Metorex

December 15, 1999

Mr. U. S. Buachu
USNRC
Mailstop T8F27
11545 Rockville Pike
North Bethesda, MD 20852

Dear Sir;

I am writing in response to our telephone conversation on December 13, 1999, which was in response to my letter dated November 12, 1999 to Mr. Strutz.

Metorex will follow your suggestion and apply for a device registration for the SUPS probe and, once the approval is received, add it to our distribution license. I agree that this approach will be less complicated than trying to research the history and reconstruct the sequence of events which apparently lead to the SUPS being dropped from the registration. Metorex will proceed as quickly as possible to complete this application and I expect that we will be able to have the submission completed by January 15, 2000.

In response to your request for a list of the probes shipped, we have reviewed the files here and prepared the attached list of probes for which records exist and believe that this is a near complete list. However, this probe has been manufactured since before Metorex existed and it is possible that there are some units in the field for which we have no records.

If you have any further questions, please feel free to contact me at (609) 406-9000 x 122 or e-mail at John.Patterson@MetorexUSA.com.

Sincerely,

John I.H. Patterson, Ph.D.
President

JIHP/jlr
Enclosure

ATTACHMENT 2

ATTACHMENT 3

SUMMARY DATA

Name and Complete Mailing Address of the Applicant:
Metorex Inc.
Princeton Crossroads Corporate Center
250 Phillips Blvd., Ste. 250
Ewing, NJ 08618

Name, Title, and Telephone Number of the Individual to Be Contacted If Additional Information or Clarification Is Needed by the NRC:
John I.H. Patterson, R.S.O. / President
(609) 406-9000, ext. 122

The Applicant is (check one):

	Custom User
	Manufacturer
XX	Distributor
	Manufacturer and Distributor

If the Applicant Is Not the Manufacturer, Provide the Name and Complete Mailing Address of the Manufacturer:
Metorex International OY
Nihtisillankuja 5
P.O. Box 85
FIN-02631 ESPOO
Finland

If the Applicant Is a Custom User, Provide the Name and Complete Mailing Address of the Distributor:
N/A

Provide the Name, Complete Mailing Address, and Function of Other Companies Involved:
N/A

Model Number: SUPS 0484 & SUPS 2476

Principal Use Code (see Appendix F): U

Name Used by the Industry to Identify the Product (e.g., Radiography Exposure Device, Teletherapy Source, Calibration Source, etc.):
XRF Probe

For Use by:

	Specific Licensees Only
X	General Licensees Only
	Both Specific and General Licensees
	Persons Exempt from Licensing

Leak-Test Frequency:

	Periodic Leak-Testing is Not Required
X	6 Months
	Attached is justification for a leak test frequency of greater than 6 months

Principal Section of the 10 CFR that Applies to the User (e.g., General Licensees under 10 CFR 31.5): 10CFR31.5

Radionuclides and Maximum Activities (including loading tolerance):
Am-241 30mCi; Cm-244 60mCi

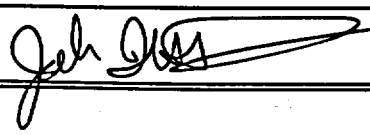
CERTIFICATION:

THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30 AND 32 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

Certifying Officer — Typed Name and Title
John I.H. Patterson Ph.D., R.S.O./President

Signature: 

Date: 1/14/00

CHECKLIST

Registration Certificate Holder: Metorex Inc.

Model: SUPS 0484 & SUPS 2476

DESCRIPTION	OK/DEF	COMMENTS
DESCRIPTION/CONSTRUCTION		
If registration certificate holder is requesting to register more than one source/device on a certificate, are designs similar enough to do so?	OK	Only different shutter activation.
Device/source design with complete engineering drawings (dimensions, tolerances, list of materials)	OK	
Assembly methods (screw, welds, etc.); verify integrity		
Source mounting (size and integrity) and security	OK	
Is source ANSI classification sufficient (from ANSI N542-1977): Radiography - Unprotected ..... 43515 Radiography - In Device ..... 43313 Medical - Radiography ..... 32312 Medical - γ Teletherapy ..... 53524 γ Gauges - Unprotected ..... 43333 γ Gauges - In Device ..... 43232 β Gauges, Low Energy γ Gauges, or X-ray fluorescence ..... 33222 Oil Well Logging ..... 56522 Portable Moist/Density ..... 43333 Neutron Applications ..... 43323 γ Irradiators (II, III, IV) ..... 43424 γ Irradiators (I) ..... 43323 Static Eliminators ..... 22222 Smoke Detectors 32222	OK	
Definition of shutter operation (locked in Off position, not locked in On position), Fail safe, spacing and tolerances	OK	
On-Off indicators (description, qty., location)	OK	
Safety interlocks, guards, etc. to prevent access to beam or high radiation levels	OK	
Corrosion between unlike materials (e.g., aluminum & steel, depleted uranium & steel, etc.)		
Shielding efficiency and integrity		
For medical devices: Was a 510(k) provided? (provide written notification to FDA)		
Well logging sources must be nondispersible and nonsoluble. (see Appendix B for a list of approved well logging sources as of November 1991)		
See "ANSI and Other Standards" list for references for particular source/device designs (e.g. radiography, Brachytherapy, etc.)		

CHECKLIST

Registration Certificate Holder: Metorex Inc.

Model: SUPS 0484 & SUPS 2476

DESCRIPTION	OK/DEF	COMMENTS
LABELING		
Copy of label	OK	
Materials, dimensions, colors (note on registration certificate if labeling is exempt from the color requirements of 10 CFR Part 20)	OK	
Permanent attachment and location(s) - visible to users?	OK	
Contents: Model#, Serial#, Isotope, Activity, Manufacturer, Date of Assay, Trefoil, "CAUTION - RADIOACTIVE MATERIAL" (Depleted Uranium information must be included)	OK	
CONDITIONS OF USE		
Expected working life of the source/device (years, operations)	5-10	
Actions to be taken when product reaches end of its working life.	OK	Return to manufacturer
Maximum allowable temperature, vibration, shock, corrosion, etc. (during use, handling, storage, and transport)	OK	
How the device will be used	OK	
Meets dose limits of Part 32 for distribution general licensees or persons exempt from licensing	OK	
PROTOTYPE TESTING/HISTORICAL USE		
Tests methods and conditions (for source and device)	OK	
Tests results	OK	
Years of use (incidents, failures, etc.)	OK	
Similarities to other sources/devices if they are used as basis.	OK	
RADIATION PROFILES		
Survey instrument used (type, window thickness, sensitivity, etc.)	OK	
Conditions: including environments, scatter (product in beam), and use of guards and shields	OK	
Distance from source/surface (per ANSI 538-1979)	OK	
Shutter Open and Closed/Source Shielded	OK	
Verify radiation surveys for γ radiation meet inv^2 law.	OK	
Verify radiation surveys for non-γ radiation have not been calculated using inv^2 law.		

CHECKLIST

Registration Certificate Holder: Metorex Inc.

Model: SUPS 0484 & SUPS 2476

DESCRIPTION	OK/DEF	COMMENTS
QUALITY ASSURANCE		
Materials, subassemblies, services	OK	
Assembly methods (screws, welding, etc.)		
Dimensions and tolerances		
Activity, radiation levels, leak tests		
QA Manual and comparison of manual to Regulatory Guide 6.9		
INSTALLATION		
Fixed, portable, movable, fixed installation but portable source housing	OK	
Inherent shielding, inaccessibility		
Beam access: size of air gap/opening to beam and use of interlocks, locks, additional shielding or barriers		
Mounting integrity		
SAFETY INSTRUCTIONS		
Operation, maintenance, calibration, damage/failure, specific warnings, leak test, and radiation surveys	OK	
ACCOMPANYING DOCUMENTATION		
Leak tests results and radiation surveys	OK	
Transportation documents	OK	
Operation, maintenance, calibration, damage/failure, specific warnings, leak test, and radiation survey instructions if applicable	OK	
For Distribution to General Licensees: Verify NRC Regions and Agreement State listing is up-to-date and copies of all pertinent regulations	OK	

January 14, 2000

X-MET PROBE SUPS 0484 & SUPS 2476

1. PRACTICAL SAFETY ASPECTS IN THE USE OF THE SUPS PROBE

The SUPS probe contains one radiation source. The probe must be used by only a person who have been trained to operate the probe so that they do not cause radiation danger to themselves or to the nearby people.

When the probe is not used it must be stored in a safe place where no unauthorised person can handle it.

should be: installed, removed, replaced

The radiation source must changed only by authorised persons.

The labels on the probe must not be removed or covered.

If there is any doubt that the shutter has remained open it is necessary to take a look at the shutter using a mirror. If the shutter has not fully covered the source the measuring window must be covered by at least 1 mm. thick lead plate and the probe must be sent for repair.

2. GENERAL DESCRIPTION OF THE SUPS PROBE

X-Met is an X-ray fluorescence analyser where the excitation source is either a radionuclide or an X-ray tube. SUPS is one of the radionuclide excited probes. Photographs 1 and 2 (on pages 9,10) and Figure 1 (p12) show the probe. These probes are meant only for surface measurements. The probe has one radioactive source that is located in the middle of the bottom part of the probe.

In the SUPS 0484 probe, pushing the probe against the sample opens the shutter. This causes the button on the bottom of the to move the shutter and expose the source. The measurement can not start unless the shutter is fully open. This action engages a microswitch which starts the measurement. In the SUPS 2476 probe pressing the probe against the sample releases the shutter interlock. Pressing the button on the handle opens the shutter electronically and starts the measurement. The measurement is stopped either by the clock after the pre-set time has elapsed or when the probe is lifted from the sample enough that the shutter starts to close. Lifting the probe from the sample makes the retracting spring turn the shutter to the closed position. The measurement result is shown in the display of the main unit.

To keep the spectral stability good a reference sample that is glued to the shutter is measured when the shutter is closed. The position of the shutter/reference is sensed by microswitches.

A light in the handle indicates by green color that the shutter is closed and the probe is not ready for the measurement and by red color that the shutter is open and the measurement is in progress. If this light turns green during the measurement due to lifting of the probe, the measurement is interrupted and must be started anew after adjusting the position of the probe properly. If the light remains red when the probe is lifted, the shutter is not completely closed and corrective action is required.

When not in use the probe is stored on a the calibration base having a properly positioned hole for the push button of the probe to prevent accidental opening of the shutter.

3. RADIATION SOURCES

The sources for these probe are manufactured by Amersham International plc (UK). The Am-241 source used is a 30 mCi Type AMC.D2 capsule type X.10/2 which achieved a classification of C44344 based on the ANSI guide N542-1977. The Cm-244 source used is a 60 mCi Type CLCL capsule X.130/7 which achieved a classification of C64545. Attached are the registrations for the AMC.D2 Americium source starting on page 35 and the CLCL Curium Source starting on page 39. The minimum requirement set for the radiation source of an XRF analyzer is C33222 and thus all the above sources fulfill this requirement.

The radiation profile of the SUPS probe are enclosed beginning on page 43.

4. WARNING LABELS

The probe is equipped with warning label(s) bearing the radiation symbol and giving the name of the nuclide of the source, its activity and the date of the measurement of the activity (see Label 2, p11) which is placed on the right side of the probe (shown in photograph 1 without the labels). In addition the label has the text required for a Generally Licensed device (see Label 1, p11) which is placed on the top of the probe (directly below the handle). The probe is also marked with the type of the equipment and the name of the manufacturer.

5. CONSTRUCTION OF THE PROBE

5.1 General construction

Figure 1 (p12) shows in 3 projections of the probe. It is a simple box having a handle and on the bottom a round plate protruding from the box. In this round part there is a window covered with a Mylar film and somewhat off center, a push button that operates the

shutter located behind the window. Behind the shutter there is the radiation source just in front of the detector window. The detector is a cylindrical proportional counter. Above these parts, in a separate compartment, are the electronic circuits necessary for the probe. The main analyzer (not shown here) contains most electronics such as the power supplies and data handling electronics. Figure 1A (p13) shows the Calibration Base for the unit. This base is machined so that the probe easily fits into the base and aligns with the center hole. For calibration, a standard is placed in the center well and the probe is places so that the shutter opens. For storage, the probe should be placed the opposite direction on the plate where the shutter button will fit into the hole to prevent the shutter from opening.

5.2 Constructional details

Figures 2-4 (p 14-16) present the two (2) covers and the frame between them. Almost all the components are fixed to this frame. The electronic circuits attach to one side of the frame and the detector and the other components directly related to radiation to the other side. The detector is fixed with part 16 in Figure 1 (p12). The radiation source (part 20) is fixed first to the source holder with a seger ring (part 18) and the source holder (Figure 16, p 30) is attached with two (2) screws (part 27) to the same part that holds the detector (part 16). On top of this comes the measurement base shown in Figure 5 (p17). When Cover 1 is fixed with four (4) screws (part 24 in figure 1) to the frame the radiation is limited to the compartment between these two parts.

The measurement base and its components are shown in Figures 5-15 (on p 17-29). The aluminium mounting base (Figure 6, p18) is lined on the inside with lead for radiation shielding and those parts of lead that could give disturbing fluorescence radiation to the detector are covered with thin iron and aluminium plates. The shutter comes as close to the cover and correspondingly the source as close to the shutter as possible. Microswitches S1 and S2 sense the position of the shutter. The window of the probe is covered with a mylar foil to prevent dust and humidity from getting into the probe.

Figure 12 (p 24) shows the shutter mechanism for the SUPS 0484 probe. Figures 12A and 12B (p 25,26) are photographs of a shutter assembly to illustrate the motion. When the probe is pushed against the sample part 15 in the upper drawing of Figure 12 moves upwards and the top of the long rod (part 14) moves to the left, this causes the shutter to open. The top end of the rod pushes the oblique (see the lower drawing) edge belonging to plate 2 making the plate turn to the left. Both the lever and the plate are spring-loaded and they will close the shutter when the push button is released. The radiation is stopped by parts shown in Figures 13-15 (p 27-29). These parts are glued on top of each other to the area 12 in Figure 12 (p24).

Figure 20 (p 34) illustrates the construction of the SUPS 2476 probe. The main assembly, the detector and source are identical to the SUPS 0484 probe. The compisition of the shutter is also the same as in the SUPS 0484 probe. The shutter activation mechanism is the only difference. In the SUPS 2476 probe, the shutter interlock pin

releases the safety interlock. This allows the rotary solenoid to rotate the shutter assembly when the button on the handle is pressed. The shutter is spring loaded so that a failure of the solenoid will immediately close the shutter. If the probe is lifted during operation, the safety interlock interrupts the power to the shutter, thus closing the shutter. In this probe the light will glow green only when the shutter is closed completely.

Figures 17-19 (p 31-33) show the steel plates that cover the electronic circuits and at the same time improve the radiation shielding upwards. Cover 2 (Figure 4, p 16) closes the whole box.

6. CONDITIONS OF USE

The SUPS probe is normally used in indoor settings, however, occasionally it is used as a portable field device. It is operated in conjunction with an electronic analyser such as the Metorex 880 or the earlier 840. Thus, the environment will in general be quite mild. The unit may be operated between 0°C and +60°C. It may be stored at temperatures from -40°C and +85°C. The major mechanical stress will be vibration during shipment and possible transport by the user prior to use.

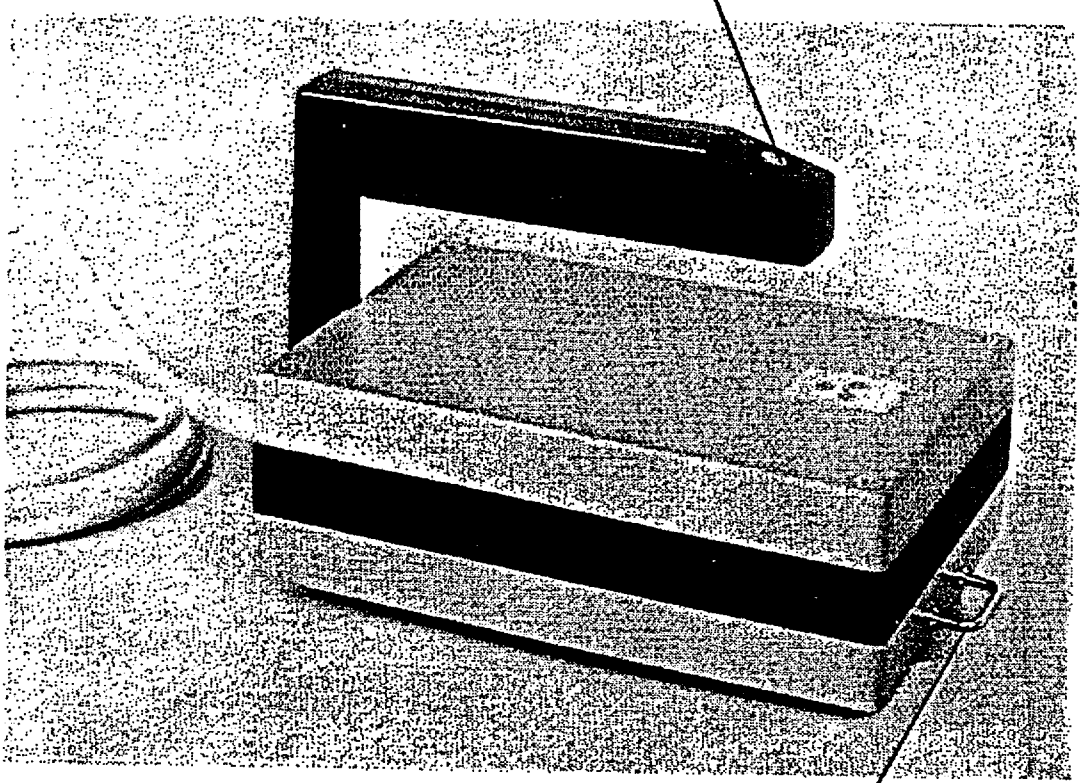
7. PROTOTYPE TESTING

A total of approximately 11 SUPS (mostly of the 0484 probe) were sold in Europe in the early 1980's and 17 SUPS probes (mostly of the 2476 probes) were sold in the United States in the 1980's and 1990's. If we assume that the average useful life was 5 years (a very conservative estimate), this represents a total operational history of 140 years. There are no known cases in which the probe failed is such a way to generate radiation in excess of the values shown in the attached radiation profiles. The shutter failures that have occurred have been with the shutter jammed in the closed position.

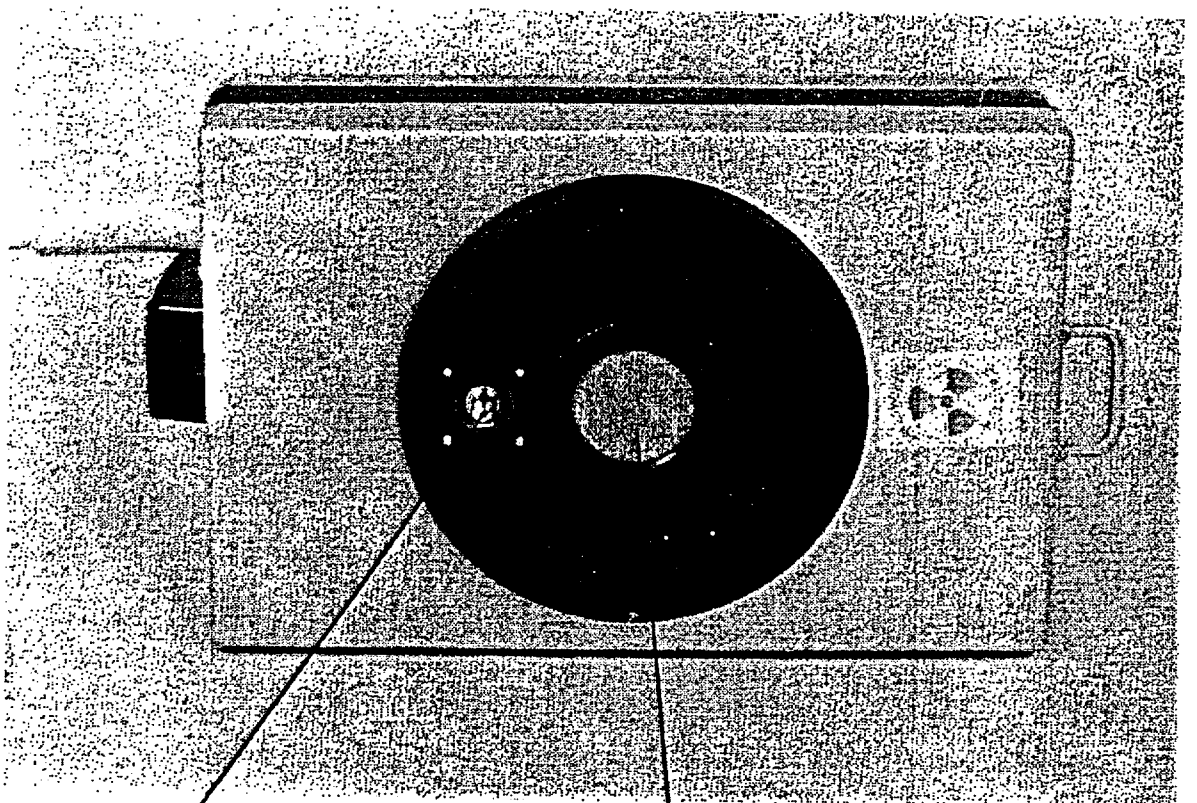
8. QUALITY ASSURANCE

?

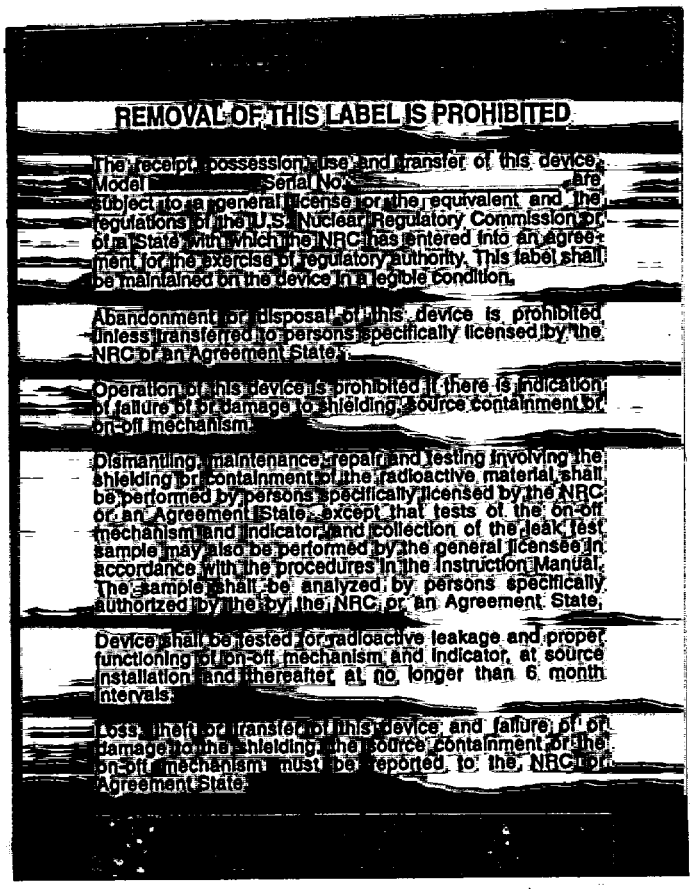
The SUPS probes are manufactured by Metorex in compliance with the ISO 9001 certification. When they are received at Metorex Inc. the unit is tested for operation, integrity of construction and assembly, accuracy of the paper documentation and analytical performance. The record (Technical Passport) of the instrument is maintained by Metorex Inc. Any deficiencies in the analyzer construction or operational performance are corrected if feasible, or the probe is returned for repair.



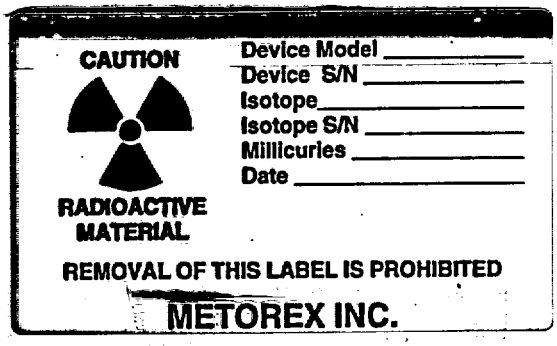
Photograph 1 Surface probe.



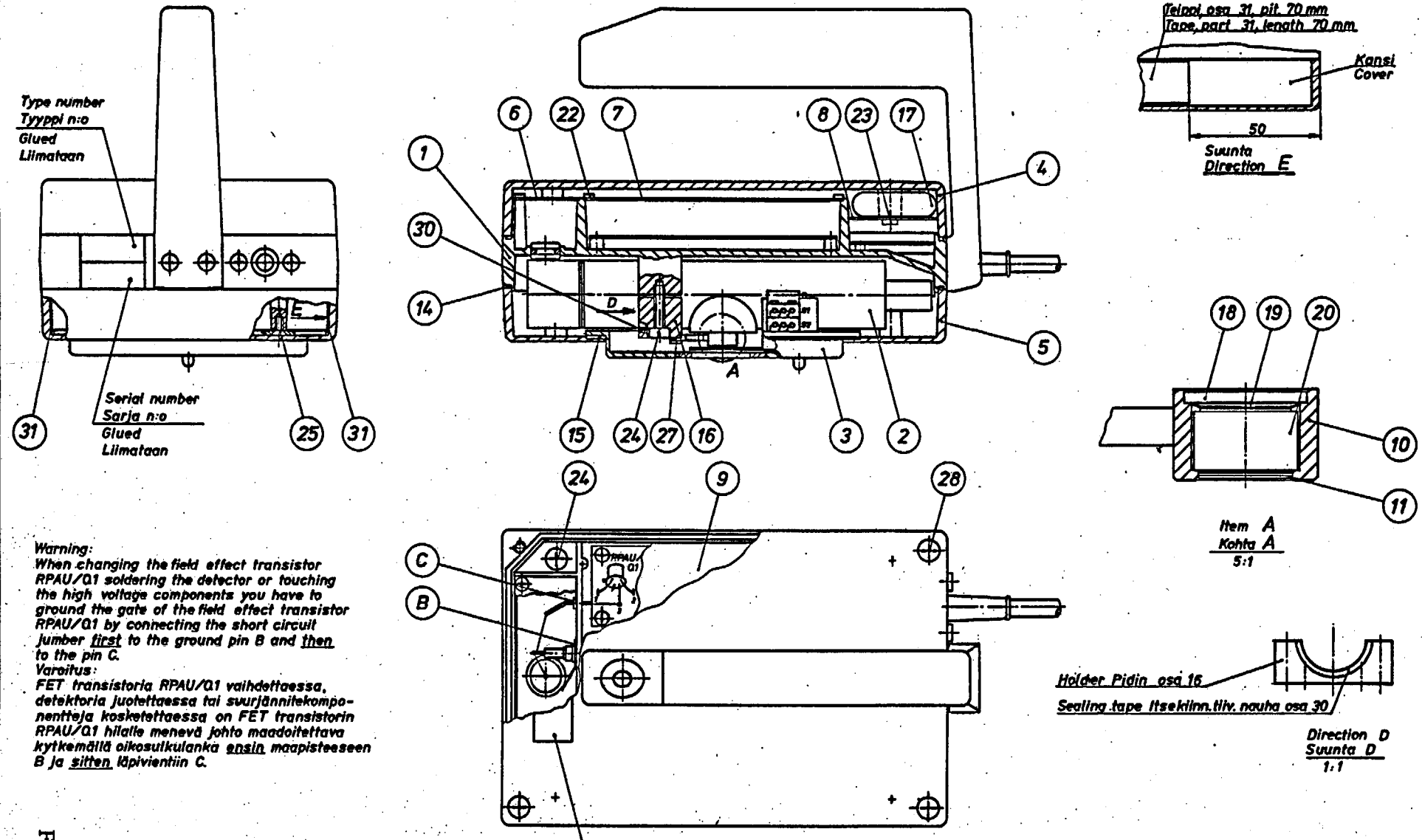
Photograph 2 Bottom of surface probe.



Label 1



Label 2



Warning:
When changing the field effect transistor RPAU/Q1 soldering the detector or touching the high voltage components you have to ground the gate of the field effect transistor RPAU/Q1 by connecting the short circuit jumber first to the ground pin B and then to the pin C.

Varoitus:
FET transistoria RPAU/Q1 vaihdettaessa, detektoria juotettaessa tai suurjännitekomponentteja kosketettaessa on FET transistorin RPAU/Q1 hilalle menevä johto maadoitettava kytkemällä oikosulkulanka ensin maapisteeseen B ja sitten läpivientiin C.

Figure 1

9003	RM		Poisteltu osat 12,13,21	c
8306	LV		Lisätty osa 31	b
8201	LV		Lisätty osa 30	a

		8003 JOH	8003 SLM
1:1[5:1]	X-Met	3811 841-40	
OUTOKUMPU OY EBPOD FINLAND	SUPS 0484		
	Surface Probe Set	3811 858 - 2KE	

JS. -1- 2000

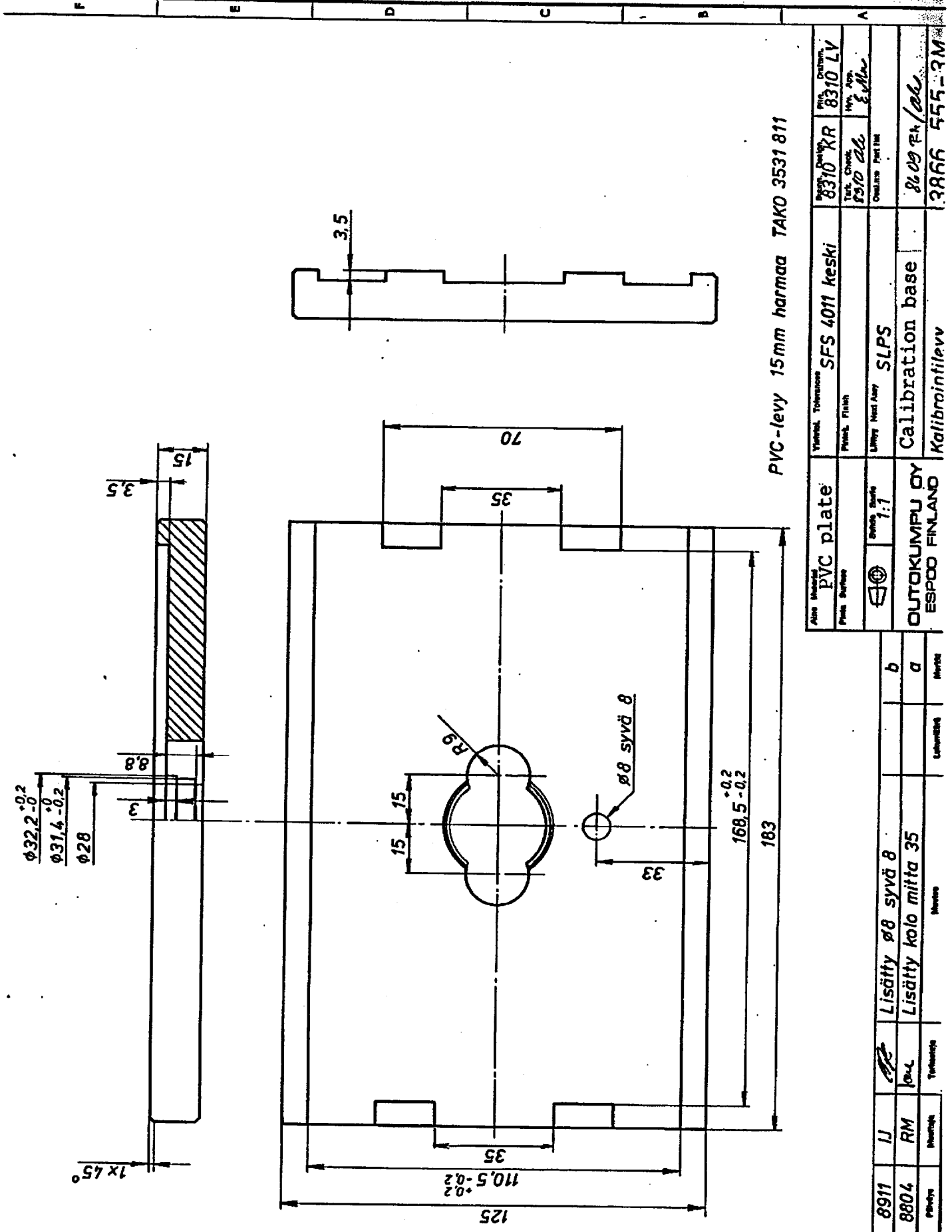
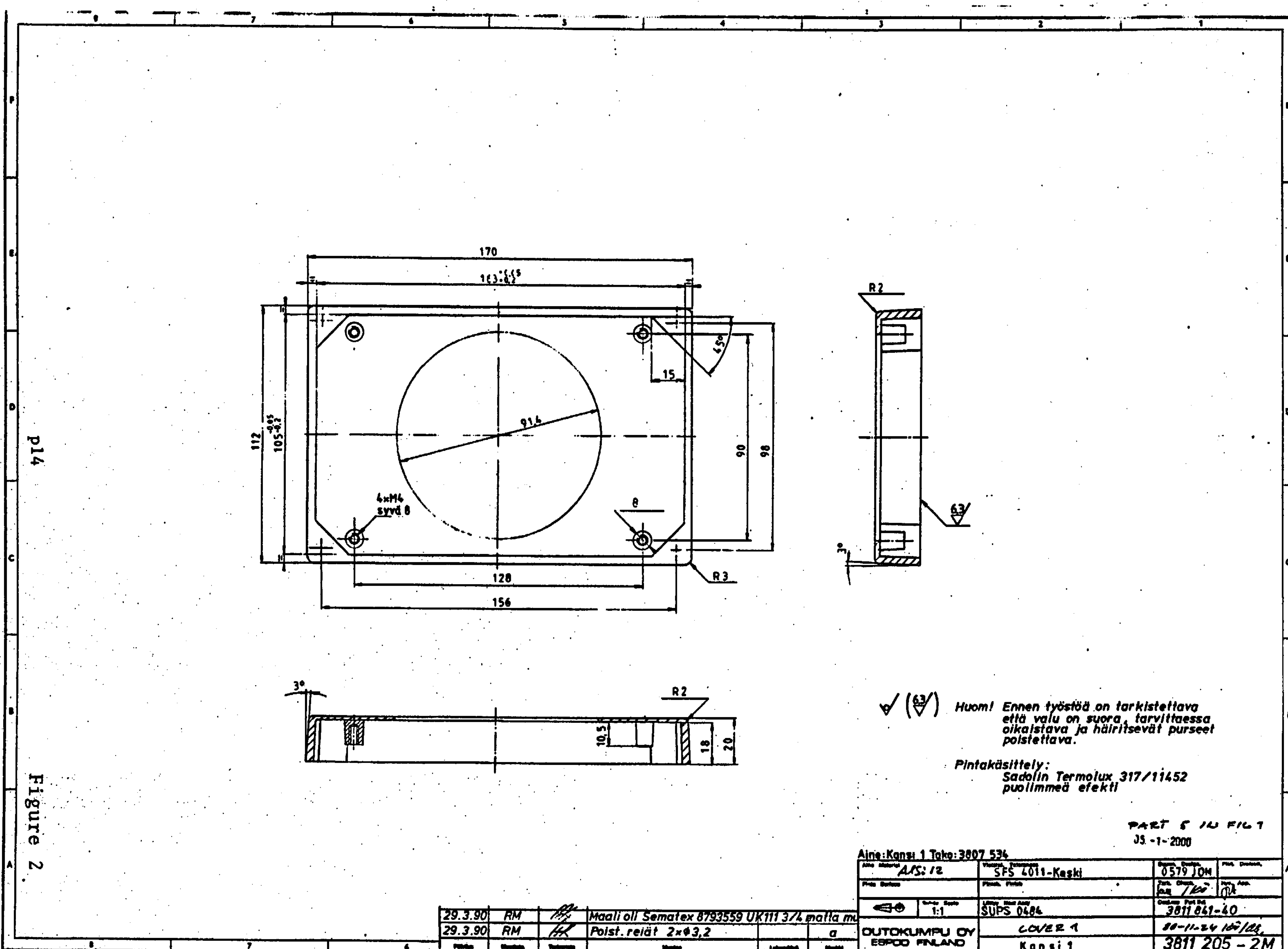

3,5
PVC-levy 15mm harmaa TAKO 3531 811
70
35
15
3,5
8,8
3
ø32,2 +0,2 -0
ø31,4 +0 -0,2
ø28
1x 45°
R9
ø8 syvä 8
15
15
33
168,5 +0,2 -0,2
183
35
110,5 +0,2 -0,2
125
PVC plate
SFS 4011 keski
SLPS
1:1
Calibration base
OUTOKUMPU OY
ESPOO FINLAND
Kalibrointilevy
8310 KR
8310 LV
8911
8804
IJ
RM
Lisätty ø8 syvä 8
Lisätty kolo mitta 35

Figure 1A

p14

Figure 2



170
112
105
4xM4
syvd 8
91,4
15
45°
90
98
8
128
156
R3
R2
6,3
3°
10,5
18
20
Huom! Ennen työstöä on tarkistettava
että valu on suora, tarvittaessa
oikaistava ja häiritsevät purseet
poistettava.
Pintakäsittely:
Sadolin Termolux 317/11452
puolimmeä efekti
PART 5 IN FIG 1
J5 -1- 2000
Aine: Kansi 1 Toko: 3807 534
A/S: 12
SFS 4011-Keski
0579 JOM
1:1
SUPS 0484
3811 841-40
OUTOKUMPU OY
ESPOO FINLAND
COVER 1
Kansi 1
3811 205 - 2M
29.3.90 RM Maali oli Sematex 8793559 UK111 3/4 matta
29.3.90 RM Poist. reiät 2xφ3,2 a

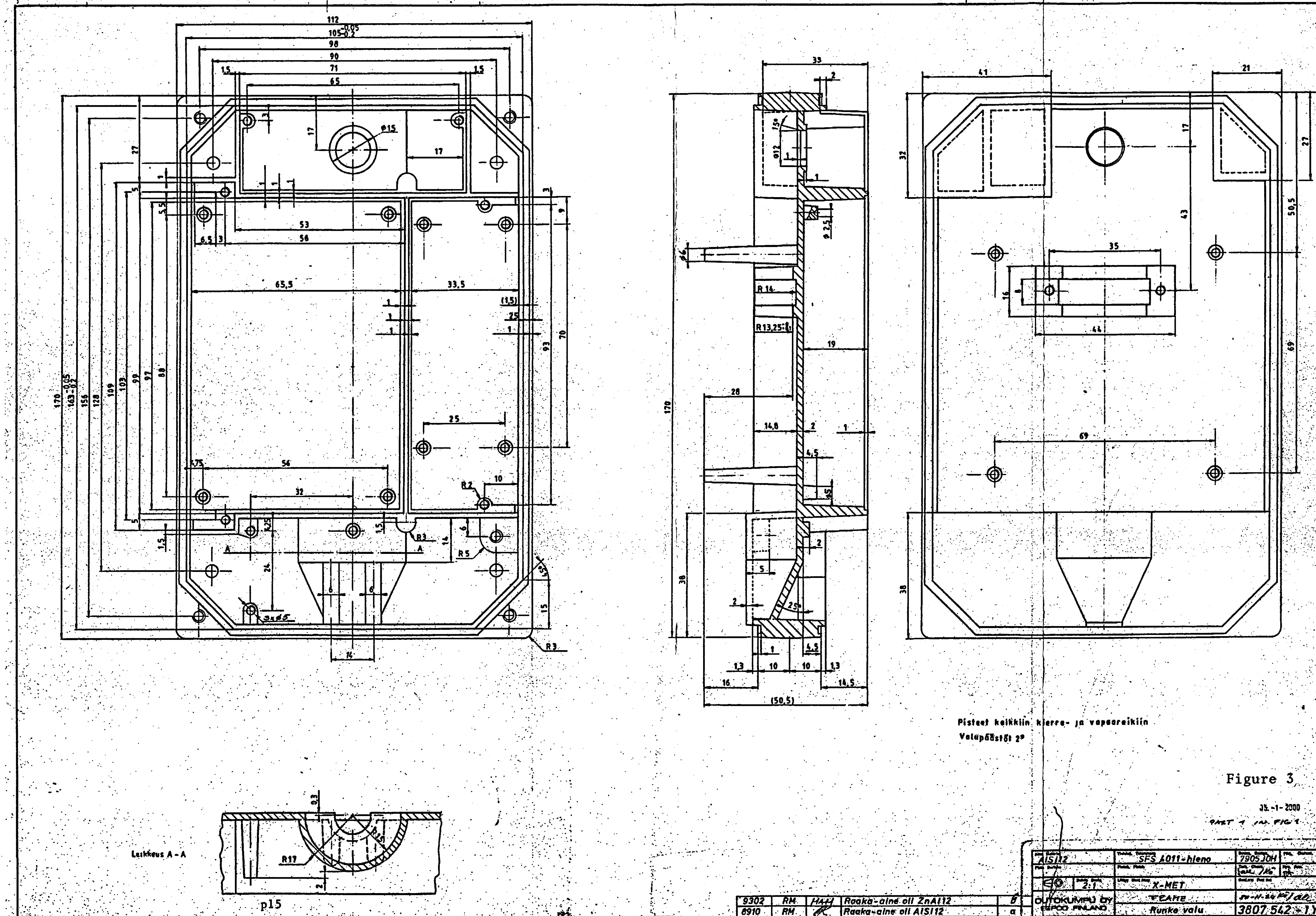
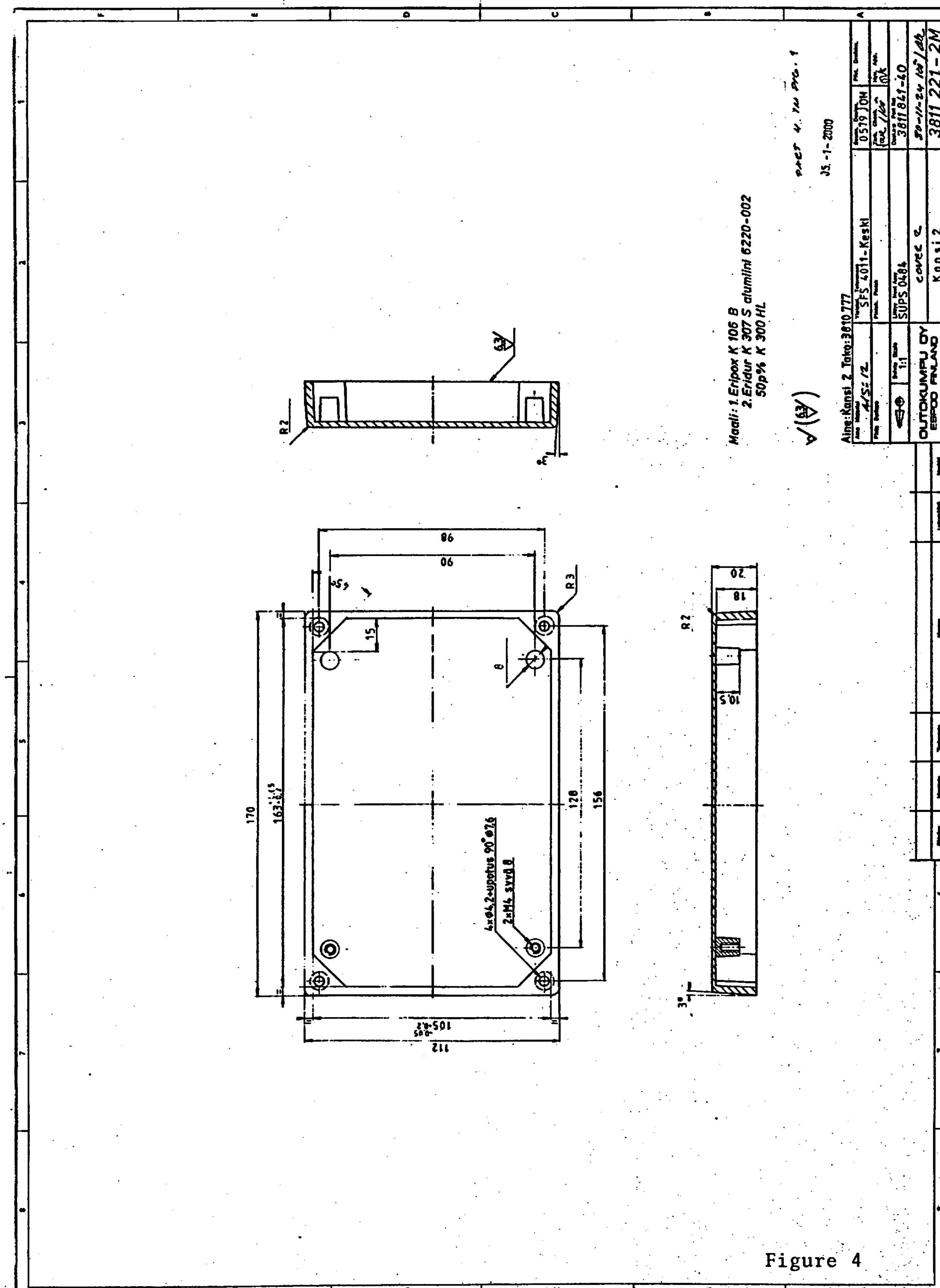

Leikkaus A - A
Pisteet kaikkiin kierre- ja vapaareikiin
Valupäästöt 2°
AlSi12
SFS 4011-hieno
2:1
X-MET
FRAME
Runko valu
OUTOKUMPU OY ESPOO FINLAND
3807 542-1Y
9302 RM Raaka-aine oli ZnAl12
8910 RM Raaka-aine oli AlSi12
25-1-2000

Figure 3



Maali: 1. Eripox K 106 B
2. Eridur K 307 S alumiini 6220-002
50p% K 300 HL
Aine: Kansi 2 Tako: 3810 777
SFS 4011-Keski
SUPS 0484
cover 2
Kansi 2
OUTOKUMPU OY
ESPOO FINLAND
3811 841-40
3811 221-2M
4xØ4,2-upotus 90°Ø7,6
2xM6 syvä 8
170
112
98
90
156
128
R 2
R 3

Figure 4

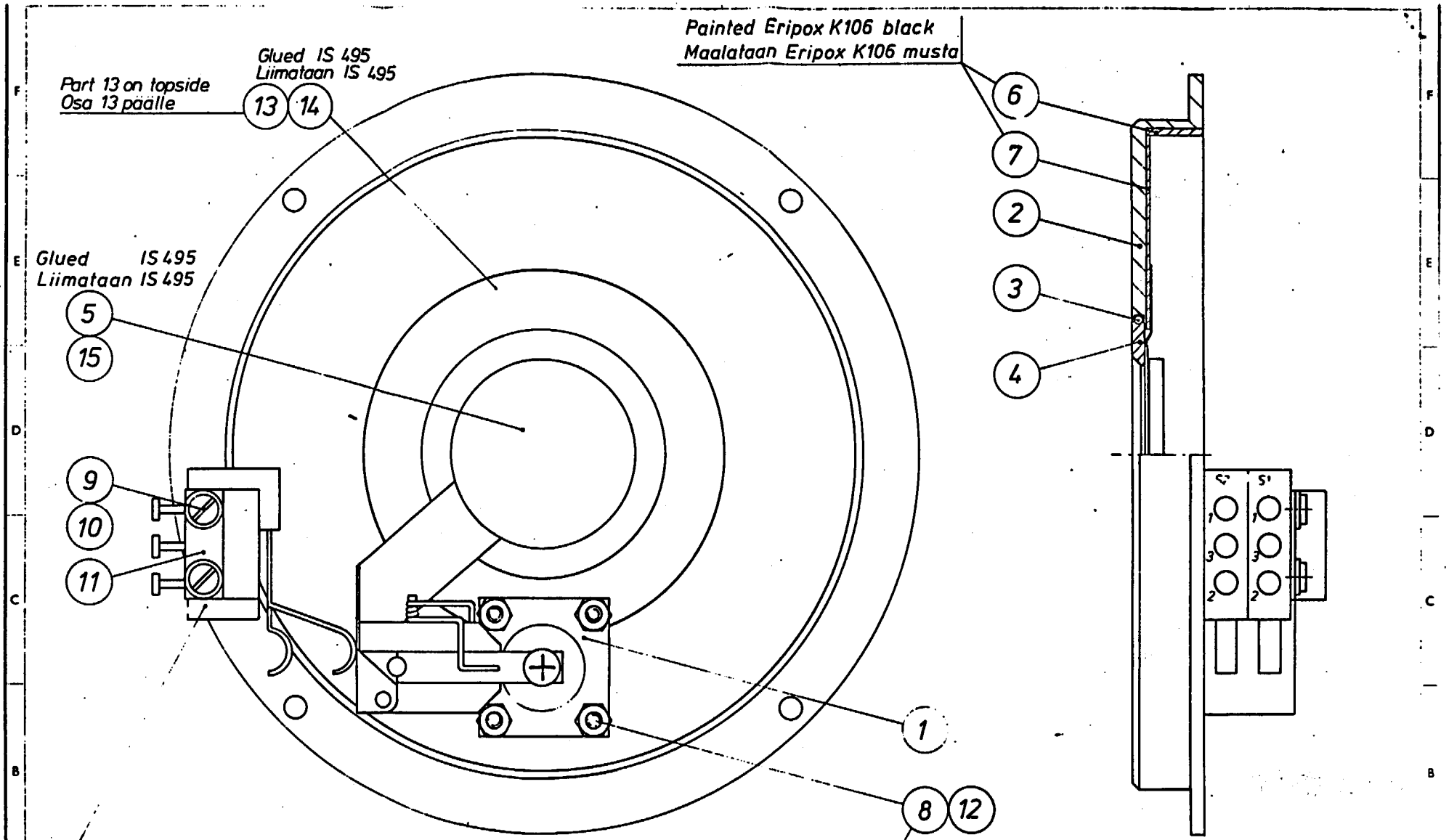


Figure 5

Adjustment instructions:
Viritysohje:
S2 is switched on when the shutter is going away from the front of the window.
S2 kytkee kun suljin poistuu ikkunan edestä.
S1 is switched on when the shutter is in front of the window.
S1 kytkee kun suljin on ikkunan edessä.

Päiväys	Muuttaja	Tarkastaja	Muutos	Luitunnäre	Merkki
830322	jkel		Lisätty osat 13, 14 ja 15		
81C4	LV	12 8109	Lisätty osat 8 ja 12		a

Aine Material	Yleistol. Tolerances	Suunn. Design 8004 JOH	Piirt. Drafts. 8004 alm
Pinta Surface	Pinnoit. Finish	Tark. Check	Hyv. Apo
Suhde Scale 2:1	Liittyy Next Assy SUPS 0484	Osal.no Part list 3812 229-40	
OUTOKUMPU OY ESPOO FINLAND	Measurement base 13.-4-1983		3812 237– 3KE

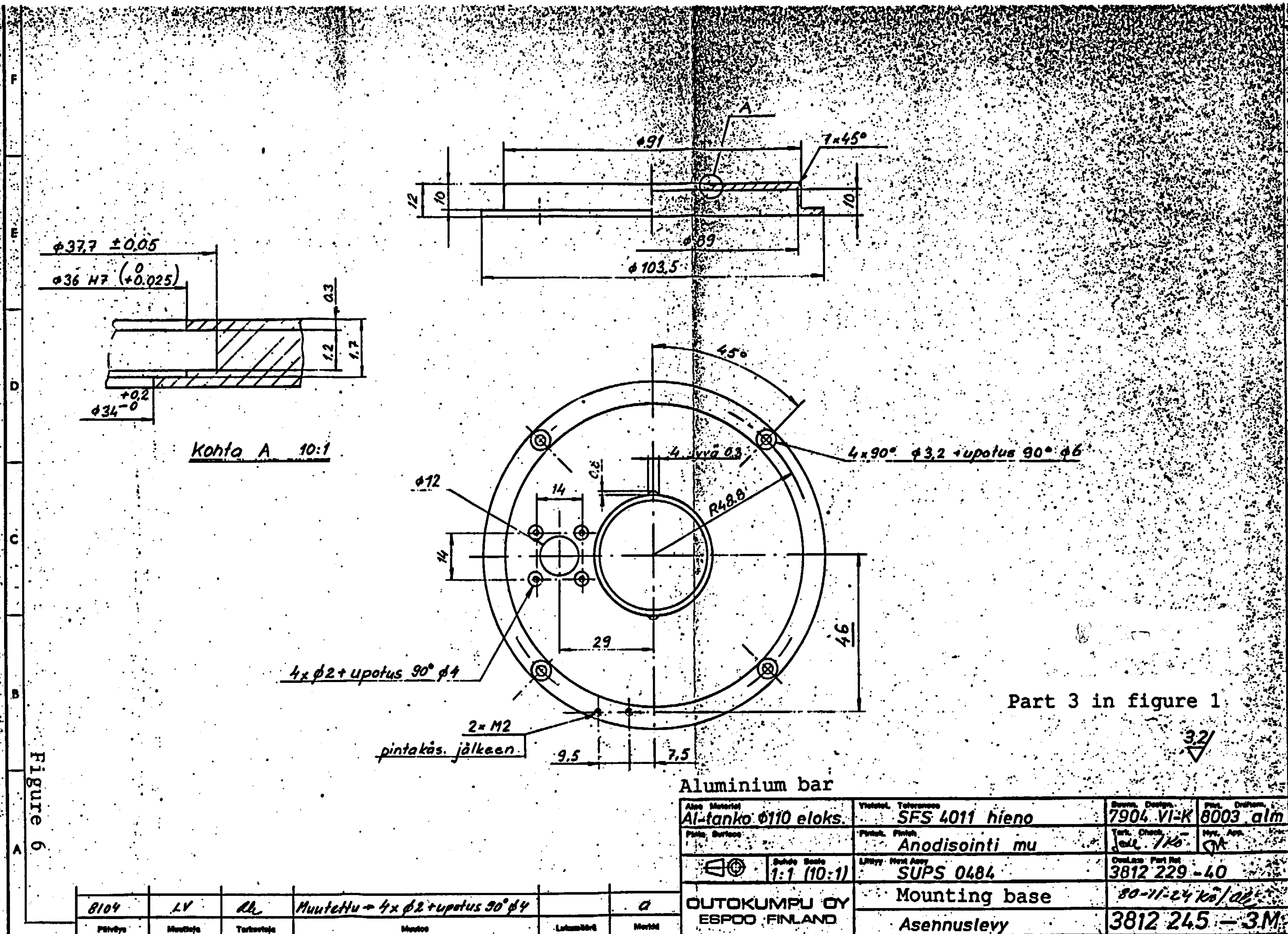

Part 3 in figure 1
Aluminium bar
Kohta A 10:1
φ37,7 ±0,05
φ36 H7 (0 / +0,025)
φ34 +0,2 / −0
φ91
φ89
φ103,5
7x45°
4x90° φ3,2 + upotus 90° φ6
4x φ2 + upotus 90° φ4
2x M2
pintakäs. jälkeen
R48,8
45°
φ12
Al-tanko Φ110 eloks.
SFS 4011 hieno
Anodisointi mu
1:1 (10:1)
SUPS 0484
Mounting base
Asennuslevy
OUTOKUMPU OY
ESPOO FINLAND
7904 VI-K
8003 alm
3812 229 -40
3812 245 - 3M
8104
LV
Muutettu → 4x φ2 + upotus 90° φ4

Figure 6

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki

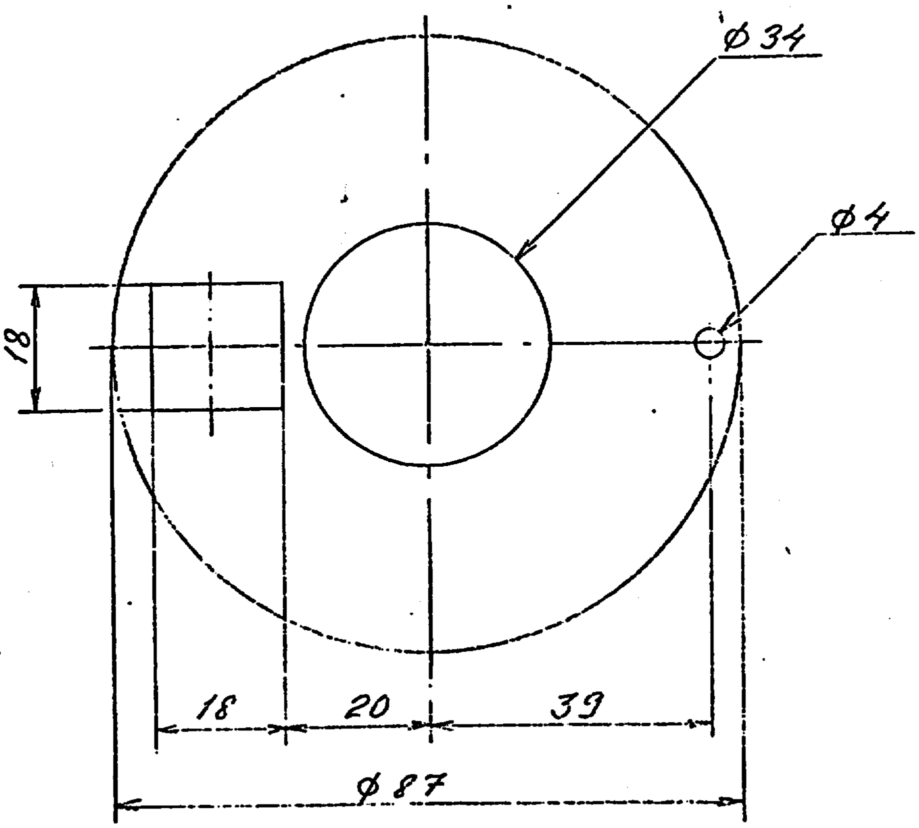


Figure 7

Part 7 in figure 5

1981 -02- 10

Aine: Lyijylevy 0,5mm Tako: 3017 464

Aine Material: Lead plate 1mm	Toleranssit Tolerances: SFS 4011-Keski	Suunn. Design.: 8006JOH	Piirt. Drafstm.: 8006SLM
Pinta Surface	Pintak. Finish	Tark. Check.	Hyv. App.
Suhde Scale: 1:1	Liittyy Next Assy: SUPS 0484, HEPS 0482	Osaluo Part list	
OUTOKUMPU OY ESPOO FINLAND	Säteilysuojalevy Radiation shield plate	80-11-24	3812 815 - 4M

4		3	2	1	
Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki

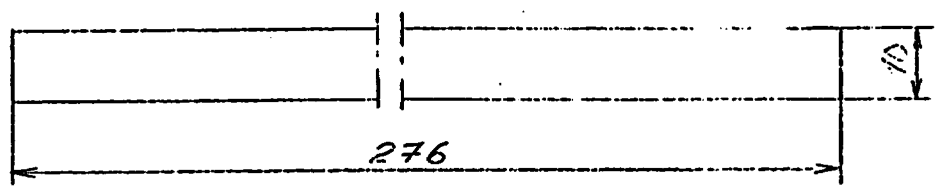


Figure 8

Part 6 in figure 5

1981 -02- 10

Aine: Lyijylevy 1mm Tako: 1082 080

Aine Material Lead plate 1mm	Yleistol Tolerances SFS 4011-Keski	Suunn. Design. 8006JOH	Piirt. Drafstm. 8006SLM
Pinta Surface	Pintak. Finish	Tark. Check Jau / Kö	Hyv. App. GR
Suhde Scala 1:1	Liittyy Next ass'y SUPS 0484, HEPS 0482	Osal.no Part list	
OUTOKUMPU OY ESPOO FINLAND	Säteilysuojavaippa Radiation shield strip	80-11-24 Kö/AA 3812 823 - 4M	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki

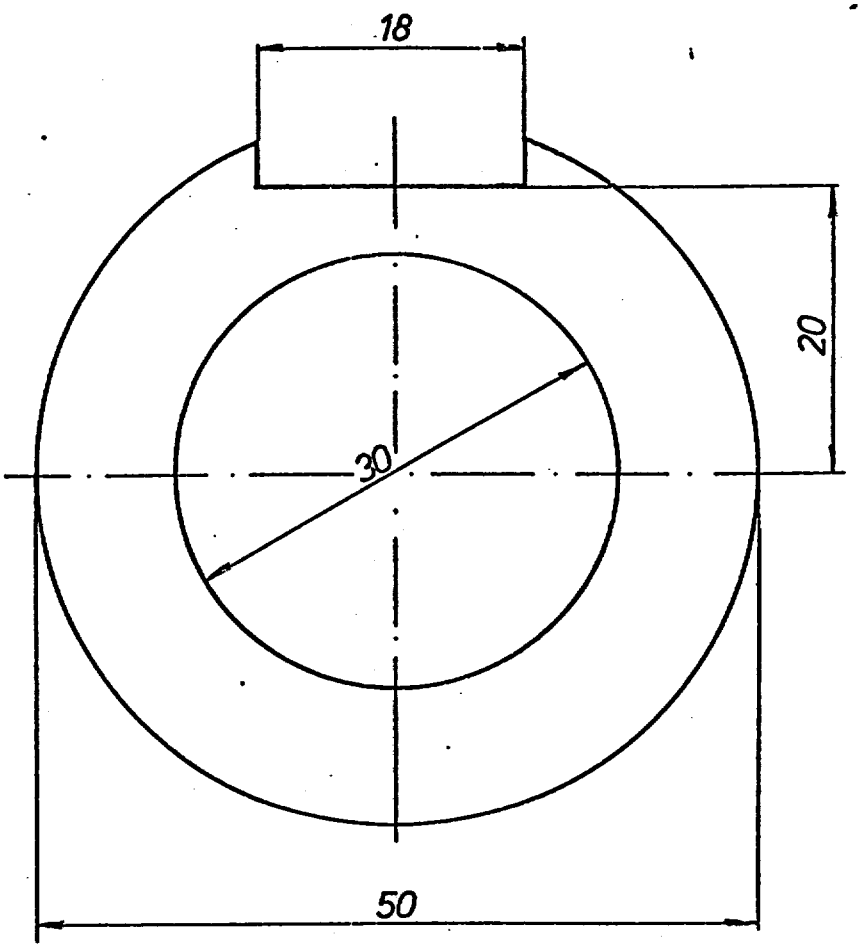


Figure 9

Part 14 in figure 5

Tako 3047 966

Aine Material: Fe S=0,075	Yleistol. Tolerances: SFS 4011 Keski	Suunn. Design.: 8210 JOH	Piirt. Draftsm.: 8303 ikl
Pinta Surface	Pintak. Finish	Tark. Check.: [illegible]	Hyv. App.
Suhde Scale: 2:1	Liittyy Next Assy: SUPS 0484	Osat.n:o Part No.: 3812 229-40	
OUTOKUMPU OY ESPOO FINLAND	Rajoitin 1 Limiter 1		
	13.-4-1983		3865 045-4M

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki

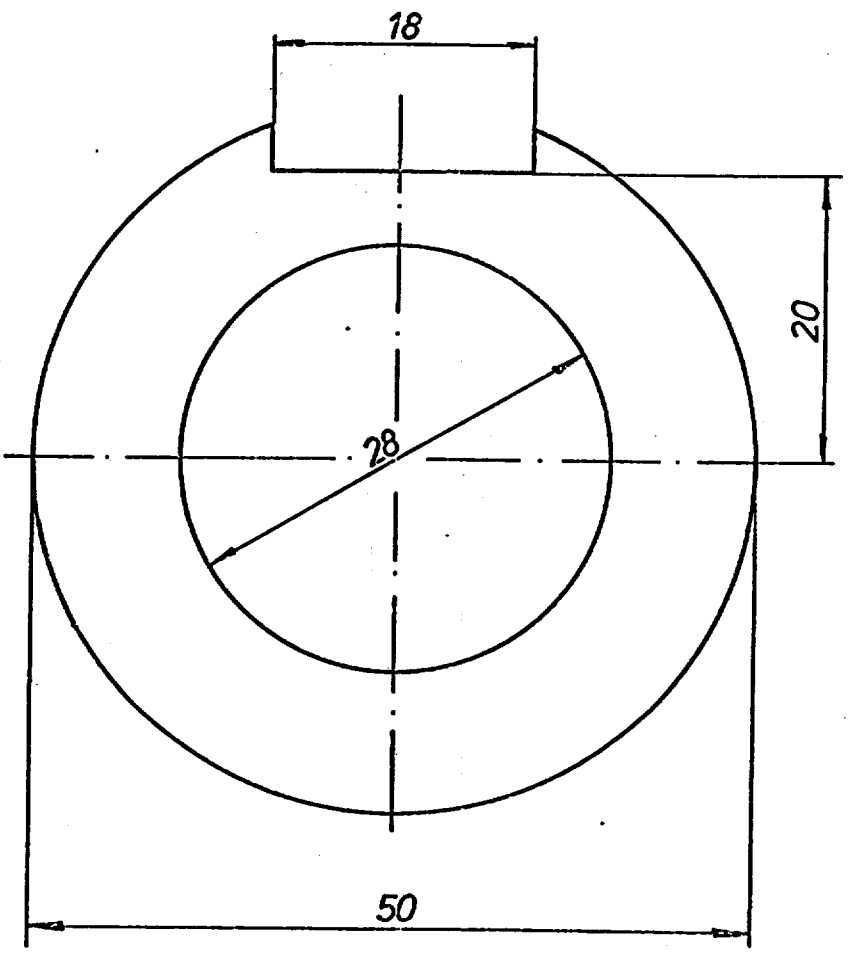


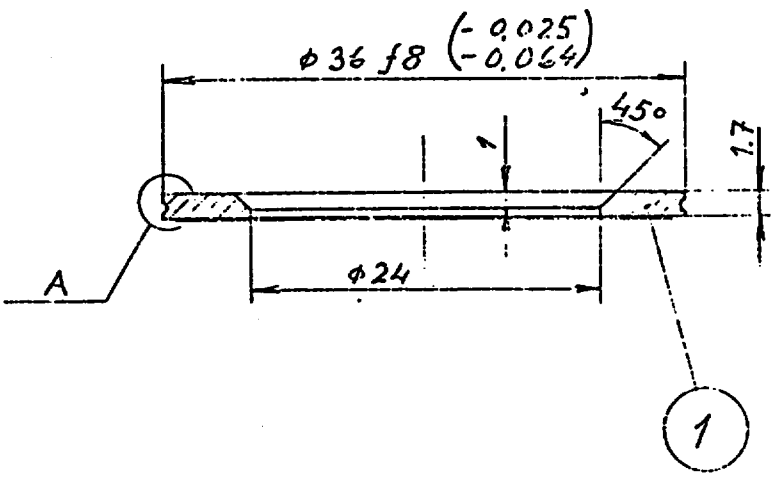
Figure 10

Part 13 in figure 5

Tako 2692 440

Aine Material: Al S=0,2	Yleistol. Tolerances: SFS 4011 Keski	Suunn. Design.: 8210 JOH	Piirt. Draftsm.: 8303 ikl
Pinta Surface:	Pintak. Finish:	Tark. Check.: 8303 ikl	Hyv. App.:
Suhde Scale: 2:1	Liittyy Next Assy: SUPS 0484	Osal:no Part list: 3612 229-40	
OUTOKUMPU OY ESPOO FINLAND	Rajoitin 2 Limiter 2		
	13.-4-1983	3865 052-4M	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki



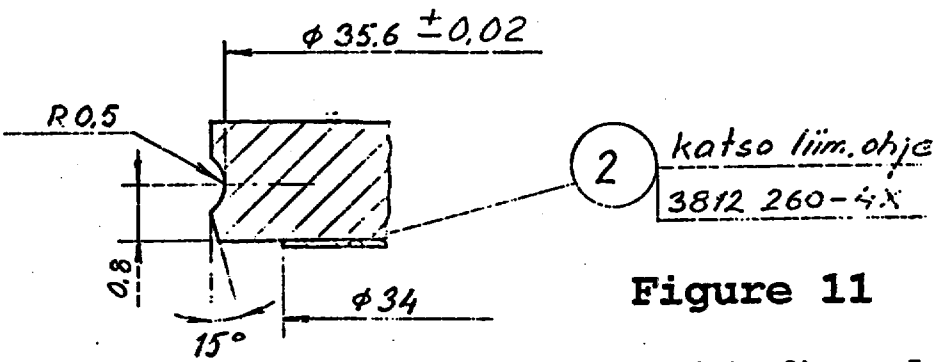


Figure 11

Part 4 in figure 5

3,2

Kohta A 10:1

Pintakäsittely : Anodisointi musta ennen osa 2 liimausta

1. Al-pyörötanko 38mm eloks. tako: 3017 399
2. Mylar-kalvo 0,05mm tako: 2362 093

1981-02-10

Aine Material	Yleistol. Toleranssi SFS 4011 hieno	Suunn. Design. 7904 VI-K	Piirt. Draftsm. 8003 alm
Pinta Surface	Pintak. Finish	Tark. Check.	Hyv. App.
Suhde Scale 2:1 (10:1)	Liittyy Part Assy SUPS 0484	Osanro Part no. 3812 229 - 40	
OUTOKUMPU OY ESPOO FINLAND	Window ring	80-11-24 kö/ah	
	Ikkunarengas	3812 252 - 4M0	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
830322	ihl	aa	Sähkysuoja taivelle puolelle		

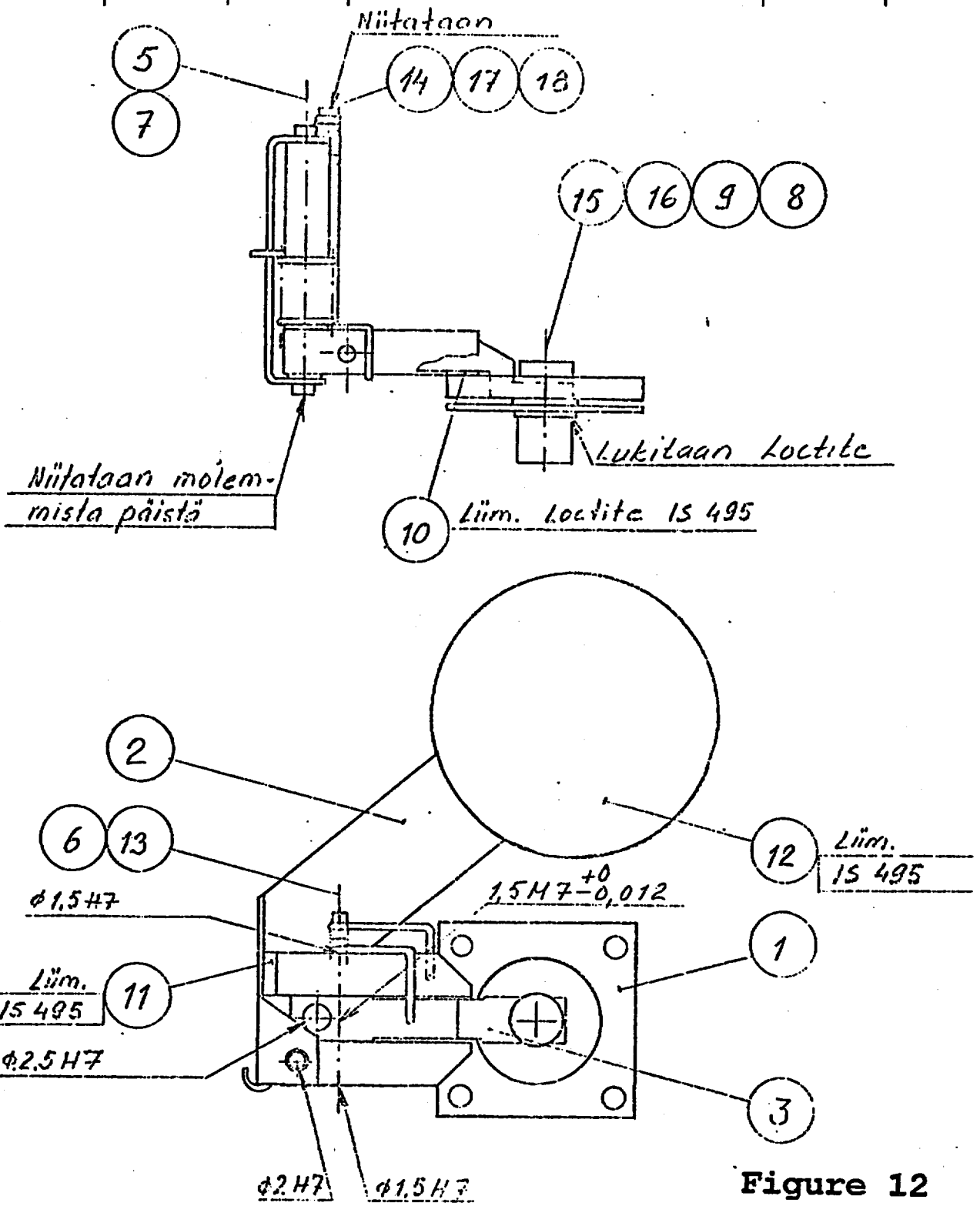


Figure 12

Aine Material	Yleistol. Tolerances	Suunn. Design. 7904 VI-K	Piirt. Draftsm. 8002 alin
Pinta Surface	Pintak. Finish	Tark. Check. /KÖ	Hyv. App.
Suhde Scale 2:1	Tulee Next Assy HEPS 0482	Ohjenro Part no. 3812 500-40	
OUTOKUMPU OY TAPIOLA FINLAND	Shutter / reference 13.-4-1983	80-11-24 KÖ/alk	
	Suljin	3813 813 - 4K	

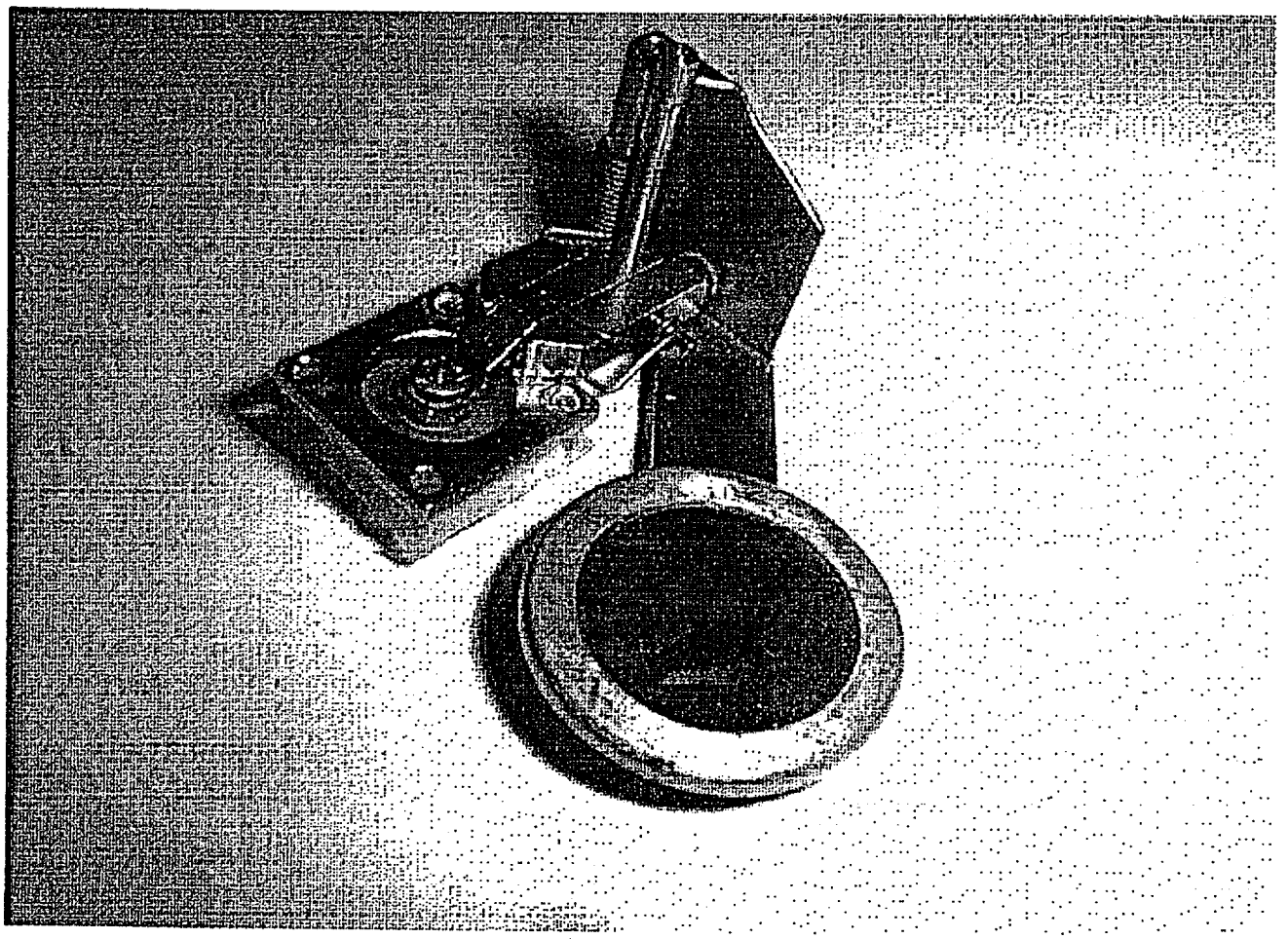


Figure 12A

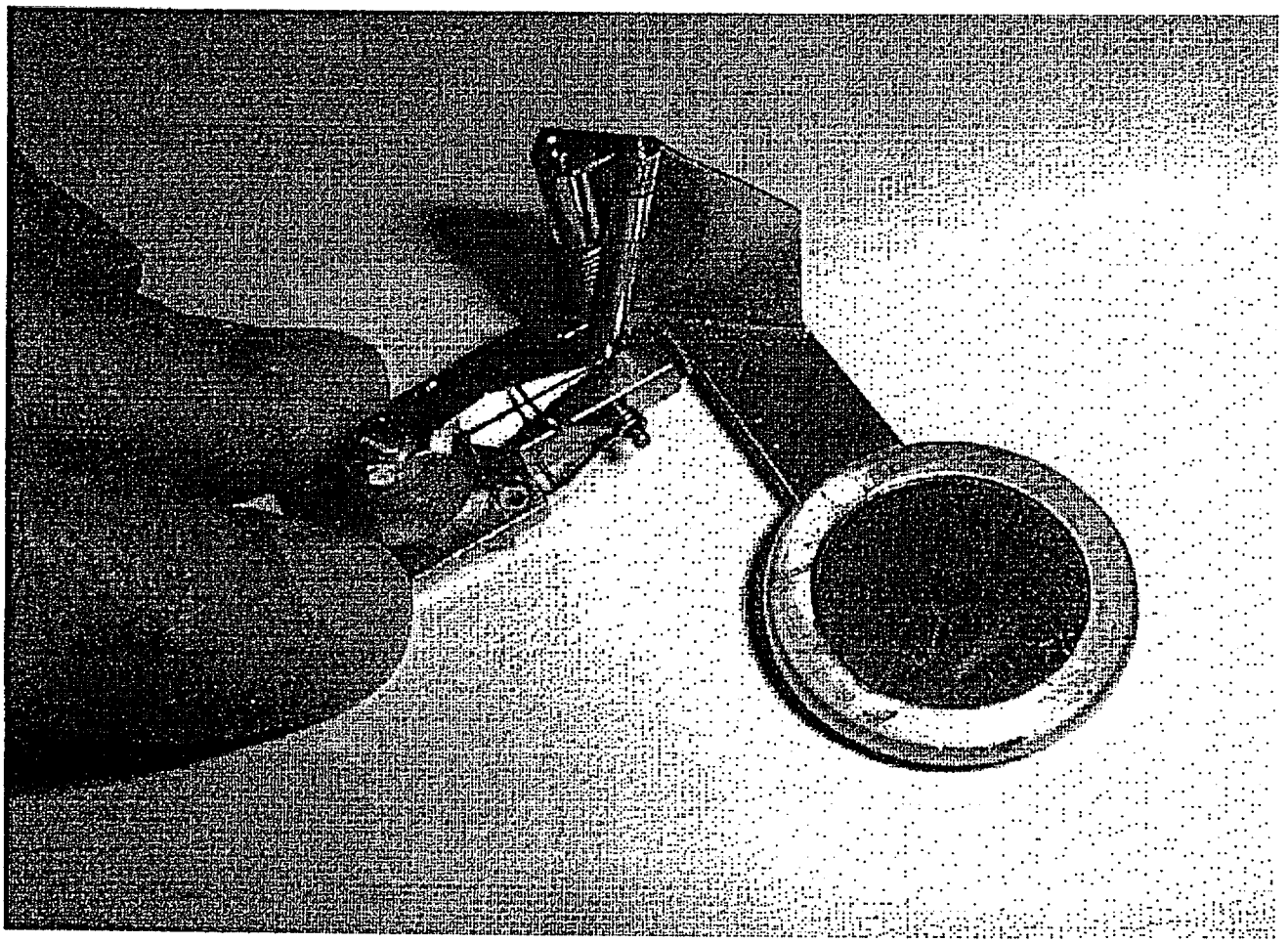
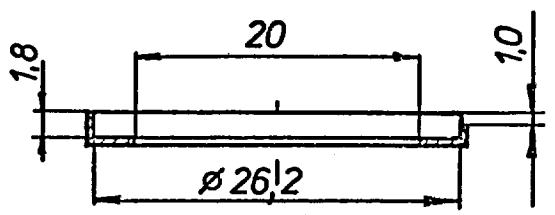


Figure 12B

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
830608	ikl	ak	ϕ 26,2 on sisämitta		
851018	alk	ak	uran leveys oli 10 nyt 11		

Leikkaus A-A



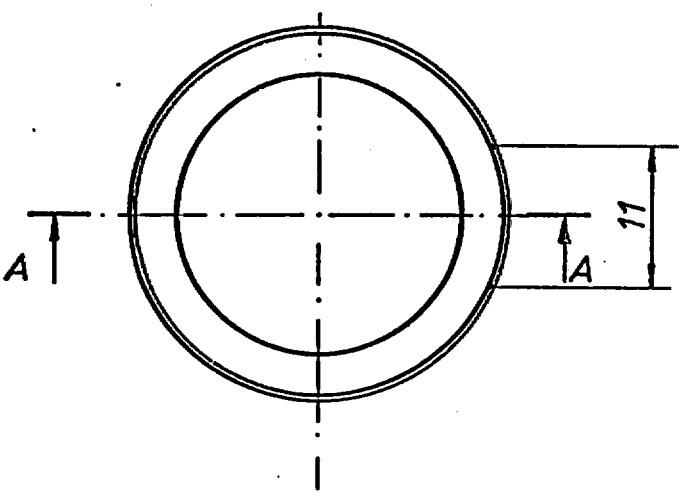


Figure 13

In area 12 in figure 12

Tako 2683 878

Aine Material: Al 99.99 S=0.5	Yle.stol. Tolerances: SFS 4011 Hieno	Suunn. Design. 8212 JOH	Piirt. Draftm. 8303 ikl
Pinta Surface	Pintak. Finish	Tark. Chock. 8303 ak	Hyv. App.
Suhde Scale 2:1	Liittyy Next Assy HEPS 0482, SUPS 0484	Osal n:o Part list	
OUTOKUMPU OY ESPOO FINLAND	Rajoitin 3 Limiter 3		
	07.-[illegible]-1985	3865 060-4M	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki

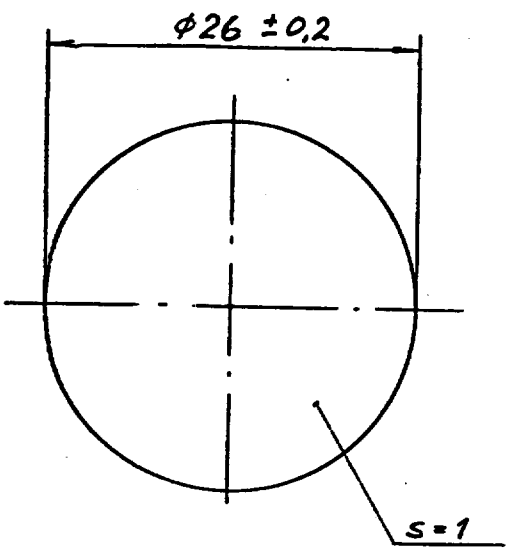


Figure 14

In area 12 in figure 12

Lead plate 1mm

Aine Material: Lyijylevy 1mm	Yleistol. Tolerances	Suunn. Design. 7904 VI-K	Piirt. Draftsm. 8002 alm
Pinta Surface	Pintak. Finish	Tark. Check. Jaul Ilkö	Hyv. App.
Suhde Scale 2:1	Liittyy Next Assy HEPS 0482, SUPS 0484	Osal.n:o Part list	
OUTOKUMPU OY TAPIOLA FINLAND	Radiation shield	80-11-24 Ilkö/alk	
	Säteilysuoja	3811 429 - 4M	

4			3	2	1	
Päiväys	Muuttaja	Tarkastaja	Muutos		Lukumäärä	Merkki

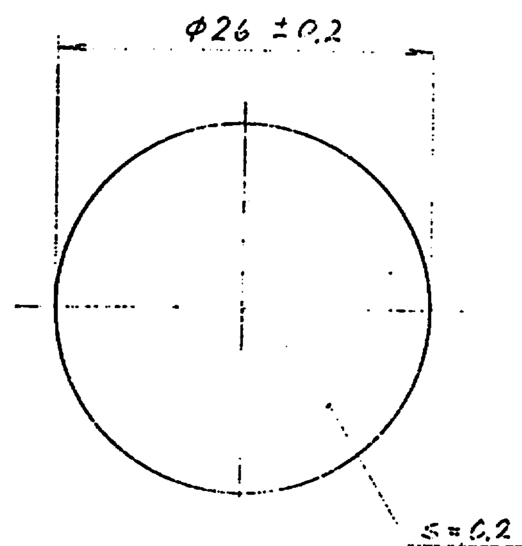


Figure 15

In area 12 in figure 12

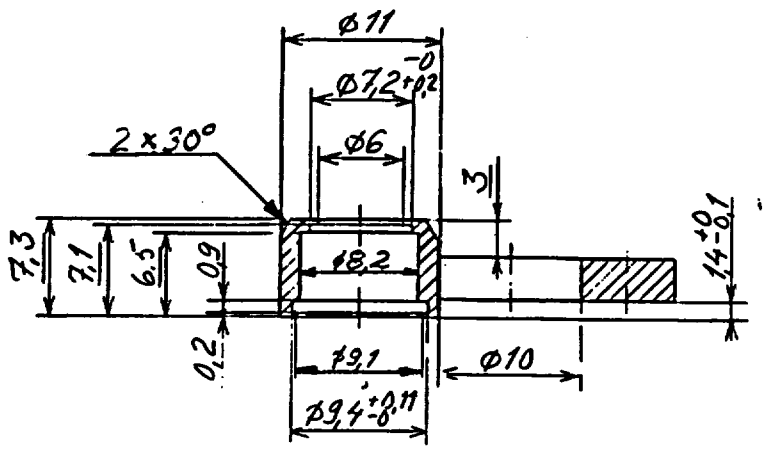
1981-02-10

Cu plate 0.2 mm

Aine Material: Cu-levy 0,2 mm	Viimeist. Tolerances	Suunn. Design.: 7904 VI-K	Piirt. Drafstm.: 8002 alm
Pinta Surface	Pintak. Finish	Tark. Check: [illegible] 1/2e	Hyv. App.: [illegible]
[illegible] 2:1	HEPS 0482, SUPS 0484		
OUTOKUMPU OY TAPIOLA FINLAND	Reference plate	80-11-24 [illegible]	
	Säätöreferenssi Cu	3911 486 - 4M	

4	3	2	1

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
810804	I.L		Mitta ϕ8,2 → ϕ9,1. Lis. ϕ8,2		
830318	ikl	ahe	Viistettä lisätty		
8808	IJ		Työstöohje lisätty	Jan	
9003	IJ		Viiste 1×30° → 2×30°		a



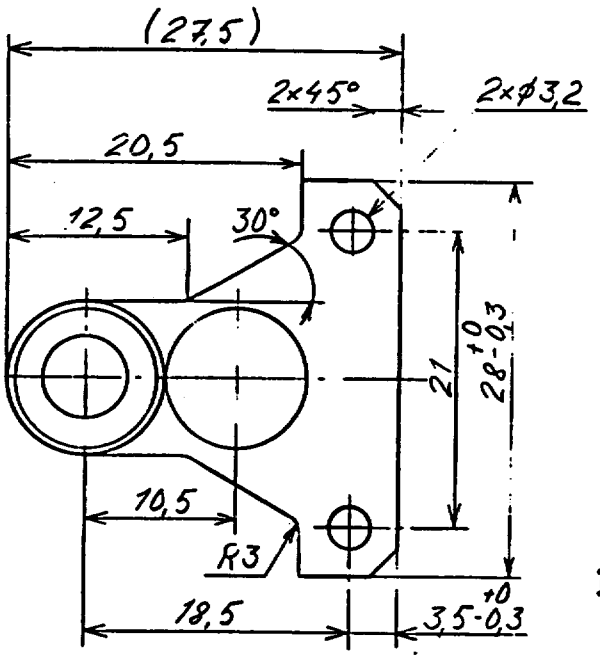


Figure 16

See item A in figure 1

Työstössä käytettävä alkoholipohjaista leikkuunestettä esim. Sinol. Valmis osa pestään asetonilla.

13.-8-1990

Aine: Alumiinilevy puhdas 8mm Tako: 3017 373

Aine Material: Pure Al plate 8mm	Yleistol. Tolerances: SFS 4011 - Hieno	Suunn. Design. 8002VI-K	Piirt. Draftsm. 8002SLM
Pinta Surface 3,2	Pintak. Finish	Tark. Check. Jan / KÖ	Hyv. App.
Suhde Scale 2:1	Liittyy Next Assy SUPS 0484, HEPS	Osal.n:o Part list	
OUTOKUMPU OY ESPOO FINLAND	Lähteenpidin	80-11-24 KÖ/Ale	
	Source holder	3811 585 - 4M	

4	3	2	1

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
9003	IJ		Mitta 25,2 → 24,5		a
9006	RH	KKO	Muutettu 2×ø 2,8 → 2×ø 3		b

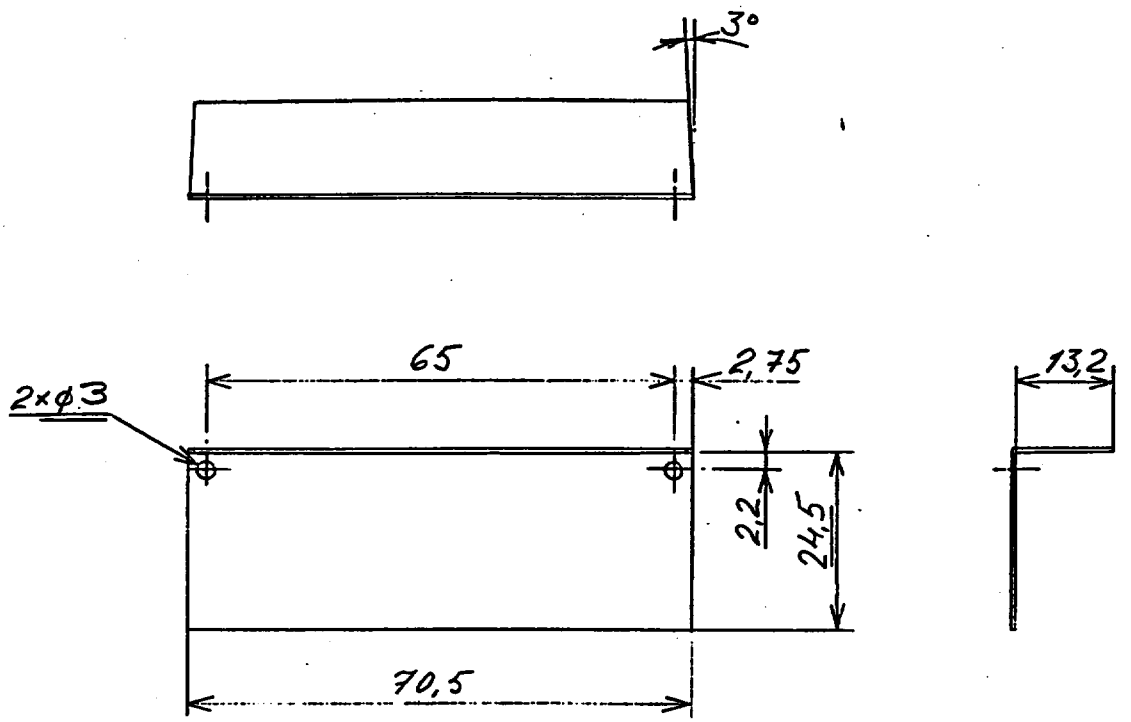


Figure 17

Part 6 in Figure 1

Aine:Teräslevy 0,5mm Fe 37 Tako:1020 304

Aine Material: Steel plate 0.5 mm	Yleistol. Tolerances: SFS 4011-Keski	Suunn. Design.: 8002JOH	Piirt. Drafstm.: 8002SLM
Pinta Surface	Pintak. Finish: SFS 2766 Fe/Zn+pass	Tark. Check.: [illegible]	Hyv. App.:
Suhde Scale: 1:1	Liittyy Next Assy	Osal.n:o Part list	
OUTOKUMPU OY ESPOO FINLAND	Kansi 1	88-11-24 KÖ/Ale	
	Steel cover 1 p31	3811 270 - 4M	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
8905	RH		Lisätty aukko 7×22		a
9006	RH	KKO	Muutettu 2×ø2,8 → 2×ø3		b

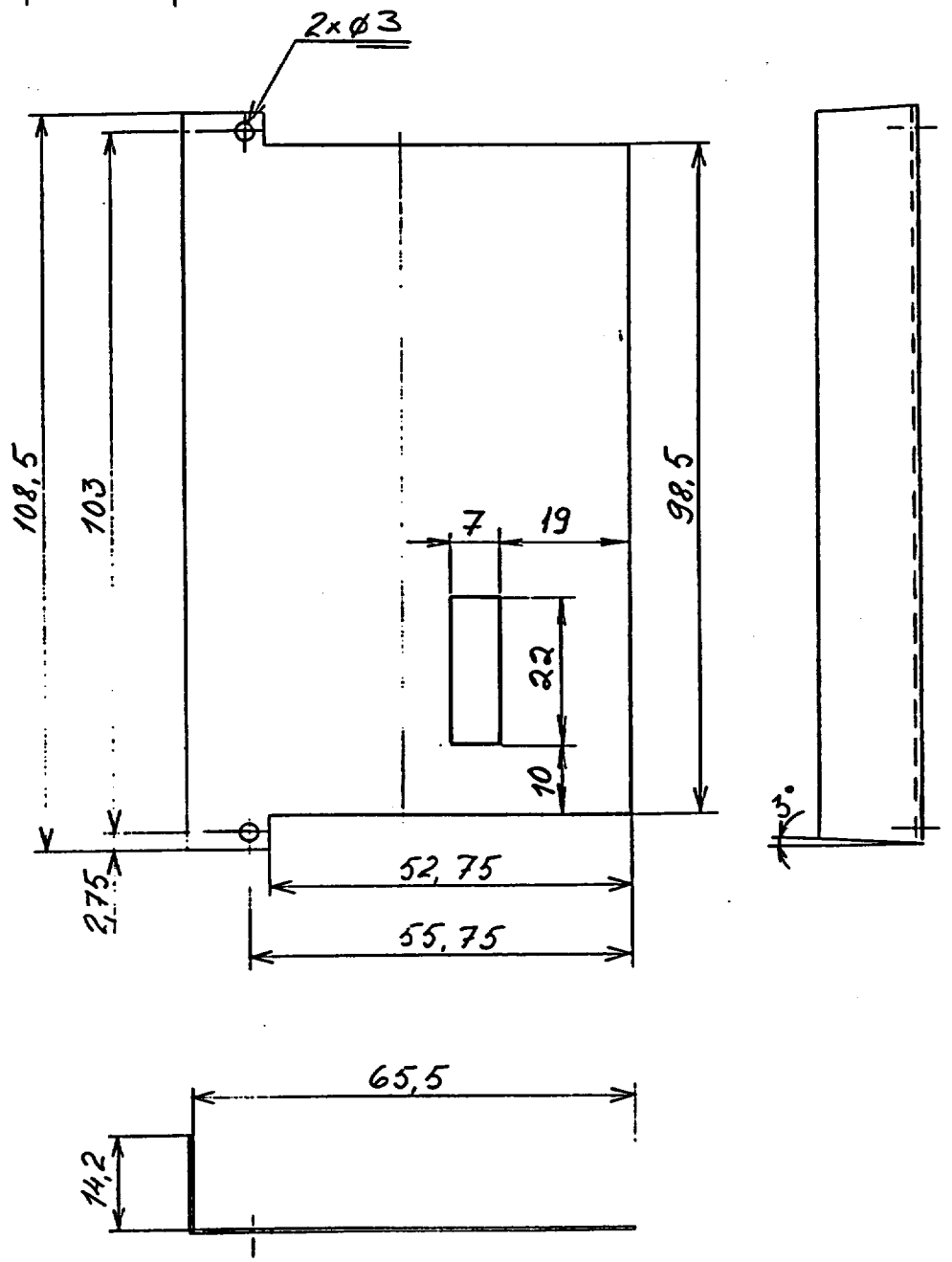


Figure 18

Part 7 in Figure 1

Aine: Teräslevy 0,5mm Fe 37 Tako: 1020 304

Aine Material: Steel plate 0.5 mm	Yleistol. Tolerances: SFS 4011-Keski	Suunn. Design.: 8002JOH	Piirt. Drafstm.: 8002SLM
Pinta Surface:	Pintak. Finish: SFS 2766 Fe/Zn+pass	Tark. Check.: Jaa Ilo	Hyv. App.:
Suhde Scale: 1:1	Liittyy Next Assy:	Osat.n:o Part list:	
OUTOKUMPU OY ESPOO FINLAND	Kansi 2	80-11-24 KÖ/al	
	Steel cover 2 p32	3811 288 - 4M	

Päiväys	Muuttaja	Tarkastaja	Muutos	Lukumäärä	Merkki
9006	RM	KKo	Muutettu 2×ø 2,8 → ø3, 33,5 → 33		a

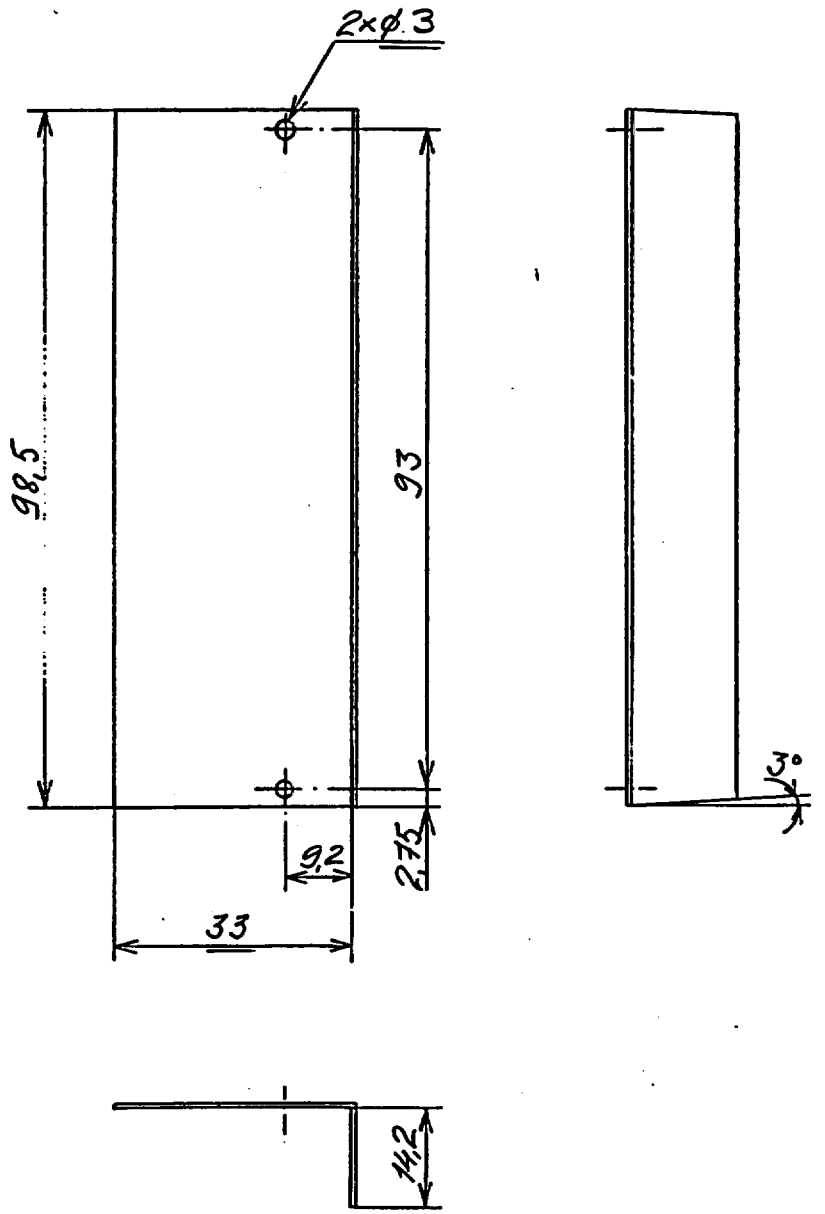


Figure 19

Part 9 in Figure 1

Aine:Teräslevy 0,5mm Fe 37 Tako:1020 304

Aine Material: Steel plate 0.5 mm	Yleistol. Tolerances: SFS 4011-Keski	Suunn. Design.: 8002JOH	Piirt. Drafstm.: 8002SLM
Pinta Surface:	Pintak. Finish: SFS 2766 Fe/Zn+pass	Tark. Check.: 1Kô	Hyv. App.:
Suhde Scale: 1:1	Liittyy Next Assy:	Osal.n:o Part list:	
OUTOKUMPU OY ESPOO FINLAND	Kansi 3	80-11-24 Kô/Ak	
	Steel cover 3	3811 296 - 4M	

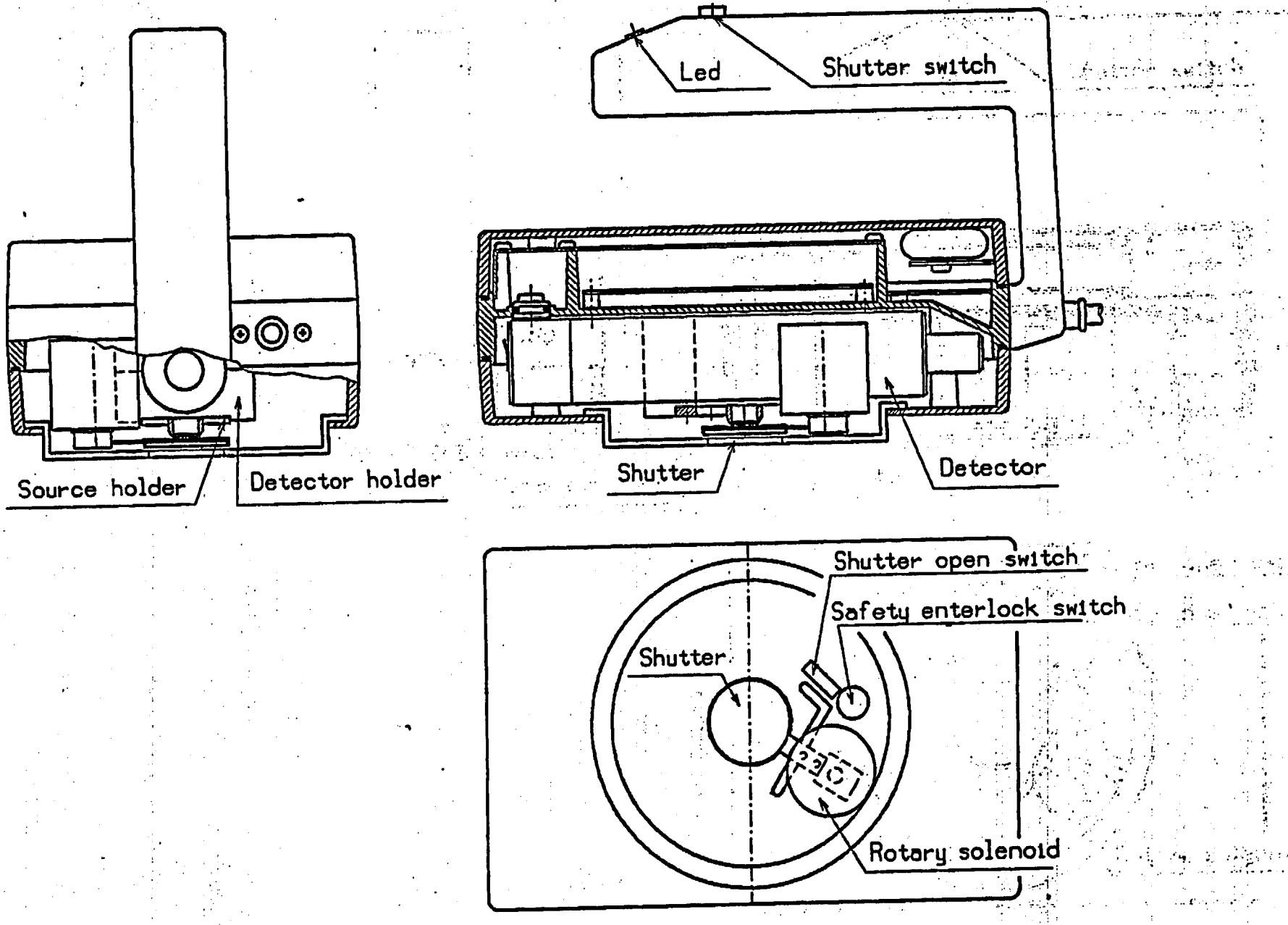

Led
Shutter switch
Source holder
Detector holder
Shutter
Detector
Shutter open switch
Safety enterlock switch
Shutter
Rotary solenoid

Figure 20