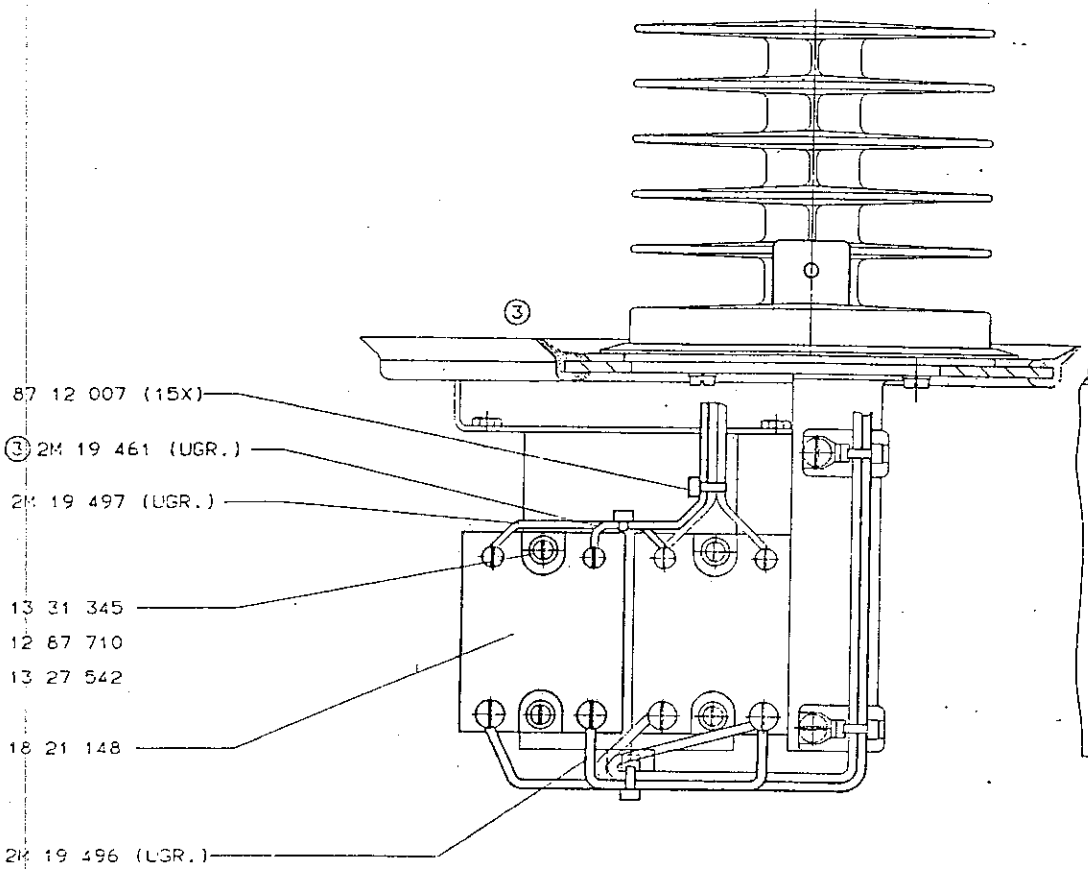
FLACHBEUTEL MIN.110X150 DWN1210

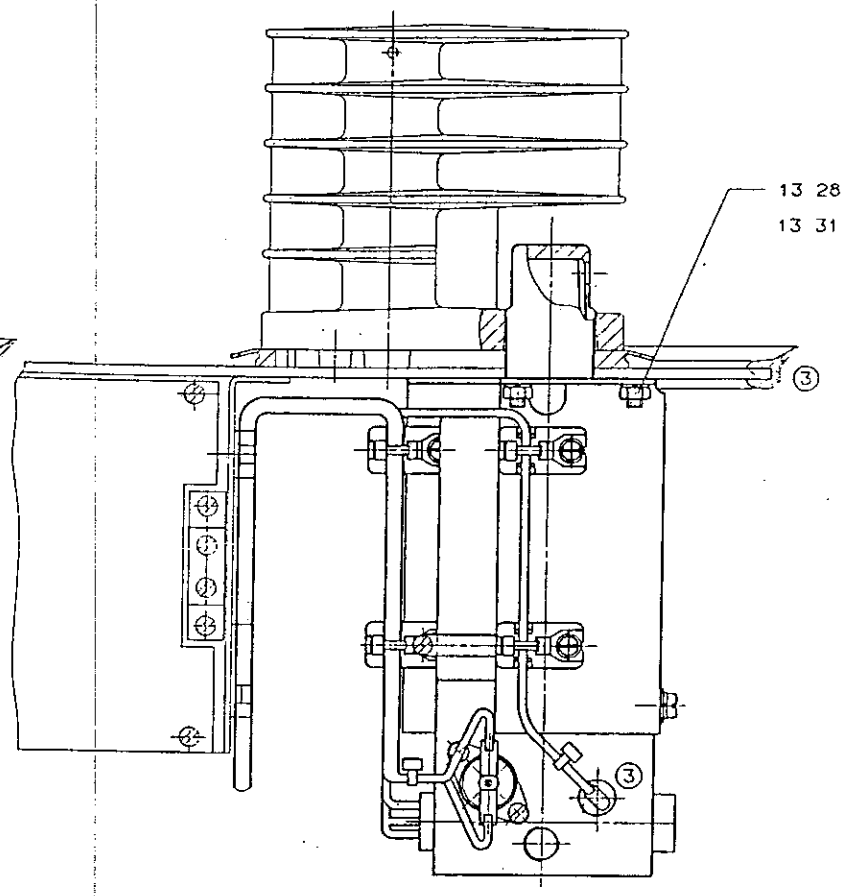
(HIERZU MONTAGEANLEITUNG 2M 19 606)

* = SCHRUMPFSH 6.35-3.2X0.64-POLYOLEFIN 84 04 085; 70LG (2X) ⑦

ST 2M 19 610

Werkstoff		7	2X	SACH-NR. NEU, STUECKZAHL GEAENDERT; DARSTELLUNG	
Massstab 1:1	Allgemeintoleranzen	Abteilung M2	Name / Datum: 966 Top None; Gez. 05.05 MEYER; Gepr.; Norm.	Aenderungen	Dräger
				Benennung: WASSERHEIZUNG, VOLLST.	Zeichnungs-Nr.: 2M 19 610
FREI					Ersatz fuer 2M19610 "6" Ersetzt durch





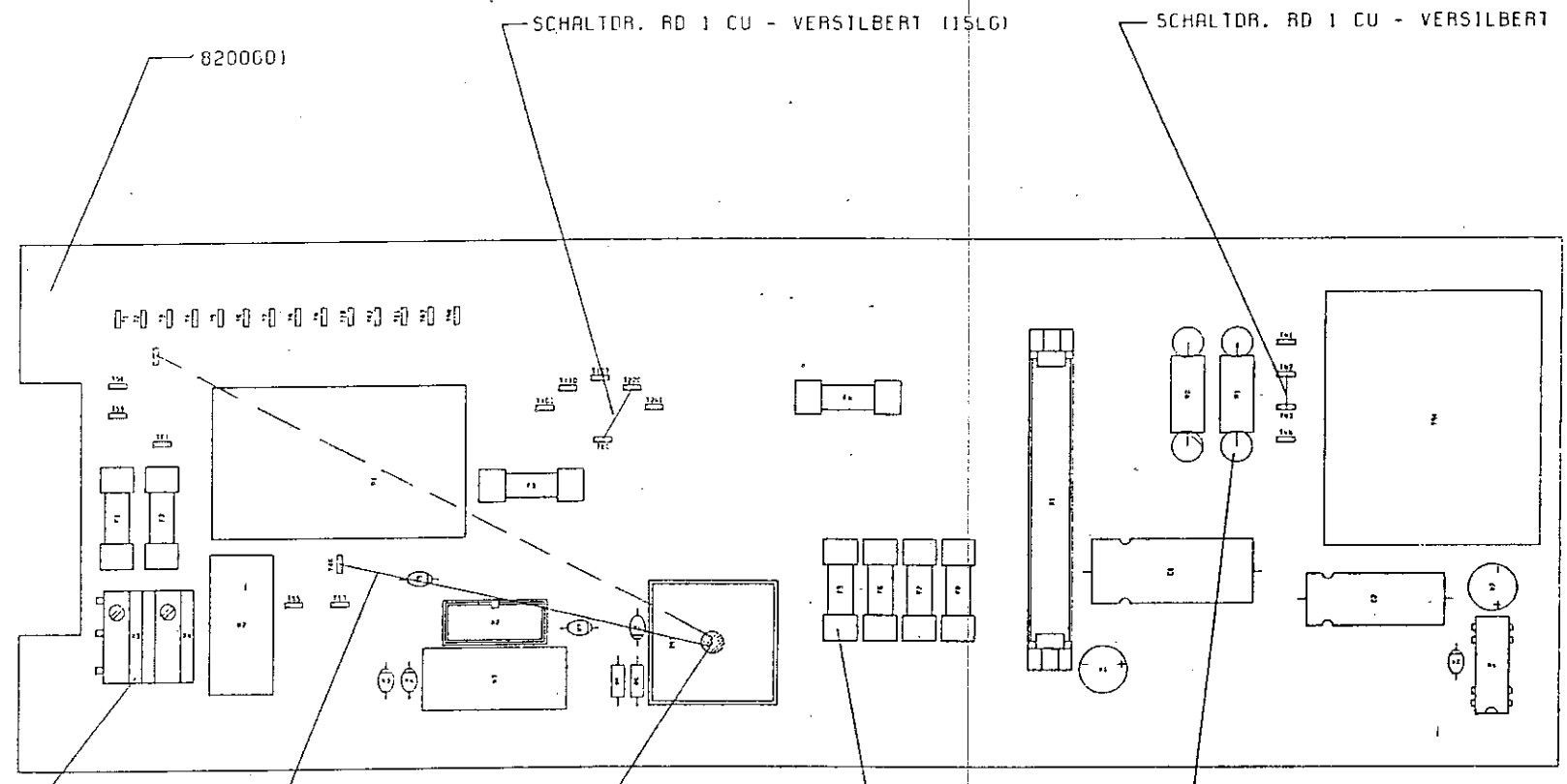
SCHMAL GEZEICHNETE TEILE GEHOEREN ZU

GDE AGGREGAT 8000 2M 19 640,ST 2M 19 640

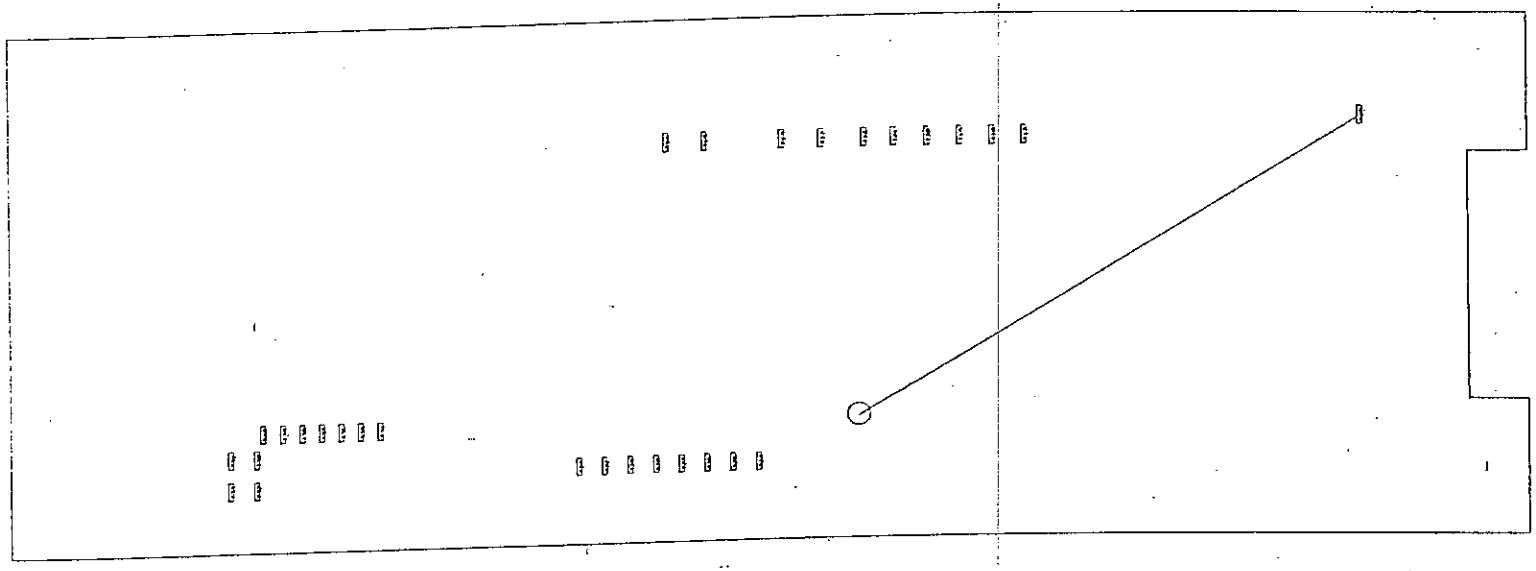
Diese Zeich... nu zur Info... rung erfolgt ...

-DA- —	-DB- —	-DC- —				
Werkstoff: —		3	4X	DARSTELLUNG GEÄNDERT, SACH-NR. NEU		
				Änderungen		
Maßstab: 1 : 1	Allgemeine Toleranzen: —	Abteilung: M2	Zeichn. geprüft: 1986 Bearb. H06.01 Gepr. Norm.	Tag: Name: MEYER	Dräger Aktiengesellschaft	Dräger
		Benennung: MONTAGEANLEITUNG			Zeichnungs-Nr.: 2M 19 606	
IDEE					Ersatz für: 2M19606 "2"	
					Ersetzt durch:	

A8+P3

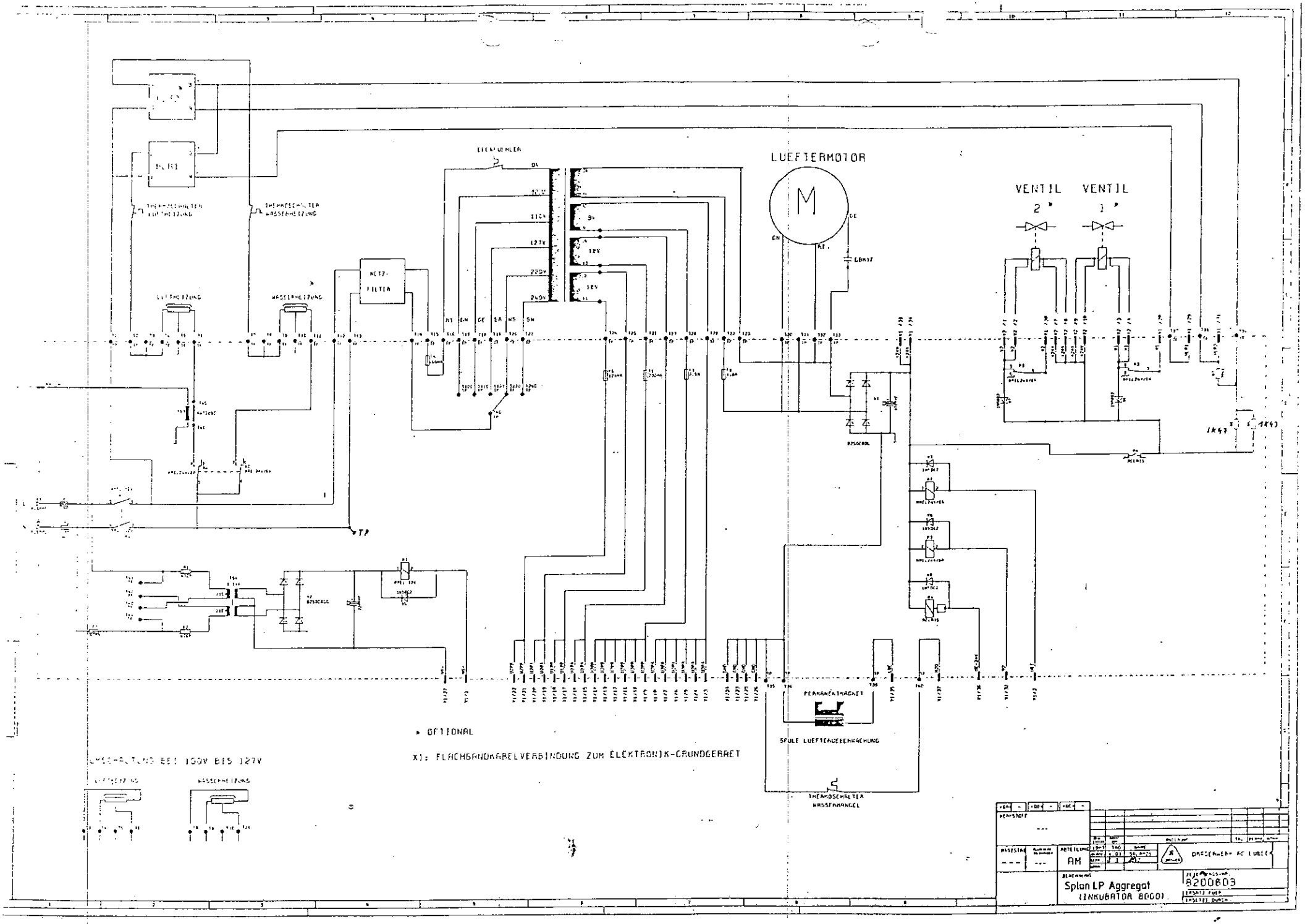


MASSSTAB 2:1		MATERIAL AM	
		LP AGGREGAT, UGR.	8200602

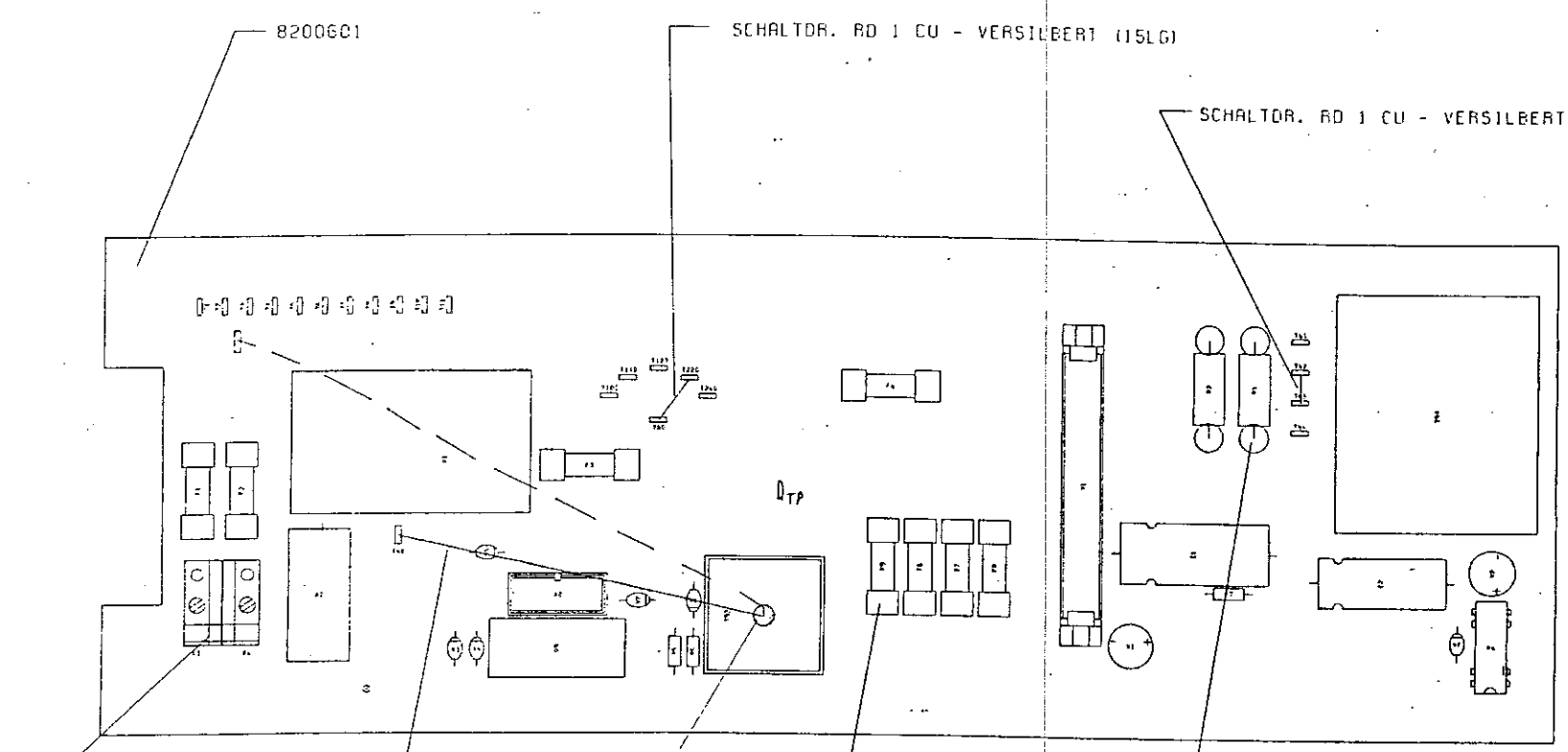


MASSSTAB		ARBEITSUNG	DRÄGERWERK AG LÜBECK	
2:1		AM		
BENENNUNG			ZEICHNUNGS-NR.	BLATT 2
LP AGGREGAT, UGR			8200602	
LINKUBATOR 8000I				

B2 + B3


LUEFTERMOTOR
VENTIL 2
VENTIL 1
NETZ-FILTER
TP
* OPTIONAL
X1: FLACHBANDKABELVERBINDUNG ZUM ELEKTRONIK-GRUNDGERAET
SPULE LUEFTERANZEIGEBRUECKE
THERMOSCHALTER WASSERMANGEL
Splan LP Aggregat (INKUBATOR 8000)
8200803
AM

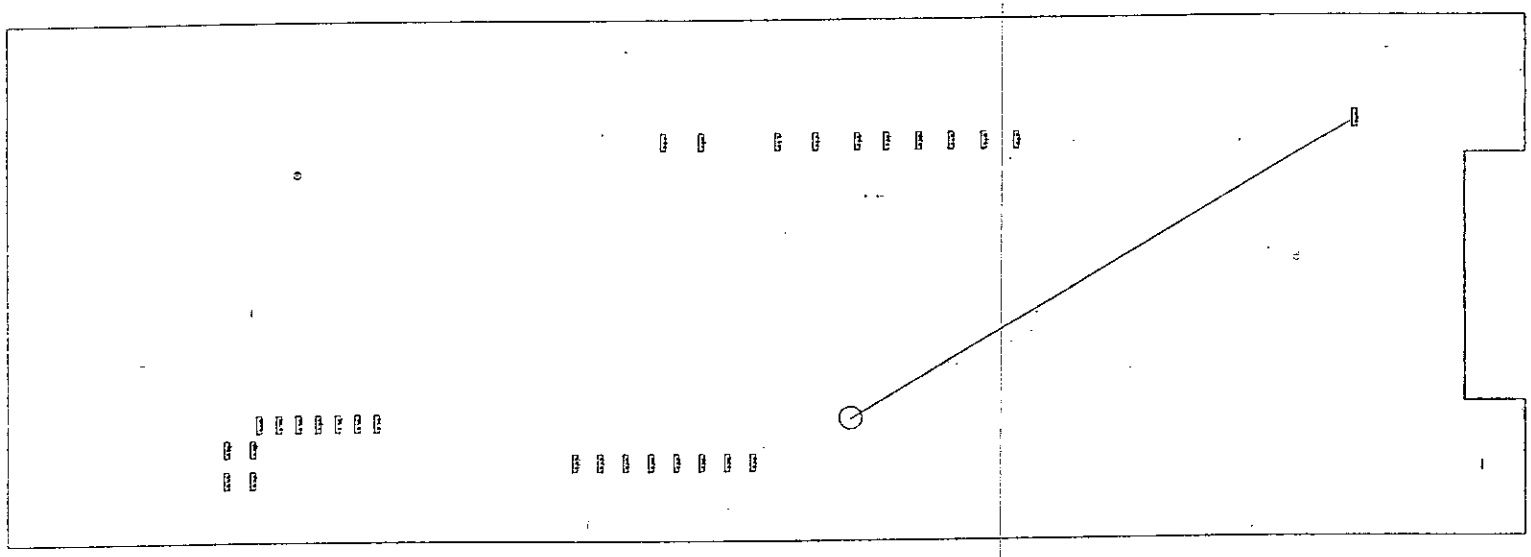
B4+B5



PVC-SCHL.LTG. 1X0.75 BL 2M18630 (250LG)
mit Schrumpfsch 3,2 - 1,6 = 0,5 - 6361798 versehen (15lg, 2x)

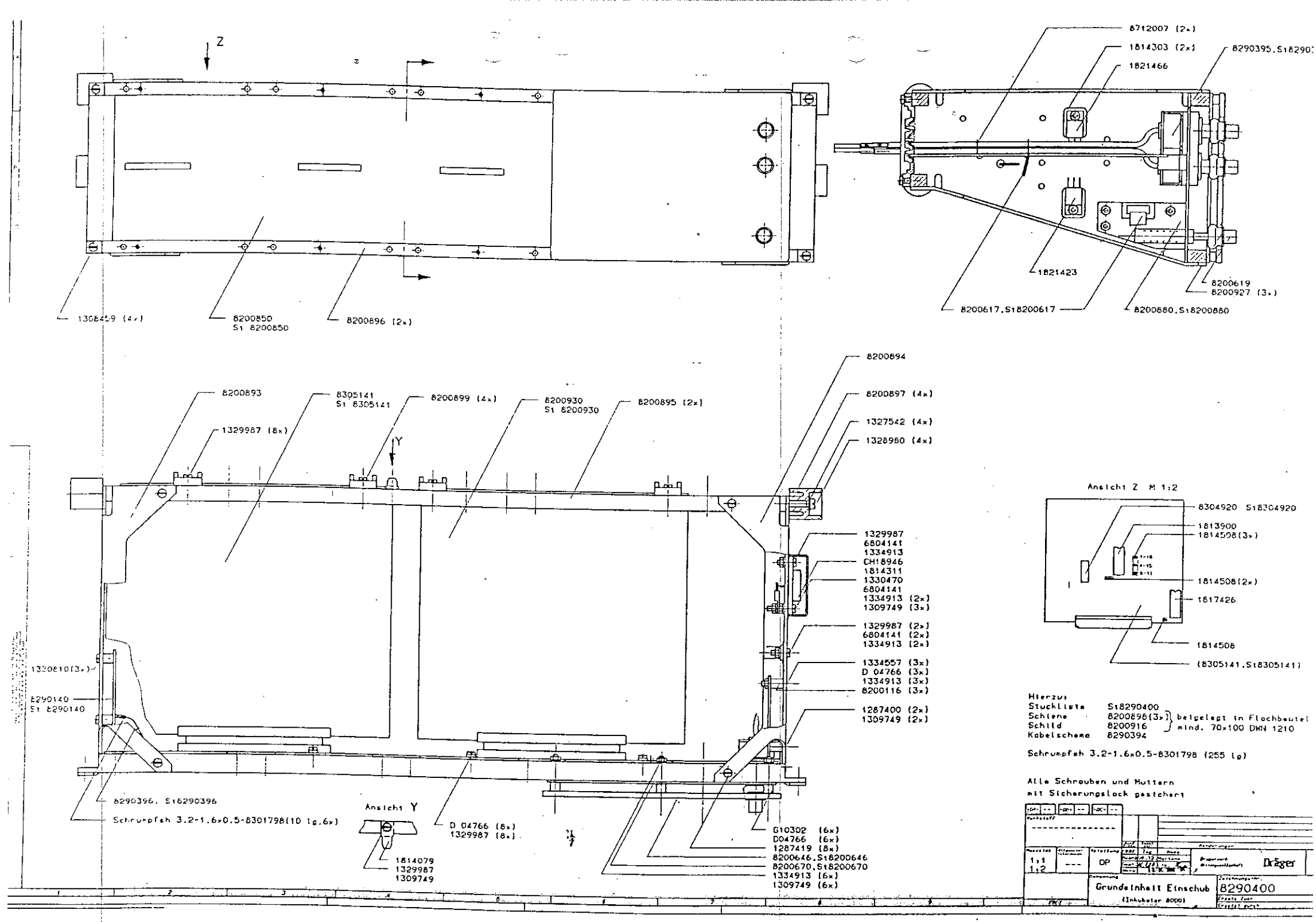
MASSSTAB 2:1		AM		DRAGERWERK AG LUBECK	
BENENNUNG LP AGGREGAT, UGR (INKUBATOR 8000)				ZEICHNUNGS-NR. 8200602	BLATT 1 BEST. AUS BDL

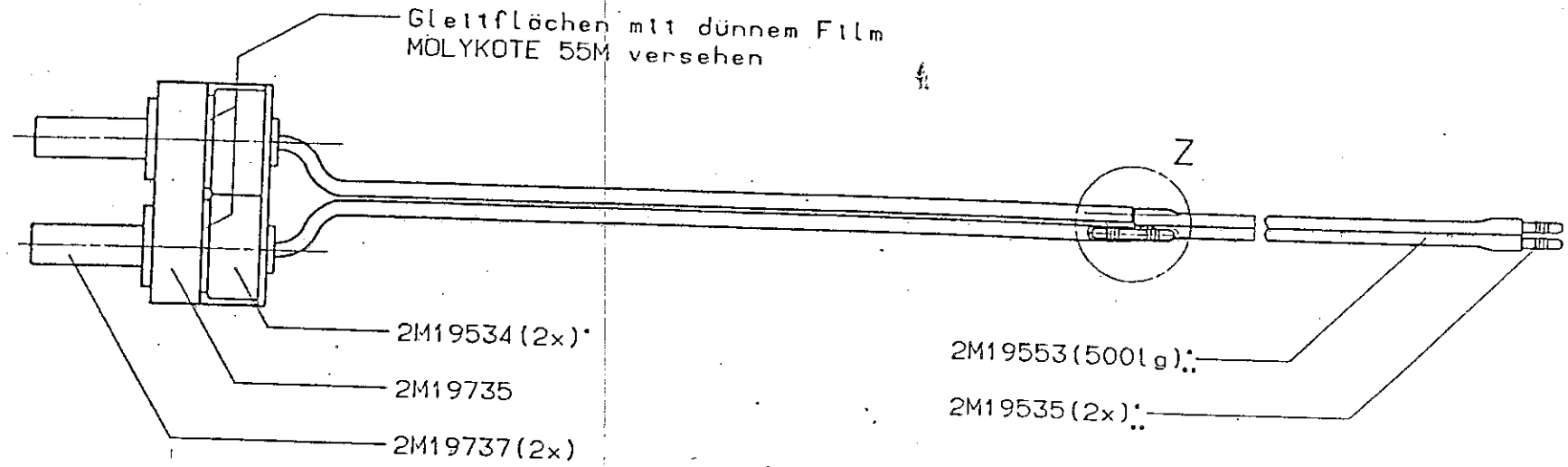
BL 4 B7

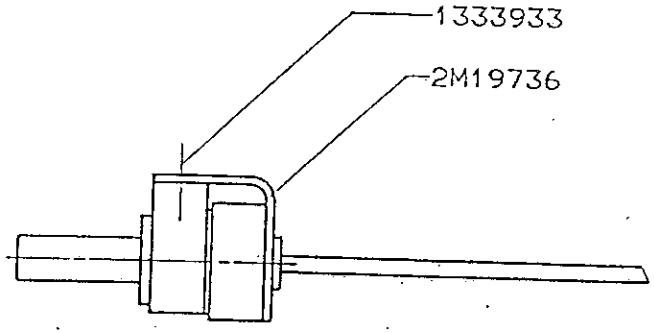


MASSSTAB				DRAGEHMEN AG LUBECK
2:1	----	AM		
BENENNUNG			ZEICHNUNGS-NR.	
LP AGGREGAT, UGR			8200602	BLATT 2
TINKUBATOR 6000				

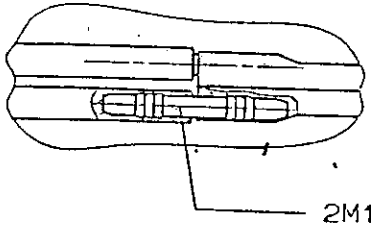
Electronicinsertion Air + Air/Skin


Z
1306459 (4x)
8200850
St 8200850
8200896 (2x)
8712007 (2x)
1814303 (2x)
1821466
8290395,St8290395
1821423
8200619
8200927 (3x)
8200617,St8200617
8200680,St8200680
8200894
8200897 (4x)
1327542 (4x)
1328980 (4x)
8200893
8305141
St 8305141
8200899 (4x)
6200930
St 8200930
8200895 (2x)
1329987 (8x)
Y
1329987
6804141
1334913
CH18946
1814311
1330470
6804141
1334913 (2x)
1309749 (3x)
1329987 (2x)
6804141 (2x)
1334913 (2x)
1334557 (3x)
D 04766 (3x)
1334913 (3x)
8200116 (3x)
1287400 (2x)
1309749 (2x)
1320810(3x)
8290140
St 8290140
8290396, St8290396
Schrumpfsh 3.2-1.6x0.5-830179B(10 lg.6x)
Ansicht Y
D 04766 (8x)
1329987 (8x)
1814079
1329987
1309749
G10302 (6x)
D04766 (6x)
1287419 (8x)
8200646,St8200646
8200670,St8200670
1334913 (6x)
1309749 (6x)
Ansicht Z M 1:2
8304920 St8304920
1813900
1814508(3x)
1814508(2x)
1817426
1814508
(8305141,St8305141)
Hierzu
Stückliste St8290400
Schiene 8200896(3x) } beigelegt in Flachbeutel
Schild 8200916 } mind. 70x100 DWN 1210
Kabelschema 8290394
Schrumpfsh 3.2-1.6x0.5-8301798 (255 lg)
Alle Schrauben und Muttern
mit Sicherungslack gesichert
1:1
1:2
DP
Dräger
Grundeinheit Einschub
(Einkubator 8000)
8290400





Einzelheit Z
M 2:1



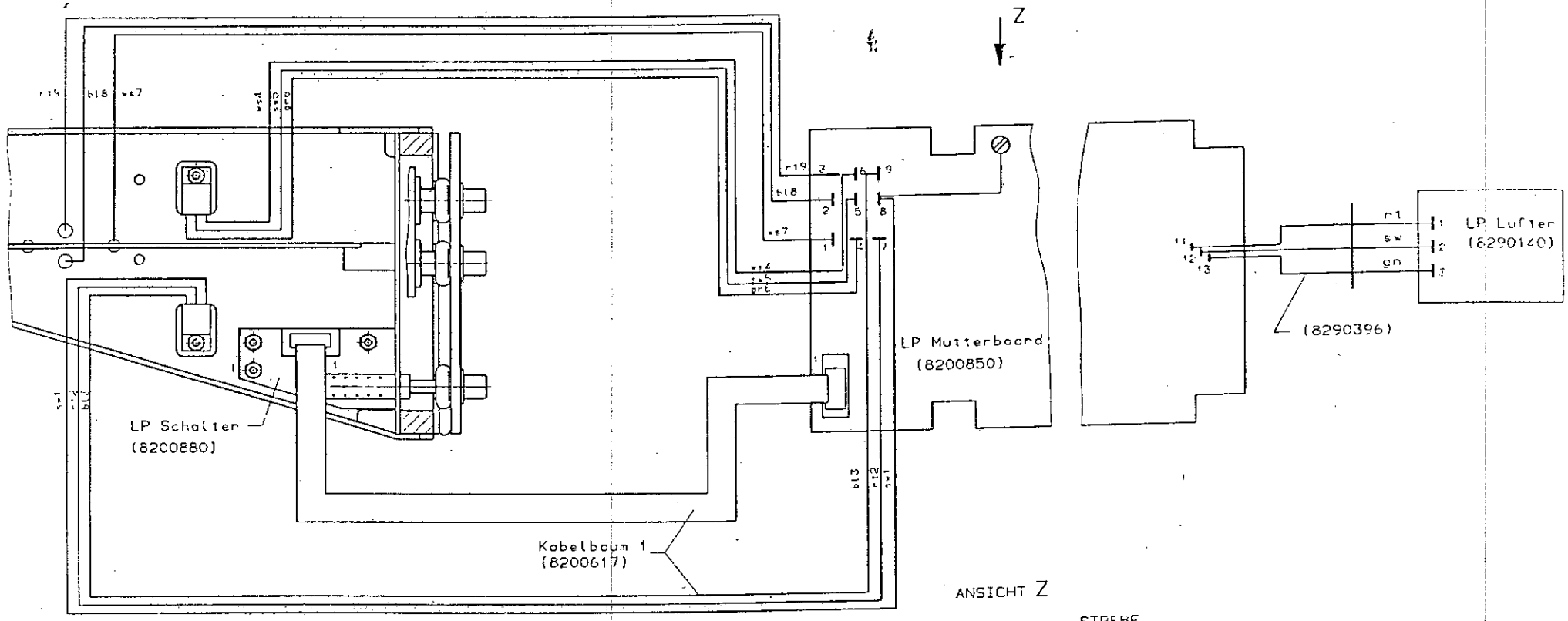
1 Druckelemente Set 2M19715, ST2M19715

* = In 2M19715 enthalten

** = montiert in Grundeinheit Inkubator 8000 2M20050 , St 2M20050

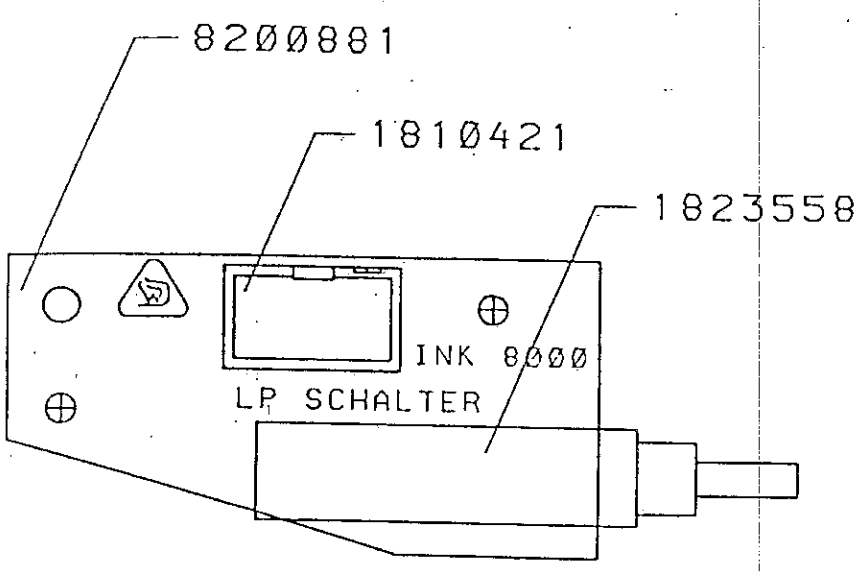
hierzu ST8290395

=OA= --	=OB= --	=OC= --					
Werkstoff -----			-	--			
			Änd. Zeiten	Kenn. Ver.	Änderungen		
Maszstab 1:1 2:1	Allgemeintoleranzen ---	Abteilung OP	1988	Tag	Name	Dräger Drägerwerk Aktiengesellschaft	Dräger
			Bearb.	07.10.	LIE		
			Gepr.	K.113	LIE		
			Norm.				
Benennung Bedienelnheit Höhenverstellung						Zeichnungs-Nr. 8290395	
						Ersatz fuer	
						Ersetzt durch	



Alle geloteten Anschlusse mit Schrumpfsh 3.2-1.6x0.5- 8301798 (15 lg.23x) versehen

Maßstab 1 : 1	Allgemeine Toleranzen ---	Abteilung OP	Dräger
Benennung Kabelschema Grundeinheit (Inku 8000)			Zeichnungs-Nr. 8290394



- SCHUTZLACKIERUNG NACH DWN 3007 DURCHGEFUEHRT
- KENNZEICHNUNG FUER A-SEITE NACH DWN 3007 VERVOLLSTAENDIGT

HIERZU STROMLAUFPLAN 8200883
STUECKLISTE ST8200880

"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."

-OA- -OB- -CC-

WERKSTOFF ---

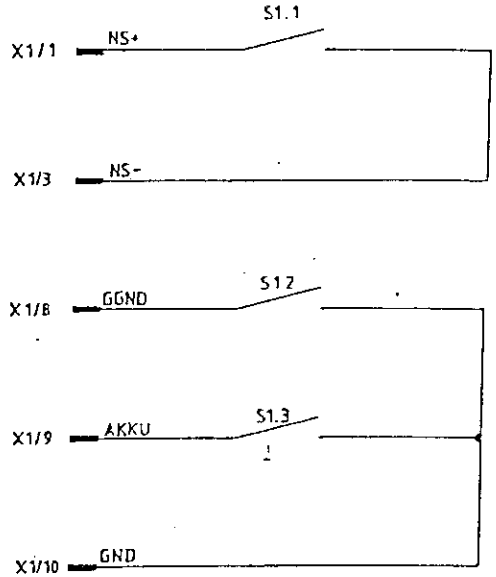
Aend. Ziffer	Kommi vor.	Aenderung	Tag	Bearb.	Norm
1	—	NEUE URZEICHNUNG			

MASSSTAB	ALLGEMEINTOLERANZEN	ABTEILUNG		1987	TAG	NAME
2:1	--	AM	BEARB.		16.01	SALAMON
			GEPR.		13.4.	
			NORM		26.05.	

DRAEGERWERK AKTIENGESELLSCHAFT Dräger

BENENNUNG
BEST. LP SCHALTER
((INKUBATOR 8000))

ZEICHNUNGSNUMMER
8200880
ERSATZ FUER 8200880 V.08.08.86
ERSETZT



=OA= =OB= =OC=

Werkstoff

Aend. Ziffer	Kommi vor.	Anderung	Tag	Bearb	Norm

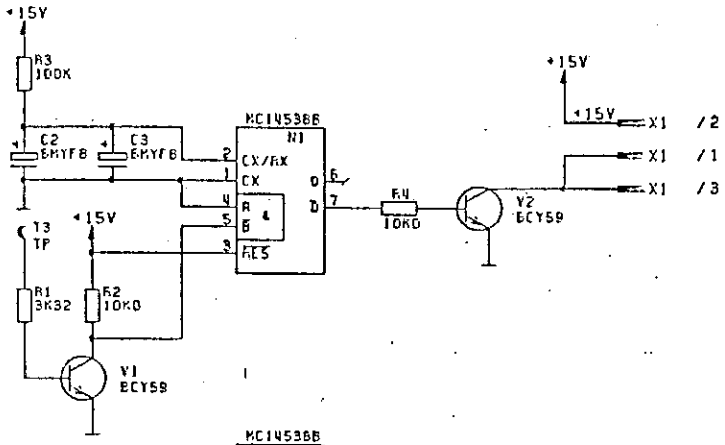
Maßstab	Allgemeintoleranzen	Abteilung		1987	Tag	Name
		AM	Bearb		15.01.	Salamon
			Gepr		15.4.	
			Norm		26.5.	

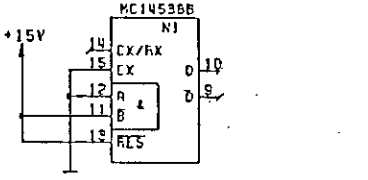
Drägerwerk AG Lübeck

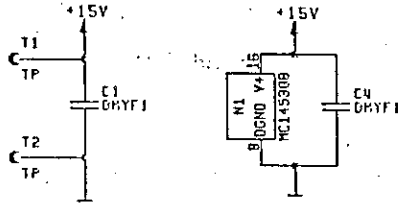
Benennung
Splan LP Schalter
(Inkubator 8000)

Zeichnungs Nr
82 00 883
Ersatz für
Ersetzt durch

C8+C9

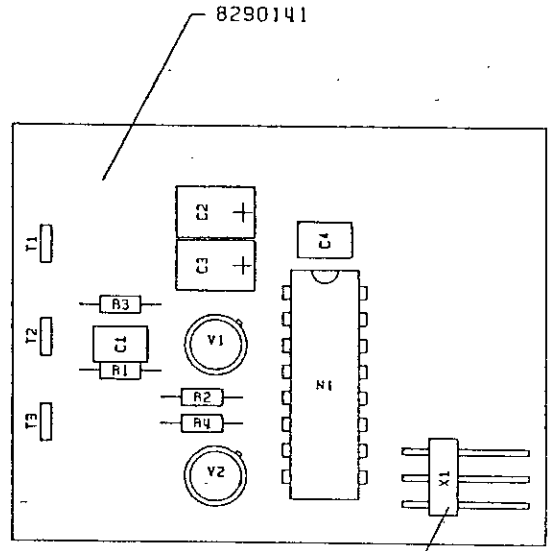






=OA= --	=OB= --	=OC= --									
WERKSTOFF											

			1	-	NEUE URZEICHNUNG (16/88						
			AEND. ZIFFER	NORM VOM	ANDERUNG			TAG	BEARB.	NORM	
MASSSTAB	ALLGEMEIN-TOLERANZEN	ABTEILUNG	1988	TAG	NAME	DRÄGERWERK AKTIENGESELLSCHAFT LÜBECK					
---	---	0P	BEARB.	04.10	GRUBE						
			GEPR.	1.11.							
			NORM	14.11.	RE jen						
BENENNUNG S-PLAN LP LUEFTER (INKUBATOR 8000)			ZEICHNUNGS-NR. 8290143			BLATT 1 VON 1 BL.					
			TZ FUER								
			TZT DURCH								

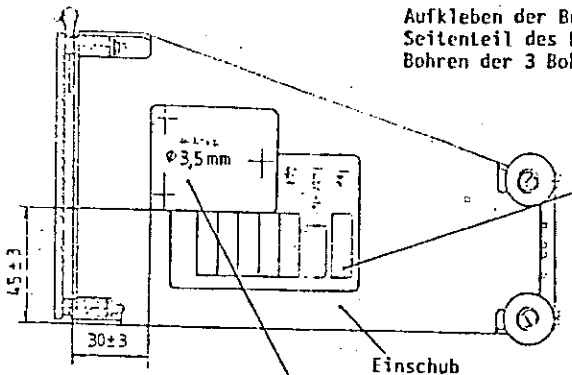


BESTUECKUNGSBILD DER A-SEITE

=OA= --	=OB= --	=OC= --									
WERKSTOFF											

			1	-	NEUE URZEICHNUNG (16/88)						
			AEND. ZIFFER	NORM VOM	ANDERUNG			TAG	BEARB.	NORM	
MASSSTAB	ALLGEMEIN-TOLERANZEN	ABTEILUNG	1988	TAG	NAME	DRÄGERWERK AKTIENGESELLSCHAFT LÜBECK					
2:1	---	0P	BEARB.	03.10	GRUBE						
			GEPR.	1.11.							
			NORM	14.11.							
BENENNUNG LP LUEFTER, UGR. (INKUBATOR 8000)			ZEICHNUNGS-NR. 8290142			BLATT 1 VON 3 BL.					
			ERSATZ FUER								
			ERSETZT DURCH								

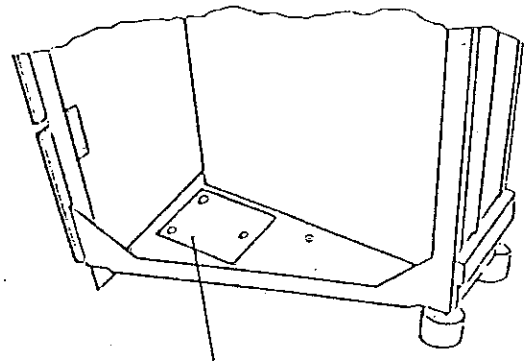
Aufkleben der Bohrschablone auf das linke Seitenteil des Einschubs (8200901/8200902)
Bohren der 3 Bohrungen (ø 3,5)



Nach Umrüstung
Typ-Nr. ändern:
8200901→8290401 oder
8200902→8290402

Einschub
8200901 oder
8200902

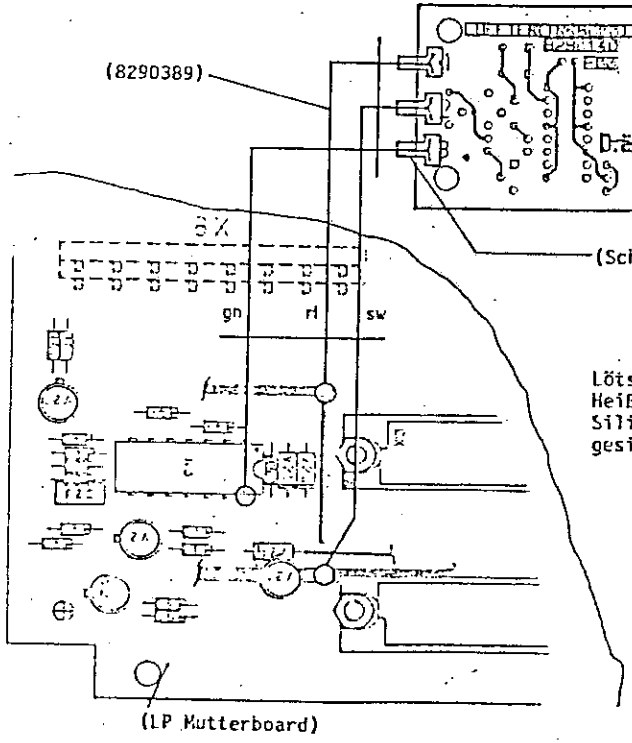
Bohrschablone, LP Lüfter
(8290387)



Festschrauben der LP Lüfter auf der Innenseite des Seitenteils

LP Lüfter
(8290140)

Anschließen der LP Lüfter an das LP Mutterboard



Lötstellen mit Heißkleber oder Siliconkleber gesichert

Besteht aus:

Best. LP Lüfter	8290140 St8290140
Bohrschablone, LP Lüfter	8290387
Rüstanweisung, LP Lüfter	8290388
Kabelbaum	8290389, St 8290389
Schraube	1330810 (3x)

Schrumpfschlauch 3,2-1,6x0,5- 8301798 (10 lg, 3x)
verpackt in Flachbeutel mind. 220x330 DWN 1210

Hierzu St 8290390

=DA= —— =DB= —— =OC= ——

Werkstoff

Änderung	Tag	Bearb.	Norm.

Maßstab	Allgemeintoleranzen	Abteilung		Tag	Name
		op	Bearb.	19.10.	Riepert
			Gepr.	1.11.	
			Norm.		

Dräger
Drägerwerk Aktiengesellschaft

Benennung
Rüstsatz, LP Lüfter
(Inku 8000)

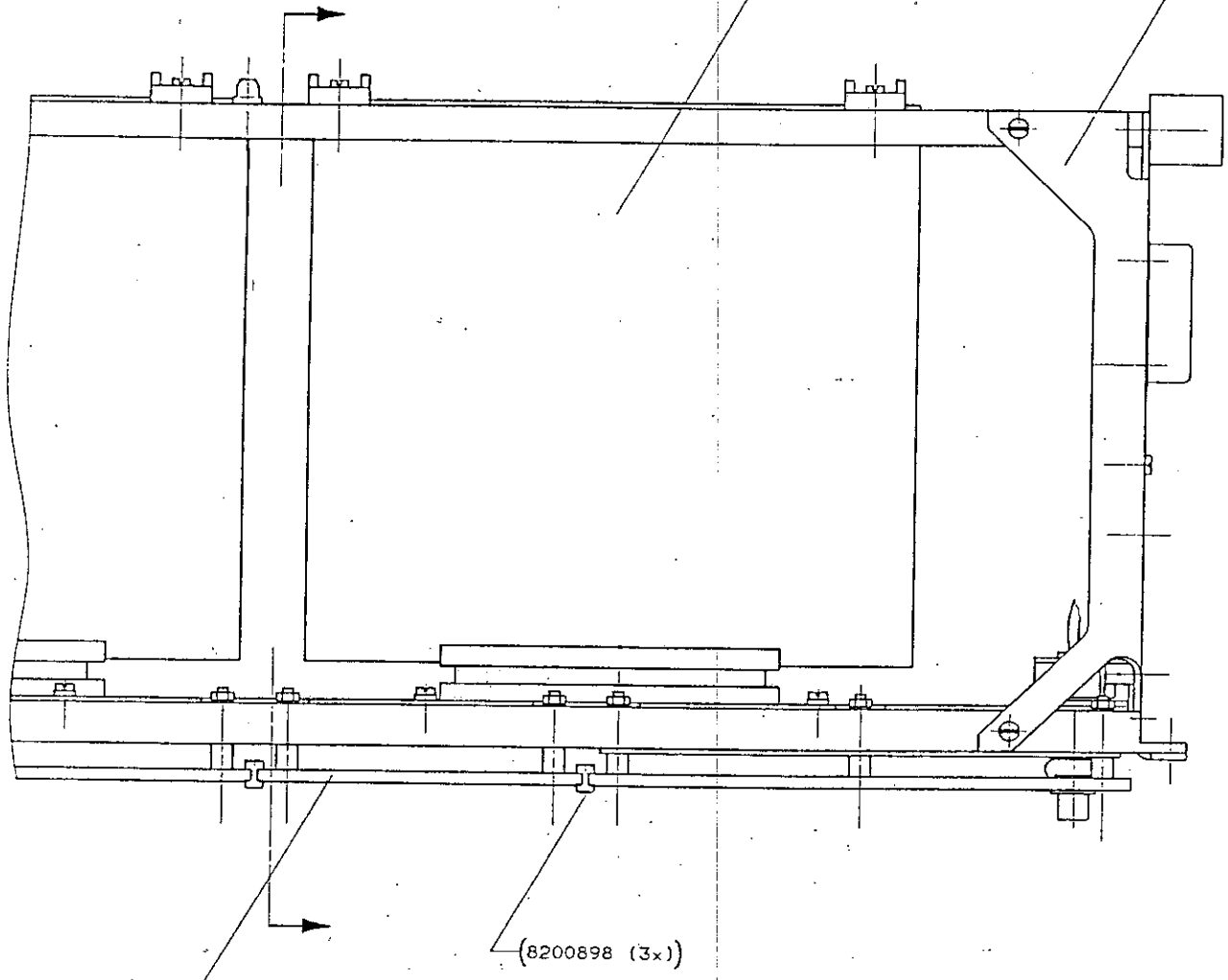
Zeichnungs-Nr
8290390

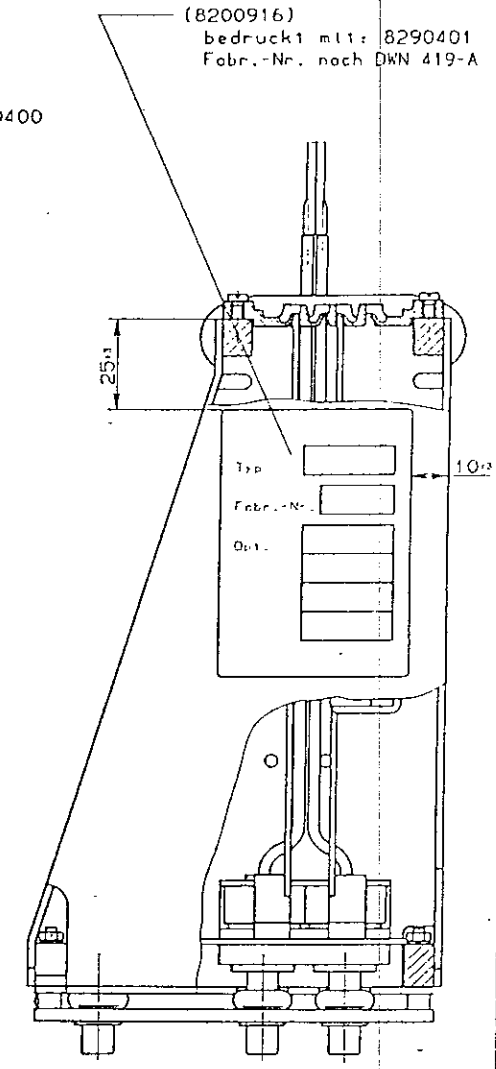
Ersatz für

Ersetzt durch

Diese Zeichnungspause dient nur zur Information. Bei Änderung erfolgt kein Austausch

Dräger

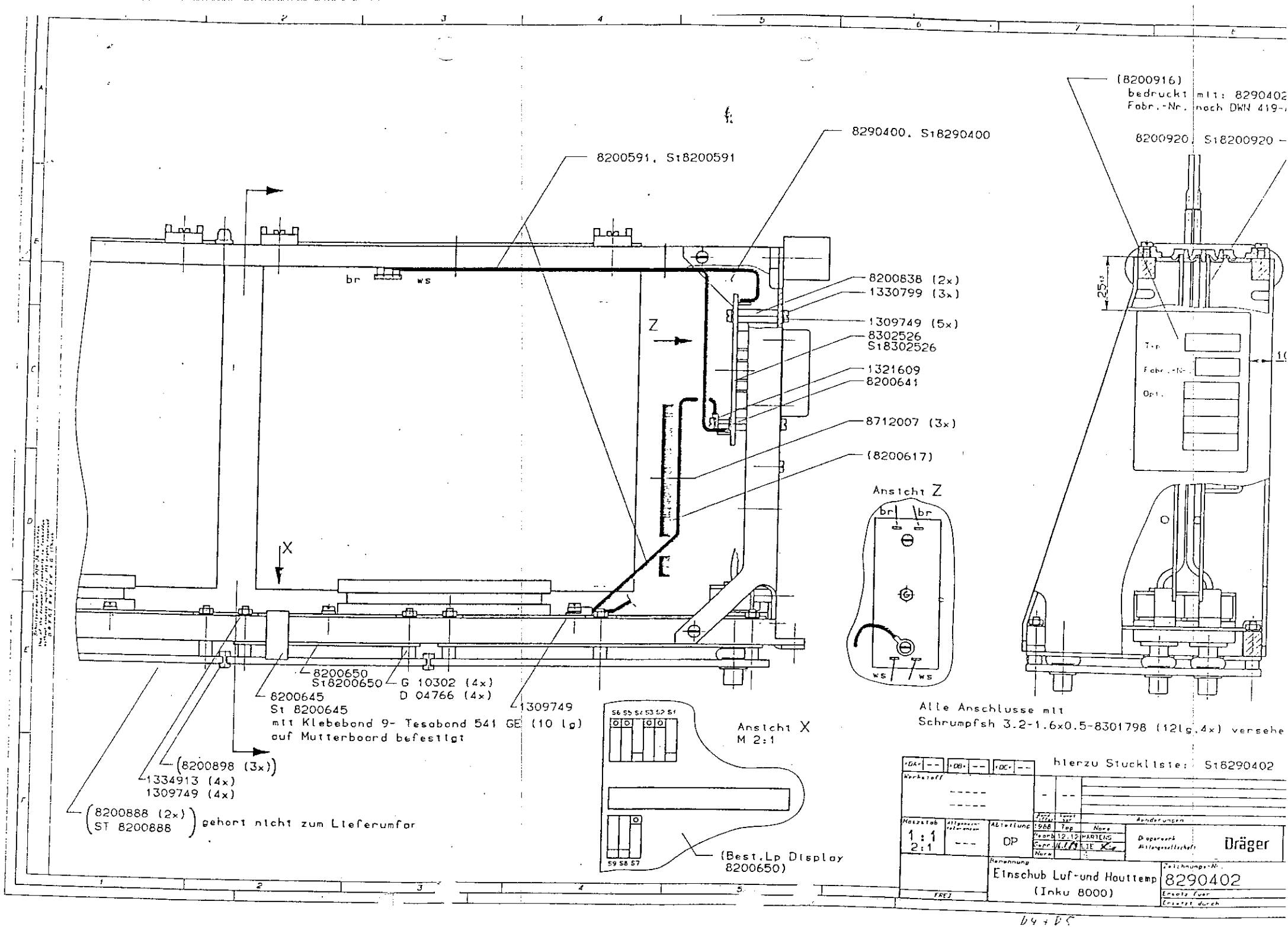


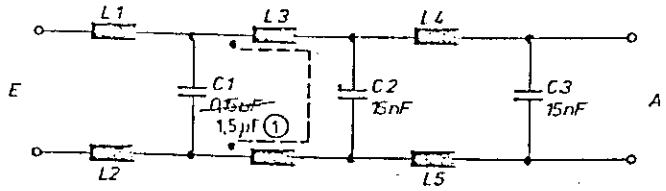


hierzu Stückliste: S18290401

Werkstoff		Abteilung	Name	Änderungen		
		OP.	12.12 MARTENS	Dräger		
Maßstab	Allgemeintoleranzen					
1 : 1	---					
Benennung				Zeichnungs-Nr.		
Einschub Lufttemp. (Inku 8000)				8290401		
FREI				Ersatz für		
				Ersatz durch		

D2403


8290400, S18290400
8200591, S18200591
(8200916)
bedruckt mit: 8290402
Fabr.-Nr. nach DWN 419-
8200920, S18200920 –
br
ws
Z
X
8200838 (2x)
1330799 (3x)
1309749 (5x)
8302526
S18302526
1321609
8200641
8712007 (3x)
(8200617)
25±1
Ansicht Z
br
br
ws
ws
8200650
St8200650
G 10302 (4x)
D 04766 (4x)
8200645
St 8200645
mit Klebebond 9- Tesaband 541 GE (10 lg)
auf Mutterboard befestigt
1309749
(8200898 (3x))
1334913 (4x)
1309749 (4x)
(8200888 (2x)
ST 8200888) gehört nicht zum Lieferumfar
S6 S5 S4 S3 S2 S1
S9 S8 S7
Ansicht X
M 2:1
(Best.Lp Display
8200650)
Alle Anschlusse mit
Schrumpfsh 3.2-1.6x0.5-8301798 (12lg,4x) versehe
hierzu Stückliste: S18290402
Werkstoff
Maßstab
1 : 1
2 : 1
Abteilung
DP
Bearb. 12.12 HARTENG
Name
Änderungen
Dräger
Benennung
Einschub Luf-und Hauttemp
(Inku 8000)
Zeichnungs-Nr.
8290402
FREI

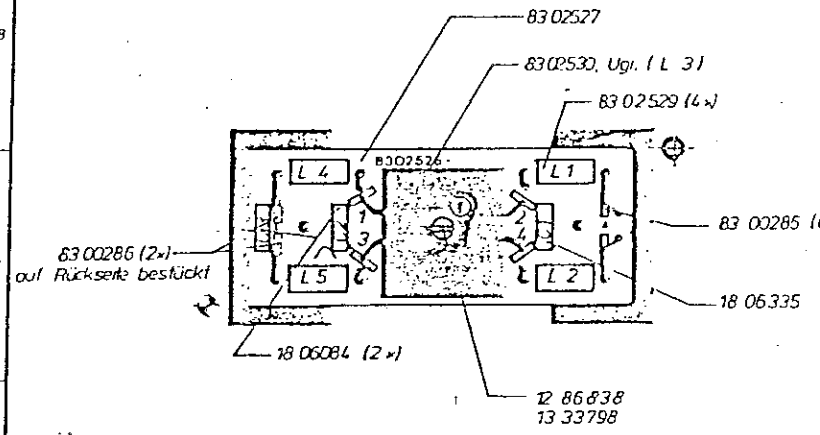


Werkstoff							
	1	1×	Wert geä.	7.12.81	Gl.		
	Änd. Ziffer	kommt vor	Änderung	Tag	Bearb.	Norm	

Maßstab	Maße ohne Toleranzangabe	Abteilung	1980	Tag	Name
		em	Bearb.	17.3.	Gl.
			Gepr.	6. 03.	Sch
			Norm	20. 11.	80 Nt

Drägerwerk AG Lübeck

Benennung	Zeichnungs-Nr
Schaltplan Filterschaltung	83 02528
	Ersatz für
	Ersetzt d



Kennzeichen A 2 DIN 3007 vervollständigt
beidseitig mit Schutzlack überzogen

hierzu:
Stückliste St 83 02526
Schaltplan Filterschaltung 83 02528

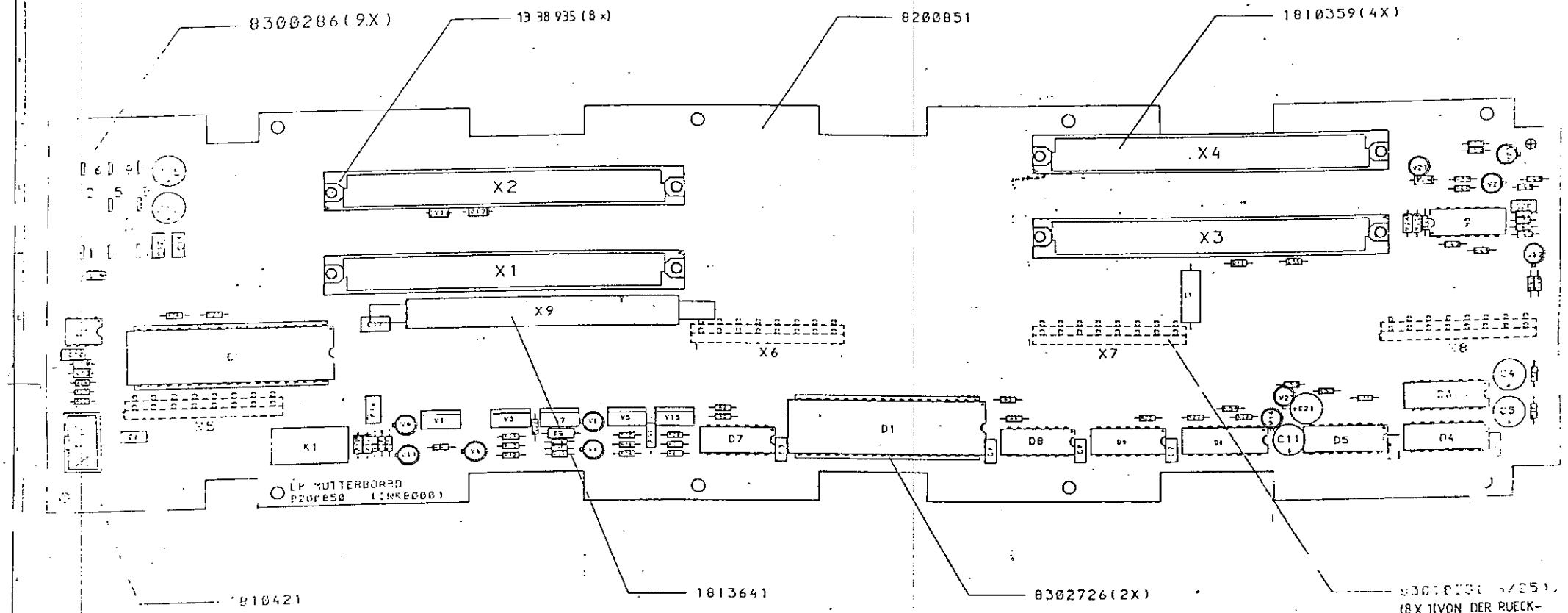
Werkstoff							
	1	2×	Schraubendarst. hinzu; Abtlg geänd.	5.10.82	Gl.		m
	Änd. Ziffer	kommt vor	Änderung	Tag	Bearb.	Norm	

Maßstab	Maße ohne Toleranzangabe	Abteilung	1980	Tag	Name
1:1		am ①	Bearb.	14. 3.	Gl.
			Gepr.	8. 03.	Sch
			Norm	20. 11.	80 Nt

Drägerwerk AG Lübeck

Benennung	Zeichnungs-Nr
Best. LP Filterschaltung	83 02526
	Ersatz für
	Ersetzt durch

PC Motherboard



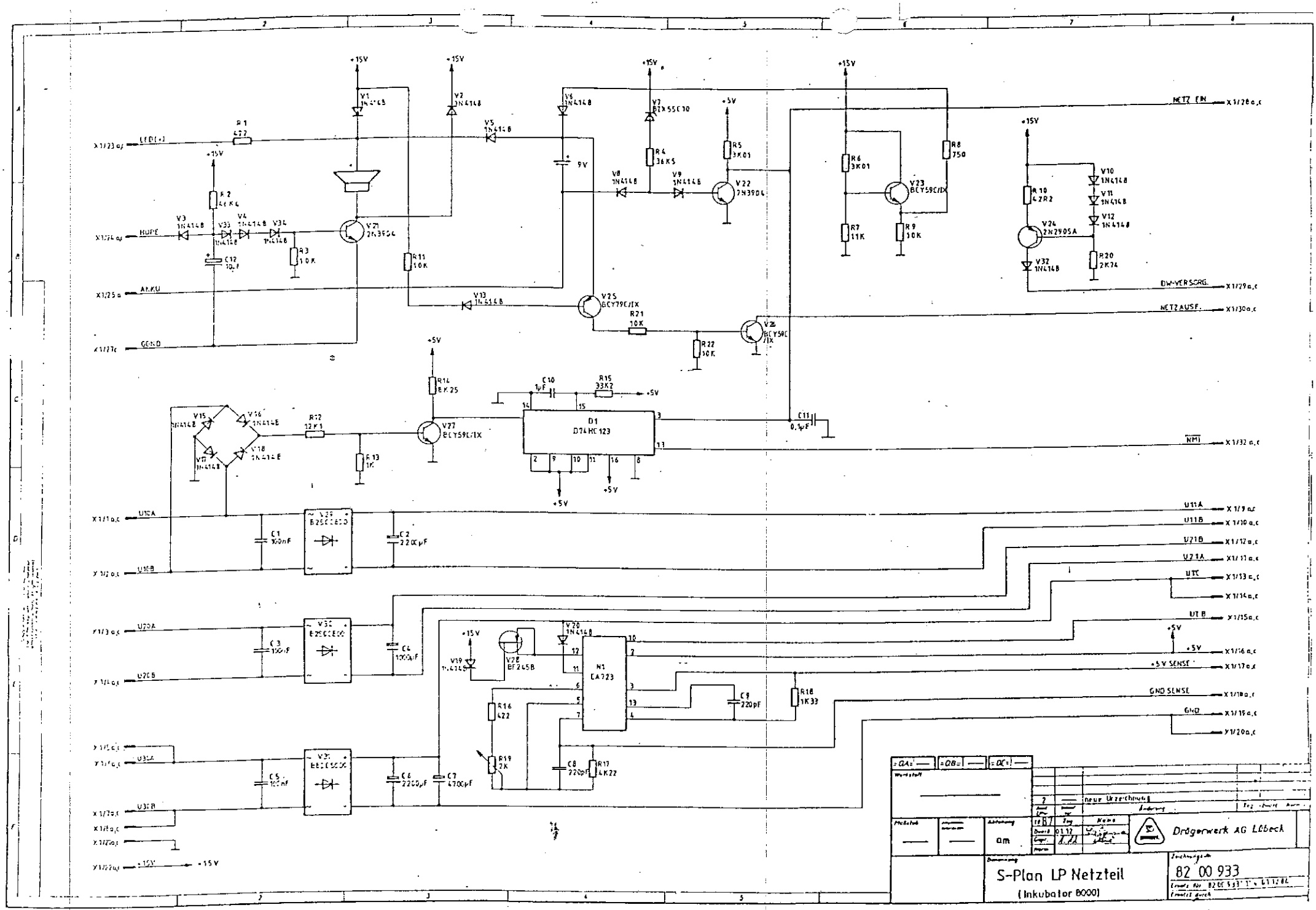
sichtbare und unsichtbare Konturen haben gleiche Linienarten und Linienbreiten

2:1

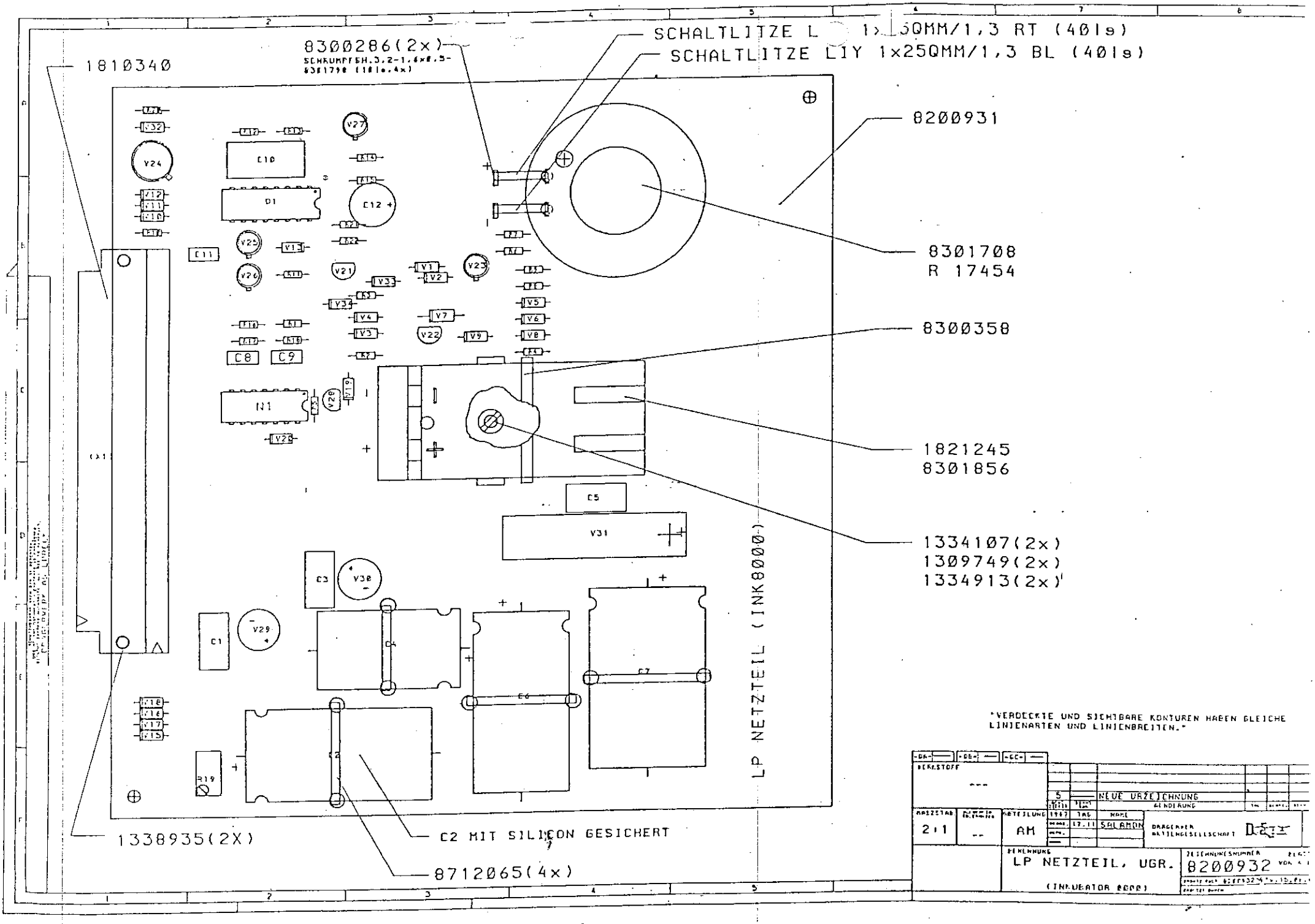
LP Mutterboard, Ugr.

EYES

PC Powersupply


+15V
LED(+)
HUPE
AKKU
GND
9V
+5V
NETZ EIN
DW-VERSORG.
NETZAUSF.
NMI
D1
D74HC123
N1
EA723
S-Plan LP Netzteil
(Inkubator 8000)
Drägerwerk AG Lübeck
82 00 933

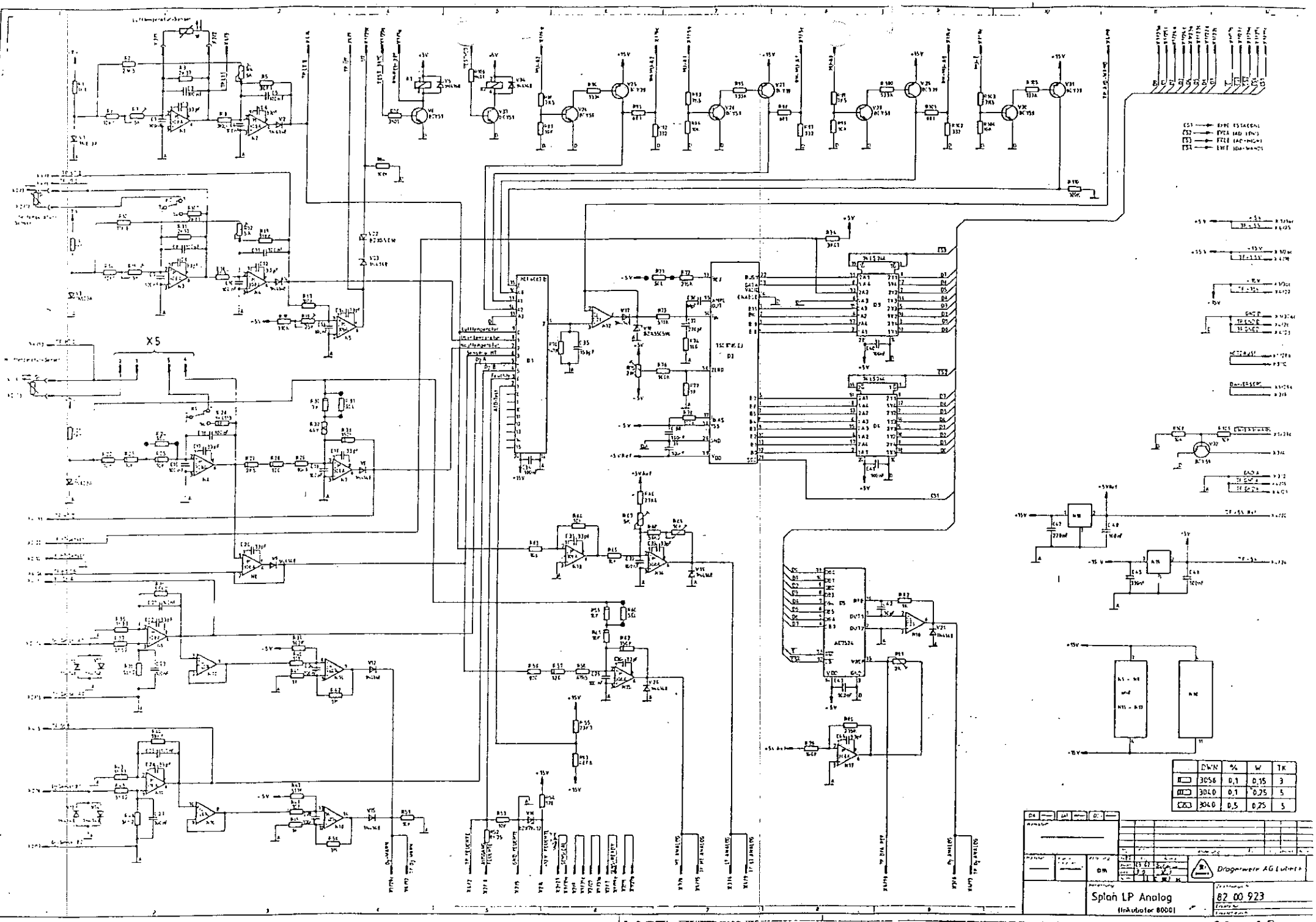
F2+F3


1810340
8300286(2x)
SCHRUMPFSH.3,2-1,6x6,5-
SCHALTLITZE L 1x50MM/1,3 RT (401s)
SCHALTLITZE LIY 1x25QMM/1,3 BL (401s)
8200931
8301708
R 17454
8300358
1821245
8301856
1334107(2x)
1309749(2x)
1334913(2x)
LP NETZTEIL (INK8000)
1338935(2X)
C2 MIT SILICON GESICHERT
8712065(4x)
"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."
WERKSTOFF

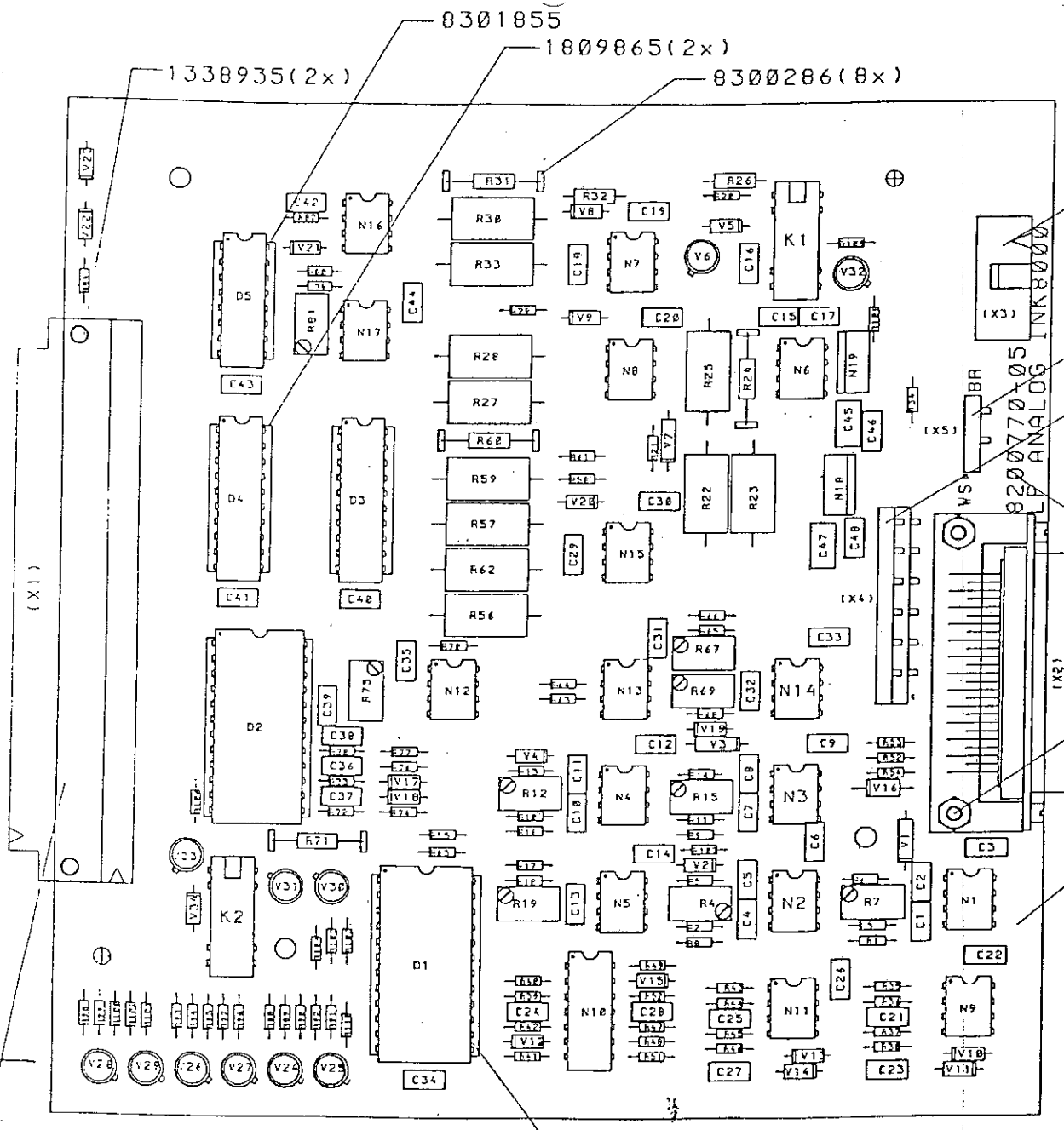
NEUE URZEICHNUNG
MASSSTAB
2:1
ABTEILUNG
AM
NAME
SALAMON
BEZEICHNUNG
LP NETZTEIL, UGR.
(INKUBATOR 8000)
ZEICHNUNGSNUMMER
8200932

F4 + F5

PC Analog Air + Air/Skin



62 + 63



"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."

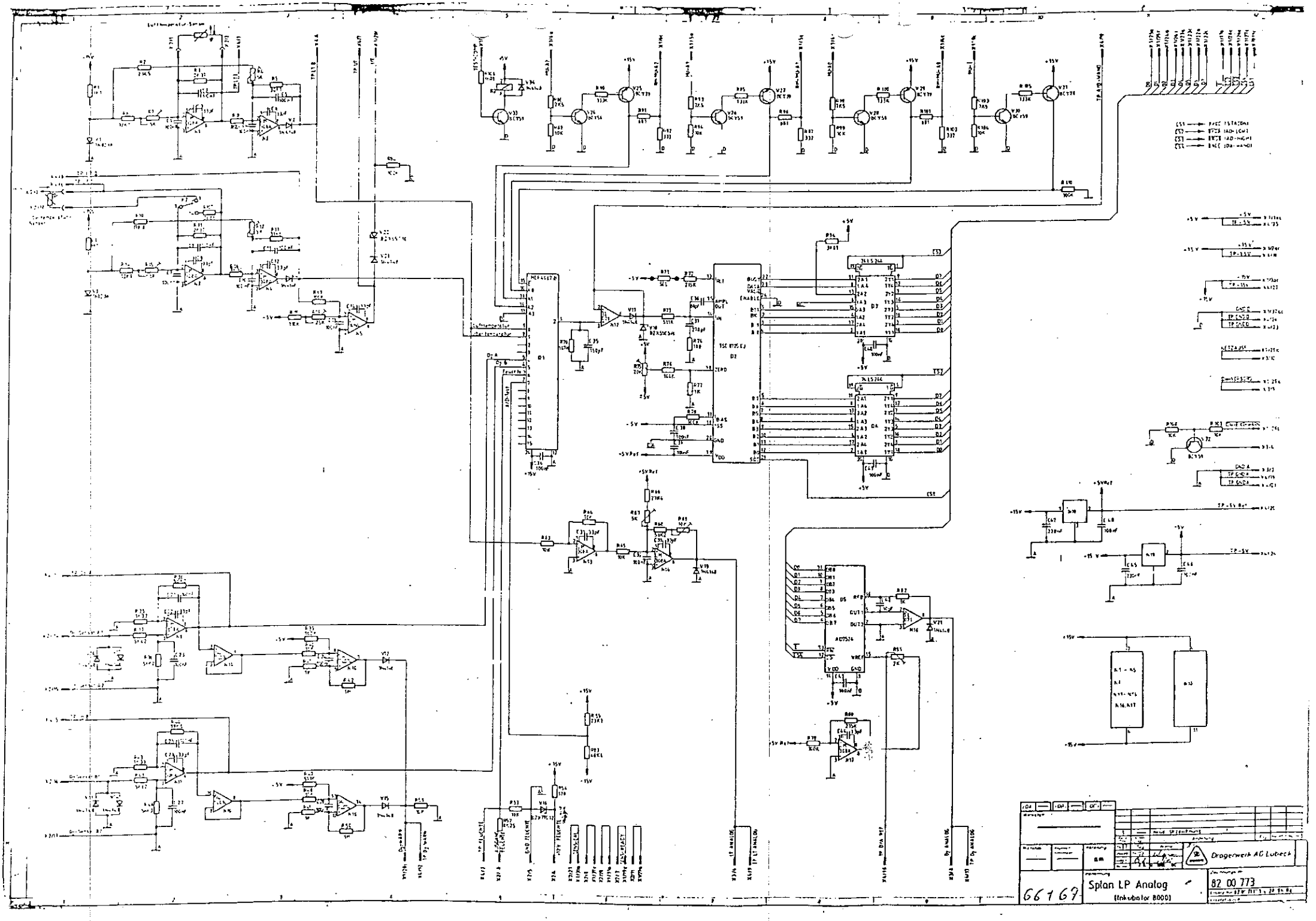
WERKSTOFF					
		1	NEUE UNZEICHNUNG		
		ÄNDERUNG			
MASSSTAB	ALLGEMEINTOLERANZEN	ABTEILUNG	1987	TAG	NAME
2:1		AM	GEPRÜFT	15.04	SALAMON
			GENEHMIGT	11	

DRÄGERWERK AKTIENGESELLSCHAFT Dräger

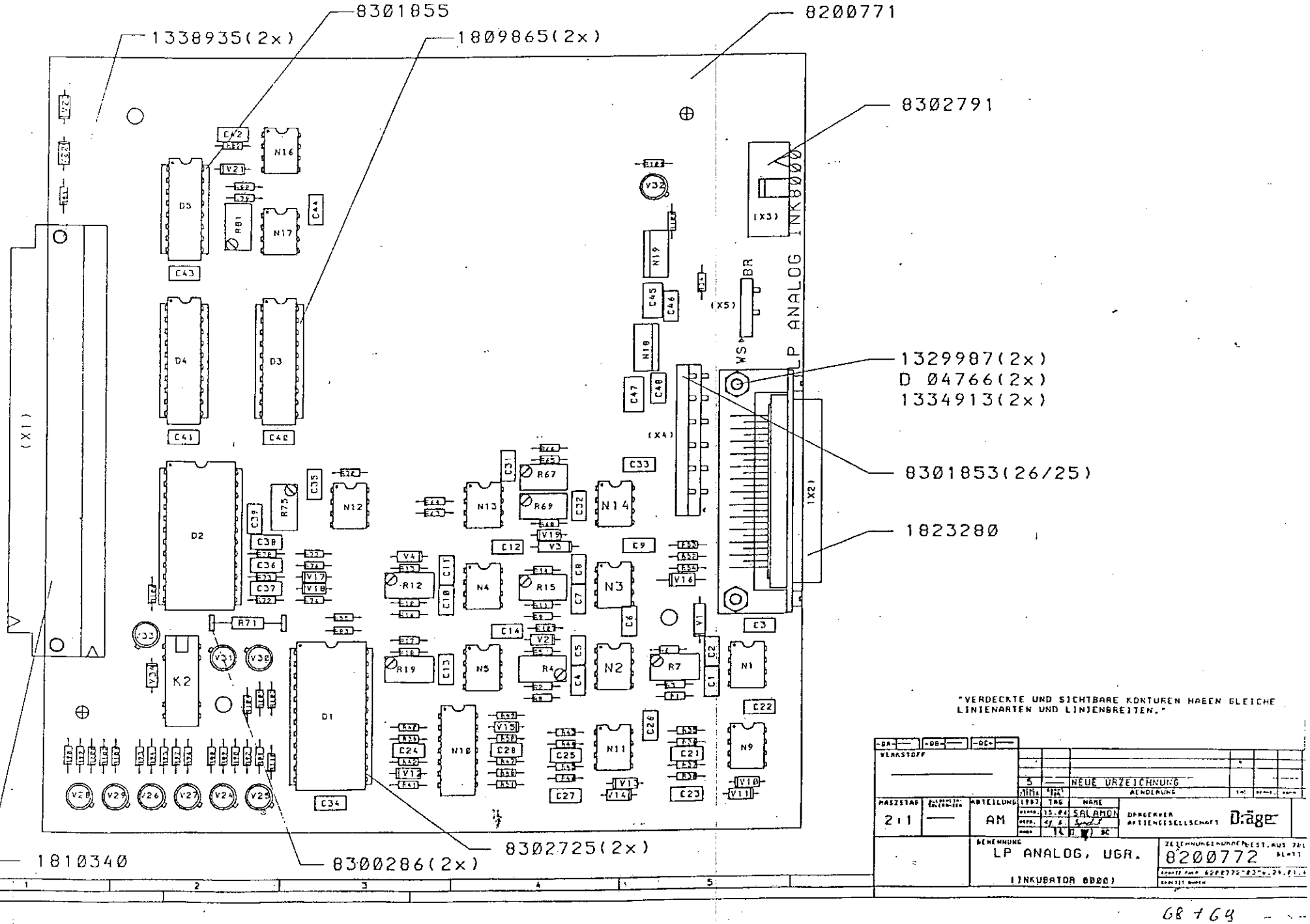
BENENNUNG: LP ANALOG. UGR. (INKUBATOR BABY)

ZEICHNUNGSNUMMER BEST. AUS DEL: 8200922 BLATT 1

64+65



Dräger
66169
Splan LP Analog
(Inkubator 8000)
82 00 773


8301855
1338935(2x)
1809865(2x)
8200771
8302791
1329987(2x)
D 04766(2x)
1334913(2x)
8301853(26/25)
1823280
1810340
8300286(2x)
8302725(2x)
LP ANALOG INK8000
(X1)
(X2)
(X3)
(X4)
(X5)
BR
WS
D1
D2
D3
D4
D5
K2
N1
N2
N3
N4
N5
N9
N10
N11
N12
N13
N14
N16
N17
N18
N19
"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."
NEUE URZEICHNUNG
MASSSTAB 2:1
ABTEILUNG AM
NAME SALAMON
BENENNUNG LP ANALOG, UGR.
(INKUBATOR 8000)
ZEICHNUNGSNUMMER 8200772
Dräger

GB 764

PC CPU

5.2 p.c. board "CPU Standard 2"

5.2.1 Component configuration

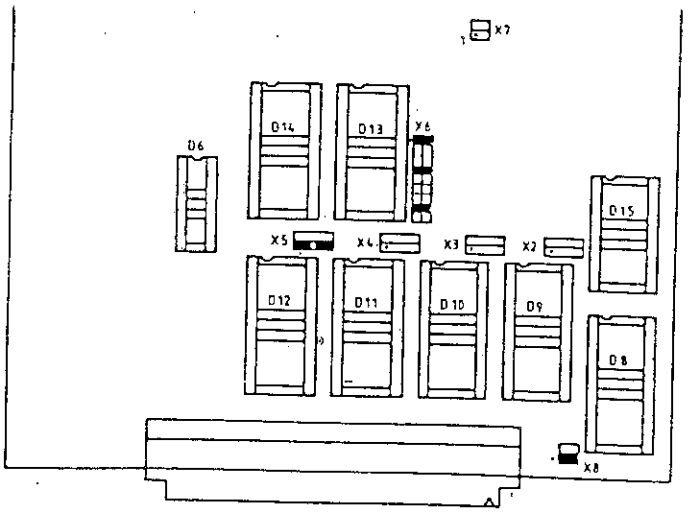
D 9 - Not configured
D 10 - Not configured
D 11 - Not configured
D 12 - EPROM
D 13 - Timer 6840
D 14 - Not configured
D 15 - Not configured
D 6 - Programmable address decoder 8304920
D 8 - RAM (2K x 8) up to software 0.3 or
(8K x 8) as of software 0.4

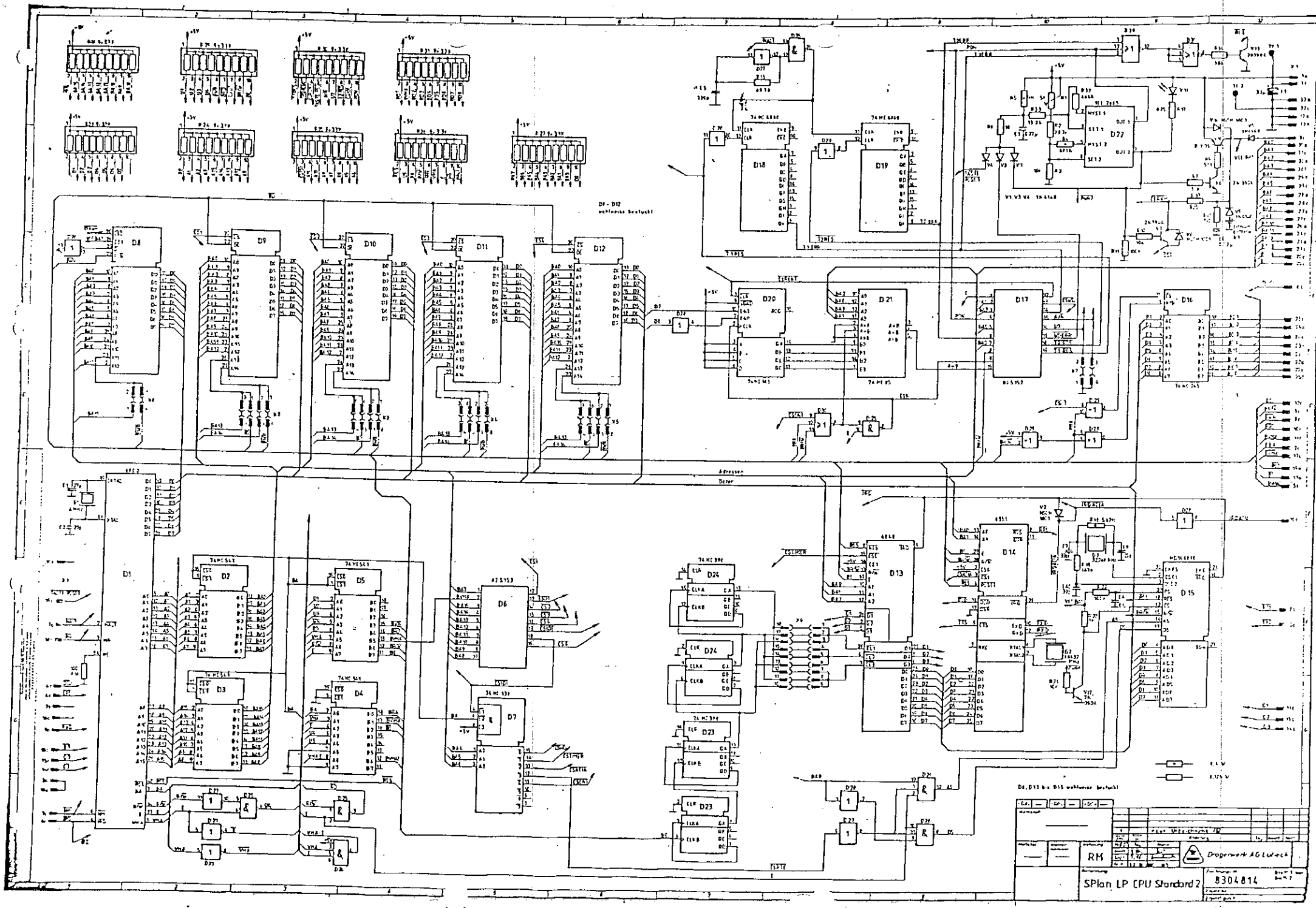
See 5.2.2 for layout plan

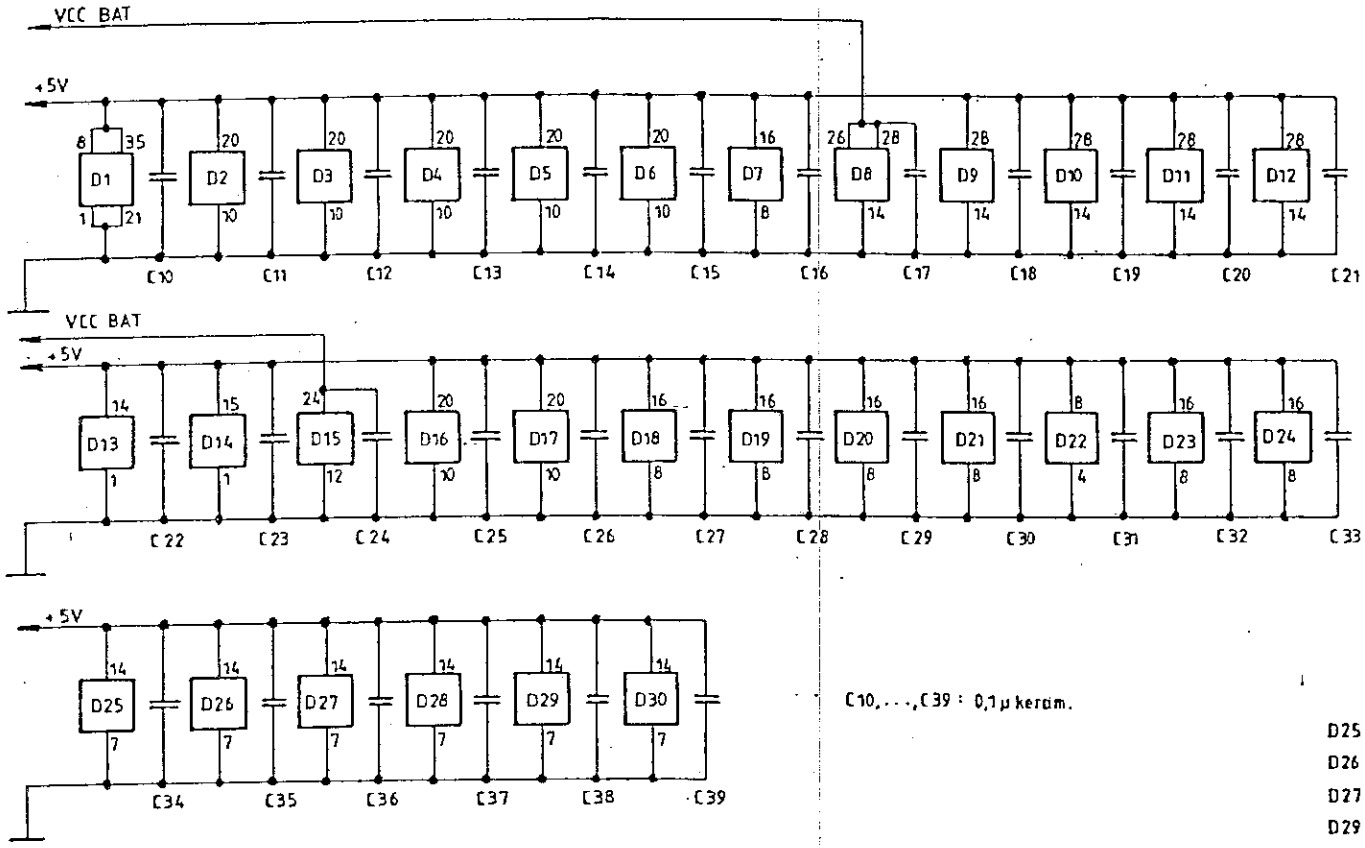
5.2.2 Assignment of jumper fields

Fitting of jumper fields X2 ... X8 with shorting links.
The pin numbering on the p.c. board is counterclockwise.

X 2 - Not fitted
X 3 - Not fitted
X 4 - Not fitted
X 5 - 1-2, 3-4 (32 K x 8) EPROM
X 6 - 1-18, 4-15, 8-11 (ext. clock for timer)
X 7 - Not fitted
X 8 - 3-4 (2 K x 8 RAM) up to software 0.3 or
1-2 (8 K x 8 RAM) as of software 0.4




D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
D23
D24
D27
RM
SPlan LP CPU Standard 2
8304814



C10, . . . , C39 : 0,1 µ keram.

D25 : 74 HC 00
D26 : 74 HC 11
D27 : 74 HC 14
D29 : 74 HC 86
D30 : 74 HC 27
D28 : 74 HC 04

Index siehe Blatt 1

=0A= — =0B= — =0C= —

Werkstoff —

Änderung	Tag	Beard	Norm
Aend. Zifer / kommt vor			

Maßstab	Allgemeintoleranzen	Abteilung		Tag	Name
—	—	RM	1985		
			Beard.	5.10.	
			Gepr.	7.10.	
			Norm	16.10.	1985 jan

Drägerwerk AG Lübeck

Benennung
SPlan LP CPU Standard 2

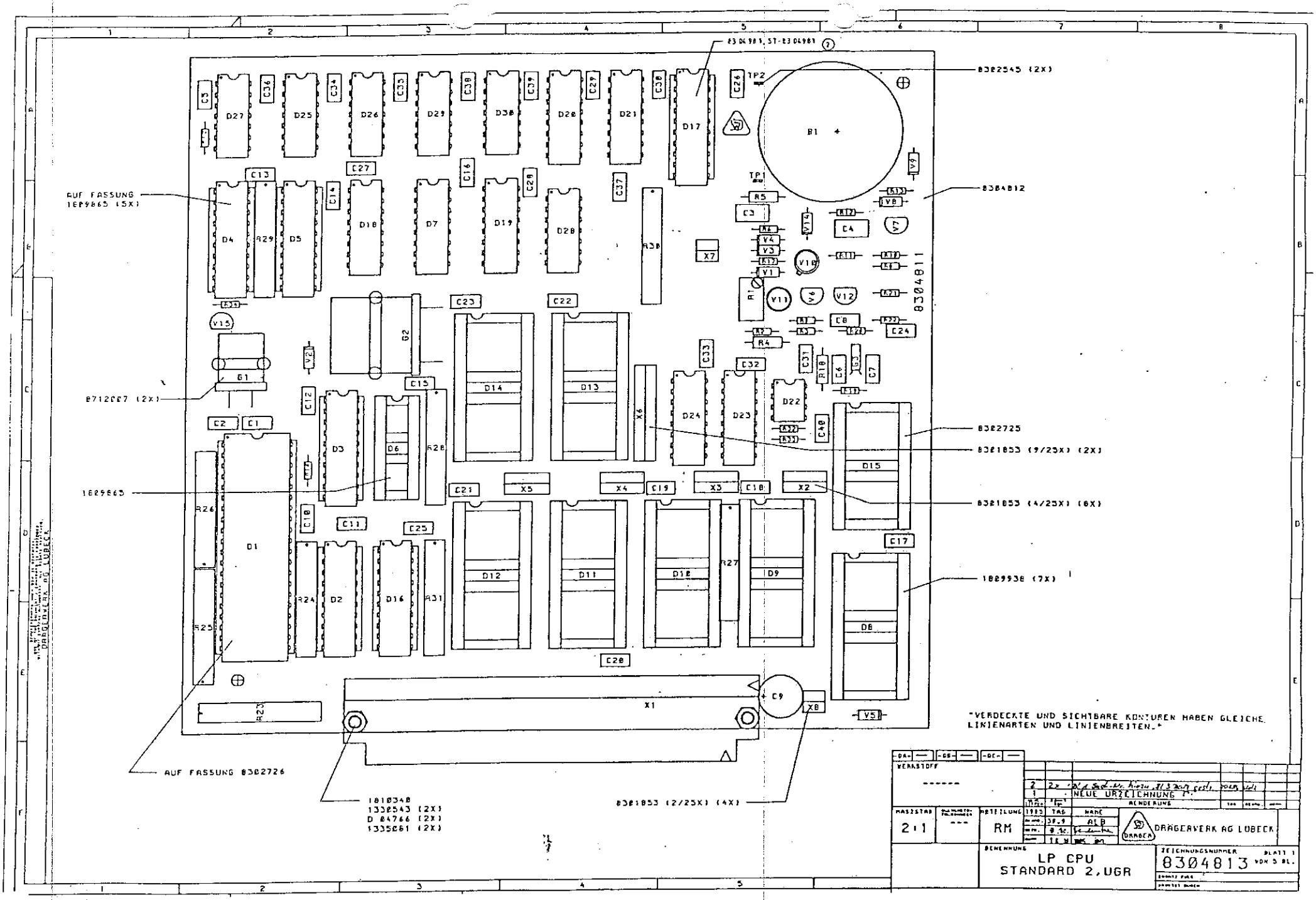
Zeichnungs-Nr.
8304814

Blatt 2 von
Blatt 2

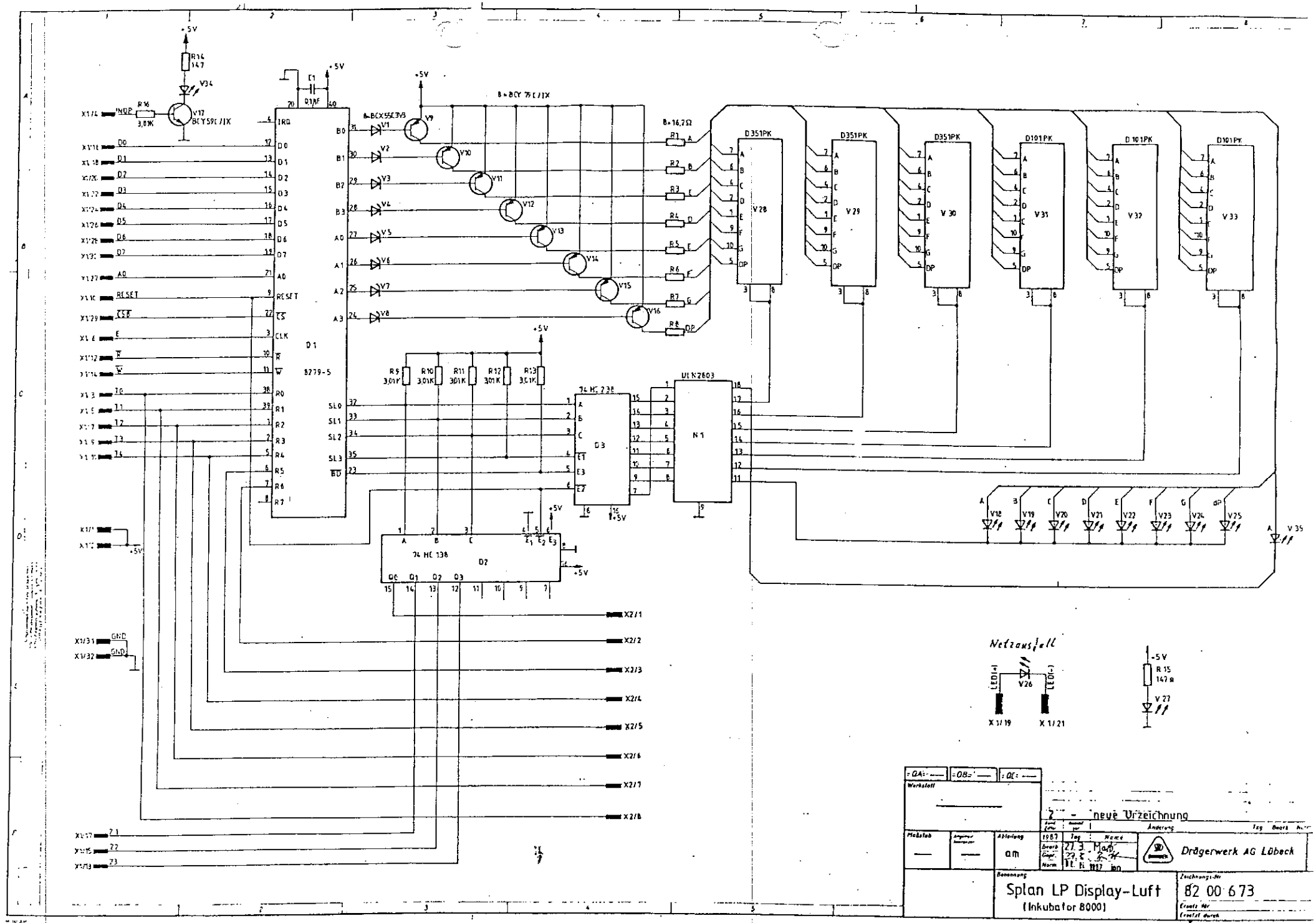
Ersatz für

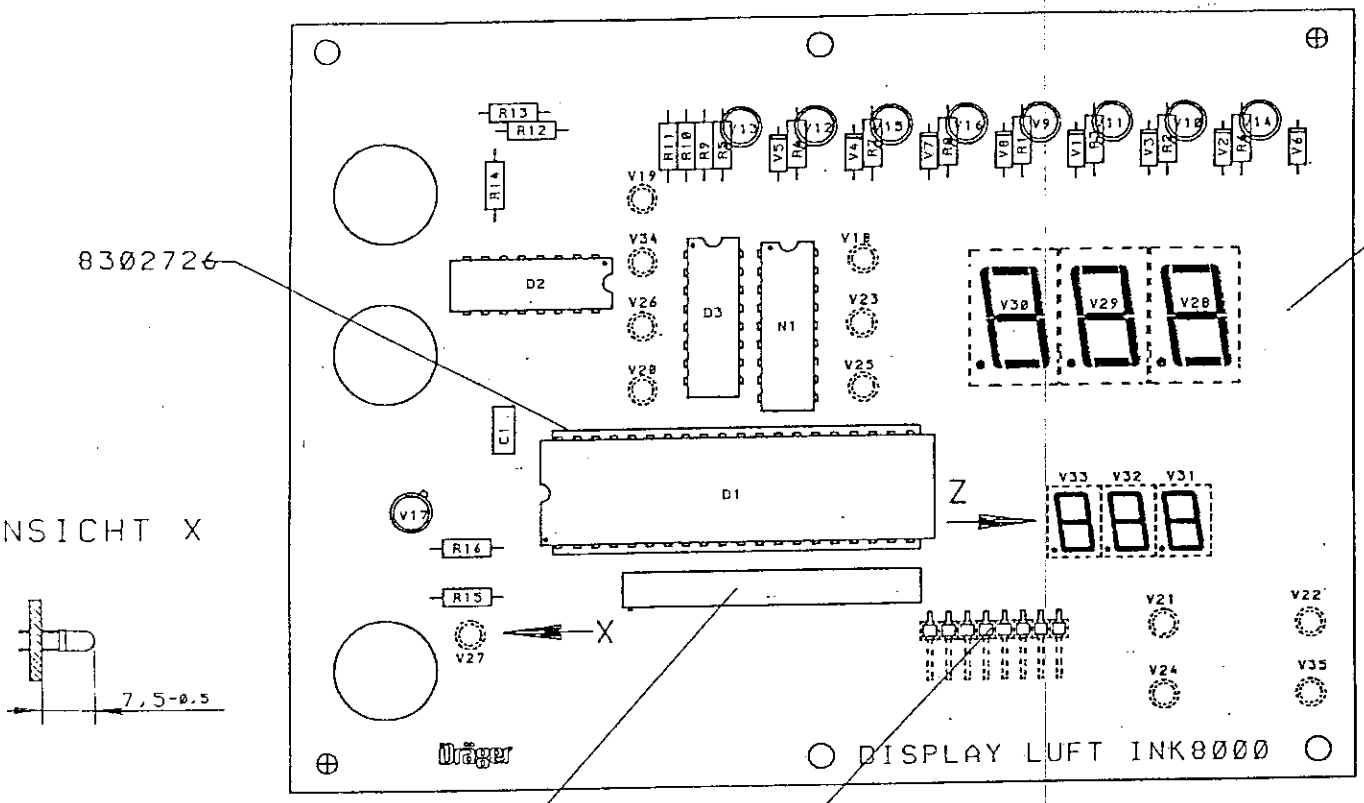
Ersetzt durch

127 KB


8304811
AUF FASSUNG 1EP9865 (5X)
8712007 (2X)
1829865
AUF FASSUNG 8302726
1810348
1338543 (2X)
D 84766 (2X)
1335061 (2X)
8381853 (2/25X) (4X)
8382545 (2X)
8384812
8382725
8381853 (9/25X) (2X)
8381853 (4/25X) (6X)
1809938 (7X)
VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN.
WERKSTOFF
MASSSTAB 2:1
ABTEILUNG RM
NAME AL B
DRÄGERWERK AG LÜBECK
BENENNUNG
LP CPU
STANDARD 2,UGR
ZEICHNUNGSNUMMER 8304813
BLATT 1 VON 5 BL.

Indicator + Keyboard


+5V
R14 147
V34
R16 3,01K
V17 BCY59C/IX
INOP
E1 0,1µF
D1
8279-5
IRQ
RESET
CS
CLK
RD
WR
A0
D0 D1 D2 D3 D4 D5 D6 D7
BD
B=BCY 75 E/IX
B=BCX55E3V8
V1 V2 V3 V4 V5 V6 V7 V8
V9 V10 V11 V12 V13 V14 V15 V16
B=16,2Ω
R1 R2 R3 R4 R5 R6 R7 R8
D351PK
V28 V29 V30
D101PK
V31 V32 V33
R9 3,01K
R10 3,01K
R11 301K
R12 301K
R13 301K
74 HC 238
D3
ULN2803
N1
V18 V19 V20 V21 V22 V23 V24 V25
V35
74 HC 138
D2
X2/1 X2/2 X2/3 X2/4 X2/5 X2/6 X2/7 X2/8
GND
Netzausfall
LED(+)
V26
LED(-)
X1/19
X1/21
-5V
R15 147Ω
V27
Werkstoff
neue Urzeichnung
Änderung
Maßstab
Abteilung
am
Datum
Name
Drägerwerk AG Lübeck
Benennung
Splan LP Display-Luft
(Inkubator 8000)
Zeichnungs-Nr.
82 00 673

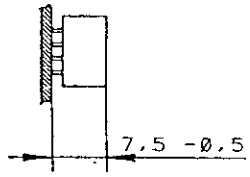


8302726

8200671

ANSICHT X

ANSICHT Z



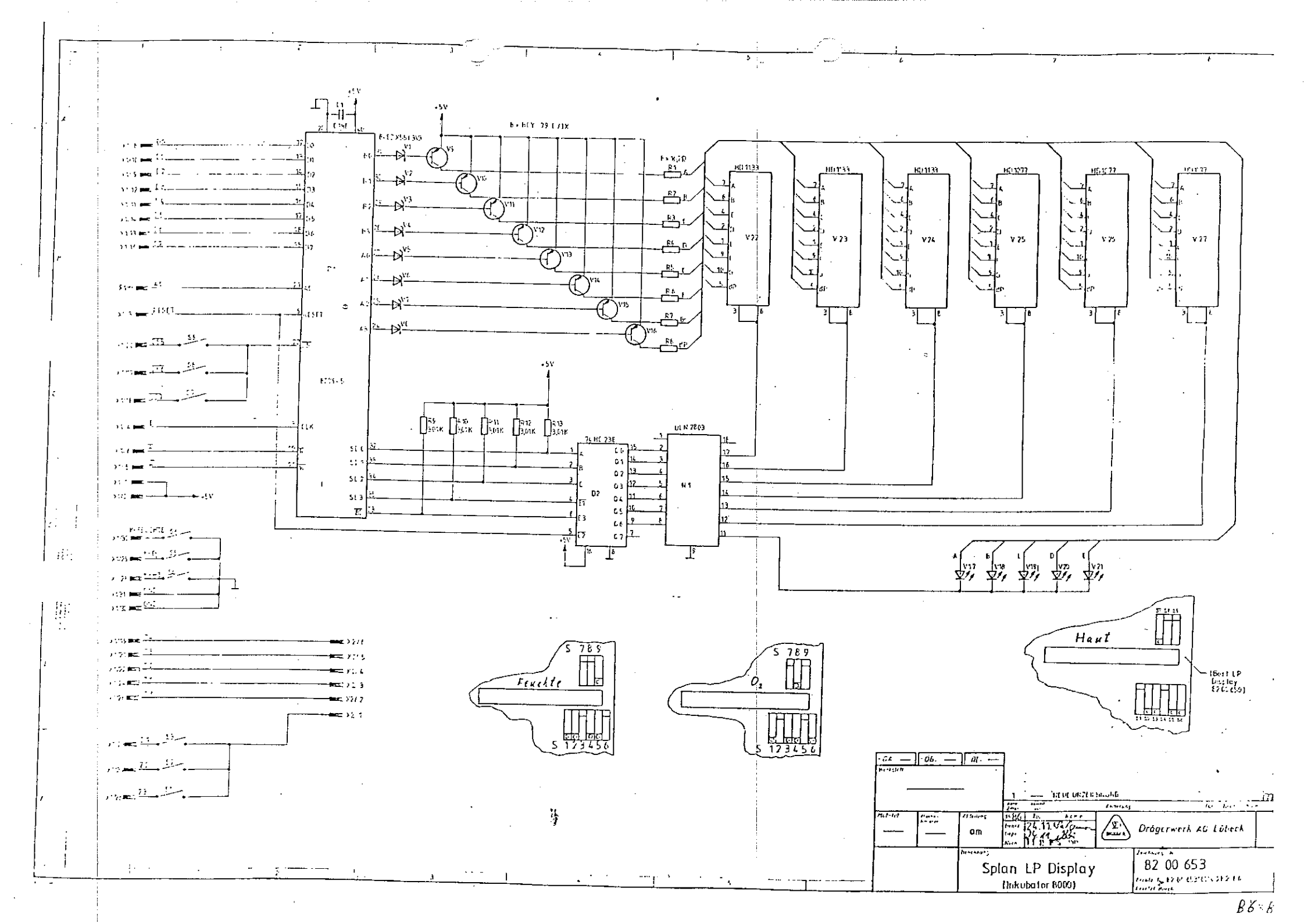
1823175

1810669(8/36)
(VON DER RUECKSEITE BESTUECKT)

V18 - V35 VON RUECKSEITE BESTUECKT
V18 - V27, V35 WIE ANSICHT X EINGESETZT

"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."

WERKSTOFF					
		4		NEUE URZEICHNUNG	
				AENDERUNG	
MASSSTAB 2:1		ABTEILUNG AM	1987 TAG	NAME	DRAEGERWERK AKTIENGESELLSCHAFT Dräger
			4.3.	SALAMON	
			27.7		
BENENNUNG	LP DISPLAY LUFT. UGR. (INKUBATOR 8000)				ZEICHNUNGSNUMMER 8200672

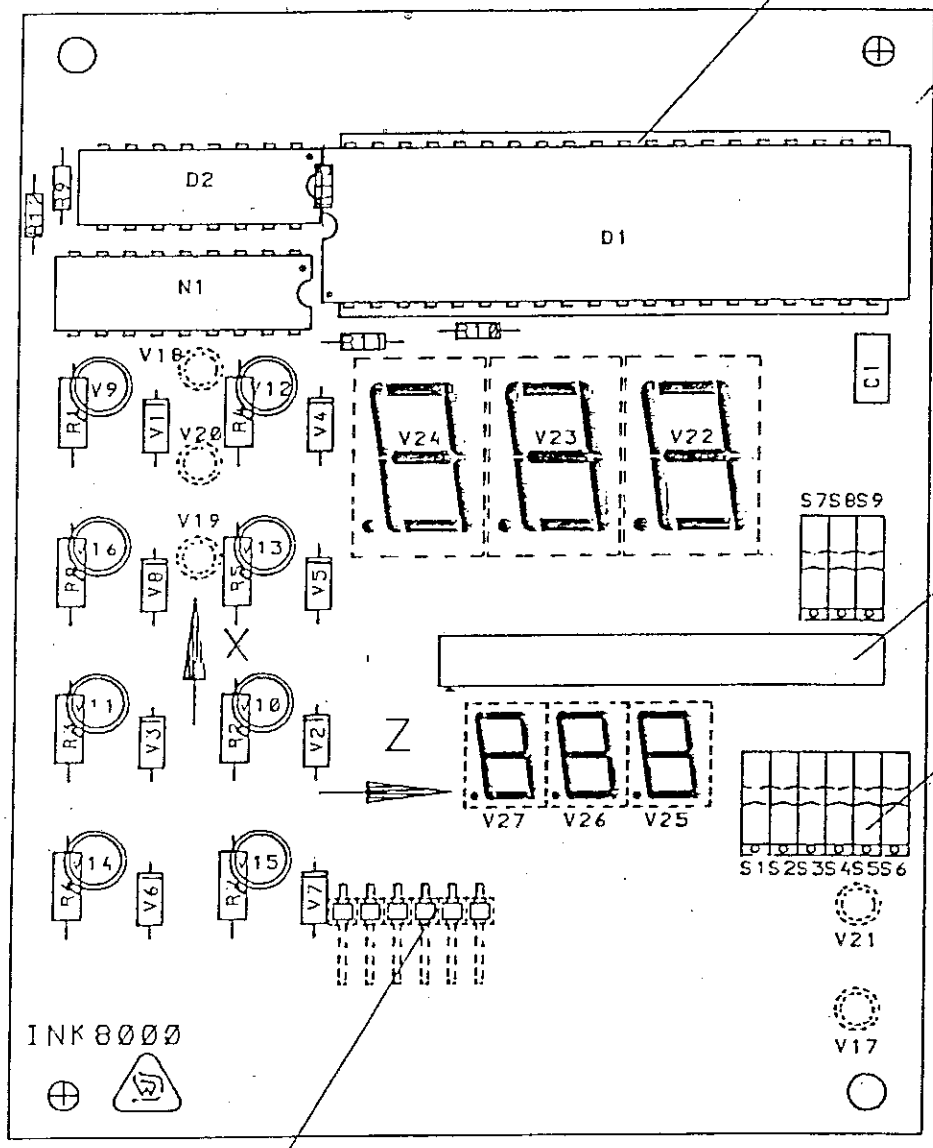


		am	Drägerwerk AG Lübeck

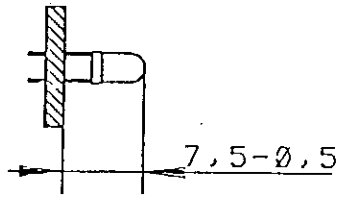
Splan LP Display
(Inkubator 8000)

82 00 653

B6-6

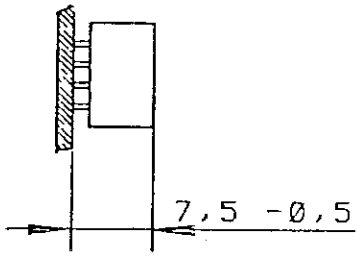


ANSICHT X



V17 - V21 WIE ANSICHT X EINGESETZT

ANSICHT Z



V17 - V27 SIND VON DER RUECKSEITE BESTUECKT

"VERDECKTE UND SICHTBARE KONTUREN HABEN GLEICHE LINIENARTEN UND LINIENBREITEN."

-DA-	-DB-	-DC-					
WERKSTOFF							
			2	—	NEUE URZEICHNUNG		
					AENDERUNG		
MASZSTAB	ALLGEMEIN-TOLERANZEN	ABTEILUNG		TAG	NAME		
2:1	—	AM	1986	83.12	SALAMON		
			GEPRÜFT	11.12.			
			NORM	11.12.	WOG		

DRÄGERWERK AG LÜBECK

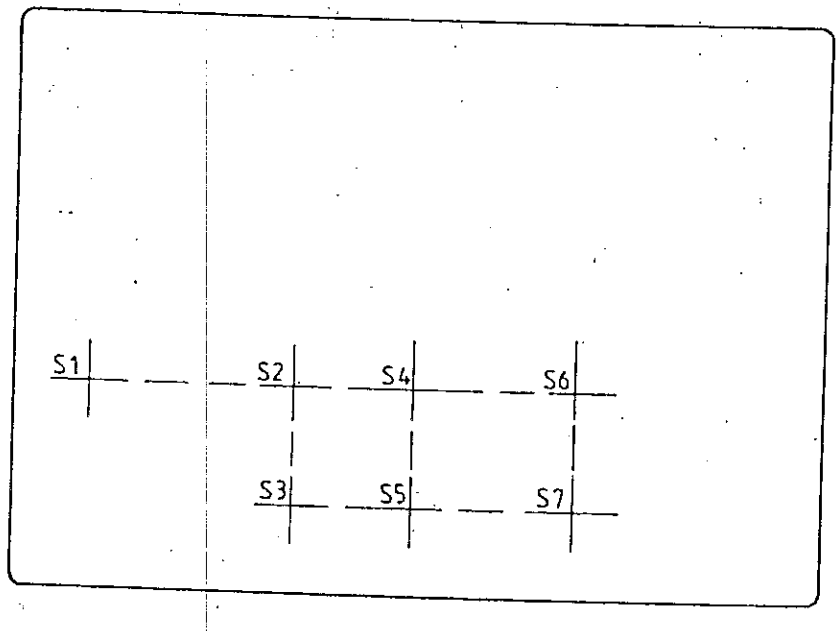
BENENNUNG: LP DISPLAY, UGR.

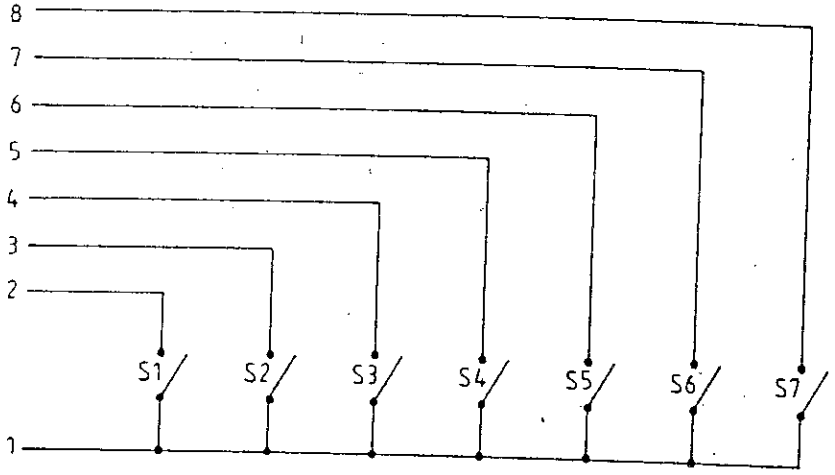
(INKUBATOR 8000)

ZEICHNUNGSNUMMER BEST.AUS 3BL: 8200652 BLATT 1

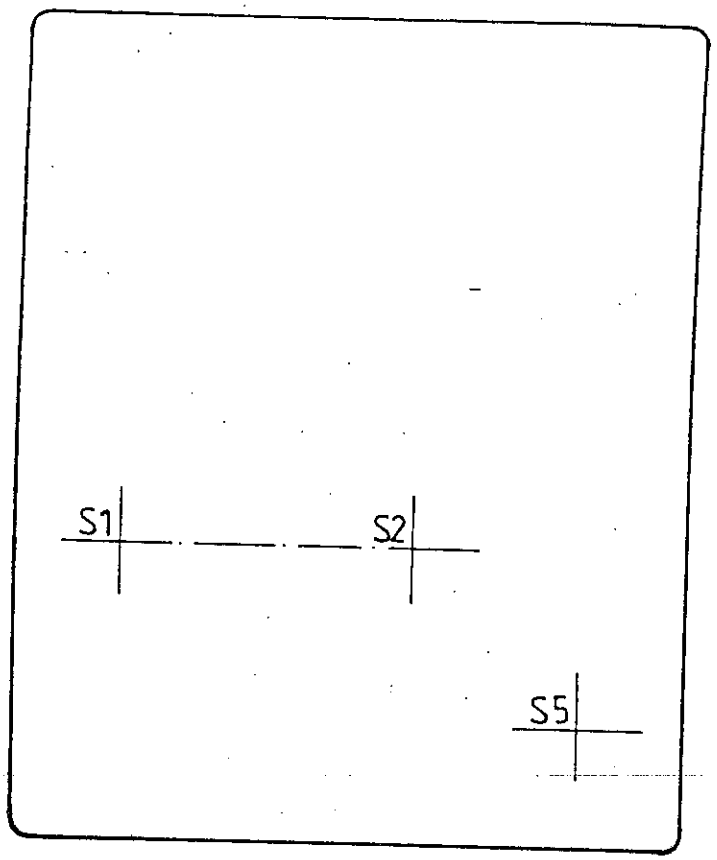
ERSETZT DURCH

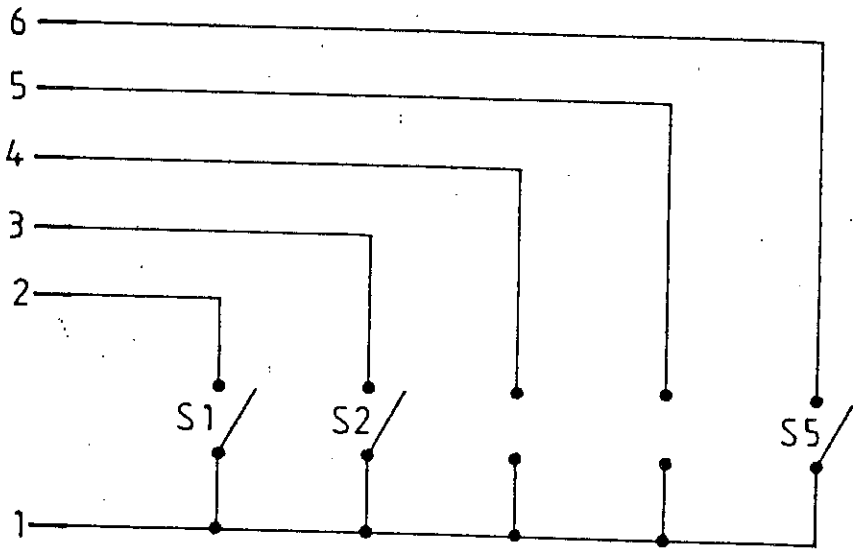
DRÄGERWERK AG LÜBECK





=QA= —	=QB= —	=QC= —					
Werkstoff							
			Änd. Zeiter	kennl. snr.	Änderung	Tag	Bearb.
Maßstab	Allgemeintoleranzen	Abteilung	1985	Tag	Name	Drägerwerk AG Lübeck	
1:1	—	am	Bearb	9.10.			
			Gepr	9.10			
			Norm	17.11			
	Benennung: Schaltfolie Lu/tt. (Inkubator 8000)				Zeichnungs Nr: 82.00 656		
					Ersatz für: B 4[illegible] F44		





=QA=	=QB=	=QC=
—	—	—

Werkstoff: —

Aend. Ziffer	kommt vor	Änderung	Tag	Bearb.	Norm

Maßstab	Allgemeintoleranzen	Abteilung	1985	Tag	Name
1:1	—	am	Bearb	8.10.	Lau
			Gepr	9.10.	Schm
			Norm		

Drägerwerk AG Lübeck

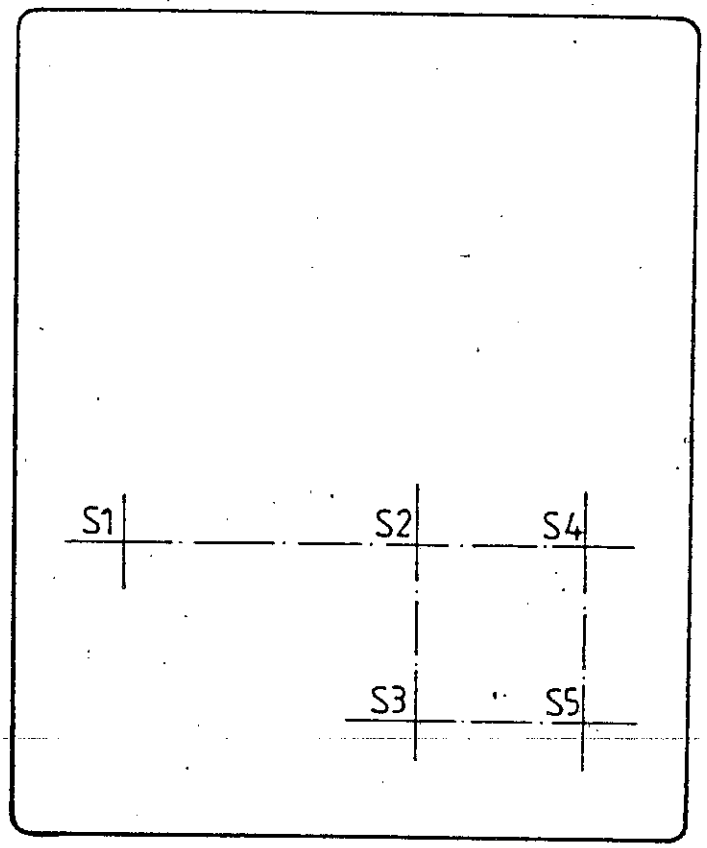
Benennung: Schaltfolie Feuchte (Inkubator 8000)

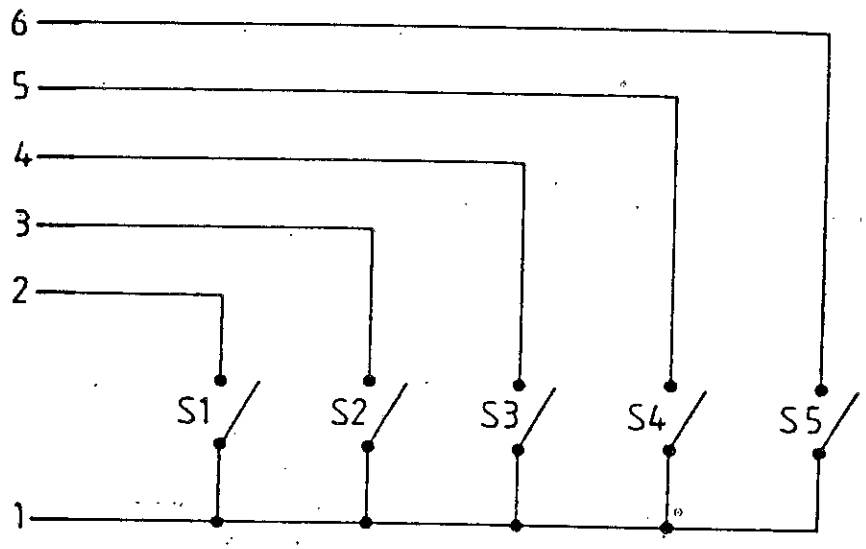
Zeichnungs-Nr.: 82 00 657

Ersatz für

Ersetzt durch

Hugo Hamann, Kiel 03 6663 83





=QA=	=QB=	=QC=
—	—	—

Werkstoff: —

Aend Zeiler	kommt vor	Änderung	Tag	Bearb	Norm

Maßstab	Allgemeintoleranzen	Abteilung
1:1	—	am

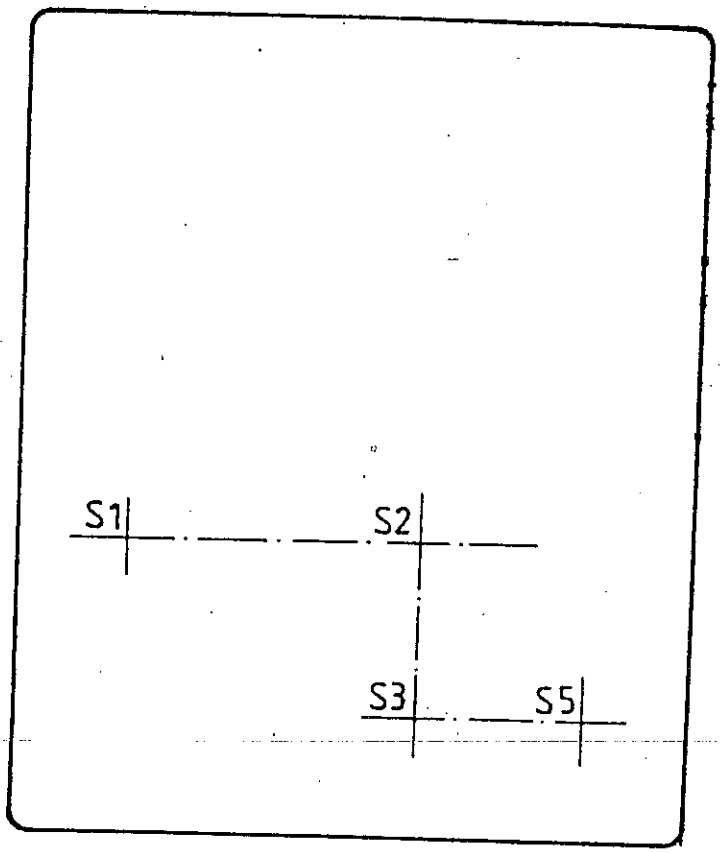
1985	Tag	Name
Bearb	8.10.	Bu
Gepr	9.10.	Schm.
Norm		

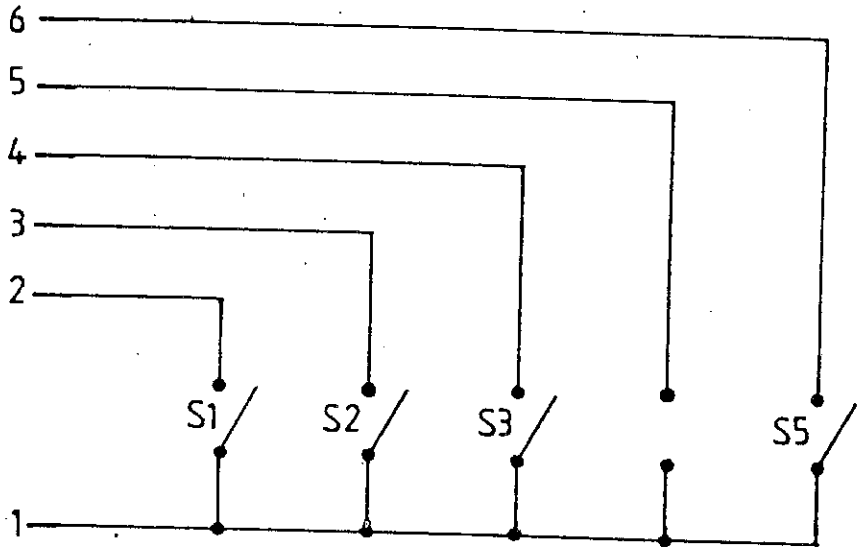
Drägerwerk AG Lübeck

Benennung: Schaltfolie O_2 (Inkubator 8000)

Zeichnungs Nr: 82 00 649

Ersatz für:





=QA=	=QB=	=QC=

Werkstoff

Aend Ziffer	kommt vor	Änderung	Tag	Bearb.	Norm

Maßstab	Allgemeintoleranzen	Abteilung
1:1	—	am

	Tag	Name
1985		
Bearb	8.10.	Pau
Gepr	9.10.	Schw
Norm		

Drägerwerk AG Lübeck

Benennung

Schaltfolie Haut

(Inkubator 8000)

Zeichnungs-Nr

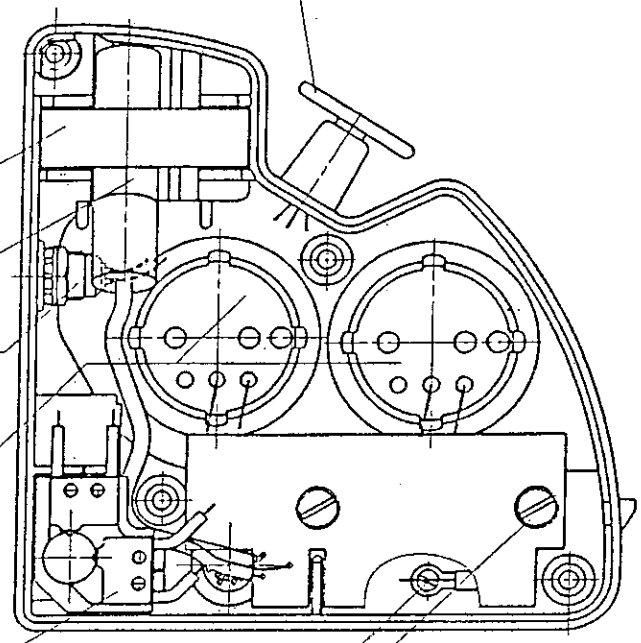
82 00 655

Ersatz für

Hugo Hamann, Kiel 03 6663 83

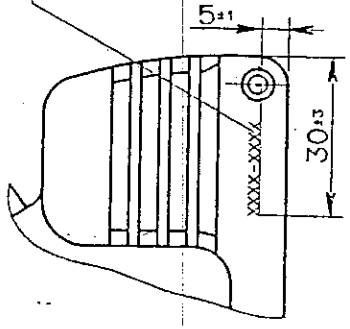
Climatesensor

Ansicht ohne Deckel dargestellt

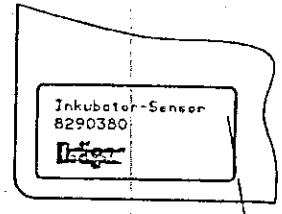


Fabr.-Nr. DWN419-A
warmgeprägt
Schriftgrösse 2mm

Ansicht Y

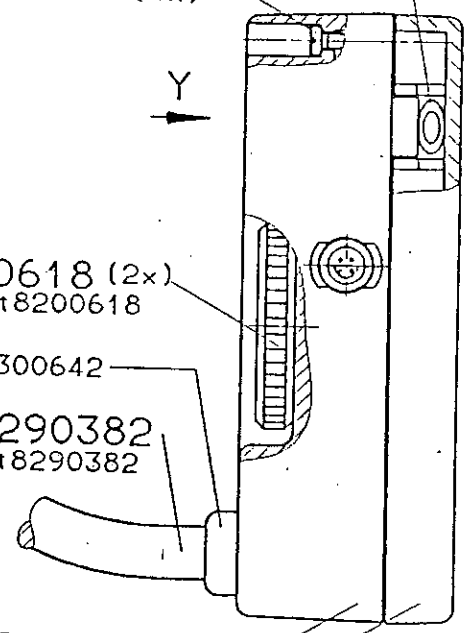


Ansicht Z



8290383

Schlauch 4x1.5-
SI NF M27729 (40lg)

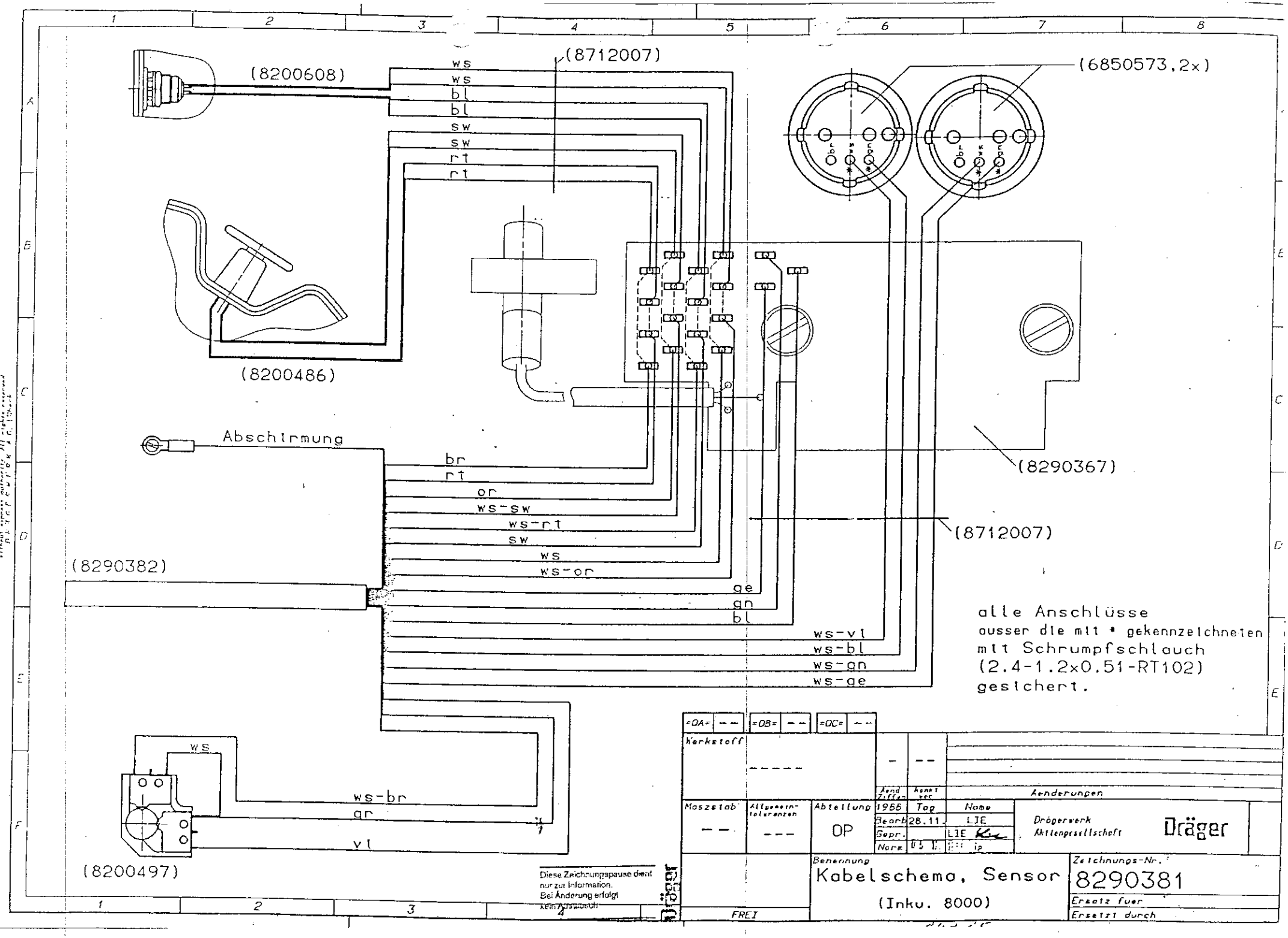


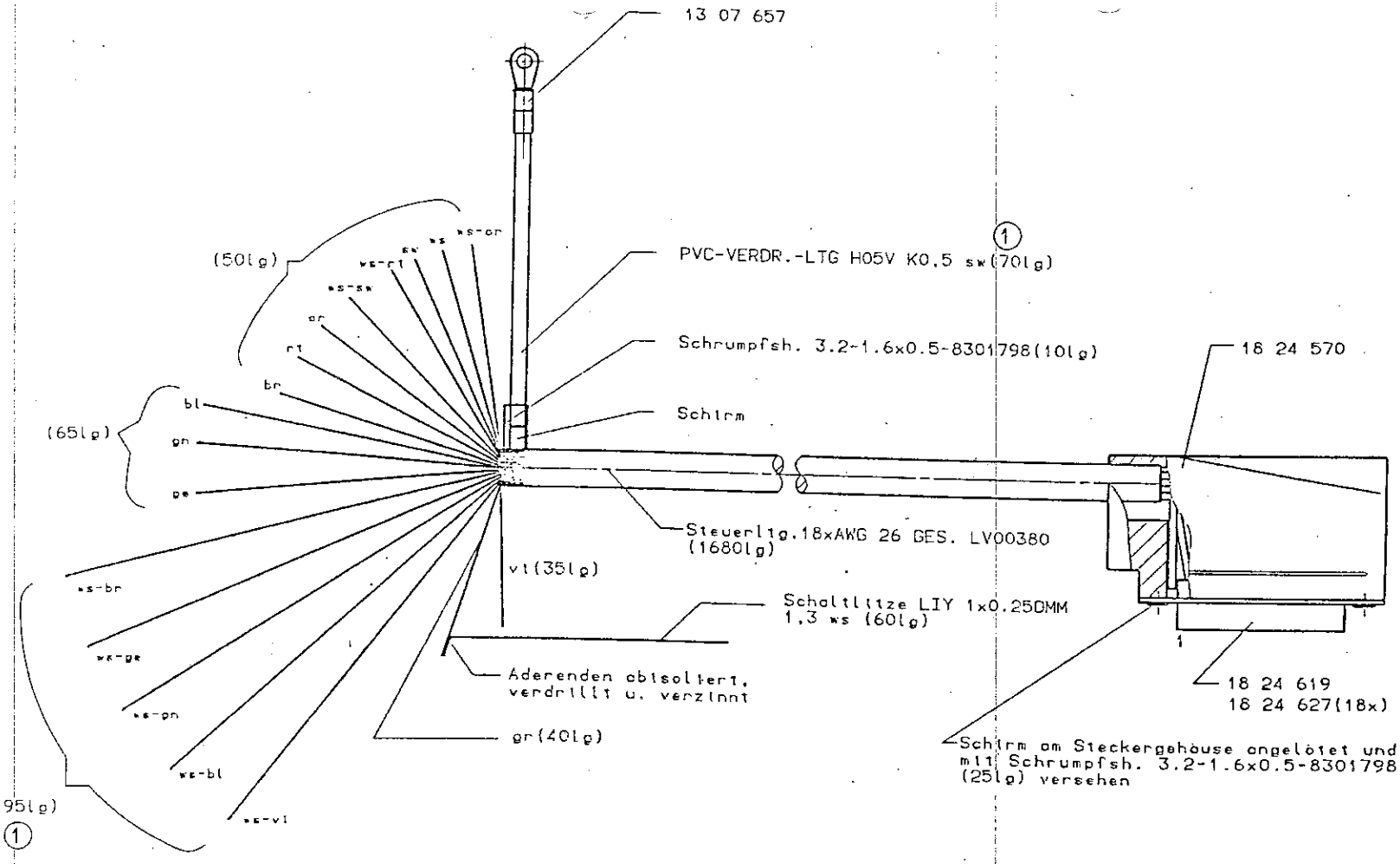
Hierzu:

FKV	K02442
Stuckliste	St8290380
Kabelschema Sensor	8290381
Kabelbinder	8712007 (2x)
Schrumpfsh 2.4-1.2x0.51-RT102 (10lg,23x)	
verpackt in:	Flachbeutel mind. 220x300 DWN 1210
	8710703

=OA= --	=OB= --	=OC= --					
Werkstoff			-	--			

			Aend. Ziffer	Aend. vom	Aenderungen		
Massstab	Allgemeintoleranzen	Abteilung	1988	Tag	Name	Drägerwerk Aktiengesellschaft	Dräger
1:1	---	OP	Gezeichnet	26.11.	LIE		
			Gepr.		LIE		
			Norm				
FREI		Benennung	Sensor, kpl. (Inku. 8000)			Zeichnungs-Nr. 8290380	
						Ersatz fuer	
						Ersetzt durch	


(8200608)
(8712007)
(6850573,2x)
ws
ws
bl
bl
sw
sw
rt
rt
(8200486)
(8290367)
Abschirmung
br
rt
or
ws-sw
ws-rt
sw
ws
ws-or
ge
gn
bl
ws-vl
ws-bl
ws-gn
ws-ge
(8712007)
(8290382)
alle Anschlüsse
ausser die mit * gekennzeichneten
mit Schrumpfschlauch
(2.4-1.2x0.51-RT102)
gesichert.
ws
ws-br
gr
vl
(8200497)
Diese Zeichnungspause dient nur zur Information. Bei Änderung erfolgt kein Austausch!
Dräger
=0A= -- =0B= -- =0C= --
Werkstoff
Aend. Ziffer
Kenner
Aenderungen
Maszstab
Allgemeintoleranzen
Abteilung
1988
Tag
Name
Bearb. 28.11. LJE
Gepr. LJE
Norm
Dräger
Drägerwerk Aktiengesellschaft
Benennung
Kabelschema, Sensor
(Inku. 8000)
Zeichnungs-Nr.
8290381
Ersatz fuer
Ersetzt durch
FREI



Buchsen-Nr.	Adernfarbe
1	br
2	rt
3	or
4	ge
5	gn
6	bl
7	vt
8	gr
9	ws
10	sw
14	ws-ge
15	ws-gn
16	ws-bl
17	ws-vt
18	ws-sw
21	ws-br
22	ws-rt
23	ws-or

hierzu: St 8290382

Ausführung nach DWN 3012

=OA= -- =OB= -- =DC= --

Werkstoff: ----- | 1 | 2x

geändert in CAD-Zeichnung.
Längen geändert.

Änderungen

Maßstab: 1 : 1 | Allgemeintoleranzen: --- | Abteilung: OP

	Änd. Ziffer	Änderungsdatum	Tag	Name
Bearb.		1988	10.11	STICKEL
Gepr.				LIE
Norm				

Dräger — Drägerwerk Aktiengesellschaft

Benennung: Kabelbaum Sensorstecker

Zeichnungs-Nr.: 8290382

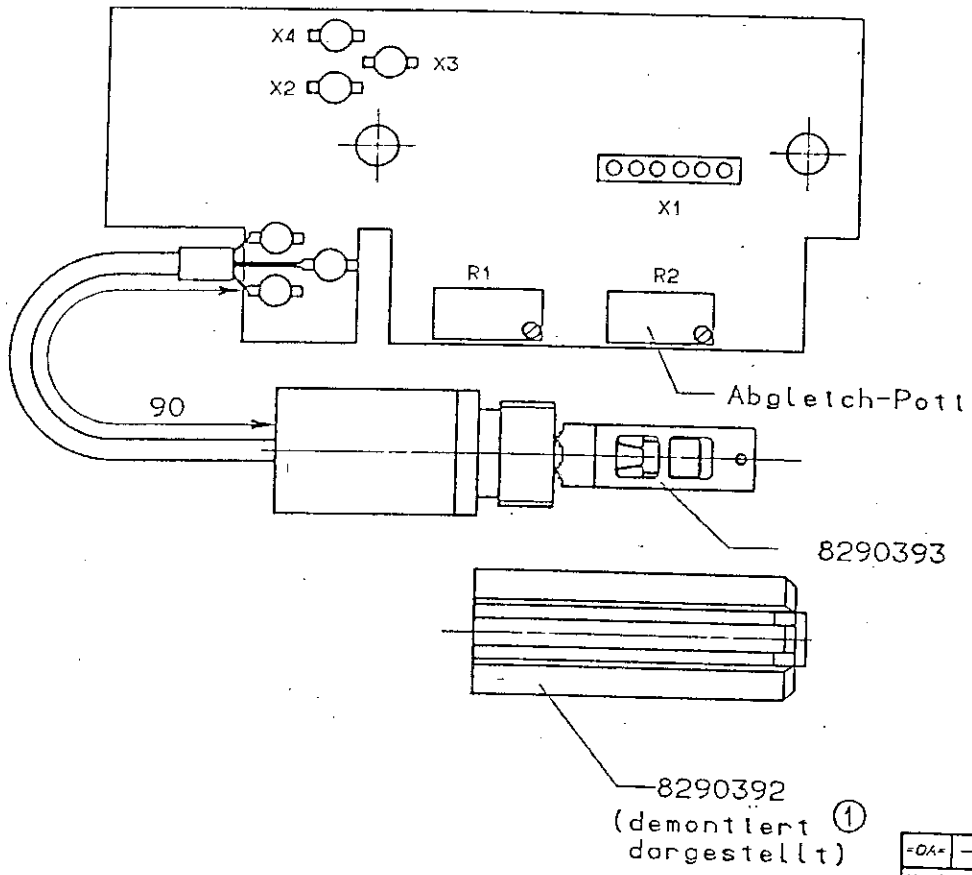
Ersatz für

Ersetzt durch

FREI

Diese Zeichnungspause dient nur zur Information. Bei Änderung erfolgt kein Austausch

Dräger



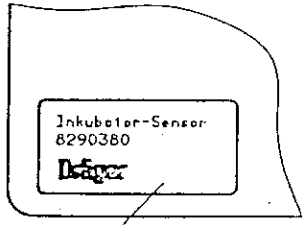
=OA= --	=OB= --	=OC= --							
Werkstoff ---			1	1X	Text korrigiert				
			Aend. Ziffer	Aend. Ver.	Aenderungen				
Massstab 2:1	Allgemeintoleranzen ---	Abteilung OP	1988	Tag	Name	Dräger			
			Bearb.	05.12.	STICKEL	Dräger Aktiengesellschaft			
			Gepr.		LJE.				
			Norm						
FREI			Benennung Feuchtesensor, vollst.			Zeichnungs-Nr. 8290367			
						Ersatz fuer			
						Ersetzt durch			

Diese Zeichnungspause dient nur zur Information. Bei Änderung erfolgt kein Austausch

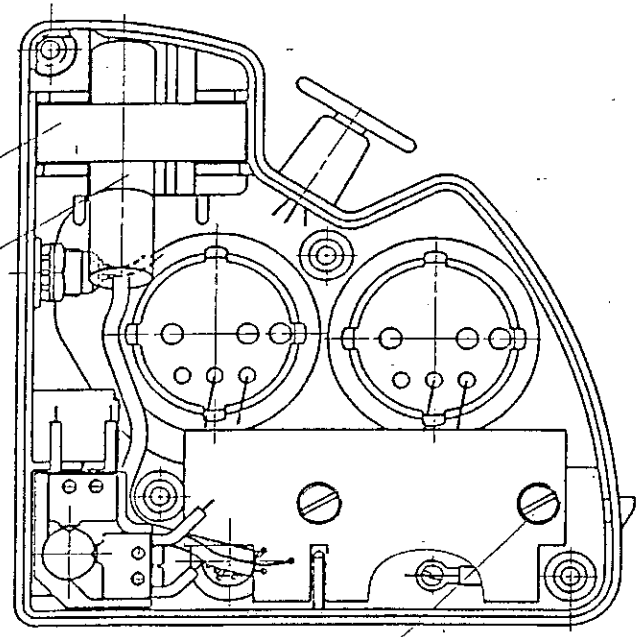
Demontage von: -Feuchtesensor (8200479)
-Kontaktleiste (8404294)
Alle Kabelanschlüsse ablöten
Mittig zerbrechen (z.B. mit Seitenschneider)
und aus Hülse vorsichtig herausdrehen. Klebereste entfernen

-Klebeschild (8200715)

Montage: -neuer Feuchtesensor, vollst. (8290367)



(8290383)



(8290386)

(8290367
St 8290367)

(1337742(2x))
(D04796(2x))

Besteht aus:

Feuchtesensor, vollst.	8290367 ST8290367
Halter	8290386
Schild	8290383
Schraube	1337742(2x)
Dichtring	D04796(2x)
Kabelbinder	8712007(2x)
Rüstanweisung	8290391

Schrumpfschlauch 2.4-1.2x0.51-RT102 (10lg. 19x)

verpackt in Flachbeutel mind. 220x330 DWN 1210

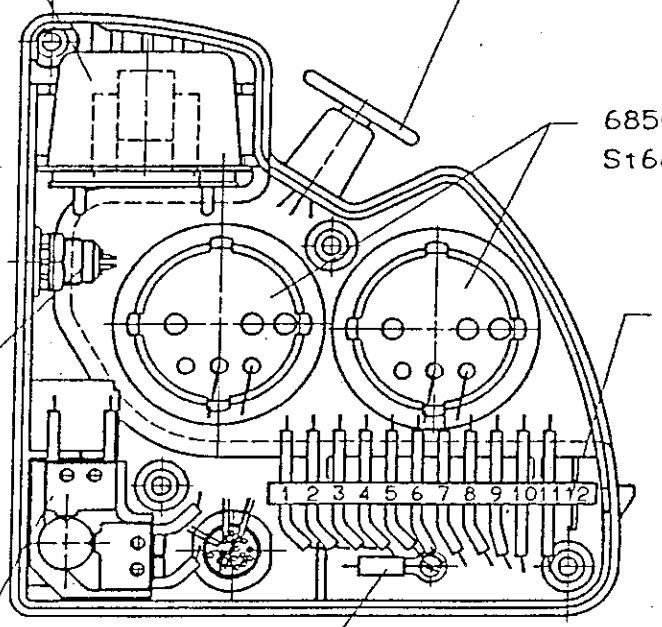
hierzu: St 8290410

Diese Zeichnungspause dient nur zur Information. Bei Änderung erfolgt kein Austausch!

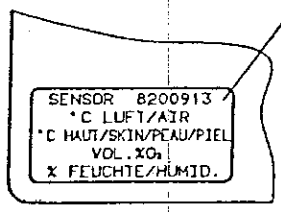
Dräger

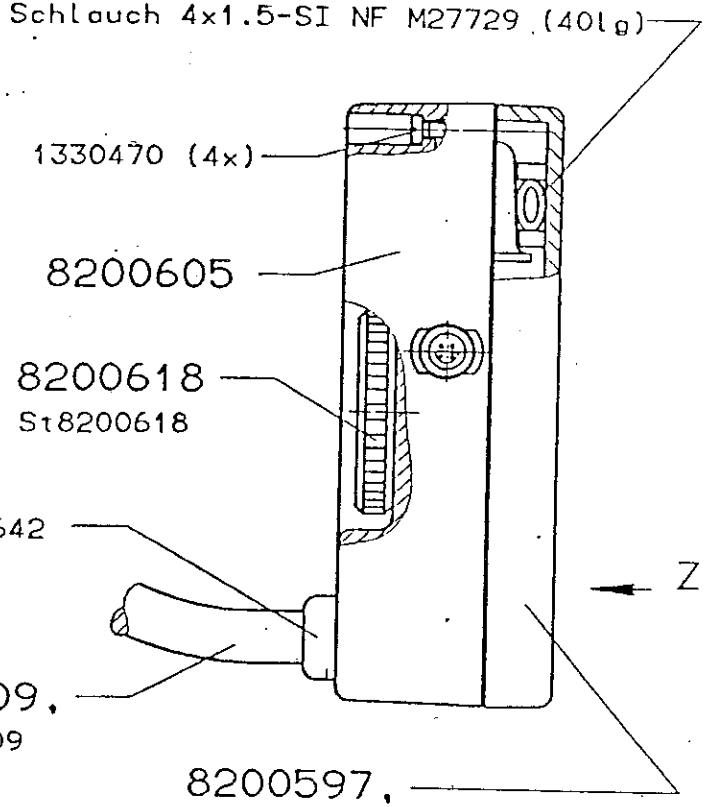
=OA= --	=OB= --	=OC= --					
Werkstoff ---							
Maszstab 1:1	Allgemeintoleranzen ---	Abteilung OP	Aend. Ziffer	Anast vcc	Aenderungen		
			1968	Tag	Name	Drägerwerk Aktiengesellschaft	Dräger
			Bearb.	10.11	STICKEL		
			Gepr.		LIE		
			Norm				
FREI			Benennung Rüstsatz, Feuchtemodul			Zeichnungs-Nr. 8290410	
						Ersatz fuer	
						Ersetzt durch	

Ansicht ohne Deckel dargestellt



ANSICHT Z



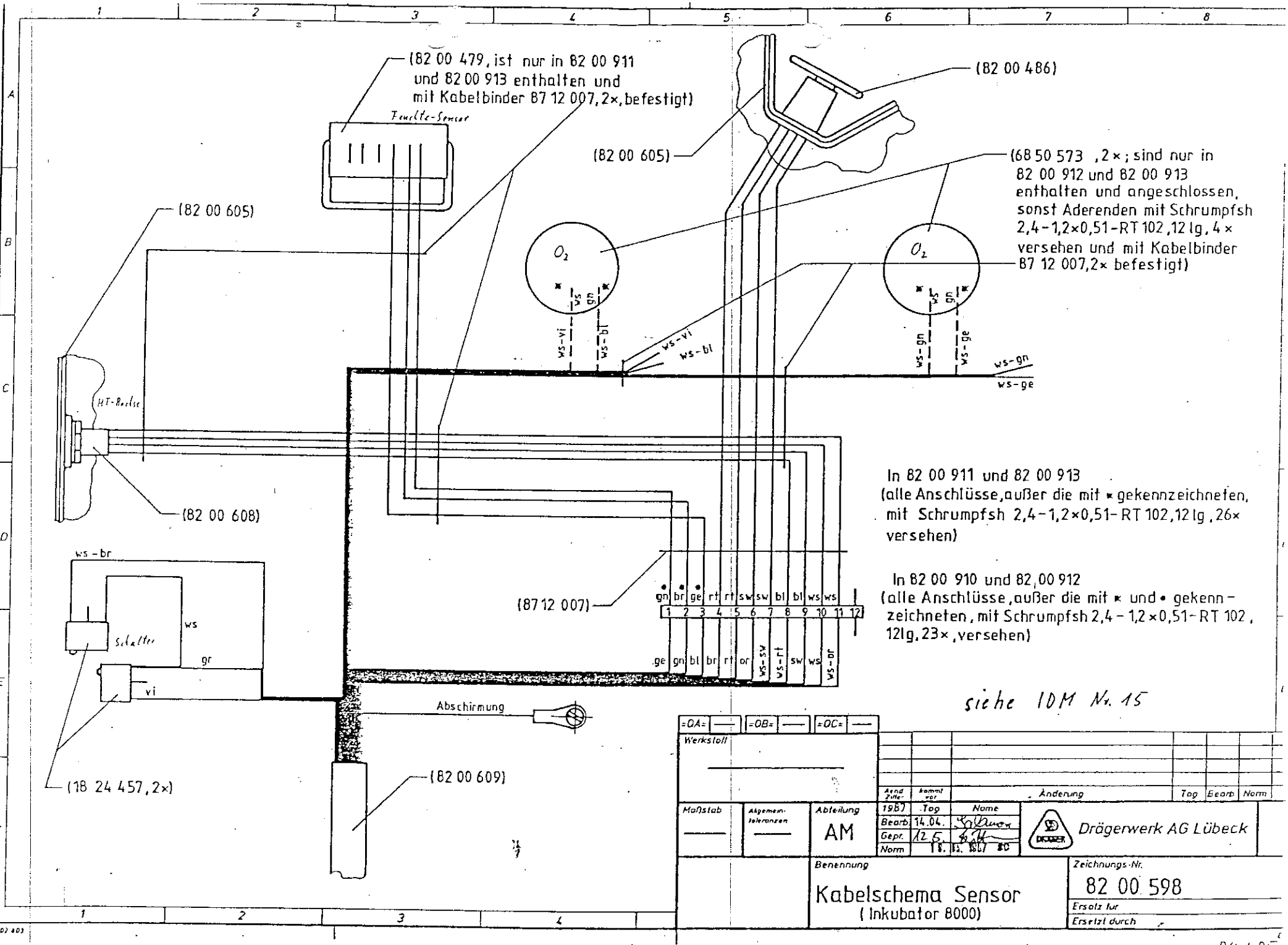


siehe IDM Nr. 15

Hierzu:

Stückliste	St8200913
Kabelschema Sensor	8200598 (nach Ausführung 8200913)
Kabelbinder	8712007 (3x)
Schrumpfsh 2.4-1.2x0.51-RT102 (312lg)	

DA --	*DB* --	*DC* --				
Werkstoff: -			Änd. Index	Änderungen		
Maßstab: 1:1	Allgemeintoleranzen: -	Abteilung: AM	1987	Tag	Name	Dräger
			Bearb.	18.06.	GREST	Drägerwerk Aktiengesellschaft
			Gepr.			
			Norm			
FREI		Benennung: SENSOR, VOLLST. (INK. 8000)		Zeichnungs-Nr.: 8200913		
				Ersatz für		
				Ersetzt durch		



=OA=	=OB=	=OC=	
Werkstoff			
Maßstab	Allgemeintoleranzen	Abteilung: AM	Änderung / Tag / Bearb / Norm
		1987 Tag Name	
		Bearb. 14.04.	
		Gepr. 12.5.	
		Norm	

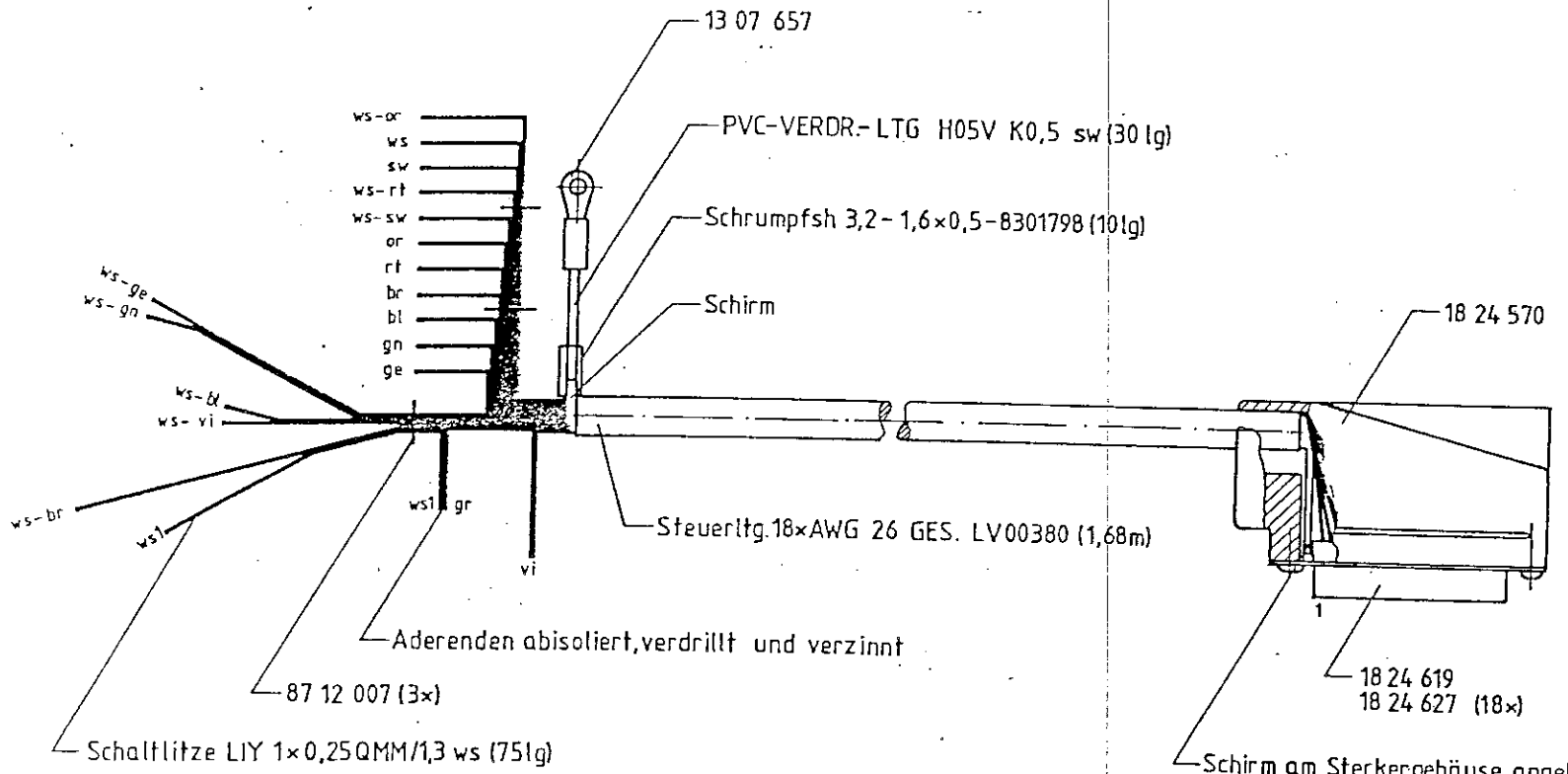
Drägerwerk AG Lübeck

Benennung: Kabelschema Sensor (Inkubator 8000)

Zeichnungs-Nr.: 82 00 598

Ersatz für

Ersetzt durch



Buchsen-Nr.	Aderfarbe
1	br
2	rt
3	or
4	ge
5	gn
6	bl
7	vi
8	gr
9	ws
10	sw
14	ws-ge
15	ws-gn
16	ws-bl
17	ws-vi
18	ws-sw
21	ws-br
22	ws-rt
23	ws-or

siehe IDM Nr. 15

Aderenden abisoliert und verzinnt

100

Hierzu: St 82 00 609

Ausführung nach DWN 3012

=QA= — =QB= — =QC= —

Werkstoff

Maßstab	Allgemeintoleranzen	Ableitung
1:1		AM

Änd. Ziffer	kommi ver.	Änderung	Tag	Bearb	Norm
19 87	Tag	Name			
Bearb	07.05.				
Gepr.	12.5.				
Norm	13. 11. 1987				

Dräger
Drägerwerk Aktiengesellschaft

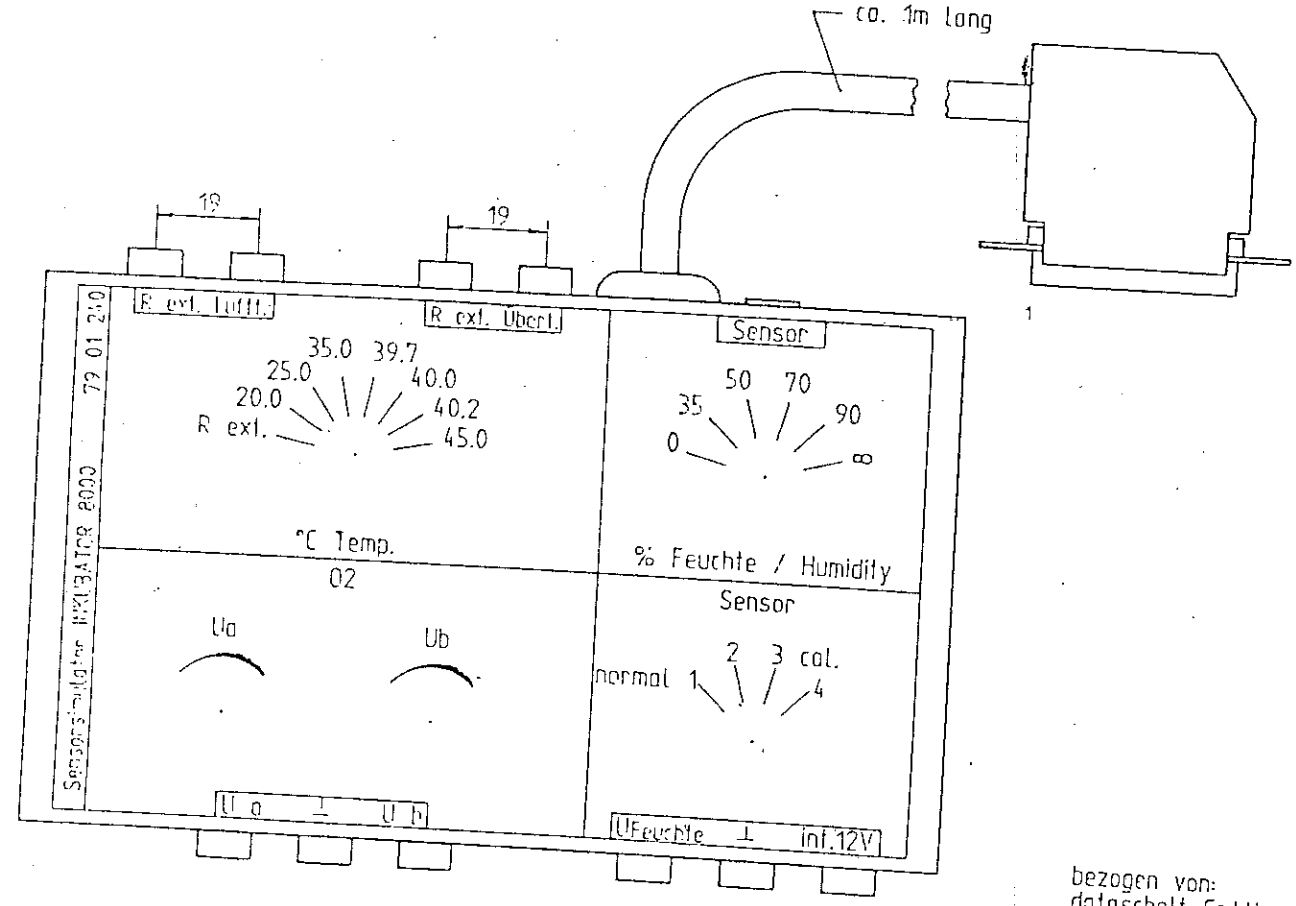
Benennung: Kabelbaum Sensorstecker

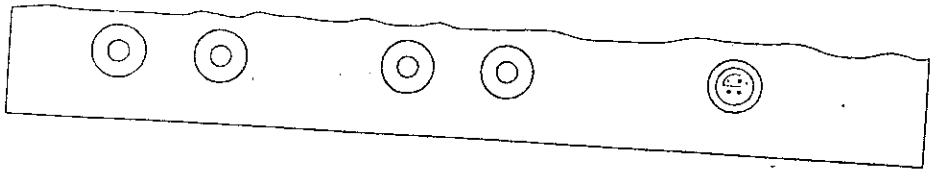
Zeichnungs-Nr.: 82 00 609

Ersatz für

Ersetzt durch

90 04 142





bezogen von:
dataschalt GmbH
An der Hülshorst 7-9
2400 Lübeck 1

ST·79 01 240

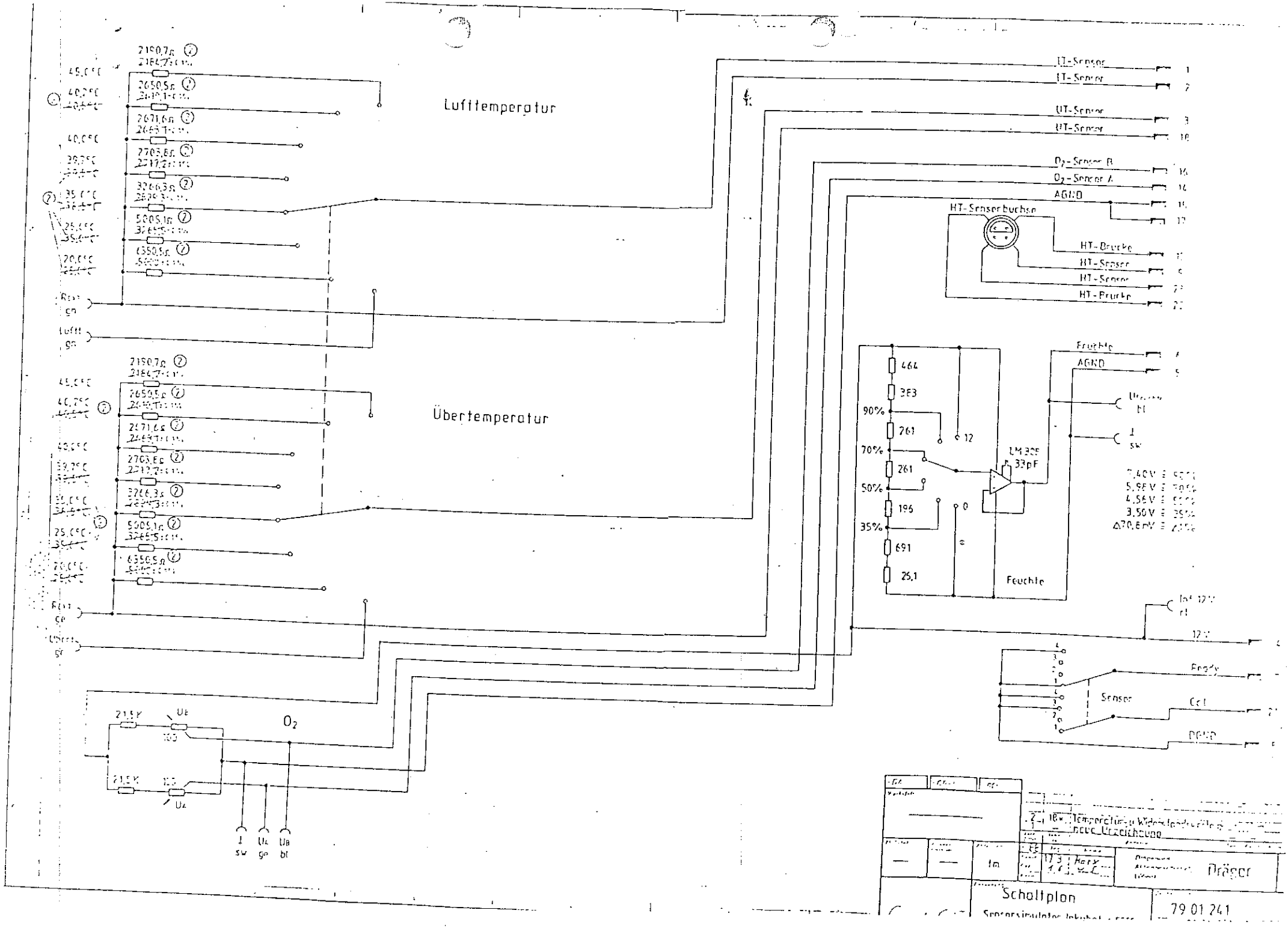
=OA=	—	=OB=	—	=OC=	—		
Werkstoff							
				2	–	neue Urzeichnung	
				Ersatz für	Ersatz durch	Änderung	
Maßstab	Allgemeintoleranzen	Abteilung		1988	Tag	Name	Drägerwerk Aktiengesellschaft
1:1	—	tm		Bearb.	31.5.	Marx	Dräger
				Gepr.	1.6.	K.L.	
CAD				Norm			

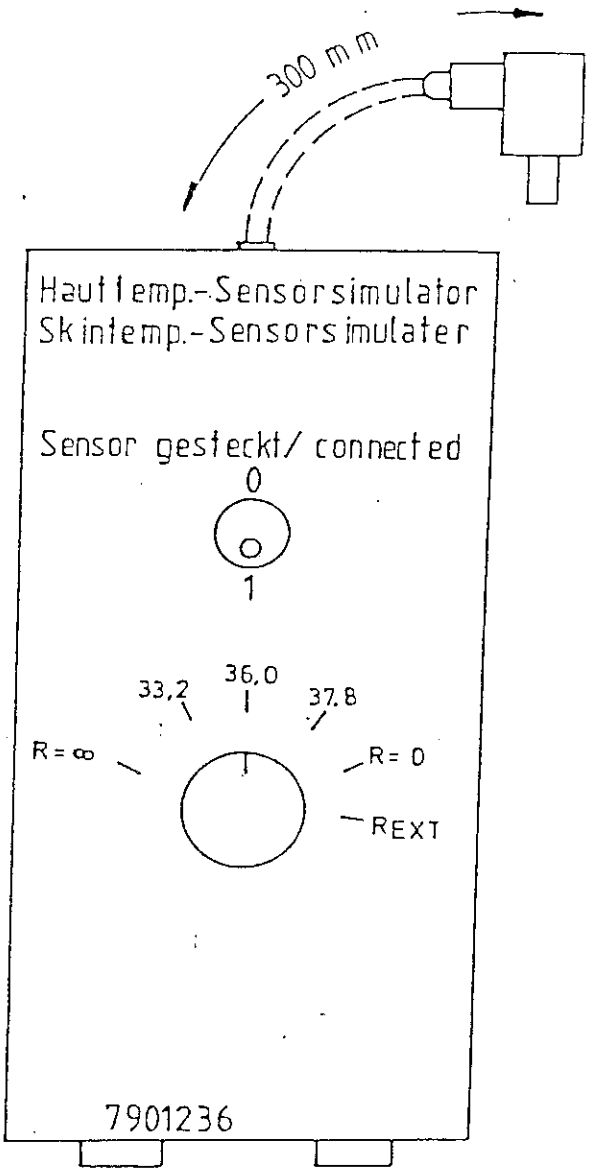
Benennung: Sensorsimulator Inkubator 8000

Zeichnungs-Nr.: 79 01 240

Ersatz für: 79 01 240 vom 15.05.1987

Anschluß Box 4


Lufttemperatur
Übertemperatur
HT-Sensor
HT-Sensor
UT-Sensor
UT-Sensor
O_2-Sensor B
O_2-Sensor A
AGND
HT-Sensorbuchse
HT-Buchse
HT-Sensor
HT-Sensor
HT-Buchse
Feuchte
AGND
464
383
90%
261
70%
261
50%
196
35%
691
25,1
12
0
LM 385
33pF
Feuchte
5,40V ≙ 65%
5,98V ≙ 70%
4,56V ≙ 55%
3,50V ≙ 35%
Δ70,6mV ≙ 4,5%
Int 12V
12V
Ready
Sensor
Ccl
DGND
O_2
Ub
Ua
sw
ge
bl
Präger
Schaltplan
79 01 241



Kleingehäuse 120 x 60 x 30

hierzu St 7901236

bezogen von:
Industrieelektronik Nord
Wesloer Str. 112
2400 Lübeck 16

=OA=	=OB=	=OC=

Werkstoff

Änd. Zust.	Kenn-Ver.	Änderung	Tag	Bearb.	Norm.

Maßstab	Allgemeintoleranzen	Abteilung		1987	Tag	Name
1:1		tm	Bearb.	09.09	Stand.	
			Gepr.			
			Norm			

Drägerwerk Aktiengesellschaft Lübeck

Dräger

Benennung

Hauttemperatur-Sensorsimulator

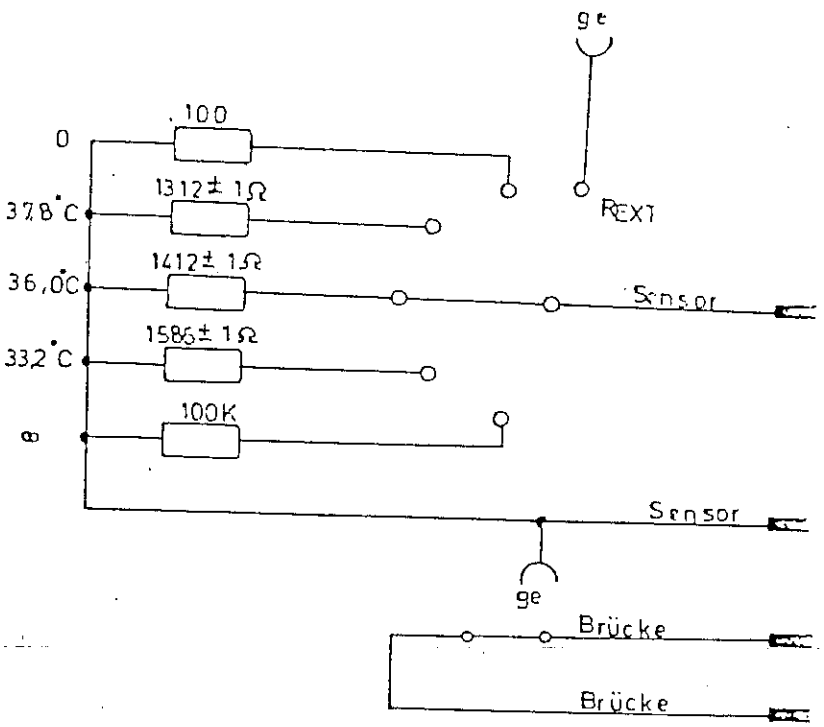
Zeichnungs-Nr.

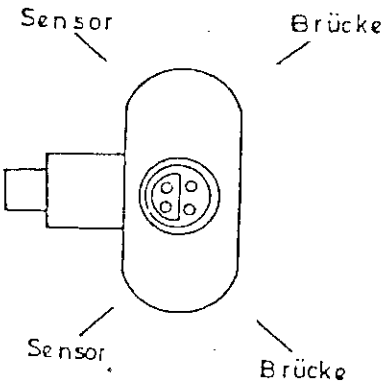
7901236

Ersatz für

Ersetzt durch

Druck Hansen, Kiel 01.6603.89





=0A=	=0B=	=0C=

Werkstoff

Änd. Zeichn.	Änd. Ers. f.	Änderung	Tag	Ecarb	Norm.

Maßstab	Allgemeintoleranzen	Abteilung	19	Tag	Name
—	—	tm	Ecarb	09.09.	Marx
			Gepr		
			Norm		

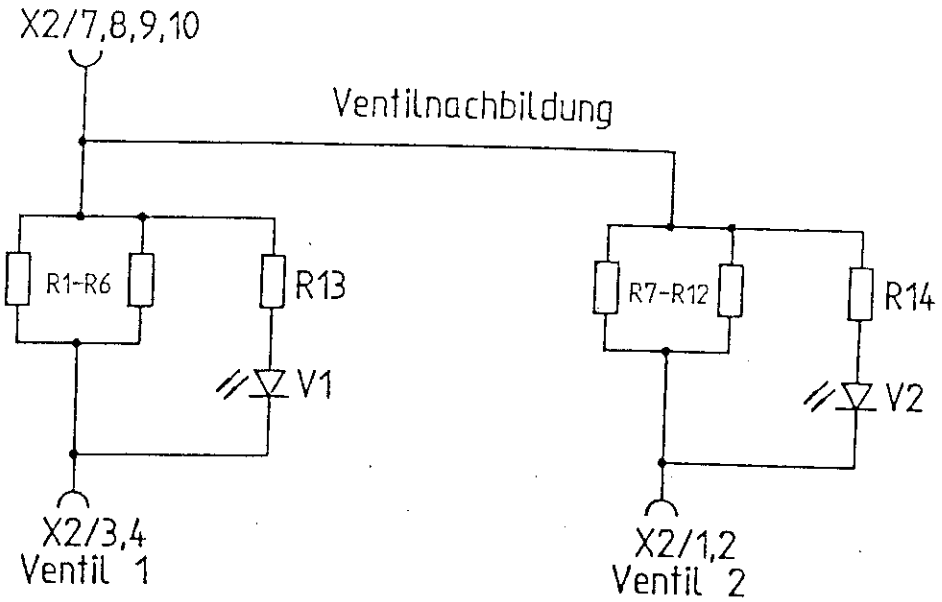
Dräger
Drägerwerk
Aktiengesellschaft
Lübeck

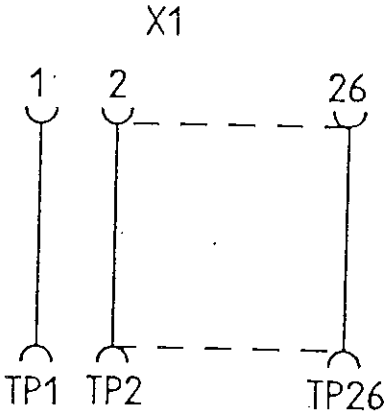
Benennung
Hauttemperatur-
Sensorsimulator

Zeichnungs-Nr.
7901237

Ersatz für

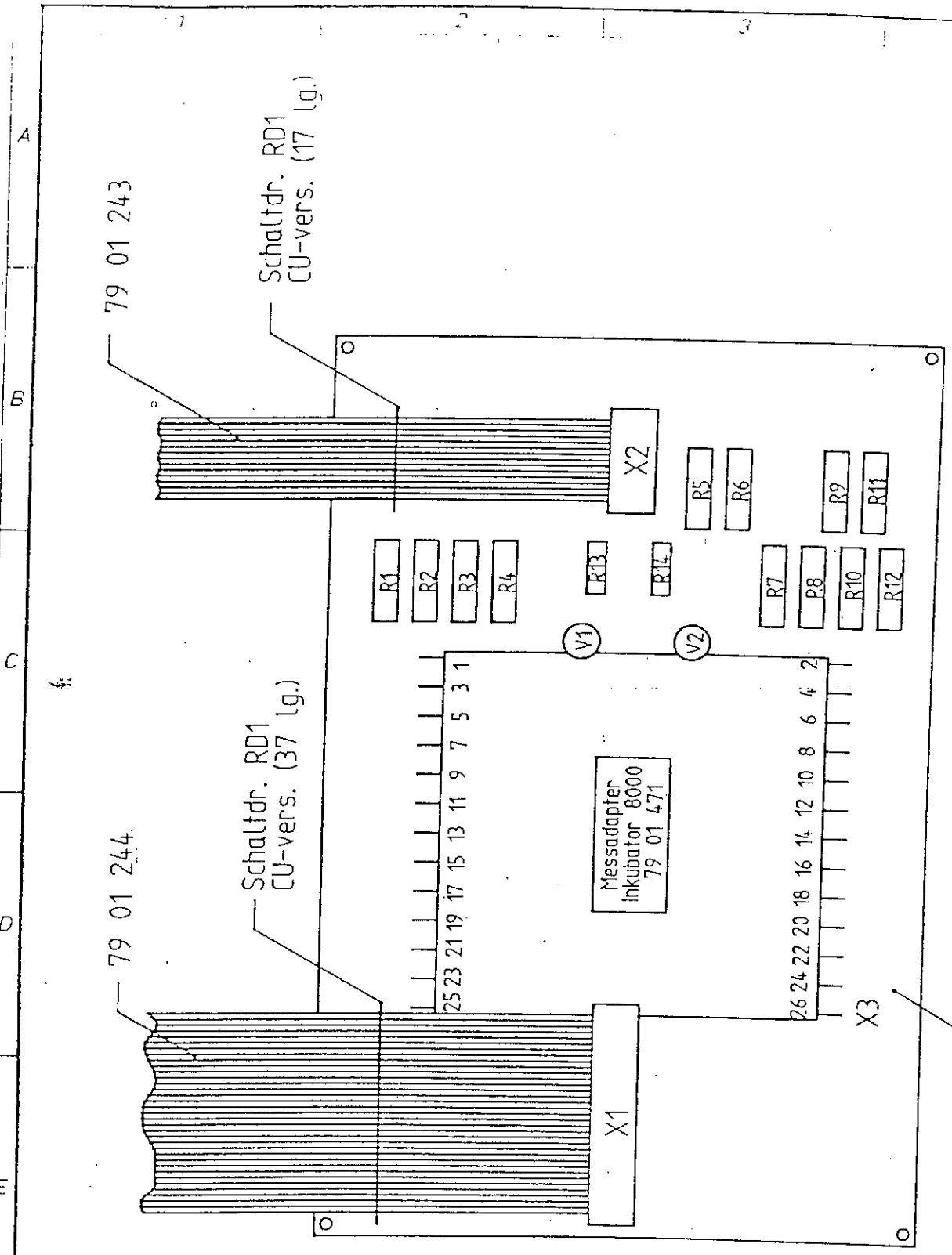
Ersetzt durch





Testpunkte 1-26

=0A= —	=0B= —	=0C= —					
Werkstoff							
			Änderung			Tag	Bearb.	Norm.
Maßstab	Allgemeintoleranzen	Abteilung	1988	Tag	Name	Dregerwerk Aktiengesellschaft Lübeck	Dräger
—	—	tm	Bearb.	17.5.	Marx		
			Gepr.	18.5.	Suhl		
			Norm.				
CAD	Benennung: S-Plan LP Meßadapter					Zeichnungs-Nr.: 79 01 474	



Die Lötseite ist mit einer VDE-Pappe 100x160mm abgedeckt.

ST 79 01471

=0A= —	=0B= —	=0C= —

Werkstoff: —

Änd. Index	Kenn. Nr.	Änderung	Tag	Bearb.	Norm

Maßstab	Allgemeintoleranzen	Abteilung	19 88	Tag	Name
1:1	—	tm	Bearb	16.5.	Marx
			Gepr	18.5.	Suhl
			Norm		

Drägerwerk Aktiengesellschaft Lübeck — Dräger

CAD

Benennung: Meßadapter Inkubator 8000

Zeichnungs-Nr.: 79 01 471

Ersatzteil-Liste
Inkubator 8000
Incubator 8000

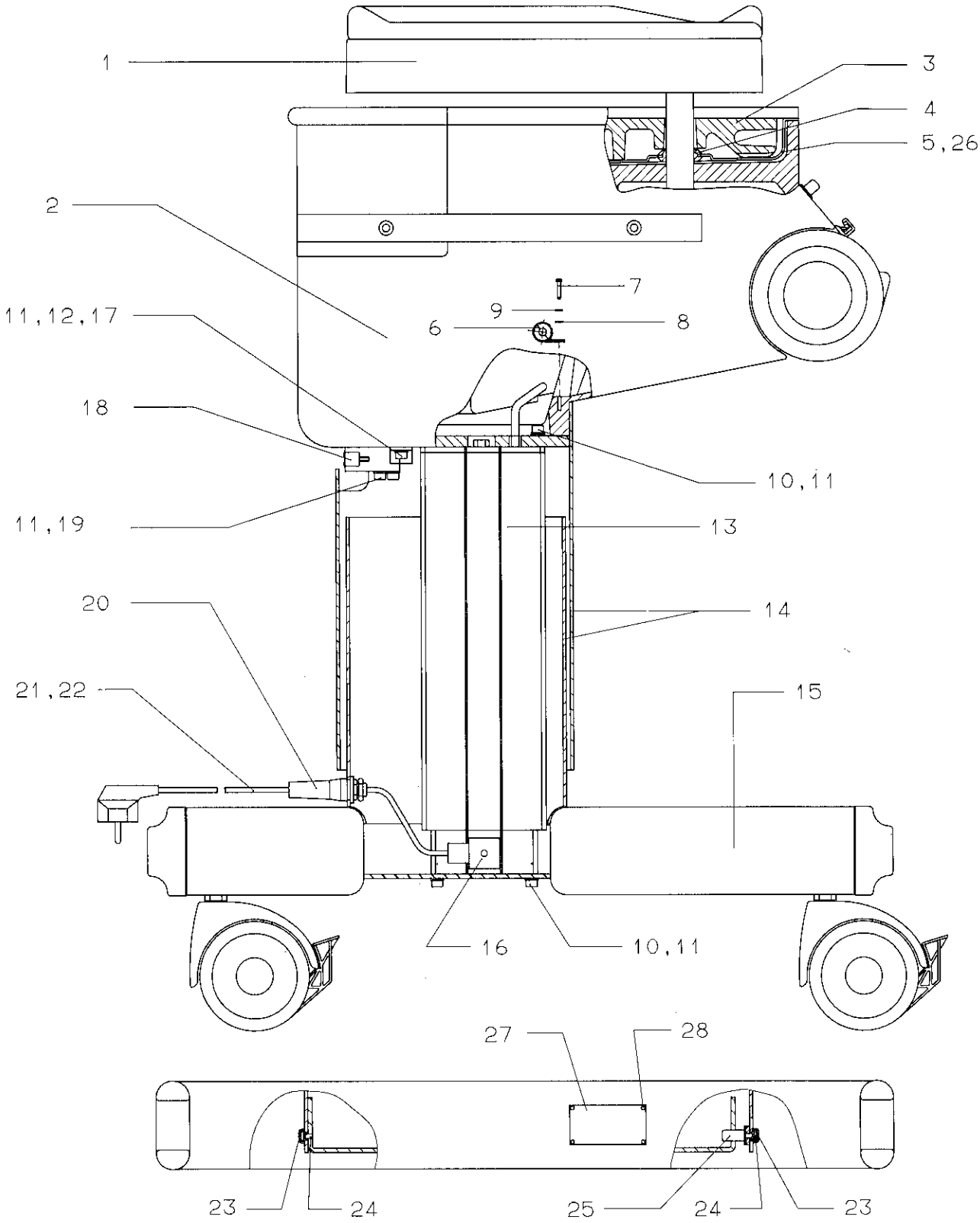
DrägerService

Medizintechnik
Medical Systems

Dräger

Ausgabe	Ersatzteil-Liste
Edition	Spare parts list
09.88	**6141.20**

bestehend aus:	Blatt
consisting of:	Sheet
35 Blatt/35 Sheets	2



Drägerwerk Aktiengesellschaft
Moislinger Allee 53 - 55
D-2400 Lübeck

Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-31	**Grundeinheit Inkubator 8000 V / Basic incubator unit 8000 V**		**2M 19720**	
1	**Gehäuse, vollst. (siehe Blatt 3-4) / Housing, complete (cf. sheet 3-4)**	2M 19590		
2	**Liegefläche, vollst. (siehe Blatt 8) / Rest surface, complete (cf. sheet 8)**	2M 19632		
3	**Zwischenelement / Intermediate device**	2M 19537		
4	**Dichtung / Washer**		**2M 19595**	
5	**Wanne / Trough**	2M 19334		
6	**Rohkern DI8 LV 00861 / Tube core DIA8 LV 00861**	18 25 704		
7	**Blechschraube / Sheet metal srew**	13 36 630		
8	**Scheibe / Washer**	13 30 233		
9	**Federring / Spring washer**	13 09 749		
10	**Schraube / Srew**	13 25 779		
11	**Federring / Spring washer**	13 33 941		
12	**Scheibe / Washer**	13 30 705		
13	**Höhenverstellung 220/240 V (siehe Blatt 9) / Height adjustment 220/240 V (cf. sheet 9)**		**2M 19625**	
14	**Verkleidung, vollst. (s. Blatt 10) / Panelling, complete (cf. sheet 10)**	2M 19575		
15	**Fahrgestell, vollst. (s. Blatt 11) / Base frame, complete (cf. sheet 11)**	2M 19270		
	Fahrgestell, vollst. (s. Blatt 11) / Base frame, complete (cf. sheet 11)	2M 19500		
16	**Gerätesteckdose / Equipment socket**		**18 09 822**	
17	**Schraube / Srew**	12 63 196		
18	**Magnethalter / Magnet holder**	2M 19719		
19	**Schraube / Srew**	12 63 366		
20	**Netzkabeldurchführung / Power cable bushing**		**2M 18642**	
21	**Netzlg. 6 m, 3G 1.5B DWN 3043 / Power cable 6 m, 3G 1.5B DWN 3043**		**2M 13126**	
22	**Aderendhülse / Multicore cable end**	13 17 172		
23	**Schraubenabdeckung M4 / Screw cover M4**	2M 18620		
24	**Schraube / Screw**	13 29 103		
25	**Schraube / Screw**	2M 19556		
26	**Schild / Plate**	2M 18167		
27	**Leistungsschild / Date plate**	87 12 046		
28	**Kerbnagel / Groved drive stud**	13 35 510		
	Lose Teile, ohne Abbildung / Separate parts, not shown			
29	**Lüfterrad, vollst. (siehe Blatt 12) / Fan wheel, complete (cf. sheet 12)**		**2M 19665**	
30	**Schutzhülle / Protective sleeve**	M 22532		
31	**Versandverpackung / Shipping container**	87 11 878		

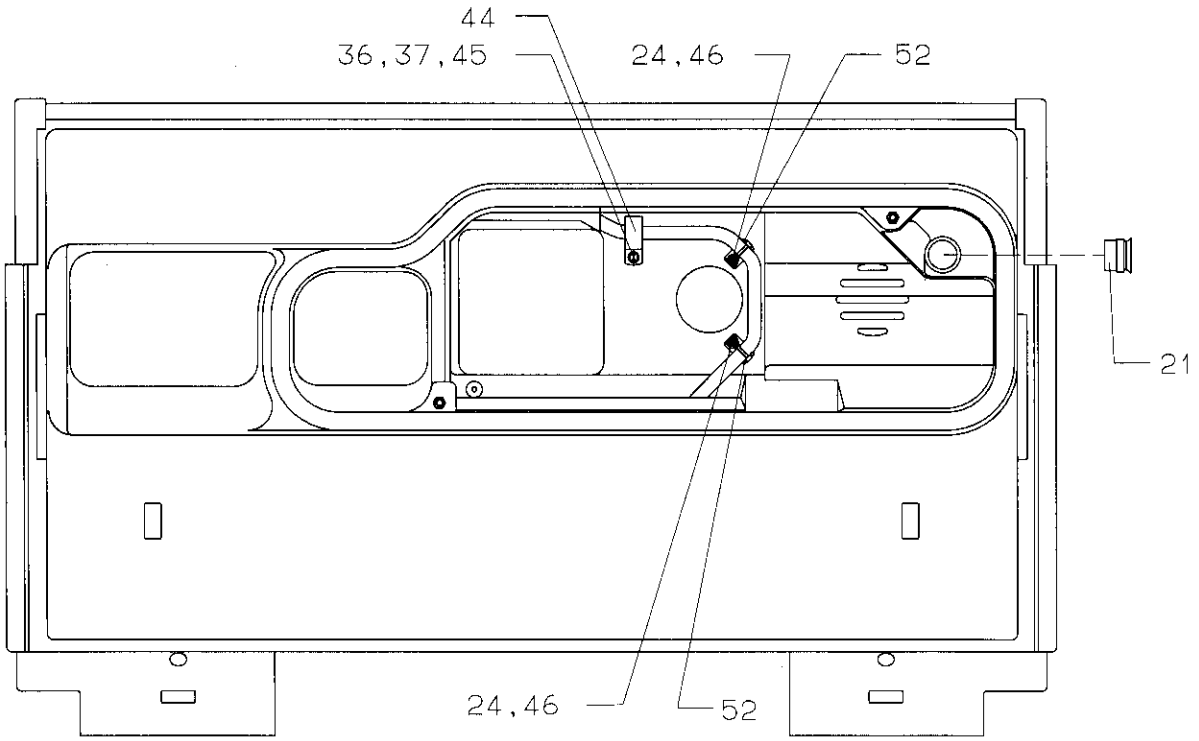
Ersatzteil-Liste
Inkubator 8000
Incubator 8000

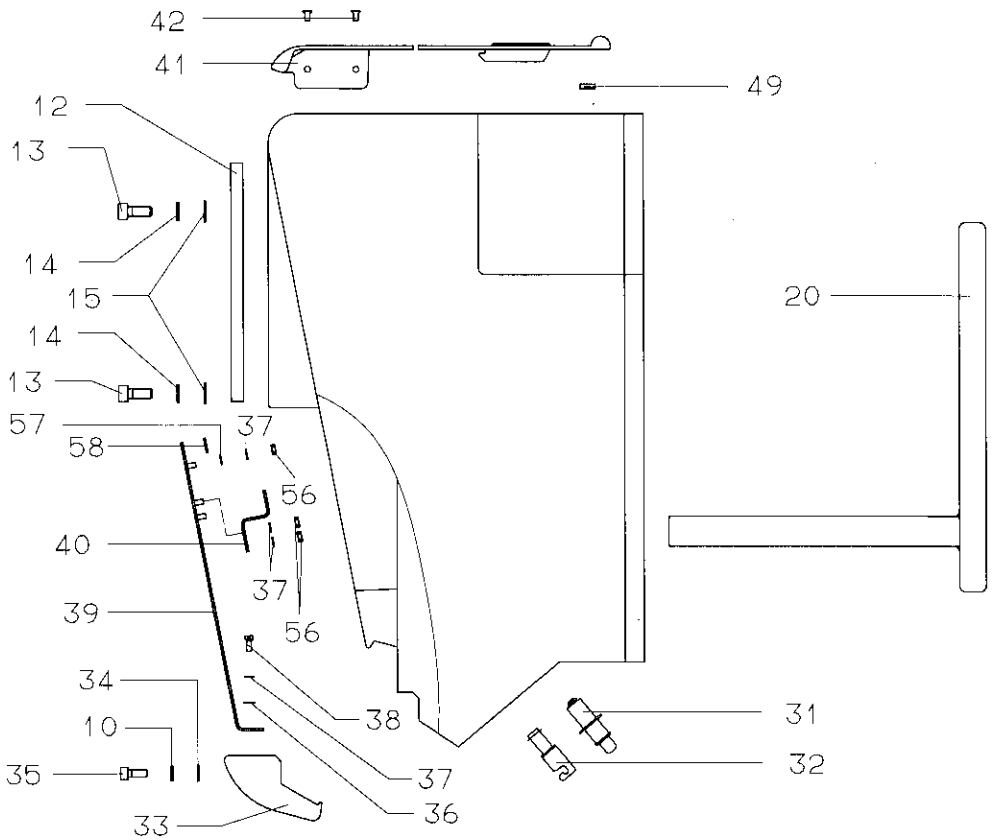
DrägerService

Medizintechnik
Medical Systems

Dräger

Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 3





Drägerwerk Aktiengesellschaft
Moislinger Allee 53 - 55
D-2400 Lübeck

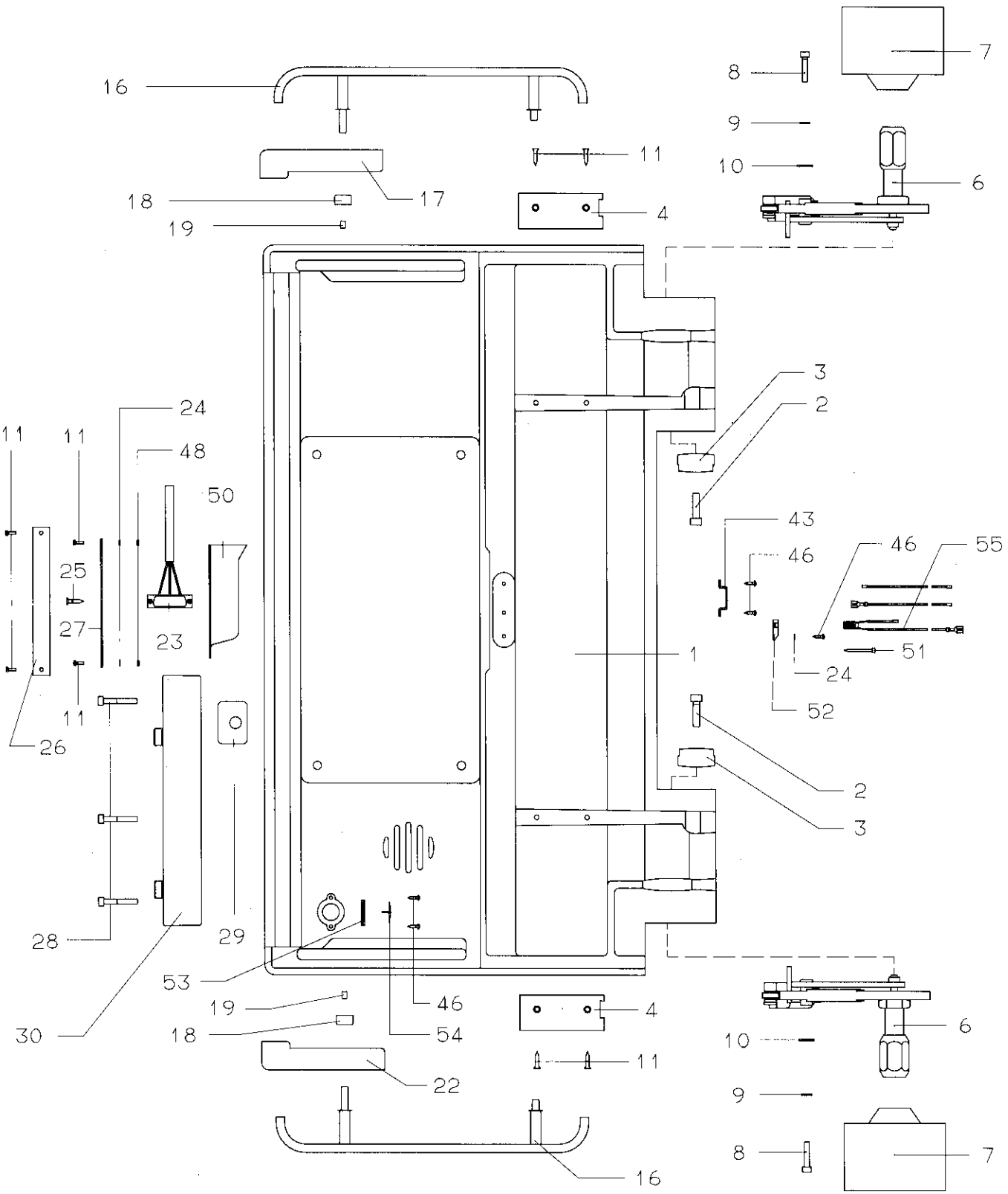
Ersatzteil-Liste
Inkubator 8000
Incubator 8000

DrägerService

Medizintechnik
Medical Systems

Dräger

Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 3



Drägerwerk Aktiengesellschaft
Moislinger Allee 53 - 55
D-2400 Lübeck

Lfd. Nr. Cons. No.	Benennung / Designation (Menge pro Sach-Nr. Qty per Item No.)	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-59	**Gehäuse, vollst. / Housing, complete**	2M 19590		
1	**Gehäuse / Housing**	2M 19589		
2	**Schraube / Screw**	2M 19465		
3	**Hebel / Lever**	2M 19613		
4	**Winkel / Bracket**	2M 19588		
5	**Schrägstellung, rechts (siehe Blatt 5) / Inclination, right (cf. sheet 5)**		**2M 19712**	
6	**Schrägstellung, links (siehe Blatt 5) / Inclination, left (cf. sheet 5)**		**2M 19650**	
7	**Handrad / Handwheel**		**2M 19647**	
8	**Schraube / Screw**	12 63 366		
9	**Scheibe / Washer**	12 92 358		
10	**Federring / Spring washer**	13 33 941		
11	**Schraube / Screw**	13 38 072		
12	**Grundplatte / Base plate**	2M 19663		
13	**Schraube / Screw**	13 14 432		
14	**Federring / Spring washer**	13 33 739		
15	**Scheibe / Washer**	13 24 780		
16	**Griffleiste, vollst. (siehe Blatt 6) / Handle bar, complete (cf. sheet 6)**	2M 19541		
17	**Ecke, links / Corner piece, left**	2M 19594		
18	**Anschlagpuffer / Stop buffer**	2M 13141		
19	**Gewindestift / Threaded stud**	13 15 897		
20	**Stütze, vollst. / Support, complete**	2M 19654		
21	**Dichtung / Gasket**		**2M 17293**	
22	**Ecke, rechts / Corner piece, right**	2M 19593		
23	**Kabelbaum / Gable harness**	82 00 755		
24	**Federring / Spring washer**	13 09 749		
25	**Schraube / Screw**	13 29 987		
26	**Blech / Metal sheet**	2M 19601		
27	**Blech / Metal sheet**	2M 19602		
28	**Schraube / Srew**	12 95 594		
29	**Dichtring / Sealing ring**	2M 19624		
30	**Filtereinsatz (siehe Blatt 6) / Filter inset (cf. sheet 6)**	2M 19645		
31	**Stößel, vollst. (siehe Blatt 7 / Tappet, complete (cf. sheet 7)**		**2M 19543**	
32	**Scharnierblock, vollst. (siehe Blatt 7) / Hinged stop, complete (cf. sheet 7)**	2M 19544		
33, 39-40, 36-38, 56-58	**Stoßleiste, vollst. (Ugr.) / Buffer strip, complete (subassembly)**	2M 19462		
33	**Stoßleiste, vollst. / Buffer strip, complete**	2M 19548		
34	**Scheibe / Washer**	13 30 705		

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
35	**Schraube / Screw**	13 31 922		
36	**Scheibe / Washer**	13 27 542		
37	**Federring / Spring washer**	13 31 345		
38	**Schraube / Screw**	13 29 049		
39	**Blech (Ugr.) / Sheet metal (subassembly)**	2M 19471		
40	**Winkel / Bracket**	2M 19807		
41	**Klappe, vollst. (siehe Blatt 8) / Gate, complete (cf. sheet 8)**	2M 19626		
42	**Schraube / Screw**	13 29 324		
43	**Schutzleiterklemme / Terminal for non-fused earthed conductor**	83 00 390		
44	**Rohrkern DI 11 LV 00862 / Tube core DIA 11 LV 00862**	18 25 712		
45	**Schraube / Screw**	13 29 855		
46	**Schraube / Screw**	13 38 986		
47	**Schraube / Screw**	13 30 071		
48	**Mutter / Nut**	13 34 913		
49	**Puffer / Buffer**	68 00 478		
50	**Kappe / Cap**	2M 19603		
51	**Kabelbinder / Cable binder**		**87 12 007**	10
52	**Kreuzhalter / Cross holder**	84 04 154		
53	**Ventilsitz / Valve seat**		**RM 8303**	
54	**Ventilscheibe / Valve washer**		**RM 8304**	
55	**Kabel (Ugr.) / Cable (subassembly)**	2M 19463		
56	**Mutter / Nut**	13 28 956		
57	**Flachstecker / Flat plug**	18 14 079		
58	**Klebeband 12 x 1,6 PVC-Schaum sw. Qualität V-540, Fa. Norton; 0,772 m / Adhesive tape 12 x 1.6 PVC foam SW. quality V-540, Norton; 0.772 m**	12 02 421		
59	**Kabelbaum / Cable harness**	82 00 759		

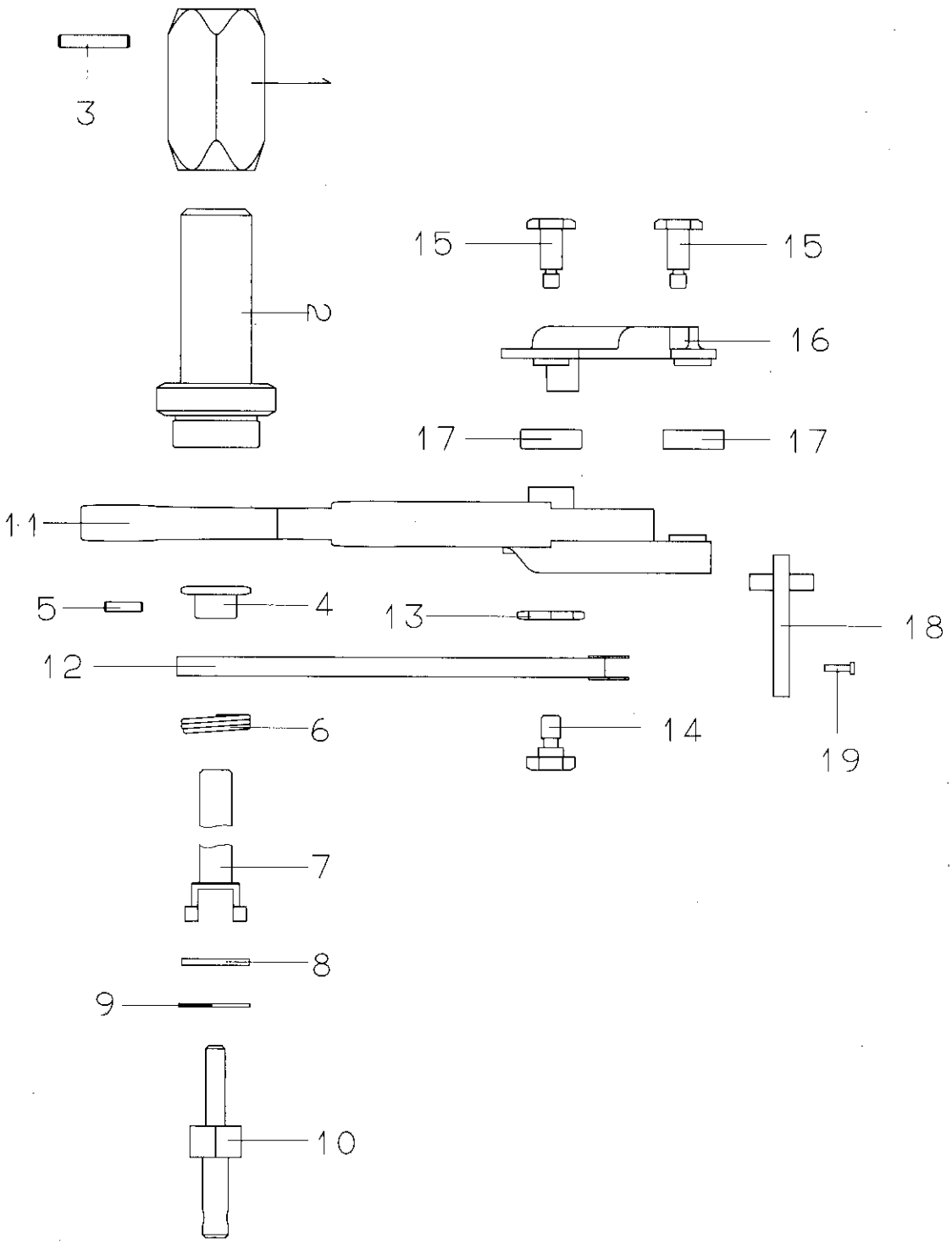
Ersatzteil-Liste
Inkubator 8000
Incubator 8000

DrägerService

Medizintechnik
Medical Systems

Dräger

Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 5



Drägerwerk Aktiengesellschaft
Moislinger Allee 53 - 55
D-2400 Lübeck

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-19	**Schrägstellung, rechts / Inclination, right**		**2M 19712**	
1-19	**Schrägstellung, links, spiegelbildlich von 2M 19712 / Inclination, left, mirror image of 2M 19712**		**2M 19650**	
1-10	**Kupplung / Coupling**	2M 19713		
1	**Verdrehschutz / Twist lock**	2M 19643		
2	**Lager / Bearing**	2M 19649		
3	**Spannhülse / Adapter sleeve**	13 29 758		
4	**Kettenrad / Sprocket wheel**	2M 19661		
5	**Spannhülse / Adapter sleeve**	12 69 968		
6.	**Feder / Spring**	2M 19648		
7	**Achse / Axle**	2M 19644		
8	**Scheibe / Washer**	12 98 542		
9	**Sicherungsring / Lock washer**	12 97 082		
10	**Stift / Pin**	2M 19651		
11	**Grundplatte / Baseplate**	2M 19646		
12	**Kette / Chain**	2M 19660		
13	**Kettenradschraube / Sprocket wheel washer**	2M 19662		
14	**Schraube / Screw**	2M 19652		
15	**Schraube / Screw**	2M 19653		
16	**Platte / Plate**	2M 19708		
17	**Kugellager / Ball bearing**	13 30 128		
18	**Aufnahme, (Ugr.) / Receptacle (subassembly)**	2M 19657		
19	**Schraube / Screw**	13 27 984		

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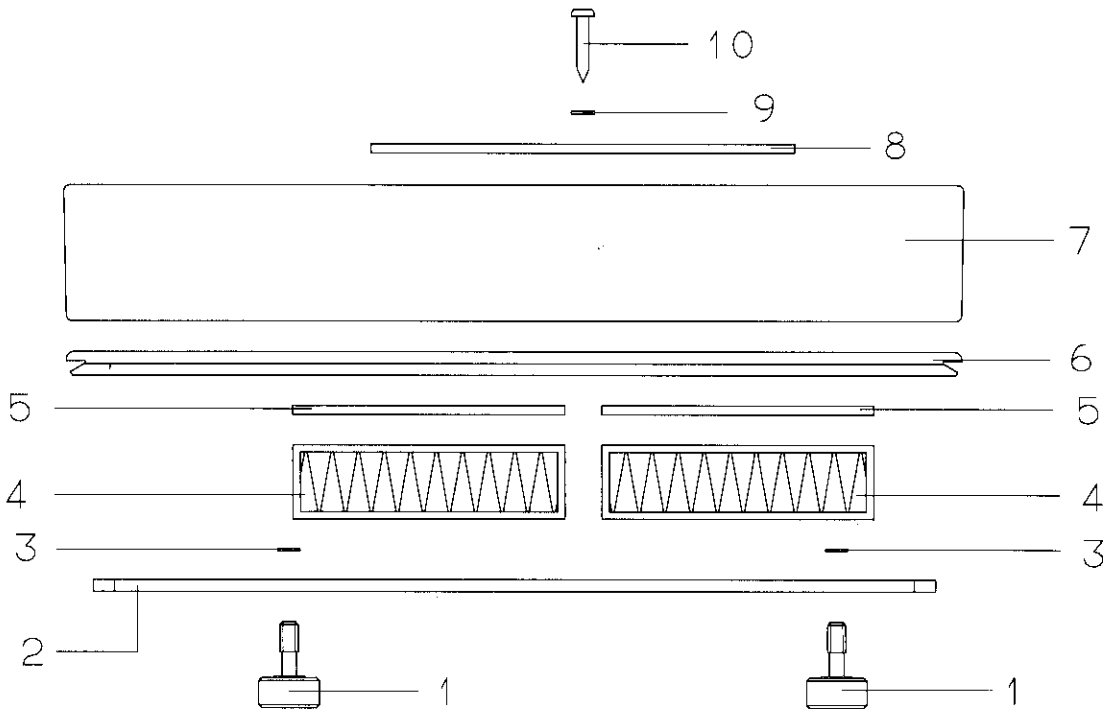
bestehend aus: / consisting of: / 35 Blatt/35 Sheets

Blatt / Sheet 6



Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-10	**Filtereinsatz / Filter inset**	2M 19645		
1	**Schraube / Screw**	2M 19616		
2	**Blech / Metal sheet**	2M 19538		
3	**Sicherungsring / Securing ring**	13 31 418		
4	**Filter, (Ugr.) / Filter (subassembly)**		**84 02 926**	
5	**Dichtung / Gasket**		**R 28225**	5
6	**Dichtung / Gasket**		**2M 19642**	
7	**Filtergehäuse / Filter housing**	2M 19592		
8	**Blech / Metal sheet**	2M 19573		
9	**Federring / Spring washer**	13 31 345		
10	**Blechschraube / Sheet metal screw**	13 34 964		

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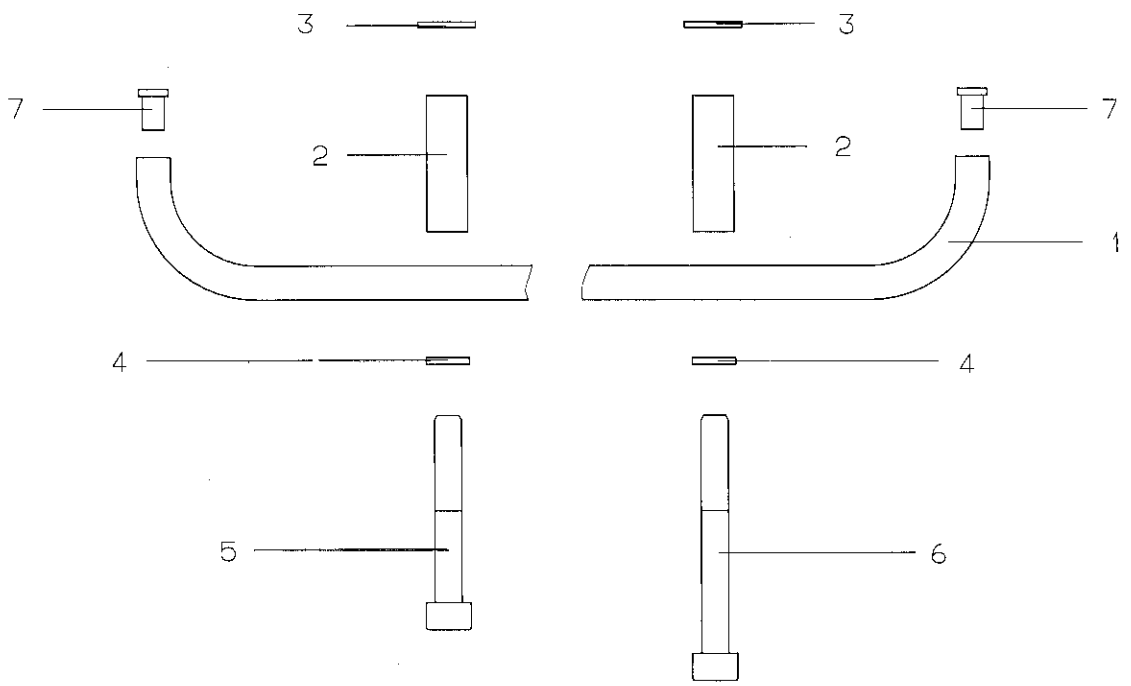

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-7	**Griffleiste, vollst. / Handle, bar, complete**	2M 19541		
1	**Griffleiste / Handle bar**	2M 19539		
2	**Rohr / Tube**	2M 19694		
3	**Scheibe / Washer**	13 35 367		
4	**Federring / Spring washer**	13 14 440		
5	**Schraube / Screw**	13 09 285		
6	**Schraube / Screw**	13 29 693		
7	**Verschlußstopfen / Vent plug**	G 60036		

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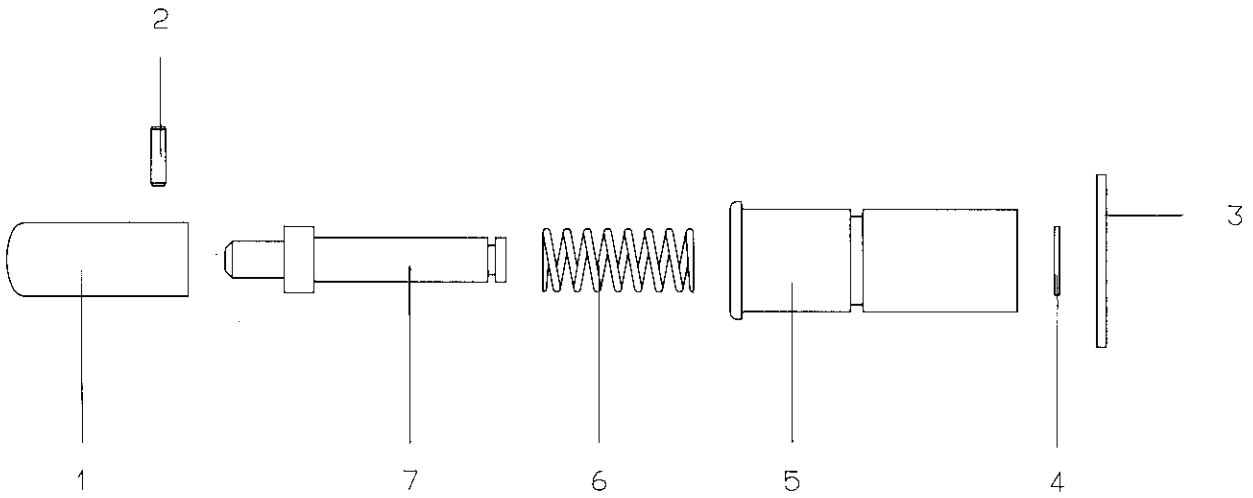

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-7	**Stößel, vollst. / Tappet, complete**		**2M 19543**	
1	**Stößel / Tappet**	2M 19532		
2	**Spannhülse / Adapter sleeve**	12 69 879		
3	**Sicherungsscheibe / Securing washer**	12 91 467		
4	**Sicherungsscheibe / Securing washer**	13 28 999		
5	**Führung / Guide**	2M 19531		
6	**Feder / Spring**		**T 50137**	
7	**Zapfen / Journal**	2M 19549		

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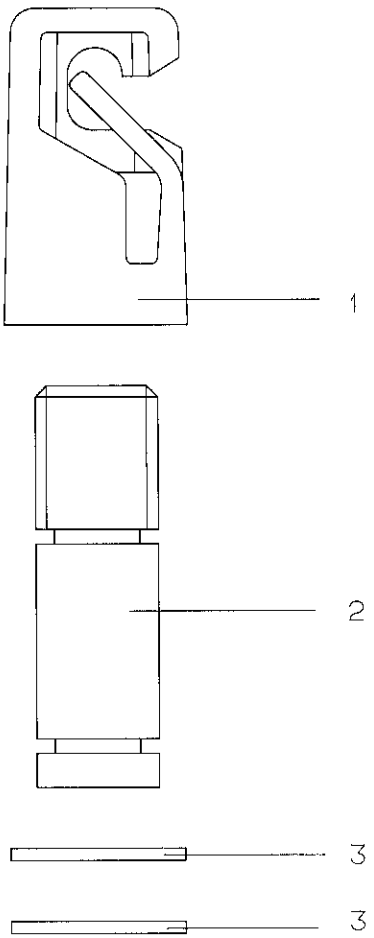

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. / Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-3	**Scharnierblock / Hinged Block**	2M 19544		
1	**Scharnierblock / Hinged Block**		**2M 19542**	
2	**Schraube / Screw**	2M 19529		
3	**Sicherungsscheibe / Securing washer**	13 09 773		

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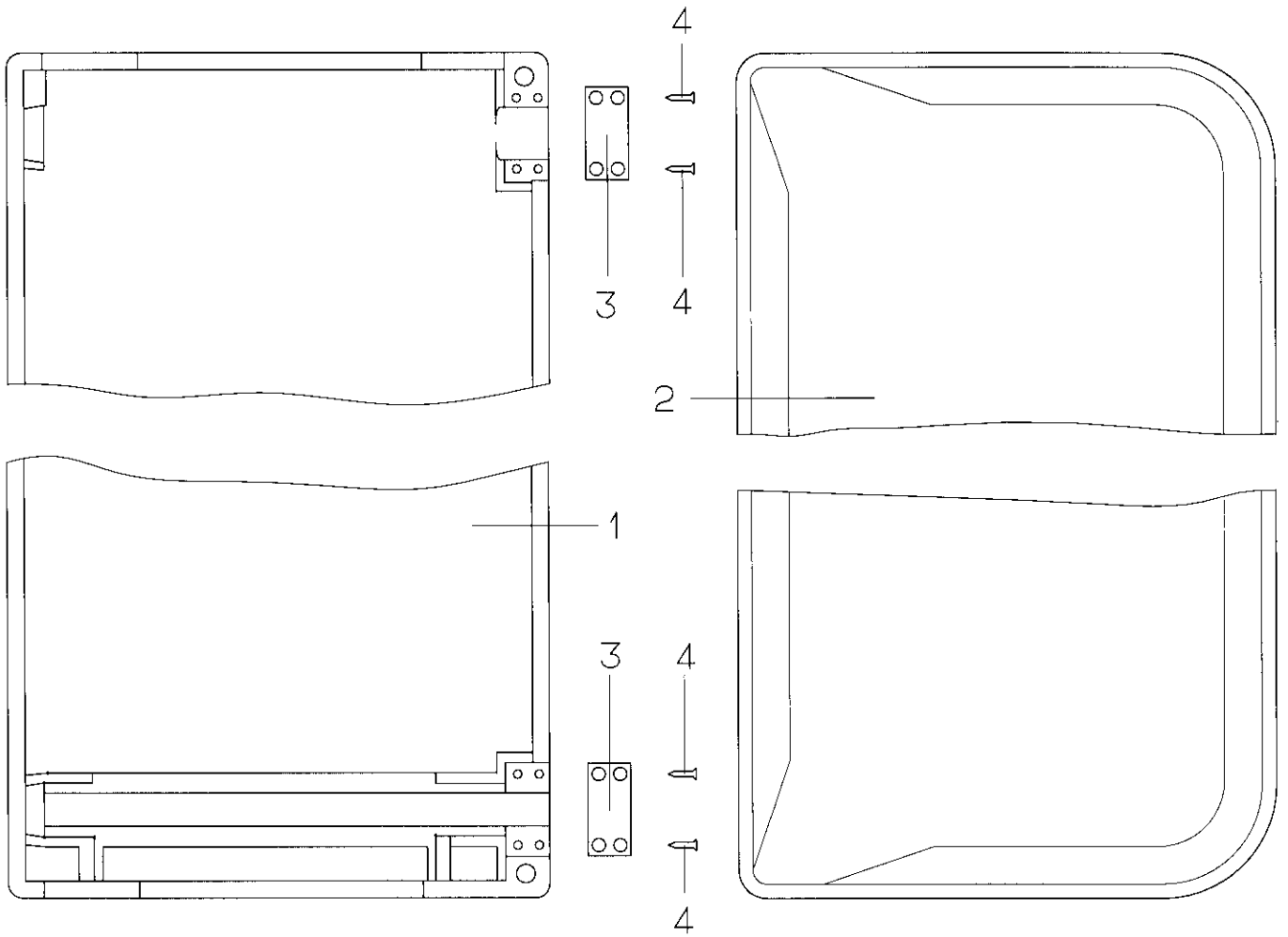
Blatt / Sheet 8



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1-4	**Liegefläche, vollst. / Rest surface, complete**	2M 19632		
1	**Liegefläche / Rest surface**		**2M 19596**	
2	**Matratze / Mattress**		**2M 19350**	
3	**Platte / Plate**	2M 19361		
4	**Schraube / Screw**	13 38 072		

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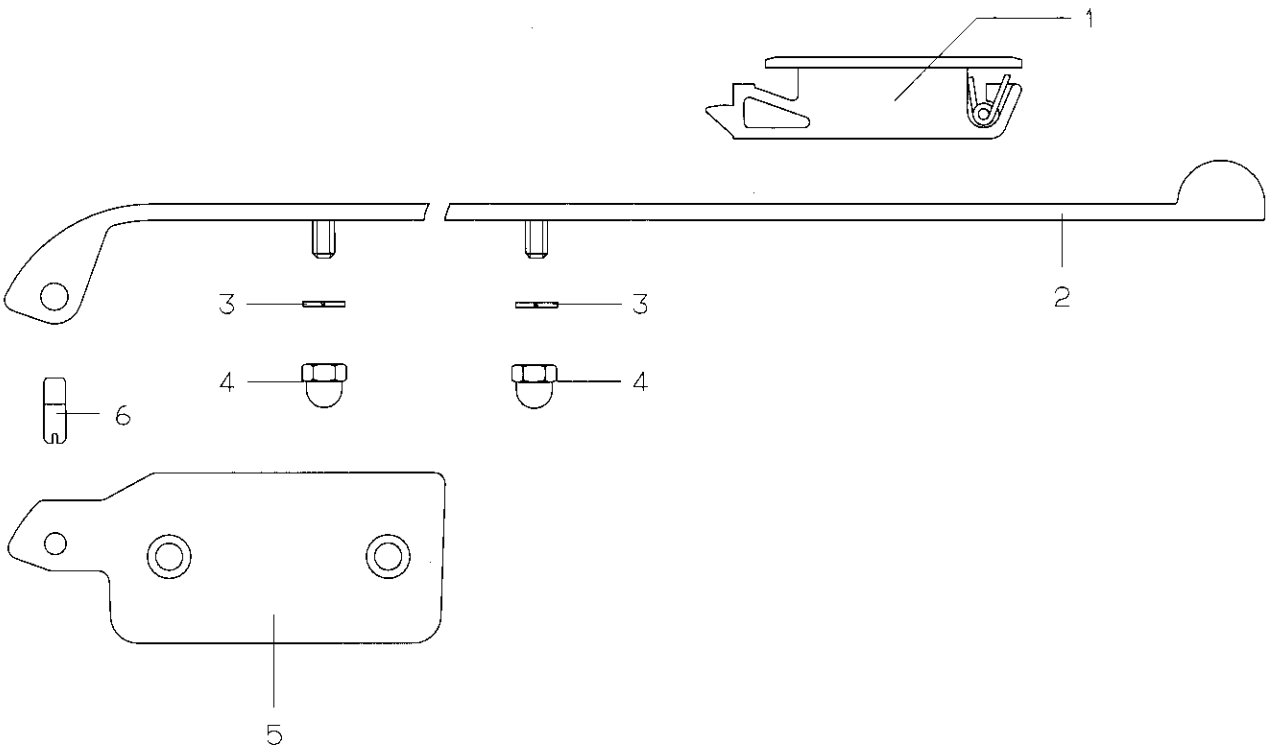

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1-6	**Klappe, vollst. / Flap, complete**		2M 19626		
1	**Schnäpper / Pawl**			**2M 19271**	
2	**Klappe, Ugr. / Flap, subassembly**		2M 19609		
3	**Federring / Spring washer**		13 31 345		
4	**Mutter / Nut**		13 34 751		
5	**Scharnierblock / Hinged block**		2M 19639		
6	**Schraube / Screw**		13 32 007		

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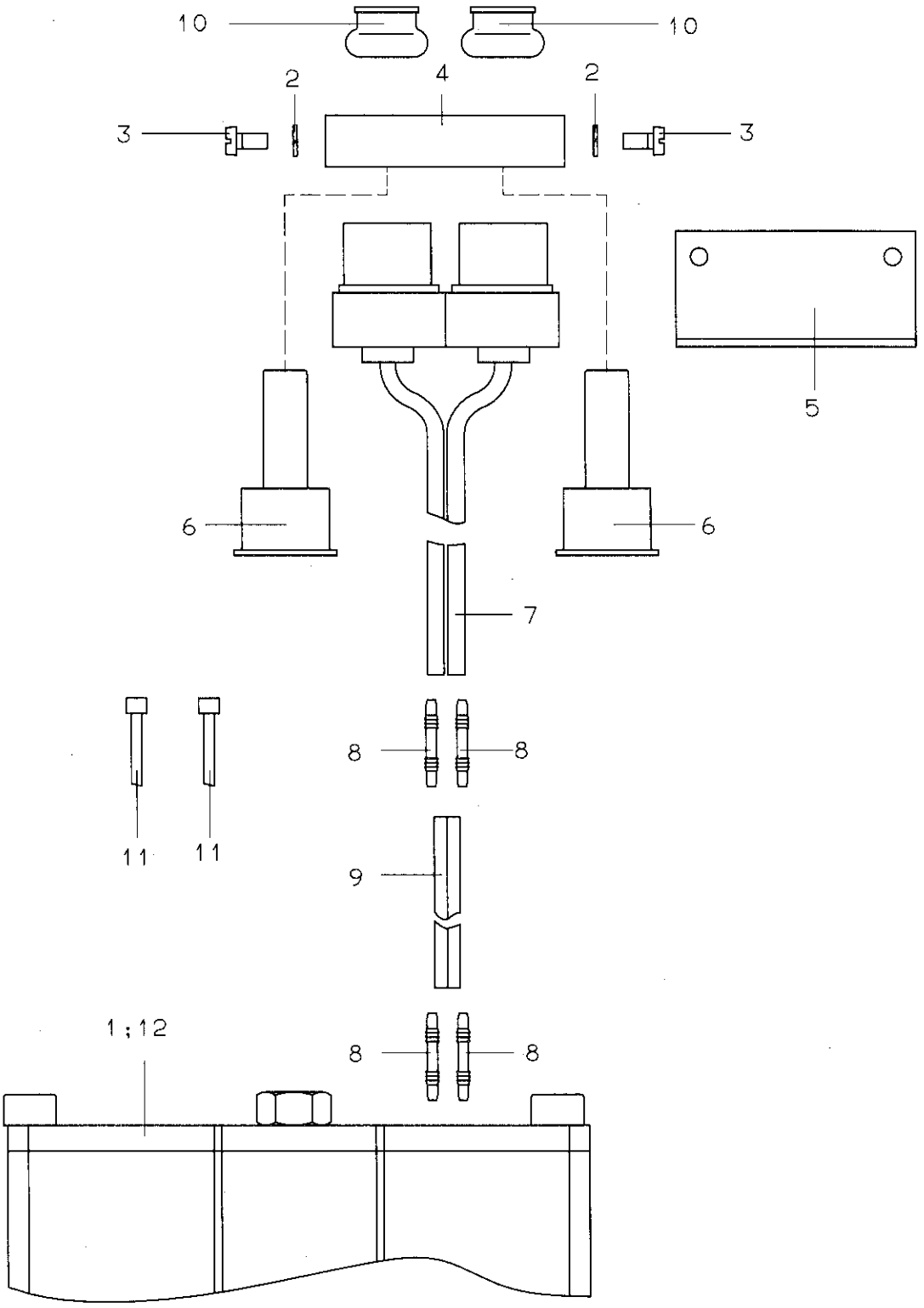

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1-11	**Höhenverstellung 220/240 V / Height adjustment 220/240 V**		**2M 19625**	
2-12	**Höhenverstellung 110/127 V / Height adjustment 110/127 V**		**2M 19703**	
1	**Höhenverstellung / Height adjustment**		**2M 19604**	
2	**Federring / Spring washer**	13 09 749		
3	**Schraube / Screw**	13 30 810		
4	**Halter / Retainer**	2M 19735		
5	**Halteblech / Metal retaining piece**	2M 19736		
6	**Knopf / Knob**	2M 19737		
7-9	**Druckelemente-Set / Set of thrust pieces**	2M 19715		
7	**Profilluftschlauch / Sectional air hose**	2M 19553		
8	**Druckelement / Thrustpiece**	2M 19534		
9	**Kupplungstift / Coupling pin**	2M 19535		
10	**Balg / Bellows**	82 00 927		
11	**Kabelbinder / Cable binder**	87 12 007		
12	**Höhenverstellung / Height adjustment**	2M 19741		

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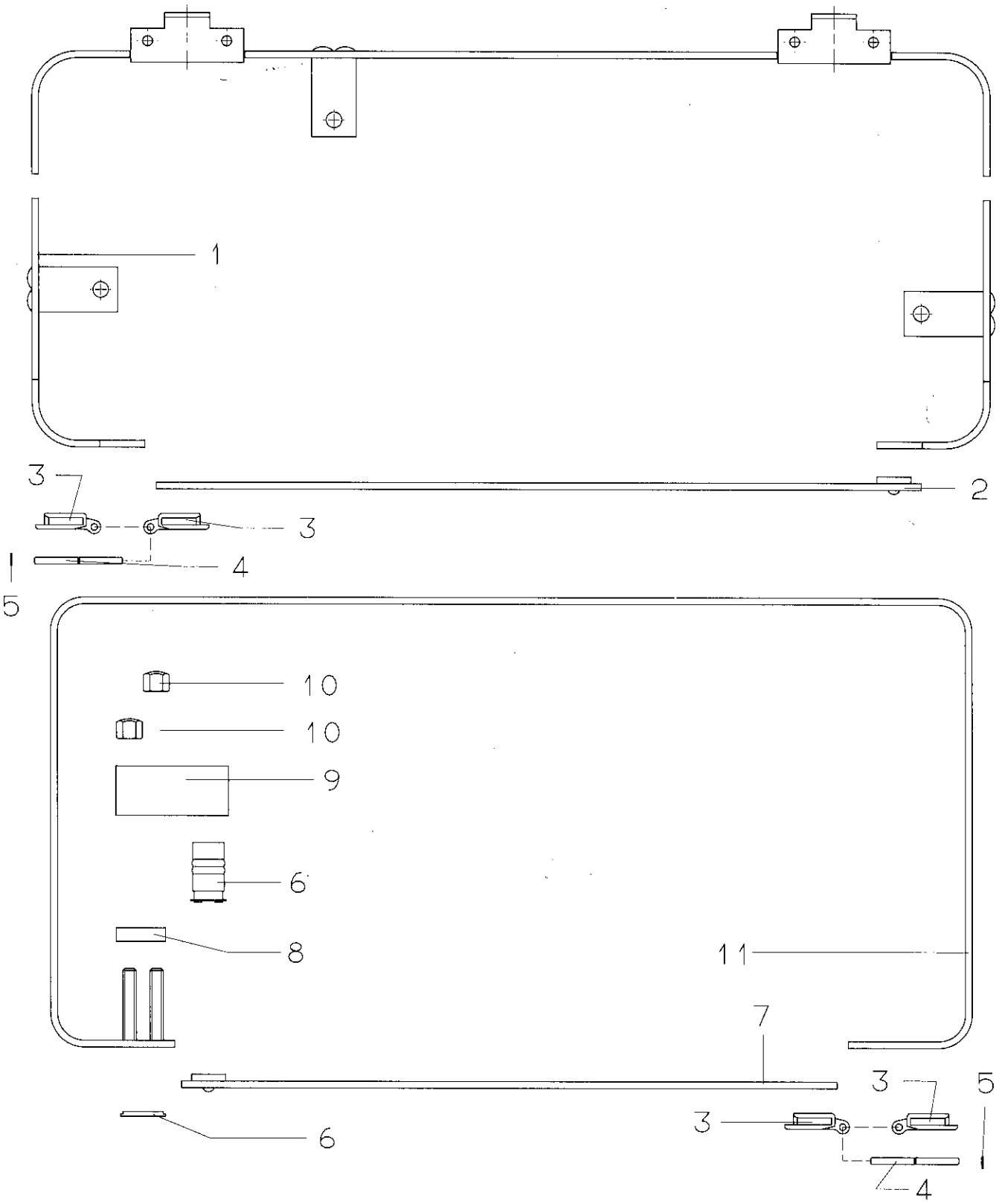
BACK LOWER DOORS



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1-11	**Verkleidung, vollst. / Panelling, complete**	2M 19575		
1-6	**Verkleidung, oben (Ugr.) / Panelling, top (subassembly)**	2M 19354		
1	**Mantel, oben (Ugr.) / Cover, top (subassembly)**	2M 19485		
2	**Tür, oben (Ugr.) / Door, top (subassembly)**	2M 19578		
3-5	**Scharnier / Hinge**		**2M 19727**	
3	**Scharnierteil / Hinged portion**	2M 19725		
4	**Achse / Axle**	2M 19726		
5	**Sicherungsscheibe / Securing washer**	12 71 431		
6	**Magnetverschluß / Magnetic lock**		**2M 19718**	
3-11	**Verkleidung, unten (Ugr.) / Panelling, bottom (subassembly)**	2M 19355		
7	**Tür, unten (Ugr.) / Door, bottom (subassembly)**	2M 19579		
8	**Platte / Plate**	2M 19551		
9	**Magnethalter / Magnetic retainer**	2M 19719		
10	**Mutter / Nut**	13 35 049		
11	**Mantel, unten (Ugr.) / Cover, bottom (subassembly)**	2M 19577		

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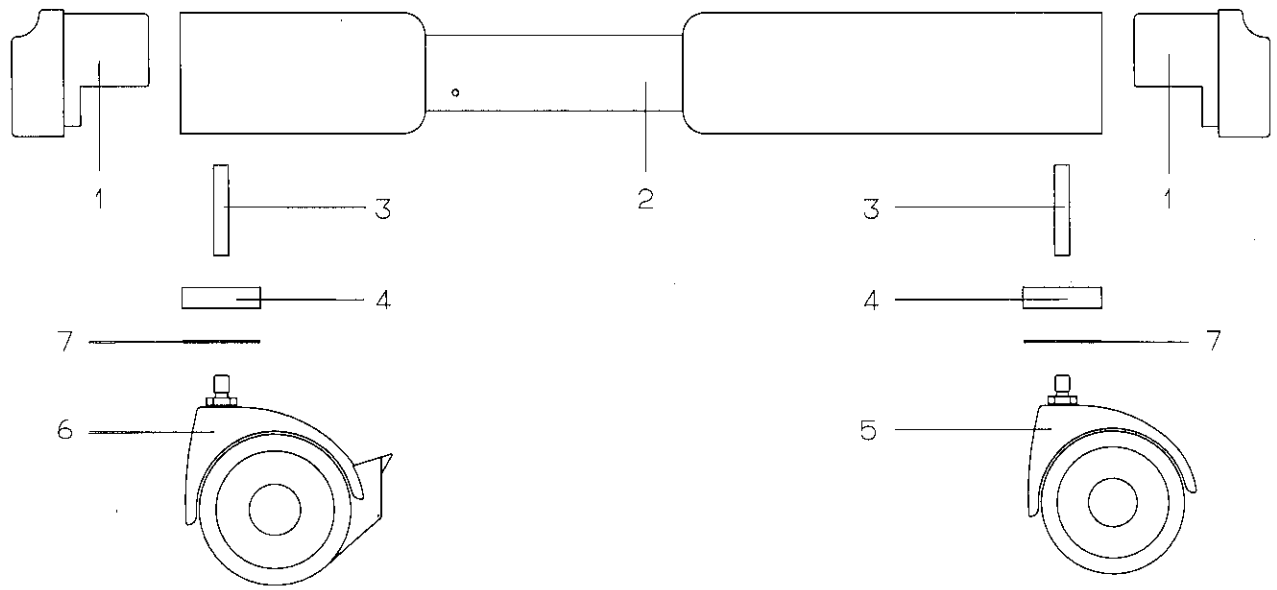

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1-6	**Fahrgestell / Frame base**	2M 19500		
1	**Kappe / Cap**	2M 19844		
2	**Fahrgestell / Frame base**	2M 19799		
3	**Stift / Pin**	13 38 587		
4	**Scheibe / Washer**	2M 19843		
5	**Lenkrolle / Steering roller**		**2M 19130**	
6	**Feststell-Lenkrolle / Lockable steering roller**		**2M 19140**	

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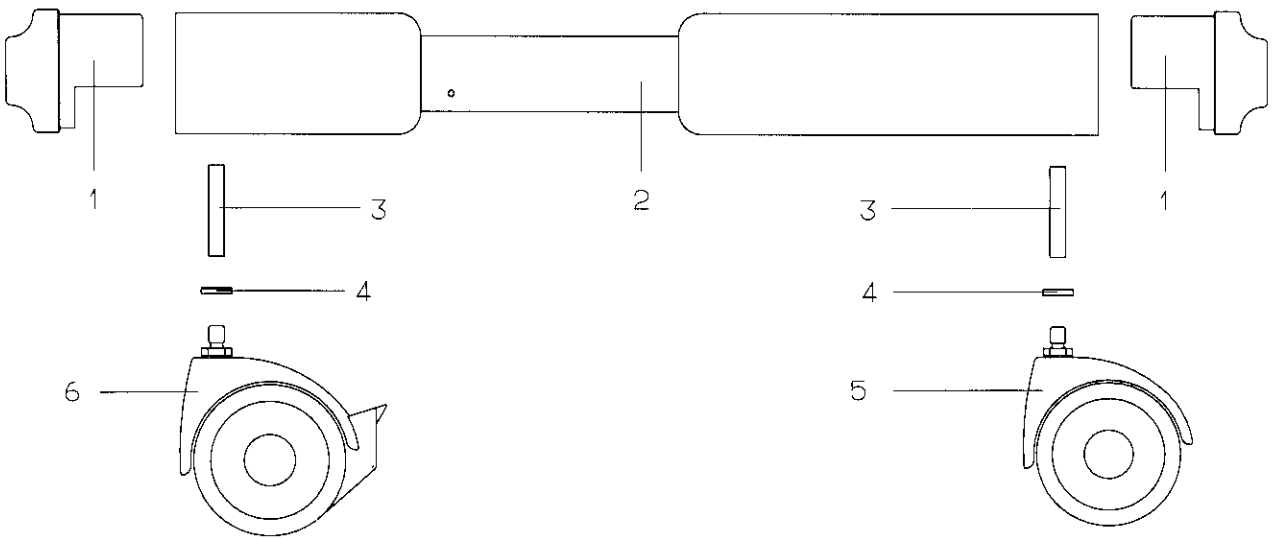

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1-7	**Fahrgestell / Base frame**	2M 19270		
1	**Kappe / Cap**	2M 19267		
2	**Fahrgestell / Base frame**	2M 19268		
3	**Stift / Pin**	13 38 587		
4	**Einsatz / Inset**	2M 19266		
5	**Lenkrolle / Steering roller**		**2M 19130**	
6	**Feststell-Lenkrolle / Fixed steering roller**		**2M 19140**	
7	**Klebeband 50, beidseitig klebend, Tesafix 4964; 0,14 m /** **Adhesive tape 50, adhesive on both sides, Tesafix 4964; 0,14 m**	12 00 240		

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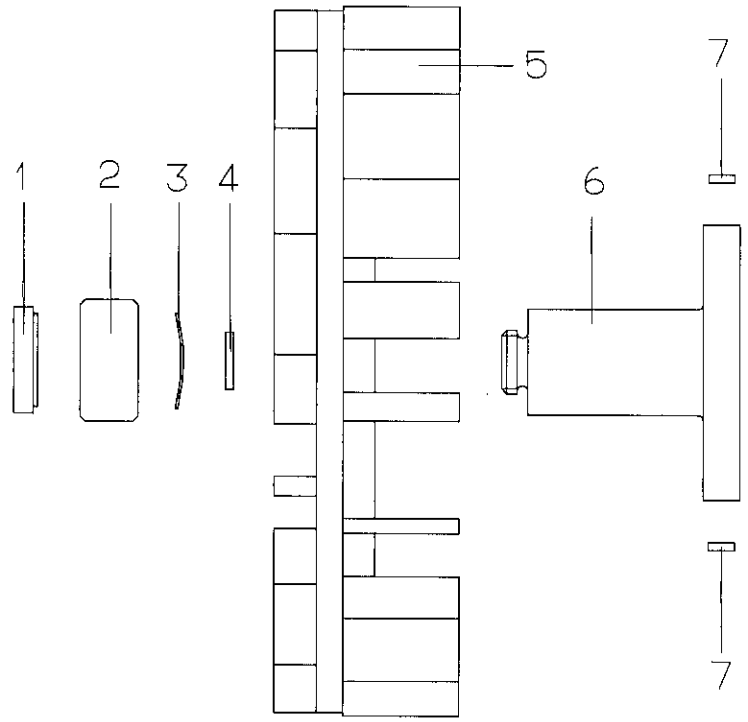

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1-7	**Lüfterad, vollst. / Fan wheel, complete**		**2M 19665**	
1	**Schraube / Screw**	2M 17224		
2	**Spannmutter / Clamp nut**	2M 17222		
3	**Sternscheibe / Star-type washer**	2M 5034		
4	**Sprengring / Snap ring**	13 31 469		
5	**Lüfterad / Fan wheel**	2M 19666		
6	**Anschluß* / Connection**	2M 19747		
7	**Magnet / Magnet**	2M 19669		
	* Bei Bedarf nur 2M 19665 komplett bestellen, da anders nicht lieferbar! If required, order only 2M 19665 complete; not available otherwise!			

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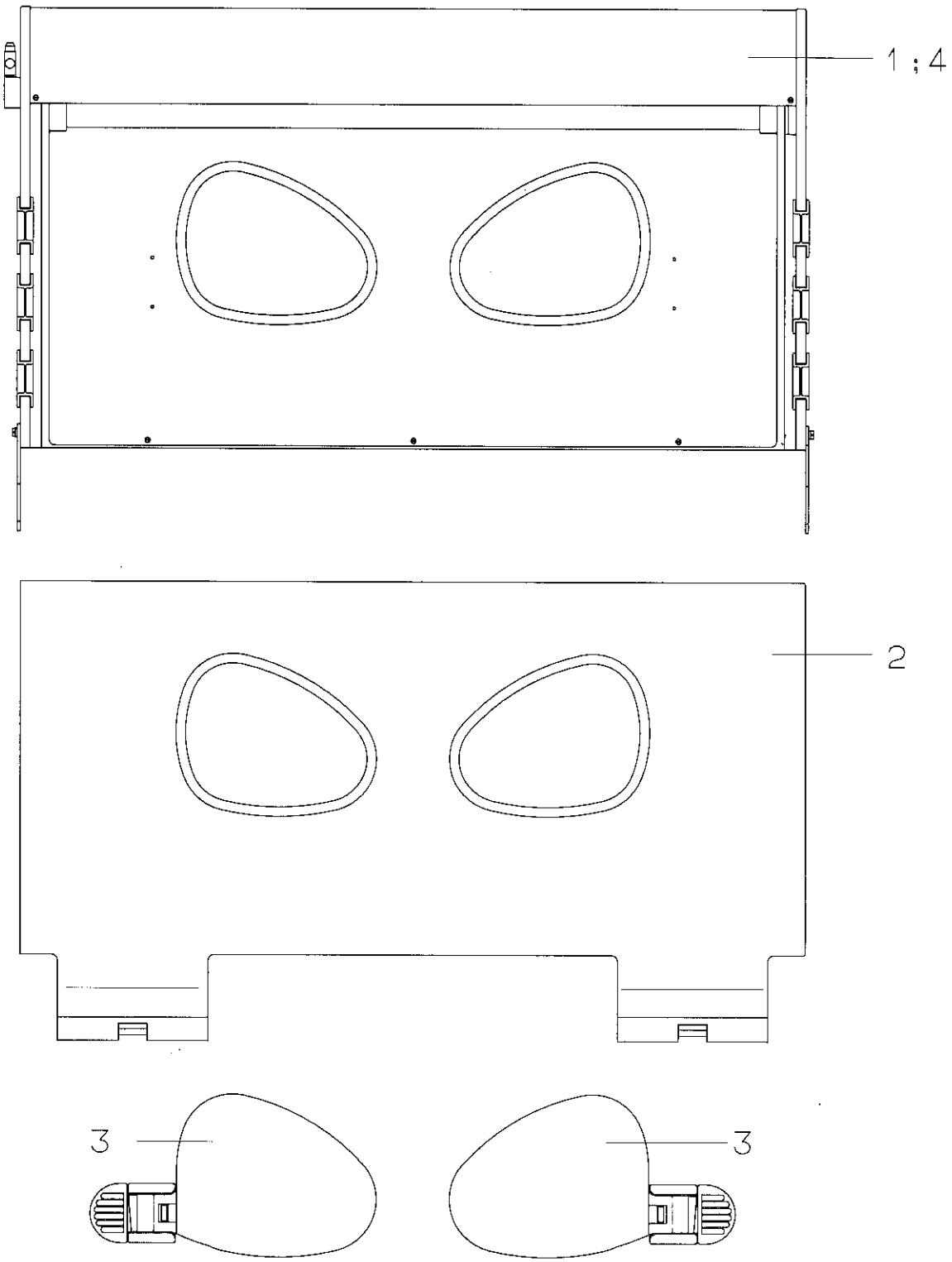

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-3	**Plexihaube, vollst. / Plexiglass hood, complete**	2M 19540		
2-4	**Haube mit Seitenöffnung, vollst. / Hood with lateral opening, complete**		**2M 19560**	
1	**Plexihaube (siehe Blatt 14) / Plexiglass hood (cf. sheet 14)**	2M 19520		
2	**Klappe, vollst. (siehe Blatt 15) / Flap, complete (cf. sheet 15)**		**2M 19525**	
3	**Satz Schwenkfenster (siehe Blatt 16) / Set of swivel windows (cf. sheet 16)**		**2M 19550**	
4	**Haube mit Seitenöffnung (siehe Blatt 14) / Hood with lateral opening (cf. sheet 14)**		**2M 19530**	

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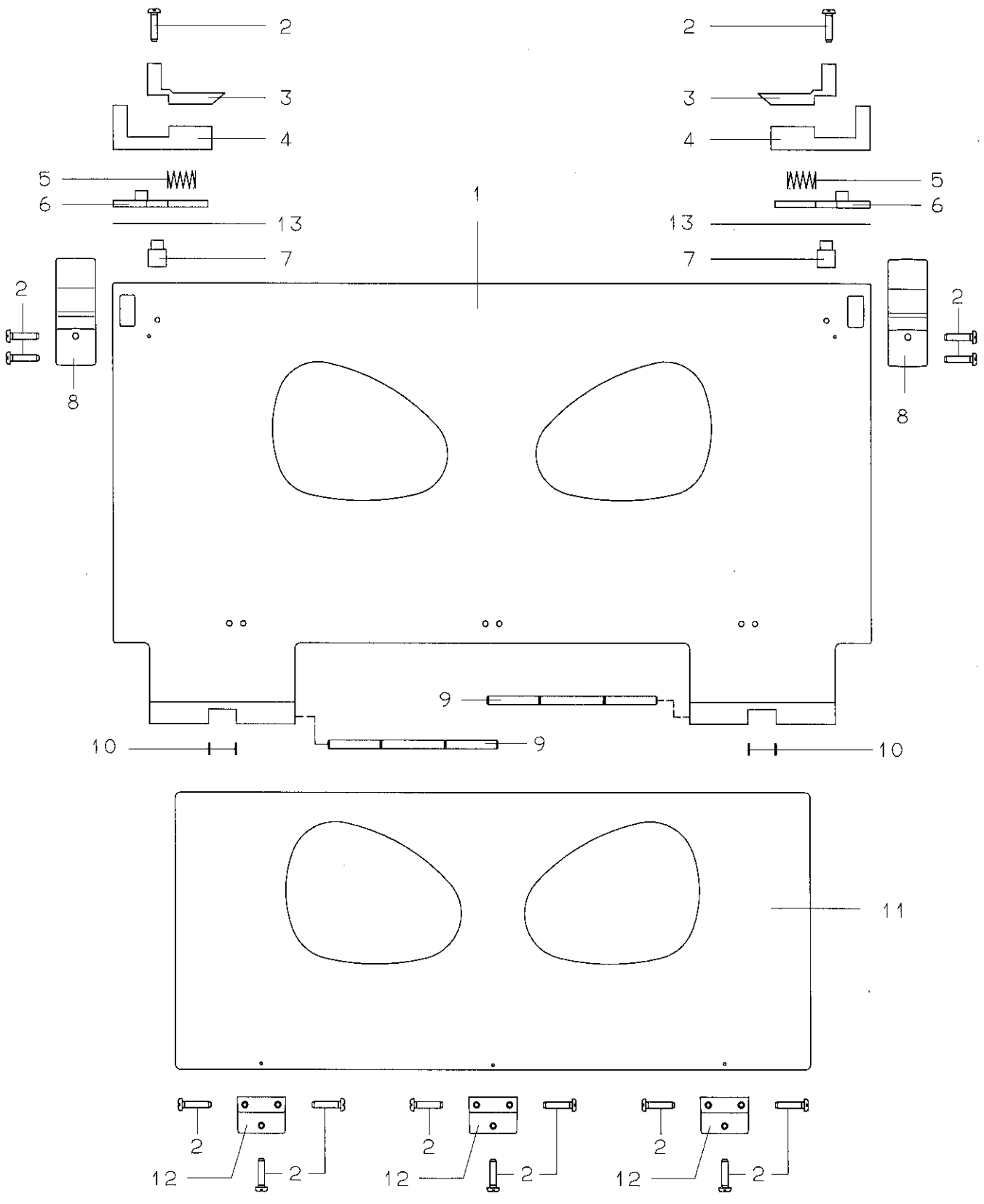
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 15



Drägerwerk Aktiengesellschaft
Moislinger Allee 53 - 55
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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-13	**Klappe, vollst. / Flap, complete**		**2M 19525**	
1	**Klappe / Flap**		**2M 19514**	
2	**Blechschraube / Sheet metal screw**	13 34 948		
3	**Raste / Pawl**		**2M 19482**	
4	**Gehäuse / Housing**		**2M 19483**	
5	**Feder / Spring**	2M 19849		
6	**Platte / Plate**		**2M 19481**	
7	**Hutmutter / Capnut**		**2M 19484**	
8	**Raste / Pawl**		**2M 19516**	
9	**Achse (Einstich ∅3,2; bei Einstich ∅2,3 lfd. Nr. 9 u. 10 verwenden) / Axle (neck dia. 3.2; for a neck of 2.3 dia. use cons. no. 9 and 10)**	2M 19848		
10	**Sicherungscheibe (f. Einstich ∅ 3,2; bei Einstich ∅ 2,3 lfd. Nr. 9 und 10 verwenden) / Securing washing (for neck of 3.2 dia.; for 2.3 dia. neck, use cons. nos. 9 and 10)**	13 31 418		
11	**Innenwand / Inner wall**		**2M 19512**	
12	**Filmscharnier / Film Hinge**		**2M 19729**	
13	**Platte / Plate**	2M 19472		

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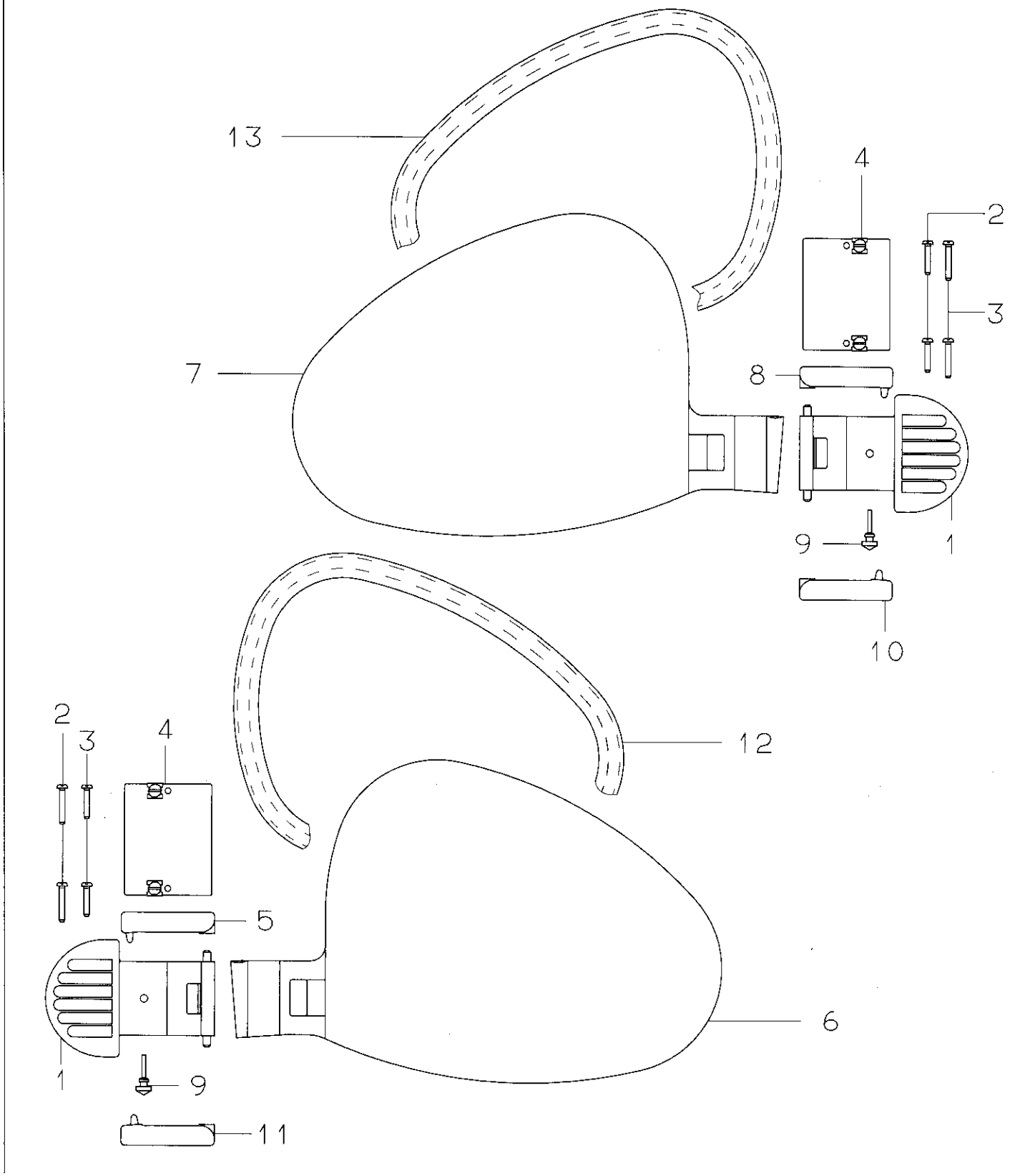
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 16



Drägerwerk Aktiengesellschaft
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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-13	**Satz Schwenkfenster / Set of swivel windows**		**2M 19550**	
1	**Raste / Retainer**		**2M 19519**	
2	**Blechschraube / Sheet metal screw**	13 37 610		
3	**Blechschraube / Sheet metal screw**	13 36 630		
4	**Grundplatte / Base plate**	2M 19521		
5	**Bock, links oben / Block, top left**		**2M 19473**	
6	**Klappe, links / Flap, left**		**2M 19477**	
7	**Klappe, rechts / Flap, right**		**2M 19478**	
8	**Bock, rechts oben / Block, top right**		**2M 19475**	
9	**Puffer / Buffer**		**2M 19524**	
10	**Bock, rechts unten / Block, bottom right**		**2M 19476**	
11	**Bock, links unten / Block, bottom left**		**2M 19474**	
12	**Dichtung, links / Gasket, left**		**2M 19469**	
13	**Dichtung, rechts / Gasket, right**		**2M 19470**	

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
2+3	**Aggregat Luft / Air unit**		**2M 19680**	
2+4	**Aggregat Luft/Haut / Air/skin unit**		**2M 19681**	
1	**Aggregat Heizung (siehe Blatt 18-20) / Heating unit (cf. sheet 18-20)**		**2M 19940**	
2	**GDE Aggregat 8000 (siehe Blatt 18-20) / GDE unit 8000 (cf. sheet 18-20)**	2M 19640		
3	**Elektronik Einschub Lufttemperatur (siehe Blatt 22-25) / Electronics of air temperature module (cf. sheet 22-25)**		**82 00 901**	
4	**Elektr. Einschub Luft- u. Hauttem. (siehe Blatt 22-25) / Electronics of air and skin temp. module (cf. sheet 22-25)**		**82 00 902**	
5	**Rüstsatz O_2-Regelung (siehe Blatt 26) / Fittings for O_2 control (cf. sheet 26)**		**2M 19684**	
6	**Rüstsatz Anfeuchter (siehe Blatt 21) / Fittings for humidifier (cf. sheet 21)**		**2M 19683**	
7	**Rüstsatz Blindplatte (siehe Blatt 22-25) / Dummy panel fittings (cf. sheet 22-25)**		**82 00 921**	
8	**Hauttemperatur-Sensor (siehe Blatt 24) / Skin temperature sensor (cf. sheet 24)**		**82 00 757**	
9	**O_2-Anschluß, vollst. (siehe Blatt 29) / O_2 connection, complete (cf. sheet 29)**		**2M 19716**	
10	**Rüstsatz 110/127 V, 60 Hz (siehe Blatt 30) / Fittings for 110/127 V, 60 Hz (cf. sheet 30)**		**2M 19704**	

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-74	**Aggregat Heizung Luft/Wasser / Air/water heating unit**		**2M 19940**	
1-60	**GDE Aggregat 8000 / GDE unit 8000**	2M 19640		
1-3	**Aggregatblech (Ugr.) / Unit metal sheet (subassembly)**	2M 19692		
1	**Blech (Ugr.) / Metal sheet (subassembly)**	2M 19605		
2	**Dichtring / Sealing ring**		**2M 19638**	
3	**Dichtung / Sealing**	2M 19637		
4	**Mutter / Nut**	13 17 873		
5-28	**LP Blech, vollst. (Ugr.) / Sheet metal PCB, complete (subassembly)**	2M 19695		
5	**Blech (Ugr.) / Sheet metal (subassembly)**	2M 19705		
6	**Schraube / Screw**	13 29 049		
7	**Transformator / Transformer**		**82 00 432**	
8	**Kabelbinder / Cable binder**		**83 00 358**	10
9	**Entstörfilter / Interference suppression filter**		**67 31 423**	
10	**CFEA 68 MYF ±15% 100 V LV 00643 / CFEA 68 MYF ±15% 100 V LV 00643**	18 23 019		
11	**Rohr / Tube**	2M 10340		
12	**Schutzleiterklemme / Terminal for non-fused earthed conductor**	83 00 390		
13	**Schraube / Screw**	12 87 753		
14	**LP Blech (Ugr.) / Sheet metal PCB (subassembly)**	2M 19691		
15	**Blech / Sheet metal**	2M 19687		
16	**Kabelbaum (Ugr.) / Cable harness (subassembly)**	2M 19697		
17	**Best. LP Aggregat / Unit PCB with components**		**82 00 600**	
18	**Kabelbaum (Ugr.) / Cable harness (subassembly)**	2M 19696		
19	**PVC-Verdrahtungsleitung HO 5V-KO, 75 SW; 0,15 m / PVC wiring line HO 5 V d.c. KO. 75 SW; 0.15 m**	11 94 488		
20	**Schraube / Screw**	13 29 987		
21	**KREL ELR 3/32V 10A LV 00414 / KREL ELR 3/32V 10A LV 00414**		**18 21 148**	
22	**Schraube / Screw**	13 30 810		
23	**Scheibe / Washer**		**13 27 542**	
24	**Kabelbinder / Cable binder**		**87 12 007**	10
25	**Federring / Spring washer**		**13 31 345**	50
26	**Kreuzhalter / Crossholder**	84 04 154		
27	**Federring / Spring washer**		**13 09 749**	
28	**Scheibe / Washer**		**13 30 233**	
20, 29-48	**Motor (Ugr.) / Motor (subassembly)**	2M 19570		
29	**Dichtung / Sealing**		**2M 19591**	
30	**Anschluß / Connection**	2M 19689		
31	**Bolzen / Bolt**	2M 19679		

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
32	**Blech / Sheet metal**	2M 19676		
33	**Druckfeder / Pressure spring**	E 20215		
34	**Mutter / Nut**	2M 19675		
35	**Wellendichtung / Shaft seal**	2M 11477		
36	**Motor / Motor**		**2M 19444**	
37	**Bolzen / Bolt**	2M 19678		
38	**Schraube / Screw**	13 34 646		
39	**Gl-Lager / Gl bearing**		**2M 18147**	
40	**Blech / Sheet metal**	2M 19677		
41	**Mutter / Nut**		**13 34 913**	
42	**Spule / Coil**	2M 18839		
43	**Schraube / Screw**	13 03 325		
44	**Gewindestift / Grub screw**	12 99 506		
45	**Motorhalter / Motor holder**	2M 19636		
46	**Schraube / Screw**	13 29 332		
47	**Kabel (Ugr.) / Cable (subasembly)**	2M 19445		
48	**Kabel (Ugr.) / Cable (subassembly)**	2M 19711		
49	**Kühlkörper (Ugr.) mit Heizpatrone / Cooling device (subassembly) with heating cartridge**		**2M 19710**	
50	**Scheibe / Washer**		**13 29 472**	
51	**Kappe / Cap**		**2M 19690**	
52	**Temperatursicherung 315 GRD LV 00719 / Temperature fuse 315 GRD LV 00719**		**18 23 809**	
53	**Schraube / Screw**		**13 30 829**	20
54	**Schraube / Screw**		**12 87 710**	20
55	**Kabel (Ugr.) / Cable (subassembly)**	2M 19498		
56	**Kabelbaum (Ugr.) / Cable harness (subassembly)**	2M 19699		
57	**Platte / Plate**	2M 19688		
58	**Federscheibe / Lock washer**	13 32 015		
59	**Mutter / Nut**		**12 67 515**	10
60	**Mutter / Nut**		**13 28 956**	30
21-28 60-74	**Wasserheizung / Water heater**	2M 19610		
61	**Anschluß / Connection**	2M 19614		
62	**Spannband / Holding strap**		**R 22465**	
63	**Schraube / Screw**		**13 33 798**	
64	**Temperatur-Wächter 115 GRD LV 00898 / Temperature guard 115 GRD LV 00898**		**18 25 992**	

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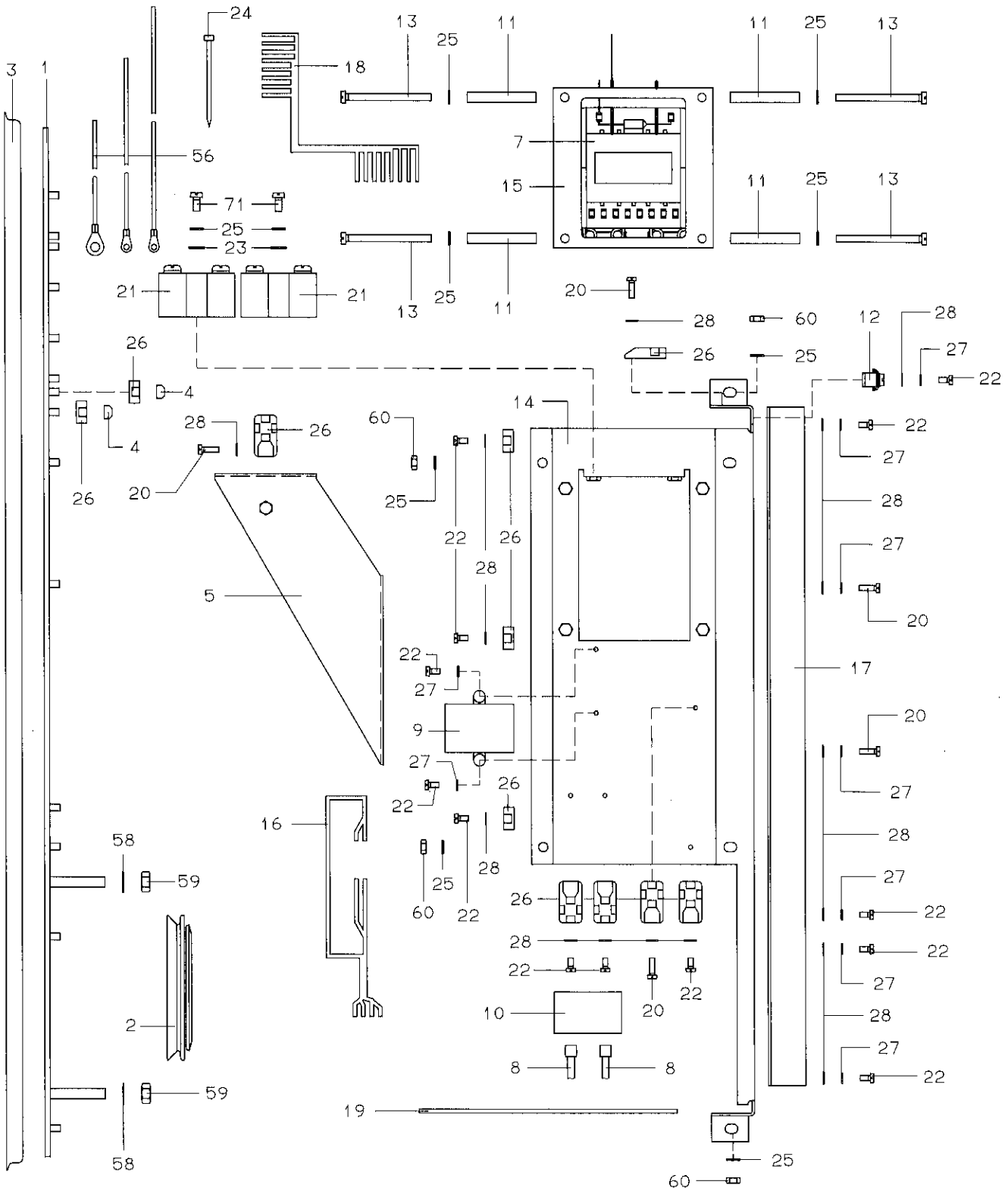
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 18



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Ersatzteil-Liste
Inkubator 8000
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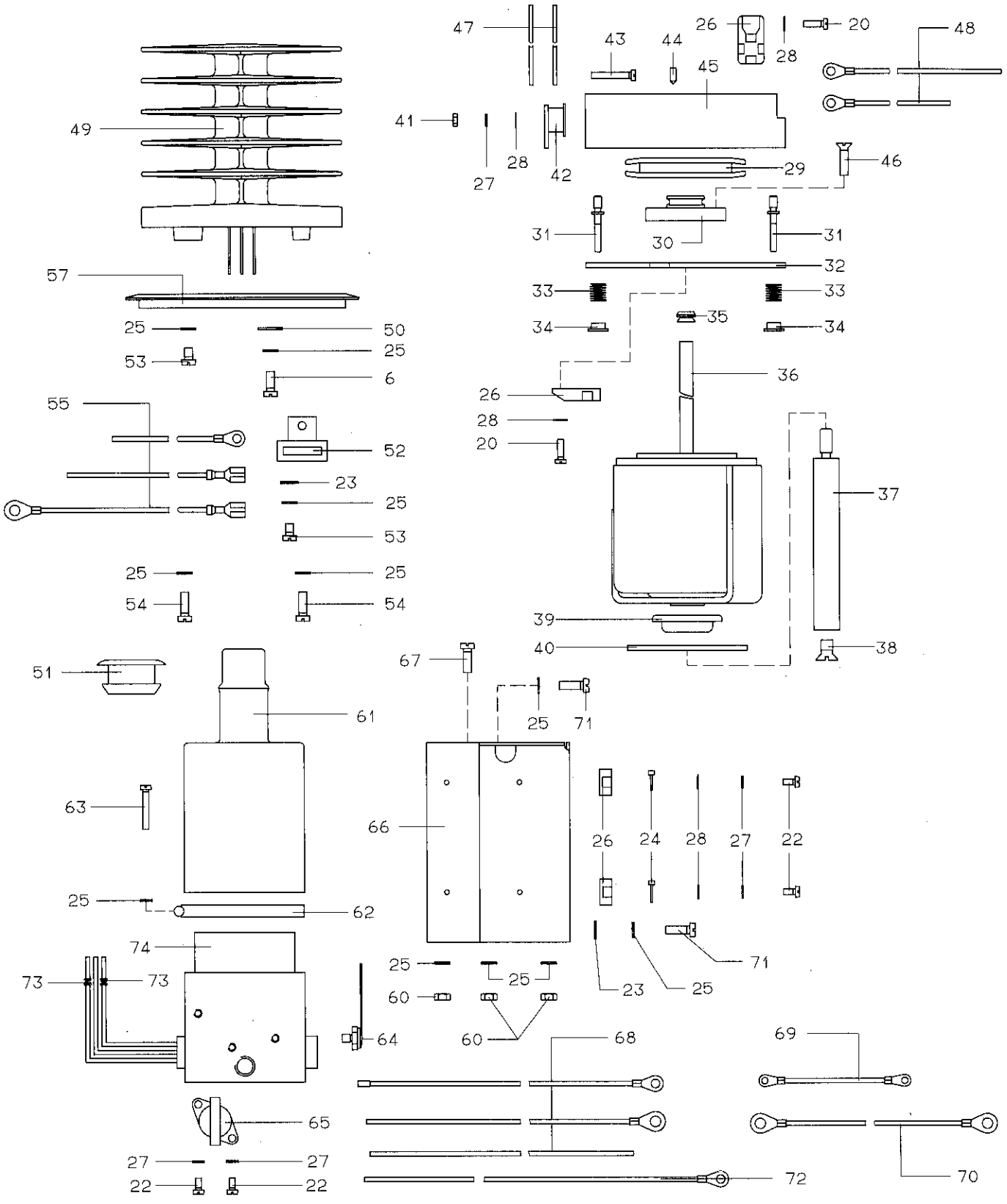
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 18



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D-2400 Lübeck

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
65	**Temperaturregler 130 GRD LV 00735 / Temperature controller 130 GRD LV 00735**		**18 24 228**	
66	**Blech / Metal sheet**	2M 19612		
67	**Schraube / Screw**		**12 87 710**	20
68	**Kabel (Ugr.) / Cable (subassembly)**	2M 19495		
69	**Kabel (Ugr.) / Cable (subassembly)**	2M 19497		
70	**Kable (Ugr.) / Cable (subassembly)**	2M 19496		
71	**Schraube / Screw**		**13 30 659**	
72	**Kabel (Ugr.) / Cable (subassembly)**	2M 19461		
73	**Diode / Diode**		**83 00 251**	
74	**Kocher (Ugr.) mit Heizpatrone / Boiler (subassembly) with heating cartridge**		**2M 19709**	

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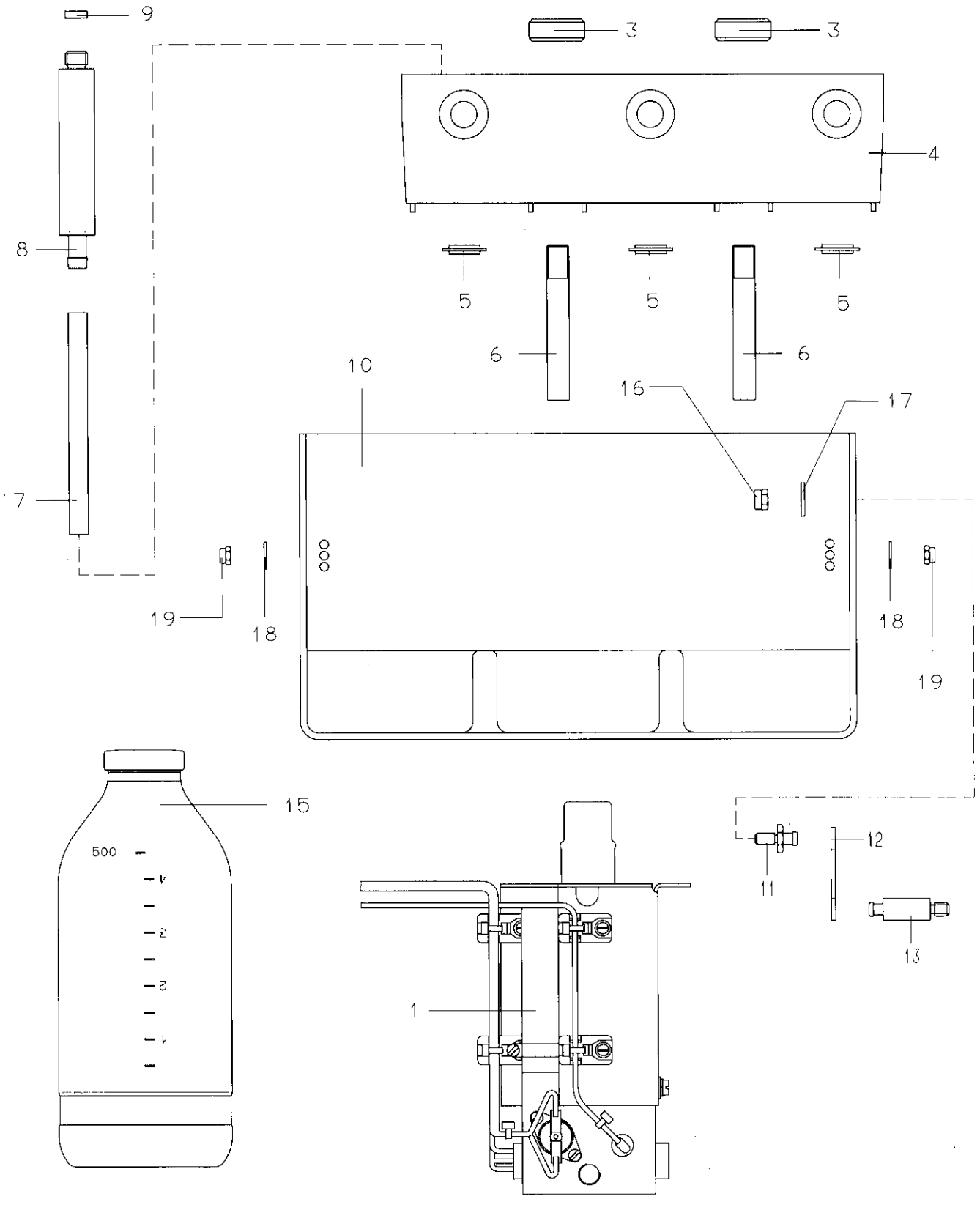
Ausgabe	Ersatzteil-Liste
Edition	Spare parts list
09.88	**6141.20**

bestehend aus:	Blatt
consisting of:	Sheet
35 Blatt/35 Sheets	21



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Moislinger Allee 53 - 55
D-2400 Lübeck

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-19	**Rüstsatz Anfeuchter / Humidifier fittings**		**2M 19683**	
1	**Wasserheizung, vollst. (siehe Blatt 18-20) / Water heater, complete (cf. sheet 18-20)**	2M 19610		
2	**Rüstsatz Feuchte (siehe Blatt 22-25), (ohne Abbildung), Humidity fittings (not shown), (cf. sheet 22-25)**	82 00 908		
3-19	**Wasserverteiler, vollst. / Water distributor, complete**	2M 19559		
3	**Rändelmutter / Knurled-head nut**		**2M 06004**	
4	**Wasserverteiler / Water distributor**		**2M 19561**	
5	**Dichtring / Sealing ring**		**2M 16045**	
6	**Bolzen / Bolt**	2M 19533		
7	**Schlauch / Hose**		**2M 19620**	
8	**Tülle / Nozzle**	2M 19619		
9	**O-Ring / O ring**		**CH 09039**	5
10	**Halter / Holder**	2M 19806		
11	**Knopf / Knob**		**2M 12044**	
12	**Zugseil / Tension rope**		**2M 12045**	
13	**Knopf / Knob**	2M 19693		
14	**Montageanleitung (ohne Abbildung) / Mounting instructions (not shown)**	2M 19702		
15	**Infusionsflasche / Infusion bottle**		**13 38 757**	
16	**Mutter / Nut**		**13 35 618**	
17	**Scheibe / Washer**		**13 29 472**	
18	**Scheibe / Washer**		**13 31 914**	
19	**Mutter / Nut**	12 98 720		

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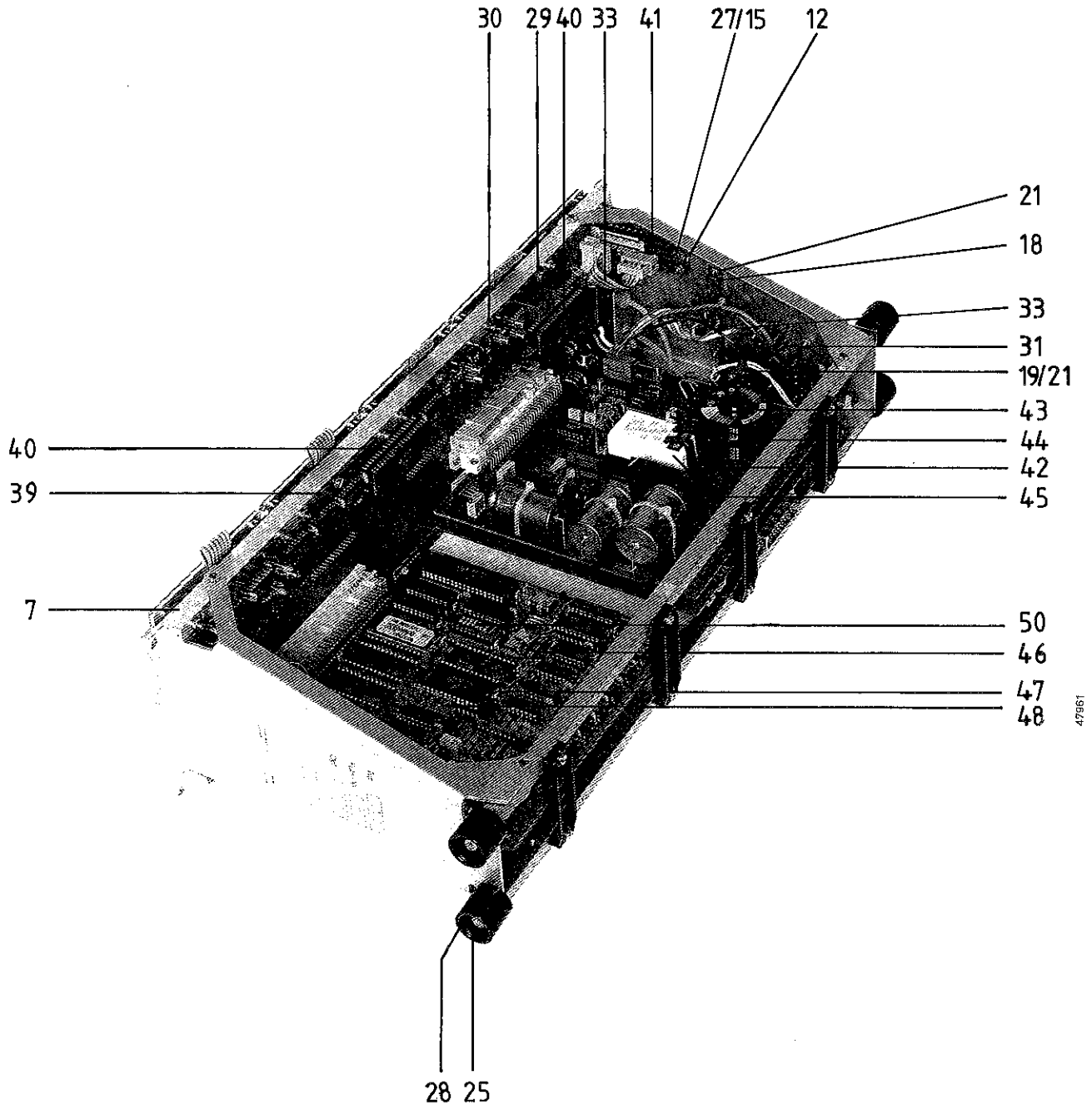
Ausgabe	Ersatzteil-Liste
Edition	Spare parts list
09.88	**6141.20**

bestehend aus:	Blatt
consisting of:	Sheet
35 Blatt/35 Sheets	22



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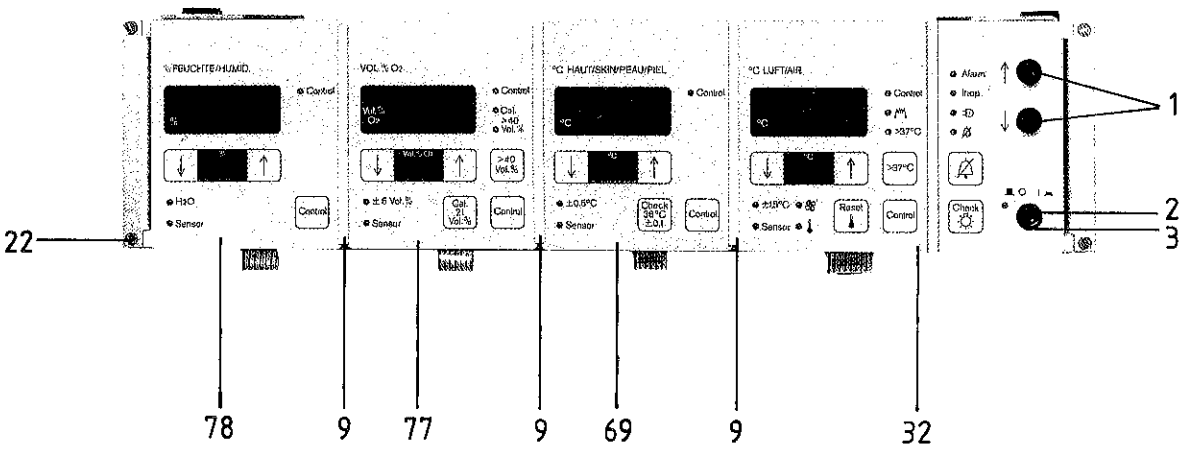
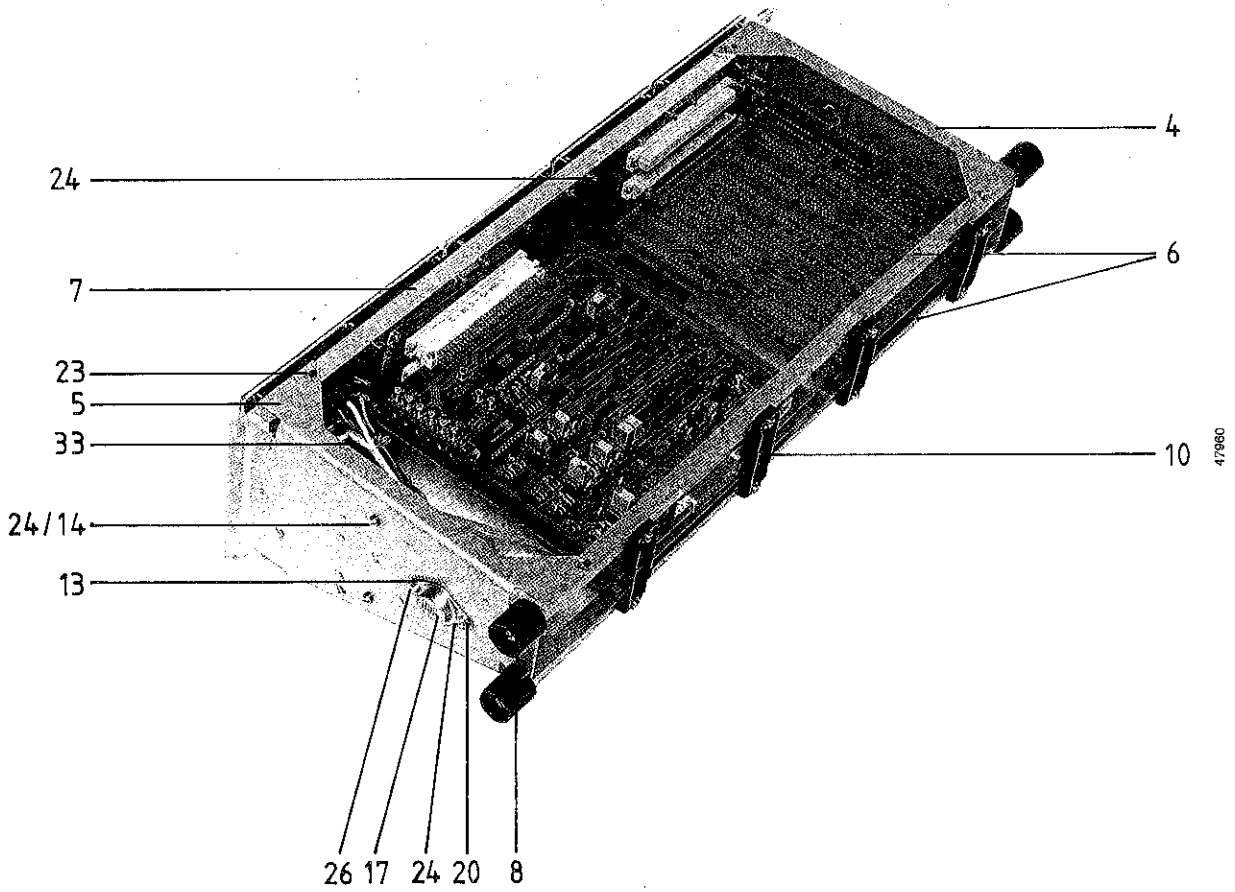
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 22





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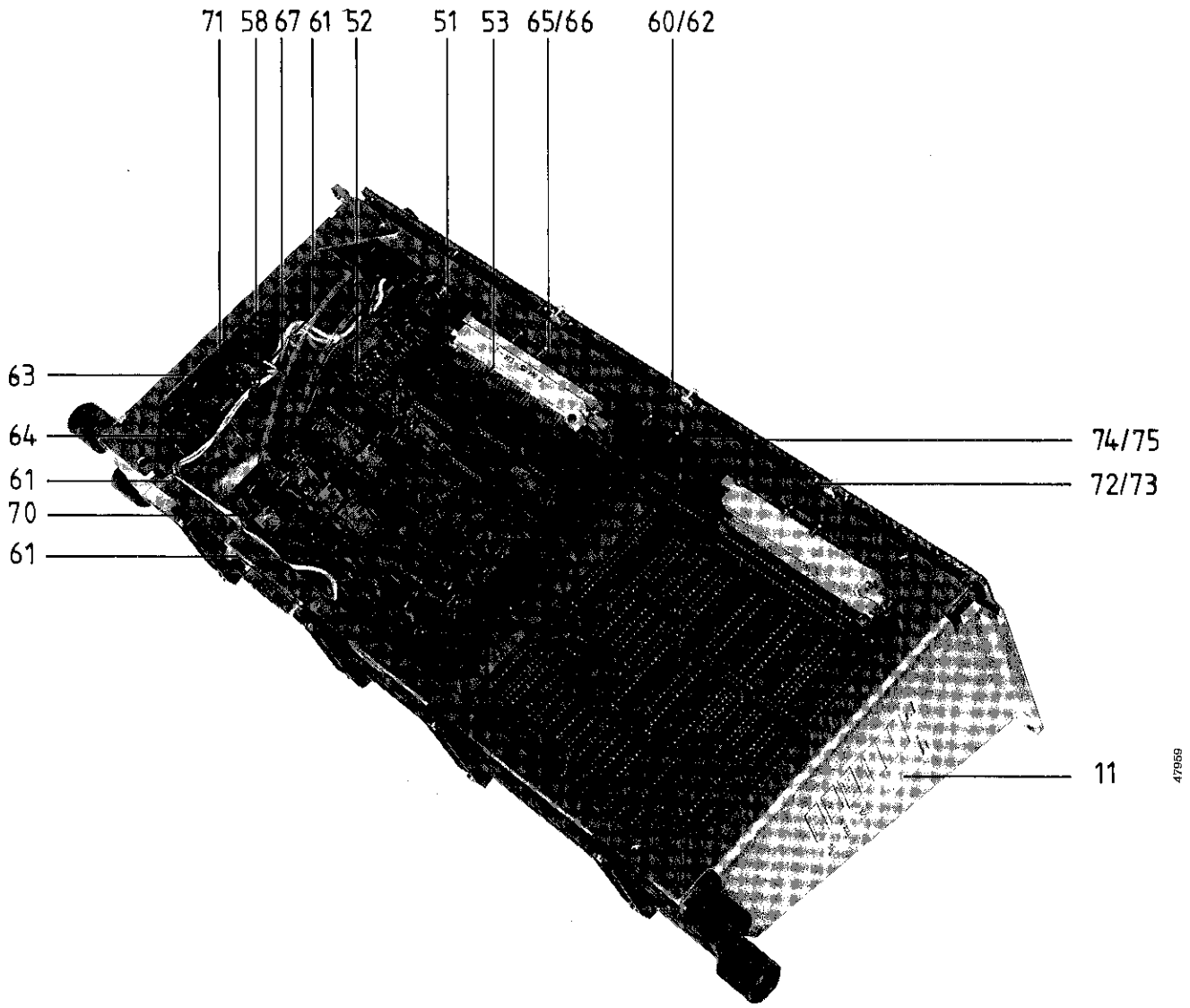
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 23



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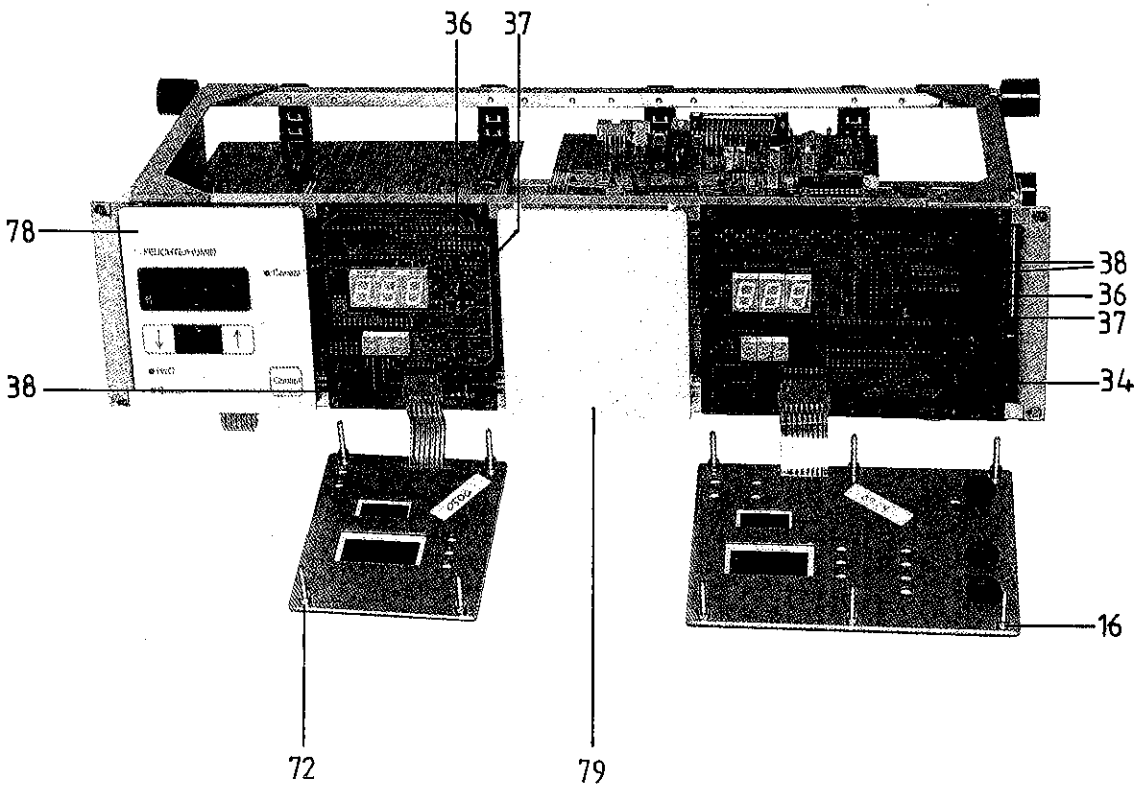
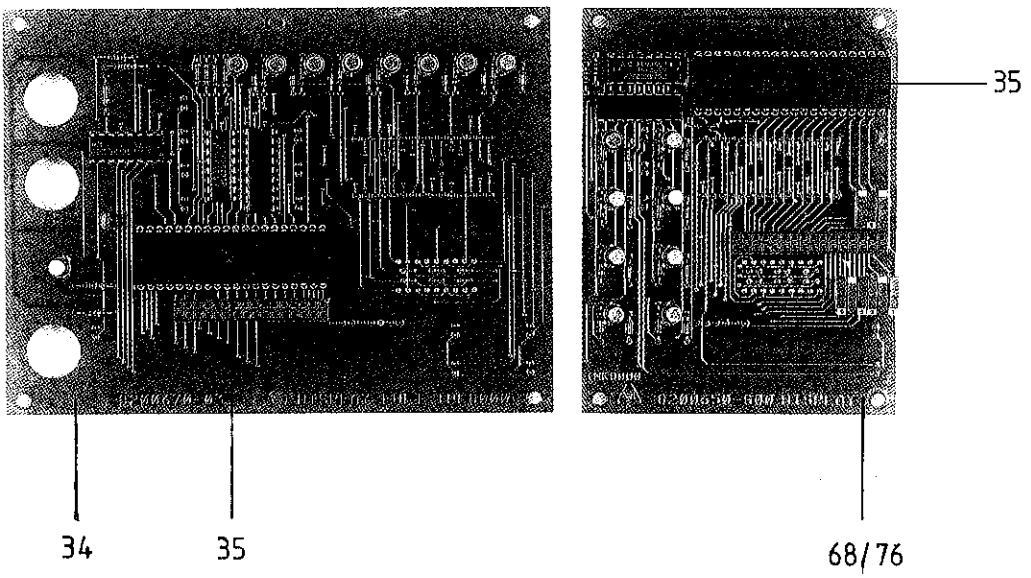
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 23





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Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-50	**Inkubator 8000 Grundgerät / Incubator 8000 basic unit**	82 00 900		
1-51	**Einschub Lufttemperatur / Air temperature module**		**82 00 901**	
1-51, 58-71	**Einschub Luft- und Hauttemperatur / Air and skin temperature module**		**82 00 902**	
1	**Kappe, sw / Cap, sw**		**82 00 616**	
2	**Knopf, sw / Knob, sw**		**82 00 619**	
3	**Balg / Bellows**		**82 00 927**	
4	**Seitenteil / Side panel**	82 00 893		
5	**Seitenteil / Side panel**	82 00 894		
6	**Strebe / Strut**	82 00 895		
7	**Strebe / Strut**	82 00 896		
8	**Buchse / Socket**	82 00 897		
9	**Schiene / Rail**		**82 00 898**	
10	**Halteschiene / Retaining bar**		**82 00 899**	
11	**Schild / Plate**	82 00 916		
12	**Hülse / Sleeve**	82 00 116		
13	**Nippel / Nipple**	83 01 823		
14	**Isolierbuchse / Insulating sleeve**	68 04 141		
15	**Dichtring / Sealing ring**	D 04 766		
16	**Distanzbuchse / Spacer socket**	G 10 302		
17	**Siliziumtransistor 2N 3055 / Silicon transistor 2N 3055**		**CH 18946**	
18	**Spannungsregler —15 V, 1,5 A / Voltage regulator —15 V, 1,5 A**		**18 21 423**	
19	**Spannungsregler +15 V, 2 A / Voltage regulator +15 V, 2 A**		**18 21 466**	
20	**Isolierscheibe T03 LV 00174 / Insulating washer T03 LV 00174**	18 14 311		
21	**Isolierscheibe T0220 LV 00173 / Insulating washer T0220 LV 00173**	18 14 303		
22	**Schraube / Screw**	13 08 459		
23	**Schraube / Screw**	12 87 419		
24	**Schraube / Screw**	13 29 987		
25	**Schraube / Screw**	13 28 980		
26	**Schraube / Screw**	13 30 470		
27	**Schraube / Screw**	13 34 557		
28	**Scheibe / Washer**	13 27 542		
29	**Federring / Spring washer**	13 09 749		
30	**Mutter / Nut**	13 34 913		
31	**Schrumpfsh 3,2-1,6 x 0,5 — 83 01 798 0,255 m / Shrink hose 3.2-1.6 x 0.5 — 83 017 798 0.255 m**	12 00 186		
32	**Frontplatte, vollst. / Front panel, complete**		**82 00 646**	
33	**Kabelbaum 1 / Cable harness 1**	82 00 617		

Lfd. Nr. Cons. No.	Benennung / Designation	Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	Bestell-Nr. Order-No.	Verp.-Menge Packing Qty.
34	Best. LP Display Luft / Air display PCB with components			82 00 670	
35	D. Prog. Tast. Anz. Interf. LV 00376 / D prog. key. ind. interf. LV 00376			18 20 877	
36	VLED GN 2,4 V 2OMA RD 3 DWN 3054 / V LED GN 2.4 V 2OMA RD 3 DWN 3054			18 13 021	
37	VLED GE 2 V 2OMA RD3 DWN 3054 / V LED GE 2 V 2OMA RD3 DWN 3054			18 10 448	
38	VLED RT 2V 2OMA RD3 DWN 3054 / V LED RT 2V 2OMA RD3 DWN 3054			18 04 324	
39	Best. LP Mutterboard / Mother board PCB with components			82 00 850	
40	D PIA 6821 1 MHZ DIL 40 LV00683 / D PIA 6821 1 MHZ DIL 40 LV00683			18 23 361	
41	Best. LP Schalter / Switch PCB with components			82 00 880	
42	Best. LP Netzteil / Power supply PCB with components			82 00 930	
43	Akustischer Signalgeber / Acustic signal transmitter			83 01 708	
44	Kabelbinder / Cable binder			83 00 358	10
45	Batterie / Battery			83 01 856	
46	Best. LP CPU Standard 2 / CPU PCB standard 2 with components			83 05 141	
47	D PTM 6840 4 MHZ DIL 28 LV00148 / D PTM 6840 4 MHZ DIL 28 LV00148			18 13 900	
48	XFL Kurzschlußbu. 2 POL LV00188 / XFL shorting socket 2 POL LV00188		18 14 508		
49	D RAM 2048WORDX8BIT/ST LV00270 (ohne Abbildung) / D RAM 2048WORDX8BIT/ST LV00270 (not shown)			18 17 590	
50	Memory Decoder, vollst. / Memory decoder, complete			83 04 920	
51	Best. LP Analog (Einschub Luft) / Analog PCB with components (air module)			82 00 770	
51	Best. LP Analog (Einschub Luft/Haut) / Analog PCB with components (air/skin module			82 00 920	
52	D C-MOS 4067 B DIL 24 LV 00680 / D C-MOS 4067 B DIL 24 LV 00680			18 23 345	
53	D A/D Wandler, 12BIT LV 00673 / D A/D converter, 12BIT LV 00673			18 23 256	
54	Rüstsatz Eichteile (inkl. Sensor eichfähig) (ohne Abbildung / Calibration parts set (including calibratable sensor) (not shown)			82 00 953	
55	Hauttemperatur-Sensor, geeicht (für BRDeutschland) (ohne Abbild.) / Skin temperature sensor calibrated (for F.R.Germany) (not shown)			82 00 756	
56	Hauttemperatur-Sensor, nicht geeicht (ohne Abbildung) / Skin temperature sensor not calibrated (not shown)			82 00 757	
57	Rüstsatz Eichteile (ohne Abbildung) / Calibration parts set (not shown)			82 00 951	
58	Distanzbolzen / Spacer bolt		82 00 641		
59	Distanzbolzen / Spacer bolt		82 00 838		
60	Distanzbuchse / Spacer bolt		G 10302		
61	Kabelbinder / Cable binder			87 12 007	10
62	Dichtring / Sealing ring			D 04766	
63	Schraube / Screw		13 21 609		
64	Schraube / Screw		13 30 799		

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
65	**Mutter / Nut**	13 34 913		
66	**Federring / Spring washer**	13 09 749		
67	**Schrumpfsh. 3,2-1,6 x 0,5 — 83 01 798 0,048 m / Shrink hose 3.2-1.6 x 0.5 — 83 01 798 0.048 m**	12 00 186		
68	**Best. LP Display (35-38) / Display PCB with components (35-38)**		**82 00 650**	
69	**Frontplatte, vollst. / Front panel, complete**		**82 00 645**	
70	**Kabelbaum 2 / Cable harness 2**	82 00 591		
71	**Best. LP Filterschaltung / Filter circuit PCB with components**	83 02 526		
72-77	**Rüstsatz O_2 / O_2 set**	82 00 909		
72-76, 78	**Rüstsatz Feuchte / Humidity set**	82 00 908		
74-75, 79	**Rüstsatz Blindplatte / Dummy plate set**		**82 00 921**	
72	**Distanzbuchse / Spacer socket**	G 10302		
73	**Dichtring / Sealing ring**	D 04766		
74	**Federring / Spring washer**	13 09 749		
75	**Mutter / Nut**	13 34 913		
76	**Best. LP Display / Display PCB with components**		**82 00 650**	
77	**Frontplatte, vollst. / Front panel, complete**		**82 00 644**	
78	**Frontplatte, vollst. / Front panel, complete**		**82 00 643**	
79	**Blindplatte, vollst. / Dummy plate, complete**	82 00 888		

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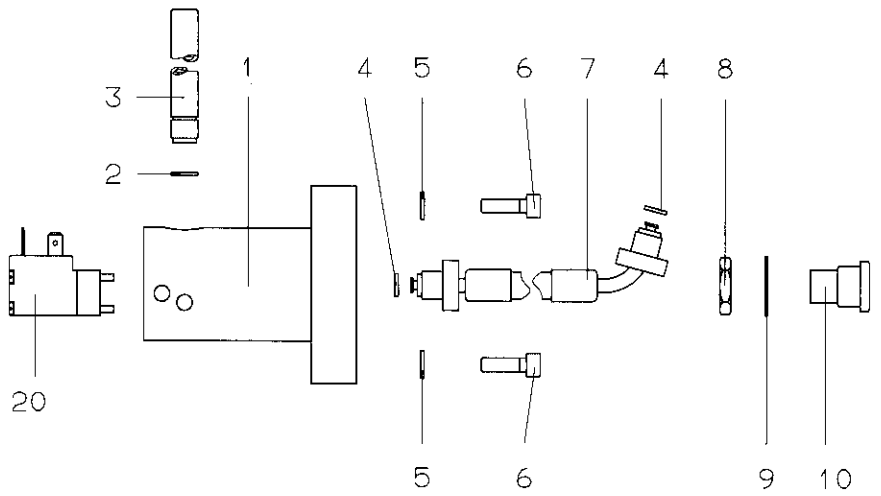
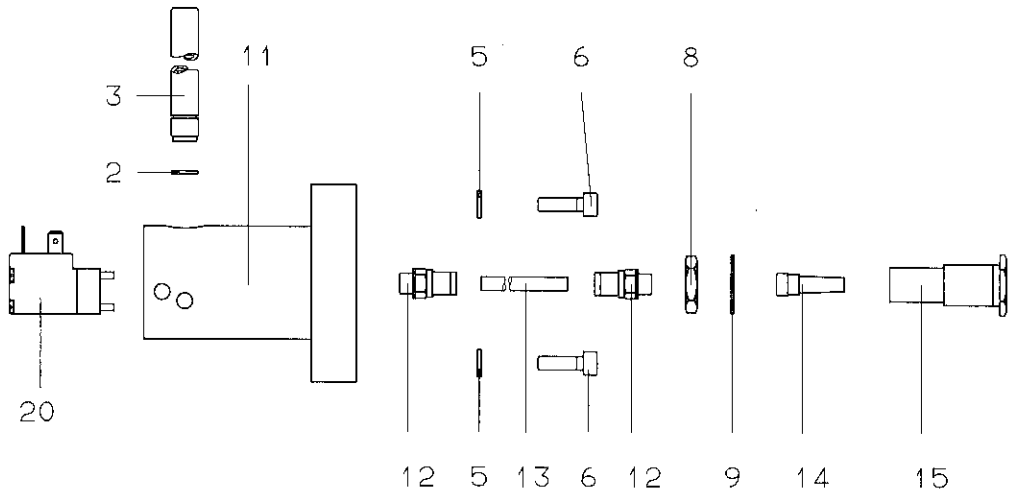
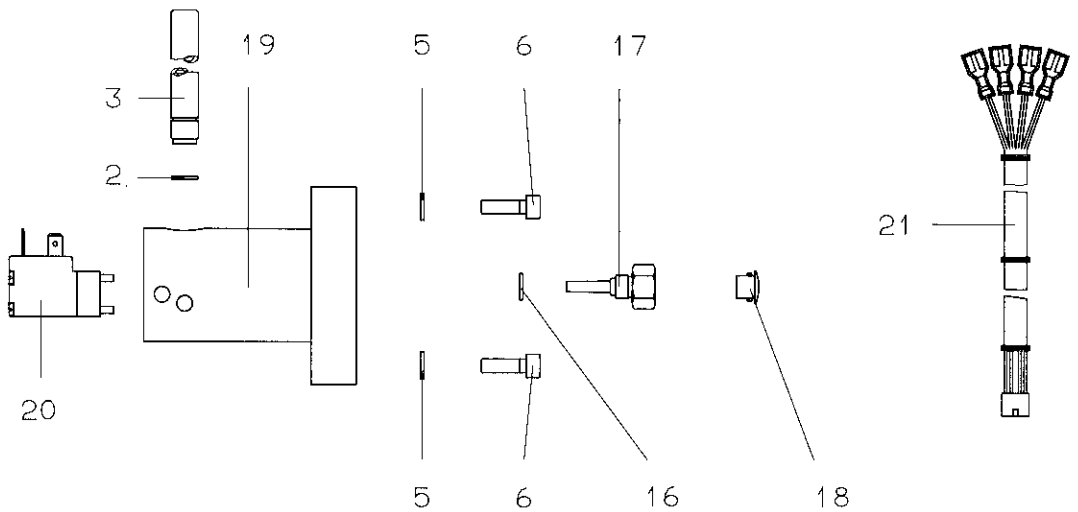
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 26







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Lfd. Nr. Cons. No.	Benennung / Designation	Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	Bestell-Nr. Order-No.	Verp.-Menge Packing Qty.
1-22	**Rüstsatz O_2-Regelung / O_2 control set**			**2M 19684**	
1-21	**O_2-Versorgung / O_2 supply**		2M 19635		
1	**Ventilblock, (Ugr.); bei Austausch Teile von lfd. Nr. 18-20 verwenden; lfd. Nr. 4, 7-10 entfernen / Valve block (subassembly); for replacement use cons. no. 18-20; remove cons. No. 4, 7-10**				
2	**O-Ring / O ring**			**M 9361**	10
3	**Rohr (Ugr.) / Tube (subassembly)**		2M 19740		
4	**Dichtring / Sealing ring**			**M 7152**	10
5	**Federring / Spring washer**		13 33 941		
6	**Schraube / Screw**		12 63 196		
7	**O_2-Anschlußschlauch / O_2 connection hose**		M 23108		
8	**Mutter / Nut**		M 13357		
9	**Scheibe / Washer**		M 7282		
10	**Zwischenstück; bei Austausch Teile von lfd. Nr. 18-20 verwenden; lfd. Nr. 1, 4, 7-10 entfernen / Spacer; for replacement use cons. no. 18-20; remove cons. no. remove 1, 4, 7-10**				
11	**Ventilblock, (Ugr.); bei Austausch Teile von lfd. Nr. 18-20 verwenden; lfd. Nr. 8, 9, 12-15 entfernen / Valve block (subassembly); for replacement use cons. no. 18-20; remove cons. no. remove 8, 9, 12-15**				
12	**Kupplung / Coupling**		M 27123		
13	**Rohr 6 x 1 DIN 73378 PA 12 W NF (0,6 m) / Tube 6 x 1 DIN 73378 PA 12 W NF (0.6 m)**				
14	**Siebeinsatz / Filter inset**			**D 2316**	
15	**Gehäuse / Housing**		M 28829		
16	**O-Ring / O ring**			**R 22364**	10
17	**Filterschraube / Filter screw**			**2M 19621**	
18	**Verschlußkappe / Screw cap**		G 12669		
19-20	**Ventilblock (Ugr.) / Valve block (subassembly)**			**2M 19734**	
19	**Ventilblock (Ugr.); bei Austausch Teile von lfd. Nr. 19-20 verwenden / Valve block (subassembly); for replacement use cons. no. 19-20**				
20	**2/2 Wege Magnetventil / 2/2-way solenoid valve**		2M 19958		
21	**Kabelbaum / Cable harness**		2M 19732		
22	**Rüstsatz O_2-Regelung (ohne Abbildung) (siehe Blatt 25, lfd. Nr. 72-77) O_2 control set (not shown) (cf. sheet 25, cons. nos. 72-77)**		82 00 909		

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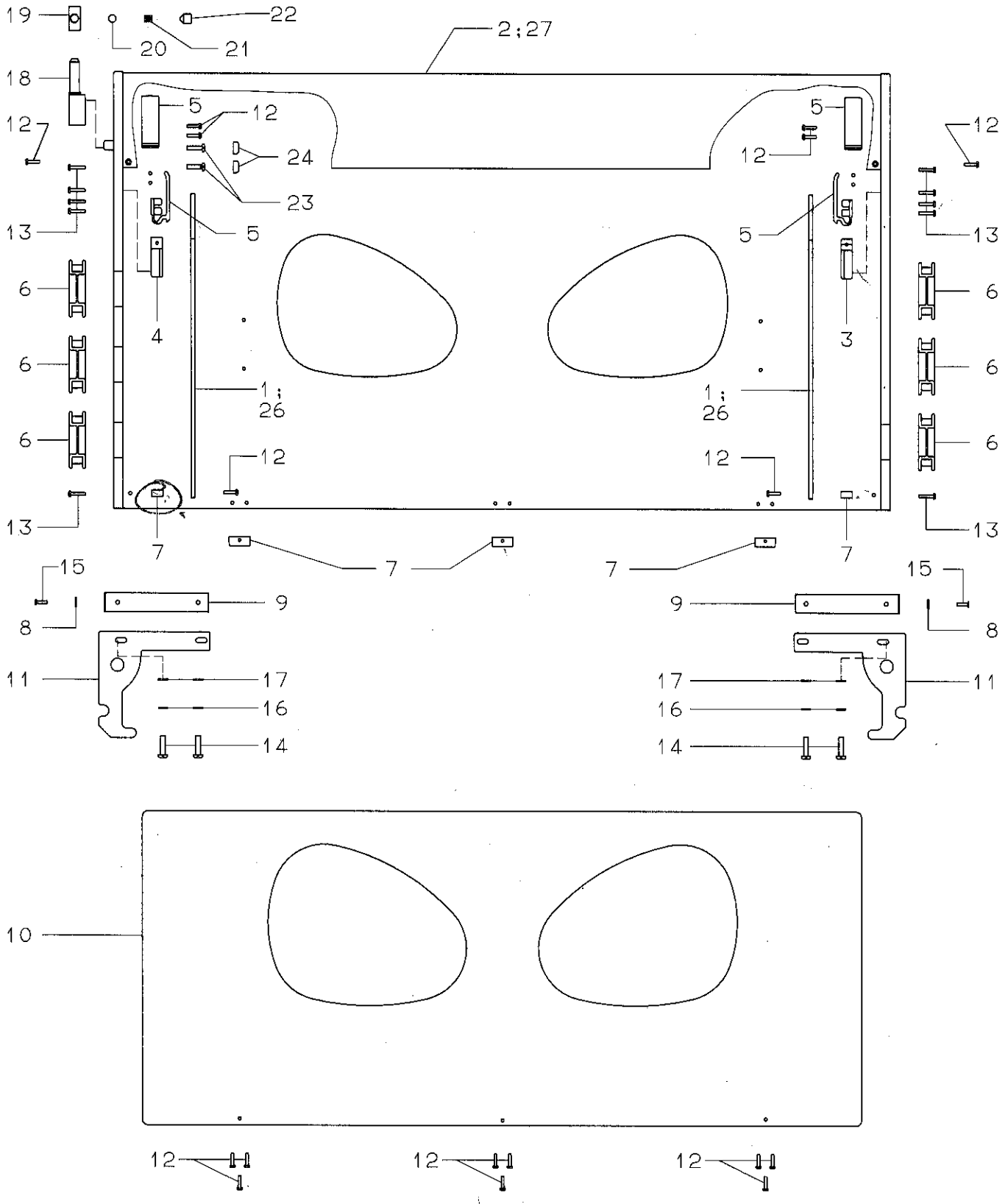
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet **14**



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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-25	**Plexihaube / Plexiglass hood**	2M 19520		
3-27	**Haube mit Seitenöffnung / Hood with lateral opening**		**2M 19530**	
1	**Seitenwand (ohne Seitenöffnung) / Side panel (without lateral opening)**	2M 19722		
2	**Plexihaube / Plexiglass hood**	2M 19513		
3	**Raste, links / Pawl, left**	2M 19505		
4	**Raste, rechts / Pawl, right**	2M 19506		
5	**Raste / Pawl**		**2M 19724**	
6	**Schlauchdurchführung / Hose bushing**		**2M 19511**	
7	**Filmscharnier / Film hinge**		**2M 19730**	
8	**Scheibe / Washer**	2M 19842		
9	**Verstärkung / Reinforcement**	2M 19504		
10	**Innenwand / Inner wall**		**2M 19512**	
11	**Winkel / Bracket**	2M 19501		
12	**Blechschraube / Sheet metal screw**	13 34 948		
13	**Blechschraube / Sheet metal screw**	13 36 630		
14	**Schraube / Screw**	13 34 069		
15	**Schraube / Screw**	13 34 107		
16	**Federring / Spring washer**	13 00 849		
17	**Scheibe / Washer**	13 26 279		
18-22	**Scharnier, vollst. / Hinge, complete**		**82 00 596**	
18	**Bolzen / Bolt**	82 00 489		
19	**Scharnierplatte / Hinged plate**	82 00 488		
20	**Kugel / Ball**	12 98 844		
21	**Feder / Spring**	R 22354		
22	**Gewindestift / Threaded stud**	13 24 586		
23	**Schraube / Screw**	13 34 034		
24	**Schraubenkopfabdeckung / Screw head cover**	2M 18620		
25	**Verpackung (ohne Abbildung) / Packing (not shown)**	87 11 876		
26	**Seitenwand / Side panel**		**2M 19721**	
27	**Plexihaube (mit Seitenöffnung) / Plexiglass hood (with lateral opening)**		**2M 19515**	

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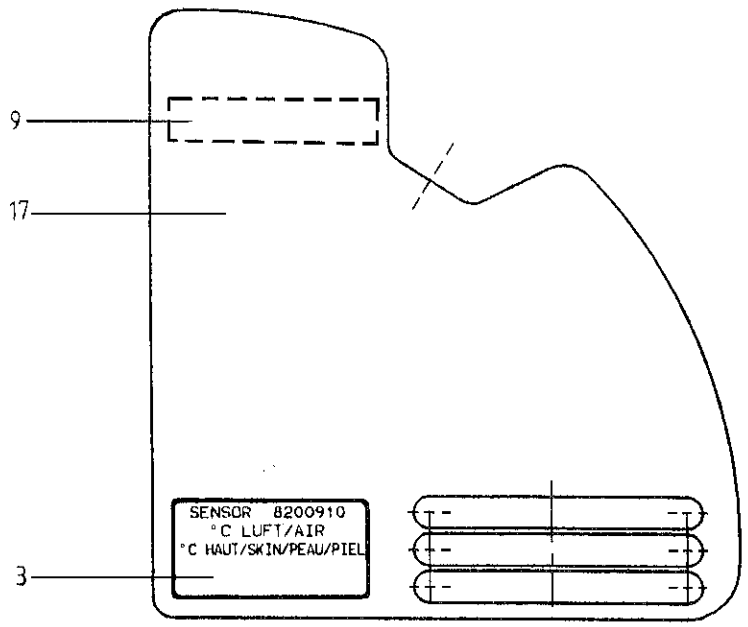
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 27



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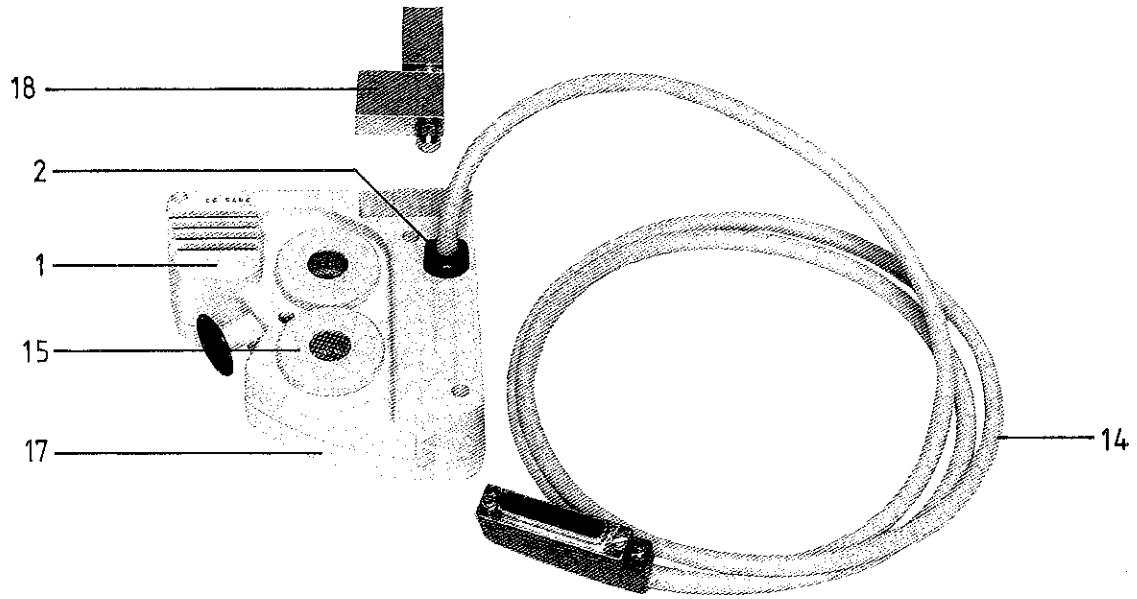
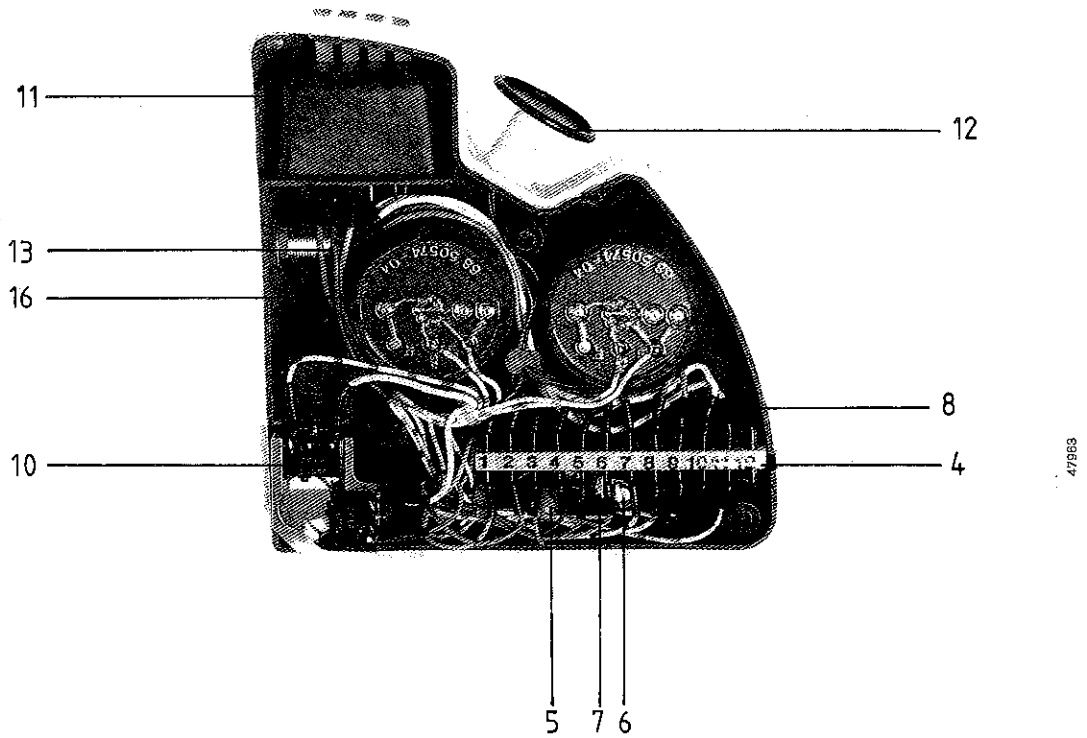
Ausgabe	Ersatzteil-Liste
Edition	Spare parts list
09.88	**6141.20**
bestehend aus:	Blatt
consisting of:	Sheet
35 Blatt/35 Sheets	27





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Lfd. Nr. Cons. No.	Benennung / Designation (Menge pro Sach-Nr. Qty per Item No.)	Sach-Nr. Item-No.	Bestell-Nr. Order-No.	Verp.-Menge Packing Qty.
1-17	**Sensor, vollst. (Luft, Haut, O_2, Feuchte) / Sensor, complete (air, skin, O_2, humidity)**		**82 00 913**	
1-8, 10, 12-15, 17	**Sensor, vollst. (Luft, Haut) / Sensor, complete (air, skin)**		**82 00 910**	
1-15, 17	**Sensor, vollst. (Luft, Haut, Feuchte) / Sensor, complete (air, skin, humidity)**		**82 00 911**	
1-8, 10, 12-17	**Sensor, vollst. (Luft, Haut, O_2) / Sensor, complete (air, skin, O_2)**		**82 00 912**	
1	**Sensorgehäuse / Sensor housing**		**82 00 605**	
2	**Zugentlastung / Traction relif device**	83 00 642		
3	**Optionsschild / Option plate**	82 00 715		
4	**Kontaktleiste / Contact strip**	84 04 294		
5	**Kabelbinder / Cable binder**		**87 12 007**	10
6	**Schraube / Screw**	13 26 619		
7	**Federring / Spring washer**	13 09 749		
8	**Schrumpfsh. 2,4-1,2 x 0,51-RT 102, 0,360 m / Shrink hose 2.4-1.2 x 0.51-RT 102, 0.360 m**	12 02 774		
9	**Schlauch 4 x 1,5-SI NF, M 27729, 0,040 m / Hose 4 x 1.5-SI NF, M 27729, 0.040 m**	11 90 520		
10	**Winkel, vollst. (Mikroschalter) / Bracket, complete (microswitch)**		**82 00 497**	
11	**Feuchtesensor, vollst. / Humidity sensor, complete**		**82 00 479**	
12	**Temperatursensor, vollst. / Temperature sensor, complete**		**82 00 486**	
13	**Buchse, vollst. / Socket, complete**		**82 00 608**	
14	**Kabelbaum Sensorstecker / Cable harness for sensor plug**		**82 00 609**	
15	**Kappe, vollst. / Cap, complete**		**82 00 618**	
16	**Bestückte Leiterplatte / PCB with components**	68 50 573	**68 50 638**	
17	**Deckel, vollst. / Lid, complete**		**82 00 597**	
18	**Scharnier, vollst. / Hinge, complete**		**82 00 596**	

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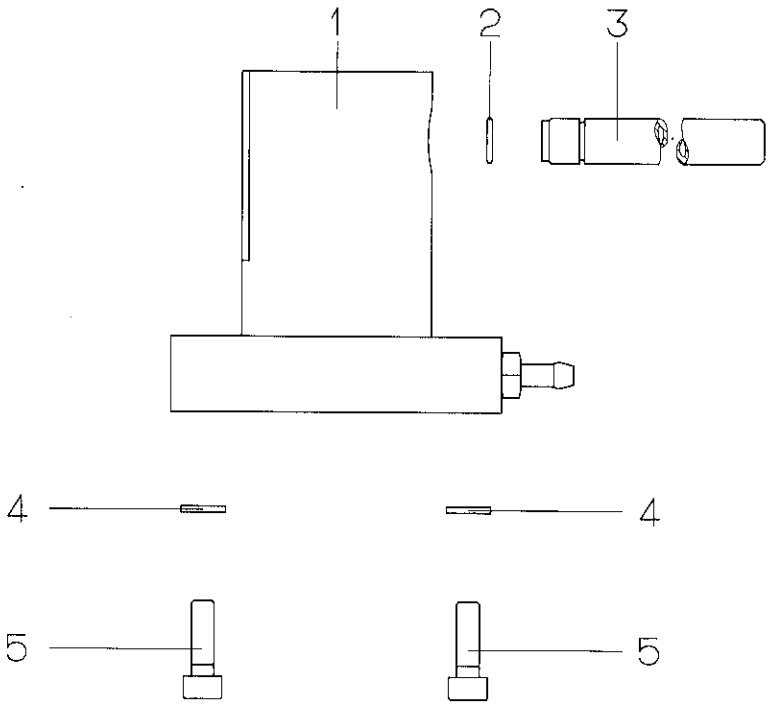
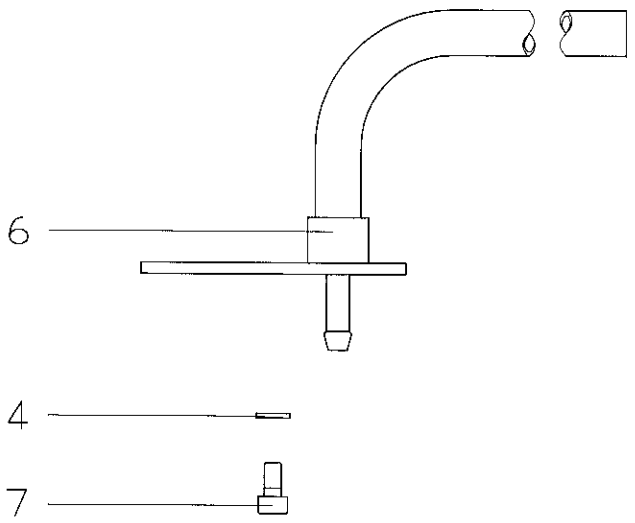
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 29





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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-9	**O_2-Anschluß, vollst. / O_2 Connection, complete**		**2M 19716**	
1	**O_2-Anschluß; bei Austausch Teile von lfd. Nr. 4, 6, 7 verwenden / O_2 connection; for replacement use cos. no. 4, 6, 7**			
2	**O-Ring / O ring**		**M 9361**	10
3	**Rohr, (Ugr.) / Tube (subassembly)**	2M 19740		
4	**Federring / Spring washer**	13 33 941		
5	**Schraube / Screw**	13 30 853		
6	**Rohrbogen, (Ugr.) / Tube elbow (subassembly)**	2M 19405		
7	**Schraube / Screw**	12 63 196		

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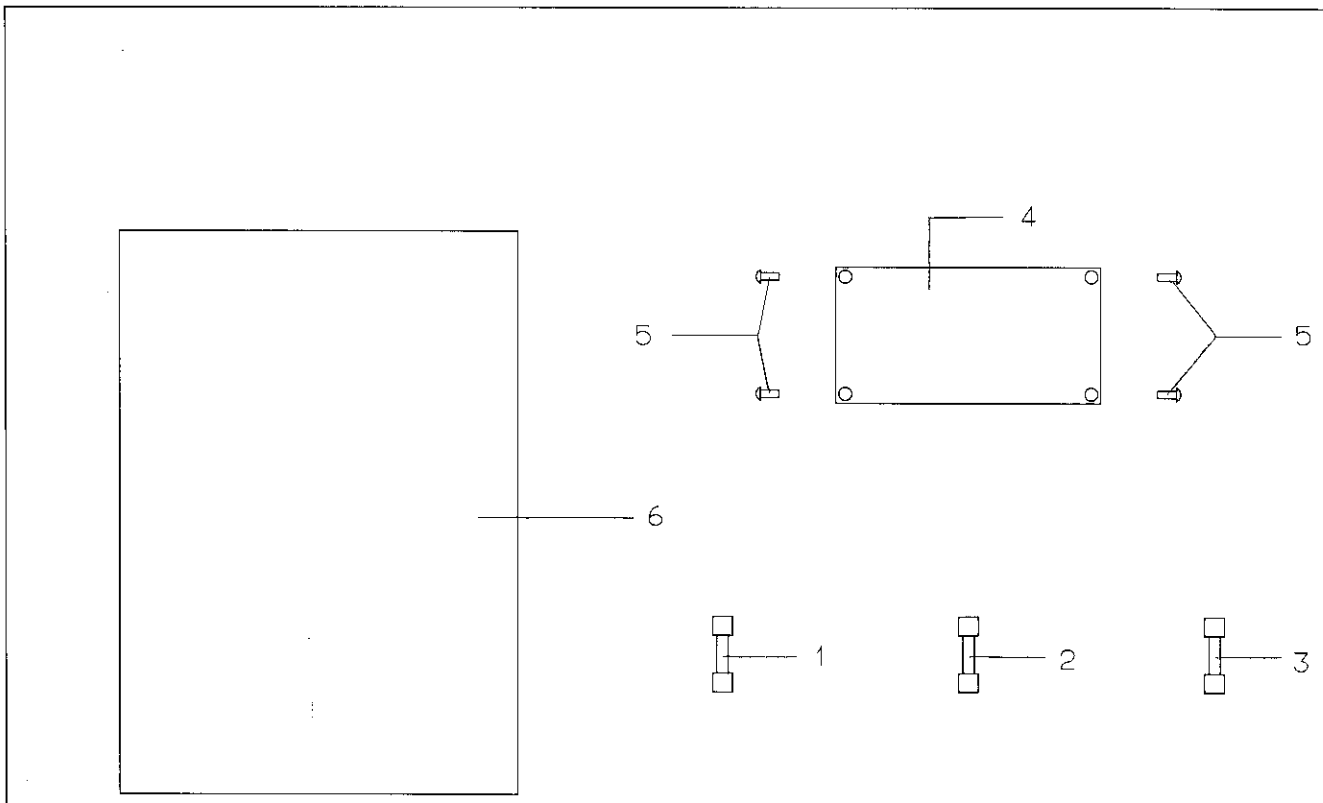
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 30



Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-6	**Rüstsatz 110/127 V, 60 Hz / Fitting set 110/127 V, 60 Hz**		**2M 19704**	
1	**Schmelzeinsatz / Fuse**		**13 30 195**	
2	**Schmelzeinsatz / Fuse**		**18 14 974**	10
3	**Schmelzeinsatz / Fuse**		**18 15 075**	
4	**Leistungsschild / Data plate**		**87 12 046**	
5	**Kerbnagel / Grooved drive stud**	13 35 510		
6	**Umrüstanweisung / Retrofitting instructions**	2M 19975		

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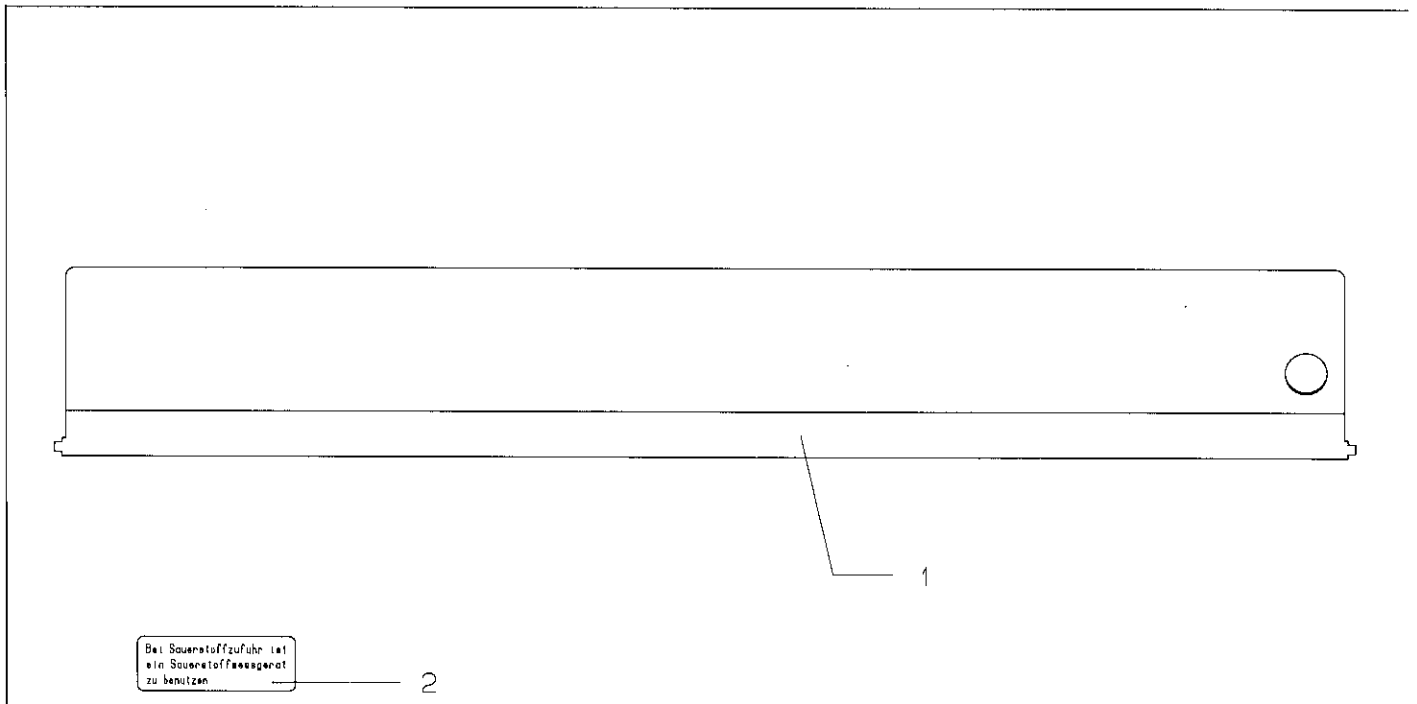
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 31



Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-7	**Rüstsatz, deutsch / Fitting set, German**		**2M 19494**	
1	**Kurz-BA INK. 8000, deutsch /** **Short operating instructions for INC. 8000, German**		**2M 19599**	
2	**Schild / Plate**		**2M 19528**	
3	**Bauartzulassungsbescheinigung (ohne Abbildung) /** **Construction licence (not shown)**	2M 19803		
4	**Gerätebuch (ohne Abbildung) / Equipment manual (not shown)**	90 04 553		
5	**GA Inkubator 800 D/E (ohne Abbildung) /** **GA incubator 800 G/E (not shown)**	90 27 300		
6	**Schutzhülle (ohne Abbildung / g) / Protective sleeve (not shown)**		**M 22532**	
7	**Registrierprotokoll (ohne Abbildung) / Recording chart (not shown)**	2M 19994		

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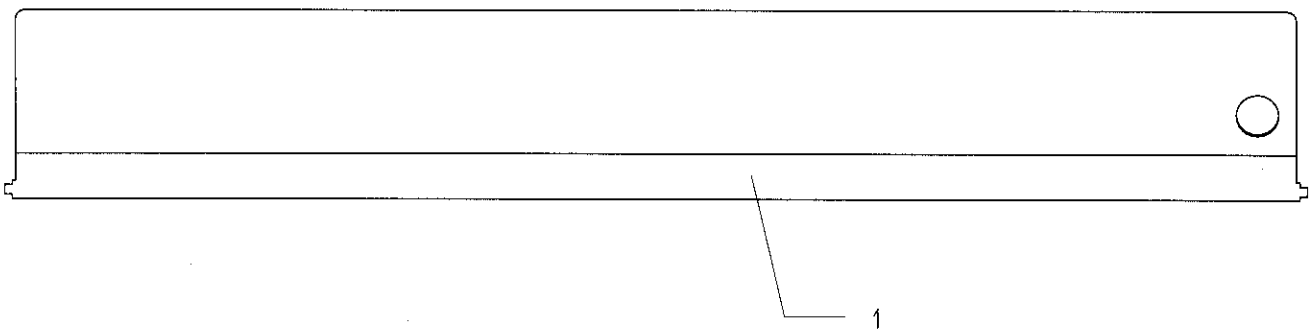
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 31



Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation**	Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-4	**Rüstsatz, engl. / Fitting set, English**			**2M 19486**	
1	**Kurz-BA INK. 8000, engl. / Short operating instructions for INC. 8000, English**			**2M 19674**	
2	**GA Inkubator 800 D/E (ohne Abbildung) / GA incubator 800 G/E (not shown)**		90 27 300		
3	**Schutzhülle (ohne Abbildung) / Protective sleeve (not shown)**			**M 22532**	
4	**Registrierprotokoll (ohne Abbildung) / Recording chart (not shown)**		2M 19986		

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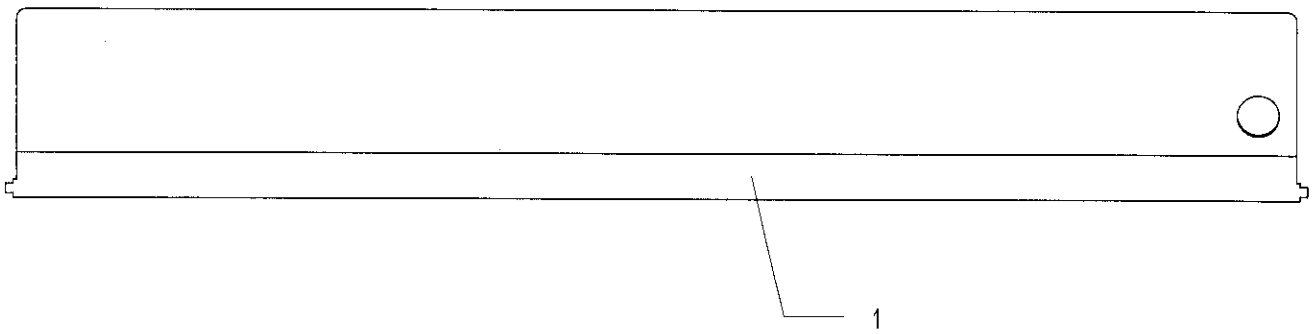
Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 32



Bestellungen bitte ausschließlich nach Bestell-Nr.
Bestell-Nr. entspricht 1 Stück. Bei Bestellung bitte Verpackungsmenge (Mindestbestellmenge) beachten.
Reparatur-Austausch (RAT) setzt die Einsendung eines reparaturwürdigen Teiles voraus.
Order exclusively in accordance with order-number.
Order code refers to 1 piece. When ordering please observe packing qty (minimum order quantity).
Repair-exchange ("RAT") possible only upon forwarding a part, with repairing.

Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. / Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-4	**Rüstsatz, franz. / Fitting set, French**		**2M 19466**	
1	**Kurz-BA INK. 8000, franz. /** **Short operating instructions for INC. 8000, French**		**2M 19706**	
2	**GA Inkubator 800 F/S (ohne Abbildung) /** **GA incubator 800 F/S (not shown)**	90 27 301		
3	**Schutzhülle (ohne Abbildung) / Protective sleeve (not shown)**		**M 22532**	
4	**Registrierprotokoll (ohne Abbildung) / Recording chart (not shown)**	2M 19966		

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Ersatzteil-Liste
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Ausgabe Edition **09.88**	Ersatzteil-Liste Spare parts list **6141.20**
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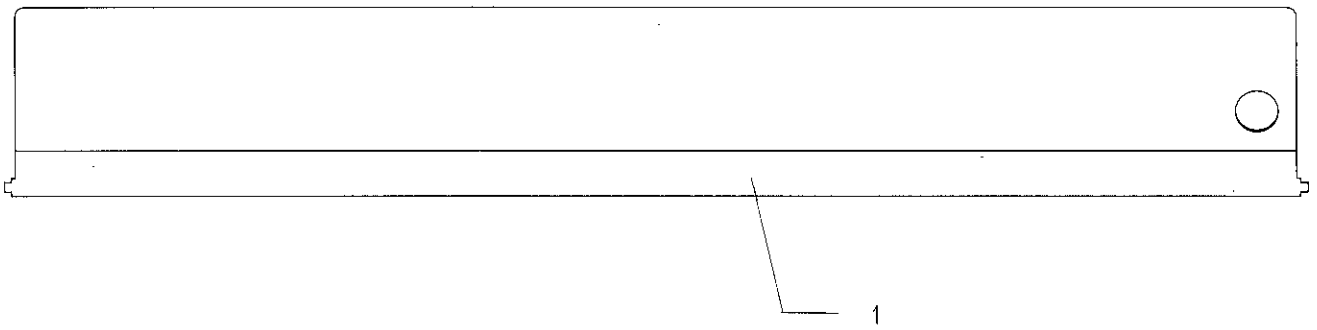

Bestellungen bitte ausschließlich nach Bestell-Nr.
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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-4	**Rüstsatz, span. / Fitting set, Spanish**		**2M 19467**	
1	**Kurz-BA INK. 8000, span. /** **Short operating instructions for INC. 8000, Spanish**		**2M 19707**	
2	**GA Inkubator 800 F/S (ohne Abbildung) /** **GA incubator 800 F/S (not shown)**	90 27 301		
3	**Schutzhülle (ohne Abbildung) / Protective sleeve (not shown)**		**M 22532**	
4	**Registrierprotokoll (ohne Abbildung) / Recording chart (not shown)**	2M 19967		

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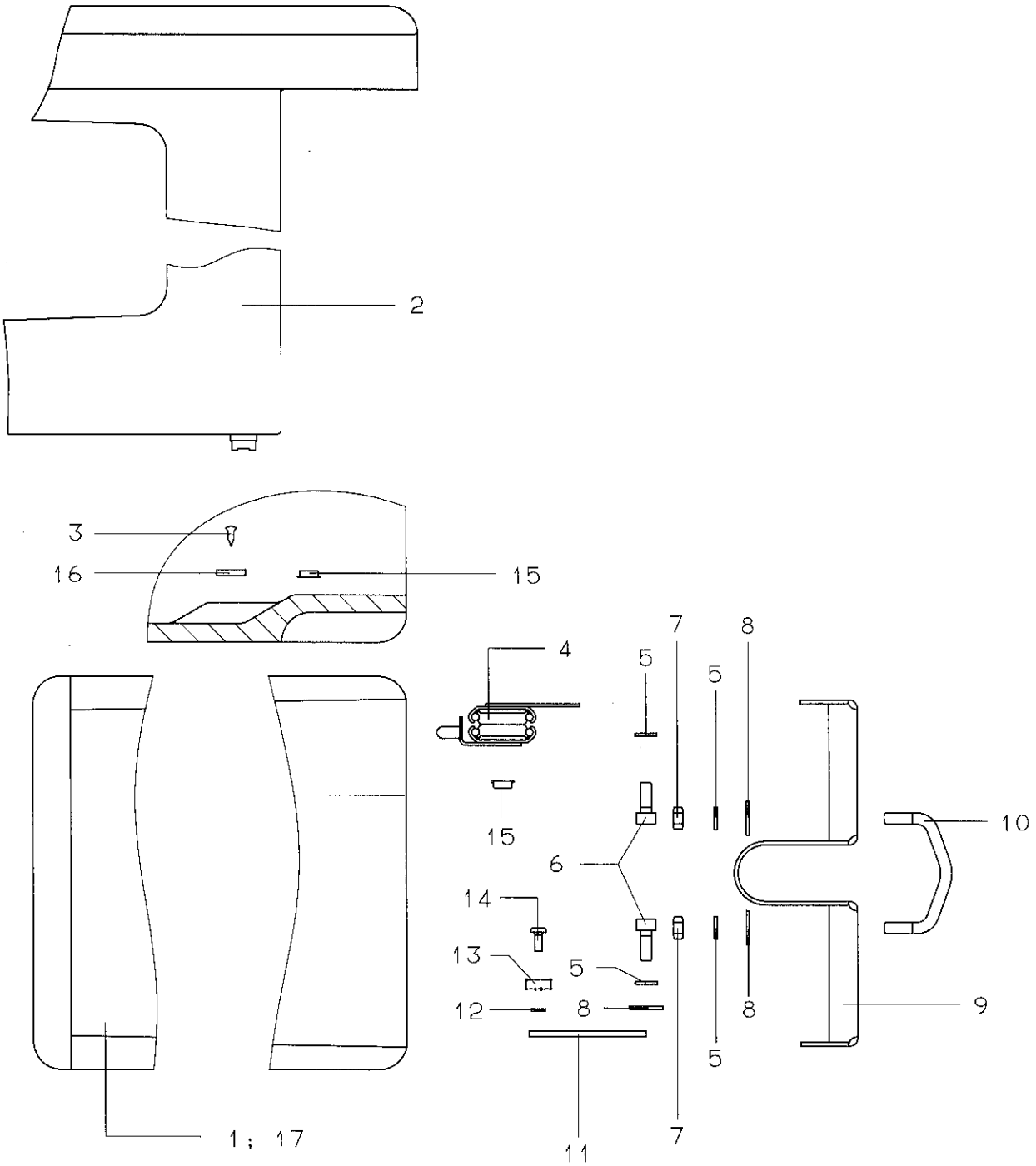

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-17	**Schrank, rechts / Cabinet, right**		**2M 19580**	
2-18	**Schrank, links / Cabinet, left**		**2M 19480**	
1	**Gehäuse, rechts (Ugr.) / Housing, right (subassembly)**	2M 19489		
2	**Einschub, vollst. (siehe Blatt 34) / Slide-in unit, complete (cf. sheet 34)**		**2M 19493**	
3	**Blechschraube / Sheet metal screw**	13 26 252		
4	**Schiene / Rail**	2M 19587		
5	**Federring / Spring washer**	13 33 941		
6	**Schraube / Screw**	13 31 922		
7	**Schraube / Screw**	12 63 196		
8	**Mutter / Nut**	12 67 515		
9	**Scheibe / Washer**	12 92 358		
10	**Blech / Sheet metal**	2M 19583		
11	**Bügel / Bracket**	2M 19582		
12	**Blech / Sheet metal**	2M 19576		
13	**Federring / Spring washer**	13 31 345		
14	**Kugellager / Ball bearing**	13 25 361		
15	**Schraube / Screw**	13 30 055		
16	**Puffer / Buffer**	68 00 478		
17	**Magnetverschluß / Magnetic lock**		**2M 19718**	
18	**Gehäuse, links (Ugr.) / Housing, left (subassembly)**	2M 19488		

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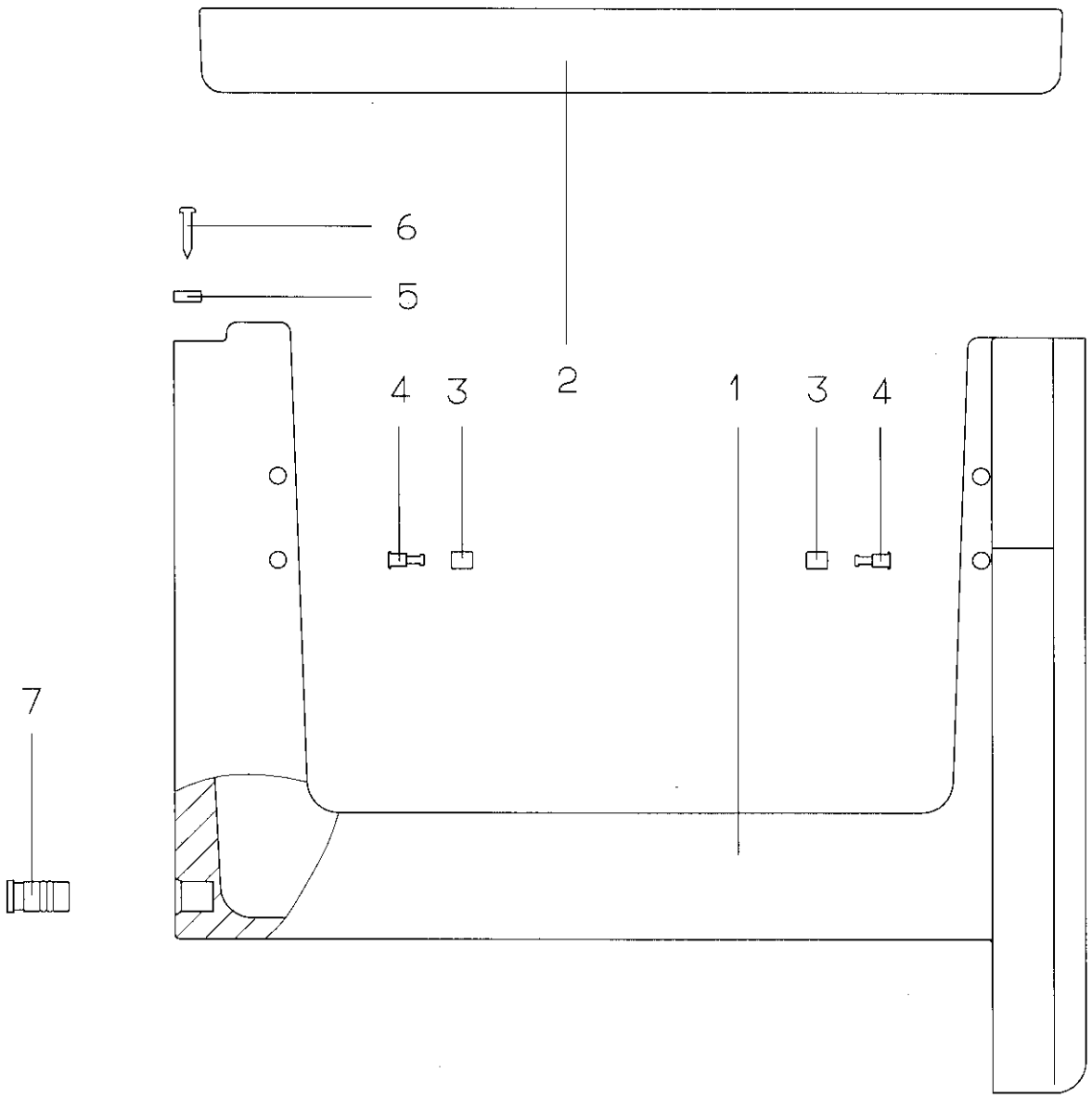
bestehend aus: consisting of: 35 Blatt/35 Sheets	Blatt Sheet 34



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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1-7	**Einschub, vollst. / Slide-in unit, complete**		**2M 19493**	
1	**Einschub / Slide-in unit, complete**	2M 19586		
2	**Einsatz / Inset**	2M 19584		
3	**Zapfen / Journal**	2M 19492		
4	**Puffer / Buffer**	2M 6342		
5	**Kugellager / Ball bearing**	13 25 361		
6	**Blechschraube / Sheet metal screw**	13 34 964		
7	**Magnetverschluß / Magnet lock**		**2M 19718**	

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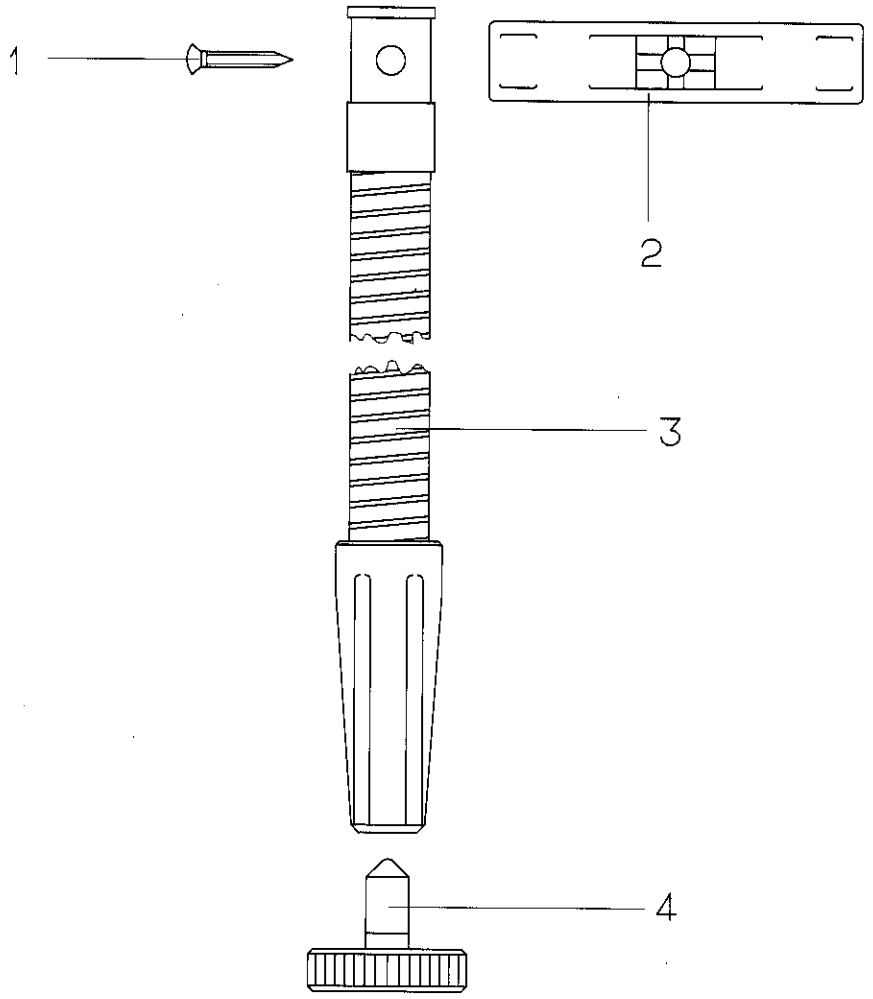

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Lfd. Nr. Cons. No.	**Benennung / Designation**	Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr.** **Order-No.**	Verp.-Menge Packing Qty.
1-4	**Schlauchhalter / Hose holder**			**2M 19630**	
1	**Schraube / Screw**	**1**	13 28 654	**84 06 138**	
2	**Schlauchklemme 2 / Hose clip 2**	**2**	84 04 761		
3	**Schlauchhalter, (Ugr.) / Hose holder (subassembly)**		2M 19670		
4	**Schraube / Screw**			**2M 15332**	

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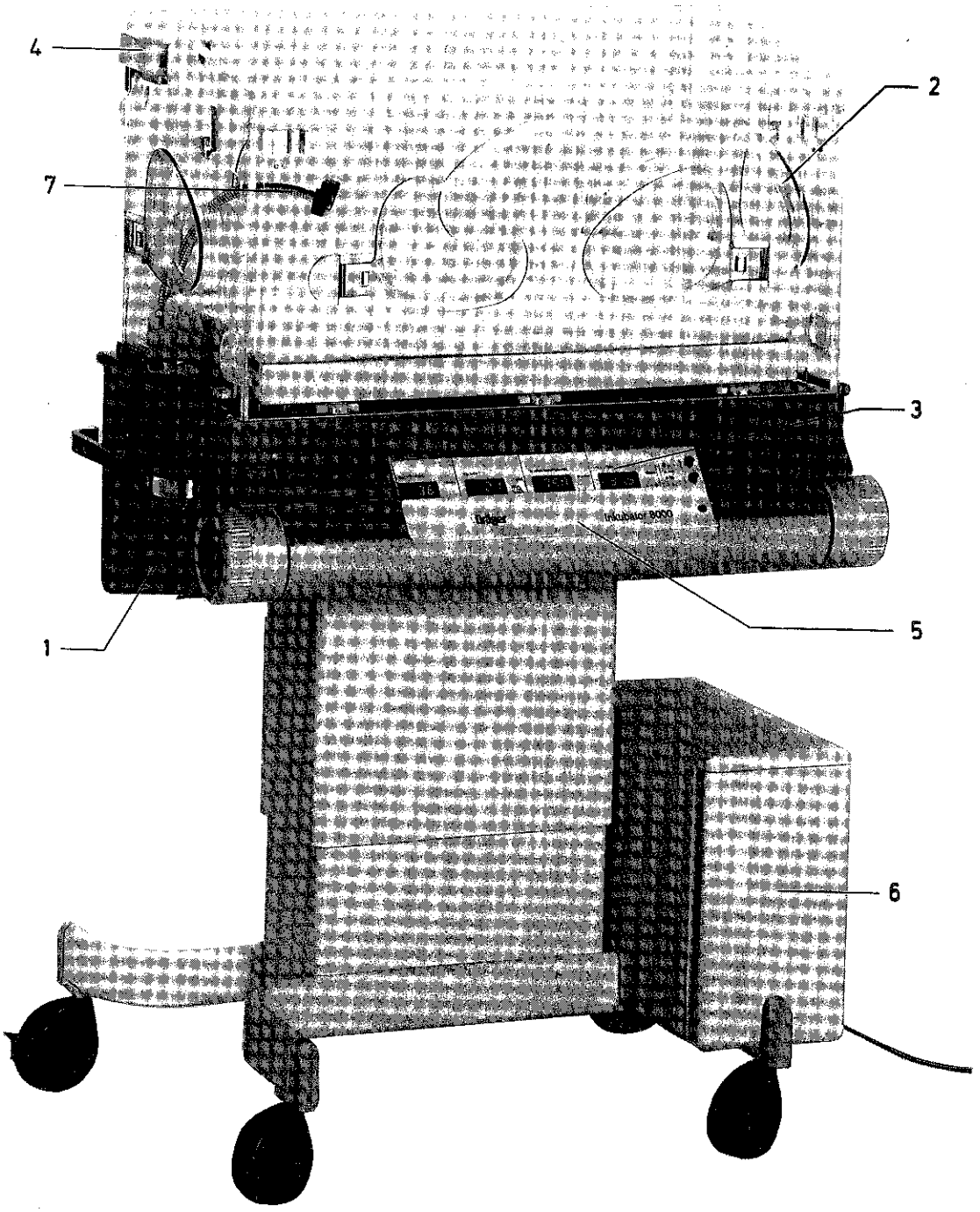

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Lfd. Nr. Cons. No.	**Benennung / Designation** Menge pro Sach-Nr. Qty per Item No.	Sach-Nr. Item-No.	**Bestell-Nr. Order-No.**	Verp.-Menge Packing Qty.
1	**Grundeinheit Inkubator 8000 V (siehe Blatt 2) / Basic incubator unit 8000 V (cf. sheet 2)**		**2M 19720**	
2	**Plexihaube, vollst. (siehe Blatt 13) / Plexiglass cover, complete (cf. sheet 13)**	2M 19540		
	Plexihaube mit Seitenöffnung (siehe Blatt 13) / Plexiglass cover with opening on side (cf. sheet 13)		**2M 19560**	
3	**Aggregate (siehe Blatt 17) / Units (cf. sheet 17)**			
4	**Sensor, vollst. (siehe Blatt 27-28) / Sensor, complete (cf. sheet 27-28)**		**82 00 910**	
	Sensor, vollst. (siehe Blatt 27-28) / Sensor, complete (cf. sheet 27-28)		**82 00 911**	
	Sensor, vollst. (siehe Blatt 27-28) / Sensor, complete (cf. sheet 27-28)		**82 00 912**	
	Sensor, vollst. (siehe Blatt 27-28) / Sensor, complete (cf. sheet 27-28)		**82 00 913**	
5	**Rüstsatz, deutsch (siehe Blatt 31) / Fittings, German (cf. sheet 31)**		**2M 19494**	
	Rüstsatz, englisch (siehe Blatt 31) / Fittings, English (cf. sheet 31)		**2M 19486**	
	Rüstsatz, franz. (siehe Blatt 32) / Fittings, French (cf. sheet 32)		**2M 19466**	
	Rüstsatz, spanisch (siehe Blatt 32) / Fittings, Spanish (cf. sheet 32)		**2M 19467**	
6	**Schrank, rechts (siehe Blatt 33) / Cupboard, right (cf. sheet 33)**		**2M 19580**	
	Schrank, links (siehe Blatt 33) / Cupboard, left (cf. sheet 33)		**2M 19480**	
7	**Schlauchhalter (siehe Blatt 35) / Hose holder (cf. sheet 35)**		**2M 19630**	

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