1086 1430
September 1995

Warning

This equipment must be installed and used in accordance with the manufacturer's recommendations. Installation must be performed by properly trained and authorised personnel.

Failure to follow these instructions may invalidate your warranty and/or impair the safe functioning of your equipment.

Please contact your local Wallac representative for installation.

EG&G WALLAC

1414-932-02
March 1996

INSTRUMENT MANUAL

1414 WinSpectral™

Digital Spectrum Analysis (DSA) based liquid scintillation counter

For instruments with software version 1.3 including WinSpectral α/β and Guardian

WALLAC
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Contents

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1 Introduction

Introduction

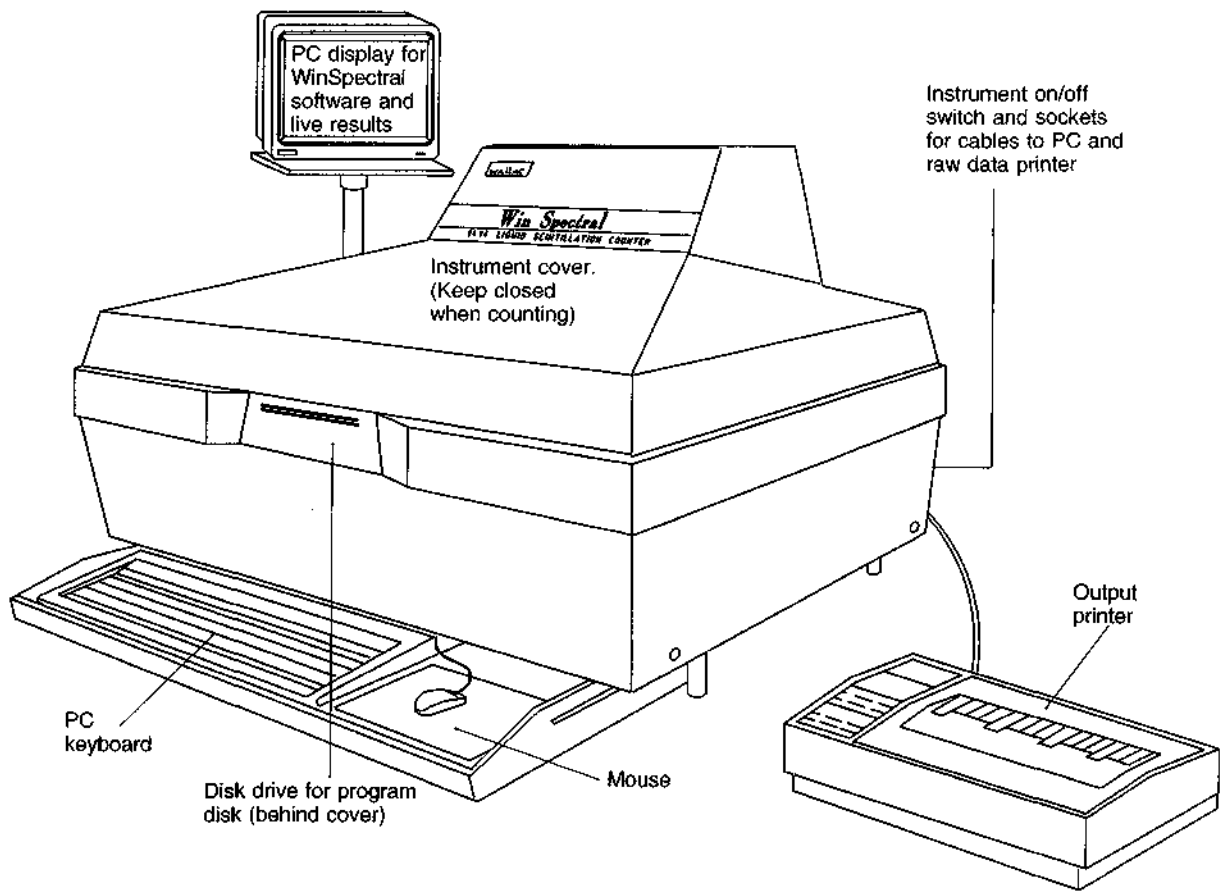
A new LS counter

The Wallac 1414 range of DSA liquid scintillation counters, WinSpectral, WinSpectral α/β and Guardian, is created to bring the very latest in LSC and PC technology to your laboratory. The combination of Digital Spectrum Analysis (DSA) with the Microsoft Windows graphical user interface as well α/β separation (WinSpectral α/β and Guardian) and sophisticated shielding (Guardian) makes an unbeatable combination.

In this manual you will find a description of what you can do with your counter (whichever model you have), including the various options available, an explanation of how to use the instrument, as well as background information about how it works and how to install it.

Note: in this manual the name WinSpectral is normally used and no distinction is made between the three different models except where they differ.

The figure below shows the instrument and identifies the different parts of the system.



Wallac 1414 WinSpectral and peripherals

Hardware features and benefits

Elegance

The first things that comes to your attention when you look at a Wallac 1414 WinSpectral DSA liquid scintillation counter are the elegant lines of the conveyor cover and the conveniently placed PC screen, keyboard and mouse. These impressions of elegance and convenience are not just superficial features of the counter, they run through every aspect of the WinSpectral hardware and software. These features and the benefits they bring you are described in the following chapters.

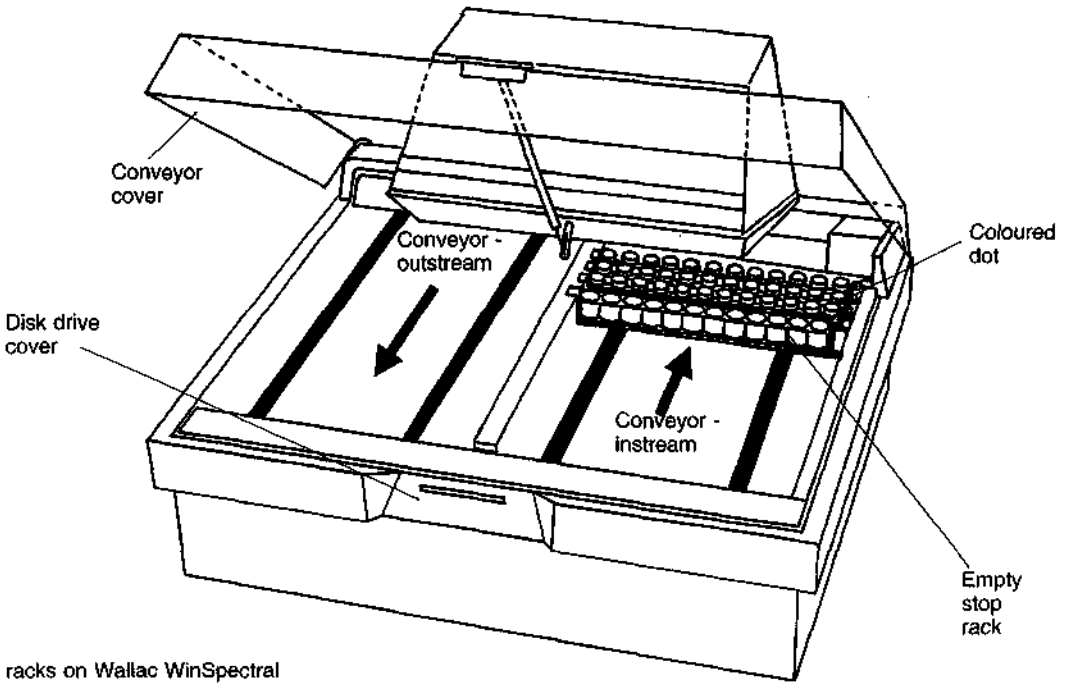
FlexiRack™ sample changer

The conveyor is designed to give the maximum visibility to the user. You can easily see the sample racks wherever they happen to be on the conveyor. The cover of the conveyor is made of a plastic which both allows a clear view of the conveyor yet shields the samples from ultra-violet light and thus reduces the problem of chemiluminescence. The cover is supported by a spring-loaded lever so that it opens and closes smoothly.

The sample conveyor has two lanes for sample racks, an in-stream (on the right) and an out-stream, as well as two transfer lanes, one of which is the counting lane. Sample racks glide along the in-stream and out-stream of the conveyor, moved by friction contact with two rubber belts. Movement along the transfer lanes is by precision made toothed belts. The conveyor is coated by an electrically conductive teflon layer to reduce friction to a minimum and to prevent the generation of static electricity on the sample racks. The conveyor motors run very quietly to avoid disturbance to users and others in the laboratory.

All movement is controlled by stepper motors and directly triggered optical sensors. This removes the danger of sensors jamming and increases the reliability of the whole conveyor system. Sample change time is about 9 secs.

Conveyor movement is fully bi-directional. With the OneRack function counting is interrupted, the rack in the counting position is driven backwards so that you can load a single rack for stat counting. After this rack has been counted, counting of the other racks resumes automatically. You do not have to remember to put the interrupted rack back at the head of the in-stream later



Loading racks on Wallac WinSpectral

on because it is already in the right position to resume counting.

Multi-size racks and vials

You are no longer limited to using only one size of rack on the conveyor if you have the appropriate options:

With FlexiRack I you can load racks of twelve 20 ml samples along with racks of eighteen 6 ml samples.

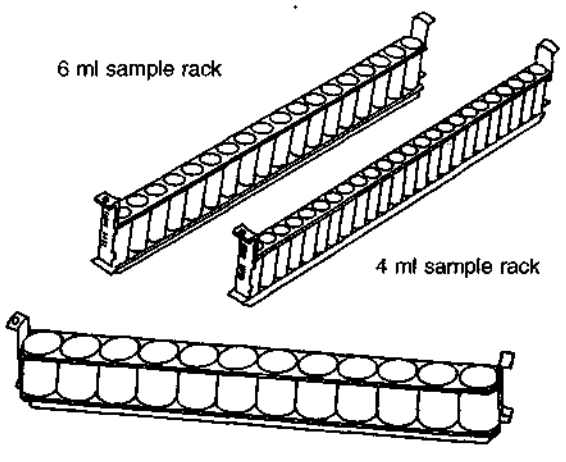
With FlexiRack II you can not only load racks of the above two types but also racks of twenty-four 4 ml samples.

These can be in any order.

A 20 ml sample rack can hold twelve samples with a maximum vial diameter of 28.4 mm. The conveyor will accept 28 racks making a full load of 336 samples.

The corresponding figures for 6 ml vials are 18.4 mm diameter, 18 samples per rack and 40 racks on the conveyor making 720 samples in all.

For 4 ml vials the figures are 13.4 mm diameter, 24 samples per rack, 52 racks per conveyor load, i.e. 1248 samples.



Racks for different vial sizes accepted by the FlexiRack system

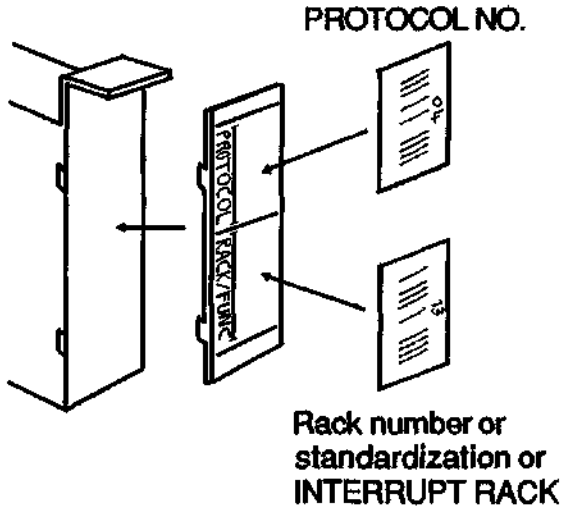
The maximum height allowed for the top of a vial above the conveyor is 78 mm. This means that for a vial of the maximum diameter in any of the categories its length can be up to 68 mm. Smaller vials in any category can be a few millimetres longer.

Not only flat bottomed vials can be accepted but also round bottomed and conical vials. For example adapters allow Eppendorf tubes and Microfuge tubes to be counted directly without the need for carrier vials.

Users with different vial sizes can load their own batches of samples on the same conveyor at the same time.

PosIden™ ID reader

The purpose of the ID system is to allow 'hands off' performance of the instrument and to enable total results identification. 'Hands off' means that counting procedures such as changes of protocol, quench fine tuning or stat counting, can be initiated automatically. Good laboratory practice requires that the results are identified in data files or on printouts with ID numbers. The Wallac WinSpectral PosIden ID reader enables all this.



PosIden system

PosIden uses a barcode reader and ID labels. These are self-adhesive and attach to a strip of plastic, the ID Clip which is then attached to the end of the sample rack. The position of the clip is such that the coding can be easily read without moving the rack, wherever the rack is on the conveyor. The combination of ID labels and clips allow each laboratory to prepare the

needed combination of coded ID Clips to meet its individual requirements.

The ready-to-use ID Clip can have labels on it as follows:

The clip for the first rack in the assay has up to two labels
- a label with the protocol number.
- an optional label with the rack number for the first rack.

The clips for other racks in the assay need only to have the rack No. label fixed them

If the rack contains quenched standards the ID Clip is coded with a label showing the quench protocol number (1-99) and instead of rack No. a special label which identifies the samples in the rack as samples for spectrum library fine tuning.

For automatic interrupt counting the rack is coded with a clip with the protocol number and a special label indicating the interrupt function.

The ID labels are supplied in a binder with 20 sheets of labels. The ID Clips are supplied in a package of 100. The box on the PC keyboard shelf can be used to share the ID binder and clips.

Elevator reliability

The elevator system is designed to handle a whole variety of sample vials without the danger of the vials falling over or getting jammed. The key to this is the small sized elevator head combined with the centralizing counterweight. The counterweight meets samples before they are raised from the rack thus ensuring that they remain vertical all the time they are on the elevator.

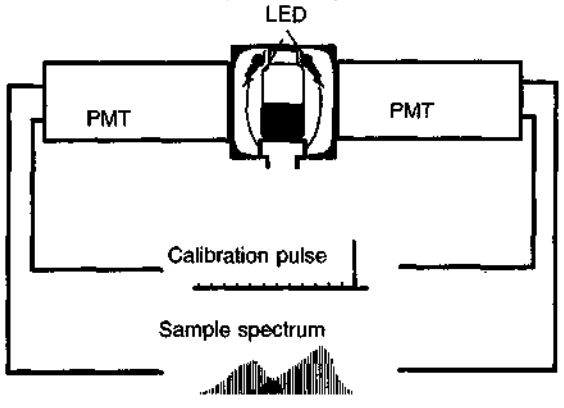
Static elimination

Plastic vials are widely used in liquid scintillation counting and manufacturers tend to use plastic also as a rack material. Conditions are often optimum for the build-up of static charge, especially when relative humidity is low (central heating) and lab technicians have to use plastic gloves during sample preparation (as when using conventional toluene, xylene and cumene based cocktails).

Static build-up on the sample vials is minimized both by the presence of ionizers around the sample elevator and by the fact that at no point does the vial come into contact with any material which might tend to deposit charge on it since a vial in the FlexiRack™ system is raised directly into the measuring chamber without making further contact with other materials. The rack design also reduces static charge build-up, because the samples are located in round holes in the rack without any sharp edges which tend to collect static charges more easily. The light shutter is in the form of two plates which close around the stem of the elevator after the vial is in position.

There is also a Statistic Monitor which flags any samples which show signs of static electricity discharges.

Automatic continuous spectrum stabilization (ACSS)



ACSS system

You need to be sure that your instrument is stable. You do not want changes in high voltage, temperature, detectors or aging to affect the accuracy of your results. The patented built-in "automatic continuous spectrum stabilization" system ACSS offers gain stability for your Wallac WinSpectral counter without the need to measure reference samples. This system is completely automatic and requires no user intervention.

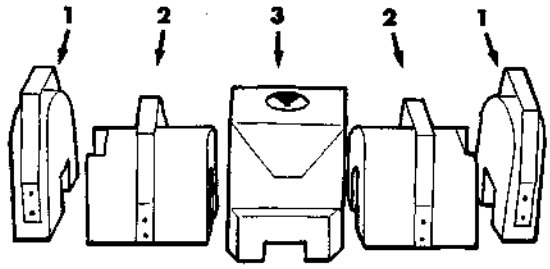
The principle is to detect when a change that would affect the gain of the instrument occurs and by means of a feedback loop to correct for the change so that the gain remains stable. Each photomultiplier has a temperature compensated reference light emitting diode (LED) which is fixed close to each detector and is used to check the gain of the PMT, see the figure above. A reference pulse is produced in the photomultiplier 10 times a second. The ratio of the pulse pro-

duced at the first dynode to that produced at the anode is measured. This ratio should be constant even if the LED output changes. If the ratio changes then the gain has changed. To compensate, the high voltage is adjusted until the reference pulse ratio is back to what it was. This takes care of changes to the high voltage and detectors. A second feedback loop monitors the signal at the first dynode to ensure that the whole system is temperature stabilized.

ACSS also acts as a protection against any damage to detectors through light leaks. If a leak occurs, the voltage to the detectors is automatically reduced thus protecting them from overloading.

Multi-section passive shielding

The massive lead shielding combined with the coincidence electronics for the pairs of detectors reduces the background to a low level. However this shielding does not make for an instrument too heavy to be conveniently handled because you can easily remove the lead shielding and then reassemble it when the instrument has been moved to its new position. The figure below shows the pieces and the order in which they should be removed from WinSpectral. Assembly is performed in the opposite order. See the installation chapter for more information about shielding.



Order for removing shielding

Guardian guard detector

The Wallac 1414 Guardian low level counter is equipped with an external guard detector around the sample chamber and phototubes. The guard has its own phototubes and is optically isolated from the sample chamber and thus offers true background event detection. It does not cause observable counting efficiency losses in low level counting. A sample event that is simultaneous with the guard event is rejected by the electronics since the event is then most probably caused by a particle or photon from the environment. No limitation in sample fluor selection is introduced by this background subtraction method.

The guard is switched on automatically, and remains on except when the external standard is being used. Usage of Wallac Guardian is thus identical to that of Wallac 1414 WinSpectral α/β, but the performance is improved due to the lower background rate.

Temperature control for sample homogeneity

When dealing with the maximum sample holding capacity of scintillators it becomes very essential that the temperature remains practically constant through the whole sample batch. Proper temperature control guarantees that all samples are counted at the same temperature in spite of variation of ambient conditions (if for instance the air conditioning is turned off during the night time). Thus the risk of phase separation in samples due to, for example, a temperature drop during overnight counting, is eliminated.

The conveyor can be temperature stabilized. This is achieved by installing the optional Temperature Control unit which can be set to maintain the temperature at a selected value in the range 5°C below ambient to 10°C above. The temperature control system is based on two thermoelectric (Peltier) modules, which enables users to adjust and control the temperature via software.

A more powerful external cooling system (10° C below room temperature) can be added later if needed.

A parameter called TEMP in the programmable output allows you to output the temperature at which sample measurements were made.

External standard for higher precision DPM

The wide range of vial types accepted by Wallac WinSpectral counters puts greater demands on the external standard parameters than ever before. If the count rate of the external standard depends on the sample volume, the few microlitres in a Microfuge tube will give a low count rate. To avoid this the isotope of the external standard is ^{152}Eu, which belongs to a lower toxicity class than previously used external standard isotopes, which means a higher activity can be used thus

allowing the external standard count time to be reduced and the counting precision increased.

The external standard source is mounted on a wire which moves it from its rest position in its own shielding to just beneath the sample vial. This arrangement allows the external standard to be positioned very accurately beneath the sample vial (it actually moves through the sample elevator shaft to a position beneath the sample).

The external standard quench parameter value SQP(E) is the endpoint of the spectrum. The use of ^{152}Eu means that you get high precision for the SQP(E) due to the well defined end of the ^{152}Eu Compton spectrum and also high sensitivity for the colour correction feature due to the relatively high energy of the isotope.

All of these features contribute to high precision DPM results.

Electronic convenience

So far we have been concentrating on the "body" of the instrument. Now we turn our attention to the "brains" - the electronics.

This is basically found in three racks and the detector unit. The proven approach of mounting the electronics in racks allows easy upgrading and service thus reducing down time when any changes are made. The central processor unit uses a 16 bit microprocessor to ensure speedy response and data handling.

The electronics not only controls operation of the instrument but it communicates with PC to allow control of the counter from the PC running the Windows WinSpectral software.

Multiple programmable MCA

Wallac WinSpectral DSA counters have a multiple programmable multichannel analyser (MCA). The isotope spectrum is divided into 8 logarithmically set spectral ranges of 4096 discrete channels. The tritium range offers up to 0.0038 keV resolution, this is equivalent to a 520,000 channel linear MCA. The appropriate number of linear channels are summed into 1024 logarithmic channels. These retain the precision of the original analogue to digital conversion of 0.0038 keV per channel.

This feature makes possible the DSA features such as ChemiStrip method of chemiluminescence correction, spectrum stripping background correction and DOT DPM calculation.

Internal disk drive

The counter has an internal disk drive with a 3.5" microfloppy disk which contains the program. The program disk can easily be changed to accommodate program changes and updates. This is a much simpler procedure than changing chips on an electronic circuit board. This drive is behind the cover at the front of the conveyor as shown on page 1. To access the drive you must slide the cover upwards to release it.

External personal computer

The WinSpectral Windows software runs on any 386 (SX), 486 (SX) or PENTIUM computer. Since our counters are designed to work within standard PC architecture, you can be assured that WinSpectral will serve you long beyond the 486 generation of computer.

Bench top or floor standing

A Wallac WinSpectral DSA LSC can be either bench top or floor standing. You can select which ever is most convenient for your working environment. The Wallac Floor Stand allows the counter to become floor standing and easily movable without having to collect together lots of separate pieces of equipment.

The monitor arm and a pullout shelf for the PC keyboard and mouse are standard features whether or not you use the Floor Stand.

These all make for ease and convenience in operating the system while keeping the footprint in the laboratory to a minimum.

Software features and benefits

Windows graphical user interface

Older types of LSC software still run under MS-DOS a character based operating system. Since MS-DOS does not allow the possibility of multitasking, any application program or commercial software must be run after the counting protocols. This kind of sequential operation inhibits the effectivity of a busy research team.

The new generation WinSpectral software running under Microsoft Windows offers dozens of features. No longer are you limited to 640 kB of memory or character based software packages. You can exchange data between WinSpectral and any Windows compatible software.

The graphical user interface itself is intuitive and easy to use. Operation involves clicking buttons or icons with a mouse pointer or selecting items from menus on the PC screen.

Hypertext help

All steps of operation are guided by comprehensive context sensitive help screens conforming to the style you are used to with other Windows software packages. Simply press the F1 key to get help for just the point of operation you are at. You can use the help to search for information on any feature you like. The hypertext links enable you to instantly jump in the help to other related pieces of information. The hypertext help is truly a manual at your fingertips

Easy Count

If you do not want to set parameters then you can use the Easy Count feature. You simply load the samples and click the Easy Count button. The DSA feature allows the counter to determine automatically which isotope you are using from a selection of three (^{3}H or ^{14}C are the defaults) and then counts the samples. An Easy Count protocol can also be initiated by using a special ID label on the racks. Easy Count is described in detail in the User manual.

Easy GLP

Compulsory daily calibration, the so-called GLP (Good Laboratory Practice) feature has proved inadequate in older generation counters since minor temperature fluctuations or voltage changes can affect the response at any time.

The basis for Wallac WinSpectral's superior performance is Wallac's patented ACSS feature (see the previous chapter on Hardware features).

The GLP protocol allows you to quickly set parameters for the monitoring of up to 8 performance parameters for GLP and get a ready formatted report after the run.

CPM counting

Introduction

CPM counting is used when sample preparation is expected to yield samples with close to constant counting efficiency. This means that the results of the samples in an assay can be compared with each other and used in further data analysis. A typical CPM application is filter counting.

Wallac WinSpectral allows you to select from six common isotopes plus an additional 69 others.

One error source in CPM counting is that of unexpected counting efficiency variations, e.g. partial elution of the sample from the filter disk. Your Wallac counter includes features to detect and inform the user of counting efficiency variations as described below.

CPM monitor

The CPM Monitor is another feature of your counter. It allows you to be confident of the consistency of the quench level of your samples.

The CPM Monitor checks the SQP(I) value of each sample. If this is within 10% of SQP(I) the first sample then there is no flag. If the difference is larger it then calculates and outputs the percentage ratio of the sample SQP(I) to the first sample SQP(I). The acceptance limit (default 10%) is a system parameter and can be changed there, see the User manual.

Spectrum stripping background correction

The traditional methods for background correction are: a typed in background CPM value or a CPM value measured from a background sample in a counting window. However the intensity of the background radiation is different at different energy levels so these methods do not give the best result. The new calculation methods in Wallac WinSpectral DSA counters do

not utilize counting windows, but use digital spectrum analysis (DSA) to calculate the CPM/DPM values over the MCA area covered by the sample spectrum.

The background counting time is selected to be either the the same as or five times the length of the sample counting time.

Background correction proceeds as follows. Firstly, one or more background samples are measured and a background spectrum accumulated. Then using the spectrum stripping technique the background spectrum is subtracted channel by channel from the sample spectrum. This gives you a reliable background correction.

Note: If you use both background samples and reference samples then the positions of the background samples must be immediately before those of the reference samples and start from position 1. If there are only reference samples they must begin from position 1. No empty positions are allowed.

DPM counting - DOT DPM

Why the need for DPM correction?

A fact which makes LS counting unique among analytical methods is that each sample is also a unique detector. Usually analytical methods are based on the principle that the sample emits radiation or some form which is measured in an external detector, e.g. gamma counter or an external source sends radiation which is absorbed by the sample, e.g. spectrophotometric methods.

In LS counting, each sample consists of the actual sample mixed with the detector, the scintillation cocktail. Thus counting efficiency is dependent on sample type, sample to cocktail ratio, volume, colour of the sample, cocktail type etc. The counting efficiency variation from sample to sample must be corrected for to allow comparisons and analysis of the samples in a batch. To do this several methods have been developed during the lifetime of LS counting.

Other methods

Several methods are offered for DPM calculations in LSCs e.g. methods based on counting windows, methods based on isotope spectrum quench parameters, methods based on external standard quench parameters, methods based on extrapolation (Efficiency Tracing), methods based on factory installed quench curves etc.

Common to these methods is that they are not universal, this means they are good for some applications but give bad results for others. This requires a good knowledge to select the right method for any specific application.

Usually the methods require special calibrations, quench curves, to be measured which are dedicated to a specific experimental situation, isotope pair, cocktail, colour or chemical quench etc. Preparation of quenched standards, checking of quench curves etc. is time consuming. In dual label counting, counting window settings are critical and different isotope ratios demand different window settings. Separate standardizations must be done for different isotope combinations. Possible occurrence of colour quench will cause systematic errors.

The Wallac solution, one universal method

DPM counting in Wallac WinSpectral uses the DSA features, the Digital Overlay Technique, DOT, and the use of spectrum libraries. DOT is the most general method available today for quench correction in LS counting.

Digital Overlay Technique - DOT

DOT is used to reconstruct a standard spectrum at the same quench level and intensity as the unknown sample. When the standard spectrum has been fitted, the DPMs are calculated.

The procedure is the same for dual or triple label counting except that when the standard spectrum for each isotope has been reconstructed these spectra are combined and fitted to the composite spectrum of the unknown sample. After a successful fit the isotope ratios and intensities are established and the DPM values calculated.

Spectrum library

A Wallac WinSpectral with DOT DPM has a library of spectrum data comprising information about isotope/cocktail/vial type combinations for about 100 quench levels (10 chemical x 10 colour). This library is built-in to the counter during its production. Along with each combination the SQP(E) and colour index are determined and saved. WinSpectral then works not with quench curves, but with quench surfaces which represent both chemical and colour quenching.

In sample counting, the SQP(E) and colour index are measured and the corresponding point on the quench surface is determined. This is then combined with the the counting mode, isotope and vial type specified in parameter setting to get a specification for the spectrum data to be selected from the library.

Advantages of DOT DPM

- the Wallac library provides Easy Count DPM results without quench curve measurements.

- no quench curve measurements are needed for specific isotope combinations in dual or triple label counting.
- no window settings are needed
- result quality is not dependant on isotope ratios
- a successful fit gives assurance of sample quality
- no systematic errors caused by colour quench
- no plastic vial effect
- no volume dependence

DOT allows for analysis of the fine structure in the isotope spectrum which can be used to warn the user of phase separation, contaminations or other phenomena which will give erroneous values.

Accuracy Enhancement for even better results

A typical DPM measurement includes determination of quench level with the help of the external standard, calculation of the counting efficiency corresponding to the quench level with the help of a quench curve, counting of the sample to obtain sample CPM and then the final DPM calculation.

The critical factor which determine the quality of the DPM results is how correctly the counting efficiency was determined. The accuracy of the counting efficiency value is totally depending on how accurate the External Standard Quench parameter is and how exactly the quench curve used represented the unknown samples.

The external standard values suffer from counting error due to the counting statistics. The modern external standard quench parameters are usually calculated from the endpoint of the external standard spectrum and depend on the shape of the spectrum. With higher quench levels and smaller sample volumes the shape becomes more and more undefined and the counting error greater. Consequently there will be bigger errors in the external standard quench parameter and bigger DPM errors.

In the DOT method the SQP(E) value is only the starting point for an iterative procedure which searches the spectrum library for the spectrum which gives the best possible fit to the measured unknown spectrum. The Accuracy Enhancement gives the following features:

Accuracy Enhancement minimizes the DPM errors caused by erroneous external standard quench parameter values.

Savings in time, only a few seconds counting time is needed for the external standard even for samples with small volumes.

Normally the counting efficiency - quench parameter relation is also dependent on the quenching agent and the cocktail used. Thus if the samples are quenched by another quencher than the one used for the quench curve systematic errors will occur. With Accuracy Enhancement systematic errors due to 'Quenching agents' or different cocktails are minimized, thus the applicability of the Wallac libraries is increased.

When using Easy Count it is not necessary to specify spectrum library or vial type, Accuracy Enhancement will search through all variations to find the best fit.

SQP(I) DOT, Single Label DPM

The SQP(I) DOT option offers you single label DPM results without the use of the external standard. The method is based on the Digital Overlay Technique. This means that no counting window is required.

To use the SQP(I) DOT you need to make a quench standardization or fine tuning of one of the HiSafe or Xylene quench data sets in the Wallac library. The standard spectra and the counting efficiency are stored as a function of the SQP(I) instead of the external standard quench parameter.

The fine tuned spectrum library can then be combined with counting protocols to obtain DPM results of unknown samples.

Depending on the number of protocols (15 or 100) the SQP(I) DOT option allows you to make 14 or 99 quench standardizations.

Dual DOT CPM/DPM

This offers you dual label counting without using the external standard. You need to make two fine tunings, one for each isotope to be used to label unknown samples. For each fine tuning you must only use one standard and the chemical and colour quenching of these two standards must be the same. Samples can have quench levels which differ to some extent from those of the standards because the Accuracy Enhancement procedure takes account of this.

When you define the DPM counting protocol you specify the two isotopes to be used, then the program prompts you to give the numbers of the two sets of fine tuned data.

Alpha/beta separation and background reduction (option)

Note: this feature is an option for 1414 WinSpectral and can be installed later; for 1414 WinSpectral α/β and 1414 Guardian it is built-in.

Introduction

Electrons from beta decays and electromagnetic (gamma, X-ray) interactions as well as Cerenkov phenomena produce pulses consisting mainly of prompt or fast fluorescence. On the other hand, the heavily ionizing particles, such as alpha particles or neutrons produce pulses with a more delayed (slow) component and are thus longer than those produced by beta particles. WinSpectral with alpha/beta separation option utilizes Pulse Shape Analysis, PSA, to separate between the long pulses typical for alpha decay and the shorter pulses typical for the gamma or beta background radiation.

The other function of this option is called PAC (pulse amplitude comparison). PAC rejects more background counts than sample counts because background pulses have greater amplitude disparity than do sample counts. Adjustment of the PAC can lead to a better figure of merit.

Benefits

The background of glass vials exhibits some slow fluorescence which is induced by cosmic and other environmental radiation and the inherent radioactivity of glass material. Pulse shape analysis is therefore a useful method of reducing this background in beta counting. The glass fluorescence appears mainly in the spectrum region of low energy beta particles such as those from tritium. The simultaneous alpha/beta separation allows you to measure alpha radiation with a background of less than 1 CPM. The sensitivity for alpha detection approaches the detection limit for semiconductor alpha particle detectors but with considerably simpler sample preparation.

The ability to simultaneously measure gross alpha and gross beta activity reduces the workload in the laboratory because the alpha detection level is sufficient to detect alpha activity at the picocurie activity levels which are the allowed activity limits.

Moreover simultaneously with the measurement of alpha radiation, beta radiation from the decay chain can be detected and analyzed. The beta spectrum may contain also Cerenkov radiation, conversion electrons, Compton electrons, X-rays and Auger electrons if they are being produced in the sample.

The PSA/PAC features can also be used to discriminate a part of the background pulses from the sample pulses. The best benefit of this is obtained when glass vials and a fast scintillator are used. Especially in low energy beta counting considerable reduction of glass vial background can be achieved by using the PSA.

Due to this alpha/beta separation feature Wallac WinSpectral with this option has a lower background than a standard LS counter. Thus the improved sensitivity can be used to minimized sample volumes and specific activity, with savings in consumables and waste as a result.

Note: vial carriers as an guard for small vials can be used to further improve background values.

How does PSA work?

The PSA integrates the delayed (tail) and the prompt (peak) light pulse from a sample producing both types of radiation. If the ratio of the delayed to prompt component exceeds the preset ratio, the pulse is directed into the long pulse or alpha spectrum. If the ratio does not exceed the preset ratio the pulse is directed into the short pulse or beta spectrum. Very low background count rates are achieved for alpha particles, since most of the LS background is composed of short pulses.

The above mentioned preset ratio is controlled by the user with the PSA level, whose range is from 0 to 255 in steps of 1. The higher the PSA level is set, the more counts will be directed into the long pulse spectrum. At PSA level = 255 all counts are directed into the

long pulse spectrum, and at 0 all counts go into the short pulse spectrum. An optimum value for the best alpha/beta separation can be found somewhere between these two extremes as explained in the next paragraph. PSA levels higher than the optimum reduce beta counting efficiency and and background leading often to better figures merit. Lower PSA levels than optimum do same for alpha counts.

Determining the PSA level

Cocktails produce different pulse lengths; HiSafe cocktails show relatively slow pulses while xylene and toluene based cocktails are fast. The PSA option allows the optimum PSA level to be found to match the cocktail speed. This is done by stepping over a range of PSA values.

Ascertaining the correct PSA level is ideally done with two reference samples: one that emits alphas (e.g. Am-241) and the other that emits betas in the alpha spectrum range (e.g. Cl-36, Sr-90, P-32). Count rates should be kept below a reasonable limit by dilution if necessary (less than 10 000 CPM is recommended). The reference samples must be made in the same type of vial, same cocktail and same mixing ratio as the actual unknown samples to be measured.

A protocol can be created which steps PSA levels over a range which is appropriate for the cocktail. See the User manual for details. There are two extra windows that can be set which in range are typical for the alpha region but the first one is for measuring the beta spectrum (short pulses) while the second one is for the alpha spectrum (long pulses). The results are printed, each line contains the CPM value for both windows, the PSA level used and a calculated field, 'RATIO' which is the CPM value in the alpha window divided by the total CPM value. For example, you can select the final PSA level to allow from 0.5 to 5 % loss of alpha counting efficiency (alphas spilling into the beta channel). In this way an almost pure alpha spectrum is acquired with the minimum loss of counting efficiency. In the same way, when you are only interested in beta counting in the presence of alphas (or glass originated background) you may allow some percentage loss of beta counting efficiency, (betas spilling into the alpha channel).

Note that the slower the cocktail the lower will be the optimum PSA level. One may use a more limited window to include the main alpha emission range, e.g. for Ra-226 and Rn-222 Ch 600-800 is good with water miscible HiSafe cocktails.

A printout and a plot of 'RATIO' vs. repeat number is generated in the run and the spectra are saved.

The optimum PSA level for glass vial background reduction in beta counting is found in a similar way. You prepare two samples, one "hot" and one background sample. You then step over the desired PSA levels and select the final level with e.g. 10 % of "hot" counts spilling into the alpha category.

For rapid use without stepping you can select LOW as the default PSA level for slow cocktails and HIGH for fast cocktails.

How does PAC work?

The Pulse Amplitude Comparator (PAC), can be used for background reduction in uncoloured samples. The sample pulse amplitudes from the left and right phototubes differ less from each other than do the background pulse amplitudes since quite many of the latter ones are generated in the phototubes themselves by environmental and internal radiation.

Determining the PAC level

To find the suitable PAC level for optimum background reduction an active beta sample and a blank sample are made, matching the samples to be measured in the type of cocktail, mixing ratio and vial.

A protocol can be created which scans the PAC levels over a range which is appropriate for the cocktail, see the User manual for more details. Both the active sample and the background are measured. The count rates in the windows of the beta emitter are printed.

There are two extra windows, both wider than the whole spectrum but the first one is for the beta spectrum while the second one is for the PAC rejected beta spectrum. The results are printed, each line contains the CPM value in each window, the PAC level used and a calculated field, 'RATIO' which is the CPM value in the beta window (the pulses with less amplitude disparity than defined by the PAC level) divided by the total CPM value. The higher the PAC level the closer to each other must the amplitudes be for the pulse pair to be accepted. A greater number of pulses will be rejected at high PAC values than at low ones.

A printout and a plot of 'RATIO' vs. repeat number is generated in the run and spectra saved.

The optimum PAC level is the one at which E*E/B, beta counting efficiency squared over background or figure of merit in the beta window, is at a maximum.

PAC does not reject alpha pulses as much as beta pulses since the number of photons from an alpha decay is very much greater than that from a beta decay. The variation of the left and right pulse amplitudes is thus less for an alpha decay event than for a beta decay.

Chemiluminescence

Why is chemiluminescence a problem?

About two thirds of all samples in LSC are of biological origin which means that they comprise long macromolecules. In order to get them soluble in organic scintillator solution these macromolecules have to be hydrolysed to smaller fragments. This process often results in the release of chemiluminescence in samples.

How is it solved?

There are two levels of solution to the chemiluminescence problem, the first of which is common to most beta counters and the other is specific for Wallac WinSpectral DSA counters.

Chemiluminescence events are "single photon" ones. Each time chemiluminescence occurs a single photon is emitted in one direction. In contrast, a normal radioactive decay releases a burst of several photons in different directions (a "multiple photon" event). A beta counter has two detectors viewing the sample vial from opposite sides. A chemiluminescence event (or any other single photon background event or random noise event in a detector) will trigger only one of the detectors whereas a radioactive decay will trigger both detectors almost simultaneously. By requiring that a signal be received from both detectors within a few nanoseconds and by rejecting signals that only come from one detector or the other, most of the chemiluminescence and random background can be cut out.

However there are limits. The period of a few nanoseconds referred to above is called the coincidence resolving time of the detectors. If two chemiluminescence or other random events occur within the coincidence resolving and so that each triggers one of the detectors then the result will look like a true multiple photon event and will be counted. If there is a high rate of chemiluminescence events many of these "random coincidences" will occur resulting in false count results. The DSA feature ChemiStrip™, a unique patented spectrum stripping chemiluminescence correction method, solves this problem.

The counter has five 1024 channel MCAs. ChemiStrip uses one MCA to store the combined sample and chemiluminescence spectrum and another the chemiluminescence alone. This second spectrum is obtained by making use of the difference between the chemiluminescence and sample spectra. The latter comes from discrete bursts of photons which occur within the coincidence resolving time of the detectors. If the signal from one detector is delayed relative to the other then no coincidence will occur and no count will be recorded in the "delayed spectrum" MCA. In the case of chemiluminescence the spectrum is formed by an almost continuous flood of photons. This means that there is just as much chance of a random coincidence between two single photon events occurring at the same time as there is between one event and the delayed signal of a previous event. The chemiluminescence events will thus contribute to the delayed spectrum whereas the sample events will not.

Channel by channel stripping (subtraction) of chemiluminescence from the sample + chemiluminescence spectrum is then done. This maintains the exact shape of the sample spectrum by removing the exact chemiluminescence spectrum from the combined one. The corrected CPMs are then used in further calculations. The result is that you can cease to worry about chemiluminescence. Just select chemiluminescence correction "on" and and your Wallac WinSpectral will look after the rest.

Isotope decay

The problem of decay

If you are counting samples labelled with an isotope such as phosphorus 32 with a half life of 14.2 days you are likely to face the situation where the count rate for samples drops over the course of an assay. In this case there will be about a 1% change from the first to the last samples in three hours. With longer counting runs or repeat runs over several days this could introduce significant errors in your results.

The solution

When you are setting your LSC or measurement parameters protocol you select half-life correction as part of the advanced mode parameter. Since you will have already specified the isotope(s) used the counter will know exactly what correction to make. In addition, you can specify if you want the initial time for the correction to be the start of the counting of the assay or a date which you set. See the User manual for details of parameter setting.

Sample quality monitor

Sample inhomogeneity

One problem in liquid scintillation counting is inhomogeneity of the mixture composed of the sample being analysed and the liquid scintillation cocktail. If sample and cocktail are not adequately mixed some of the beta particles will be absorbed in the sample phase and thus not reach the scintillation liquid phase. This will appear as a reduced counting efficiency for the sample.

This happens because the external standard spectrum which is produced by the Compton electrons resulting from the gamma radiation from the external standard, is not affected by the inhomogeneity of the sample and cocktail mixture. This is because the Compton electrons are generated throughout the whole volume and thus will produce scintillations effectively. The counting efficiency might even be improved for the external standard as the quenching agents are in the sample phase.

Thus the counting efficiency obtained from the measurement of the external standard is not correct if the sample and cocktail mixture is two phased.

The sample and liquid scintillator mixture can be homogeneous when the counting starts, but as time goes the last samples can be inhomogeneous if the samples are close to the sample holding capacity of the cocktail. When using an emulsifying cocktail, the sample is suspended in "drops", micelles, in the cocktail. The micelles are small compared to the range of the beta particle energy so that absorption in the micelles is minimized. However if the sample amount is big close to the sample holding capacity the micelle start to grow which will affect the counting efficiency.

Sample Quality Monitor

Wallac WinSpectral DSA counters include a Sample Quality Monitor which can be chosen in output selection (see Output items in the User manual).

In the DPM case this monitor evaluates the amount the spectrum of the external standard and the unknown samples deviate from the library values you are using. If the deviation is not significant then the monitor gives the output "100".

If there is a significant deviation but one that might be accounted for by some fine tuning of the library then the sample quality monitor is below 95. You should check your sample and if it seems all right you should consider fine tuning the library you are using.

The Sample Quality Monitor warns you of problems with your sample as well as indicating when fine tuning is necessary.

Sample count rate variation monitor (Statistics Monitor)

The problem

Plastic vials are widely used in liquid scintillation counting and manufacturers tend to use plastic also as a rack material. Conditions are often conducive for the build-up of static charge, especially when relative humidity is low (central heating) and lab technicians have to use plastic gloves during sample preparation (as when using conventional toluene, xylene and cumene based cocktails).

The solution

Wallac WinSpectral has a built-in ionizer unit which removes static charges by sending positive and negative ions towards the vial. Since the vials in the FlexiRack™ system are raised directly into the measuring chamber without making further contact with other materials, the ionizer is very effective. The rack design also reduces static charge build-up, because the samples are located in round holes in the rack without any sharp edges which tend to collect static charges more easily.

In addition to the ionizer there is the Statistics Monitor. The purpose of this monitor is to warn of unacceptable count rate variation in a sample. The sample count rate in different periods of the sample counting time is measured to determine the sample count rate variation. A χ^2 test is used to see if the count rate

variation for each sample lies within the range expected from the statistical nature of radioactive decay. Sometimes it may not lie within this range due to, for example, chemiluminescence, radio frequency signals, static or extreme cases of normal statistical variation. In such cases of unexpectedly high sample count rate variation the sample is recounted.

The test is applied to both the sample alone and the sample with the external standard in position. A maximum of two recounts are made for each of these cases. The various flags that can appear are given in Output items in the User manual.

After a second recount (if there is one) the result of the second recount will be appear as output then counting of the next sample or repeat will begin.

The chemiluminescence monitor and correction feature as well as the special static eliminator, allow the correction of chemiluminescence if it persists, and static is eliminated anyway. However, the Statistics Monitor gives you an independent check on sample count rate variation and avoids results based on unexpectedly high sample count rate variation being accepted undetected.

Advanced statistical result evaluation

If you want to do statistical analysis on your results, as many do, especially in a research environment then your Wallac WinSpectral provides you the tools you need. You can get quench monitoring errors, DPM errors, theoretical errors, observed errors, chi-squares, to mention but a few. In addition you can select trend plots and frequency distributions. You do not need to go to an external statistics program to do the analysis.

The Spectrum Plot option allows the printout of the sample spectrum after the numerical results. The Spectrum Plot option also allows the sample spectra to be sent and stored on the datalogger, PC or Mainframe, if corresponding options are installed.

The Statistical Plot option allows a graphical presentation of the result to be added to the printout extras, e.g. sample CPM as a function of sample number. The Statistical Plot also include Levy-Jennings type plot of repeat or replicate measurements.

Alternatively you can output results to MultiCalc or Excel for further evaluation.

Other computer interfaces

Wallac WinSpectral can also save data in ASCII format files or binary WKS type files. The WKS type files can be read directly into spread sheet programs such as LOTUS 123, Symphony or EXCEL.

Spectrum analysis (option)

Note: this feature is an option for 1414 WinSpectral and can be installed later; for 1414 WinSpectral α/β and 1414 Guardian it is built-in.

Alpha counting and low level beta counting applications include spectrum analysis as a final step.

The counter saves the measured sample spectra in the connected PC. The spectra can then be analyzed off line using the Wallac Spectrum Analysis program.

The Spectrum analysis program can be installed in the PC connected to the counter but also in a PC in the researcher's office. The program offers:

- off line optimization of counting windows,
- display of up to three spectra simultaneously on screen
- smoothing and zoom function for analysis of details,
- colour graphics
- calculations of Figure of Merit, Counting Efficiency, during on screen optimization
- calculation of radio-carbon age
- calculation of tritium units/litre for ^{3}H in water
- statistical calculation and Levy-Jennings plots of repeats, replicates or cycles
- high resolution printout of measured spectra.

For the laboratory with recurring routines the Wallac Spectrum Analysis Macro Program allows macro programming of often repeated analysis routines and summing/subtraction of spectrum files.

Password protection

You can set a password to protect any protocol - LSC, fine tuning or Easy GLP. This will mean that the protocol can be used by those not knowing the password but it cannot be changed. To unlock a protocol so that you can change it you must give the password first. If the password is forgotten your local service representative can get access to the protocol.

How to proceed

Part 2 is for the User manual which you will find in the package with the program disks. This gives you all the information you need to operate Wallac WinSpectral. You can keep this manual in this Instrument manual or use it separately with the instrument.

Part 3 describes the methods used for calculating results.

Part 4 contains the Quality control information that comes with the counter.

Part 5 gives you information on how to install and start the instrument.

Part 6 presents the instrument specifications, gives safety information and describes routine maintenance that can be performed by the user.

Part 7 contains spare parts information.

Part 8 is the alphabetical index for the Instrument manual excluding the User manual, which has its own index.

We at Wallac trust that you will find your Wallac WinSpectral counter to be a powerful and reliable aid to enable you to achieve the results you want in your work.

2 User manual

The User manual from the program package can be inserted in this section of the Instrument manual if desired.

3 Calculation methods

Calculation methods

Introduction

This chapter describes the path by which the Wallac 1414 WinSpectral DSA counter arrives at the final isotope activity values using the Digital Spectrum Analysis (DSA) features such as Digital Overlay Technique (DOT). Measured count values are combined with built-in reference spectrum information which takes account of both chemical and colour quench, as well as cocktail type in order to arrive at the final activity values. Corrections such as those for chemiluminescence and half-lfe etc. are also included if required.

Activity

The DPM (or activity a) is defined as

$$a = x / e = y / t / e$$

in which x is the count rate (CPM), e is the counting efficiency and y is the number of counts collected during counting time t. The error in a, da, can be written as

$$da = \left(\frac{1}{e}\right)\sqrt{dx^2 + a^2 \cdot de^2}$$

Count rate

For a multi-label sample with m isotopes, the measured spectrum is the sum of m individual pure isotope spectra. Hence, for each channel j ($1 \le j \le n$) in the measured composite spectrum, the total count rate c_j is equal to the sum of the individual count rates x_{ij} where i ($1 \le i \le m$) designates each of the m pure isotope spectra. In mathematical terms this can be expressed as a set of linear equations:

isotope $i \rightarrow$

1	2	...	m	
$x_{1,1}$	+ $x_{2,1}$	+ ... +	$x_{m,1} = c_1$	channel 1
$x_{1,2}$	+ $x_{2,2}$	+ ... +	$x_{m,2} = c_2$	channel 2
		.		
		.		
		.		
$x_{1,n}$	+ $x_{2,n}$	+ ... +	$x_{m,n} = c_n$	channel n

For each isotope i, the individual count rate $x_{i,j}$ is a product of the (unknown) activity of the isotope a_i, the counting efficiency e_i and a scaling factor $s_{i,j}$ telling which proportion of the spectrum is in each channel j. While the activity and the efficiency are the same for all channels, each channel has its own scaling factor. The array of scaling factors $s_{i,j}$ is in fact equal to the reference spectrum of the isotope i, normalized so that the sum of all scaling factors equals 1.0. Thus,

$$x_{i,j} = s_{i,j} \cdot a_i \cdot e_i = s_{i,j} \cdot x_i$$

where x_i denotes the unknown count rate of isotope i. Using this relationship, the above set of n linear equations can be written as:

$$s_{1,1} \cdot x_1 + s_{2,1} \cdot x_2 + \ldots + s_{m,1} \cdot x_m = c_1$$
$$s_{1,2} \cdot x_1 + s_{2,2} \cdot x_2 + \ldots + s_{m,2} \cdot x_m = c_2$$
$$\vdots$$
$$s_{1,n} \cdot x_1 + s_{2,n} \cdot x_2 + \ldots + s_{m,n} \cdot x_m = c_n$$

Introducing matrix notation, this set of n linear equations can be written as

$$S * X = C$$

where S denotes an m-by-n matrix containing the m reference spectra s_i. C is an array (or column vector) comprising the n measured count rates c_j and X is an array (or row vector) comprising the m unknown count rates x_i to be determined. In the case of single label counting, the matrix S is reduced to a column vector of length n.

As the number of equations n is much larger than the number of unknowns m, this set must be solved by using the method of least squares. In practice, the method of weighted least squares is preferred in which the statistical accuracy of each count rate in C is taken into account. The solution can be written as

$$X = (S^T * W^{-1} * S)^{-1} * (S^T * W^{-1} * C) = G * (S^T * W^{-1} * C)$$

where S^T represents the transpose of the model matrix S and W^{-1} represents the inverse of the weight matrix W. The matrix W is an n-by-n matrix in which the diagonal elements are equal to the weight of each channel j and all other elements are equal to zero. A suitable weight value w_j is the inverse of the number of counts in channel j.

The errors in the vector X, dx_i, due to the reference spectrum fitting, are given by the equation

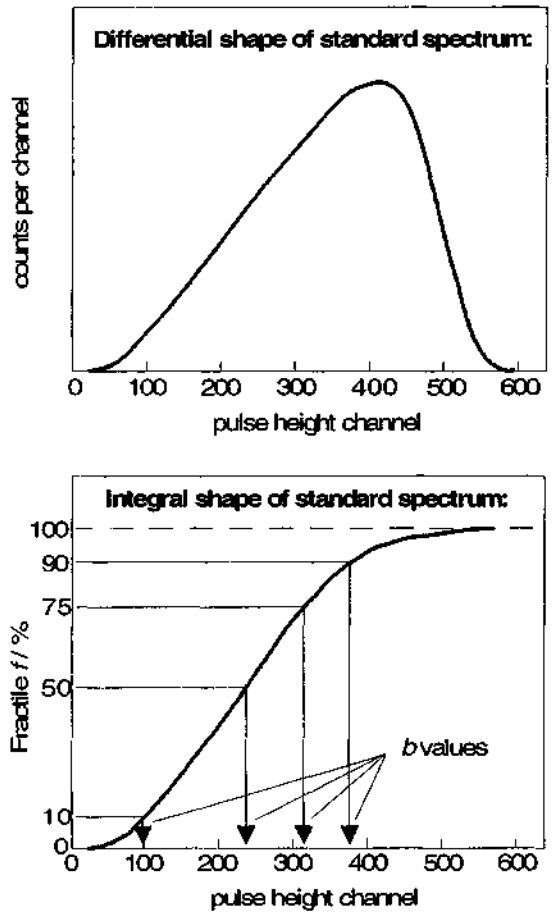
$$dx_i = \sqrt{|g_{i,i}|} \quad (1 \le i \le m)$$

in which $g_{i,i}$ denotes a diagonal element in the matrix G defined above.

Reference spectra

The built-in reference spectra s_i are stored in the spectrum library by using Fractile Integral Presentation (FIP). The spectrum library data for an isotope is produced by measuring in the factory from 60 to 80 standards of the isotope. In this standard set there is one subset with only chemical quench, one subset with only colour quench and one subset with a mixture of both. The spectra are stored in integral form reduced to a limited number of channel values (real numbers b_u, $1 \le u \le q$) corresponding to q predetermined percentage values (fractiles f_u) of the total integral intensity (=100%). Thus each spectrum is reduced to q fractile channels with value b_u. The b_u values depend on the quench level in a well behaved manner which can be described as a function of a suitable quench index.

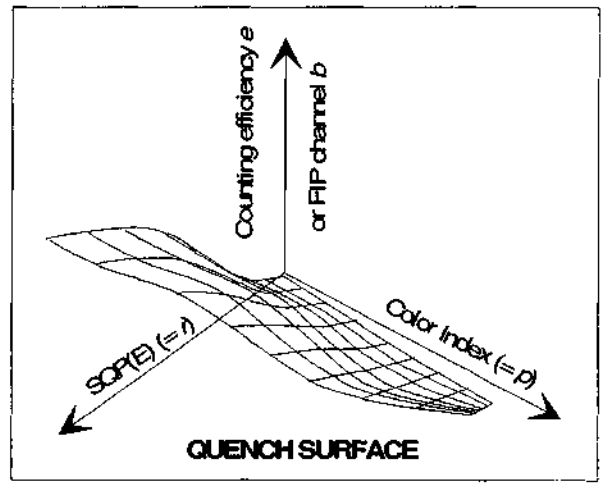
Conversion of spectrum to FIP format



In Wallac WinSpectral, two quench indices are used: the total quench level (SQP(E) or p) and the colour quench level (Colour or r). The variable p is equal to the overall quench level index determined from the end-point of the external standard spectrum (see below), while r is equal to the colour index determined from the left-right dispersion of the external standard pulses (see below). Thus each fractile channel b_u can be described by a surface function of the form

$$b_u(p,r) = \sum_{k=1}^{l} h_{u,k} \sqrt{(p-p_k)^2 + (r-r_k)^2 + h_0} \quad (\text{for } 1 \le u \le q)$$

where $h_{u,k}$ are l parameters defining the surface, h_0 is a constant, and p_k and r_k are l coordinate pairs defining a grid (lattice) on the surface. The constant h_0 and the grid points p_k and r_k are the same for all b_u parameters.



A complete reference spectrum is arrived at by first computing the b_u parameters, interpolating this array and differentiating the result. Notice that errors in the reference spectra are considered to be unimportant.

Counting efficiency

The counting efficiency e is also a function of the two quench indices, p and r. The counting efficiency e is a surface function defined as

$$e(p,r) = \sum_{k=1}^{l} h_k \sqrt{(p-p_k)^2 + (r-r_k)^2 + h_0}$$

where h_k are l parameters defining the shape of the surface, h_0 is a constant, and p_k and r_k are l coordinate pairs defining a grid (lattice) on the surface. The error in e, de, is a function of the errors in p and r (dp and dr).

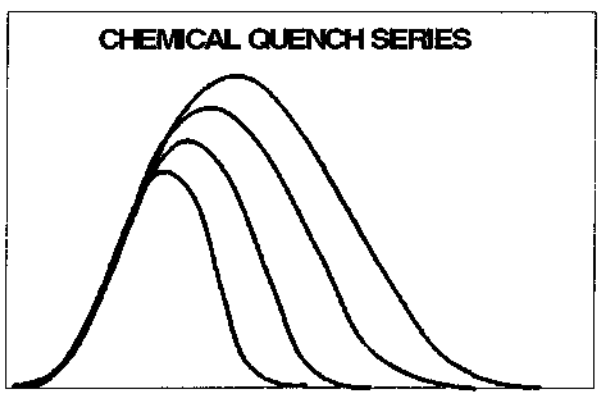
$$\frac{\partial e}{\partial p} = \sum_{k=1}^{l} \left\{ \frac{h_k \cdot (p-p_k)}{\sqrt{(p-p_k)^2 + (r-r_k)^2 + h_0}} \right\}$$

$$\frac{\partial e}{\partial r} = \sum_{k=1}^{l} \left\{ \frac{h_k \cdot (r-r_k)}{\sqrt{(p-p_k)^2 + (r-r_k)^2 + h_0}} \right\}$$

and, finally

$$de^2 = \left(\frac{\partial e}{\partial p}\right)^2 \cdot dp^2 + \left(\frac{\partial e}{\partial r}\right)^2 \cdot dr^2$$

Total quench index



The total quench index p is defined by the expression

$$\sum_{j=p}^{ul} c_j = z \cdot c_{tot} = z \cdot \sum_{j=ll}^{ul} c_j$$

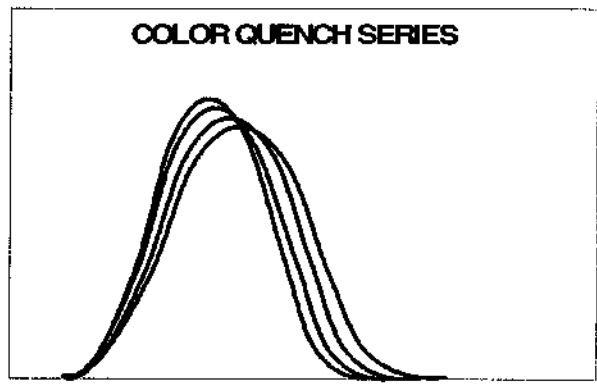
in which j denotes the pulse height channel, ul denotes the upper pulse height limit, ll denotes the lower limit and z is a constant (=0.01). The external standard spectrum is here rather treated as a continuous distribution $c(j)$ instead of a discrete distribution c_j in order to facilitate greater detail in determining p which is hence not an integer but a real number:

$$\int_{p}^{ul} c(j)\, dj = z \cdot c_{tot}$$

The error dp is given by the expression

$$dp = \left(\frac{1}{c_j}\right) \sqrt{(1-z) \cdot z \cdot c_{tot}} \quad (\text{for } j = \text{int}(p))$$

Colour index



The colour index r is defined by the equation

$$r = 1 + \frac{y_a}{y_b}$$

where y_a denotes the number of counts above the left/right or right/left pulse height criterion limit and y_b denotes the number of pulses below this limit. Hence, the error dr is given by

$$dr = (r-1) \sqrt{\frac{1}{y_a} + \frac{1}{y_b}}$$

Spectrum quench index

The spectrum quench index SQP(I) can be used as an alternative to SQP(E) and Colour index for quench monitoring and activity calculations. SQP(I) is defined by the equation

$$SQP(I) = \frac{\sum_{i=ll}^{ul} i \cdot y_i}{\sum_{i=ll}^{ul} y_i}$$

where *ll* and *ul* are the lower and upper limits of the spectrum. When using SQP(I), the Colour index is assumed to be equal to the value for an uncoloured sample.

The error in SQP(I) is expressed as:

$$dSQP(I) = \frac{1}{c_{tot}} \sqrt{\frac{1}{c_{tot}} \sum_i i^2 c_i - SQP(I)^2}$$

$$= \sqrt{\frac{1}{c_{tot}^2} \left(\sum_i i^2 c_i - c_{tot} \cdot SQP(I)^2 \right)}$$

$$= \frac{1}{c_{tot}} \sqrt{\left(\sum_i i^2 c_i - c_{tot} \cdot SQP(I)^2 \right)}$$

where $c_{tot} = \sum_i c_i$

Background correction

If a background sample is measured, then the count rate c_j is corrected by subtraction

$$c_{jcorr} = c_j - c_{jbkg}$$

where c_{jcorr} is the corrected count rate in channel j and c_{jbkg} is the measured count rate in channel j. In this case the correction is made before spectrum fitting.

If a background value is submitted, then the count rate x_i is corrected after spectrum fitting.

Half-life correction

Half-life correction is performed on the count rate x and the activity a after spectrum fitting by using the equation:

$$x_{corr} = x \cdot \frac{t_2 - t_1}{t_{1/2}} \left[e^{-\ln(2) \cdot t_1 / t_{1/2}} - e^{-\ln(2) \cdot t_2 / t_{1/2}} \right]$$

where ln(2) is the natural logarithm of 2, t_1 is the time elapsed at the beginning of the counting period since the reference time, t_2 is the time elapsed at the end of the counting period since the reference time and $t_{1/2}$ is the half-life.

Chemiluminescence correction

A chemiluminescence spectrum is recorded at the same time as the normal (uncorrected) spectrum by using the delayed coincidence principle. After measurement, the measured spectrum is corrected by subtracting the delayed spectrum from the normal spectrum channel by channel. The percentage of chemiluminescence (CLM%) is computed by the formula

$$CLM\% = 100\% \cdot \frac{y_{del}}{y}$$

where y_{del} is the number of counts in the delayed spectrum and y is the number of counts in the normal spectrum.

Statistics of repeat/replicate counting

The mean value of n count values y_i is

$$y = \frac{1}{n} \sum_i y_i$$

Note: It is assumed that the counting times of all n repeats/replicates are the same.

The theoretical standard error σ_i (or standard deviation) of each measurement is equal to $\sqrt{y_i}$. The standard error σ of the n measurements is equal to

$$\sigma = \sqrt{\frac{1}{(n-1)} \cdot \sum_i (y - y_i)^2}$$

while the observed standard error σ_{y_o} of the mean is equal to

$$\sigma_{y_o} = \frac{\sigma}{\sqrt{n}}$$

The theoretical standard error σ_{y_t} of the mean is equal to

$$\sigma_{y_t} = \frac{1}{n} \sqrt{\sum_i \sigma_i^2} = \frac{1}{n} \sqrt{\sum_i y_i}$$

The theoretical standard error σ_{y_t} can be compared to the observed standard error σ_{y_o} by using the reduced χ_r^2 ("Chi-square") value:

$$\chi_r^2 = \frac{\sigma_{y_o}^2}{\sigma_{y_t}^2}$$

The degree to which χ_r^2 deviates from unity is a direct measure of the extent to which the observed error deviates from the theoretical. χ_r^2 multiplied by the 'degrees of freedom' *(=n-1)* can be used to determine a probability that a random sample from a normal distribution would have a larger (or smaller) value of χ^2 than the observed value.

List of symbols used

a = activity (DPM)
b = FIP channel
c = measured total count rate (CPM)
c_j = measured channel count rate (CPM)
C = an array (or column vector) comprising the measured count rates c_j
d = error in function or parameter
e = counting efficiency
f = fractile value
$g_{i,i}$ = diagonal element of matrix G
G = the matrix $(S^T * W^{-1} * S)^{-1}$
h = surface function parameter
i = index to isotope
j = index to channel
k = index to surface function parameter
l = number of parameters defining the surface
m = maximum number of isotopes
n = maximum number of channels or number of repeats/replicates
p = total quench index (SQP(E))
q = number of fractiles f
r = colour quench index (Colour)
s_i = reference spectrum, a column in S
$s_{i,j}$ = channel value in reference spectrum, an element in the matrix S
S = a matrix containing the reference spectra s_i.
t = counting time or elapsed time
$t_{1/2}$ = half-life
u = index to fractile f and FIP channel b
w_j = weight value for channel j, a diagonal element in the matrix W
W = the weight matrix
x_i = unknown total count rate for isotope i, an element in the array X
$x_{i,j}$ = unknown channel count rate for isotope i
X = an array (or row vector) comprising the count rates x_i
y = number of counts
z = fractile for total quench index p
σ = standard error at 68.3% confidence limit (= standard deviation)
χ_r^2 = reduced chi square

4 Quality control information

QC Contents

PROTOCOL : 1 MAPPING
DATE : 1998/02/11
TIME : 15:26
ID : P01SS030

Quench Standardization

Wallac 1400 DSA ver 2.50 S/N 4140189
Counting mode : DPM
Quench index : SQP(E)
Isotope(s) : H3
H3 = ,12.43 y
Protocol name : MAPPING
Counting time : 600
Activity (DPM) : 194500
2 sigma % : 0.01
Minimum cpm : 0.00 Checking time: 10
Vial type : Clear
Liquid system : Xylene
Advanced modes : Halflife
Halflife zerotime :
Zerotime of H3 : 1997/07/01 ,10:00:00
Output to Printer :
CTIME,CPM1,CPMer1,EFF1,SQPE,SQPEer
Additions to Printer : Listing
Spectrum : Beta

Quench standard samples:

CTime	H3_CPM	H3_CPMer	H3_Eff%	SQPE	SQPEer
600	1945.0	0.00	1.00	965.15	0.04

E E P R O M L I S T I N G

LRC = 199 A0 = 100 A1 = 0

TEMP = 25.0

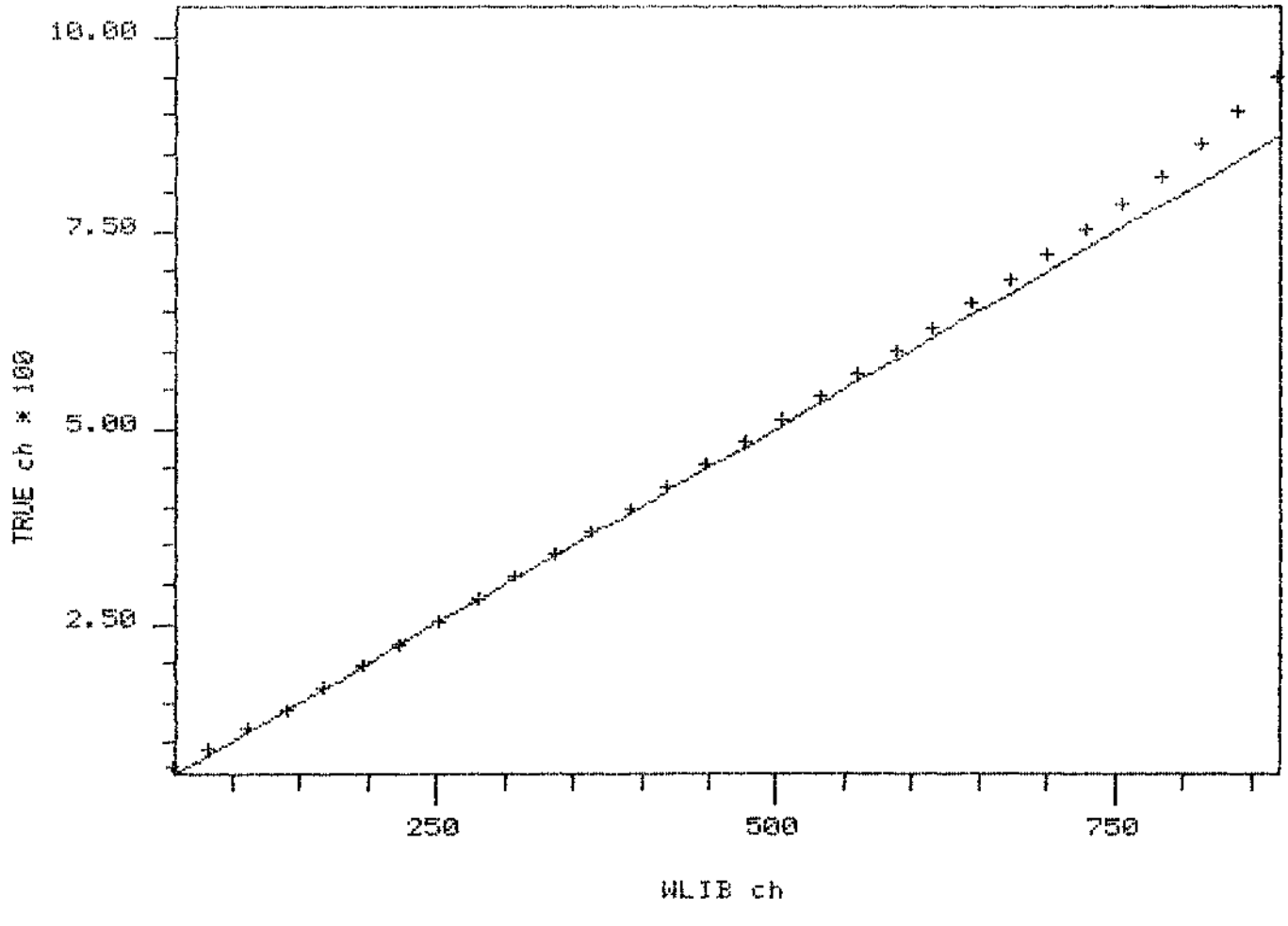
CONV STEPS = 112

M a p p i n g d a t a

Channels:	WLIB	TRUE	TRUE-WLIB
	0.0	0.0	0.0
	47.9	58.6	10.7
	93.3	98.2	4.9
	137.8	137.5	-0.3
	156.1	154.6	-1.5
	173.9	171.9	-2.0

191.7	189.6	-2.1
210.6	208.6	-1.9
677.2	692.4	15.2
740.9	765.3	24.4
793.3	831.5	38.2
880.6	965.1	84.6
889.2	979.5	90.3
915.3	1023.0	107.8

Mapping Curve



Total activity: H3 194500.0 DPM 3.242 kBq

PROTOCOL : 9 3H, 14C, BG Wallac std.
DATE : 1998/02/13
TIME : 16:33
ID : P09AS018

Wallac 1414 WinSpectral v1.30 S/N 4140189

Counting mode	: CPM
Isotope(s)	: H3,C14
H3	= 5- 350,12.43 y
C14	= 5- 660,5730.00 y
Protocol name	: 3H, 14C, BG Wallac std.
Counting time	: 1200
Repeats	: 4
Cycles	: 1
Replicates	: 1
2 sigma %	: 0.30
Minimum cpm	: 0.00 Checking time: 10
Output to Printer	:
POS,CTIME,CPM1,CPM2,SQPI,SQPE	
Additions to Printer	: Listing
Output to Display	:
POS,RACKPOS,CPM,RPT,SQPI,CPM1,CPM2	
Additions to Display	: Listing,Spectrum
Spectrum	: Beta
Window 1	: 1-1024 /Beta
Window 2	: 1-1024 /Beta
Window 3	: 1-1024 /Beta
Window 4	: 1-1024 /Beta
Window 5	: 1-1024 /Beta
Window 6	: 1-1024 /Beta
FNCT1 = FNCT1	:
FNCT2 = FNCT2	:
FNCT3 = FNCT3	:
FNCT4 = FNCT4	:

Unknown samples:

Pos	CTime	H3_CPM	C14_CPM	SQPI	SQPE	
1	222	127295.2	127402.2	176.41	966.42	
1	223	127472.4	127566.7	175.94	966.12	
1	223	127405.0	127507.1	176.00	965.14	
1	223	127462.2	127563.1	176.01	965.16	
						REPEATS
	222	127408.7	127509.8	176.09	965.71	= Mean
	0	81.3	76.7	0.22	0.66	= St.Dev.

Pos	CTime	H3_CPM	C14_CPM	SQPI	SQPE	
2	274	26908.0	102616.2	419.89	963.68	
2	275	27007.7	102489.5	419.50	961.01	
2	275	27140.1	102521.8	419.29	961.53	
2	276	26906.3	102098.8	419.38	963.36	
						REPEATS
	275	26990.5	102431.6	419.52	962.40	= Mean
	0	110.4	228.3	0.26	1.32	= St.Dev.

Pos	CTime	H3_CPM	C14_CPM	SQPI	SQPE	
3	1200	16.8	23.8	388.55	965.66	
3	1200	17.1	23.2	389.95	967.15	
3	1200	15.9	23.2	412.37	966.59	
3	1200	16.7	24.1	407.87	968.22	
						REPEATS
	1200	16.6	23.6	399.69	966.91	= Mean
	0	0.5	0.5	12.20	1.07	= St.Dev.

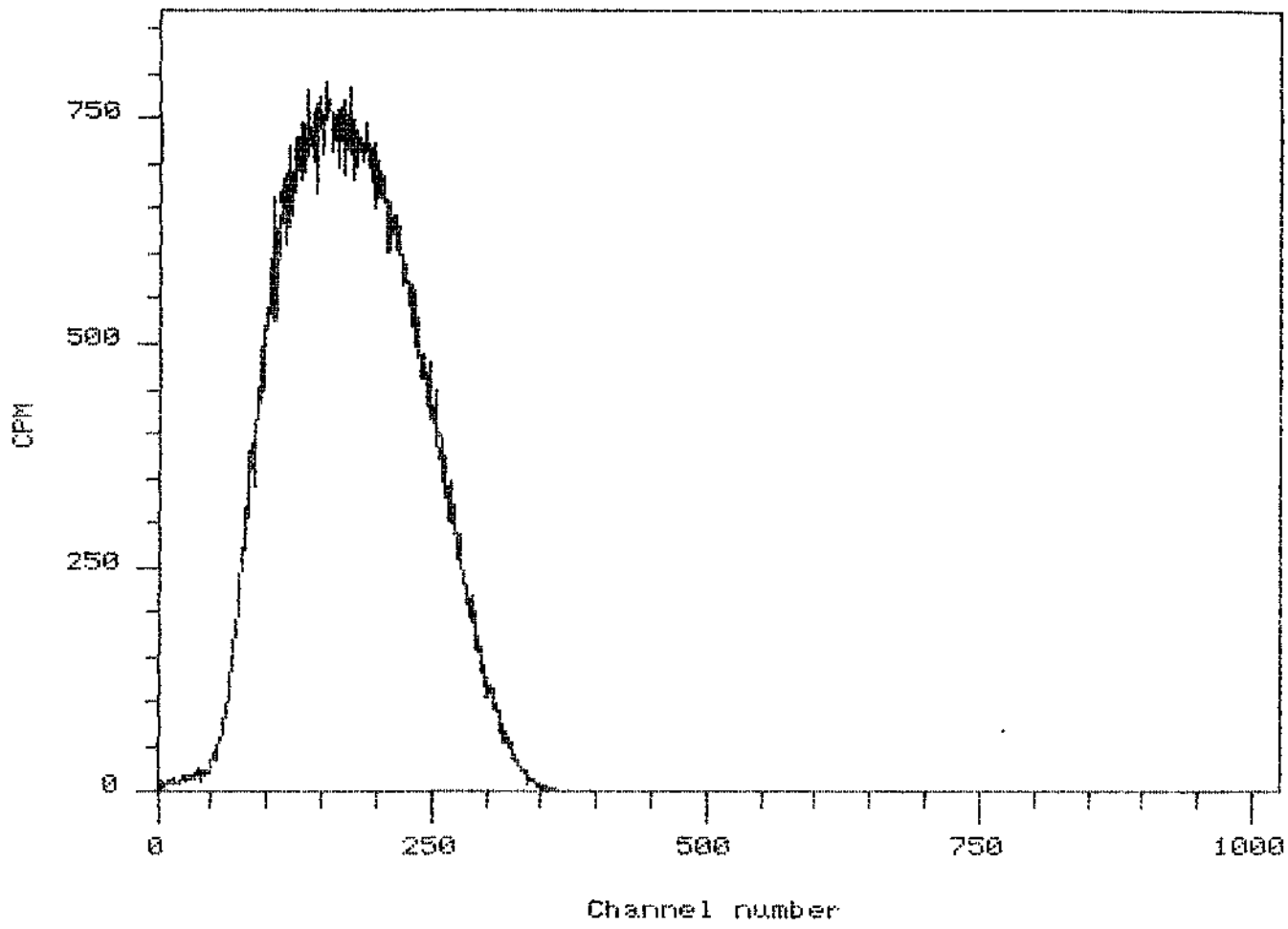
Total count rate: H3 154415.9 CPM
C14 229964.9 CPM

PROTOCOL : 8 SPECTRUM
DATE : 1998/02/16
TIME : 09:35
ID : P08AS016

Unknown samples:

Pos	CTime	H3_CPM	C14_CPM	SQPI	SQPE
1	120	127526.4	127612.9	175.77	966.40

Spectrum Plot



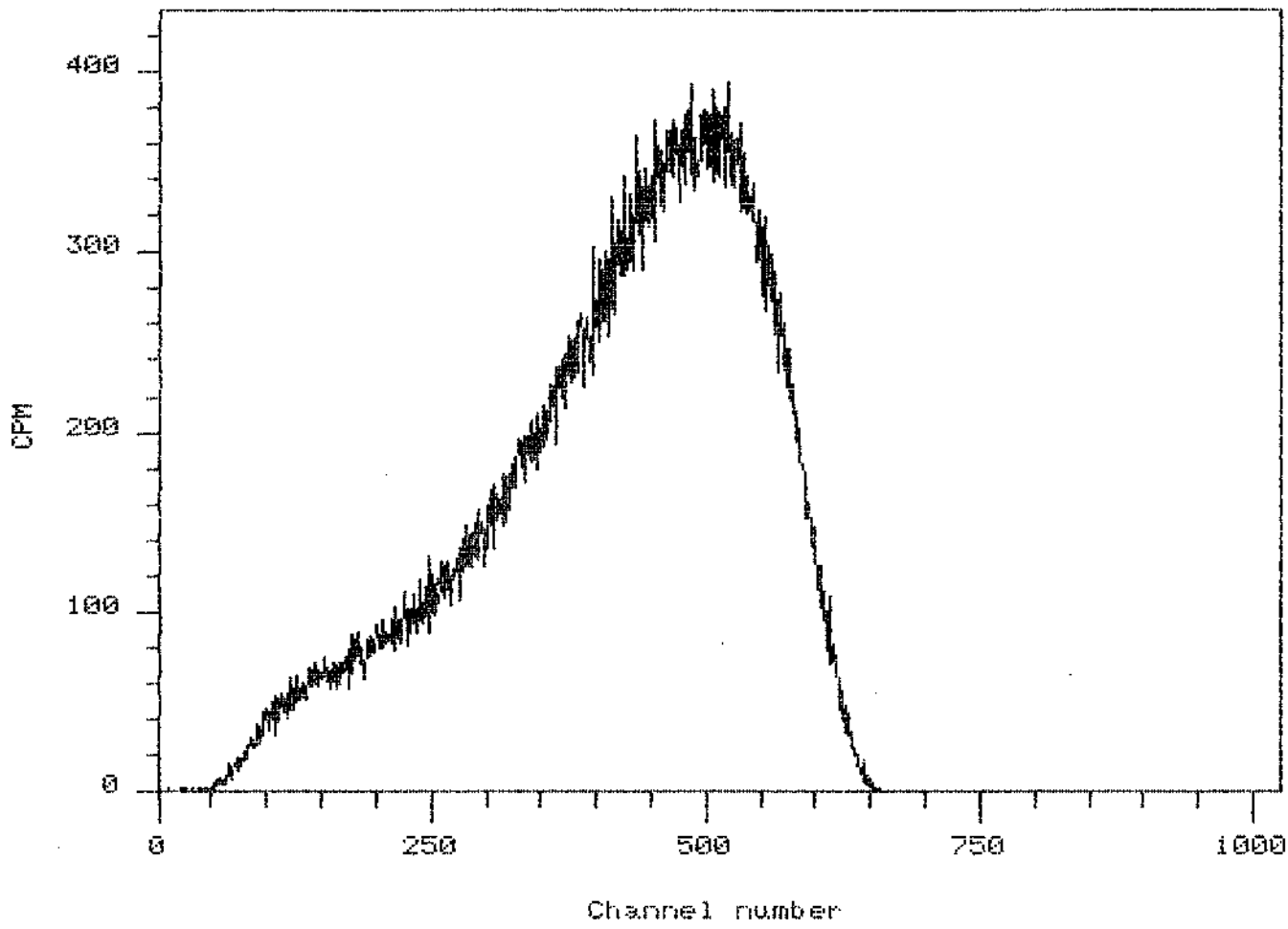
Total count rate: H3 127526.4 CPM
C14 127612.9 CPM

PROTOCOL : 8 SPECTRUM
\TE : 1998/02/16
TIME : 09:40
ID : P08AS017

Unknown samples:

Pos	CTime	H3_CPM	C14_CPM	SQPI	SQPE
2	120	27225.9	102986.0	418.90	963.06

Spectrum Plot

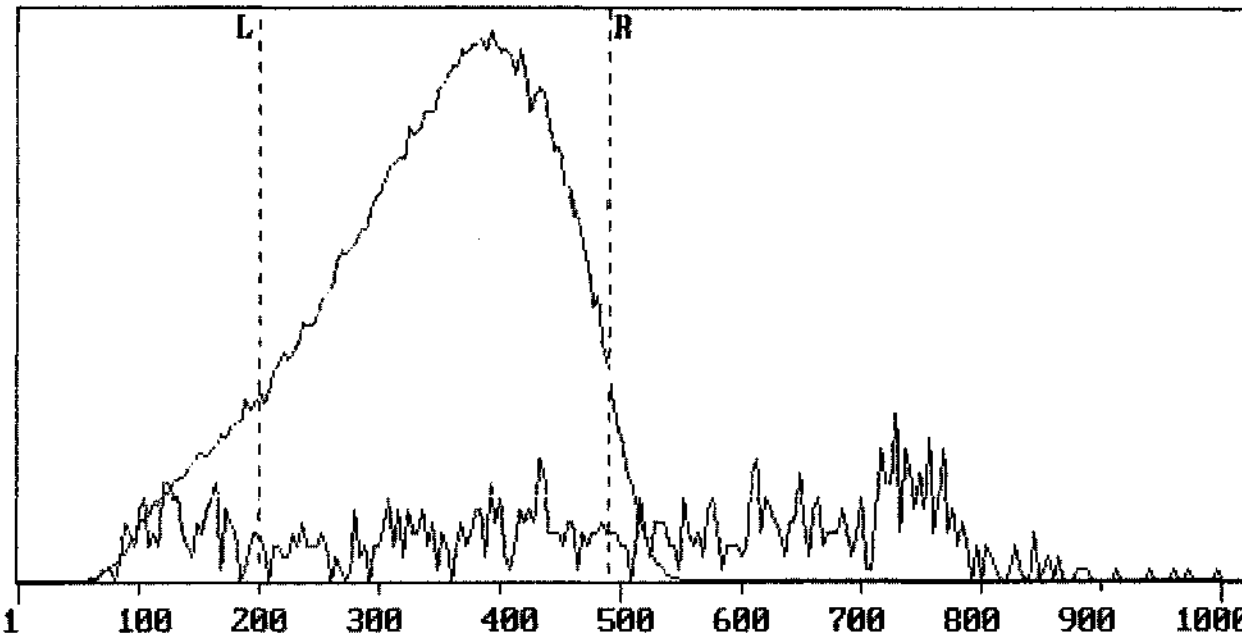


Total count rate:

H3	27225.9 CPM
C14	102986.0 CPM

```
PROTOCOL : 15  14C Benz. protocol
DATE     : 1998/02/17
TIME     : 16:03
FILE     : A:Ç4140189ÇP15AS016.TXT
ID       : P15AS016

Wallac 1414 WinSpectral v1.30 S/N 4140189
Counting mode                  : CPM
Isotope(s)                     : C14
C14                             =    5- 660,5730.00 y
Protocol name                  : 14C Benz. protocol
Counting time                  : 14400
Repeats                        : 1
Cycles                         : 1
Replicates                     : 1
2 sigma %                      : 0.50
Minimum cpm                    : 0.00 Checking time: 10
Advanced modes                 : PSA,PAC
PSA level                      :  85
PAC level                      : 163
Output to  Printer             :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1
Additions to Printer           : Listing
Output to  Display             :
  POS,RACKPOS,CPM,SQPI,CPM1
Additions to Display           : Listing,Spectrum
Path of File                   : a:Ç4140189
Output to  File                :
  POS,CTIME,SQPI,CPM1,CPM2,CPM3,FNCT1
Additions to File              : Spectrum,Listing
Spectrum                       : Beta
Window 1                       :  200- 500 /Beta
Window 2                       :  200- 500 /PACRejß
Window 3                       :  200- 500 /Alpha
Window 4                       :    1-1024 /Beta
Window 5                       :    1-1024 /Beta
Window 6                       :    1-1024 /Beta
FNCT1 = FNCT1                  : (100*CPMW1/103600)
FNCT2 = FNCT2                  :
FNCT3 = FNCT3                  :
FNCT4 = FNCT4                  :


Unknown samples:

 Pos  CTime    SQPI      CPMw1      CPMw2      CPMw3 FNCT1
   1    115  339.50    78617.2     2381.9     1225.1  75.9
   2  14400  478.95        1.2        0.4        0.1   0.0

Total count rate:              C14     88774.1 CPM
```

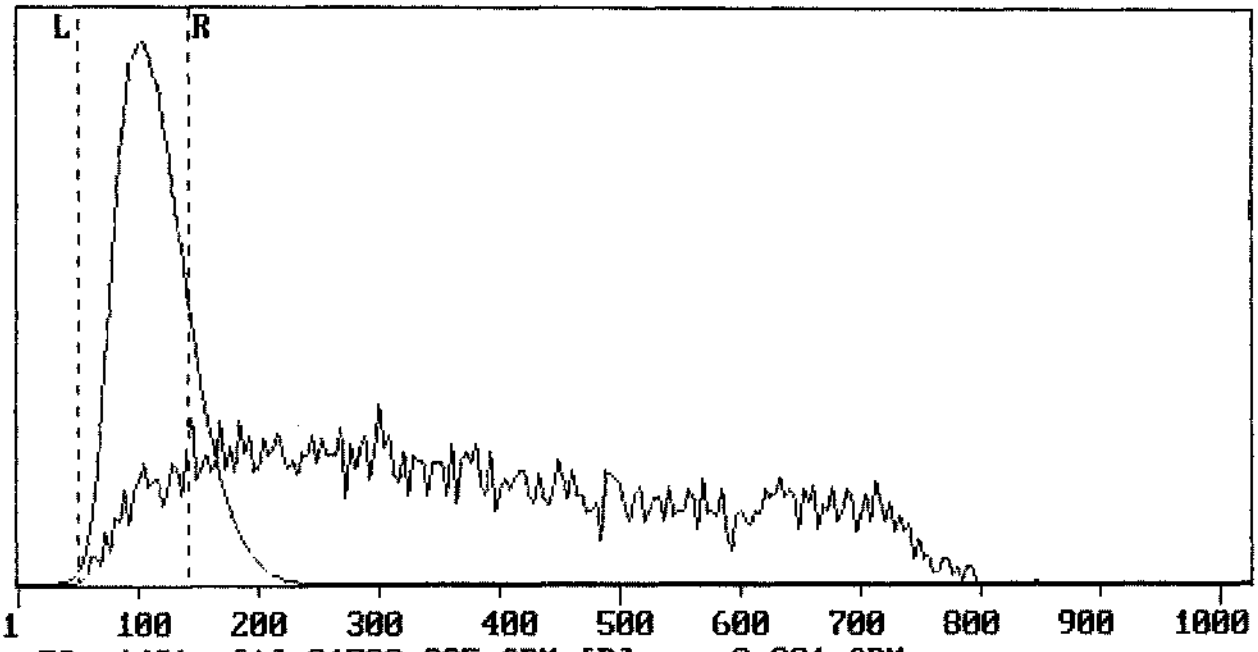
[A] 390.000 CPM/ch 1.81 min A:\4140189\P15AS016\S0010101.001 SP# 1
[B] 0.052 CPM/ch 231.14 min A:\4140189\P15AS016\S0020101.001 SP# 1



INTEGR(200- 491) [A] 77670.805 CPM [B] 1.177 CPM
BUNCH= 4 * FM * (103600.00 DPM) FM {[A],[B]}= 4777 (E= 74.98 %)

```
PROTOCOL : 16  3h qs 8+12 PROTOCOL
DATE     : 1998/02/17
TIME     : 20:07
FILE     : A:Ç4140189ÇP16AS017.TXT
ID       : P16AS017

Wallac 1414 WinSpectral v1.30 S/N 4140189
Counting mode                  : CPM
Isotope(s)                     : H3
H3                              =    5- 350,12.43 y
Protocol name                  : 3h qs 8+12 PROTOCOL
Counting time                  : 14400
Repeats                        : 1
Cycles                         : 1
Replicates                     : 1
? sigma %                      : 0.30
Minimum cpm                    : 0.00 Checking time: 10
Advanced modes                 : Halflife,PSA,PAC
Halflife zerotime              :
Zerotime of H3                 : 1993/04/01 ,00:00:00
PSA level                      : 205
PAC level                      : 120
Output to  Printer             :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1
Additions to Printer           : Listing
Output to  Display             :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1,RACKPOS,CPM,CPM1,RPT,DPM1
Additions to Display           : Spectrum,Listing
Path of File                   : a:Ç4140189
Output to  File                :
  POS,CTIME,SQPI,CPM1,CPM2,CPM3,FNCT1
Additions to File              : Spectrum,Listing
Spectrum                       : Alpha,Beta,PACRejß
Window 1                       :   20- 200 /Beta
Window 2                       :   20- 200 /PACRejß
Window 3                       :   20- 200 /Alpha
Window 4                       :    1-1024 /Beta
Window 5                       :    1-1024 /Beta
Window 6                       :    1-1024 /Beta
FNCT1 = FNCT1                  : (100*CPM1/(207500))
FNCT2 = FNCT2                  :
FNCT3 = FNCT3                  :
FNCT4 = FNCT4                  :


Unknown samples:

 Pos  CTime    SQPI      CPMw1      CPMw2      CPMw3 FNCT1
   1    742  112.01    37358.6     1012.3     2229.9  23.8
   2  14400  376.98       4.1        0.2        1.5   0.0

Total count rate:              H3     49359.1 CPM
```

[A] 550.000 CPM/ch 11.82 min A:\4140189\P16AS017\S0010101.001 SP# 1
[B] 0.160 CPM/ch 231.06 min A:\4140189\P16AS017\S0020101.001 SP# 1

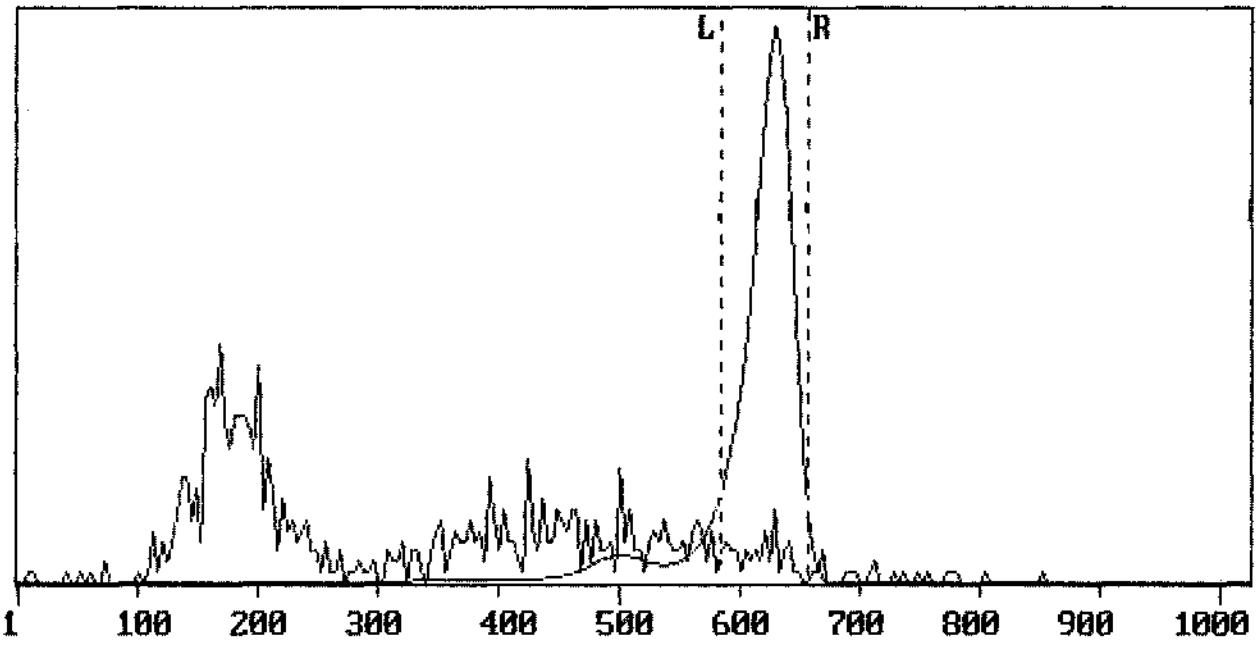


INTEGR(50- 143) [A] 31700.805 CPM [B] 2.021 CPM
BUNCH= 4 * FM * (158020.97 DPMco) FM {[A],[B]}= 199 (E= 20.06 %)

Isotope: H-3 Half Life = 12.43 Y
STANDARD preparation date = 01.04.93 12:00 207500.00 DPM
measurement date = 17.02.98 12:00 158020.97 DPM (decay corr.)
decay ratio (A/Ao) = 0.7615

```
PROTOCOL : 17  Am & Sr & Bg Ophs3 protocol
DATE     : 1998/02/18
TIME     : 00:23
FILE     : A:Ç4140189ÇP17AS001.TXT
ID       : P17AS001

Wallac 1414 WinSpectral v1.30 S/N 4140189
Counting mode                    : CPM
Isotope(s)                       : H3
H3                                =    5- 350,12.43 y
Protocol name                    : Am & Sr & Bg Ophs3 protocol
Counting time                    : 14400
Repeats                          : 1
Cycles                           : 1
Replicates                       : 1
? sigma %                        : 1.00
Minimum cpm                      : 0.00 Checking time: 10
Advanced modes                   : PSA
PSA level                        :  38
Output to  Printer               :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1
Additions to Printer             : Listing
Output to  Display               :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1,RACKPOS,CPM,CPM1
Additions to Display             : Spectrum,Listing
Path of File                     : a:Ç4140189
Output to  File                  :
  POS,CTIME,SQPI,CPMw1,CPMw2,CPMw3,FNCT1
Additions to File                : Spectrum,Listing
Spectrum                         : Alpha,Beta
Window 1                         :  570- 670 /Beta
Window 2                         :  570- 670 /Alpha
Window 3                         :    1-1024 /Beta
Window 4                         :    1-1024 /Beta
Window 5                         :    1-1024 /Beta
Window 6                         :    1-1024 /Beta
FNCT1 = FNCT1                    : (100*CPMW2/(CPMW1+CPMW2))
FNCT2 = FNCT2                    :
FNCT3 = FNCT3                    :
FNCT4 = FNCT4                    :


Unknown samples:

 Pos  CTime     SQPI       CPMw1       CPMw2       CPMw3 FNCT1
   1  12542   339.48        13.0      9881.6       199.1  99.9
   2    292   548.63      1507.2         7.7      8539.2   0.5
   3  14400   389.54         6.3         0.3        49.0   4.0

Total count rate:                H3       1296.2 CPM
```

[A] 240.000 CPM/ch 200.91 min A:\4140189\P17AS001\S0010101.001 SP# 4
[B] 0.060 CPM/ch 231.09 min A:\4140189\P17AS001\S0030101.001 SP# 4



INTEGR(584- 657) [A] 9404.063 CPM [B] 0.195 CPM
BUNCH= 4 * FM * (9894.60 DPM) FM {[A],[B]}= 46385 (E= 95.04 %)

WALLAC

AN EG&G COMPANY

FINAL TEST DATA SHEET (FTDS)

INSTRUMENT S/N : 4140189

HV - GENERATOR EPM-A OUTPUT	VOLTAGE DROP * OVER RFA (RRH)	PMT VOLTAGE (calculated)
1991 V	L = 391 V	1626 V
	R = 414 V	1583 V

GUARD		
	G1 = 369 V	1628 V
	G2 = 390 V	1627 V

EBU - INTEGRATORS	
	LINT = -0,2 V
	RINT = -1,3 V

* DVM input impedance 10 MΩ

PERFORMANCE WITH SUPPLIED STANDARDS

H-3				C-14		
E%	BG	SQP(I)	SQP(E)	E%	BG	SQP(I)
64,8	17	176	966	96,6	24	420

LRC VALUE =	199
LRC C1 (A0) =	110
LRC C2 (A1) =	109

CONV. STEPS =	112

Base mapping data	
0d	-6
1d	-6
2d	-6
3d	0
4d	0

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UNQUENCHED LSC STANDARD

for

Liquid Scintillation Counter

Product No. : 1215-111

CERTIFICATE

Radioactive isotopes: **tritium, carbon-14** and **blank**

The absolute activities of standards and the reference dates for all standards are as follows:

^{3}H : 194500 dpm 1. Jul 1997 Ref. Date

^{14}C : 106000 dpm Nov 1997 Ref. Date

Blank : Feb 1997 Ref. Date

The 1215-111 is from the production Lot No.: 9702 A ;

Product Description: The 1215-111 Liquid Scintillation Standards set consists of two activity standards and one blank standard. The activity standards are precisely calibrated, sealed unquenched samples of carbon-14 labelled [1-14C] stearic acid and tritium labelled [7(n)-3H]-cholesterol in 10 ml of xylene based scintillation solution. The labelled compounds are produced by DuPont NEN, Belgium and Amersham International, UK. The unquenched blank standard is a sample of 10 ml of xylene based scintillation solution. The standards are supplied in 20 ml capacity low potassium content Wheaton vials. These are flame-sealed and secured with white silicon mastic and an aluminum cap. Standards are deoxygenated with pure nitrogen before sealing.

Activity Calibration : The tritium standards are calibrated against reference standards of tritium labelled toluene by the National Institute of Standards and Technology (NIST), Standard Reference Material (SRM) No. 4947C, the estimated accuracy of which was ± 1.2%. The Carbon-14 standards are calibrated against reference standards of n-hexadecane-1-14C supplied by the National Institute of Standards and Technology, Standard Reference Material (SRM) No. 4222C, the estimated accuracy of which was ± 0.81%. The absolute activity of the standards is within ± 0.5% of the reference standards of NIST SRM's.

On behalf of the Quality Control Department

Wallac Oy
P.O. Box 10
SF -20101 Turku
Finland

Definition of Use: The 1215-111 unquenched standards set is intended for use with LS-counter Serial No: 414018; to calibrate the instrument and measure day-to-day ^{3}H and ^{14}C counting efficiencies and background for comparison with original factory specifications and for verifying stable system performances. For specific instructions on the use of these standards with an LS-counter, the Instrument manual should be consulted.

Precautions on Storage and Use : Fluors are susceptible to photo-chemical degradation. The standard set should be stored in a dark place at room temperature. Recommended shelf-life is not more than 5 years.

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AN EG&G COMPANY

M. Ala-Uotila

Doc. no 1096 1059

Electrical safety routine test report

Product name	1400 DSA	
Product number	1414- 003	
Serial number	41401[illegible]	
Test description	Limits	Test results
Protective Earth Continuity Measured between the ground terminal of the mains connector and accessible metal parts.	max. 0.10 ohm	0.02 ohm
Dielectric Strength 1500 V AC is applied between the mains input and the ground terminal for 1 minute.	The leagake current rejection limit is 12.5 mA, including the current through EMI suppression capacitors. *(Defined in the UL-Client's Test Data Program)*	Result of the test passed Signature [illegible]
Earth Leakage Current The current through the ground lead is measured during normal operation. The test is repeated with mains polarity reversed.	max. current 0.50 mA max. current 0.50 mA	0.26 mA 0.25 mA

The tests have been performed with the measuring equipment which belong to the regular Wallac calibration program.

Tests performed by: [illegible] **Date:** 18.02.1998

1390 3693

WALLAC
AN EG&G COMPANY

DECLARATION OF CONFORMITY FOR CE-MARKING

We

Supplier's name
WALLAC OY
Address
PL 10, 20101 TURKU, FINLAND

declare under our sole responsibility that the product

Name, type or model, lot, batch or serial number, possibly sources and numbers of items
1414 Liquid Scintillation Counter **Valid from serial number 4140044**

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

Title and/or number and date of issue of the standard(s) or other normative document(s)
EN 50082-1 :1992; EN 50081-1 :1992
EN 61010-1 :1993

(if applicable) following the provisions of the following directives

Electromagnetic compatibility (EMC), 89/336/EEC
Low voltage (LV), 73/23/EEC

Place and date of issue
12 Nov. 1997 Turku, Finland
Name and signature or equivalent marking of authorized person
Heikki Kouru, Quality Assurance Manager

wallac

AN EG&G COMPANY

1096 1060

Quality Control Report

Name of Product:	1400-Series Liquid Scintillation Counters
Manufacturer:	Wallac Oy, Turku, Finland
Function Tested:	Classification of External Standard Capsule Eu-152 according to ISO 2919.
Activity of the capsule:	440 kBq

CERTIFICATION

Eu-152 External standard source has been tested according to ISO 2919 - 'Sealed Radioactive Sources - Classification'.

The tests are:

Test	Class	Short definition
Temperature	4	- 40 °C (20 min) + 400 °C (1 h) and thermal shock to 20 °C
Ext. pressure	3	25 kPa abs. to 2 MPa abs.
Impact	4	2000 g from 1 m
Vibration	3	2 times 10 min, two axes 25 Hz to 50 Hz/5G, 50 Hz to 90 Hz/0.635 mm amplitude, 90 Hz to 400 Hz/10G
Puncture	4	50 g from 1 m

Leakage tests according to ISO TR 4826 have been performed after the classification tests. The tests show no significant leakage.

The source fulfils ISO 2919 requirements and is therefore classified as C43434.

Date: 25 Nov. 1994

Signature of controller Raimo Kananen

Raimo Kananen, M.Sc.
Physicist
Quality Assurance Department, Instruments

Evaluation of the safety of the Eu-152 external standard source in Wallac 1400 series LS counters

Isotope
Europium 152.

Maximum activity
12 microcuries (half-life 13.5 years).

Origin of radioactive material
The Eu-152 radioactive material is made by the Radiochemical Centre, Amersham, England.

Manufacturer of the standard capsules
The Eu-152 standard capsules are manufactured by Wallac Oy, Finland.

Manufacturing process
The manufacturing process by which the radioactive standards are produced involves two steps: the preparation of the radioactive material and the encapsulation of this material with a metal cover.

In the manufacturing process the active Eu-152 solution (1 mCi/ml) is absorbed homogeneously into crystalline synthetic zeolites in such a way that the activity of each active source is 12 µCi.

The active source is enclosed in a stainless steel shield of thickness 0.35 mm. The source is sealed first with silicon rubber and then the shield is closed by using a stainless steel pin, which is held in place by pinching the shield with a special tool. The wire that moves the capsule is then inserted into the shield and fixed in place by again pinching the shield.

ISO-test
The capsule has been tested by the Quality Assurance department of Wallac Oy according to the ISO 2919 standard. The rating C43434 has been achieved.

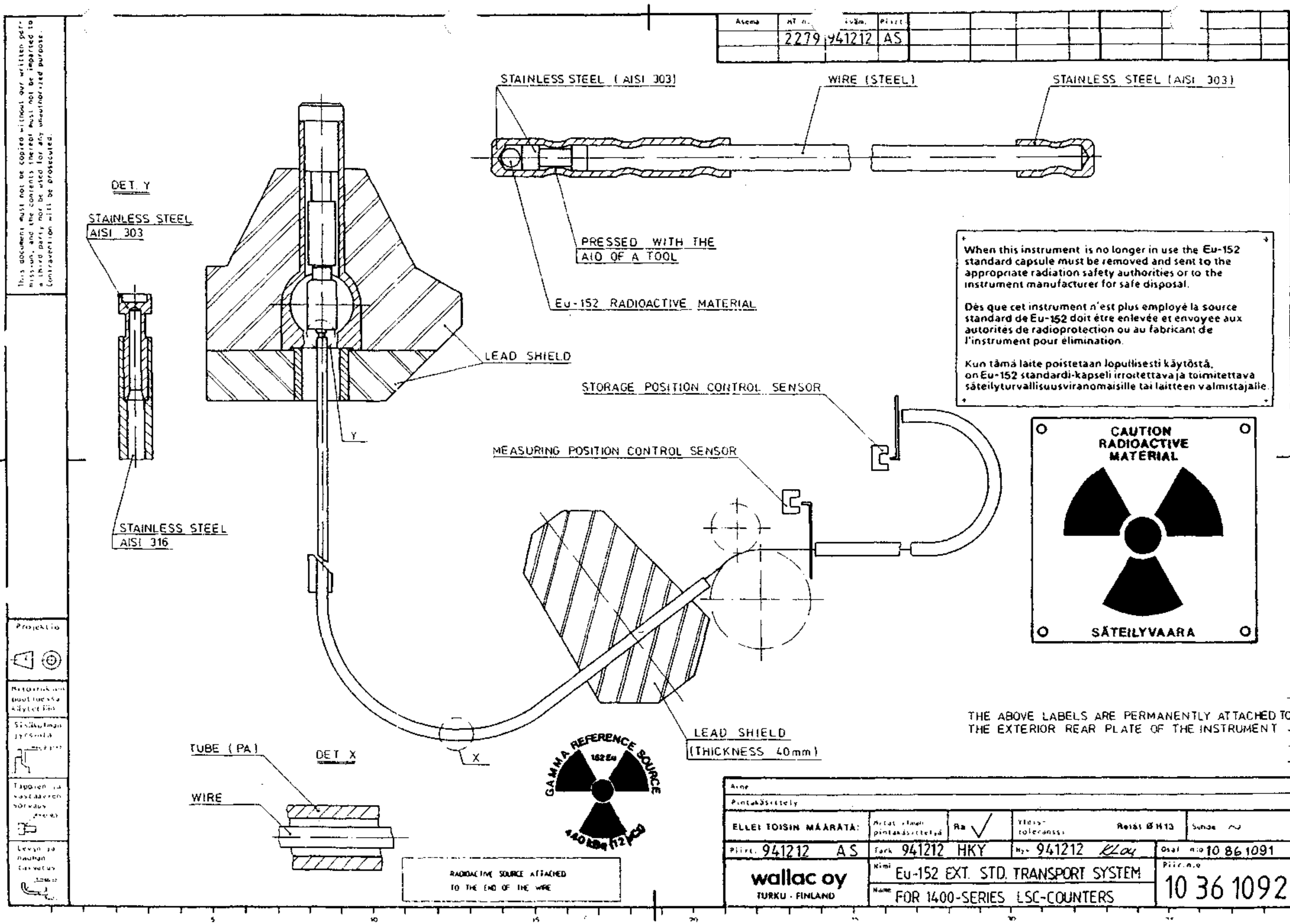
External standard transport system
The transport system is illustrated in document 1036 1092.

The standard is mounted on a metal wire which is moved by two friction wheels controlled by a stepper motor and two sensors.

The capsule has two stable positions in the transport system; one in the storage shielding and the other in the measuring chamber inside the lead shielding. The storage shield is made of lead (thickness 50 mm) and is equipped with a radiation hazard warning label. This includes a definition of the isotope and its activity.

The capsule is transported to the measuring chamber along a PA (polyamide) tube and a stainless steel elevator tube. The transport time is less than 3 seconds.

Disposal of the capsule
When the instrument is no longer in use, the Eu-152 standard capsule must be removed and sent to the appropriate radiation safety authorities or to Wallac for safe disposal. This procedure must be performed only by a qualified Wallac service engineer.


This document must not be copied without our written permission, and the contents thereof must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted.
2279 941212 AS
STAINLESS STEEL (AISI 303)
WIRE (STEEL)
STAINLESS STEEL (AISI 303)
PRESSED WITH THE AID OF A TOOL
Eu-152 RADIOACTIVE MATERIAL
DET. Y
STAINLESS STEEL AISI 303
STAINLESS STEEL AISI 316
LEAD SHIELD
Y
When this instrument is no longer in use the Eu-152 standard capsule must be removed and sent to the appropriate radiation safety authorities or to the instrument manufacturer for safe disposal.
Dès que cet instrument n'est plus employé la source standard de Eu-152 doit être enlevée et envoyee aux autorités de radioprotection ou au fabricant de l'instrument pour élimination.
Kun tämä laite poistetaan lopullisesti käytöstä, on Eu-152 standardi-kapseli irroitettava ja toimitettava säteilyturvallisuusviranomaisille tai laitteen valmistajalle.
STORAGE POSITION CONTROL SENSOR
MEASURING POSITION CONTROL SENSOR
CAUTION
RADIOACTIVE
MATERIAL
SÄTEILYVAARA
THE ABOVE LABELS ARE PERMANENTLY ATTACHED TO THE EXTERIOR REAR PLATE OF THE INSTRUMENT
LEAD SHIELD (THICKNESS 40mm)
X
TUBE (PA)
DET. X
WIRE
GAMMA REFERENCE SOURCE
152 Eu
440 kBq (12 μCi)
RADIOACTIVE SOURCE ATTACHED TO THE END OF THE WIRE
ELLEI TOISIN MÄÄRÄTÄ:
Piirt. 941212 AS
Tark. 941212 HKY
Hyv. 941212
Osat n:o 10 86 1091
wallac oy
TURKU - FINLAND
Nimi Eu-152 EXT. STD. TRANSPORT SYSTEM
Name FOR 1400-SERIES LSC-COUNTERS
Piir. n:o 10 36 1092

1095 7794

wallac

CERTIFICATE
for
SEALED RADIOACTIVE SOURCE

Manufacturer:

Wallac Oy
P.O.Box 10
20101 TURKU 10
FINLAND

Batch No: 7C

Serial No: 25

Description of the Radionuclide:

EU-152 gamma source in stainless steel shield of thickness 0.35 mm.
Active length 1.3 mm.

Max. activity: 440 kBq (12 µCi)

ISO classification: ISO 2919 C43434

Leakage test: The sealed source is immersed in distilled water. The water is heated to 323 ± 5 K and held at this temperature for 4 h. The sealed source is then removed and the activity of the water is measured with a liquid scintillation counter. Activity levels exceeding 185 Bq will be cause for rejection.

Result of test: Passed

Date of test: 15/09/97

Signature:

Raino Kavana

5 Installation information

wallac

AN EG&G COMPANY

1099 0045
March 1991

QUALITY CONTROL CERTIFICATE

PRODUCT INFORMATION

Name of product: WALLAC 1414 LSC

Product type no: 1414-003

Serial no: 4140189

Sample capacity:

PHOTOMULTIPLIER TUBE INFORMATION

position	size	type	serial no.
L	2 INCH	R331-13	CG4461
R	2 INCH	R331-13	CG4322
GL	0.75 INCH	R1166-10	AJ9302
GR	0.75 INCH	R1166-10	AK2592

CERTIFICATE

This is to certify that this instrument and its components and subunits have been tested according to the Wallac Instrument Quality Control plan, and that it fulfils the specified quality and performance values.

Details of this plan can be obtained from your local Wallac representative.

Date: 19.02.1993.

Signature:

On behalf of the Quality Control Department

1086 1430
September 1995

Warning

This equipment must be installed and used in accordance with the manufacturer's recommendations. Installation must be performed by properly trained and authorised personnel.

Failure to follow these instructions may invalidate your warranty and/or impair the safe functioning of your equipment.

Please contact your local Wallac representative for installation.

EG&G WALLAC

Installation

Environment

Normal clean laboratory conditions usually provide a satisfactory operational environment, but the following points should be taken into consideration.

Ideally a separate room should be provided for your Wallac 1414 WinSpectral counter as this allows the best control over the immediate environment. Ventilation should be adequate for all conditions of use, the temperature should be reasonably constant at about 22°C, relative humidity should not be excessive, and direct sunlight should not be able to reach the instrument. It is also important that the various isotopes are stored well away from the instrument in another room. Only those radioactive samples that are actually being measured should be in the laboratory at any time in order to keep the background at a low level.

Electric power

Three electrical outlets should be available, with, if possible, a separate power line for the instrument itself having an isolation switch and a fuse box. If excessive fluctuations in the mains voltage are anticipated, a mains stabilizer may be necessary.

Unpacking

To unpack the instrument proceed as follows (see fig. 5.1).

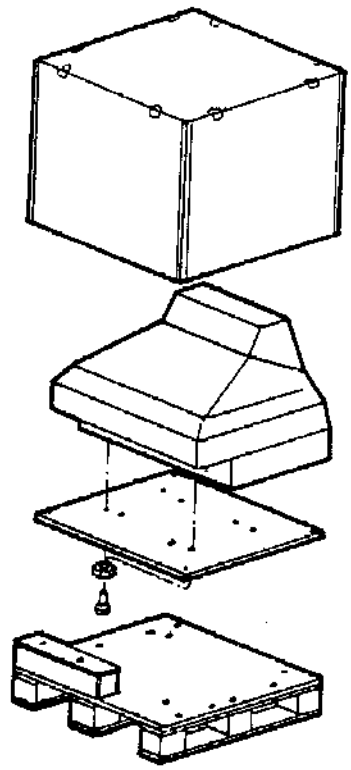


Fig. 5.1 Unpacking the instrument and accessories

Cut off and remove the binding bands. Open the clinching nails and lift off the cover. Unpack the separate packages. Then open the lower clinching nails and remove the box. Unscrew the fixing screws. Lift the instrument up from the shipping package base and unscrew the suspension bushes from the frame.

Check all units and accessories against the packing list. Note any possible transport damage.

Move the instrument to its place of operation.

Installing the lead shielding

Remove the screws holding the back panel (fig. 5.2).

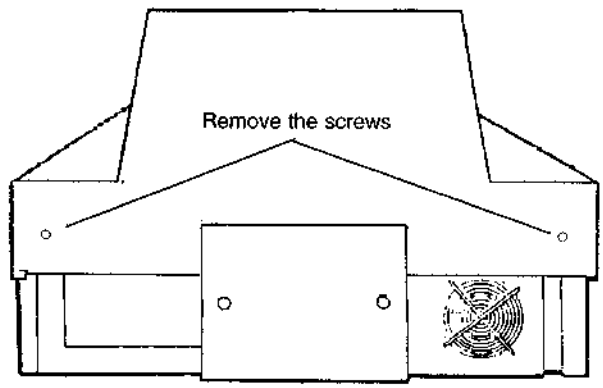


Fig. 5.2 Removing the screws

Remove the back panel (fig. 5.3)

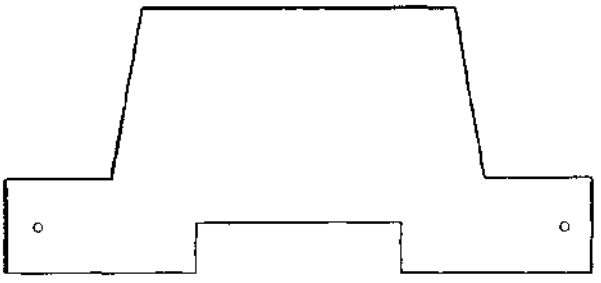


Fig. 5.3 Remove the back panel

Unscrew and remove the PC board (fig. 5.4).

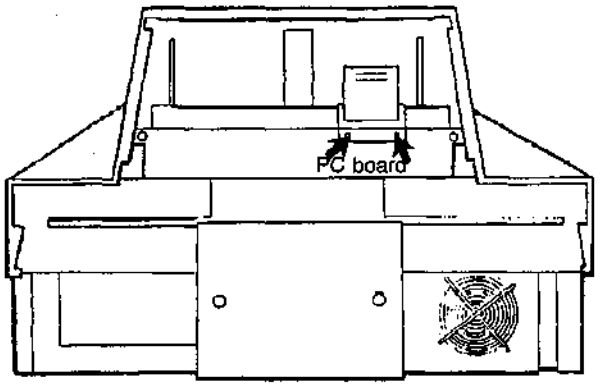


Fig. 5.4 Remove the PC board

Unscrew the top cover screws (fig. 5.5).

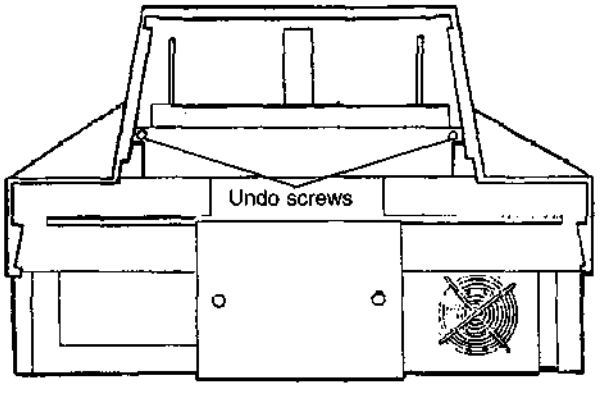


Fig. 5.5 Releasing the top cover

Remove the additional screws securing the inner cover (fig. 5.6).

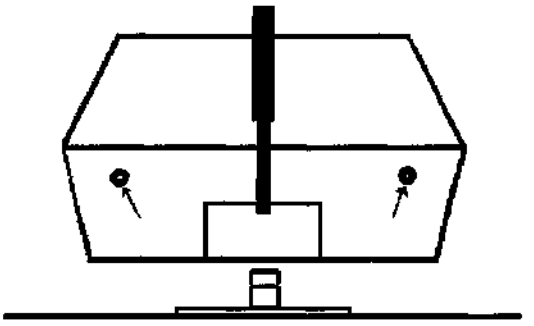


Fig. 5.6 Releasing the inner cover

Pull the top cover forward and remove it (fig. 5.7).

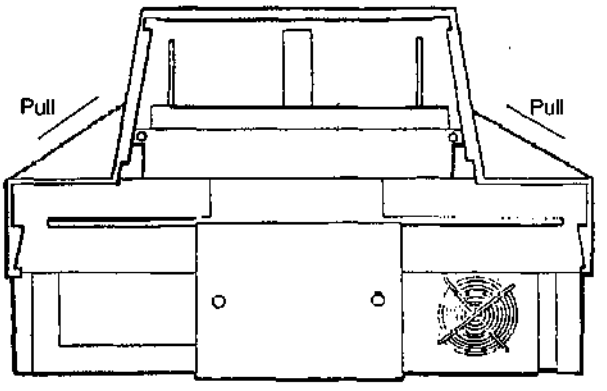


Fig. 5.7 Pull the top cover forward

Install the lead shielding for 1414-001 WinSpectral as shown (fig. 5.8) the lead sections are numbered.

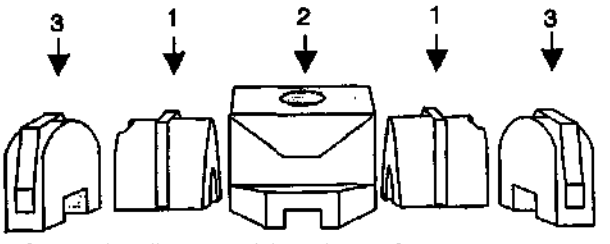


Fig. 5.8 Installing the shielding for WinSpectral

In the case of 1414-002 WinSpectral α/β, first place the two identical pieces of lead shielding with metal supports on top of the PMTs around the tube for the counterweight, see fig. 5.9.

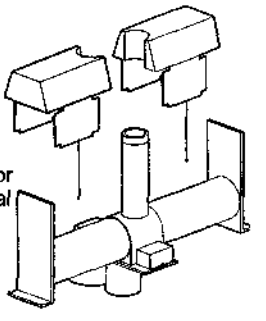


Fig. 5.9 Installing shielding for WinSpectral α/β

When you have done this, proceed with the following instructions, which are the same for 1414-002 WinSpectral α/β and 1414-003 Guardian; see the following three figures.

The shielding should be installed in the order shown in fig 5.10).

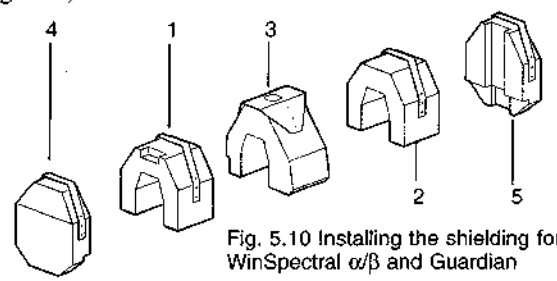


Fig. 5.10 Installing the shielding for WinSpectral α/β and Guardian

There is additional shielding to install around the vial sensor (fig. 5.11) and under the instrument on the bench (centred on the elevator), see fig. 5.12.

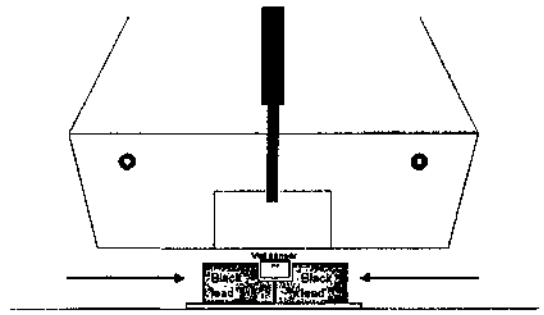


Fig. 5.11 Extra shielding for WinSpectral α/β and Guardian

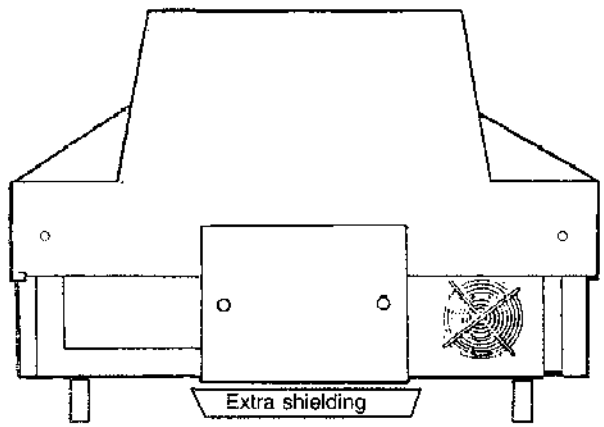


Fig. 5.12 Extra shielding underneath WinSpectral α/β and Guardian

Installing the stand-by power supply fuse

During transportation the stand-by power supply is disconnected. Install the fuse after the lead shield installation (fig. 5.13).

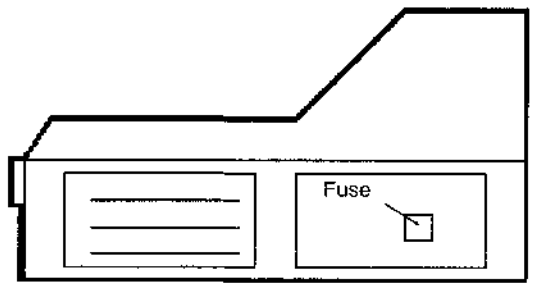


Fig. 5.13 Stand-by power supply fuse

Replace the instrument covers.

Installing the PC keyboard shelf

Assemble and fix the PC keyboard and mouse shelf (product number 10860862) and the monitor stand (1414-160) following the instructions supplied with them, see fig. 5.14.

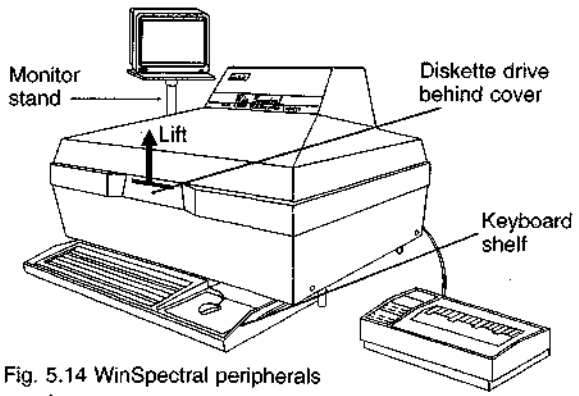


Fig. 5.14 WinSpectral peripherals

Checking the mains voltage setting

Measure and note the mains voltage at the outlets to be used.

Locate the mains selector switch, this is on the left side when looking at the rear of the instrument. If necessary adjust the mains selector switch to correspond with the measured supply. For supplies with a nominal

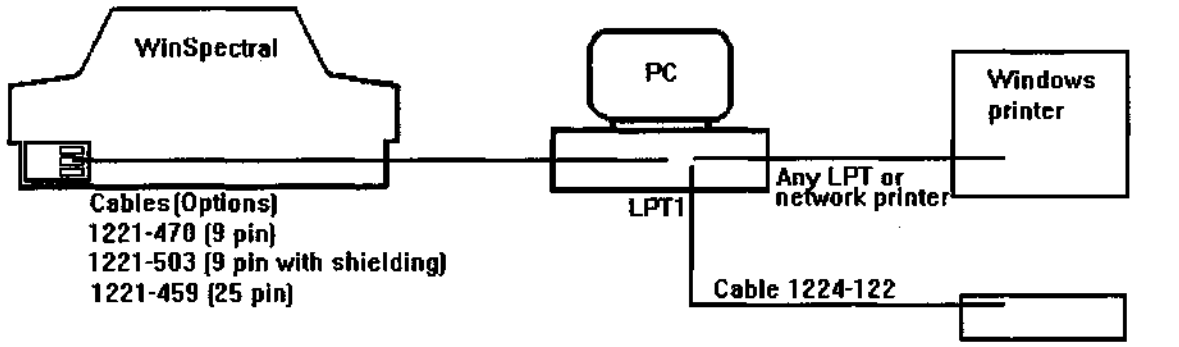


Fig. 5.15a Cables when raw printer connected to PC

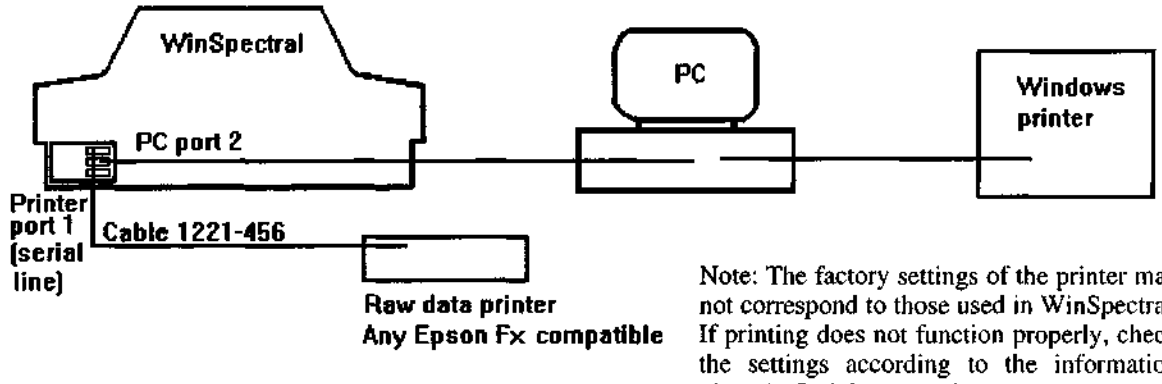


Fig. 5.15b Cables when raw printer connected to WinSpectral

Note: The factory settings of the printer may not correspond to those used in WinSpectral. If printing does not function properly, check the settings according to the information given in Serial port settings

voltage of 230 V it is recommended that the selector be set to 240 V.

Check that the fuses fitted in the fuse carriers on the back panel are of the correct rating for the local supply, and according to the label.

Connecting the counter and peripherals

Connect the counter to the PC and the printer(s) using the cables shown in fig. 5.15 above. As well as the normal PC Windows printer e.g. a network laser printer, you can also have a raw data printer. Normally this will be connected to the PC (fig. 5.15a), but you can have it connected to WinSpectral directly in port 1 (fig. 5.15b).

The PC is connected to port 2 of the counter.

The third port is not used and should have a blanking connector (1086 0713).

Further details of the settings for the printer are given in its own installation sheet which follows these installation instructions.

Plug in the power cables for each device.

Installing the PC software

Install the WinSpectral following the instructions in the User manual.

After installation, start the program by double clicking the 1414 WinSpectral icon in the WinSpectral window.

When the WinSpectral main window appears, you will see at the bottom the status bar; this is divided into four sections. In the third and fourth there are the date and time respectively. In the second there is a message about the communication status. If the counter is not switched on then there will be a message "No response from counter".

Starting the counter

Lift the instrument cover and then the diskette drive cover. This latter should be lifted straight up first to release it. Then insert the instrument program diskette into the diskette drive in the counter and replace the cover. *Do not remove the program diskette.*

Switch on the counter. The message on the status bar will change to "Counter online". During the loading process the status bar will show the following messages: "Loading DOT", "Loading texts" and "Loading 1400 program". When the program is completely loaded, the message "Counter idle" will appear. Loading takes some 2 minutes.

Note: The program diskette labelled BACKUP may also be used but be sure to always have a program diskette in addition to the one in the instrument. When needed make a backup copy using the "Backup instrument disk" function in the System menu. It is also recommended that from time to time you make a backup copy of your program diskette to save your own protocols and spectrum libraries.

Note: You should also make backup copies of the WinSpectral program diskettes before use. Use e.g. the Copy disk function in your Windows File manager.

Carrying out a functional check of the instrument

For checking the instrument mechanically and for checking the function of the ID reader proceed as follows:

Load some racks with ID labels, then start counting and check that the instrument will change the protocol as required by the labels.

Performance test with Easy GLP

To define the proper values for GLP you have to make an initial measurement of the local background. Make sure that all stationary and moving gamma sources are removed from the neighbourhood of the instrument. Use at least 300 s measurement time.

Start the editing of the Easy GLP protocol (see page 52 in the User manual). Type the values of the supplied standards into the text box marked Reference samples. The isotope windows are 5-350 for ^{3}H and 5-650 for ^{14}C. The measurement time should be 300 s or longer and the precision 0.5%.

Test values are as follows (where FTDS means the Final Test Data Sheet included with the Instrument manual):

	Min	Max	Comment
^{3}H background			Use the local background*
^{3}H efficiency	-3%	+1%	from FTDS value
^{3}H SQP(I)	-5 ch	+3 ch	from FTDS value
^{14}C background			Use the local background*
^{14}C efficiency	-2%	+1%	from FTDS value
^{14}C SQP(I)	-5 ch	+3ch	from FTDS value

*The minimum and maximum background warning limits for GLP are calculated from "the value measured during installation +/- 3σ". Some example backgrounds and 3σ limits are:

Observed background	3σ
46 - 50	9.5
41 - 45	9.0
36 - 40	8.5
31 - 35	7.9
26 - 30	7.3
21 - 25	6.7
16 - 20	6.0
11 - 15	5.2
6 - 10	4.2
0 - 5	3.0

E.g. if your background is 21 then 3σ is 6.7 which means the minimum and manximum limits are 14.3 and 27.7 respectively. You can calculate the 3σ from the expression 3σ = 3 * SQRT (BGD/t) where BGD is the measured mean background rate in the window and t is the counting time in minutes.

Note: a typical change in efficiency of 2% for ^{3}H over a period of a year may be expected.

Serial port settings

The factory settings of the printer serial port on Win-Spectral are as follows:

Baudrate:	4800 PC
Parity:	No
Data bits:	8
Stop bits:	2
Handshake:	DTR i.e. ESN

These settings may be changed by selecting System parameters in the System menu. See the User manual on page 71.

MultiCalc installation

Introduction

If you are planning to use MultiCalc to handle results from Wallac WinSpectral, please follow the installation instructions below in addition to the normal MultiCalc installation procedure.

- do normal the MultiCalc installation (see the MultiCalc Installation module in the Supervisor's manual)

- start up Windows

- with File Manager copy the file c:\1400w\mc\winbeta.c01 to the directory c:\wiacalc\0com

- create the directory c:\wiacalc\0com\winbeta

- create a new program in the Windows StartUp group: click Browse to select c:\1400w\mc\WIA.PIF.

- start MultiCalc by double clicking that icon

- select Level 5 (if your starting level is 3 or less then press F7 LEVELS then F4 Level 4 and then again LEVELS (F7) and Level 5 (F5))

- select the System properties to be AOSPMTIV (follow the sequence: F7 SYSTEM F8 ETC F3 COMM PROT F4 PROPERTY, select the protocol winbeta and then type in the properties)

- go to the MultiCalc main menu by pressing ESC ESC ...

- create a startup macro for MultiCalc as follows:

Press ctrl A
Select MACROS
Select CREATE
Enter @ as the macro name
Select level 2
Press Enter as the comment
Press function key F1 (this is the body of the macro and it means that the program will go to COUNTER).
Now the macro is complete and should be ended by pressing the ESC key.

To save the macro on disk you now have to exit from MultiCalc. To do so press ESC once and then press X and select F1 Yes for the question "Exit MultiCalc Yes/No".

- now use the Windows Program Manager and copy the icon WinSpectral to the StartUp group. To do this, drag it from the WinSpectral group to the StartUp group while you hold down the CTRL key.

Changes to Autoexec.bat

Edit the MS-DOS Autoexec.bat file. (Use Windows Notepad or a DOS editor to do this).

Make sure that you have there the command COMRS and that it has the parameter 00000000 i.e. eight zeros. This is to force MultiCalc not to use serial ports at all. Otherwise you will get the question about who should use the COM1 or COM2 port, the Windows application or the DOS application when MultiCalc is started.

While you are editing the Autoexec.bat file, add also there the command WIN to make Windows start automatically after a bootup.

Setting up a protocol in MultiCalc

In WinSpectral, go to System/Options/Directories and give the MultiCalc assay path as:
C:\WIACALC\0COM\WINBETA.

From the MultiCalc main menu select F4 PROTOCOLS and create a new protocol. The name should be a short one, e.g. MCASS. Select the protocol type, e.g. RATIO and edit the the protocol or use the default settings. Save the protocol.

After you exit from Protocol editing, go to the main menu and select from there F1 COUNTER. MultiCalc is then ready to evaluate results from WinSpectral.

Switch now to the WinSpectral program.

Setting up a protocol in WinSpectral

Create a protocol for any user group and give the protocol the same name as you gave for the assay protocol. WinSpectral allows longer protocol names but use

exactly the same name as for the assay protcol, e.g. MCASS.

Set the counting time and the isotopes used. Then go to Output devices and select Filing data. Click the More button and select MultiCalc export. Save these settings.

You are then ready to run the protocol.

WinSpectral will receive data and save it on the hard disk of the PC. As the samples in the assay are being counted, WinSpectral will create a file in the Multi-Calc communication protocol directory. MultiCalc will find the file and start evaluating it in about 30 seconds depending on the speed of your PC and the amount of time you have given for DOS applications.

INSTALLATION REPORT APPENDIX

Please fill in the following information about the type of work the instrument is to be used for. We would also be pleased to get some brief feedback about your opinions concerning Wallac as a company.

Service specialist fills in:

Instrument type:_____ Serial no:_____ Country:_____

Customer fills in:

Name & Profession: _____

_____

Fax no: _____

This instrument is used as described below (x):

Main segment:

- ☐ Clinical Diagnostics
- ☐ Academic Research
- ☐ Industrial Research
- ☐ Environ. Research
- ☐ _____

Data management:

Software :

- ☐ None
- ☐ Ria/MultiCalc
- ☐ Workstation
- ☐ Other .....

Connections :

- ☐ PC
- ☐ Local network
- ☐ Mainfame

Rate the importance of the items below on a scale of 1 to 5 (1= not important, 5= very important). In the column Wallac put a (+) mark if you think the company does well for that item and a (-) mark if you think it should do better.

	Rating not imp. 1	2	3	4	very imp. 5	**Wallac** (+ / -)
PRODUCT PRICE						
QUALITY&RELIABILITY						
TECHNOLOGY						
FEATURES						
PERFORMANCE						
EASE OF USE						
DATA MANAGEMENT						
SUPPORT&SERVICE						
SYSTEM SUPPLIER						
COMPANY IMAGE						
_____						

Other comments: _____

_____

_____

6 Specifications, Safety and Routine maintenance

6.1 Specifications

Description

Wallac 1414-001 WinSpectral, 1414-002 WinSpectral α/β and 1414-003 Guardian are general purpose liquid scintillation counters for counting sample vials from racks.

Physical dimensions

Width	900 mm
Height	700 mm
Depth	600 mm
Weight	218 kg (WinSpectral), 250kg (WinSpectral α/β), 244 kg (Guardian)

Power

Mains voltage selectable 100, 115, 120, 220 and 240 V, +/-10%, 50/60 Hz. Power consumption is 200 VA without the temperature control unit and 300 VA with it.

Standby power supply

Power failure recovery and protection by back-up standby power supply provided with NiCd accumulators. In the case of power failure the status of the counting process will be stored on diskette, thus providing effectively an unlimited standby time for recovery from power failure.

Input/output connections

Serial ASCII interface RS-232C. Two output terminals: port 1 for printer, port 2 for laboratory PC.

Radiation shield

Low specific activity lead around detector assembly and external standard rest position. Weight 103 kg (WinSpectral), 135 kg (WinSpectral α/β), 128 kg (Guardian), thickness at least 48 mm around the measuring chamber.

Operating conditions

Temperature +15 to +35 °C
Humidity max. 75 %.

FlexiRack™ sample changer and conveyor

Sample capacity varies from 336 to 1248 vials, depending on the used rack combination. When using only standard vial racks, 336 samples in 28 racks of 12 samples each. With minivial racks, 720 samples in 40 racks of 18 samples each. With small mini/microvial racks, 1248 samples in 52 racks of 24 samples each.

Rack transport by friction belt drive system, transverse movement by toothed chain driven by electric motors. Sample lifted up to measuring chamber by elevator driven by electric motor, single "dual plate" light shutter system, sample change time 5 s. Rack and sample position movements controlled by electro-optical sensors.

Optional external standard

Eu-152 450 kBq (12 µCi) enclosed in a stainless steel capsule.

Optional temperature control unit

Controls sample and instrument +/- 5 °C of ambient.

Detector assembly

Two PM tubes in coincidence. Assembly includes also light emitting diodes for the automatic spectrum stabilizer. Coincidence resolution time is 15 ns.

Racks and modification kits

Sample racks

1410-401 for 20 ml vials, max. vial diameter 28.4 mm, 12 sample positions per rack.

1410-402 for 6 ml vials, max. vial diameter 18.4 mm, 18 sample positions per rack.

1410-403 for 4 ml vials, Skatron or Biovial, max. vial diameter 13.4 mm, 24 sample positions per rack.

Max. acceptable vial height is 68 mm.

Rack modification kits

1410-408 for Eppendorf tubes to be used in 1410-402 racks.

1410-409 for microfuge tubes to be used in 1410-403 racks.

Posiden™ sample identification system

Each rack can be provided with a 1410-407 ID clip for 1450-452 ID labels. The ID clip has two marked areas,

the upper for the protocol number and the lower for rack number or special code. This provides the information needed for Good Laboratory Practice.

Electronic hardware

A 16-bit microprocessor controls counting and data reduction. Memory configuration is 64 kbyte ROM and 1 Mbyte RAM.

Logarithmic A/D converter, energy range 1 - 2000 keV. Dual 1024-channel multichannel analyzer. Built-in dead time correction.

Performance

Efficiency

Counting efficiency, typical:
^{3}H : 68 % (min. 64 %)
^{14}C : 96 % (min. 94 %)

Stability

Count variation less than 0.2 % / 24 h (not including random statistics).

6.2 Safety and radioactive materials

The following comments about precautions and safety measures in handling radioactive materials are included as a guide and are not intended to be fully comprehensive. More complete details may be found elsewhere, for example in the booklet SAFE HANDLING OF RADIONUCLIDES, published by the International Atomic Energy Agency, Vienna; this may be recommended as a useful code of practice appropriate to radio-chemical laboratories.

Unless a specially designed radioisotope laboratory is used, limitations should be placed on the amount of active material in the laboratory area depending on toxicity and type of chemical operation. For high toxicity material and wet chemical operations involving the risk of spillage, the IAEA recommend a maximum activity of about 10 μCi.

Personnel should be properly trained in the safe handling of these materials, maximum levels of stored activities should be set, proper records should be kept, and a definite monitoring schedule maintained.

The areas where samples are handled should be kept clean and free of dust. This is most easily accomplished if all surfaces are as smooth as possible and if the minimum number of extra surfaces is introduced into the room. Lastly it is extremely important to store all radioactive materials in a separate room to which access is restricted.

6.3 Routine maintenance

Keeping the instrument clean

The conveyor cover should always be closed to prevent dust from getting onto the conveyor and into the electronics below the conveyor. If there is still dust and other dirt on the conveyor then remove the dirt by a dry clothing.

ID labels

Check the labels on the ID clip. Those in bad condition should be replaced by new ones to guarantee correct reading of the labels. When fixing ID labels on the clip, ensure that the area where the label is to be fixed is clean, e.g. there is no perspiration from your fingers on it.

Power supply fan

Check that the cooling fan in the power supply unit is working by listening for its sound.

Cables

Check that the power cable and the cables to the peripherals are tightly connected and that the cables and connectors are not damaged. Any damaged cable should immediately be replaced!

Response mapping - MCA calibration

What is response mapping?

The quench correction system and DOT DPM technique make use of built-in libraries of information derived from a reference counter. Response mapping is the procedure by which a connection is established between the MCA channel values in your actual counter and the reference counter. This allows the libraries in your counter to be customized to fit your counter in the case that there are small differences between it and the reference counter.

This is done in the factory before you receive your counter but mapping must be done again when the measurement electronics is adjusted or repaired or the PM tubes are replaced or the external standard capsule is changed. Mapping can also be done at any time and it is recommended that it should be performed at least once a year as part of routine maintenance.

How to do response mapping

Boot the instrument with the 1414 WinSpectral instrument program disk.

Create or edit a fine tuning protocol, e.g. Finetuning 01. Set the protocol name to "MAPPING". Use the sealed ^{3}H standard sample. Set the DPM value according to the value printed on top of the standard. Set half-life correction on and set the half-life zero time according to the date printed on top of the standard. Set the counting time to 300 s. Save the protocol.

Load a rack with the sealed ^{3}H standard sample onto the conveyor instream. Other positions in the rack should be left empty.

Start counting the protocol.

To stop the instrument after measurement of the mapping sample put an empty rack on the conveyor after the mapping sample rack.

Results are printed out shown in the example on the next page. The plot has the reference counter channel number on the *x*-axis and the measured real channel number on the y-axis. Two lines are drawn, one is a solid line and the other is dashed (on the raw data printer it is marked with crosses (+)). The solid line represents the reference counter MCA channels and the dashed (crossed) line the measured channels. On the display the reference line is in blue and the actual in red. This line may reside slightly above and below the ideal line. There should be no straight horizontal or vertical section which would indicate missing MCA channels.

The mapping information is also saved in numerical form in the printer and instrument history file.

When the Ready message is displayed on the Status bar after mapping has been done, it shows that the mapping information has been saved in the EEPROM memory. Then switch the instrument off and on again to reboot it.

```
PROTOCOL   :   1   MAPPING
DATE       : 1994/08/11
TIME       : 10:25
ID         : P01AS002

Quench standardization
Wallac 1414 WinSpwctral DSA version  1.0
Counting mode                : DPM
Quench index                 : SQP(E)
Isotope(s)                   : H3
Protocol name                : MAPPING
Counting time                : 300
Activity (DPM)               : 202400
2 sigma %                    : 0.01
Minimum cpm                  : 0.00 Checking time:10
Vial type                    : Clear
Liquid system                : HiSafe
Advanced modes               : Halflife
Halflife zerotime            :
Zerotime of H3               : 1994/08/01 ,12:00:00
Output to printer            :
  POS,CTIME,CPM1,CPMer1,EFF1,SQPE,SQPer
Additions to printer         : Listing
Spectrum                     : Beta

Quench standard samples:

Pos  CTime  H3_CPM  H3_CPMer  H3_Eff%    SQPE  SQPer
  1     60  2018.0       0.0     1.00  977.87   0.04
```

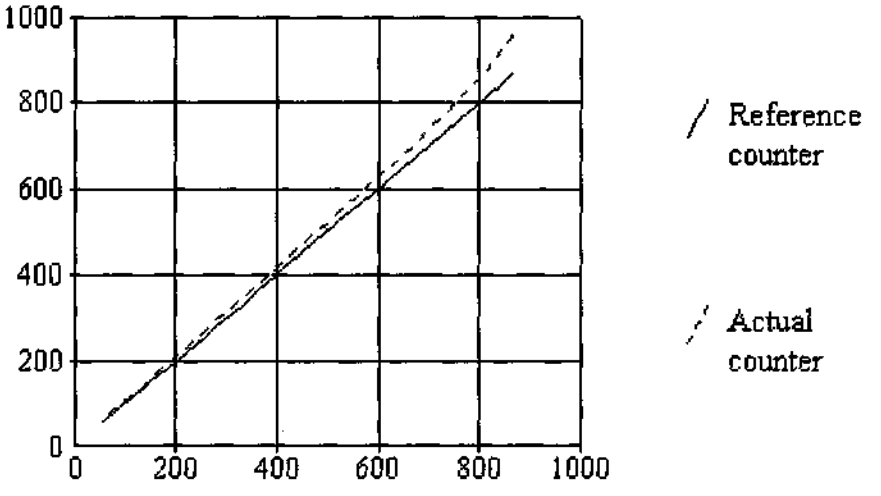
```
EEPROM LISTING

LRC  = 200  A0 =   110 A1 =    0
TEMP =    25.0
CONV STEPS = 114

Mapping data

Channels: WLIB    TRUE    TRUE-WLIB
            0.0     0.0          0.0
           48.9    58.4          9.5
           95.0    99.2          4.2
          140.4   142.6          2.1
          159.3   160.6          1.3
          177.4   178.0          0.6
          195.7   195.8          0.1
          214.8   214.3         -0.5
          682.9   695.2         12.3
          746.1   768.1         22.1
          798.6   834.1         35.5
          886.0   977.9         91.9
          894.7   993.6         98.9
         1000.0  1000.0          0.0
Total activity:
        H3 201800.0 DPM  3.363kBq
```

Mapping



7 Spare parts information

1410-951-05
November 1996

1409,1410,1411,1414,1415
Spare Parts Catalogue

AN EG&G COMPANY

Wallac Oy, P.O.Box 10, FIN-20101 Turku, Finland, Tel. +358-2-2678 111, Telex 62 333wac fin,
Telefax +358-2-2678357

Ordering Information

If parts are being ordered from Wallac Oy give the following information on the order:

Purchase order number

Type and serial number of the instrument for which the spare part is intended

Quantity of each item ordered

Ordering number and description (obtained from parts list)

Where the parts are to be sent

When the order is to be dispatched

Preferred mode of transport

Note: Subassemblies with an order number beginning 10 84xxxx, 1085xxxx or 1086xxxx are kept as stock items. It should be noted that these subassemblies consist of several smaller parts which can be ordered as separate items if necessary using the corresponding order numbers.

Index

1409,1410,1411 LSC

INDEX CONT...

1415 Supplement

1414 Supplement

1409, 1410, 1411 Spare part kit

1410-201

96-10-10

FOR PART NUMBER	1410-201	SPARE PART KIT	1410	1410-201	960731

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	11550141	SERVICE KIT	590*400*260	EIRI	10
	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	20
	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	30
	1	10856730	DCD EXPANSION KIT		DCD 10356465	40
	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	50
	1	10853314	P.C.ASSEMPLY	MCA	DIA 10353517	60
	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	70
	1	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	80
	1	10854652	P.C.ASSEMBLY	HV SUPPLY	EPM-A 10354653	90
	1	10857670	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC-A 10357727	100
	1	10854767	P.C.ASSEMBLY	MCA INTERFACE 1CH	LBR 10354766	110
	1	10857671	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD-A 10357728	120
	1	10860105	P.C.ASSEMBLY	GAIN STABILIZER	EBU-A 10360197	130
	1	10852642	P.C.ASSEMBLY	POS. HV SUPPLY	EPK 10652641	140
	1	10853857	P.C.ASSEMBLY	PREAMP.AND COINS.BOARD	LAB-A	150
	1	10859028	P.C.ASSEMBLY	A/D CONVERTER	EBZ 10359027	160
	1	10858037	P.C.ASSEMBLY	SAMPLE AND HOLD	EBC-A 10358036	170
	2	10854679	P.C.ASSEMBLY	EXTENSION BOARD	LPA	180
	1	10849799	P.C.ASSEMBLY	POWER EXTENSION BOARD	10649798	190
	1	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	PH265-04	200
	1	11690044	STEPPING MOTOR	12V 0,4A 1,8AST 0,26NM	6500-15-4-13.5 R455	210
	1	11690050	STEPPING MOTOR	1,5IN 0.7A STEP ANG1.8	6500 R568	211
	1	10855233	P.C.ASSEMBLY	SENSOR BOARD	RXC 10455232	220
	1	10855235	P.C.ASSEMBLY	SENSOR BOARD	RSV 10455234	230
	1	10855231	P.C.ASSEMBLY	SENSOR BOARD	RSZ 10455230	240
	1	10856692	1410 OPTICS MODKIT	1410		250
	1	10853686	ID-UNIT	1205	RSJ 10354300	260
	1	10855313	WIRING ASS.		CA18	270
	1	10855668	P.C.ASSEMBLY	RAMCODE READER	RAM 10355667	280
	1	10855385	P.C.ASSEMBLY	RXA HOME SENSOR BOARD	RXA 10455384	290
	1	11760040	PHOTOMULTIPLIER	D19MM 10DYN 12PIN	R1166-10	300
	1	10855243	P.C.ASSEMBLY	POSITION SENSOR	RSU-A 10355242	310
	1	10855186	P.C.ASSEMBLY	CONNECTION BOARD	RSP 10455185	320
	1	10854760	P.C.ASSEMBLY	DISPLAY (CPU)	HCB 10354759	330
	1	10853794	P.C.ASSEMBLY	PREAMPLIFIER BOARD	RAE 10353795	340
	1	10857681	PREAMPLIFIER UNIT	1409/11 10-DYNODE	10455394	350
	1	10860160	PREAMPLIFIER UNIT	1409/11/15 12-DYNODE	10455394	355
	1	10856799	P.C.ASSEMBLY	PREAMPLIFIER BOARD	RAP 10353795	360
	2	11611029	TRIMPOTENTIOMETER	1K +-10% 0,5W CERMET	67WR1K	370
	2	11611024	TRIMPOTENTIOMETER	2K +-10% 0.5W CERMET	67WR2K	380
	2	11611032	TRIMPOTENTIOMETER	10K +-10% 0,5W CERMET	67XR10K	390
	2	11611033	TRIMPOTENTIOMETER	100K +-10% 0,5W CERMET	67XR100K	400
	2	11611026	TRIMPOTENTIOMETER	500K +-10% 0,5W CERMET	67WR500K	410
	12	11601169	RESISTOR	470K 2% 0.5W	B 1/2 BEYSCHLAG	420
	12	11601173	RESISTOR	1M 2% 0.5W	B 1/2 BEYSCHLAG	430
	12	11601177	RESISTOR	1,5M 2% 0,5W	B 1/2 BEYSCHLAG	440
	12	11601178	RESISTOR	2.2M 2% 0.5W	B 1/2 BEYSCHLAG	450
	12	11601179	RESISTOR	3.3M 2% 0.5W	B 1/2 BEYSCHLAG	460
	12	11601180	RESISTOR	4,7M 2% 0,5W	B 1/2 BEYSCHLAG	470
	1	11550051	SHIELDING BAG	125*200	MAPOSTAT	480
	0.060	11550159	INSULATION	MS-PU-JK	40110	490
	2	11810160	MICROCIRCUIT TTL	QUAD BUS/LINE DRIVER	N74F244N	500
	2	11810131	MICROCIRCUIT TTL	QUAD 2-INP MUX	SN74LS157N	510
	2	11811048	MICROCIRCUIT C-MOS	OCTAL BUS TRANSCEIVER	PC74HCT245P	520
	2	11811047	MICROCIRCUIT C-MOS	OCTAL D-TYPE LATCH	PC74HCT373P	530
	2	11811050	MICROCIRCUIT C-MOS	OCTAL D-TYPE FLIP-FLOP	PC74HCT374P	540
	2	11811051	MICROCIRCUIT C-MOS	HEX INV SCHMITT TRIGG	MC74HCT14AN	550
	2	11813024	MICROCIRCUIT LIN	QUAD OPER AMPL.	CA 324 E	560
	2	11813038	MICROCIRCUIT LIN	QUAD JFET-INP OP AMPL	TL084CN	570
	2	11813033	MICROCIRCUIT LIN	OPERATIONAL AMPL	LF356N	580
	2	11813025	MICROCIRCUIT LIN	QUAD COMPAR.	LM 339 N	590
	2	11813037	MICROCIRCUIT LIN	PWM CONTROL	TL494CN	600
	2	11811032	MICROCIRCUIT C-MOS	8-INP ANALOG MUX	HCF4051BE	610
	2	11814037	MICROCIRCUIT CMOS	1X262144-BIT DYN RAM	HY51C256S-12	620
	2	11814039	MICROCIRCUIT HMOS	SERIAL COMM CONTROLLER	P82530-6	630
	2	11813019	MICROCIRCUIT LIN	QUAD LINE DRIVERS	MC1488	640
	1	11814028	MICROCIRCUIT CMOS	8X8192-BIT RAM	HM6264P-12	650
	2	11801012	TRANSISTOR NPN	40V 10MA0.31W	2N3904	660

2	11800007	TRANSISTOR PNP	40V 10MA 0.31W	2N3906	670
2	11802007	TRANSISTOR FET	40V 50MA 0.37WP-CH MOS	3N163	680
2	11802009	TRANSISTOR FET	50V 12A 75W N-CH MOS	BUZ10	690
2	11802010	TRANSISTOR FET	100V 18A 75W N-CH MOS	BUZ21	700
2	11801014	TRANSISTOR NPN	60V 5A 65W DARLINGTON	TIP120	710
2	11800009	TRANSISTOR PNP	60V 5A 65W DARLINGTON	TIP125	720
10	11830006	FUSE	2.0A 250V SLOW 6,3*32	19343	730
10	11830017	FUSE	4,0A 250V SLOW 6,3*32	19343	740
10	11830009	FUSE	6.3A 250V SLOW 5*20	19195	750
1	11845027	VOLTAGE SELECTOR	1X6 . 10A 250V	SWPO33.1109	760
2	11813018	MICROCIRCUIT LIN	VOLTAGE REG 5V 1A	MC 7805 CP	770
4	11814011	OPTICAL SENSOR		OPB804	780
2	11784015	DIODE LIGHT EMITT	D3X5 585NM <100NS	MV5374C	790
1	10442965	SERIAL NUMBER PLAT			800
5	11863069	P.C.CONNECTOR	2-PIN JUMPER 2A	59001	810
4	11782023	ZENER DIODE	15V 5% 17MA 1W	1N4744A	820
2	11780016	DIODE	30V 12A DUAL SCHOTTKY	VSK13	830
2	11781006	DIODE BRIDGE	200V 25A	BYV25-200	840
2	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205 1470	850
1	11350044	COGGED BELT	SYNCHROFLEX	6T 2,5/285	860
1	10451435	COGGED BELT	BRECOFLEX	1205	870
1	11350065	COGGED BELT	BRECOFLEX		880
1	11350076	COGGED BELT	SYNCHROFLEX	6 T2,5/120	890
2	11350077	COGGED BELT	SYNCHROFLEX	10 T2,5/160	900
1	11350048	COGGED BELT	SYNCHROFLEX	6 T2.5/200	910
1	11350087	COGGED BELT	SYNCHROFLEX	6 T2,5/380	920
2	11350083	COGGED BELT	SYNCHROFLEX	6 T2,5/500	930
2	11350097	COGGED BELT	SYNCHROFLEX	10 T2,5/650	940
1	11350078	COGGED BELT	SYNCHROFLEX	10 T2,5/1300	950
2	10354388	GOGGED BELT WHEEL	GRILON W 5239	1297	960
1	11862143	CONNECTOR	5-N 24AWG	CT100F24-5B	970
3	11862144	COVER	5-N	TC100F-5	980
3	11862132	CONNECTOR	6-P FEMALE 24AWG	CT156F24-6B	990
3	11862133	CONNECTOR	6-N FEMALE 18AWG	CT156F18-6B	1000
6	11862137	COVER	FOR 3-P CONNECTOR	TC156F-6	1010
3	11862130	CONNECTOR	8-N 24AWG	CT100F24-8B	1020
3	11862135	COVER	8-N	TC100F-8	1030
1	11862131	CONNECTOR	16-N 24AWG	CT100F24-16B	1040
1	10855315	WIRING ASS.		CA20	1050
1	10555603	LABEL SET		CA20	1060
1	11550078	DISK STORAGE BOX	3,5"	MICROBOX 5	1080
1	1221-244	PROGRAM PACKAGE	ULTROTERM	TERMINAL EMULATOR	1090
1	10857062	SERVICE PROGRAM	1205 BETAPLATE		1110
1	10856281	PROGRAM PACKAGE	1410 SERVICE PROGRAM	WITH FIXED PROTOCOL	1120
1	10856289	PROGRAM PACKAGE	1410 SERVICE PROGRAM	FOR HARDWARE	1130
1	10857813	PROGRAM PACKAGE	1409 SERVICE PROGRAM		1135
1	10857820	PROGRAM PACKAGE	1409 FIXED PROTOCOLS	V1.4, V1.8, V2.0	1136
1	10856296	PROGRAM PACKAGE	1410 DO MAPPING PRG	SERVICE PROGRAM	1140
1	10855628	PROGRAM PACKAGE	DISPLAY PRG. HCB-BOARD		1160
1	10854502	SERVICE CONNECTOR	1205	10454503	1170
1	10855262	PC BOARD EXTRACTOR		10455261	1180
1	11510021	HEXAGON KEY	3MM	NO 368	1190
1	11510022	HEXAGON KEY	4MM	NO 368	1200
1	11550108	PLASTIC PEEL	A4 CLEAR	T126/A4 0,08	1210
1	1410-921	JUMPER SETTINGS		1410-921	1220
1	10857679	RAM EXTENSION KIT	DIE RAM	10354603	1230
1	10457685	LOCKRING KEY	SPRINGSTEEL T=0.7	1410	1250

FOR PART NUMBER	1410-201	SPARE PART KIT	1410	1410-201	960731

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
	1	10854735	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC 10354734	100	920120
	1	10855551	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD 10354773	120	920120
	1	10853313	P.C.ASSEMBLY	SAMPLE AND HOLD	EBC 10353702	170	920117
	1	11690049	STEPPING MOTOR	12V 0,4A 1,8AST 0,26NM	6500-15-4-13.5	211	920327
	1	10855393	PREAMPLIFIER UNIT	1410	10455394	350	920120
	1	1410-921	JUMPER SETTINGS	1410 SERVICE BAG	1410-921	1220	930527
	7	1410-921	JUMPER SETTINGS	1410 SERVICE BAG	1410-921	1220	940425
	1	10854784	P.C.ASSEMBLY	GAIN STABILIZER	EBU 10354783	130	931020
	1	10854242	P.C.ASSEMBLY	A/D CONVERTER	EBP 10353905	160	931011
	1	1221-243	PROGRAM PACKAGE	GEN TERM	1221-243	1100	931129
	1	11550063	DISK CARD BOX	5 1/4"	02177	1070	960731
	3	10857820	PROGRAM PACKAGE	1409 FIXED PROTOCOLS		1136	960730

LSC Model 1409-001

10857647

96 - 10 - 10

FOR PART NUMBER	10857647	LSC	1409-001		930316
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10857646	LSC ASS.	1409/1410/1411	10155600	40
	1	10856730	DCD EXPANSION KIT		DCD 10356465	50
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	90
	1	10855233	P.C.ASSEMBLY	SENSOR BOARD	RXC 10455232	100
	1	10857618	PROGRAM PACKAGE	MAIN PR. 1409/11 LSC	WALLAC 1400 DSA	110
	1	1411-932	INSTRUMENT MANUAL	FOR 1409,1411	1411-932	120
	1	10990045	QC CERTIFICATE		10990045	130
10155600-34	1	10557601	LABEL	1409- AL S=0.5		30
10255462-23	1	10457957	SUPPORT	ST D=16	1409	10
10255462-23	1	10357612	COVER PLATE	POLYCARB.0.375	1409	20
10255462-37	1	11570061	LABEL	WALLAC 52X22,16 STICKER		35

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10857647	LSC	1409-001			930813
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**	**DATE**
10155600-75	1	11570061	LABEL	WALLAC 52X22,16 STICKER		35	930315
	2	10855393	PREAMPLIFIER UNIT	1410	10455394	60	911030
	1	10854735	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC 10354734	70	911030
	1	10855551	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD 10354773	80	911030

LSC Model 1410-001

10857648

96 - 10 - 10

FOR PART NUMBER	10857648	LSC	1410-001		920602
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	10
	1	10857679	RAM EXTENSION KIT	DIE RAM	10354603	40
	1	10857646	LSC ASS.	1409/1410/1411	10155600	50
	1	10855272	EXTERNAL STANDARD		10255273	60
	1	10855268	STD. CAPSULE		10455269 (NTL5)	70
	1	10855620	PROGRAM PACKAGE	1410 LSC	INSTRUMENT PROGRAM	110
	1	1410-931	INSTRUMENT MANUAL	FOR 1410	1410-931	120
	1	10555672	LABEL	AL 99.5 S=1	NTL5	130
	1	10494512	WARNING PLATE	AL-PLATE		140
	8	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	150
10155600-34	1	10555665	LABEL	AL S=0.5	NTL5	30
10155600-75	1	11570061	LABEL	WALLAC 52X22,16STICKER		35
10255462-23	1	10355660	COVER PLATE	POLYCARB 0,375		20

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10857648	LSC	1410-001			920602
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**	**DATE**
	2	10855393	PREAMPLIFIER UNIT	1410	10455394	80	911030
	1	10854735	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC 10354734	90	911030
	1	10855551	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD 10354773	100	911030

LSC Model 1411-001

10857649

96 - 10 - 10

FOR PART NUMBER	10857649	LSC	1411-001		931203

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	10
	1	10857646	LSC ASS.	1409/1410/1411	10155600	40
	1	10861091	STD. CAPSULE		10361101	50
	1	10855272	EXTERNAL STANDARD		10255273	60
	1	10856730	DCD EXPANSION KIT		DCD 10356465	70
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	110
	1	10857618	PROGRAM PACKAGE	MAIN PR. 1409/11 LSC	WALLAC 1400 DSA	120
	1	10857810	PROGRAM PACKAGE	COMM.PROTOCOLS 1409/11	1409/11/15	130
	1	1411-932	INSTRUMENT MANUAL	FOR 1409,1411	1411-932	140
	1	10990045	QC CERTIFICATE		10990045	145
	1	10555672	LABEL	AL 99.5 S=1	NTL5	150
	1	10494512	WARNING PLATE	AL-PLATE		160
	8	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	170
10155600-34	1	10557602	LABEL	AL S=0.5	NTL5	30
10255462-23	1	10357616	COVER PLATE	POLYCARB,0.375	1411	20
10255462-37	1	11570061	LABEL	WALLAC 52*22,16 STICKER		35

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10857649	LSC	1411-001		931203

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
	2	10857681	PREAMPLIFIER UNIT	1411	10455394	80	911030
	1	10857670	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC-A 10357727	90	911030
	1	10857671	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD-A 10357728	100	911030
10155600-75	1	11570061	LABEL	WALLAC 52X22,16 STICKER		35	931202
	1	10855268	STD.CAPSULE		10455269	50	950216

Fig. 1409, 1410, 1411 -01 LSC Assembly

10857646

96 - 10 - 10

FOR PART NUMBER		10857646	LSC ASS.		10155600	960321
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	1215-111	UNQ.STANDARDS SET	20ML VIALS 3H/14C/BACK	1215-111	110
	1	10551111	LABEL	CSA-APPROVED (ALO,08)	(LR52500) BRADY	404
	1	10560490	LABEL SET		CA22 12-DYN	409
	1	10555509	LABEL SET		FC33,FC207	412
	1	10556126	LABEL	VME RACK	1410	414
	1	10561614	LABEL	11570078 (BRADY)	CE -LABEL	416
	1	11310040	CLAMP		ACC62-A	586
	5	11310037	CLAMP		FCC-A-C8	587
	0.300	10561102	LABEL	WARNING STICK, BRADY	EU-152 10561102.LAB	595
	0.300	10856077	INSTALL.KIT 115V	FOR 1410		605
	0.700	10856078	INSTALL.KIT 250V	FOR 1410		615
	1	11560029	MOUSE MAT	194*244		670
1	1	10854916	BODY ASSEMBLY	1410	10154917	10
2	1	10855818	ID-UNIT	1410	10355859	11
3	1	10855338	SAMPLE CHANGER	1410	10255339	15
4	1	10854849	MEASURING UNIT	1410	10354850	25
5	1	10859369	P.C.ASSEMBLY	HV-DIVIDER UNIT	RPA10359368,10355373	35
6	1	10861711	TOP COVER ASSEMBLY	1409,1411	10255462	45
7	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	55
8	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	65
9	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	75
10	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	85
11	2	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	95
12	1	10859287	DISPLAY UNIT	1400-SERIES	10355598	115
13	1	10361369	BOX ASSEMBLY		1414	125
14	1	10360774	SIDE BOX RIGHT	FE PLATE S=1.0	1414	135
15	1	10360773	SIDE BOX LEFT	FE PLATE S=1.0	1414	145
16	1	10455523	BOTTOM ASSEMBLY		NTL5	155
17	2	10455328	CAM	D25	NTL5	175
18	2	10458890	GUIDE PLATE	FE-PLATE S=3	1415	205
19	1	10455330	BUSHING	D12	NTL5,1470	195
20	2	10455329	PLATE	FE-PLATE S=3	NTL5	185
21	1	10355332	LEAD	LEAD 99.9%	NTL-5	215
22	2	10455333	LEAD	LEAD 99.9%	NTL-5	225
23	2	10455334	LEAD	LEAD 99.9%	NTL-5	235
24	1	10355335	HANDLE 1	FE-PLATE S=2	NTL5	245
25	1	10255612	BACK PLATE	FE-PLATE S=1	NTL5	265
26	4	10455616	BUSHING	MS D=20	NTL5	275
27	1	10355617	INSULATION	SOLUPOLYETHEN		285
28	1	10355618	COVER 1	AL-PLATE S=2	NTL 5	295
29	1	10455632	COVER 2	FE-PLATE S=2	NTL 5	305
30	1	10355742	COVER 3	AL-PLATE S=2	NTL5	306
32	0.200	10461480	PLATE		1414	325
33	1	11710021	FLOPPY DISK DRIVE	3,5"2-P 80U/P500/250KB	FD1137H	335
37	1	10548122	LABEL	0,5MM		366
38	1	10355677	SUPPORT	AL-PLATE S=2	NTL5	375
39	1	10355686	COVER	FE-PLATE S=1	NTL5	385
40	1	10455723	BUSHING	POM-ROD D=40	NTL5	395
41	2	10455797	SHIELD	MU S=0,1	NTL5	405
42	15	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		415
43	12	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		425
44	1	11250019	WASHER	6.4/18*1.6 FE,ZINKED		435
45	18	11251018	PIN	3*20 ST		445
46	4	11251045	LOCKRING	13*1		455
47	4.200	11251077	LOCKRING	16*1		465
48	2	11252008	RIVET	1.9*3 ST	KDS 0*3	475
49	10	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	485
50	6	11271016	SCREW	M 3*4 FE YELLOWPASS.		495
51	4	11271034	SCREW	M 4*5 FE YELLOWPASS.		505
52	12	11274013	SCREW	M 5*12 FE YELLOWPASS.		515
53	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		525
54	2	11274034	SCREW	M 6*30 FE YELLOWPASS.		535
55	6	11274145	SCREW	M6*12 FE YELLOWPASS.		545
56	1	11274095	SCREW	M6*25 YELLOWPASS.		555
57	10	11274139	SCREW	M4*8 FE BLACKPASS.		565
58	2	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		575
59	2	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		434

60	2	10455131	COOLING PLATE	AL-PLATE S=3	NTL5	326
61	8	11271036	SCREW	M 4*10 FE YELLOWPASS.		510
62	8	11278003	NUT	M4 FE YELLOWPASS.		585
63	1	10455897	PLATE	FE-PLATE S=1	NTL5	327
64	2	11271095	SCREW	M6*12 FE YELLOWPASS.		511
65	1	10556070	LABEL	HV	1410 WARNING	406
66	1	10556095	LABEL	AL0,08	1410 CR	407
67	1	10556071	LABEL	AL S=0.8	1410 PROGRAM CR	408
68	1	10456182	PLATE	FE-PLATE T=1	LSC-5	410
69	2	11274003	SCREW	M 3*10 FE YELLOWPASS.		514
70	1	10456382	INSULATION	SOLUPOLYETHEN S=20	NTL-5	411
71	1	10556607	LABEL	WHITE-SELF-ADHESIVE-L	NOTE !	413
72	2	10457299	BRACKET	FE-PLATE T=1	LSC	328
73	1	10457300	GUIDE	FE-PLATE T=1	LSC	329
74	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		576
75	0.400	11140018	SEALING TAPE	10*12	SM 530 K	588
76	1	10458898	BRACKET RIGHT	FE S=1	1409/11/15	400
77	1	10458899	BRACKET LEFT	FE S=1	1409/11/15	401
78	0.100	10458891	BRACKET	FE-PLATE S=1	1415	240
79	0.100	10458887	LEAD SHIELD	LEAD CAST	1415	239
81	0.100	10358889	LEAD	CAST LEAD	1415	237
82	0.100	10358888	LEAD	CAST LEAD	1415	238
101	4	11250039	WASHER	4.3/12*1 FE, ZINKED		440
102	4	11274004	SCREW	M 4*6 FE YELLOWPASS.		513
105	2	11310047	NUT	M4 PLATE 1,7-2,7	. 2.54.329	590
112	0.100	11550112	INSULATING TAPE	S=1,2-1,6	CE-016	660
113	1	10460803	COVER PLATE	ST-PLATE T=1.5	NTL5	640
114	2	11276032	SCREW	C 3.5*6.5 FE YELLOWPASS.		650
115	1	10460964	SHELTER	POM-PLATE S=8, BLACK	NTL 5	645
116	2	11271053	SCREW	M4*8 FE YELLOWPASS.		648
117	0.100	10361270	PB -PLATE	PB 99.6%, NICKELIZED	1400 -SERIE	241
118	1	10861410	P.C.ASSEMBLY	CONNECTION BOARD	RGE 10461408	40
119	2	11274156	SCREW	M6*16 ST YELLOWPASS.		546
120	1	10460762	PLATE RIGHT	FE PLATE S=2.0	1414	680
121	1	10460761	PLATE LEFT	FE PLATE S=2.0	1414	690
122	4	11274002	SCREW	M 3*6 FE YELLOWPASS.		700
123	2	10461276	HOLDER	FE-PLATE S=1 NICKELIZED		710
124	1	10461414	SUPPORT 1	FE PLATE S=1.0	1414	720
125	2.700	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603	730
126	1.800	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601	740
127	1	10461613	HOLDER	FE-PLATE T=1	1409	725
10355819-43	1	10457903	PLATE	ST-PLATE T=1,5	1410	12
10355819-44	1	10357902	SUPPORT	RST. T=0,8	1410	13
10355819-17	1	10355762	ID-SHIELD	FE-PLATE S=1	NTL 5	635
W24	1	10861346	FLAT CABLE	40S-40S	FC207 10461300	117
W32	1	10861411	WIRING ASS		CA210	120

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

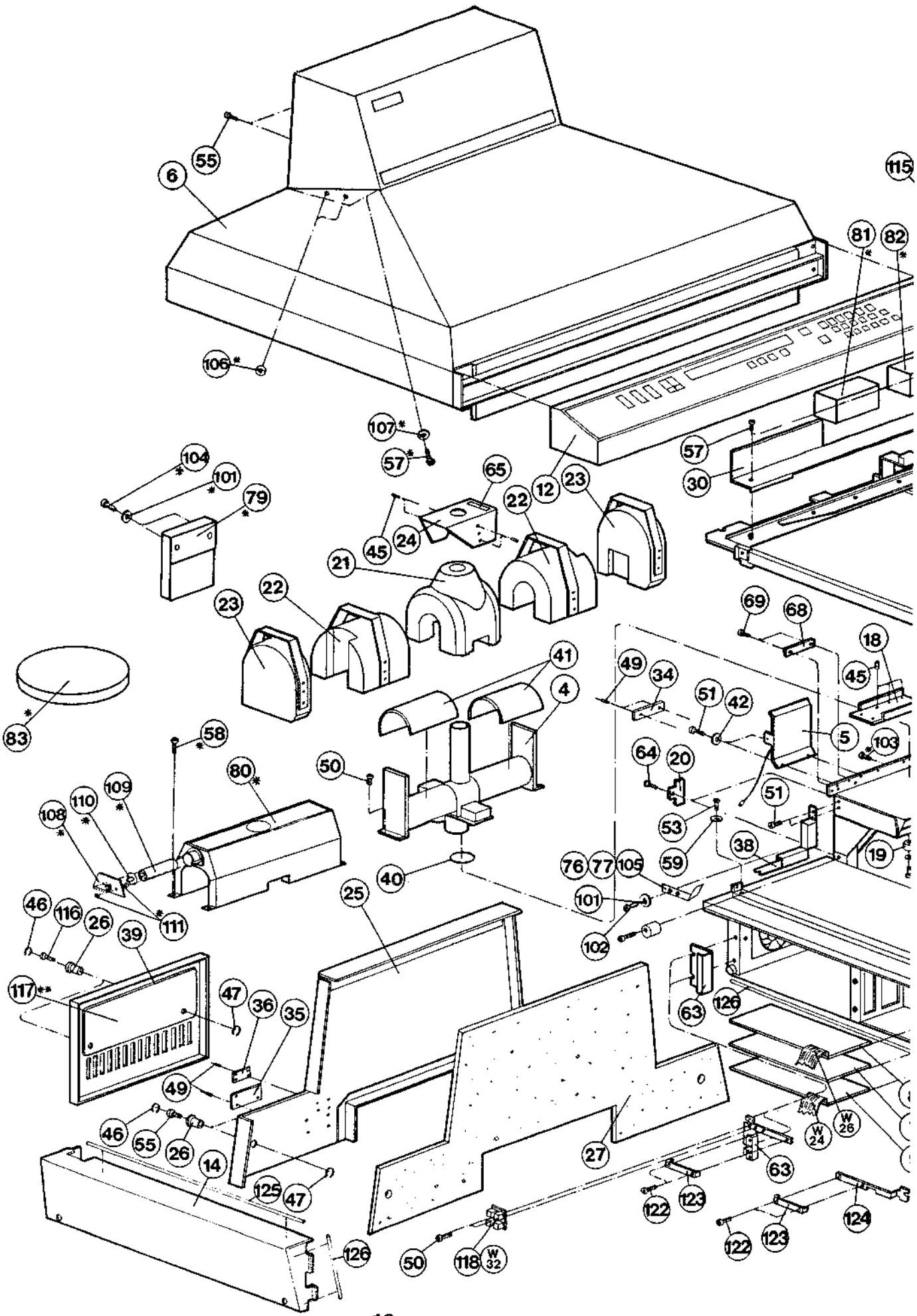
FOR PART NUMBER	10857646	LSC ASSEMBLY		10155600	960321

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
5	1	10854023	HV-DIVIDER UNIT	HV-DIVIDER UNIT	10355373	35	930812
	2	10857681	PREAMPLIFIER UNIT	1411	10455394	36	920625
	1	10857670	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC-A 10357727	37	920625
	1	10857671	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD-A 10357728	38	20625
	1	10856263	PROGRAM PACKAGE	1410/80186 BIOS ROM		106	911007
35	1	10555672	LABEL	AL 99.5 S=1	NTL5	355	911002
36	1	10494512	WARNING PLATE	AL-PLATE		365	911002
12	1	10855597	DISPLAY UNIT	1410	10355598	115	940313
18	2	10455331	PLATE	FE-PLATE S=3	NTL5	205	940325
	1	10555408	LABEL SET		CA2	409	940525
	1	10551111	LABEL	AL-PLATE S=0.8	LR52500	404	941214
6	1	10855461	TOP COVER ASSEMBLY	1410	10255462	45	960122
W24	1	10855508	FLAT CABLE	40S-40S	FC33	117	951128
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	118	960321
13	1	10355564	FRONT BOX ASSEMBLY		NTL5	125	960115
14	1	10355567	SIDE BOX RIGHT	FE-PLATE S=1	NTL5	135	960115
15	1	10355568	SIDE BOX LEFT	FE-PLATE S=1	NTL5	145	960115
32	0.500	10455572	PLATE 2		NTL5	325	960313
	1	11570078	LABEL	THERMAL TRANSFER PRINT	THT-5-438-10	404	950508
42	10	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		415	960115

43	8	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		425	960115
47	4	11251077	LOCKRING	16*1		465	950324
50	4	11271016	SCREW	M 3*4 FE YELLOWPASS.		495	960115
52	8	11274013	SCREW	M 5*12 FE YELLOWPASS.		515	960115
55	8	11274145	SCREW	M6*12 FE YELLOWPASS.		545	950324
116	2	11274156	SCREW	M6*16 ST YELLOWPASS.		546	960115
57	5	11274139	SCREW	M4*8 FE BLACKPASS.		565	960115
	0.300	10556201	LABEL	WARNING STICK PVC ALUM	EUROPIUM 152	595	950216
112	2	11276032	SCREW	C 3.5*6.5 FE YELLOWPASS.		650	960311
114	0.100	11550112	INSULATING TAPE	S=1,2-1,6	CE-016	660	960311

Fig. 1409, 1410, 1411-01 LSC Assembly

10155600



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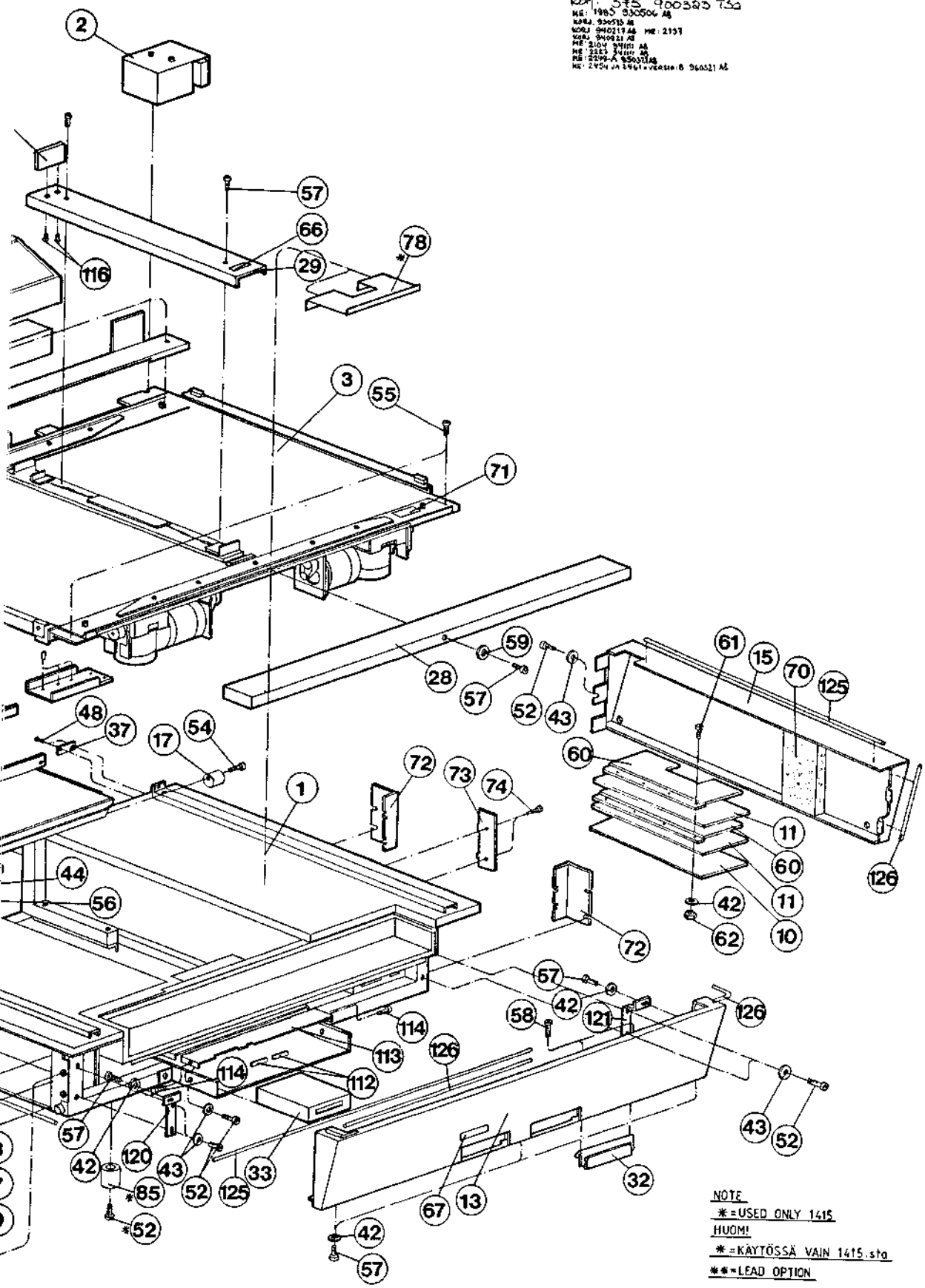
Korj. 263 890906 TSa
Korj. 299 891005 TSa
Korj. 364 900212 TSa
Korj. 375 900525 TSa



NOTE
*=USED ONLY 1415
HUOM!
*=KÄYTÖSSÄ VAIN 1415.sta
**=LEAD OPTION

10 15 5600-8

LSC 1410

Piirt. 881220 TNS
Tark. 881220 Ha
Hyv. 881220 JK

Fig. 1409, 1410, 1411 -02 Body Assembly

10854916

96-10-10

FOR PART NUMBER		10854916	BODY ASSEMBLY		10154917	960503
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	12	11310037	CLAMP		FCC-A-C8	320
	7	11310038	CLAMP		ACC38-A	330
	8	11310040	CLAMP		ACC62-A	340
	1	10555601	LABEL SET		FC31	370
	1	10555430	LABEL SET		CA24	380
1	1	10254918	BODY		NTL5	19
2	1	10160788	BOTTOM PLATE ASS.		1414	20
3	1	10354921	COVER PLATE RIGHT	AL-PLATE S=2,5	NTL5	30
4	1	10354922	COVER PLATE LEFT	AL-PLATE S=2,5	NTL5	40
5	1	10354923	BOX	AL-PLATE S=1,5	NTL5	50
6	1	10354924	LID		NTL5	60
7	4	10454925	GUIDE ASSEMBLY		NTL5,1470,1460	70
8	4	10454928	TUBE ASSEMBLY		NTL5,1470,1460	80
9	2	10354931	SUPPORT	FE-PLATE S=1,5	NTL5	90
10	1	10454932	BOX ASSEMBLY		NTL5	100
11	1	10354935	SUPPORT RIGHT		NTL5	110
12	1	10354940	SUPPORT LEFT		NTL5	120
13	4	10454941	ADJUSTER NUT	6K14	NTL5,1470	130
14	4	11275024	SCREW	M8*60		140
15	2	10454943	BRACKET ASSEMBLY		NTL5	150
16	4	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	160
17	4	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		170
18	14	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		180
19	14	11252012	RIVET	3.2*7.4 MONELL	TLP/D/BS 429	190
20	22	11252002	RIVET	3.2*8.9 MONELL	TLP/D/BS435	200
21	20	11260010	RIVETED NUT	M 5 2.0-3.0 MS	338592RIV-TI	210
22	4	11274004	SCREW	M 4*6 FE YELLOWPASS.		220
23	8	11274012	SCREW	M 5*10 FE YELLOWPASS.		230
24	4	11274013	SCREW	M 5*12 FE YELLOWPASS.		240
25	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		250
26	2	11274031	SCREW	M 5*12 FE YELLOWPASS.		260
27	1	11274136	SCREW	M8*40 YELLOWPASS.		270
28	9	11278011	NUT	M 8 FE YELLOWPASS.		280
29	4	11278026	NUT	M5 NYLOC		290
30	4	10455004	BUSHING	POM BLACK D=16	NTL5	155
31	8	11250004	WASHER	A6,4 ZN		165
32	4	11274076	SCREW	M6*16 FE YELLOWPASS.		275
33	1	10854987	INSULATION SET	11 CODES = 13 PARTS	NTL5	18
34	1	10855506	P.C.ASSEMBLY	IONIZER	RRI	11
35	1	10355320	SUPPORT		NTL5	161
36	1	10355113	LEAD	LEAD 99.9%	NTL-5	162
37	4	11251018	PIN	3*20 ST		201
38	4	11250015	WASHER	8.4/17*1.6 FE YELLOWPASS.		171
39	4	11274126	SCREW	M8*35 FE YELLOWPASS.		271
40	3	11271016	SCREW	M 3*4 FE YELLOWPASS.		219
41	1	10855115	POWER UNIT		10255116	12
42	1	10855188	POWER-RACK			13
43	1	10855187	VME-RACK			14
44	1	11690045	FAN	24VDC 5W 2800RPM	4314	350
45	1	11690040	FINGER GUARD		9.601-43	360
46	12	11274015	SCREW	M 5*16 FE YELLOWPASS.		241
47	4	11250001	WASHER	A3,2		166
48	4	11271025	SCREW	M 3*16 FE YELLOWPASS.		218
49	4	11278002	NUT	M3 FE YELLOWPASS.		279
50	4	10455327	BUSHING	POM D30 BLACK	NTL5	156
51	2	10455938	BRACKET	FE-PLATE S=1	NTL-5	151
54	1	11274030	SCREW	M 4*8 FE YELLOWPASS.		255
55	1	11480047	FERRITE CLAMP	D 6,6 MM	28B2025-0A0	400
56	1	11480048	FERRITE CLAMP	D 13 MM	28B2024-0A0	410
57	2	11480049	FERRITE CLAMP	26-WIRE FLAT CABLE	28B2022-000	420
58	4	11480050	CLAMP	FOR 26-W.FLAT C. CLAPM	M-CLIP	430
59	2	11480052	FERRITE CLAMP	40-WIRE FLAT CABLE	28B2001-000	440
60	1	10462059	INSULATOR	TEFLON PLATE T=1		157
TR	1	11650053	TRANSFORMER	27V/4,5KV 0.45VA		300

W11-19	1	10858057	1410 FRAME WIREING	CA 23-30, SYT.		25
W20, W21, W2	3	10855441	FLAT CABLE	26S-2*26S	FC31	09
W23	1	10855442	FLAT CABLE	34S-2*34S-40S	FC32	10
W27	1	10855593	WIRING ASS		CA36	17
W30	1	10856412	WIRING ASS		CA51	16

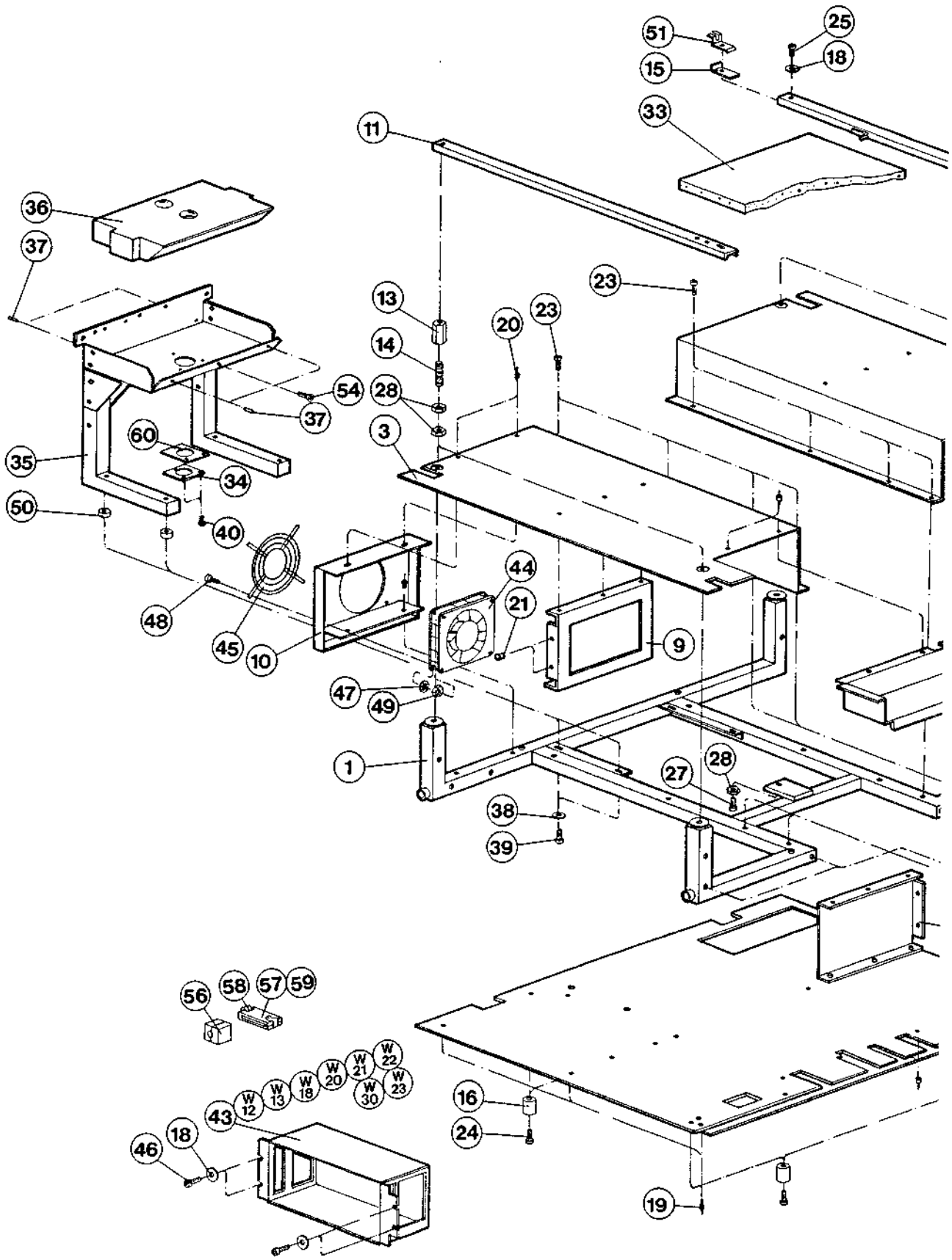
PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

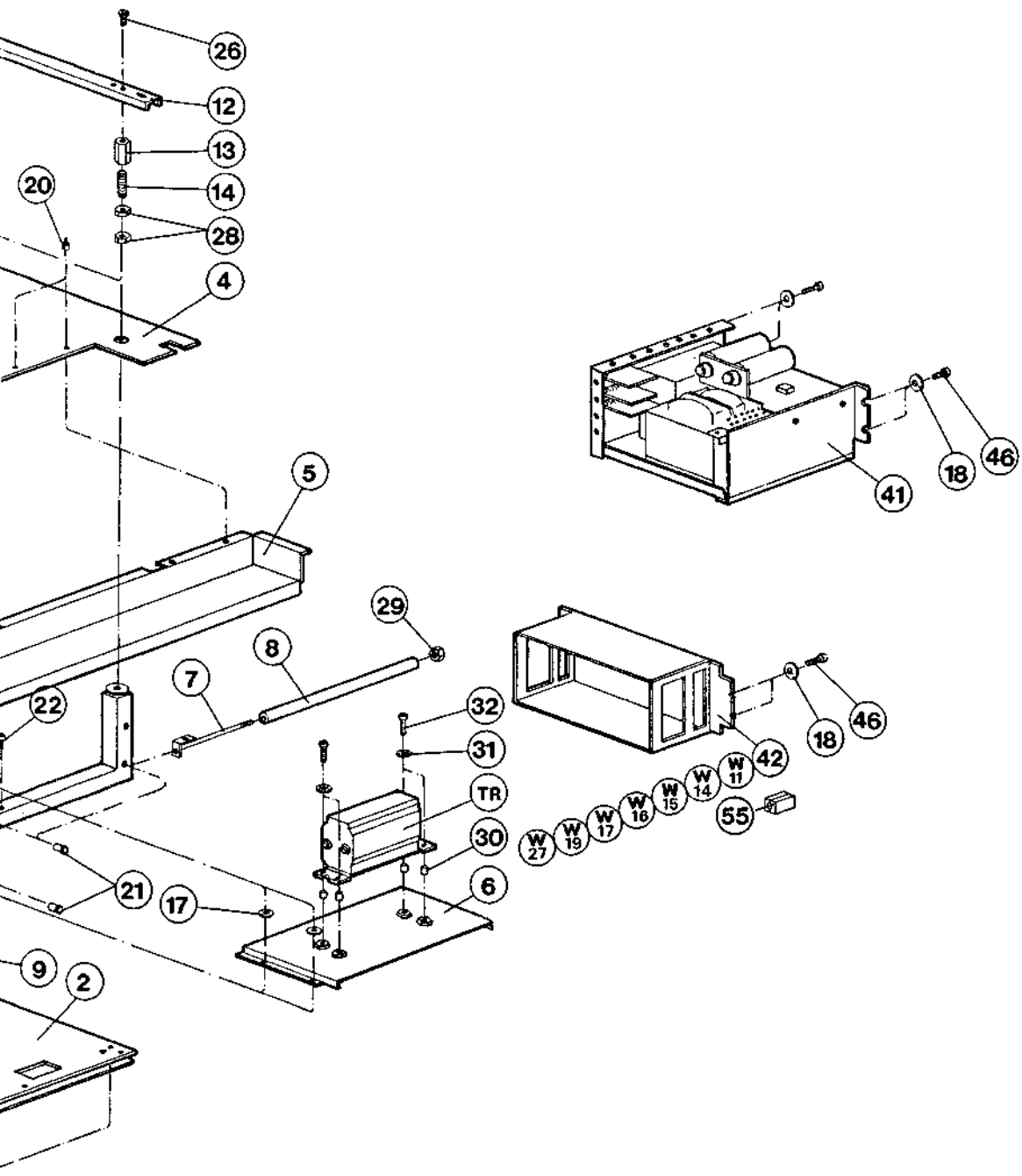
FOR PART NUMBER	10854916	BODY ASSEMBLY	10154917	960503

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF	LINE	DATE
W27	1	10855593	WIRING ASS	CA36		15	930512
2	1	10354920	BOTTOM PLATE	FE-PLATE S=1,5		20	941026
52	0.100	11550112	INSULATING TAPE	S=1,2-1,6 FOR PLATE	CE-016	310	941027
55	11	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	195	951121
56	0.105	11240174	RF GASKET SPRING	BeCu 28MM*6MM	97-438-02	196	951121

Fig. 1409, 1410, 1411-02 Body Assembly

10154917





10 15 4917-D

Piirt. 881201 TNS
Tark. 881201 H/a
Hyv. 881201

Fig. 1409, 1410, 1411 -03 Sample Conveyor

10855197

96 - 10- 10

FOR PART NUMBER		10855197	SAMPLE CONVEYOR		10155198	960610
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10555603	LABEL SET	CONNECTOR LABEL	CA20	520
1	1	10855064	MOTOR UNIT 1		10355065	10
2	1	10855070	MOTOR UNIT 2		10355071	20
3	1	10855074	SUPPORT 1 ASSEMBLY		10455075	30
4	1	10855078	SUPPORT 2 ASSEMBLY		10455079	40
5	1	10855051	PLATE ASSEMBLY, R		10455052	50
6	1	10855056	PLATE ASSEMBLY, L		10455057	60
7	1	10255199	CONVEYOR PLATE	AL-PLATE S=5	NTL5	70
8	4	10455200	PLATE 1	AL-PLATE S=0,5	NTL5	80
9	1	10455201	PLATE 2	AL-PLATE S=0,5	NTL5	90
10	1	10455202	PLATE 3	AL-PLATE S=0,5	NTL5	100
11	10	10455203	WASHER	AL-PLATE S=4	NTL5	110
12	1	10355204	SUPPORT ASSEMBLY		NTL5	120
13	1	10357958	SUPPORT ASSEMBLY	S=0.8	NTL5	130
14	2	10358091	SUPPORT BAR	AL 9,3*15	1410	140
15	2	10358092	PLATE	S=1	1410	150
16	4	10455209	BUSHING	MS 6K10	NTL5	160
17	1	10355210	PLATE	AL S=2	NTL5	170
18	2	10355211	GUIDE 1	POM-PLATE BLACK S=25	NTL5	180
19	2	10355212	GUIDE 2	POM-PLATE BLACK S=8	NTL5	190
20	2	10455213	BRACKET ASSEMBLY		NTL5	200
21	2	10455216	BUSHING	MS 6K10	NTL5	210
22	2	10447733	SPRING	D0,75	1260,1250,1480	220
23	4	10455217	AXLE	MS 6K6	NTL5	230
24	1	10455218	PLATE		NTL5	240
25	2	10454558	COGGED BELT WHEEL		NTL5	250
26	2	10455220	HOLDER	FE-PLATE S=2	NTL5	260
27	2	10455221	SUPPORT		NTL5	270
28	2	10455222	HOLDERT	FE-PLATE S=1,5	NTL5	280
29	1	10355223	PLATE	FE-PLATE S=1,5	NTL 5	290
30	1	10355368	SUPPORT	FE-PLATE S=1	NTL 5	300
31	40	10258236	TOOTH	POM BLACK	1410	310
32	2,400	11350025	CHAIN	6MM	445	320
33	2	11350026	LINK	6MM		330
34	22	11250002	WASHER	A4,3		340
35	4	11251023	FASTENING RING	4-5 MM		350
36	2	11250019	WASHER	6.4/18*1.6 FE,ZINKED		360
37	2	11251006	LOCK RING	6*0.7		370
38	2	11251037	GRIP RING	FOR D6 AXLE		380
39	5	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	390
40	14	11274006	SCREW	M 4*10 FE YELLOWPASS.		400
41	2	11274007	SCREW	M 4*12 FE YELLOWPASS.		410
42	2	11274072	SCREW	M4*16 FE YELLOWPASS.		420
43	10	11274072	SCREW	M4*16 FE YELLOWPASS.		430
44	4	11274132	SCREW	M3*8 FE BLACKPASS.		440
45	10	11271034	SCREW	M 4*5 FE YELLOWPASS.		450
46	4	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804	476
47	4	11278002	NUT	M3 FE YELLOWPASS.		470
48	5	11350078	COGGED BELT	SYNCHROFLEX	10 T2,5/1300	480
49	1	10855243	P.C.ASSEMBLY	POSITION SENSOR	RSU-A 10355242	65
50	2	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	490
51	4	11310039	CLAMP		ACC19-A	510
52	2	11276005	SCREW	C 4.2*9.5 FE YELLOWPASS.		460
53	8	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		341
55	2	11274005	SCREW	M 4*8 FE YELLOWPASS.		395
58	4	11278003	NUT	M4 FE YELLOWPASS.		475
59	1	10455263	BRACKET	FE-PLATE S=2,0	NTL5	313
60	4	11275014	SCREW	M4*6		455
61	2	11274012	SCREW	M 5*10 FE YELLOWPASS.		435
62	1	10355796	GUIDE	FE-PLATE S=2	NTL5	314
63	1	10455633	BRACKET	FE-PLATE S=1,5	NTL5	315
64	2	10355889	PLATE		1410,1470,1297	316
66	2	10456345	GLUE FILM 1	GLUE FILM T=0,16	FIXMATE 500	318
67	4	10456346	GLUE FILM 2	GLUE FILM T=0,16	FIXMATE 500	319
68	0.100	11140002	SEALING TAPE	5*10 BLACK	73-63120	515

69	1	11290013	FOOT	D12*3 RUBBER	3M SJ 5012	530
W1	1	10855299	WIRING ASS.		CA16	61
W2	1	10855300	WIRING ASS.		CA17	62
W3	1	10855313	WIRING ASS.		CA18	67
W6, W7	2	10855315	WIRING ASS.		CA20	69

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855197	SAMPLE CONVEYOR	10155198	940203

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
14	2	10355207	SUPPORT BAR	9,3*15	1470,1297	140	911018
15	2	10355208	PLATE	S=1	1470,1297	150	911018
31	40	10353703	TOOTH	POM BLACK	1470,1297	310	920519

Fig. 1409, 1410, 1411 -03 Sample Conveyor 10155198

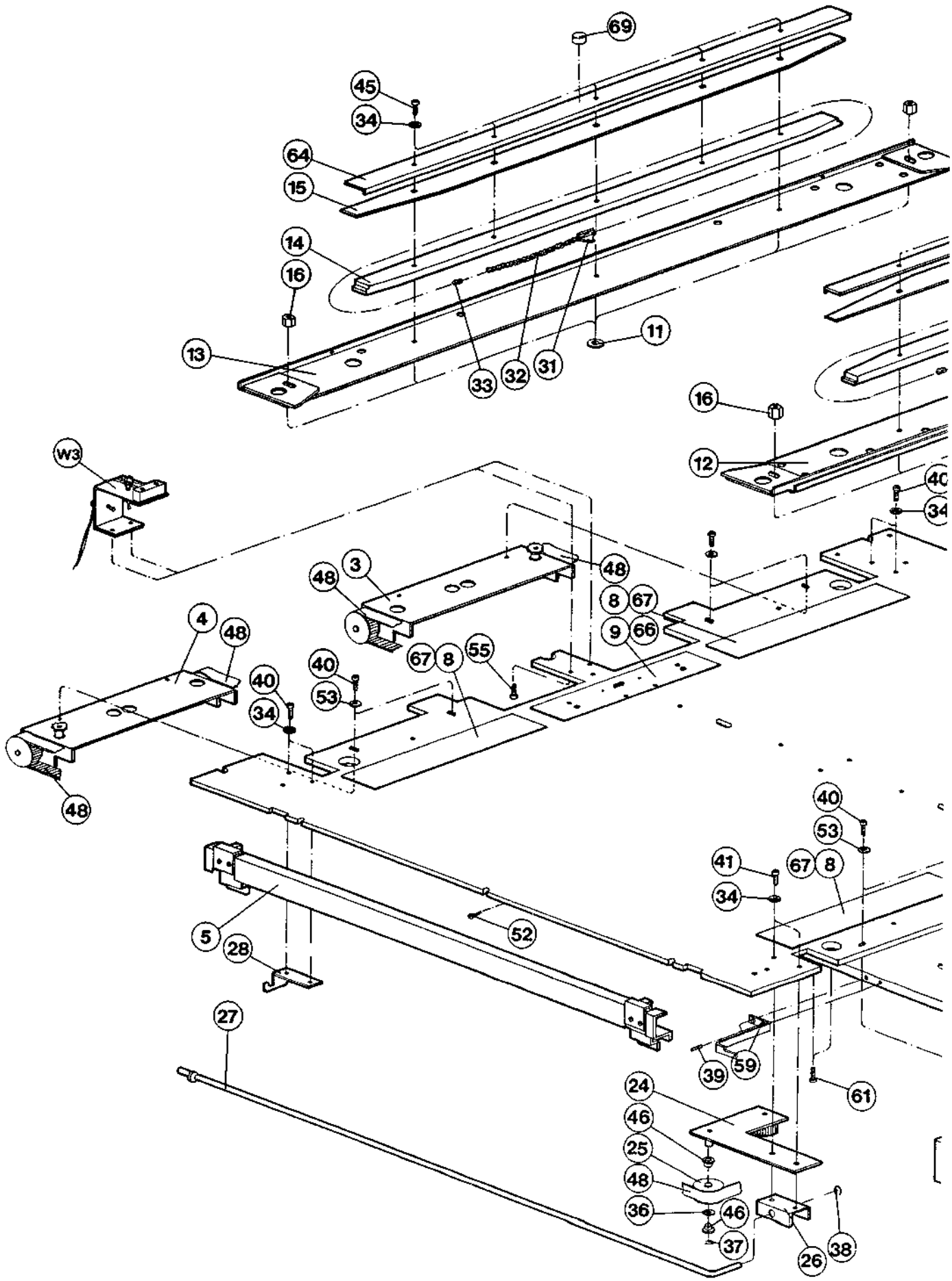


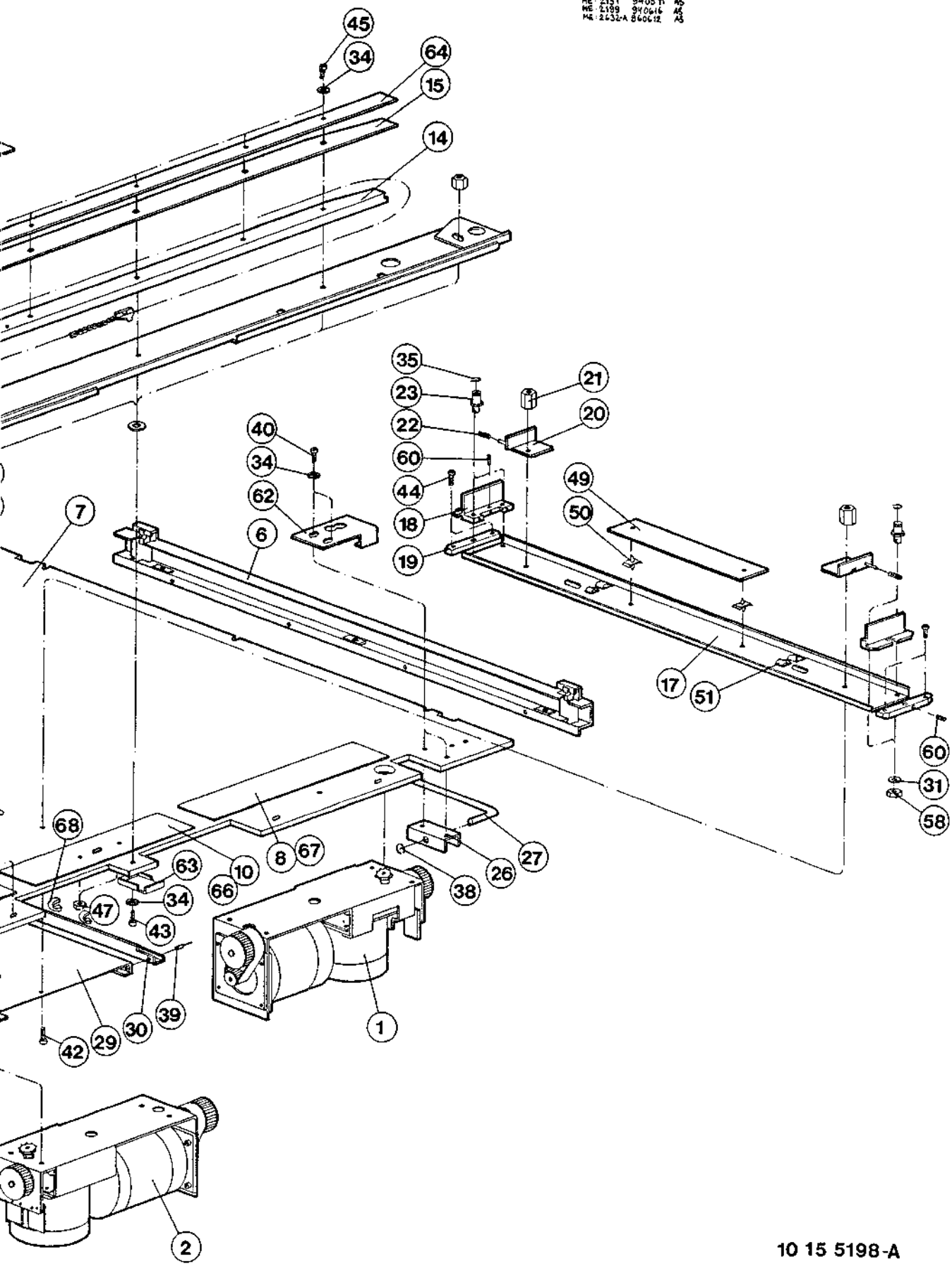
Fig. 1409, 1410, 1411 -04 Floor Stand

10856020

96 - 10 - 10

FOR PART NUMBER		10856020	FLOOR STAND		10256021	890828
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	11550143	PACKING BOX	1050*780*860	VIKEX	400
	5	11550069	L-LIST	90*90*25*1000	6311-01	410
	1	11550043	PACKING LISTBAG	MERCAPOCKET 180X140	C6	420
	1	10549484	LABEL		WALLAC	430
1	1	10256022	BOTTOM FRAME		NTL5	10
2	1	10256025	TOP FRAME		NTL5	20
3	4	10356027	VERTICAL TUBE		NTL5	30
4	1	10356030	SHELF 1	FE-PLATE S=0.5	BLACK NTL5	40
5	1	10356031	SHELF 2	FE-PLATE S=0.5	BLACK NTL5	50
6	2	10456032	SHELF 3	FE-PLATE S=2,5	NTL5	60
7	1	10456033	HANDLE 1	FE-PLATE S=0.5	NTL5	70
8	1	10456034	HANDLE 2	FE-PLATE S=0.5	NTL5	80
9	4	10456035	BRACKET	FE-PLATE S=2	NTL5	90
10	4	10456036	SUPPORTING RAIL	FE-PLATE S=2	NTL5	100
11	4	10456037	SUPPORT PLATE	STAINLES PLATE S=0.8	NTL5	110
12	4	10456038	PIN	STAINLES ROUND BAR D5	NTL5	120
13	1	10356039	END PLATE, RIGHT	12MM	NTL5	130
14	1	10356040	END PLATE, LEFT	12MM	NTL5	140
15	1	10356041	SEPARATION WALL	12MM	NTL5	150
16	1	10456042	DECK	18MM	NTL5	160
17	1	10456043	BOTTOM PLATE	15MM	NTL5	170
18	1	10356044	CHEST OF DRAWERS		NTL5	180
19	1	10356045	VERTICAL ROD		NTL5	190
20	1	10456047	SWINGING ARM		NTL5	200
21	2	10456048	BUSHING	FE-AUTOM.STEEL D22	NTL5	210
22	1	10456049	PLATE ASSEMBLY		NTL5	220
23	1	10356052	BOTTOM PLATE	AL-PLATE S=3	NTL5	230
24	3	10456053	PLATE	FE-PLATE S=3	NTL5	240
25	3	10456054	NUT	6K19	NTL5	250
26	4	11350085	WHEEL		ESL-J-75ND/K	260
27	2	11310043	SLIDE		BS 230E6500	270
28	12	11271093	SCREW	M4*6 FE YELLOWPASS.		280
29	2	11274034	SCREW	M6*30 FE YELLOWPASS.		290
30	12	11274038	SCREW	M8*16 FE YELLOWPASS.		300
31	4	11274023	SCREW	M8*30 FE YELLOWPASS.		310
32	4	11274024	SCREW	M8*40 FE YELLOWPASS.		320
33	3	11277010	SCREW	M8*35 FE YELLOWPASS.	SFS 2458	330
34	56	11276031	SCREW	3,5*13 YELLOWPASS.	HECO-FIX	340
35	8	11278003	NUT	M4 FE YELLOWPASS.		350
36	4	11278011	NUT	M8 FE YELLOWPASS.		360
37	6	11260017	RIVETED NUT	M5 1.0-2.0 MS	338591RIV-TI	361

Kori. n:o 256 890320 TSa
Kori. n:o 278 890414 TSa
ME: 1927 910827 AS
ME: 2122 940511 AS
ME: 2151 940511 AS
ME: 2199 940616 AS
ME: 2432-A 860612 AS



10 15 5198-A

Piirt. 881124 TMS
Tark. 881124 MVa
Hyv. 881124 KK

Fig. 1409, 1410, 1411 -04 Floor Stand

10256021

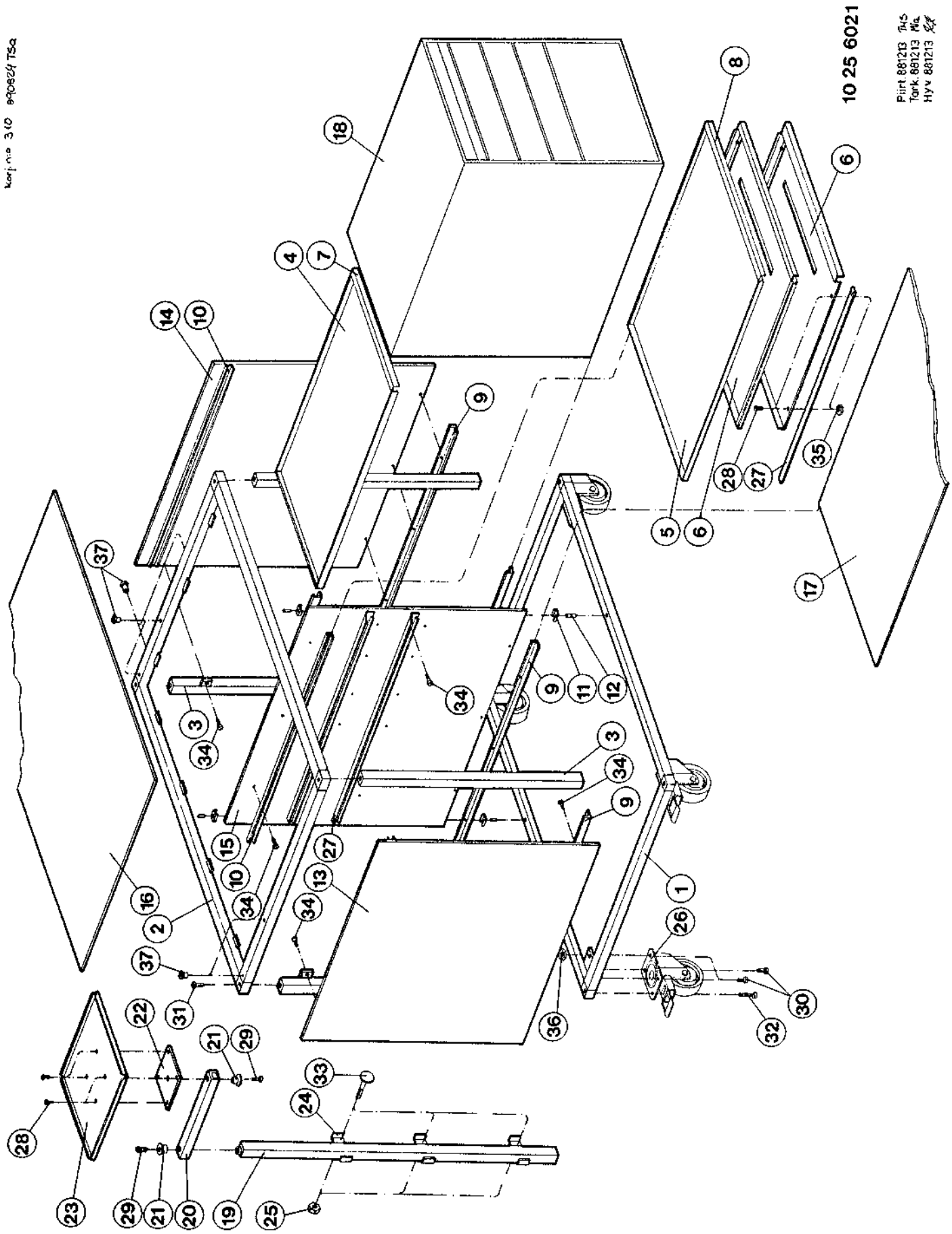


Fig. 1409, 1410, 1411 -05 Top Cover Assembly 10855461

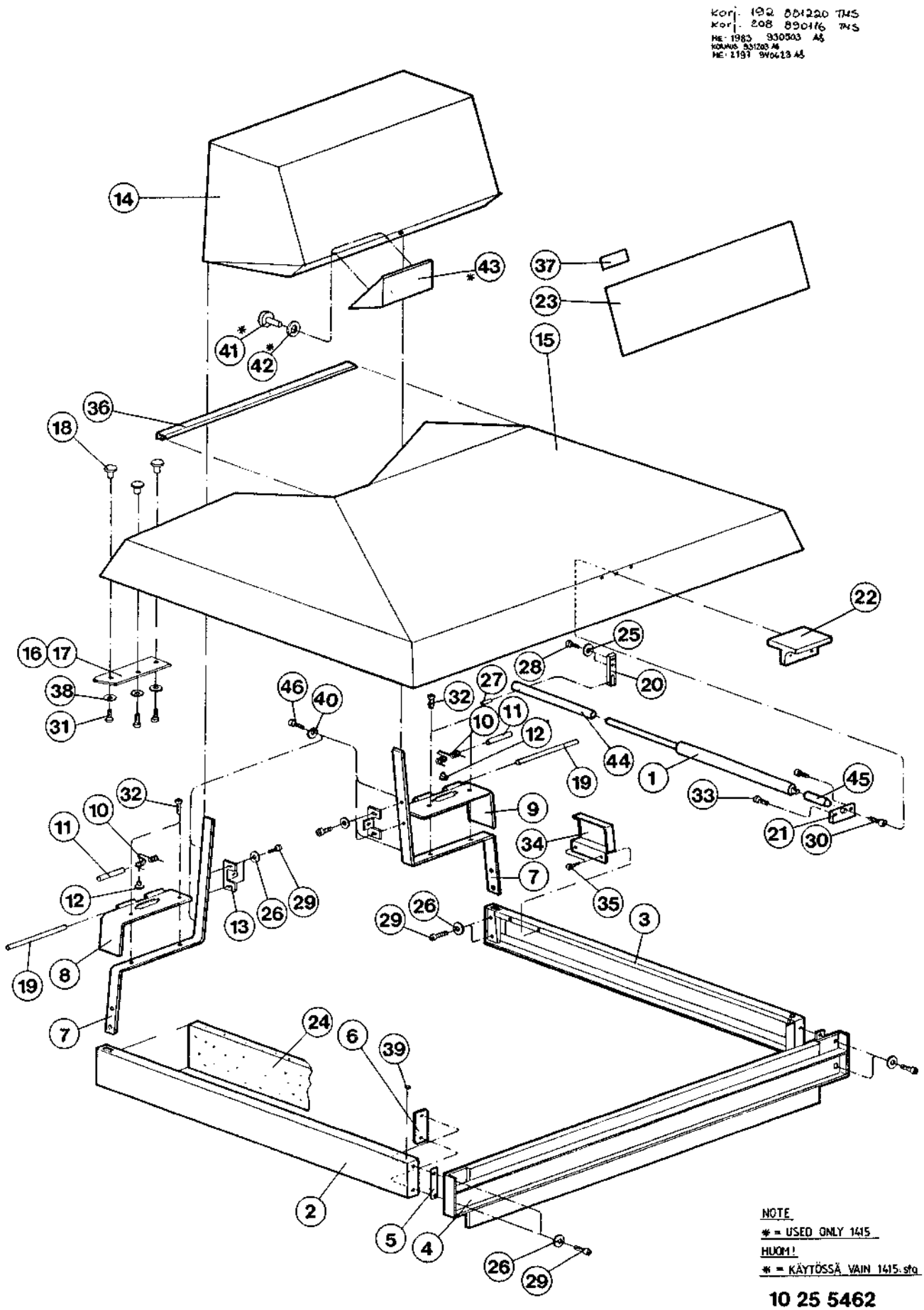
96 - 10 - 10

FOR PART NUMBER	10855461	TOP COVER ASSEMBLY		10255462	940623
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	11391026	GAS SPRING		16-1-168-135-40	245
2	1	10355463	PLATE RIGHT, ASS.		NTL5	30
3	1	10355467	PLATE LEFT ASS.		NTL5	40
4	1	10355470	SUPPORT BOX ASS.		NTL5	50
5	2	10455473	PLATE	FE-PLATE S=1,5	NTL5	60
6	2	10455474	PLATE	FE-PLATE S=3	NTL5	70
7	2	10255475	SUPPORT	10X25	NTL5	80
8	1	10355476	HINGE BODY RIGHT	FE-PLATE S=1,5	NTL5	90
9	1	10355477	HINGE BODY LEFT	FE-PLATE S=1,5	NTL5	100
10	2	10455000	SPRING	D2	NTL5	110
11	2	10455478	GUIDE	D6H8	NTL5	120
12	2	10455479	PLATE	POM BLACK D=12	NTL5	130
13	2	10455480	BRACKET		NTL5	140
14	1	10255481	TOP COVER		NTL5	150
15	1	10254553	COVER	PLATE S=5	NTL5	160
16	1	10355488	HINGE RIGHT	FE-PLATE S=1,5	NTL5	170
17	1	10355489	HINGE LEFT	FE-PLATE S=1,5	NTL5	180
18	6	10455490	NUT	MS D18	NTL5	190
19	2	10455491	PIN	D2,5	NTL5	200
20	1	10455492	SUPPORT	8,2X8,2	NTL5	210
21	1	10455493	PLATE	POM-PLATE S=8	NTL5	220
22	1	10355494	HANDLE	POM-PLATE S=25	NTL5	230
24	1	10855453	INSULATION SET		NTL5	20
25	2	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		250
26	12	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		260
27	1	11251015	PIN	2*10 ST		270
28	2	11274005	SCREW	M4*8 FE YELLOWPASS.		280
29	12	11274012	SCREW	M5*10 FE YELLOWPASS.		290
30	1	11274088	SCREW	M3*20 FE YELLOWPASS.		300
31	6	11274133	SCREW	M4*6 FE BLACKPASS.		310
32	4	11274134	SCREW	M5*10 FE BLACKPASS.		320
33	2	11276030	SCREW	B4.2*22 FE YELLOWPASS.		330
34	1	10455763	COVER ASSEMBLY		NTL5	231
35	2	11276015	SCREW	B2.9*6.5 FE YELLOWPASS.		340
36	1	10456094	EDGE STRIP	FE-PLATE S=1	NTL5	241
38	6	11250041	WASHER	4.3/9*0.8 FE BLACK		360
39	2	11290013	FOOT	D12*3 RUBBER WHITE	3M SJ 5012	370
40	4	10456181	WASHER	FE-PLATE S=2	LSC-5	242
44	1	10459978	EXTENSION ARM	MS D=8	1409	10
45	1	10459979	MOUNTING PIN	MS-ROD D10	1409	15
46	4	11274031	SCREW	M5*12 FE YELLOWPASS		295

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855461	TOP COVER ASSEMBLY		10255462	940623	
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
1	1	10855445	SPRING ASSEMBLY	10455446	NTL5	10	930812

Fig. 1409, 1410, 1411-05 Top Cover Assembly 10255462



NOTE
* = USED ONLY 1415
HUOM!
* = KÄYTÖSSÄ VAIN 1415:stä

10 25 5462

Piirt. 881109 TMS
Tark. 881109 Ma.
Hyv. 881109 LL

Fig. 1409, 1410, 1411 -06 Sample Changer

10855338

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FOR PART NUMBER	10855338	SAMPLE CHANGER		10255339	910603

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10855197	SAMPLE CONVEYOR	1410	10155198	10
2	1	10854857	ELEVATOR ASSEMBLY	1410	10254858	20
4	2	11274031	SCREW	M5*12 FE YELLOWPASS.		40

Fig. 1409, 1410, 1411 -06 Sample Changer

10255339

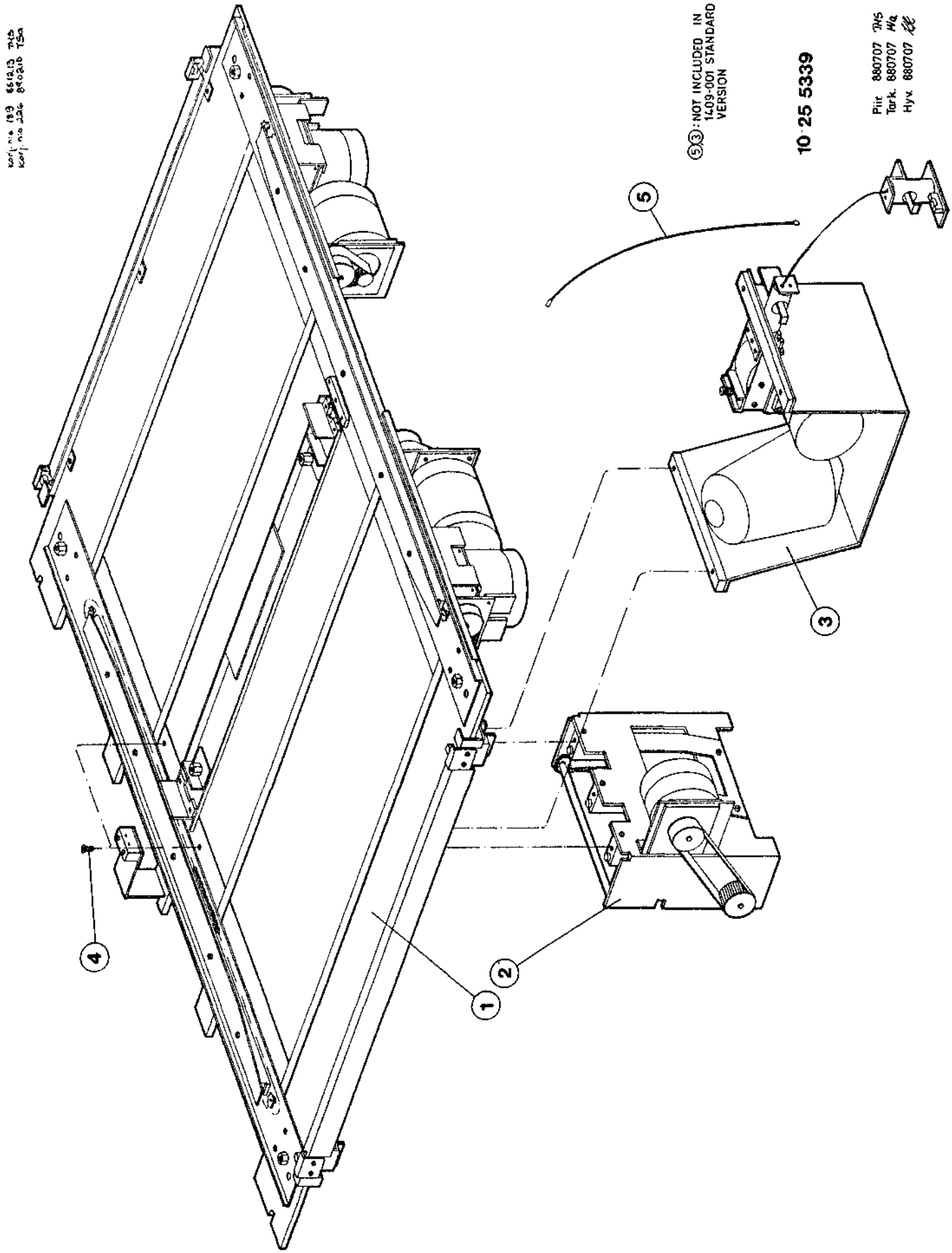


Fig. 1409, 1410, 1411 -07 Power Unit

10855115

96 - 10 - 10

FOR PART NUMBER		10855115	POWER UNIT		10255116	960112
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10555709	LABEL SET			121
	6	11310013	WIRE TIE	2.4*102 NYLON 66	SST1MPANDUIT	560
	2	11862137	COVER	FOR 3-P CONNECTOR	TC156F-6	580
	0.250	11450017	WRAPPING SPIRAL	12 MM	PLIOSPIRE 12MM	590
1	2	10850578	CONNECTION BOARD	1230	RPC 10650579	10
2	1	10850577	CONNECTION BOARD	1230	RPD 10650580	20
3	1	10853848	P.C.BOARD	CONNECTION BOARD	RPZ	30
4	1	10255117	BODY PLATE	AL-PLATE S=3	NTL5	40
5	1	10355118	COVER PLATE	AL-PLATE S=2	NTL5	50
6	1	10355119	BOX	FE-PLATE S=1	NTL5	60
7	1	10455120	SEAL	PRESPAN S=0,5	NTL5	70
8	1	10455121	SEAL	PZ-940		80
9	1	10355122	PLATE	AL S=3	NTL5	90
10	1	10355123	COVER	FE-PLATE S=1	NTL5	100
11	1	10455124	SLIDE	PVC S=8	NTL5	110
12	4	10454836	NUT	MS 6K6	NTL5	120
13	1	11730016	ACCU PACK	12V 4AH NICD	10X NC10VR4	220
14	1	11870048	CONNECTOR STRIP	3-P 2,5MM2	321/BDS/03	230
15	3	11880025	FUSE HOLDER	16A 250V	FEU 031.1673	240
16	3	11880027	FUSE CAP	FUSE . 6,3X32MM	FEK 031.1661	250
17	1	10555002	LABEL	POLYETHEN	1205 ACCU	260
18	1	10548240	LABEL	1215/16	WALLAC	270
19	4	11250001	WASHER	A3,2		280
20	4	11250002	WASHER	A4,3		290
21	2	11250004	WASHER	A6,4 ZN		300
22	4	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		310
23	4	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		320
24	4	11250021	SERRAT LOCK WASHER	3.0 ANNEALED ZINKED	3.2*5.5*0.45	330
25	1	11250012	WASHER	M6 CU		340
26	6	11260016	RIVETED NUT	M 4 1.0-2.0 MS	336493RIV-TI	350
27	2	11260010	RIVETED NUT	M 5 2.0-3.0 MS	338592RIV-TI	360
28	1	11270001	SCREW	M 6*25 CU		370
29	6	11862127	LOCKING NUT ASSY	D-CONN. L7,1 4-40NC-2B	17D20418-2	380
30	2	11271021	SCREW	M 3*10 FE YELLOWPASS.		390
31	4	11271025	SCREW	M 3*16 FE YELLOWPASS.		400
32	2	11271048	SCREW	M 3*10 FE YELLOWPASS.		410
33	2	11271054	SCREW	M 4*10 FE YELLOWPASS.		420
34	2	11274009	SCREW	M 4*20 FE YESLLOWPASS.		430
35	2	11274015	SCREW	M 5*16 FE YELLOWPASS.		440
36	4	11274072	SCREW	M4*16 FE YELLOWPASS.		450
37	2	11276010	SCREW	C 2.9*13 FE YELLOWPASS.		460
38	8	11278002	NUT	M3 FE YELLOWPASS.		470
39	3	11278003	NUT	M4 FE YELLOWPASS.		480
40	9	11278004	NUT	M5 FE YELLOWPASS.		490
41	2	11278006	NUT	M 6 CU		500
42	2	11861036	CABLE LUG	M4 0,75-1,5MM2	A 1543 R	510
43	1	11861028	CABLE LUG	M6 0.75-1.5MM2	A1565R	520
44	1	11310040	CLAMP		ACC62-A	550
45	4	11861003	FLAT CONNECTOR	6,3X0,8MM 0,75-1.5MM2	A 1507 FL	530
46	1	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		311
47	7	11460009	SOLDERING TAG	D10/6*10	A2004 ME	540
48	10	11274012	SCREW	M 5*10 FE YELLOWPASS.		441
49	1	10461424	SLIDE	AL 8X30	1400 -SERIE POWER U	610
50	0.260	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603	600
51	10	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	630
52	0.096	11240174	RF GASKET SPRING	BeCu 28MM*6MM	97-438-02	620
C1	1	11626007	CAPACITOR H.V.	47NF 20% 250VAC 1KVDC	PME275ME5470M RIFA	130
C2,3	2	11630036	CAPACITOR ELECTR	10000UF -10+30% 40V	PEH179KD5100QB2	140
D1	1	11781006	DIODE BRIDGE	200V 25A	BYV25-200	160
F1,2	2	11830006	FUSE	2.0A 250V SLOW 6,3*32	19343	200
F3	1	11830020	FUSE	15A 32V FAST 6,3X32	AGC-15	210
K1, K2	2	11862133	CONNECTOR	6-N FEMALE 18AWG	CT156F18-6B	570
L1	1	11650063	MAINS FILTER-CONN	250V 6A 3-N	FN321-6/01	190
R1	1	11601173	RESISTOR	1M 2% 0.5W	B 1/2 BEYSCHLAG	150
S1	1	11845021	ROCKER SWITCH	2X2 10A 250V	A1450VA	170
S2	1	11845027	VOLTAGE SELECTOR	1X6 5-TENSION 10A 250V	SWPO33.1109	180
TR1	1	11650066	TRANSFORMER	288VA		125

PART HISTORY **FROM: 93-09-22 TO: 96-10-10**

FOR PART NUMBER	10855115	POWER UNIT		10255116	960112

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
11	2	10455124	SLIDE	PVC-PLATE S=8	NTL5	110	950920
48	8	11274012	SCREW	M 5*10 FE YELLOWPASS.		441	950920
40	7	11278004	NUT	M5 FE YELLOWPASS.		490	950920
52	0.105	11240174	RF GASKET SPRING	BeCu 28MM*6MM	97-438-02	620	960111
51	11	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	630	960111

Fig. 1409, 1410, 1411 -07 Power Unit

10255116

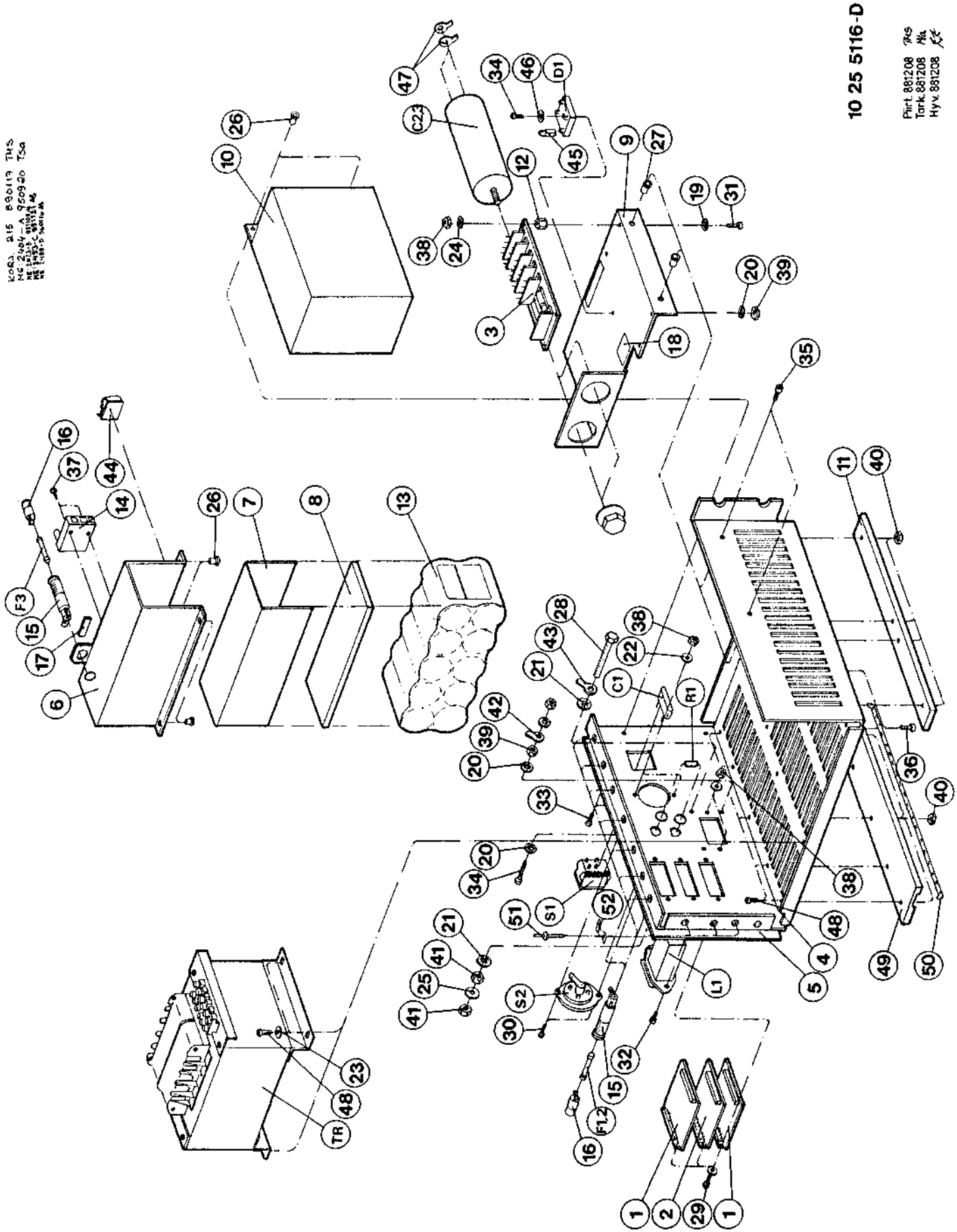


Fig. 1409, 1410, 1411 -08 Elevator Assembly

10854857

96-10-10

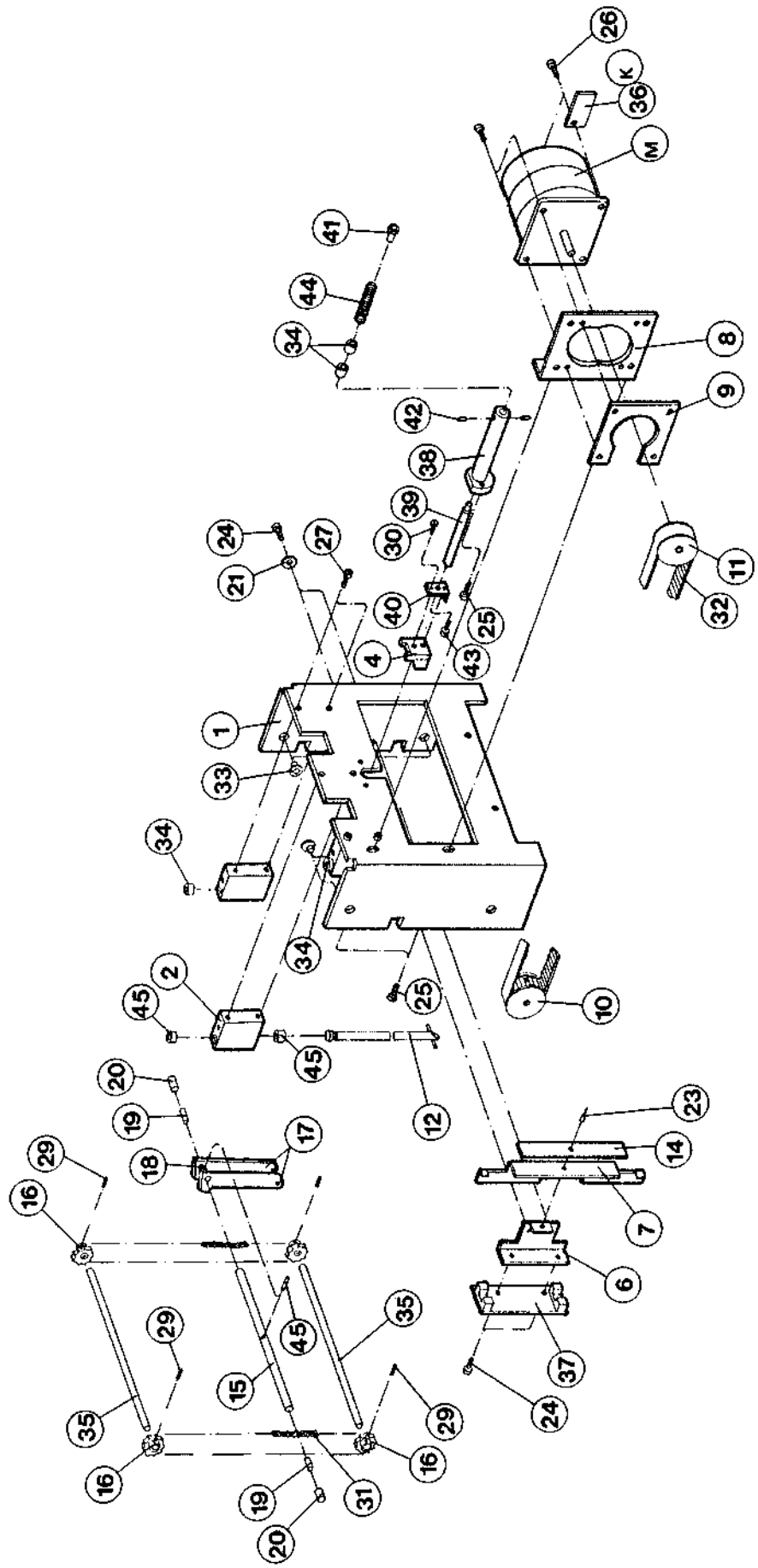
FOR PART NUMBER		10854857	ELEVATOR ASSEMBLY		10254858	951025
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	1	10254859	BODY	AL S=3	NTL5	10
2	3	10454860	GUIDE PIECE	AL 10X25	NTL5	20
4	1	10454862	GUIDE	POM BLACK S=20	NTL5	40
6	1	10454864	BRACKET	FE S=1,5	NTL5	60
7	1	10454865	SPRING	SPRINGBRONZE S=0,5	NTL5	70
8	1	10454866	BRACKET	FE S=2,5	NTL5	80
9	1	10454867	PLATE	FE S=2	1409,1235,1297	90
10	1	10357482	COGGED BELT WHEEL	Z 28	NTL-5	100
11	1	10354388	GOGGED BELT WHEEL	GRILON W 5239	1297	110
12	1	10454873	LIFT ARM		NTL5	120
14	1	10454875	PLATE	FE S=1,5	NTL5	140
15	1	10454876	AXLE	D6H8	NTL5	155
16	4	11350098	COG WHEEL	Z10	S6-10	160
17	2	10454878	PLATE	ROSTPROOF PLATE S=0,8	NTL5	170
18	1	10454879	BUSHING	MS D8/6	NTL5	180
19	2	10454880	PIN	SPRINGBRONZE 1,7X16	NTL5	190
20	2	10454881	BUSHING	POM BLACK D=8	NTL5	200
21	2	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		210
23	1	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	230
24	4	11274004	SCREW	M 4*6 FE YELLOWPASS.		240
25	4	11274005	SCREW	M 4*8 FE YELLOWPASS.		250
26	4	11274007	SCREW	M 4*12 FE YELLOWPASS.		260
27	6	11274012	SCREW	M 5*10 FE YELLOWPASS.		270
29	4	11275021	SCREW	M4*4 AISI316		290
30	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		300
31	0.600	11350025	CHAIN	6MM	445	310
32	1	11350044	COGGED BELT	SYNCHROFLEX	6T 2,5/285	320
33	4	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804 F	330
34	4	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	340
35	2	10454882	AXLE	DD6H8		150
36	1	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205 1470	201
37	1	10855186	P.C.ASSEMBLY	CONNECTION BOARD	RSP 10455185	202
38	1	10456162	BUSHING	BRASS ROUND BAR D30	NTL5	203
39	1	10456164	AXEL	STAINLES BAR D6	NTL5	204
40	1	10456163	PLATE	FE-PLATE S=1	NTL5	205
41	1	10456161	BUSHING	BRASS ROUND BAR D8	NTL5	206
42	2	11251055	PIN	2*10 ROSTPROOF		238
43	2	11271035	SCREW	M 4*8 FE YELLOWPASS.		239
44	1	11391012	BREAK SPRING	0.5*5*30 ROSTPROOF		341
45	2	10461476	JOURNAL BEARING	6/9x10		208
45	1	11251042	PIN	2*8		235
K	1	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	350
M	1	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	PH265-04	360

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER		10854857	ELEVATOR ASSEMBLY		10254858	951025	
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**	**DATE**
5	1	10454863	PLATE	FE-PLATE S=1,5	NTL5	50	920406
11	1	10357481	COGGED BELT WHEEL	Z 28	NTL5	110	920403
16	4	10454877	COGWHEEL	S6-10	NTL5	160	911212
13	1	10454874	LIFT ARM HEAD	STAINLESS STEEL D6h8	NTL5	130	950608
34	8	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	340	951024

Fig. 1409, 1410, 1411 -08 Elevator Assembly

10254858



10 25 4 858-B
Nostolaite 1410

Fig. 1409, 1410, 1411 -09 External Standard 10855272

96 - 10 - 10

FOR PART NUMBER	10855272	EXTERNAL STANDARD		10255273	941216
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
2	2	10855233	P.C.ASSEMBLY	SENSOR BOARD	RXC 10455232	20
3	1	10355274	BODY	AL-PLATE S=5	NTL-5	30
4	1	10454866	BRACKET	FE-PLATE S=2,5	NTL5	40
5	1	10454867	PLATE	FE-PLATE S=2	1409,1235,1297	50
7	1	10455276	LOCKING RING	MS D20	NTL-5	70
8	2	10455277	PLATE 1	FE-PLATE S=2,5	NTL-5	80
9	2	10455278	PLATE 2	FE-PLATE S=2,5	NTL-5	90
10	1	10455062	WHEEL 1	URETHAN	87 SHORE A	100
11	1	10455279	BUSHING	MS-ROD D18	NTL-5	110
12	1	10455280	AXLE 1	D8H7	NTL-5	120
13	1	10455063	WHEEL 2	URETHAN	87 SHORE A	130
14	2	10455281	AXLE 2	D6H8		140
15	2	10455282	BEARING	POM	NTL-5	150
16	1	10455283	GUIDE 1	AL 10X25	NTL-5	160
17	1	10455284	GUIDE 2	AL 10X25	NTL-5	170
18	1	10455285	LATH	FE S=1	NTL-5	180
19	1	10452652	SPRING	D=1,5	1220	190
20	1	10455286	TUBE	ACID-PROOF TUBE D6/4		200
21	2	10455287	BUSHING	MS-ROD D20	NTL-5	210
22	1	10455288	SPRING	SPRINGBRONZE S=0,5	NTL 5	220
23	2	10455289	BRACKET	FE S=1,5	NTL-5	230
24	1	10355290	LEAD SHIELD	LEAD 99,9%	NTL-5	240
26	2	10455292	PLATE	AL 10X20	NTL-5	260
27	1	10461099	LABEL	AL S=1	1400-SERIES	270
28	1	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205 1470	280
29	0.950	11183031	TUBE	D=6/4 POLYAMID	6*1 PA 11	290
31	4	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		310
32	3	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		320
33	2	11250019	WASHER	6.4/18*1.6 FE,ZINKED		330
34	3	11250039	WASHER	4.3/12*1 FE, ZINKED		340
35	4	11251031	FASTENING RING	FOR 5-7 MM AXLE		350
36	2	11252008	RIVET	1.9*3 ST	KDS 0*3	360
37	2	11260021	PLUG NUT	M6*11 ST SINK.	LA6	370
38	4	11271016	SCREW	M 3*4 FE YELLOWPASS.		380
39	16	11274004	SCREW	M 4*6 FE YELLOWPASS.		390
40	6	11274007	SCREW	M 4*12 FE YELLOWPASS.		400
41	4	11274015	SCREW	M 5*16 FE YELLOWPASS.		410
42	1	11274072	SCREW	M4*16 FE YELLOWPASS.		420
43	4	11275008	SCREW	M4*6 AISI316		430
44	2	11274095	SCREW	M6*25 YELLOWPASS.		440
45	2	11350027	BEARING	D6/10-9	HK0609	450
46	2	11350080	JOURNAL BEARING	GLYCODUR	PBG 081005.5F	460
47	1	10556158	LABEL	WHITE SELF-FASTENING	1410	271
48	2	11250004	WASHER	A6,4 ZN		309
49	1	10457125	BUSHING	POM	1410	201
50	1	10460571	SPRING	SPRINGBRONZE S=0,3	NTL 5	225
K	1	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	490
M	1	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	PH265-04	480

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855272	EXTERNAL STANDARD		10255273	941216	
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
6	1	10455275	PLATE	FE-PLATE S=2,0	NTL5	60	930115
22	1	10455288	SPRING	SPRING PRONZE S=0.5	NTL5	220	940510
27	1	10455310	LABEL	AL-PLATE S=1	NTL5	270	941215

Fig. 1409, 1410, 1411 -09 External Standard

10255273

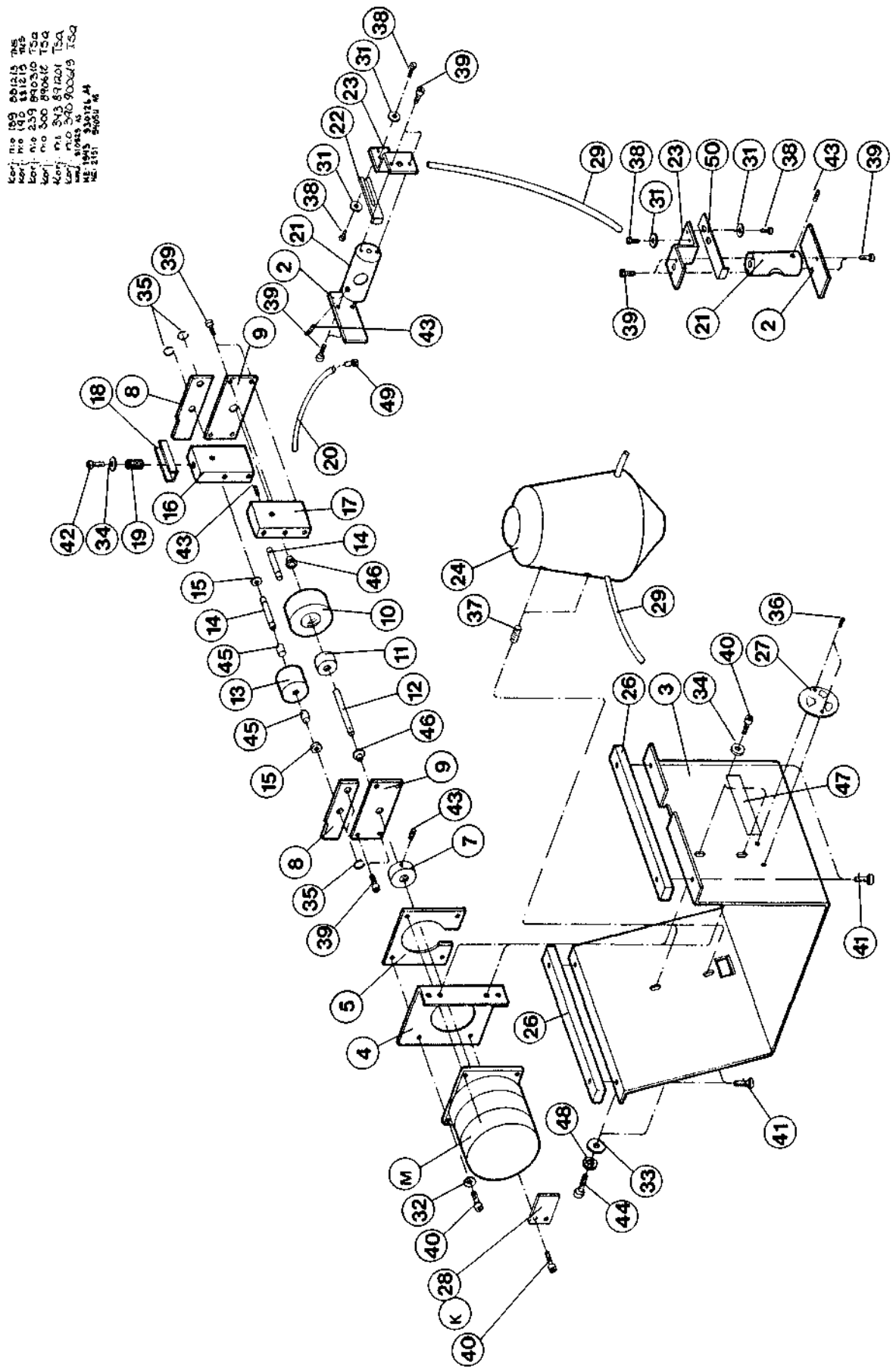


Fig. 1409, 1410, 1411 -10 Measuring Unit

10854849

96 - 10 - 10

FOR PART NUMBER	10854849	MEASURING UNIT		10354850	950522

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10855189	ANALOG-RACK	1410		41
	1	10854767	P.C.ASSEMBLY	MCA INTERFACE 1CH	LBR 10354766	45
	1	10854652	P.C.ASSEMBLY	HV SUPPLY	EPM-A 10354653	47
	0.150	11240068	CONNECTING WIRE	1*0.20 MM2 GREEN	TPF 01507	150
	0.150	11240071	CONNECTING WIRE	1*0.20 MM2 BLACK	TPF 01507	160
	0.150	11240067	CONNECTING WIRE	1*0.20 MM2 YELLOW	TPF 01507	170
	0.150	11240072	CONNECTING WIRE	1*0.20 MM2 WHITE	TPF 01507	180
	1	10560490	LABEL SET		CA22 12-DYN	200
1	1	10859277	OPTICS	1415	10356123	20
2	1	10854789	COUNT WEIGHT		10454790	30
3	2	10860160	PREAMPLIFIER UNIT	1409/11/15 12-DYNODE	10455394	40
4	2	10454039	LIGHT SEAL	SILICON BLACK	NTL5	90
6	1	10857670	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC-A 10357727	42
7	1	10857671	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD-A 10357728	43
8	1	10859028	P.C.ASSEMBLY	A/D CONVERTER	EBZ 10359027	44
10	1	10860105	P.C.ASSEMBLY	GAIN STABILIZER	EBU-A 10360197	46
PM	2	11760038	PHOTOMULTIPLIER	D52MM 12DYN B21	R331-13	130
W9, W10	2	10855406	WIRING ASS		CA22	10

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10854849	MEASURING UNIT		10354850	950522

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
3	2	10857681	PREAMPLIFIER UNIT	1409/11 10-DYNODE	10455394	40	931112
	1	10854242	P.C.ASSEMBLY	A/D CONVERTER	EBP 10353905	44	931011
	1	10854784	P.C.ASSEMBLY	GAIN STABILIZER	EBU 10354783	46	931020
	1	10555408	LABEL SET		CA22 10-DYN	200	940524
1	1	10856122	OPTICS	1410	10356	20	950519

Fig. 1409, 1410, 1411 -10 Measuring Unit

10354850

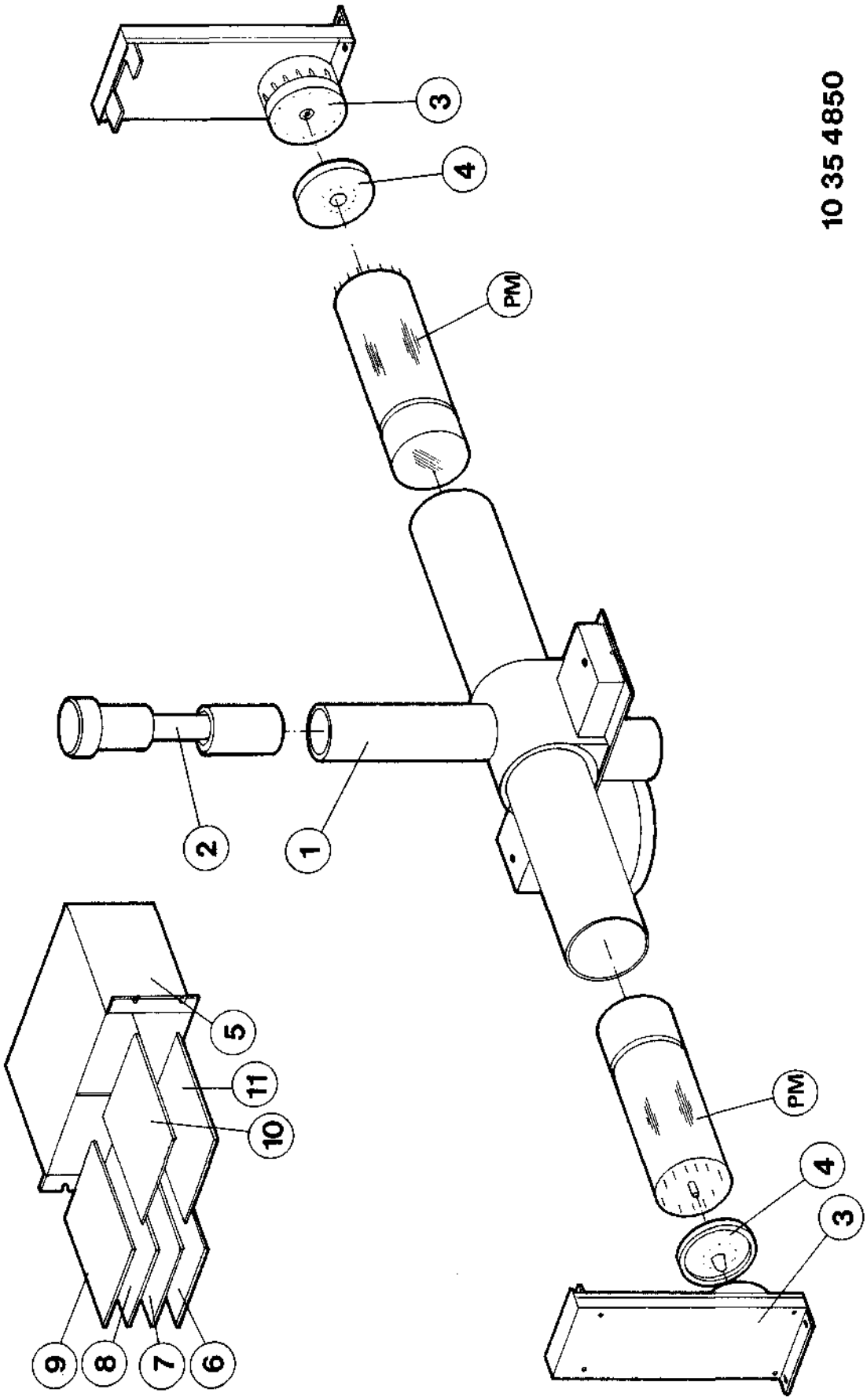


Fig. 1410 -11 Preamplifier Unit

10857681

96-10-10

FOR PART NUMBER	10857681	PREAMPLIFIER UNIT	10-DYNODE	10455394	940831

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10857669	P.C.ASSEMBLY	PREAMPLIFIER BOARD	RAG-A 10357726	10
2	1	10355395	BOX ASSEMBLY		NTL5	30
3	1	10355397	COVER	FE-PLATE S=1	NTL5	40
4	4	10455398	NUT	6K6	NTL5	50
5	1	10455399	INSULATION	PRESPAN-PLATE S=0,5	NTL5	60
6	2	10455400	SPRINGTION	GERMAN SILVER S=0,15	NTL 5	70
7	1	10455401	BASE	BASE HAMAMATSU	E678-21A NTL5	80
8	1	10544576	LABEL	WARNING LABEL	DANGER H.V. SERIVA	90
9	4	11271044	SCREW	M3*4 FE YELLOWPASS.		100
10	5	11271045	SCREW	M3*5 FE YELLOWPASS.		110
11	2	11271021	SCREW	M3*10 FE YELLOWPASS.		120
12	3	11278002	NUT	M3 FE YELLOWPASS.		130
13	1	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	140
14	2	11251014	PIN	1*5 ST		150
15	0.400	11241001	GROUNDING BRAID	D2,4 MONEL	MR111	160
16	2	11250001	WASHER	A3,2 YELLOWPASS.		170
C37	1	11620027	CAPACITOR ELECTR	1NF -20+50% 500V	221265703102	27
R77-83	7	11603501	RESISTOR MF	1M 1% 0.25W 50PPM	411-2 VITROHM	23

Fig. 1409, 1411 -11 Preamplifier Unit

10860160

96-10-10

FOR PART NUMBER	10860160	PREAMPLIFIER UNIT	12-DYNODE	10455394	960103

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10860159	P.C.ASSEMBLY	PREAMPLIFIER BOARD	RAS 10360158	10
2	1	10355395	BOX ASSEMBLY		NTL 5	30
3	1	10355397	COVER	FE-PLATE S=1	NTL 5	40
4	4	10455398	NUT	MS 6K6	NTL 5	50
5	1	10455399	INSULATION	PRESPAN S=0,5	NTL-5	60
6	2	10455400	SPRINGTION	S=0,15	NTL 5	70
7	1	10455401	BASE		E678-21A NTL5	80
8	1	10544576	LABEL		DANGER H.V. SERIVA	90
9	4	11271044	SCREW	M 3*4 FE YELLOWPASS.		100
10	5	11271045	SCREW	M 3*5 FE YELLOWPASS.		110
11	2	11271019	SCREW	M 3*8 FE YELLOWPASS.		120
12	1	11278002	NUT	M3 FE YELLOWPASS.		130
13	2	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	140
14	2	11251014	PIN	1*5 ST		150
15	0.400	11241001	GROUNDING BRAID	D2,4 MONEL	MR111	160
16	4	11250001	WASHER	A3,2		170
17	2	11271017	SCREW	M 3*5 MS	KTS.11271079	180
18	2	11260035	RISE PIN	M3*10 MS	5.03.103	190
C37,41	2	11620027	CAPACITOR ELECTR	1NF -20+50% 500V	221265703102	27
R77-86	10	11603501	RESISTOR MF	1M 1% 0.25W 50PPM	411-2 VITROHM	23

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10860160	PREAMPLIFIER UNIT	12-DYNODE	10455394	960103

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
11	2	11271021	SCREW	M 3*10 FE YELLOWPASS.		120	960102
12	3	11278002	NUT	M3 FE YELLOWPASS.		130	960102
13	1	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	140	960102
16	2	11250001	WASHER	A3,2		170	960102

Fig. 1409, 1410, 1411 -11 Preamplifier Unit

10455394

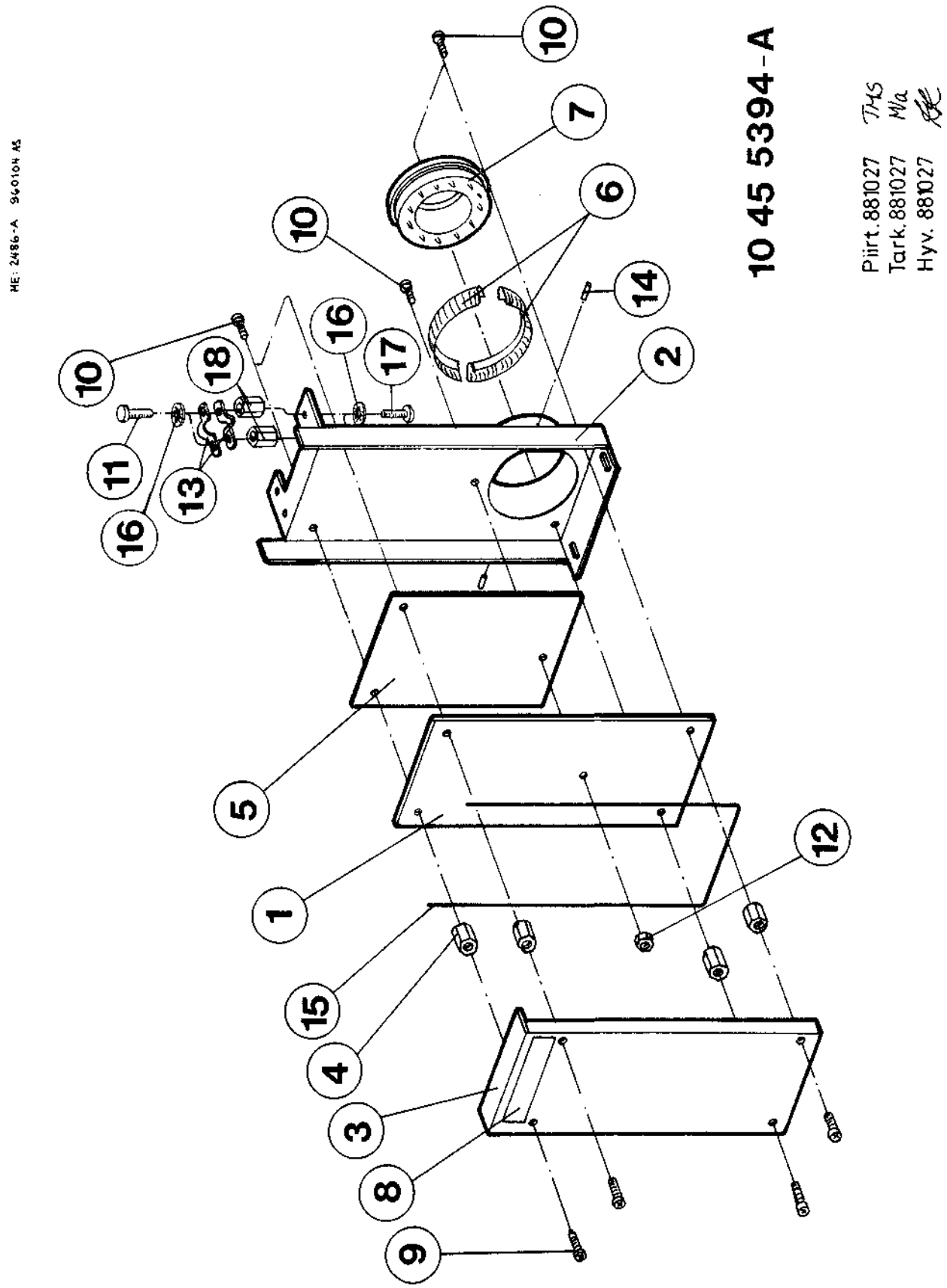


Fig. 1409, 1410, 1411 -12 Optics

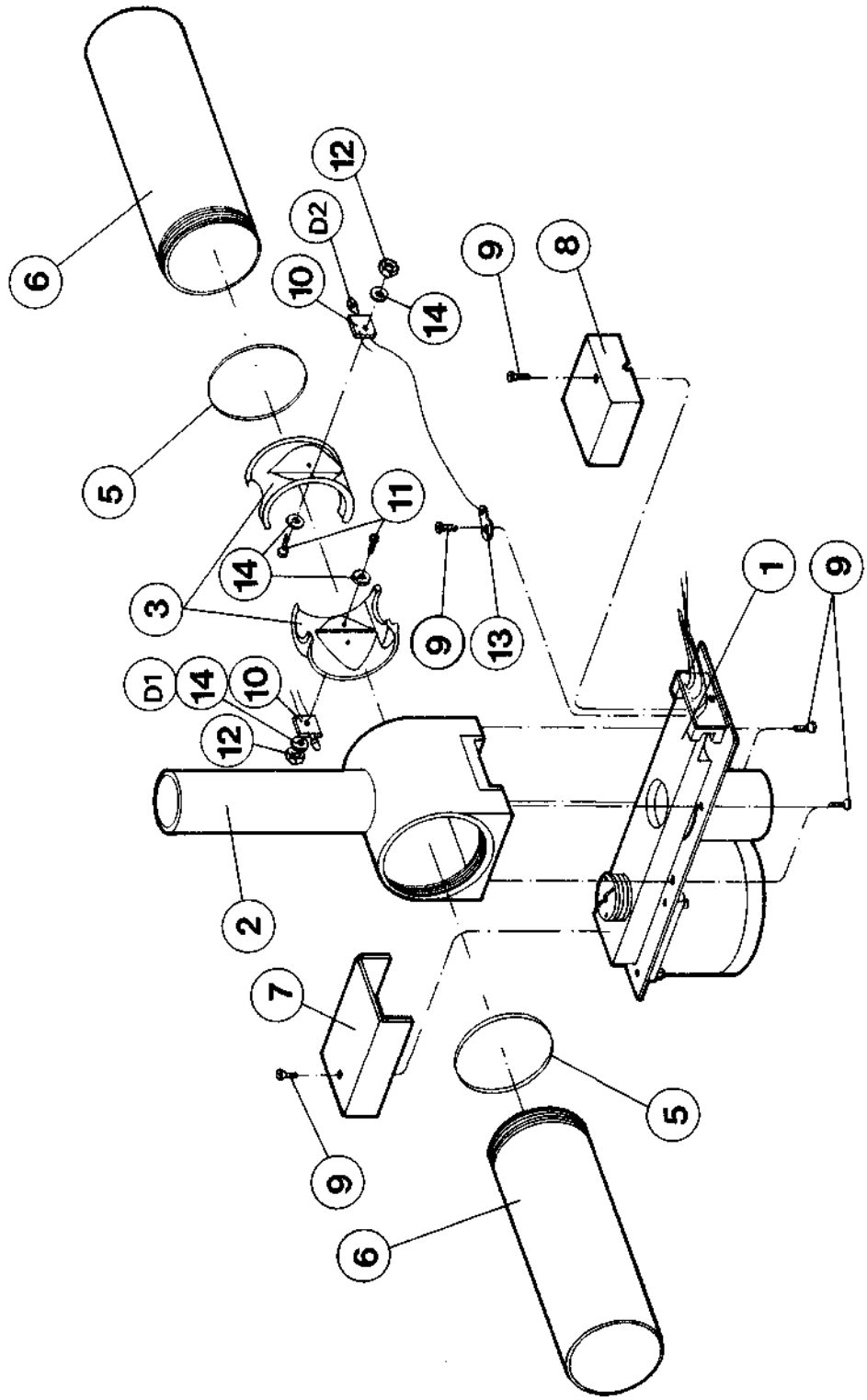
10856122

96 - 10 - 10

FOR PART NUMBER		10856122	OPTICS		10356123	930916
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	1	10854822	LIGHT SHUTTER UNIT		10354823	10
2	1	10354851	BODY		NTL5	20
3	2	10256157	REFLECTOR	ULTEM 1000	NTL5	30
5	2	10457768	RING	POM, BLACK	1410	50
6	2	10454853	TUBE	CU-TUBE D=57/52	NTL5	60
7	1	10454854	BOX 1	AL-PLATE S=1	NTL5	70
8	1	10454855	BOX 2	AL-PLATE S=1	NTL5	80
9	6	11271045	SCREW	M3*5 FE YELLOWPASS.		90
10	2	10556418	P.C.BOARD	1,6MM 1-P EP	RXI	110
11	2	11271107	SCREW	M2.5*6 MS NICKEL		120
12	2	11278017	NUT	M2.5 FE YELLOWPASS.		130
13	2	11460001	SOLDERING TAG	D 5.5/3.5*8	A2021 ME	140
14	4	11250042	WASHER	2.7/5*0.5 ACID-PROOF.		150
D1,D2	2	11784015	DIODE LIGHT EMITT	D3X5 YELLOW 585NM <100NS	MV5374C	100

Fig. 1409, 1410, 1411 -12 Optics

10356123



10 35 6123

Piirt. 881115 TMS
Tark. 881115 MA.
Hyv. 881115

Fig. 1409, 1410, 1411 -13 ID Unit

10855818

96 - 10 - 10

FOR PART NUMBER		10855818	ID UNIT		10355819	950110
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10555375	LABEL SET	CONNECTOR LABEL PAPER	CA17	177
1	1	10855668	P.C.ASSEMBLY	RAMCODE READER	RAM 10355667	10
2	1	10355734	ID-BODY	FE-PLATE S=1,5	NTL 5	20
3	1	10455732	PIECE	AL-PLATE S=5	NTL 5	30
4	1	10455733	SUPPORT PIECE	AL 15*20	NTL 5	40
5	1	10455725	LOWERPIECE	AL	NTL 5	50
6	1	10455724	UPPERPIECE	AL	NTL 5	60
7	4	11290024	BUSHING	D3,4/6*7	5.83.070	70
8	2	10455731	GUIDE	AL	NTL 5	80
9	4	11252033	RIVET	3*12 A2		90
10	1	10455726	SLEDGE	POM ,BLACK	NTL 5	100
11	1	10455728	PLATE1	AL	NTL 5	110
12	1	10455750	FILL PIECE	6T 2,5/950	NTL 5	120
13	1	10354388	GOGGED BELT WHEEL	GRILON W 5239	1297	130
14	2	10455727	AXLE	D3	NTL 5	140
15	1	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205 1470	150
16	3	11290019	BUSHING	D3,4/6*5	5.83.050	160
18	0.015	11186006	SHRINKABLE TUBING	1/4" CLEAR	FP-301	180
19	1	11350048	COGGED BELT	SYNCHROFLEX	6 T2.5/200	190
20	1	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		200
21	3	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		210
22	1	10455899	BASEPIECE	FE-PLATE S=3	NTL5	175
23	1	11271016	SCREW	M 3*4 FE YELLOWPASS.		230
24	3	11271018	SCREW	M 3*6 FE YELLOWPASS.		240
25	1	11271023	SCREW	M 3*14 FE YELLOWPASS.		250
26	1	11271026	SCREW	M 3*18 FE YELLOWPASS.		260
27	2	11271034	SCREW	M 4*5 FE YELLOWPASS.		270
28	4	11271036	SCREW	M 4*10 FE YELLOWPASS.		280
29	2	11271075	SCREW	M 3*6 MS	TES 196-38	290
30	1	11274001	SCREW	M 3*5 FE YELLOWPASS.		300
31	1	11274015	SCREW	M 5*16 FE YELLOWPASS.		310
32	7	11275003	SCREW	M3*4 AISI316		320
33	1	11310031	CLAMP		A3031ASA	330
34	2	11390034	O-RING	OR 3.10-1.60	00044/84	360
35	1	10456132	ADJUST PART		NTL-5	176
36	2	11250019	WASHER	6.4/18*1.6 FE,ZINKED		211
38	3	11278002	NUT	M3 FE YELLOWPASS.		312
39	2	11278004	NUT	M5 FE YELLOWPASS.		313
40	1	11275025	SCREW	M3*16 AISI316		314
41	1	10457147	PIN	POM BLACK D=8	1410	178
42	1	10449428	SPRING	D=0,5	1291,1235	179
K	1	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	350
M	1	11690044	STEPPING MOTOR	12V 0,4A 1,8AST 0,26NM	6500-15-4-13.5 R455	340

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER		10855818	ID-UNIT		10355819	950110	
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
20	4	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		200	950109
23	3	11271016	SCREW	M 3*4 FE YELLOWPASS.		230	950109
24	2	11271018	SCREW	M 3*6 FE YELLOWPASS.		240	950109
29	6	11271075	SCREW	M 3*6 MS	TES 196-38	290	950109
32	6	11275003	SCREW	M3*4		320	950109

Fig. 1409, 1410, 1411 -13 ID Unit

10355819

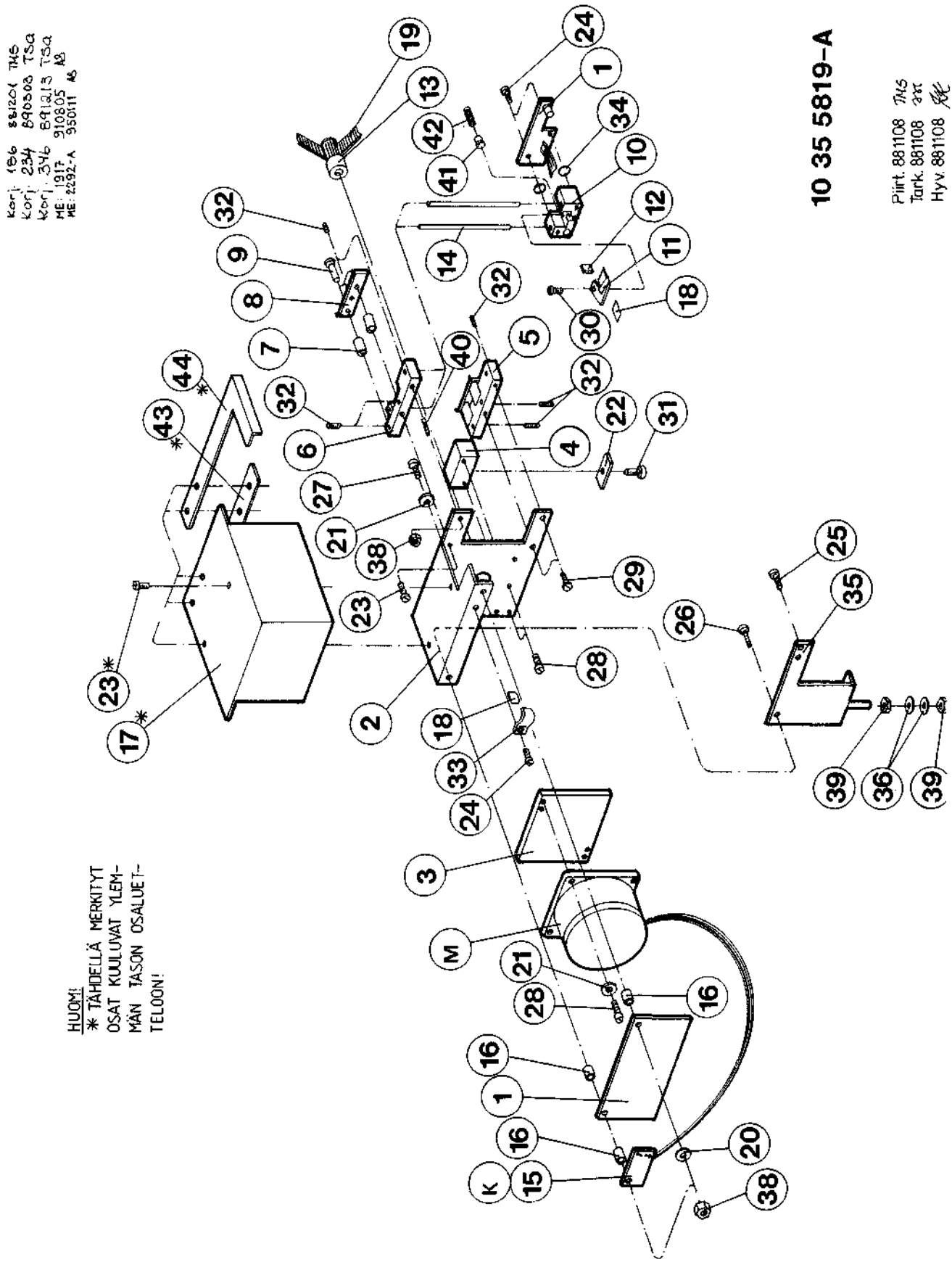


Fig. 1409, 1410, 1411 -14 Light Shutter Unit

10854822

96-10-10

FOR PART NUMBER	10854822	LIGHT SHUTTER UNIT		10354823	930518

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205,1470	200
	1	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	210
1	1	10454824	BODY PLATE	FE-PLATE S=2	NTL5	20
2	1	10354825	SHAFT COVER	D50	NTL5	30
3	1	10354826	BODY	10X40	NTL5	40
4	1	10457757	COUPLING 1	POM D=30 BLACK	NTL5	50
5	2	11251095	PIN	1*18		60
6	1	10454830	PLATE 1	SPRINGSTEEL S=0.2	NTL5	70
7	1	10454831	PLATE 2	SPRINGSTEEL S=0.2	NTL5	80
8	1	10454832	PLATE 3	SPRINGSTEEL S=0.2	NTL5	90
9	1	10454833	PLATE 4	SPRINGSTEEL S=0.2	NTL5	100
10	1	10454834	COVER PLATE	FE-PLATE S=1	NTL5	110
11	1	10455111	COVER 1	10X40	NTL5	120
12	2	10454837	BUSHING	D3	NTL5	130
13	1	10454838	COUPLING	POM D=30 BLACK	NTL5	140
14	4	11251071	LOCK WIRE	FOR D=28 AXLE (RW 28)		145
15	1	11271045	SCREW	M3*5 FE YELLOWPASS.		150
16	1	11271045	SCREW	M3*5 FE YELLOWPASS.		160
17	2	11271051	SCREW	M3*16 FE YELLOWPASS.		170
18	4	11271035	SCREW	M4*8 FE YELLOWPASS.		180
19	1	10455112	COVER 2	10X40	NTL5	125
20	2	10458293	WASHER	SPRINGPRONZE T=0,5	NTL5	142
M	1	11690050	STEPPING MOTOR	1,5IN 0.7A STEP ANG1.8	6500 R568	190
W8	1	10855405	WIRING ASS		CA21	10

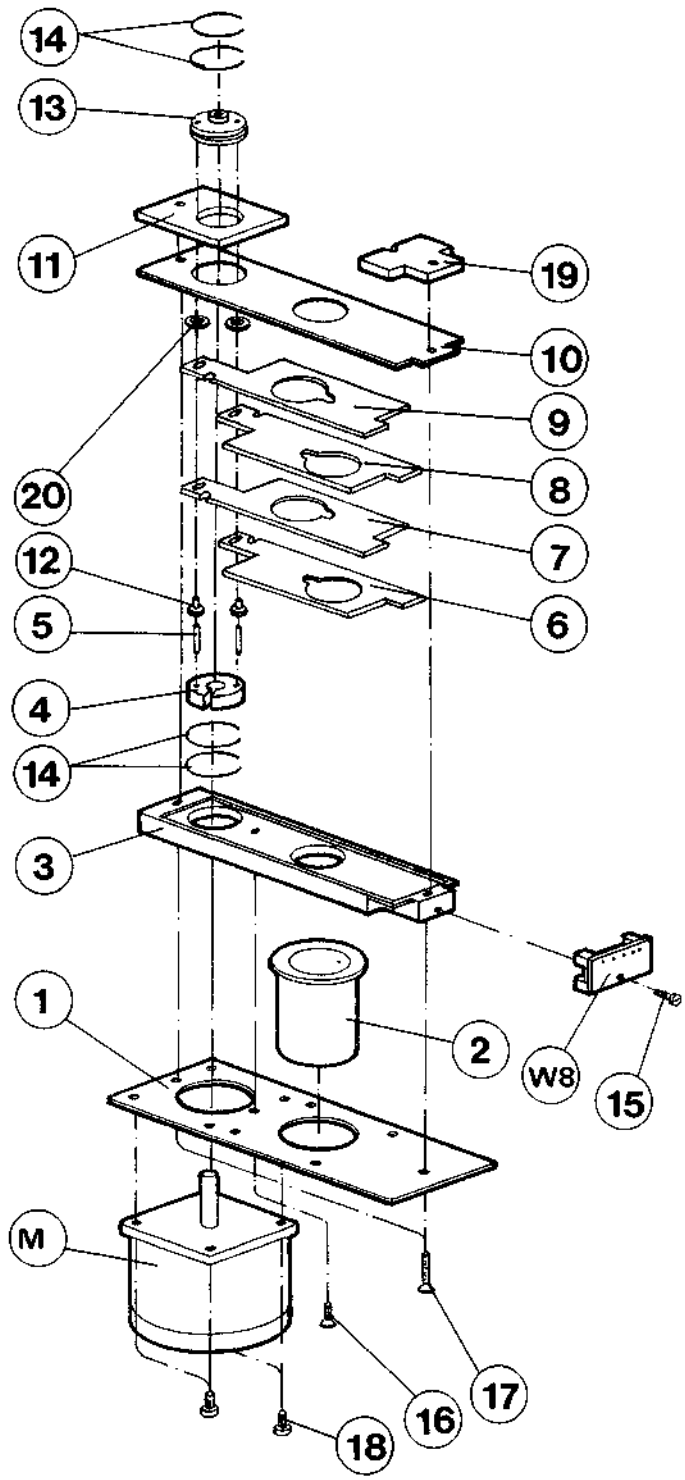
PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10854822	LIGHT SHUTTER UNIT		10354823	920625

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
4	1	10454827	FLANGE	D30	NTL5	50	920122
5	2	10454829	PIN	D1	NTL5	60	930517
	2	10458293	WASHER	SPRINGPRONZE T=0,5	NTL5	142	921215
14	2	11251071	LOCK WIRE	FOR D=28 AXLE (RW 28)		145	920207
M	1	11690049	STEPPING MOTOR	12V 0,4A 1,8AST 0,26NM	6500-15-4-13.5	190	911213

Fig. 1409, 1410, 1411 -14 Light Shutter Unit 10354823

ME: 1916 910936 A5
ME: 1916 910910 A8
ME: 1936 920526 A6
ME: 2113 940112 A5



10 35 4823

Piirt. 881108 TMS
Tark. 881108 Ma
Hyv. 881108

Fig.1409, 1410, 1411 -15 Motor Unit 1

10855064

96 - 10 - 10

FOR PART NUMBER	10855064	MOTOR UNIT 1		10355065	941026

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10255066	MOUNTING BRACKET	FE-PLATE S=2,5	NTL5	10
2	1	10455067	AXLE	D6H8	NTL5	20
3	1	10353799	COGGED BELT WHEEL	PA6+30% MINERAL	1297	30
4	2	10353761	COGGED BELT WHEEL	PA6+30% MINERAL	1297	40
5	1	10357482	COGGED BELT WHEEL	Z 28	NTL5	50
6	2	10354388	GOGGED BELT WHEEL	GRILON W 5239	1297	60
7	2	10454867	PLATE	FE-PLATE S=2	1409,1235,1297	70
8	1	11350098	COG WHEEL	Z10	S6-10	80
9	1	10455068	AXLE	D6H8	NTL5	90
10	1	10455069	BEARING HOUSE	6K14	NTL5	100
11	1	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	110
12	3	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804 F	120
13	8	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		150
14	8	11274007	SCREW	M4*12 FE YELLOWPASS.		160
15	1	11275008	SCREW	M4*6 AISI316		170
16	1	11275007	SCREW	M4*4		180
17	1	11278015	NUT	M12 FE YELLOWPASS.		190
18	2	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205,1470	220
19	4	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	230
20	1	11350076	COGGED BELT	SYNCHROFLEX	6 T2,5/120	130
21	1	11350077	COGGED BELT	SYNCHROFLEX	10 T2,5/160	140
22	2	11251037	GRIP RING	FOR D6 AXLE	G6	45
K	2	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	240
M1,M2	2	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	6500-20-4-4.8 R416	215

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855064	MOTOR UNIT 1		10355065	941026

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
M1	1	11690043	STEPPING MOTOR	5V 1,5A 1,8AST 0,835NM	PH268-21	210	920212
M2	1	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	PH265-04	215	920211

Fig. 1409, 1410, 1411 -15 Motor Unit 1

10355065

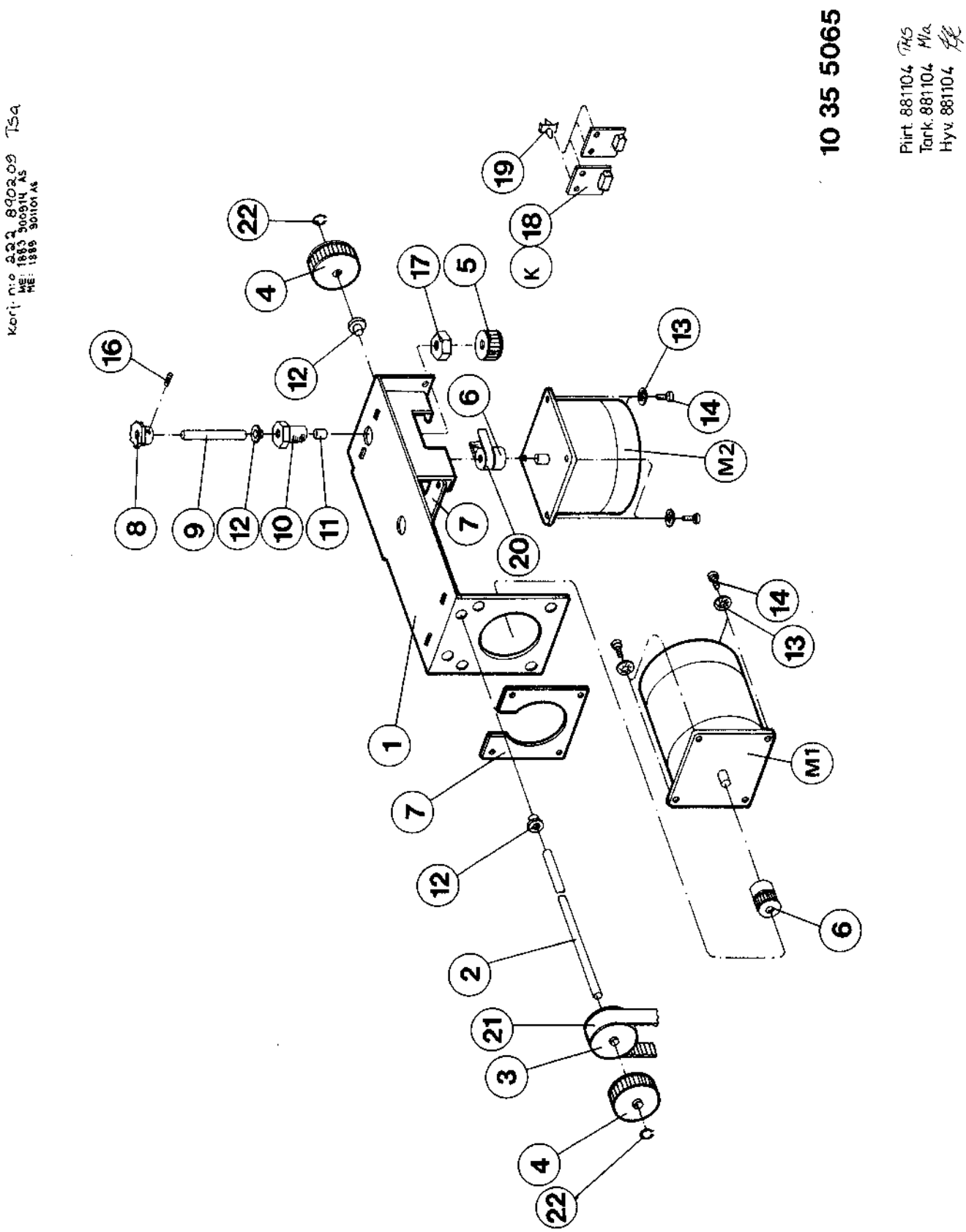


Fig. 1409, 1410, 1411 -16 Motor Unit 2

10855070

96 - 10 - 10

FOR PART NUMBER	10855070	MOTOR UNIT 2		10355071	941026

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10255066	MOUNTING BRACKET	FE-PLATE S=2,5	NTL5	10
2	1	10455067	AXLE	D6H8	NTL5	20
3	1	10353799	COGGED BELT WHEEL	PA6+30% MINERAL	1297	30
4	2	10353761	COGGED BELT WHEEL	PA6+30% MINERAL	1297	40
5	2	10354388	GOGGED BELT WHEEL	GRILON W 5239	1297	50
6	2	10454867	PLATE	FE-PLATE S=2	1409,1235,1297	60
7	1	11350098	COG WHEEL	Z10	S6-10	70
8	1	10455068	AXLE	D6H8	NTL5	80
9	1	10455069	BEARING HOUSE	6K14	NTL5	90
10	1	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	100
11	3	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804 F	110
12	8	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		140
13	8	11274007	SCREW	M4*12 FE YELLOWPASS.		150
14	1	11275007	SCREW	M4*5		160
15	1	11251037	GRIP RING	FOR D6 AXLE	G6	170
16	1	11278015	NUT	M12 FE YELLOWPASS.		180
17	2	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205,1470	190
18	4	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	200
20	1	11350077	COGGED BELT	SYNCHROFLEX	10 T2,5/160	130
21	2	11251037	GRIP RING	FOR D6 AXLE	G6	45
K	2	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	230
M1,M2	2	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	6500-20-4-4.8 R416	215

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855070	MOTOR UNIT 2		10355071	941026

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
M4	1	11690042	STEPPING MOTOR	5V 1A 1,8AST 0,4NM	PH265-04	215	920211
M3	1	11690043	STEPPING MOTOR	5V 1,5A 1,8AST 0,835NM	PH268-21	220	920212

Fig. 1409, 1410, 1411 -16 Motor Unit 2

10355071

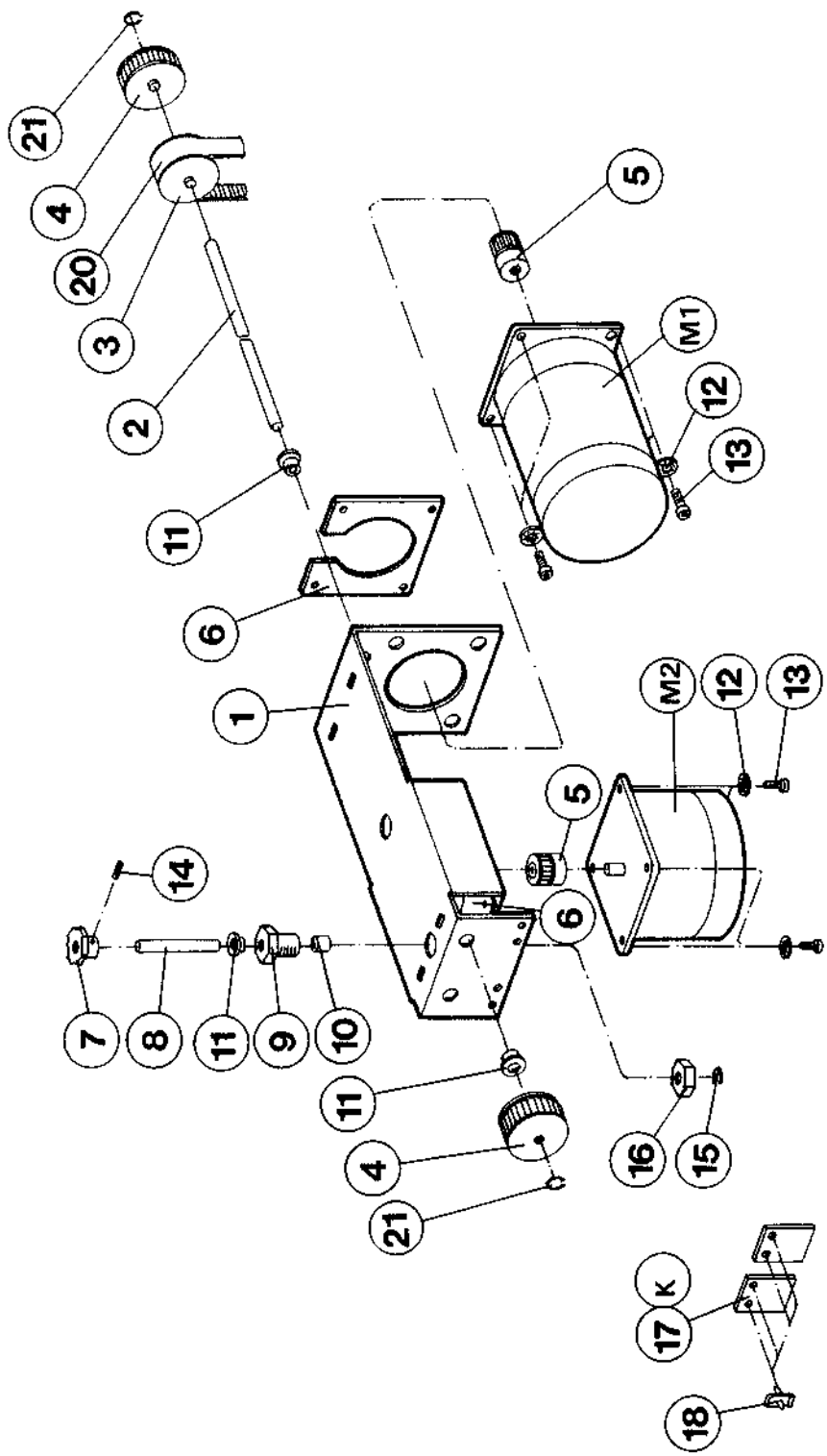


Fig. 1409, 1410, 1411 -17 Count Weight

10854789

96 - 10 - 10

FOR PART NUMBER	10854789	COUNT WEIGHT		10454790	960620

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10454794	BUSHING	MS-ROD D30	NTL5	15
2	1	10454795	TUBE	D10H8	NTL5	20
3	1	10454796	BUSHING	MS-ROD D36	NTL5	30
4	3	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	40
5	3	11350075	JOURNAL BEARING	GLYCODUR	PG 101210 F	50
6	1	11251070	LOCK WIRE	FOR D=10 AXLE (RW 10)		60
7	1	11251069	LOCK WIRE	FOR D=6 AXLE (RW 6)		70
8	1	10454793	AXLE	D6H8	NTL5	10
9	1	11251055	PIN	2*10 RUSTPROOF		80

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

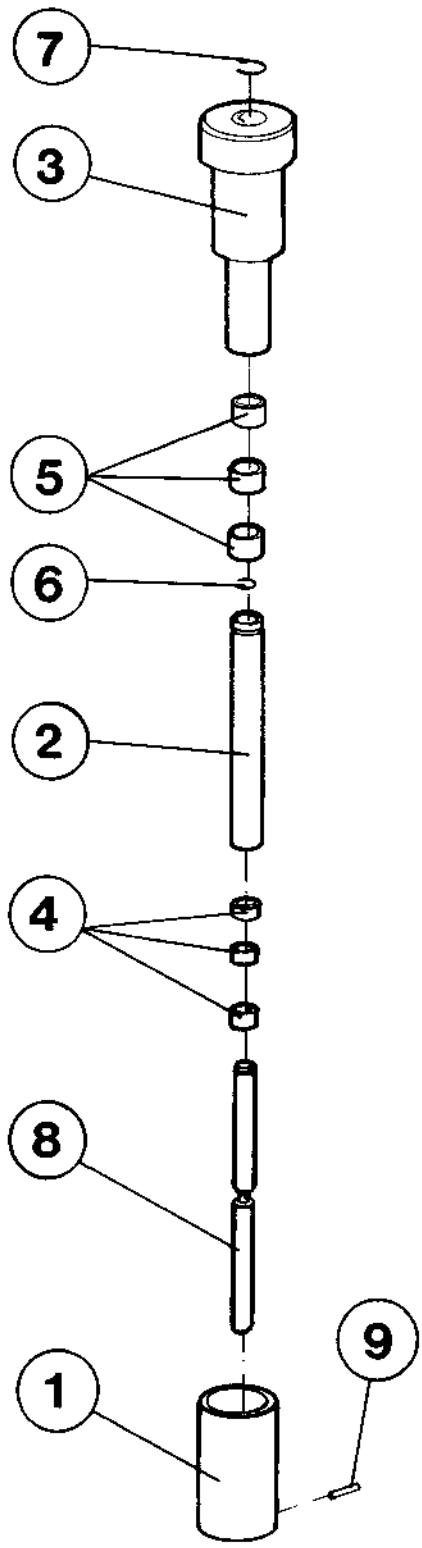
FOR PART NUMBER	10854789	COUNT WEIGHT		10454790	960620

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
	1	10454793	AXLE	D6H8	NTL5	10	931115
	1	10454794	BUSHING	MS-ROD D30	NTL5	15	931115
	1	10454795	TUBE	D10H8	NTL5	20	931115
	1	10454796	BUSHING	MS-ROD D36	NTL5	30	931115
	3	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	40	931115
	3	11350075	JOURNAL BEARING	GLYCODUR	PG 101210 F	50	931115
	1	11251070	LOCK WIRE	FOR D=10 AXLE (RW 10)		60	931115
	1	11251069	LOCK WIRE	FOR D=6 AXLE (RW 6)		70	931115
	1	11251055	PIN	2*10 RUSTPROOF		80	931115

Fig. 1409, 1410, 1411 -17 Count Weight

10454790

ME: 2073 831221 A6



10454790

Piirt. 870826 THS
Tark. 870827 MVa
Hyv. 870827 KK

Fig. 1409, 1410, 1411 -18 Support 1 Assembly 10855074

96 - 10 - 10

FOR PART NUMBER	10855074	SUPPORT 1 ASSEMBLY		10455075	951006
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	1	10355076	SUPPORT ASSEMBLY		NTL5	10
2	1	10455077	AXLE	D6H8	NTL5	20
3	1	10353761	COGGED BELT WHEEL	PA6+30% MINERAL	1297	30
4	1	11350098	COG WHEEL	Z10	S6-10	40
5	1	10455068	AXLE	D6H8	NTL5	50
6	1	10455069	BEARING HOUSE	6K14	NTL5	60
7	1	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	70
8	3	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804 F	80
9	1	11251037	GRIP RING	FOR D6 AXLE	G6	90
10	1	11278015	NUT	M12 FE YELLOWPASS.		100
11	1	11275007	SCREW	M4*5		110
12	2	11275008	SCREW	M4*6		120
13	1	10456254	COGGED BELT WHEEL	BLANK: 10353761		31
14	1	11250019	WASHER	6.4/18*1.6 FE YELLOWPASS.		130
15	1	11251006	LOCK RING	FOR 6*0.7 AXLE		140
16	1	11251037	GRIP RING	FOR D6 AXLE		45

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855074	SUPPORT 1 ASSEMBLY		10455075	941026	
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**	**DATE**
11	1	11275021	SCREW	M4*4		110	941024

Fig. 1409, 1410, 1411 -18 Support 1 Assembly 10455075

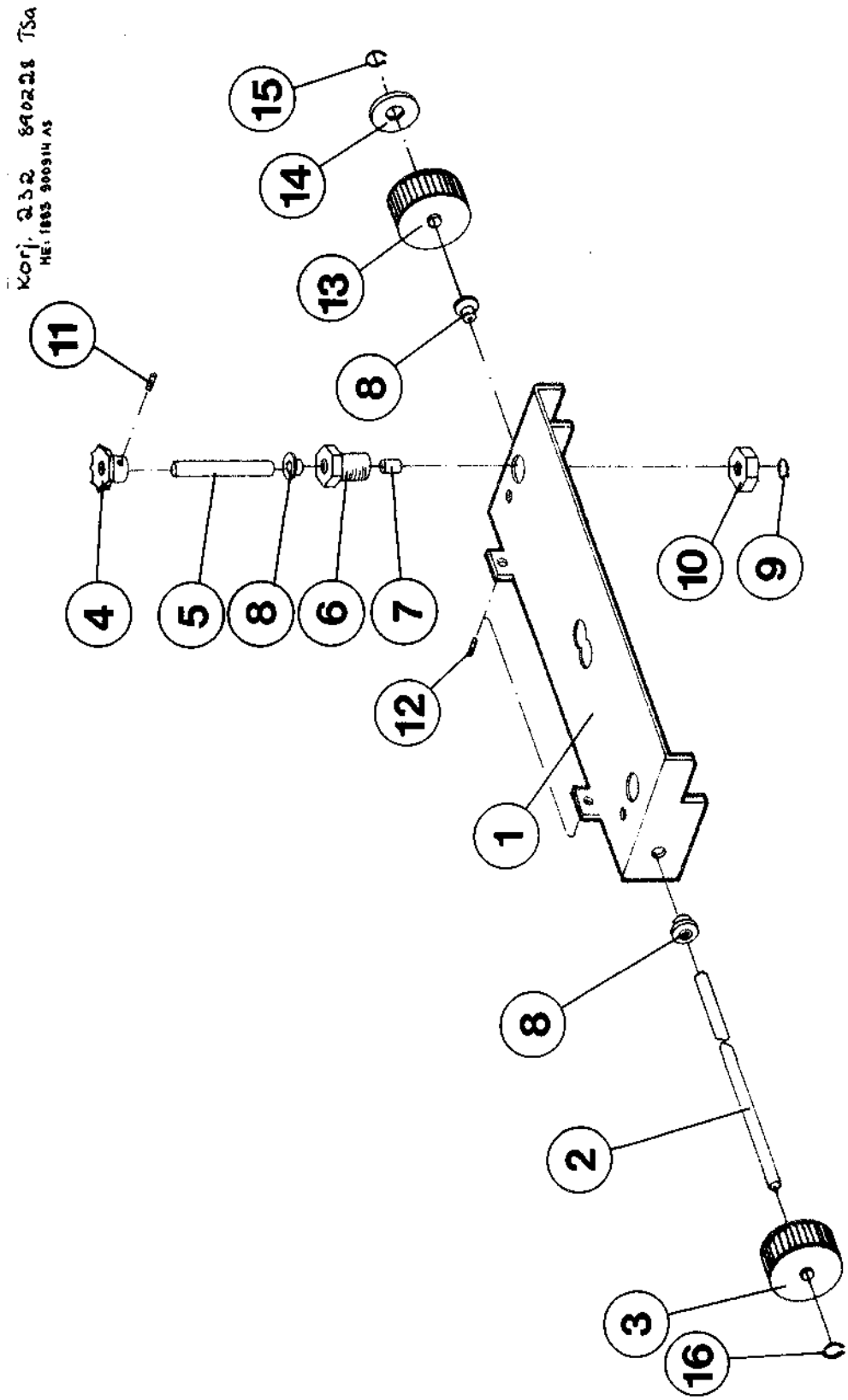


Fig. 1409, 1410, 1411 -19 Support 2 Assembly 10855078

96 - 10 - 10

FOR PART NUMBER	10855078	SUPPORT 2 ASSEMBLY		10455079	951006
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10355076	SUPPORT ASSEMBLY		NTL5	10
2	1	10455077	AXLE	D6H8	NTL5	20
3	1	10353761	COGGED BELT WHEEL	PA6+30% MINERAL	1297	30
4	1	10357482	COGGED BELT WHEEL	Z28	NTL5	40
5	1	11350098	COG WHEEL	Z10	S6-10	50
6	1	10455068	AXLE	D6H8	NTL5	60
7	1	10455069	BEARING HOUSE	6K14	NTL5	70
8	1	11350073	JOURNAL BEARING	GLYCODUR	PG 060810 F	80
9	3	11350072	JOURNAL BEARING	GLYCODUR	PBG 060804 F	90
10	1	11278015	NUT	M12 FE YELLOWPASS.		100
11	1	11275007	SCREW	M4*5		110
12	2	11275008	SCREW	M4*6		120
13	1	10456254	COGGED BELT WHEEL	BLANK: 10353761		31
14	1	11250019	WASHER	6.4/18*1.6 FE YELLOWPASS.		130
15	1	11251006	LOCK RING	FOR 6*0.7 AXLE		140
16	1	11251037	GRIP RING	FOR D6 AXLE	G6	45

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10855078	SUPPORT 2 ASSEMBLY		10455079	951006	
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
11	1	11275021	SCREW	M4*4		110	941024

Fig. 1409, 1410, 1411 -19 Support 2 Assembly 10455079

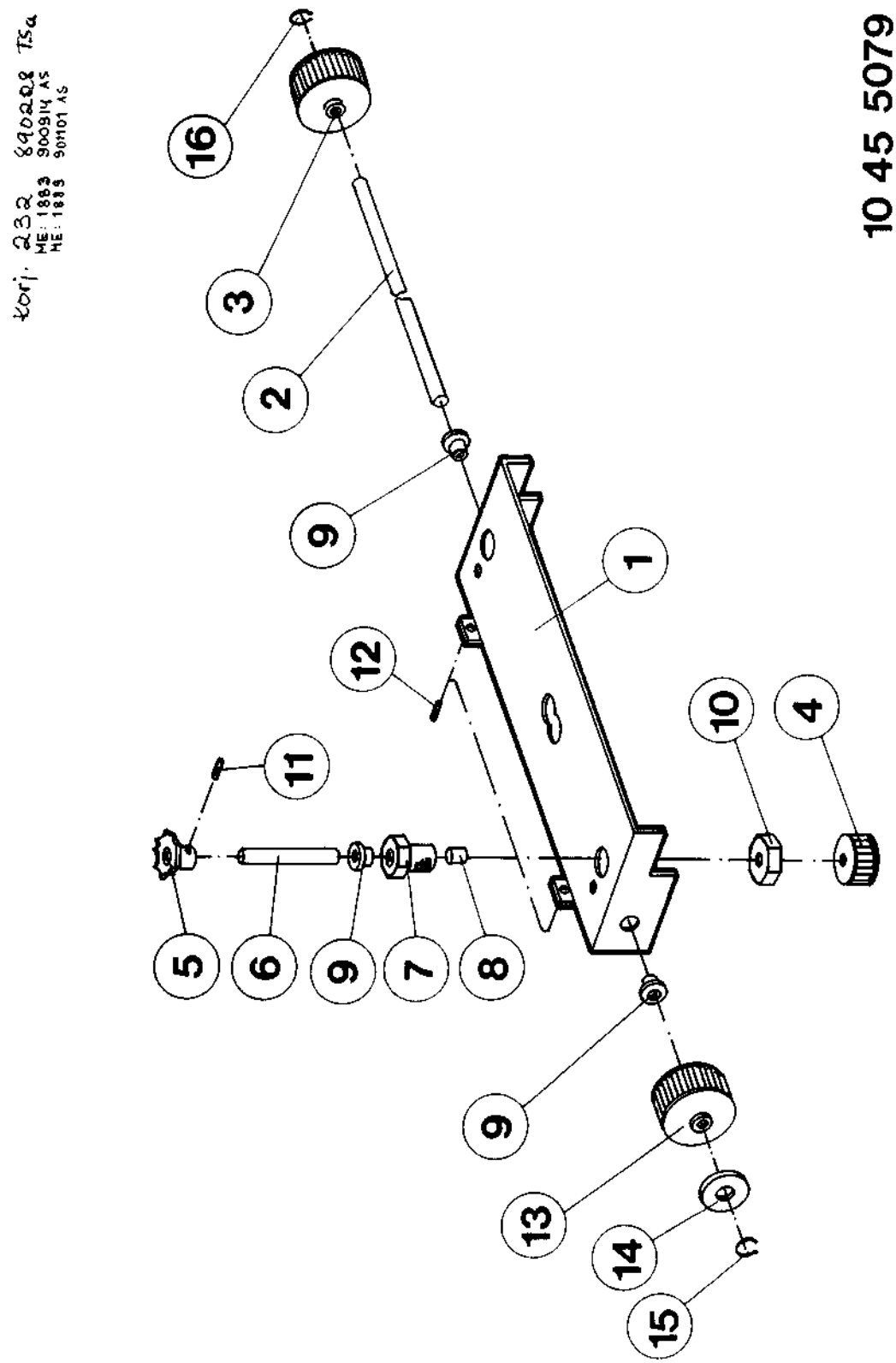


Fig. 1409, 1410, 1411 -20 Plate Assembly, R

10855051

96 - 10 - 10

FOR PART NUMBER	10855051	PLATE ASSEMBLY, R		10455052	940929
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	2	10855235	P.C.ASSEMBLY	SENSOR BOARD	RSV 10455234	10
2	1	10355053	GUIDE PLATE RIGHT	AL-PLATE S=2	NTL5	20
3	2	10455054	COVER PLATE	FE-PLATE S=2	NTL5	30
4	3	10455055	PLATE	FE-PLATE S=1,5	NTL5	40
5	3	11250002	WASHER	A4,3 YELLOWPASS.		50
6	4	11274002	SCREW	M3*6 FE YELLOWPASS.		60
7	3	11274006	SCREW	M4*10 FE YELLOWPASS.		70

Fig. 1409, 1410, 1411 -20 Plate Assembly, R 10455052

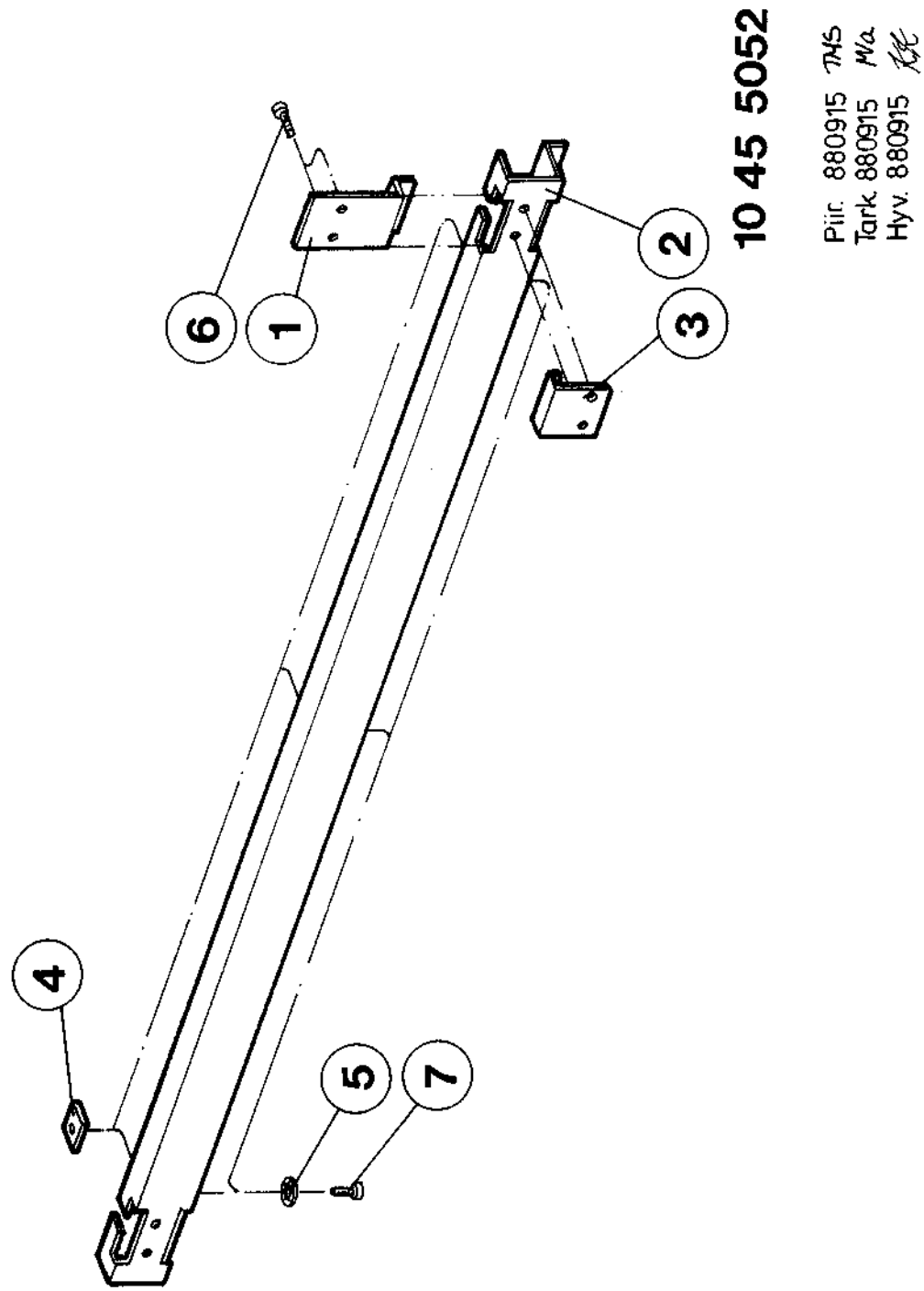


Fig. 1409, 1410, 1411 -21 Plate Assembly, L

10855056

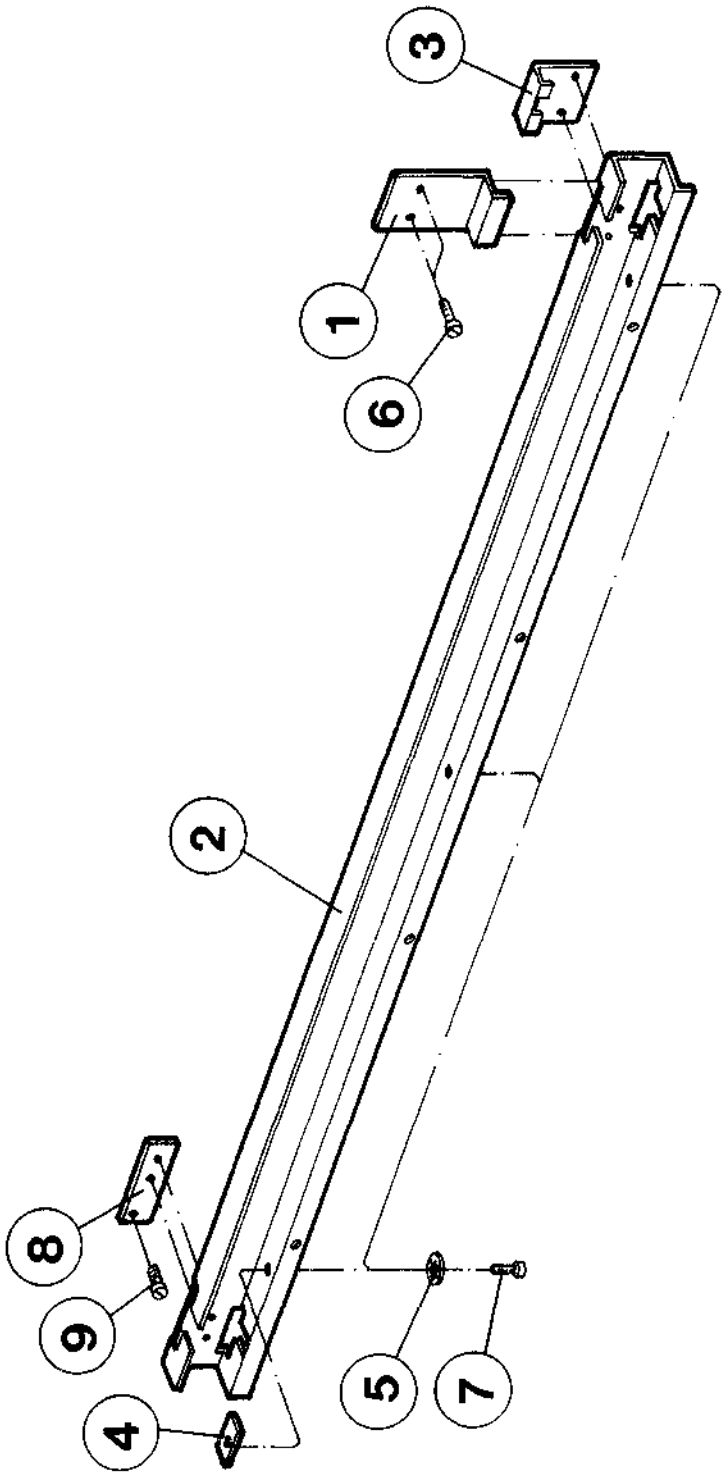
96 - 10 - 10

FOR PART NUMBER	10855056	PLATE ASSEMBLY, L	10455057	940929

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	2	10855235	P.C.ASSEMBLY	SENSOR BOARD	RSV 10455234	10
2	1	10355058	GUIDE PLATE LEFT	AL-PLATE S=2	NTL5	20
3	1	10455054	COVER PLATE	FE-PLATE S=2	NTL5	30
4	3	10455055	PLATE	FE-PLATE S=1,5	NTL5	40
5	3	11250002	WASHER	A4,3 YELLOWPASS.		50
6	4	11274002	SCREW	M3*6 FE YELLOWPASS.		60
7	3	11274006	SCREW	M4*10 FE YELLOWPASS.		70
8	1	10455888	HOLDER	FE-PLATE S=2	NTL5	31

Fig. 1409, 1410, 1411 -21 Plate Assembly, L

10455057



10 45 5057

Piir. 880913 TNS
Tark. 880913 MA
Hyv. 880913

Fig. 1409, 1410, 1411 -22 Spring Assembly, L 10855445

96 - 10 - 10

FOR PART NUMBER		10855445	SPRING ASSEMBLY		10455446	950207
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10455447	TUBE 1	D12/10	NTL5	10
2	0.390	11182011	PTFE-TUBE	10/8	TEFLON	80
3	1	10455449	PIN 1	D12	NTL5	30
4	1	10455003	SPRING	D1	NTL5	40
5	1	10455450	PIN 2	D8	NTL5	50
6	1	10455451	PIN 3	D5H8	NTL5	60
7	1	10455452	FLANGE	D12	NTL5	70

Fig. 1409, 1410, 1411 -22 Spring Assembly, L 10455446

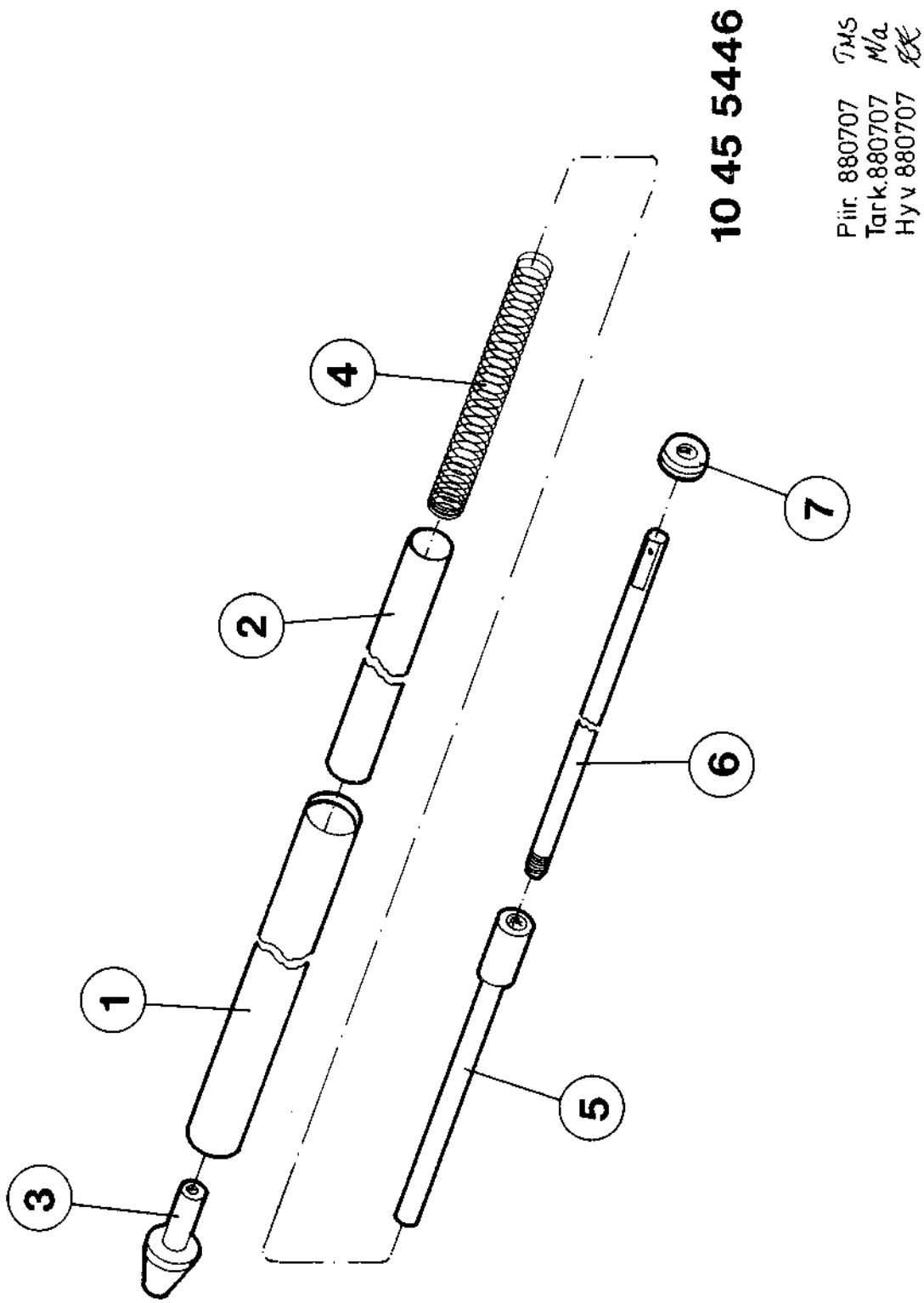


Fig. 1409, 1410, 1411 -23 HV-Divider Unit

10854023

96 - 10 - 10

FOR PART NUMBER		10854023	HV-DIVIDER UNIT		10355373, 10355106	920515
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	11860001	COAXIAL CONNECTOR		11H4-50-3-1	80
	1	11460001	SOLDERING TAG	D 5.5/3.5*8	A2021 ME	90
	1	11250021	SERRAT LOCK WASHER	3.0 ANNEALED YELLOWPAS	3.2*5.5*0.45	140
	2	11250001	WASHER	A3,2 YELLOWPASS.		135
	1.100	11240035	COAXIAL CABLE		RG-58 C/U BLACK	100
	0.100	11240008	HV WIRE	1000V PVC		105
	0.400	11240101	COPPER WIRE	D 0,8		110
	1	10554024	P.C.BOARD	1,6MM 2-P EP LK	RRH 1410	70
1	1	10355372	PLATE	FE-PLATE S=1	NTL5	150
2	3	10454836	NUT	6K6	NTL5	160
3	2	11260035	RISE PIN	M3*10	5.03.103	170
4	1	10454401	BOX	ABS-PLATE S=2	1205	180
5	1	10544576	LABEL	WARNING LABEL	DANGER H.V. SERIVA	190
6	1	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	200
7	2	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	210
8	3	11271018	SCREW	M3*6 FE YELLOWPASS.		220
9	4	11271019	SCREW	M3*8 FE YELLOWPASS.		230
10	3	11271023	SCREW	M3*14 FE YELLOWPASS.		240
11	3	11278002	NUT	M3 FE YELLOWPASS.		130
12	1	10556568	LABEL	WHITE-SELF-ADHESIVE-L	HV-OUTPUT-INPUT	181
C1	1	11626002	CAPACITOR H.V.	2.5NF 3KV	DD30 252	10
C2,3	2	11626008	CAPACITOR H.V.	150PF 3.0KV 20/50%	9/0130.9 D FERROP	20
R1	1	11601149	RESISTOR	10K 2% 0.5W	B 1/2 BEYSCHLAG	30
R2	1	11604049	RESISTOR MF SM	100 1% 0,125W 100PPM		40
R8,15	2	11604209	RESISTOR MF SM	215K 1% 0,125W 100PPM		50
R17-21,24-28	10	11604241	RESISTOR MF SM	1,00M 1% 0,125W 100PPM		45
R22,29	2	11604225	RESISTOR MF SM	464K 1% 0,125W 100PPM		43
S1-4	0.560	11863070	P.C.CONNECTOR	40-PIN STRAIGHT	SL1/25/36G	60

Fig. 1409, 1410, 1411 -23 HV-Divider Unit

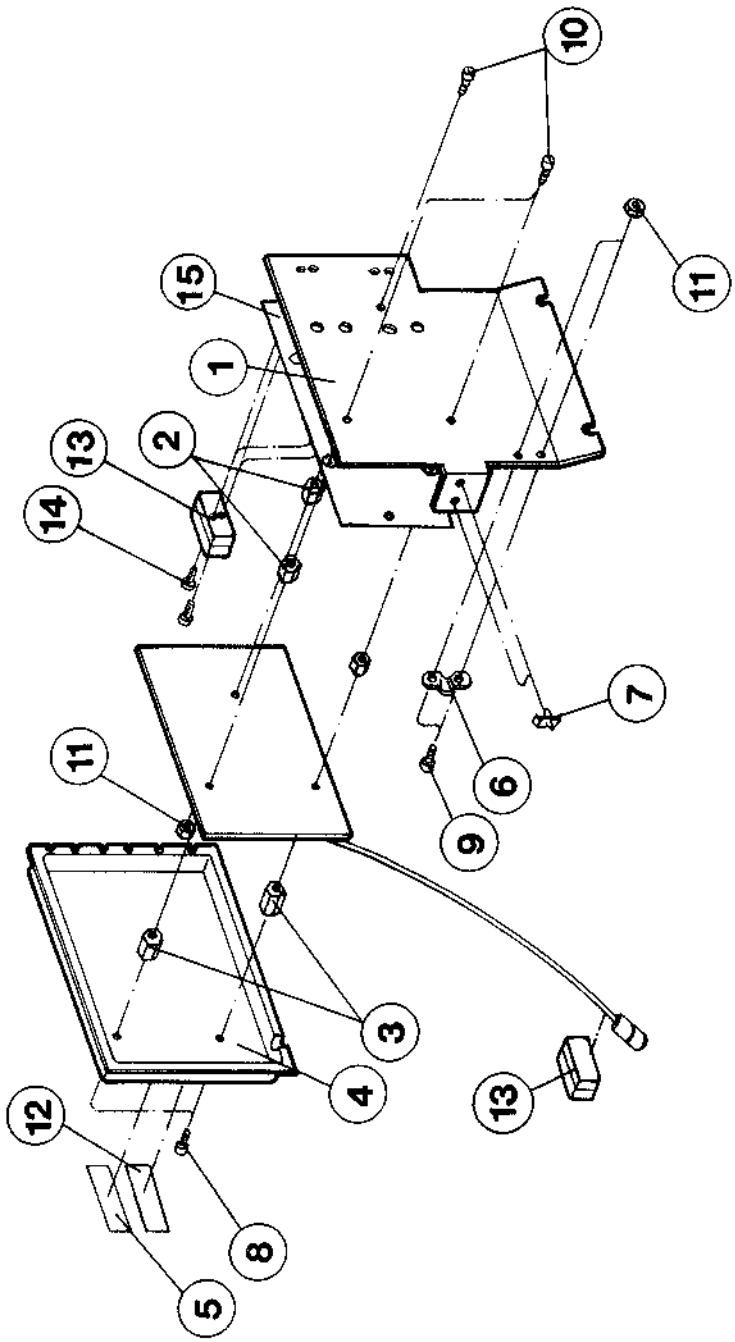
10859369

96 - 10 - 10

FOR PART NUMBER		10859369	HV-DIVIDER UNIT	RFA	10359368, 10355373	960607
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	11860001	COAXIAL CONNECTOR		11H4-50-3-1	30
	1	11460001	SOLDERING TAG	D 5.5/3.5*8	A2021 ME	110
	5	11250021	SERRAT LOCK WASHER	3.0 ANNEALED ZINKED	3.2*5.5*0.45	190
	4	11250001	WASHER	A3,2		200
	1.090	11240035	COAXIAL CABLE		RG-58 C/U	210
	1	10554024	P.C.BOARD	1,6MM 2-P EP LK	RRH 1410	230
1	1	10358910	PLATE	FE- PLATE S=1	1415	260
2	3	10454836	NUT	MS 6K6	NTL5	240
3	2	11260035	RISE PIN	M3*10 MS	5.03.103	180
4	1	10454401	BOX	ABS S=2	1205	250
5	1	10544576	LABEL		DANGER H.V. SERIVA	270
6	1	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	130
7	2	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	120
8	3	11271018	SCREW	M 3*6 FE YELLOWPASS.		170
9	6	11271019	SCREW	M 3*8 FE YELLOWPASS.		160
10	3	11271023	SCREW	M 3*14 FE YELLOWPASS.		150
11	8	11278002	NUT	M3 FE YELLOWPASS.		140
12	1	10556568	LABEL	WHITE-SELF-ADHESIVE-L	HV-OUTPUT-INPUT	220
13	2	11480047	FERRITE CLAMP	D 6,6 MM	28B2025-OAO	115
14	4	11273013	SCREW	M2.5*4 FE BLACK		135
15	1	10461951	INSULATOR PLATE	PRESPAN S=0,5		280
C1	1	11626002	CAPACITOR H.V.	2.5NF 3KV	DD30 252	50
C2-5	4	11626008	CAPACITOR H.V.	150PF 3.0KV 20/50%	9/0130.9 D FERROP	40
R1	1	11601149	RESISTOR	10K 2% 0.5W	B 1/2 BEYSCHLAG	100
R2	1	11604049	RESISTOR MF SM	100 1% 0,125W 100PPM	CRCW1206	90
R3-7,10-14. 17-21,24-28.	20	11604241	RESISTOR MF SM	1,00M 1% 0,125W 100PPM	CRCW1206	60
R8,15,22,29	4	11604225	RESISTOR MF SM	464K 1% 0,125W 100PPM	CRCW1206	70
R9,16,23,30	4	11603868	HV RESISTOR	22Mohm 5% 0.5W 3.5kVDC	232224213226	95
R31-34	4	11604209	RESISTOR MF SM	215K 1% 0,125W 100PPM	CRCW1206	80
S1-8	1.111	11863070	P.C.CONNECTOR	40-PIN STRAIGHT	SL1/25/36G	20

Fig. 1409, 1410, 1411- 23 HV-Divider Unit

10355373



10 35 5373-B

Piirt. 881107 JHS
Tark. 881107 Ma.
Hyv. 881107

Fig. 1410 -24 Display Unit

10855597
96 -10 - 10

FOR PART NUMBER	10855597	DISPLAY UNIT			10355598	940516
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	1	10854665	P.C.ASSEMBLY	DISPLAY	HDG 10254761	10
2	1	10854760	P.C.ASSEMBLY	DISPLAY (CPU)	HCB 10354759	20
3	1	10255574	BOX		NTL5	40
4	1	11842036	TOUCH PANEL	1410 FRONT PLATE TOUCH KEY	010377	50
5	5	10455619	BUSHING	MS D6/4	NTL5	60
6	2	11250001	WASHER	A3,2 YELLOWPASS.		70
7	5	11271030	SCREW	M3*35 FE YELLOWPASS.		80
8	12	11278002	NUT	M3 FE YELLOWPASS.		90
W	1	10851794	FLAT CABLE	26S-26S	10451797	30

PART HISTORY **FROM: 93-10-11 TO: 96-10-10**

FOR PART NUMBER	10855597	DISPLAY UNIT			10355598	940516	
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**	**DATE**
	1	10855628	PROGRAM PACKAGE	DISPLAY PRG.	HCB-BOARD	21	921231
10	1	11842024	PUSH BUTTON SWITCH	1X2 28VDC 1A	8121YZ	110	911001

Fig. 1409, 1411 -24 Display Unit

10859287

96 - 10 -10

FOR PART NUMBER	10859287	DISPLAY UNIT	1400-SERIES	10355598	960612

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10854665	P.C.ASSEMBLY	DISPLAY	HDG 10254761	510
2	1	10854760	P.C.ASSEMBLY	DISPLAY (CPU)	HCB 10354759	520
3	1	10259283	BOX	ASSEMBLY	1415	540
4	1	11842036	TOUCH PANEL		010377	550
6	2	11250001	WASHER	A3,2		570
8	4	11278002	NUT	M3 FE YELLOWPASS.		590
9	1	10557386	LABEL	PVC FASKAL-400 T=0,1	1410 RESET	600
12	2	11480049	FERRITE CLAMP	26-WIRE FLAT CABLE	28B2022-000	610
13	2	11480050	CLAMP	FOR 26-W.FLAT C. CLAPM	M-CLIP	620
14	1	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601	630
15	1	10361691	LID ASSEMBLY	TIN COVERED	NTL-5	640
16	1	10361690	BOX ASSEMBLY	TIN COVERED	NTL-5	650
17	2	10461689	BUSHING	MS	NTL-5	660
18	9	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		670
19	6	11271021	SCREW	M 3*10 FE YELLOWPASS.		680
20	2	11271026	SCREW	M 3*18 FE YELLOWPASS.		690
21	8	11250044	WASHER	3.2/9*0.8 FE YELLOWPASS.		700
22	1	11271018	SCREW	M 3*6 FE YELLOWPASS.		710
23	2	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		720
24	1	10861635	P.C.ASSEMBLY	FILTER BOARD	RYP 10461634	525
25	1	10861638	P.C.ASSEMBLY	FILTER BOARD	RYQ 10461637	535
26	0.050	11180017	PE-STRING	5*5, BLACK	PZ-940 SJH	730
27	1	10453697	INSULATOR PLATE	PRESPAN S=0,5	1205	740
28	0.850	11220014	TAPE	12MM CLEAR	TESA4971	750
W25	1	10851794	FLAT CABLE	26S-26S	10451797	530
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	533
W33	1	10861704	FLAT CABLE	34S-34S	FC220 10461703	537

PART HISTORY **FROM: 93-11-11 TO: 96-10-10**

FOR PART NUMBER	10859287	DISPLAY UNIT	1400-SERIES	10355598	960612

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
	1	10855628	PROGRAM PACKAGE	DISPLAY PRG. HCB-BOARD		521	930825
7	5	11271030	SCREW	M3*35 FE YELLOWPASS		580	940405
W	1	10851794	FLAT CABLE	26S-26S	10451797	530	960213
5	5	10455619	BUSHING	MS D6/4	NTL5	560	960115
7	4	11271030	SCREW	M 3*35 FE YELLOWPASS.		580	960115
11	1	11271029	SCREW	M 3*30 FE YELLOWPASS.		585	960115
8	12	11278002	NUT	M3 FE YELLOWPASS.		590	960112

Fig.1409, 1410, 1411 -24 Display Unit

10355598

CORR NO.	DATE
369	900307 TSA
ME:2165	940418 AS
Kori	940614 AS
Kori	940921 AS
ME 2463-A	951219 AS
ME:2489-B	960214 TSA
ME:2512-C	960215 TSA
ME:2524-D	960322 AS
ME:2559-E	960568 AS

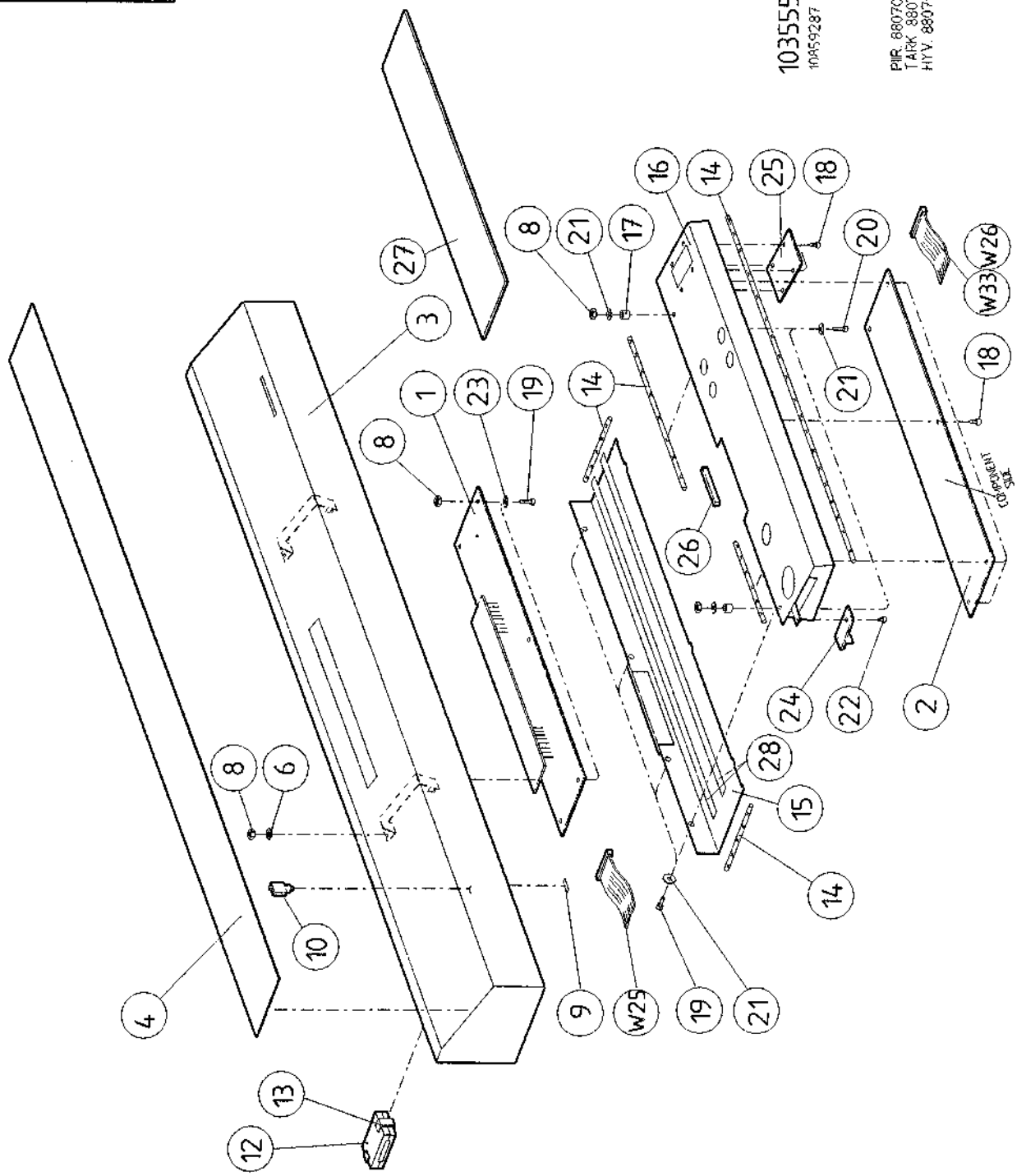


Fig. 1409, 1410, 1411 -25 Thermostat Unit

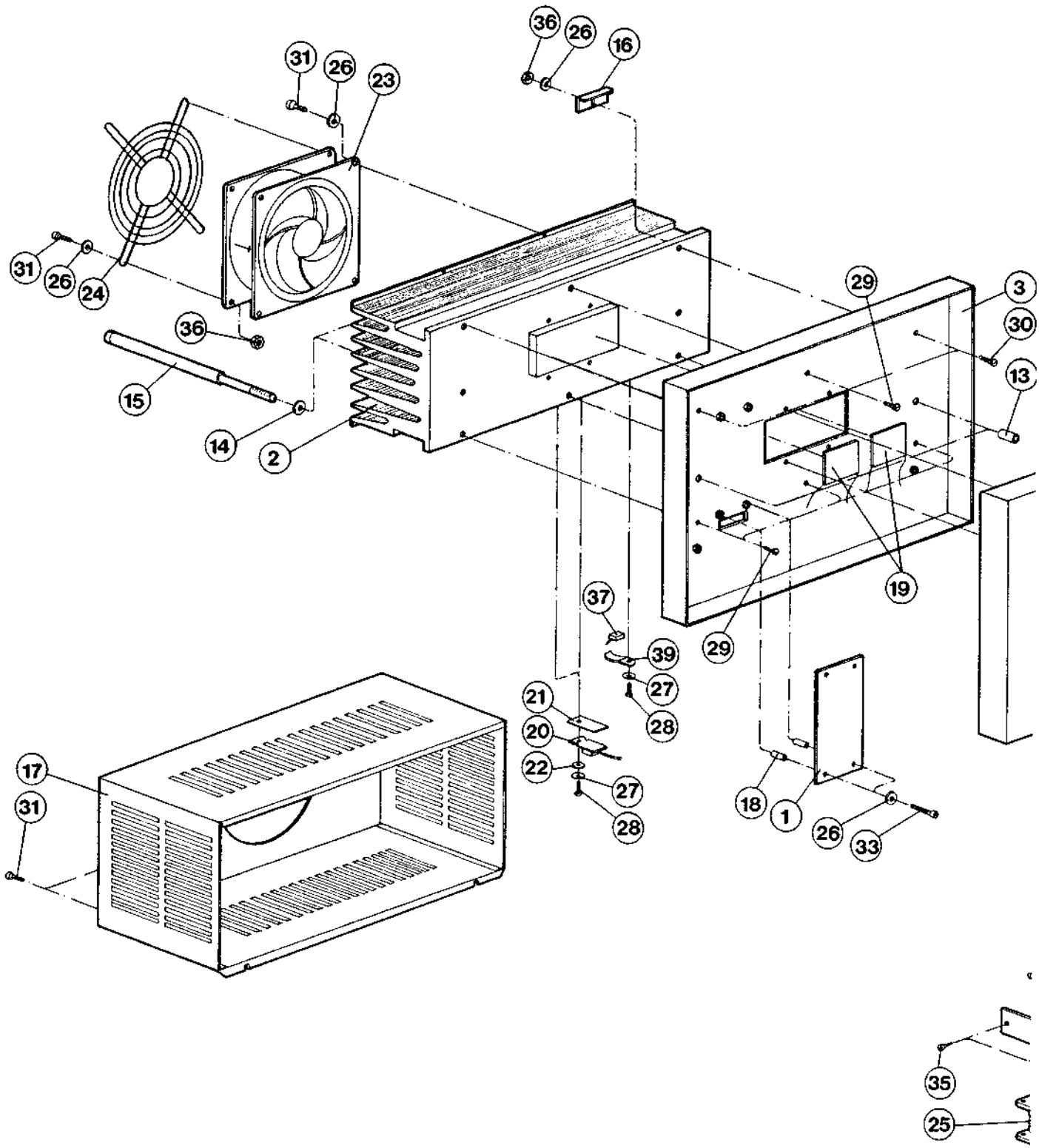
10856321

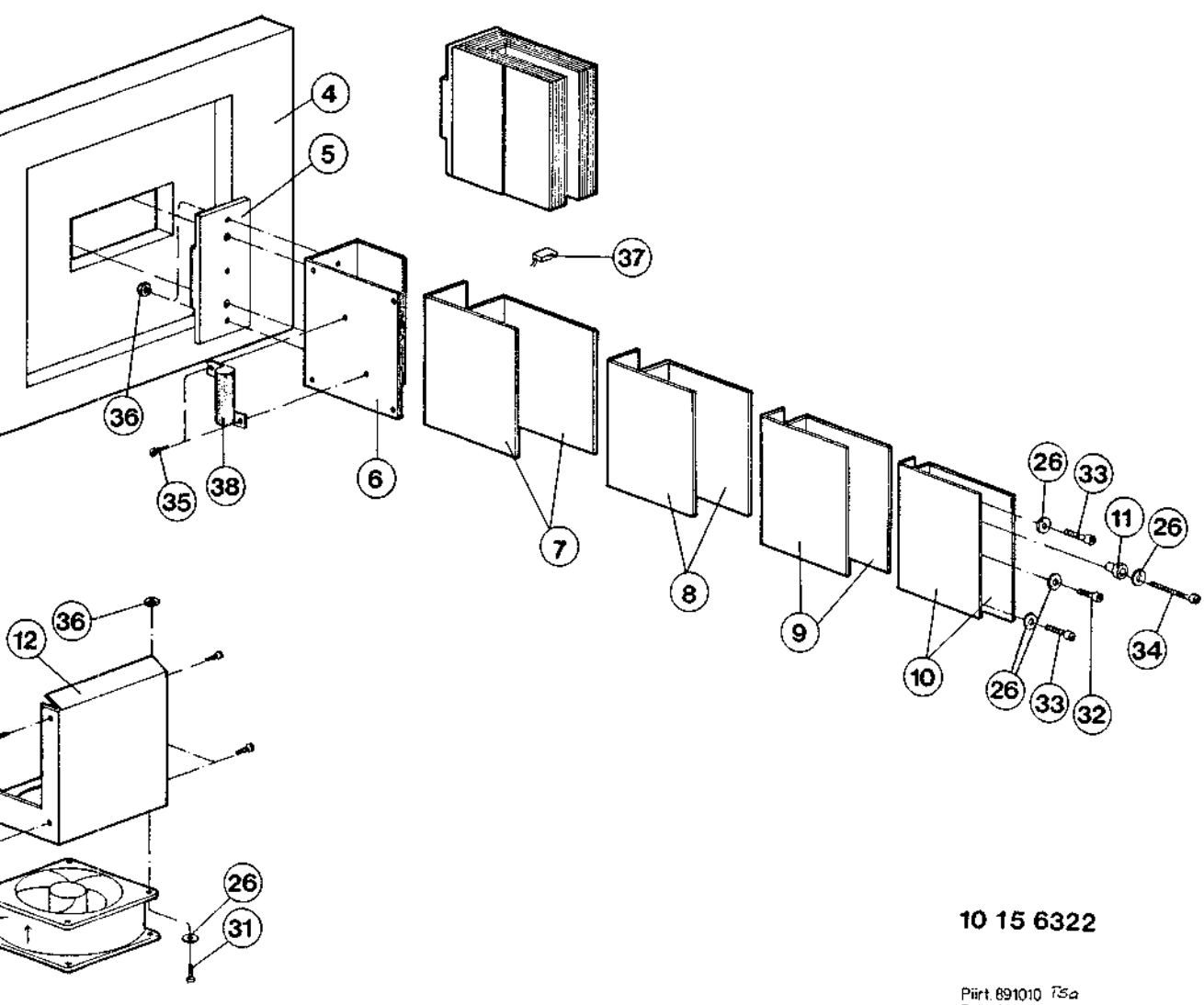
96 - 10 - 10

FOR PART NUMBER		10856321	THERMOSTAT UNIT		10156322	930909
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	2	11310026	WIRE TIE	2.4*140 NYLON 66		370
	0.080	11183019	PVC-INSULAITING	D1.5 BLACK		390
	0.650	11183027	PVC-INSULAITING	D4,0 BLACK		400
	1	11310038	CLAMP		ACC38-A	410
	0.150	11141024	SILICONE TUBING	2.5-0.4		420
1	1	10856342	P.C.ASSEMBLY	COOLING UNIT	RRM 10456341	10
2	1	10256323	COOLING PROFIL	ALUM.PROFIL 95,5*120	NTL5	20
3	1	10256324	INSULATION BOX		NTL5	30
4	1	10356325	INSULATION	PE-PLATE PZ940	NTL5	40
5	2	10456326	FASTENING PIECE	CU 10X100	NTL5	50
6	2	10356327	COOLING PLATE 1	CU-PLATE S=1	NTL5	60
7	4	10456328	COOLING PLATE 2	CU-PLATE S=1	NTL5	70
8	4	10456329	COOLING PLATE 3	CU-PLATE S=1	NTL5	80
9	4	10456330	COOLING PLATE 4	CU-PLATE S=1	NTL5	90
10	4	10456331	COOLING PLATE 5	CU-PLATE S=1	NTL5	100
11	4	10456332	INSULATION BUSHING	POM D10	NTL5	110
12	1	10256333	COVER	FE-PLATE S=1	NTL5	120
13	2	10456334	BUSHING	POM	NTL5	130
14	2	10456335	INSULATION PLATE	POM	NTL5	140
15	2	10456336	SCREW		NTL5	150
16	2	10456337	BRACKET	FE-PLATE	NTL5	160
17	1	10356338	BOX ASSEMBLY		NTL5	170
18	4	10451961	BUSHING	6/4	1219	180
19	2	11691000	COLD ELEMENT	12V	CP1.4-127-06L	190
20	2	11802009	TRANSISTOR FET	50V 12A 75W N-CH MOS	BUZ10	200
21	2	11731007	INSULATOR	TO-220 MICA	MI6108	210
22	2	11450027	INSULATING BUSH	TO-220,TO-3 CONNECTION	3-37-11	220
23	1	11690045	FAN	24VDC 5W 2800RPM	4314	230
24	1	11690040	FINGER GUARD	105X105MM	9.601-43	240
25	1	11690046	FAN	24VDC 2,2W 3300RPM	8314	250
26	26	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		260
27	3	11250021	SERRAT LOCK WASHER	3.0 ANNEALED YELLOWPASS. 3.2*5.5*0.45		270
28	3	11271019	SCREW	M3*8 FE YELLOWPASS.		280
29	4	11271053	SCREW	M4*8 FE YELLOWPASS.		290
30	2	11271057	SCREW	M4*16 FE YELLOWPASS.		300
31	14	11274006	SCREW	M4*10 FE YELLOWPASS.		310
32	2	11274072	SCREW	M4*16 FE YELLOWPASS.		320
33	8	11274009	SCREW	M4*20 FE YELLOWPASS.		330
34	4	11274142	SCREW	M4*40 AISI 316 ACID-PROOF		340
35	10	11276015	SCREW	B2.9*6.5 FE YELLOWPASS.		350
36	14	11278003	NUT	M4 FE YELLOWPASS.		360
37	2	11814502	PTC-SENSOR	1000R/25AST.C 2%	KTY81-120	191
38	2	11605034	RESISTOR WW	10R 5% 50W	HSA50	192
39	1	11310031	CLAMP		A3031ASA	380
W29	1	10856411	WIRING ASS		CA50	06

Fig. 1409, 1410, 1411 -25 Thermostat Unit

10156322





10 15 6322

Piirt. 891010 TSa
Tark. 891010 MVa
Hyv. 891010 ÅHa

1415 Supplement

1415 LSC

1415-001

96-10-10

FOR PART NUMBER	1415-001	LSC	1415-001		951004
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10858924	LSC	1415-001	10155600	10
	1	1410-405	SAMPLE TRAY	FOR SAMPLE RACKS	1410-405	20
	1	1409-411	ID KIT	1409-411		30
	0.500	1200-437	OPTIPHASE`HISAFE`3	2X5 L	1200-437	40
	1	1224-313	MULTICALC EDITOR		1224-313	50
	1	1224-512	PC-PROGRAM	1400 DSA WIW	1224-512	60
	1	10859610	PACKAGE	1415	10459611	100

Fig. 1415 - 26 LSC Assembly

10858924

96-10-10

FOR PART NUMBER	10858924	LSC	1415-001	10155600	960314
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10855272	EXTERNAL STANDARD		10255273	15
	1	10861091	STD. CAPSULE		10361101 1400-SERIES	20
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	90
	1	10856730	DCD EXPANSION KIT		DCD 10356465	100
	1	1215-111	UNQ.STANDARDS SET	20ML VIALS 3H/14C/BACK	1215-111	120
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	410
	1	10551111	LABEL	CSA-APPROVED (ALO,08)	(LR52500) BRADY	414
	1	10560490	LABEL SET		CA22 12-DYN	419
	1	10555509	LABEL SET		FC33,FC207	422
	1	10556126	LABEL	VME RACK	1410	424
	1	10561348	LABEL	PATENTS, BRADY -LABEL	STD B/PLATE	428
	1	10561614	LABEL	11570078 (BRADY)	CE -LABEL	429
	1	11310040	CLAMP		ACC62-A	596
	5	11310037	CLAMP		FCC-A-C8	597
	0.300	10561102	LABEL	WARNING STICK, BRADY	EU-152 10561102.LAB	605
	0.300	10856077	INSTALL.KIT 115V	FOR 1410		615
	1	10857618	PROGRAM PACKAGE	MAIN PR. 1409/11 LSC	WALLAC 1400 DSA	620
	1	10857810	PROGRAM PACKAGE	COMM.PROTOCOLS 1409/11	1409/11/15	622
	0.700	10856078	INSTALL.KIT 250V	FOR 1410		625
	1	1411-932	INSTRUMENT MANUAL	FOR 1409,1411	1411-932	650
	1	10990045	QC CERTIFICATE		10990045	660
	1	11560029	MOUSE MAT	194*244		670
1	1	10854916	BODY ASSEMBLY	1410	10154917	10
2	1	10855818	ID-UNIT	1410	10355859	21
3	1	10855338	SAMPLE CHANGER	1410	10255339	25
4	1	10859278	MEASURING UNIT	1415	10354850	35
5	1	10859369	P.C.ASSEMBLY	HV-DIVIDER UNIT	RFA10359368,10355373	45
6	1	10861712	TOP COVER ASSEMBLY	1415	10255462	55
7	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	65
8	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	75
9	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	85
10	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	95
11	2	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	105
12	1	10859287	DISPLAY UNIT	1400-SERIES	10355598	125
13	1	10361369	BOX ASSEMBLY		1414	135
14	1	10360774	SIDE BOX RIGHT	FE PLATE S=1.0	1414	145
15	1	10360773	SIDE BOX LEFT	FE PLATE S=1.0	1414	155
16	1	10455523	BOTTOM ASSEMBLY		NTL5	165
17	2	10455328	CAM	D25	NTL5	185
18	2	10458890	GUIDE PLATE	FE-PLATE S=3	1415	215
19	1	10455330	BUSHING	D12	NTL5,1470	205
20	2	10455329	PLATE	FE-PLATE S=3	NTL5	195
21	1	10358884	LEAD	CAST LEAD	1415	225
22	2	10358885	LEAD	CAST LEAD	1415	235
23	2	10358886	LEAD	CAST LEAD	1415	245

24	1	10458893	HANDLE 2	FE-PLATE S=2	1415	255
25	1	10255612	BACK PLATE	FE-PLATE S=1	NTL5	275
26	4	10455616	BUSHING	MS D=20	NTL5	285
27	1	10355617	INSULATION	SOLUPOLYETHEN		295
28	1	10355618	COVER 1	AL-PLATE S=2	NTL 5	305
29	1	10455632	COVER 2	FE-PLATE S=2	NTL 5	315
30	1	10355742	COVER 3	AL-PLATE S=2	NTL5	316
32	0.200	10461480	PLATE		1414	335
33	1	11710021	FLOPPY DISK DRIVE	3,5*2-P 80U/P500/250KB	FD1137H	345
34	1	10559262	LABEL	(BRADY)	1415	413
35	1	10555672	LABEL	AL 99.5 S=1	NTL5	360
36	1	10494512	WARNING PLATE	AL-PLATE S=0,5		355
37	1	10548122	LABEL	0,5MM		376
38	1	10355677	SUPPORT	AL-PLATE S=2	NTL5	385
39	1	10355686	COVER	FE-PLATE S=1	NTL5	395
40	1	10455723	BUSHING	POM-ROD D=40	NTL5	405
41	2	10455797	SHIELD	MU S=0,1	NTL5	415
42	15	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		425
43	12	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		435
44	1	11250019	WASHER	6.4/18*1.6 FE,ZINKED		445
45	18	11251018	PIN	3*20 ST		455
46	4	11251045	LOCKRING	13*1		465
47	4.200	11251077	LOCKRING	16*1		475
48	2	11252008	RIVET	1.9*3 ST	KDS 0*3	485
49	10	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	495
50	6	11271016	SCREW	M 3*4 FE YELLOWPASS.		505
51	4	11271034	SCREW	M 4*5 FE YELLOWPASS.		515
52	16	11274013	SCREW	M 5*12 FE YELLOWPASS.		525
53	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		535
54	2	11274034	SCREW	M 6*30 FE YELLOWPASS.		545
55	6	11274145	SCREW	M6*12 FE YELLOWPASS.		555
56	1	11274095	SCREW	M6*25 YELLOWPASS.		565
57	7	11274139	SCREW	M4*8 FE BLACKPASS.		575
58	6	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		585
59	2	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		444
60	2	10455131	COOLING PLATE	AL-PLATE S=3	NTL5	336
61	8	11271036	SCREW	M 4*10 FE YELLOWPASS.		520
62	8	11278003	NUT	M4 FE YELLOWPASS.		595
63	1	10455897	PLATE	FE-PLATE S=1	NTL5	337
64	2	11271095	SCREW	M6*12 FE YELLOWPASS.		521
65	1	10556070	LABEL	HV	1410 WARNING	416
66	1	10556095	LABEL	AL0,08	1410 CR	417
67	1	10556071	LABEL	AL S=0,08	1410 PROGRAM CR	418
68	1	10456182	PLATE	FE-PLATE T=1	LSC-5	420
69	2	11274003	SCREW	M 3*10 FE YELLOWPASS.		524
70	1	10456382	INSULATION	SOLUPOLYETHEN .S=20	NTL-5	421
71	1	10556607	LABEL	WHITE-SELF-ADHESIVE-L	NOTE !	423
72	2	10457299	BRACKET	FE-PLATE T=1	LSC	338
73	1	10457300	GUIDE	FE-PLATE T=1	LSC	339
74	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		586
75	0.400	11140018	SEALING TAPE	10*12	SM 530 K	598
76	1	10458898	BRACKET RIGHT	FE S=1	1409/11/15	400
77	1	10458899	BRACKET LEFT	FE S=1	1409/11/15	401
78	1	10458891	BRACKET	FE-PLATE S=1	1415	411
79	1	10458887	LEAD SHIELD	LEAD CAST	1415	246
80	1	10858914	GUARD	1415	1415	40
81	1	10358889	LEAD	CAST LEAD	1415	247
82	1	10358888	LEAD	CAST LEAD	1415	248
83	1	10448323	LEAD SHIELD		1282,1480	250
85	4	10460785	LEG	BRASS ROUND SECTION	1414	412
101	6	11250039	WASHER	4.3/12*1 FE, ZINKED		587
102	4	11274004	SCREW	M 4*6 FE YELLOWPASS.		588
103	2	11276005	SCREW	C 4.2*9.5 FE YELLOWPASS.		589
104	2	11274010	SCREW	M 4*25 FE YELLOWPASS.		590
105	2	11310047	NUT	M4 1,7-2,7	2.54.329	600
106	4	11290015	BOD	D4,8*4,4	14.08.040	601
107	2	11250036	WASHER	4.3 CLEAR NYLON		602
108	2	10858304	P.C.ASSEMBLY	GUARD PREAMPLIFIER	SAC 10358303	110
109	2	11760040	PHOTOMULTIPLIER	D19MM 10DYN 12PIN	R1166-10	115
110	2	10358901	LIGHT SEAL	SILICONE D21*15 BLACK	1415	117
111	12	11278002	NUT	M3 FE YELLOWPASS.		594
112	0.100	11550112	INSULATING TAPE	S=1,2-1,6	CE-016	635
113	1	10460803	COVER PLATE	ST-PLATE T=1.5	NTL5	630
114	2	11276032	SCREW	C 3.5*6.5 FE YELLOWPASS.		640
115	1	10460964	SHELTER	POM-PLATE S=8, BLACK	NTL 5	633

116	2	11271053	SCREW	M4*8 FE YELLOWPASS.		638
117	0.100	10361270	PB -PLATE	PB 99.6%, NICKELIZED	1400 -SERIE	252
118	1	10861410	P.C.ASSEMBLY	CONNECTION BOARD	RGE 10461408	112
119	2	11274156	SCREW	M6*16 ST YELLOWPASS.		556
120	1	10460762	PLATE RIGHT	FE PLATE S=2.0	1414	680
121	1	10460761	PLATE LEFT	FE PLATE S=2.0	1414	690
122	4	11274002	SCREW	M 3*6 FE YELLOWPASS.		700
123	2	10461276	HOLDER	FE-PLATE S=1 NICKELIZED		710
124	1	10461414	SUPPORT 1	FE PLATE S=1.0	1414	720
125	2.700	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603	730
126	1.800	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601	740
127	1	10461613	HOLDER	FE-PLATE T=1	1409	725
10255462-37	1	11570061	LABEL	WALLAC 52X22,16STICKER		350
10255462-23	1	10358600	COVER PLATE	POLYCARBON S=0.375	1415	352
10355819-43	1	10457903	PLATE	ST-PLATE T=1,5	1410	22
10355819-44	1	10357902	SUPPORT	RST. T=0,8	1410	23
10355819-17	1	10355762	ID-SHIELD	FE-PLATE S=1	NTL 5	645
W24	1	10861346	FLAT CABLE	40S-40S	FC207 10461300	127
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	128
W32	1	10861411	WIRING ASS		CA210	130

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10858924	LSC	1415-001	10155600	960314

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
87	1	11570061	LABEL	WALLAC 52X22,16 STICKER		350	930315
86	1	10358600	COVER PLATE	POLYCARBON S=0.375	1415	352	930315
	1	10555408	LABEL SET		CA22	419	940202
	1	10551111	LABEL	AL-PLATE S=0.8	LR52500	404	941214
	1	10855268	STD. CAPSULE		10455269 (NTL-5)	20	950216
6	1	10859279	TOP COVER ASSEMBLY	1415	10255462	55	960122
W24	1	10855508	FLAT CABLE	40S-40S	FC33	127	951128
13	1	10355564	FRONT BOX ASSEMBLY		NTL5	135	960116
14	1	10355567	SIDE BOX RIGHT	FE-PLATE S=1	NTL5	145	960116
15	1	10355568	SIDE BOX LEFT	FE-PLATE S=1	NTL5	155	960116
32	0.500	10455572	PLATE 2		NTL5	335	960313
85	4	10458900	FOOT	FE S=1	1415	412	950612
	1	11570078	LABEL	THERMAL TRANSFER PRINT	THT-5-438-10	414	950508
42	10	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		425	960116
43	8	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		435	960116
47	4	11251077	LOCKRING	16*1		475	950324
50	4	11271016	SCREW	M 3*4 FE YELLOWPASS.		505	960116
52	12	11274013	SCREW	M 5*12 FE YELLOWPASS.		525	960116
55	8	11274145	SCREW	M6*12 FE YELLOWPASS.		555	950324
116	2	11274156	SCREW	M6*16 ST YELLOWPASS.		556	960116
	0.300	10556201	LABEL	WARNING STICK PVC ALUM	EUROPIUM 152	605	950216

Fig. 1415 -26 LSC Assembly

10155600

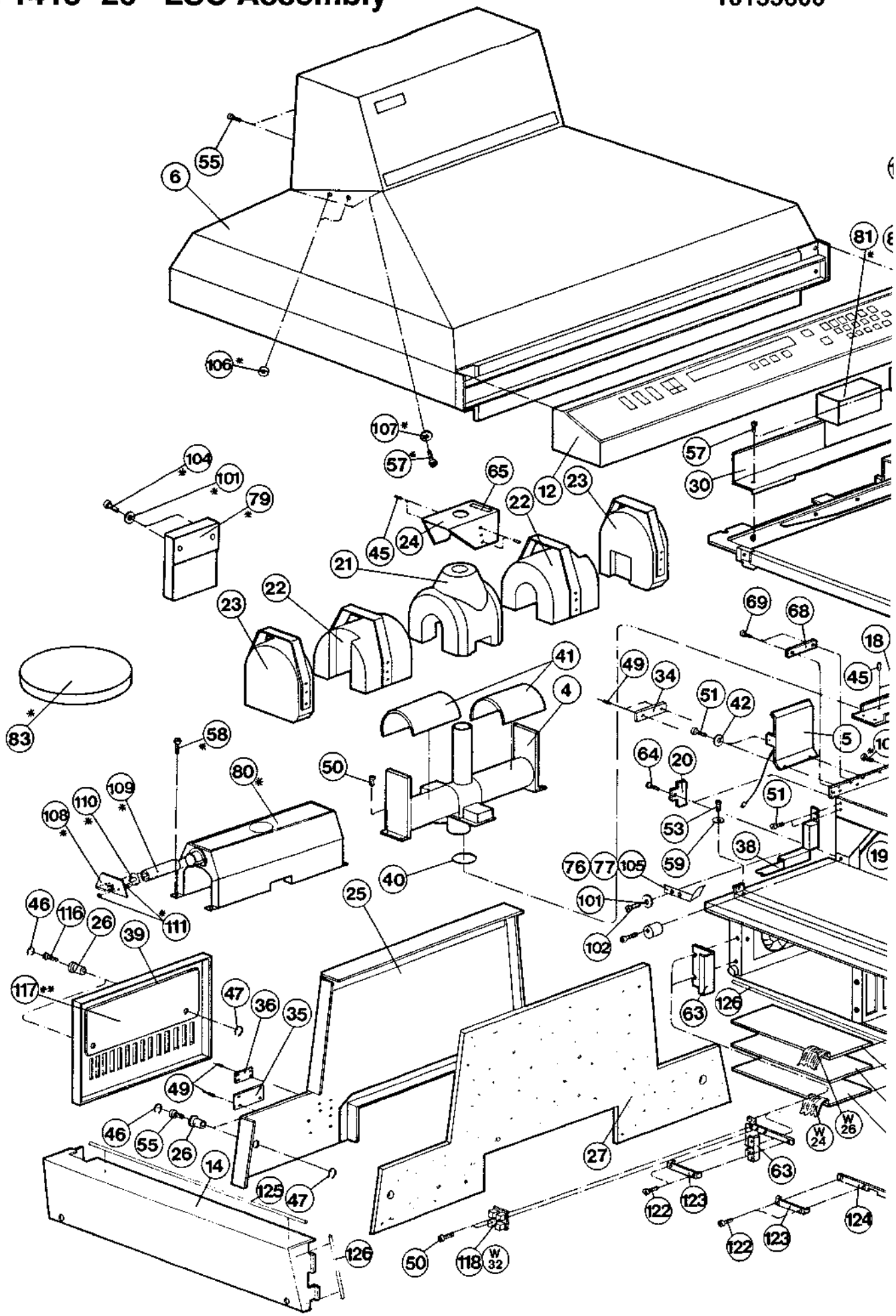


Fig. 1415 -27 Measuring Unit

10859278

96 - 10 - 10

FOR PART NUMBER	10859278	MEASURING UNIT	1415	10354850	940203

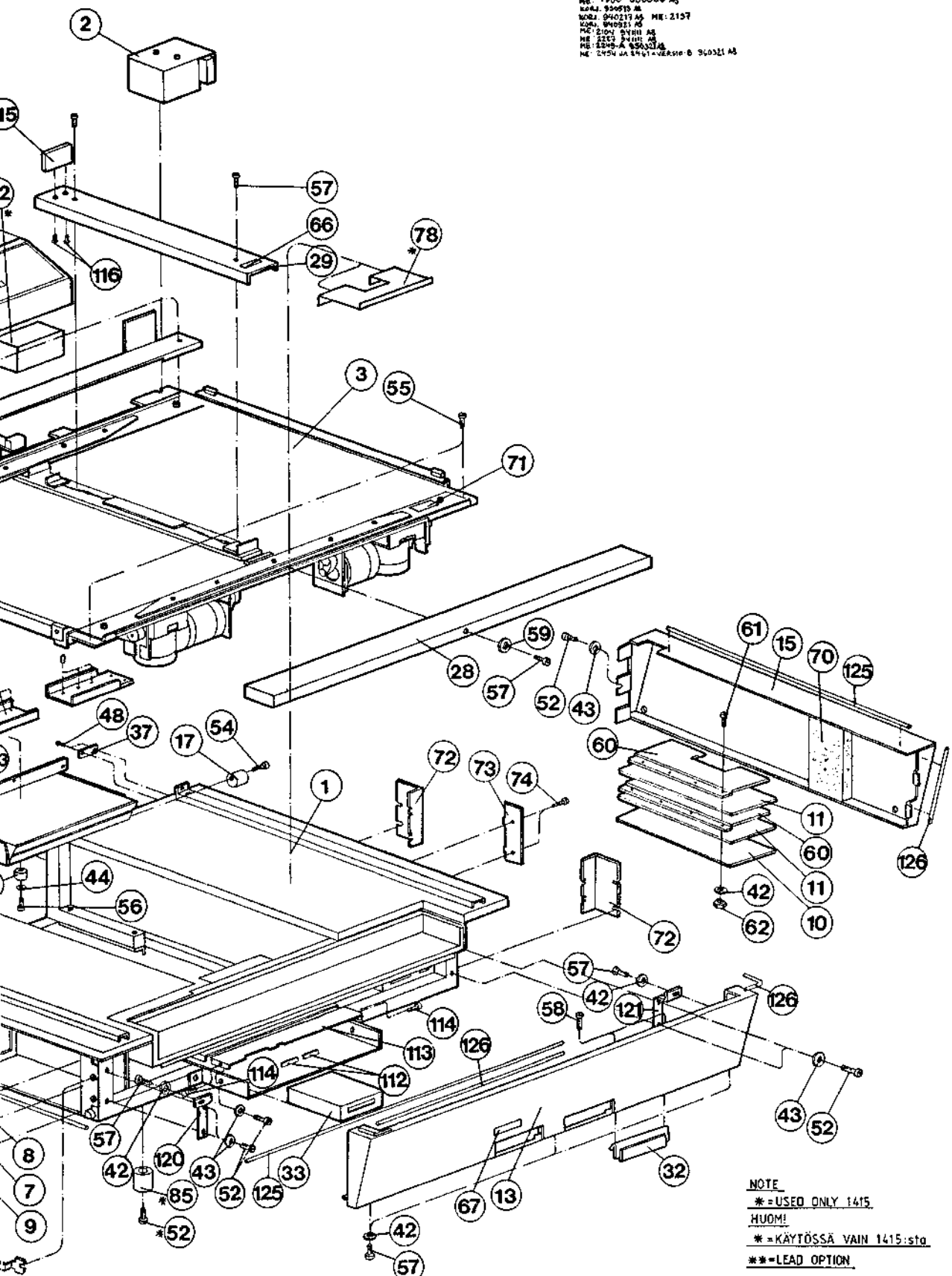
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	0.150	11240068	CONNECTING WIRE	1*0.20 MM2 GREEN		350
	0.150	11240071	CONNECTING WIRE	1*0.20 MM2 BLACK		360
	0.150	11240067	CONNECTING WIRE	1*0.20 MM2 YELLOW		370
	0.150	11240072	CONNECTING WIRE	1*0.20 MM2 WHITE		380
	1	10560490	LABEL SET	CONNECTOR LABEL	CA22 12-DYN	400
1	1	10859277	OPTICS	1415	10356123	220
2	1	10854789	COUNTER WEIGHT		10454790	230
3	2	10860160	PREAMPLIFIER UNIT	1409/11/15 12-DYNODE	10455394	240
4	2	10454039	LIGHT SEAL	SILICON BLACK	NTL5	290
5	1	10855189	ANALOG-RACK	1410		241
6	1	10857670	P.C.ASSEMBLY	COINCIDENCE BOARD	LAC-A 10357727	242
7	1	10857671	P.C.ASSEMBLY	SAMPLE & HOLD 1CH	LAD-A 10357728	243
8	1	10859028	P.C.ASSEMBLY	A/D CONVERTER	EBZ 10359027	244
9	1	10854767	P.C.ASSEMBLY	MCA INTERFACE 1CH	LBR 10354766	245
10	1	10860105	P.C.ASSEMBLY	GAIN STABILIZER	EBU-A 10360197	246
11	1	10854652	P.C.ASSEMBLY	HV SUPPLY	EPM-A 10354653	247
PM	2	11860438	PHOTOMULTIPLIER	D52MM 12DYN B21	R331-05 SLTD	330
W9, W10	2	10855406	WIRING ASS		CA22	210

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10859278	MEASURING UNIT	1415	10354850	931109

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
3	2	10857681	PREAMPLIFIER UNIT	1409/11 10-DYNODE	10455394	240	930927
8	1	10854242	P.C.ASSEMBLY	A/D CONVERTER	EBP 10353905	244	930607
10	1	10854784	P.C.ASSEMBLY	GAIN STABILIZER	EBU 10354783	246	930927
PM	2	11760038	PHOTOMULTIPLIER	D52MM 12DYN B21	R331-05	330	931108
PM	2	11760045	PHOTOMULTIPLIER	D52MM 12DYN B21	R331-05 SLTD	330	931217
	1	10555408	LABEL SET		CA22 10-DYN	400	940202

Korj. 213 890117 THS
Korj. 263 890406 TSa
Korj. 299 890605 TSa
Korj. 364 900818 TSa
Korj. 375 900323 TSa



NOTE
* = USED ONLY 1415
HUOM!
* = KÄYTÖSSÄ VAIN 1415:stä
** = LEAD OPTION

10 15 5600-B

LSC 1410

Piirt. 881220 THS
Tark. 881220 MA
Hyv. 881220 AK

Fig. 1415 -27 Measuring Unit

10354850

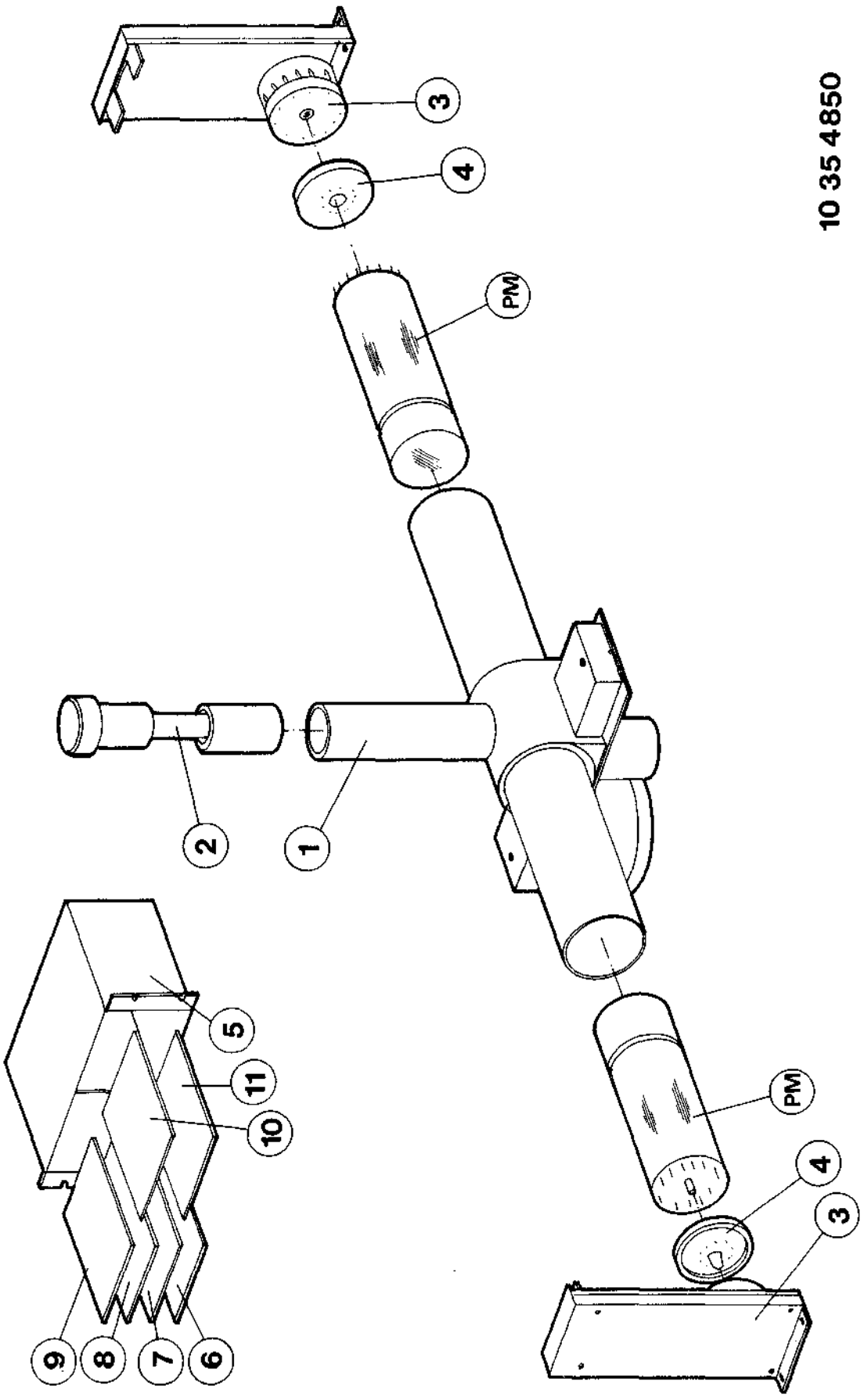


Fig. 1415 -28 Optics

10859277

96 - 10 - 10

FOR PART NUMBER		10859277	OPTICS		10356123	930916
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
1	1	10859276	LIGHT SHUTTER UNIT	1415	10354823	160
2	1	10354851	BODY		NTL5	170
3	2	10256157	REFLECTON	ULTEM 1000	NTL5	180
5	2	10457768	RING	POM, BLACK	1410	200
6	2	10454853	TUBE	CU-TUBE D=57/52	NTL5	210
7	1	10358896	SHIELD 1	FE-PLATE S=1	1415	220
8	1	10358897	SHIELD 2	FE-PLATE S=1	1415	230
9	6	11271045	SCREW	M 3*5 FE YELLOWPASS		240
10	2	10556418	P.C.BOARD	1,6MM 1-P EP	RXI	260
11	2	11271107	SCREW	M2.5*6 MS		270
12	2	11278017	NUT	M2.5 FE YELLOWPASS		280
13	2	11460001	SOLDERING TAG	D 5.5/3.5*8	A2021 ME	290
14	4	11250042	WASHER	2.7/5*0.5		300
D1, D2	2	11784015	DIODE LIGHT EMITT	D3X5 YELLOW	MV5374C	250

Fig. 1415 -28 Optics

10356123

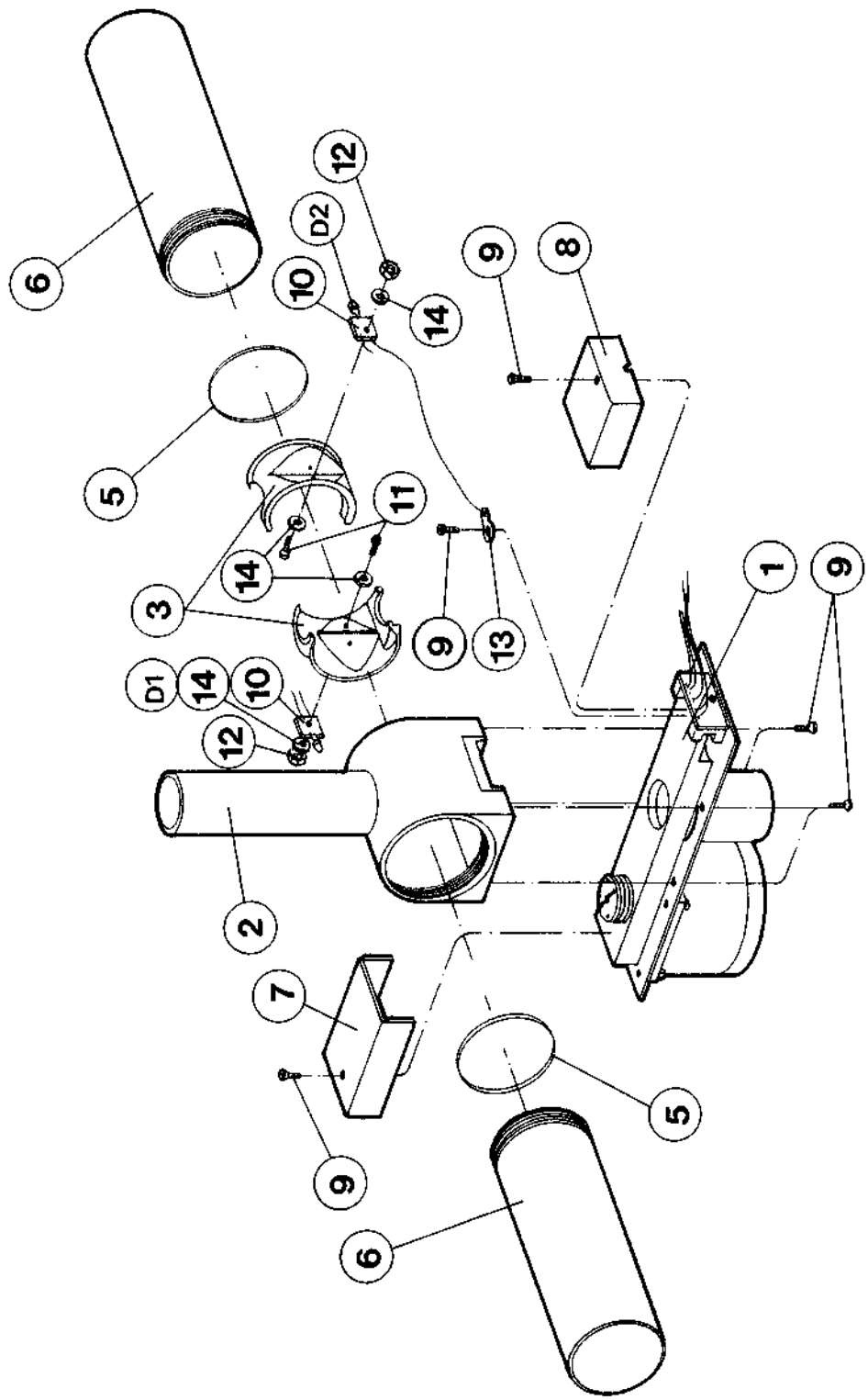


Fig. 1415 -29 Light Shutter Unit

10859276

96 - 10 - 10

FOR PART NUMBER	10859276	LIGHT SHUTTER UNIT	1415	10354823	950814

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10553597	P.C.BOARD	1,6MM 2-P EP LK	RRA 1205 1470	410
	1	11863089	P.C.CONNECTOR	5-P STRAIGHT LOCKABLE	MLSS100-5B	420
1	1	10454824	BODY PLATE	FE-PLATE S=2	NTL5	230
2	1	10354825	SHAFT COVER	MS D50	NTL5	240
3	1	10354826	BODY	AL 10X40	NTL5	250
4	1	10457757	COUPLING 1	POM D=30 BLACK	NTL5	260
5	2	11251095	PIN	1*18		357
6	1	10454830	PLATE 1	SPRINGBRONZE S=0.2	NTL 5	280
7	1	10454831	PLATE 2	SPRINGBRONZE S=0.2	NTL 5	290
8	1	10454832	PLATE 3	SPRINGBRONZE S=0.2	NTL 5	300
9	1	10454833	PLATE 4	SPRINGBRONZE S=0.2	NTL 5	310
10	1	10454834	COVER PLATE	FE-PLATE S=1	NTL5	320
11	1	10458894	SHIELD 1	MS 10*40	1415	330
12	2	10454837	BUSHING	D3	NTL5	340
13	1	10454838	COUPLING	POM D=30 BLACK	NTL5	350
14	4	11251071	LOCK WIRE	D=28		355
15	1	11271045	SCREW	M 3*5 FE YELLOWPASS.		360
16	1	11271045	SCREW	M 3*5 FE YELLOWPASS.		370
17	2	11271051	SCREW	M 3*16 FE YELLOWPASS.		380
18	4	11271035	SCREW	M 4*8 FE YELLOWPASS.		390
19	1	10458895	SHIELD 2	MS 10*40	1415	335
20	2	10458293	WASHER	SPRINGPRONZE T=0,5	NTL5	352
M	1	11690050	STEPPING MOTOR	1,5IN 0.7A STEP ANG1.8	6500 R568	400
W8	1	10855405	WIRING ASS		CA21	220

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

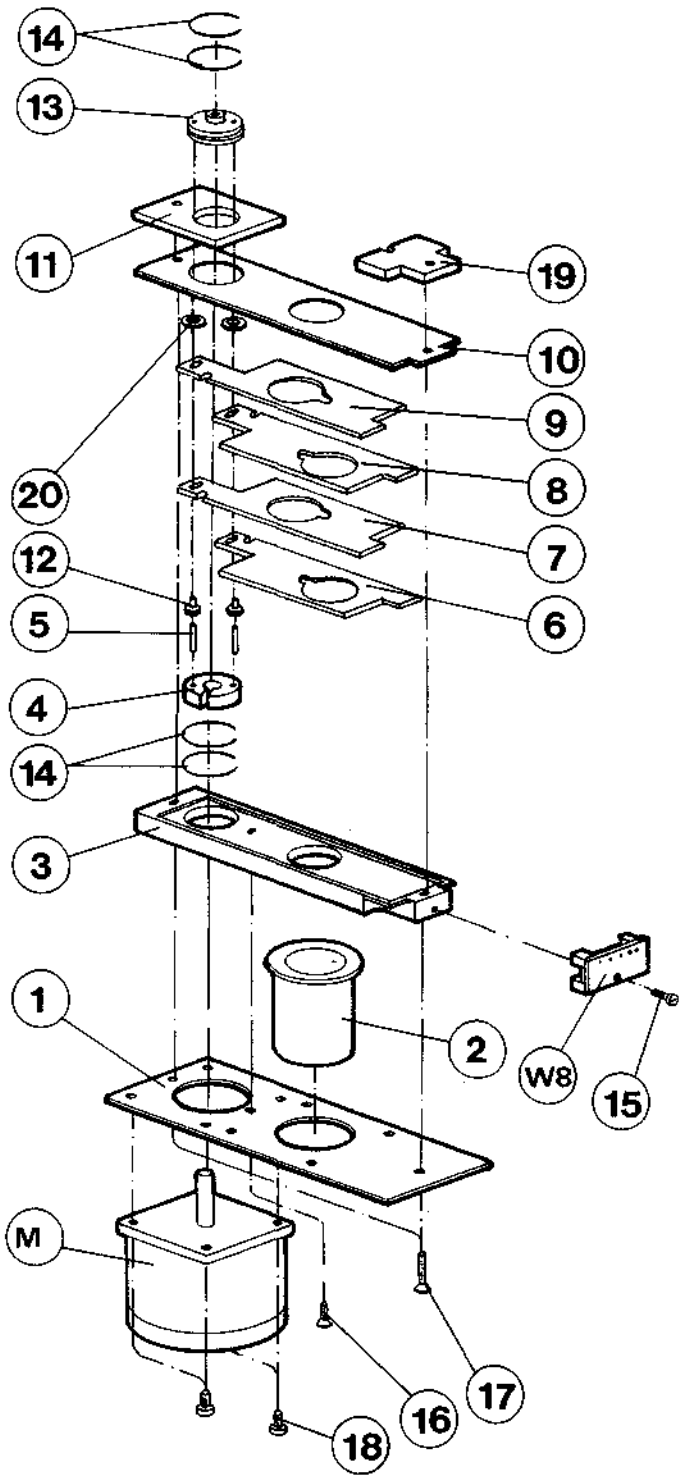
FOR PART NUMBER	10859276	LIGHT SHUTTER UNIT	1415	10354823	950814

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
5	2	10454829	PIN	D1	NTL5	270	930518
	2	10458293	WASHER	SPRINGPRONZE T=0,5	NTL5	352	950811

Fig. 1415 -29 Light Shutter Unit

10354823

HE: 1816 810826 A5
HE: 1916 910910 A8
HE: 1936 920526 A6
HE: 2113 940112 A6



10 35 4823

Piirt. 881108 TMS
Tark. 881108 Ma
Hyv. 881108 KK

Fig. 1415 -30 Top Cover Assembly

10859279

96 - 10 - 10

FOR PART NUMBER	10859279	TOP COVER ASSEMBLY	1415	10255462	940623

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	11391026	GAS SPRING	FJ-DER	16-1-168-135-60	745
2	1	10355463	PLATE RIGHT, ASS.		NTL5	530
3	1	10355467	PLATE LEFT ASS.		NTL5	540
4	1	10355470	SUPPORT BOX ASS.		NTL5	550
5	2	10455473	PLATE	FE-PLATE S=1,5	NTL5	560
6	2	10455474	PLATE	FE-PLATE S=3	NTL5	570
7	2	10255475	SUPPORT	AL-PLATE 10X25	NTL5	580
8	1	10355476	HINGE BODY RIGHT	FE-PLATE S=1,5	NTL5	590
9	1	10355477	HINGE BODY LEFT	FE-PLATE S=1,5	NTL5	600
10	2	10455000	SPRING	D2	NTL5	610
11	2	10455478	GUIDE	D6H8	NTL5	620
12	2	10455479	PLATE	POM BLACK D=12	NTL5	630
13	2	10455480	BRACKET		NTL5	640
14	1	10255481	TOP COVER		NTL5	650
15	1	10254553	COVER	PLATE S=5	NTL5	660
16	1	10355488	HINGE RIGHT	FE-PLATE S=1,5	NTL5	670
17	1	10355489	HINGE LEFT	FE-PLATE S=1,5	NTL5	680
18	6	10455490	NUT	MS D18	NTL5	690
19	2	10455491	PIN	D2,5	NTL5	700
21	1	10455493	PLATE	POM-PLATE S=8	NTL5	720
22	1	10355494	HANDLE	POM-PLATE S=25	NTL5	730
24	1	10855453	INSULATION SET		NTL5	520
26	12	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		760
27	1	11251015	PIN	2*10 ST		770
29	12	11274012	SCREW	M5*10 FE YELLOWPASS.		790
30	1	11274088	SCREW	M3*20 FE YELLOWPASS.		800
31	6	11274133	SCREW	M4*6 FE BLACKPASS.		810
32	4	11274134	SCREW	M5*10 FE BLACKPASS.		820
33	2	11276030	SCREW	B4.2*22 FE YELLOWPASS.		830
34	1	10455763	COVER ASSEMBLY		NTL5	731
35	2	11276015	SCREW	B 2.9*6.5 FE YELLOWPASS.		840
36	1	10456094	EDGE STRIP	FE-PLATE T=1	NTL5	741
38	6	11250041	WASHER	4.3/9*0.8 FE BLACK		860
39	2	11290013	FOOT	D12*3 RUBBER WHITE	3M SJ 5012	870
40	4	10456181	WASHER	FE-PLATE T=2	LSC5	742
41	4	11274031	SCREW	M5*12 FE YELLOWPASS.		850
42	2	11250039	WASHER	4.3/12*1 FE YELLOWPASS.		750
43	1	10358879	SHIELD ASSEMBLY	FE-PLATE/LEAD CAST	1415	655
44	1	10459978	EXTENSION ARM	MS D=8	1409	510
45	1	10459979	MOUNTING PIN	MS-ROD D10	1409	515
46	2	11274004	SCREW	M4*6 FE YELLOWPASS.		805

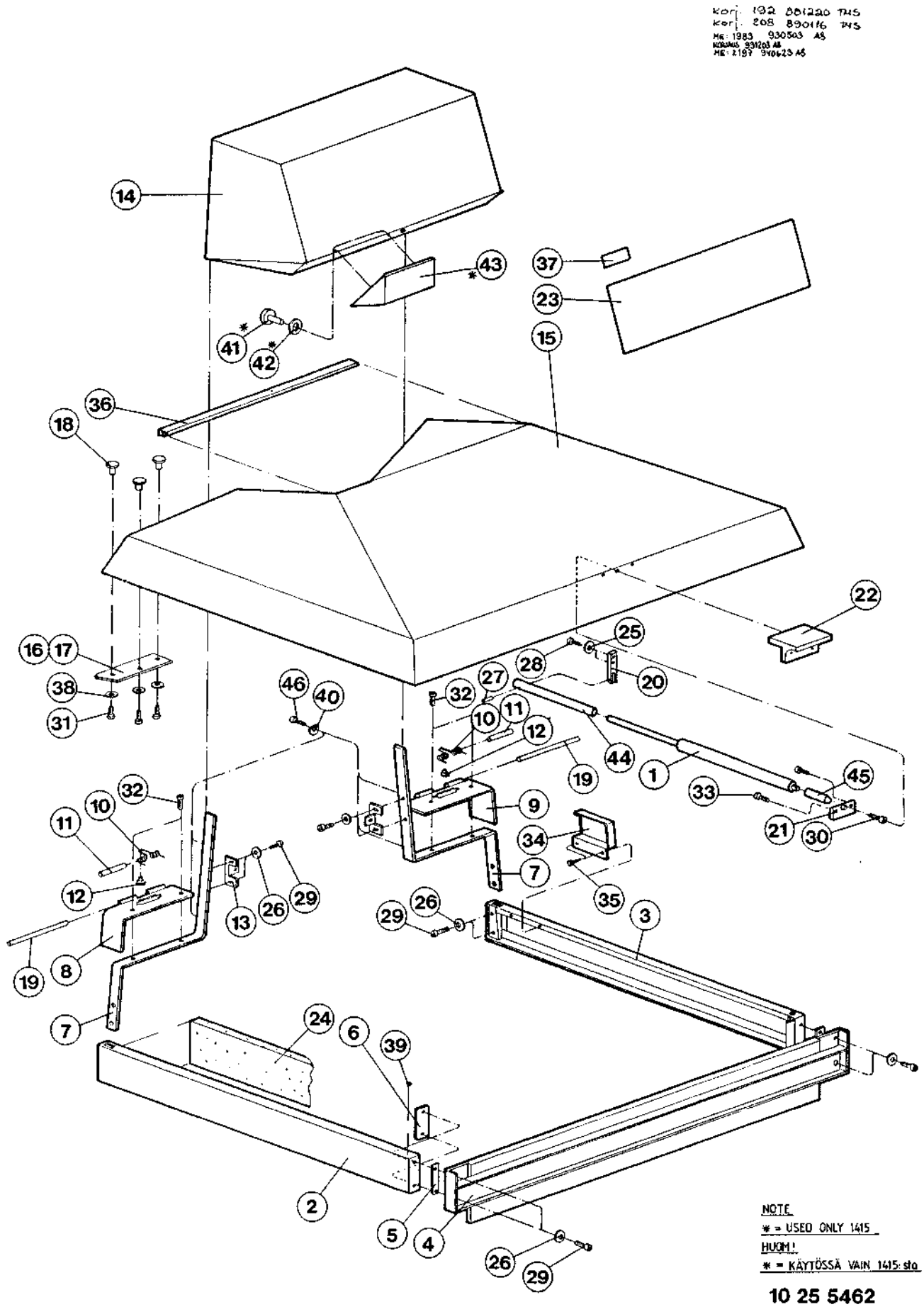
PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10859279	TOP COVER ASSEMBLY	1415	10255462	940623

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
1	1	10855445	SPRING ASSEMBLY	10455446	NTL5	510	930812
7	1	10255475	SUPPORT	AL-PLATE 10X25	NTL5	580	940607
40	2	10456181	WASHER	FE-PLATE T=2	LSC5	742	940607
29	14	11274012	SCREW	M5*10 FE YELLOWPASS.		790	940607
41	2	11274004	SCREW	M4*6 FE YELLOWPASS.		805	940622

Fig. 1415 -30 Top Cover Assembly

10255462



NOTE
* = USED ONLY 1415
HUOM!
* = KÄYTÖSSÄ VAIN 1415:sta

10 25 5462

Piirt. 881109 THS
Tark. 881109 MA
Hyv. 881109 KL

Fig. 1415 -31 Guard

10858914

96 - 10 - 10

FOR PART NUMBER	10858914	GUARD	1415	10458913	930915

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10358909	LID	CU S=0.5	1415	10
2	1	10258902	GUARD TANK	ASSEMBLY	1415	20
3	0.550	11090011	SOLVENT	DOBANE 103	DOBANE 103	70
3	0.125	11091022	SILICONE RUBBER	2-KOMP., CLEAR	RTV 615	80
3	0	11120019	SECONDARY SCINTILL	QUALITY	BIS-MSB	90
3	0.007	11120018	PRIMARY SCINTILLAT	QUALITY	PPO	100
4	1	10460181	SEAL	D50*3 POM	1415	110

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10858914	GUARD	1415	10458913	950424

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
3	0.500	11091022	SILICONE RUBBER	2-KOMP., CLEAR	RTV 615	80	950421

Fig. 1415 -31 Guard

10458913

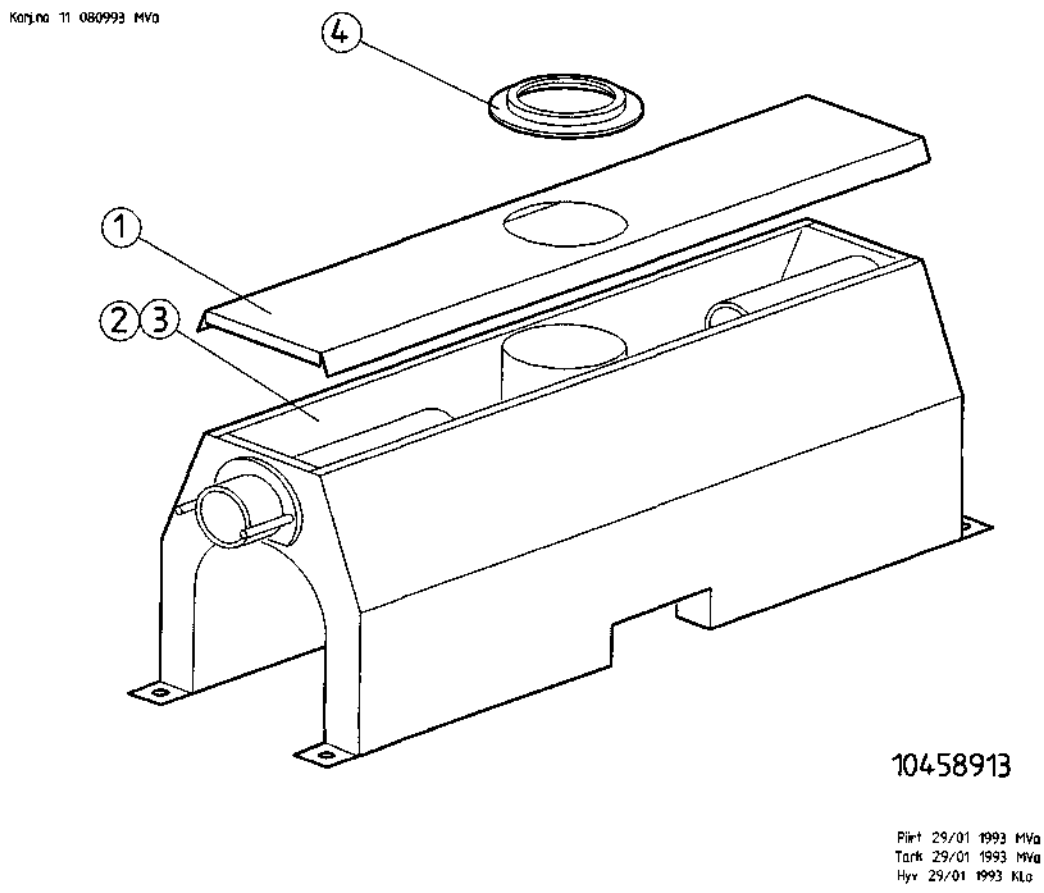


Fig. 1415 -32 HV-Divider Unit

10859369

96 - 10 - 10

FOR PART NUMBER		10859369	HV-DIVIDER UNIT	RFA	10359368, 10355373	960607
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	11860001	COAXIAL CONNECTOR		11H4-50-3-1	30
	1	11460001	SOLDERING TAG	D 5.5/3.5*8	A2021 ME	110
	5	11250021	SERRAT LOCK WASHER	3.0 ANNEALED ZINKED	3.2*5.5*0.45	190
	4	11250001	WASHER	A3,2		200
	1.090	11240035	COAXIAL CABLE		RG-58 C/U	210
	1	10554024	P.C.BOARD	1,6MM 2-P EP LK	RRH 1410	230
1	1	10358910	PLATE	FE- PLATE S=1	1415	260
2	3	10454836	NUT	MS 6K6	NTL5	240
3	2	11260035	RISE PIN	M3*10 MS	5.03.103	180
4	1	10454401	BOX	ABS S=2	1205	250
5	1	10544576	LABEL		DANGER H.V. SERIVA	270
6	1	11310006	CLAMP	MS 1.25 MKL	A 3024 ASA	130
7	2	11320106	LOCK. CARD SPACER	NYLON	KGLS-3S	120
8	3	11271018	SCREW	M 3*6 FE YELLOWPASS.		170
9	6	11271019	SCREW	M 3*8 FE YELLOWPASS.		160
10	3	11271023	SCREW	M 3*14 FE YELLOWPASS.		150
11	8	11278002	NUT	M3 FE YELLOWPASS.		140
12	1	10556568	LABEL	WHITE-SELF-ADHESIVE-L	HV-OUTPUT-INPUT	220
13	2	11480047	FERRITE CLAMP	D 6,6 MM	28B2025-OAO	115
14	4	11273013	SCREW	M2.5*4 FE BLACK		135
15	1	10461951	INSULATOR PLATE	PRESPAN S=0,5		280
C1	1	11626002	CAPACITOR H.V.	2.5NF 3KV	DD30 252	50
C2-5	4	11626008	CAPACITOR H.V.	150PF 3.0KV 20/50%	9/0130.9 D FERROP	40
R1	1	11601149	RESISTOR	10K 2% 0.5W	B 1/2 BEYSCHLAG	100
R2	1	11604049	RESISTOR MF SM	100 1% 0,125W 100PPM	CRCW1206	90
R3-7,10-14,1	20	11604241	RESISTOR MF SM	1,00M 1% 0,125W 100PPM	CRCW1206	60
R8,15,22,29	4	11604225	RESISTOR MF SM	464K 1% 0,125W 100PPM	CRCW1206	70
R9,16,23,30	4	11603868	HV RESISTOR	22Mohm 5% 0.5W 3.5kVDC	232224213226	95
R31-34	4	11604209	RESISTOR MF SM	215K 1% 0,125W 100PPM	CRCW1206	80
S1-8	1.111	11863070	P.C.CONNECTOR	40-PIN STRAIGHT	SL1/25/36G	20

Fig. 1415 -32 HV-Divider Unit

10355373

Kori. 298 890605 TSa
ME: 2458 940427 AS
ME: 2452-A 951120 AS
ME: 2514-B 960410 AS

10 35 5373-B

Piirt. 881107 JHS
Tark. 881107 MA
Hyv. 881107

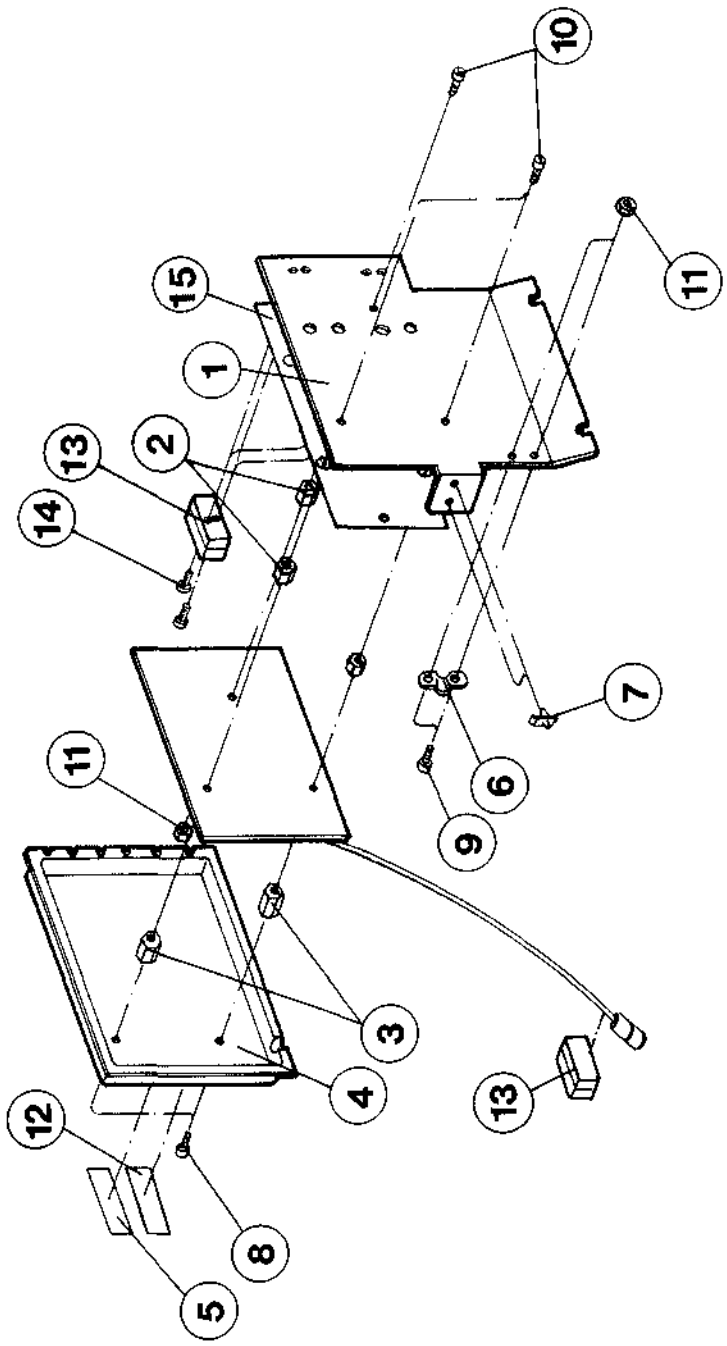


Fig. 1415 -33 Display Unit

10859287

96 - 10 - 10

FOR PART NUMBER	10859287	DISPLAY UNIT	1415	10355598	960612

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	10854665	P.C.ASSEMBLY	DISPLAY	HDG 10254761	510
2	1	10854760	P.C.ASSEMBLY	DISPLAY (CPU)	HCB 10354759	520
3	1	10259283	BOX	ASSEMBLY	1415	540
4	1	11842036	TOUCH PANEL		010377	550
6	2	11250001	WASHER	A3,2		570
8	4	11278002	NUT	M3 FE YELLOWPASS.		590
9	1	10557386	LABEL	PVC FASKAL-400 T=0,1	1410 RESET	600
12	2	11480049	FERRITE CLAMP	26-WIRE FLAT CABLE	28B2022-000	610
13	2	11480050	CLAMP	FOR 26-W.FLAT C. CLAPM	M-CLIP	620
14	1	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601	630
15	1	10361691	LID ASSEMBLY	TIN COVERED	NTL-5	640
16	1	10361690	BOX ASSEMBLY	TIN COVERED	NTL-5	650
17	2	10461689	BUSHING	MS	NTL-5	660
18	9	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		670
19	6	11271021	SCREW	M 3*10 FE YELLOWPASS.		680
20	2	11271026	SCREW	M 3*18 FE YELLOWPASS.		690
21	8	11250044	WASHER	3.2/9*0.8 FE YELLOWPASS.		700
22	1	11271018	SCREW	M 3*6 FE YELLOWPASS.		710
23	2	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		720
24	1	10861635	P.C.ASSEMBLY	FILTER BOARD	RYP 10461634	525
25	1	10861638	P.C.ASSEMBLY	FILTER BOARD	RYQ 10461637	535
26	0.050	11180017	PE-STRING	5*5, BLACK	PZ-940 SJH	730
27	1	10453697	INSULATOR PLATE	PRESPAN S=0,5	1205	740
28	0.850	11220014	TAPE	12MM CLEAR	TESA4971	750
W25	1	10851794	FLAT CABLE	26S-26S	10451797	530
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	533
W33	1	10861704	FLAT CABLE	34S-34S	FC220 10461703	537

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

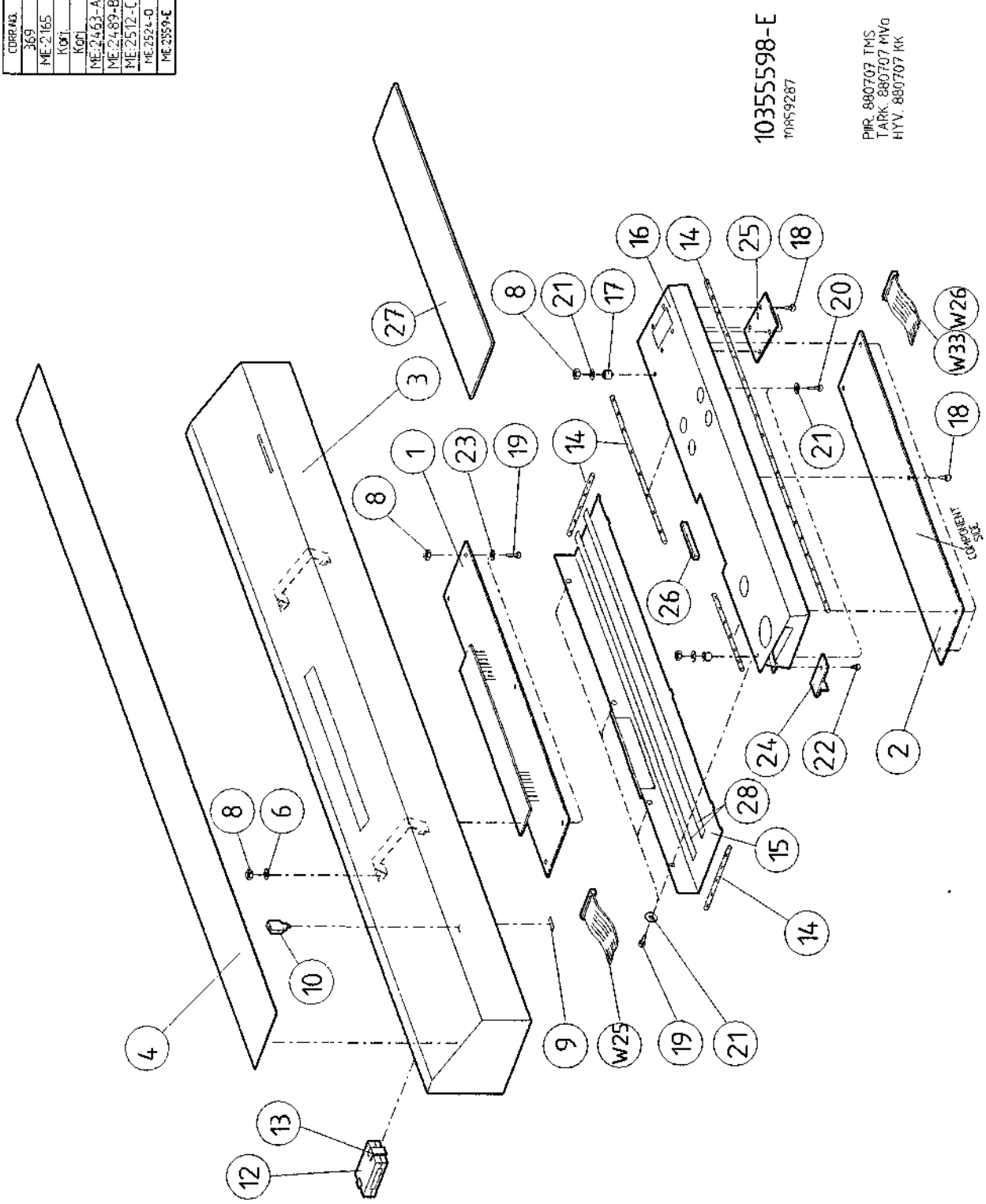
FOR PART NUMBER	10859287	DISPLAY UNIT	1415	10355598	960612

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
	1	10855628	PROGRAM PACKAGE	DISPLAY PRG. HCB-BOARD		521	930825
7	5	11271030	SCREW	M3*35 FE YELLOWPASS		580	940405
W	1	10851794	FLAT CABLE	26S-26S	10451797	530	960213
5	5	10455619	BUSHING	MS D6/4	NTL5	560	960115
7	4	11271030	SCREW	M 3*35 FE YELLOWPASS.		580	960115
11	1	11271029	SCREW	M 3*30 FE YELLOWPASS.		585	960115
8	12	11278002	NUT	M3 FE YELLOWPASS.		590	960112

Fig. 1415 -33 Display Unit

10355598

CORR.NO.	DATE
369	900307 TSA
ME-2165	940418 AS
Kori	940614 AS
Kori	940921 AS
ME-2463-A	951219 AS
ME-2489-B	960214 TSA
ME-2512-C	960215 TSA
ME-2524-D	960322 AS
ME-2559-E	960508 AS



1414 Supplement

1414 WinSpectral

1414-001
96 - 10 - 10

FOR PART NUMBER	1414-001	WIN SPECTRAL	1414-001		960805
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10860678	WINSPECTRAL	1414-001	10160809	10
	1	1410-405	SAMPLE TRAY	FOR SAMPLE RACKS	1410-405	110
	1	1410-401	RACKS, 20 ML	PACKAGE OF 10 RACKS	1410-401	120
	1	1409-411	ID KIT	1409-411		130
	0.500	1200-437	OPTIPHASE`HISAFE`3	2X5 L	1200-437	140
	1	1414-160	MONITOR STAND	600 MM / 230 MM		150
	1	10855884	PACKAGE	10455885	1410	170
10160809-120	1	10860862	KEYBANK ASSEMBLY	1414	10260855	160

Fig. 1414 -34 Win Spectral

10860678
96 - 10 - 10

FOR PART NUMBER	10860678	WIN SPECTRAL	1414-001	10160809	960404
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	110
	1	10856730	DCD EXPANSION KIT		DCD 10356465	121
	1	10855272	EXTERNAL STANDARD		10255273	122
	1	10861091	STD. CAPSULE		10361101 1400-SERIES	123
	0.300	10856077	INSTALL.KIT 115V	FOR 1410		124
	0.700	10856078	INSTALL.KIT 250V	FOR 1410		125
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	408
	1	10555509	LABEL SET		FC33,FC207	412
	1	10556126	LABEL	VME RACK	1410	414
	1	10551111	LABEL	CSA-APPROVED (ALO,08)	(LR52500) BRADY	416
	1	10560490	LABEL SET		CA22 12-DYN	420
	0.300	10561102	LABEL	WARNING STICK, BRADY	EU-152 10561102.LAB	422
	1	10561348	LABEL	PATENTS, BRADY -LABEL	STD B/PLATE	427
	1	10561614	LABEL	11570078 (BRADY)	CE -LABEL	429
	1	11310040	CLAMP		ACC62-A	586
	5	11310037	CLAMP		FCC-A-C8	587
	1	1215-111	UNQ.STANDARDS SET	20ML VIALS 3H/14C/BACK	1215-111	1000
	1	1224-513	SOFTWARE PACKAGE	1414 WINSPECTRAL	1224-513	1010
	1	1414-931	INSTRUMENT MANUAL	FOR 1414-001	1414-931	1020
	1	10990045	QC CERTIFICATE		10990045	1030
1	1	10860804	BODY ASSEMBLY	1414	10160805	10
2	1	10855818	ID-UNIT	1410	10355859	11
3	1	10855338	SAMPLE CHANGER	1410	10255339	15
4	1	10854849	MEASURING UNIT	1410	10354850	25
5	1	10859369	P.C.ASSEMBLY	HV-DIVIDER UNIT	RFA10359368,10355373	35
6	1	10860806	TOP COVER ASSEMBLY	1414	10260807	45
7	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	55
8	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	65
9	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	75
10	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	85
11	2	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	95
12	1	10360749	FRONT PANEL RIGHT		1414	146
13	1	10361369	BOX ASSEMBLY		1414	130
14	1	10360774	SIDE BOX RIGHT	FE PLATE S=1.0	1414	135
15	1	10360773	SIDE BOX LEFT	FE PLATE S=1.0	1414	145
16	1	10360752	FRONT PLATE LEFT		1414	147
17	2	10455328	CAM	D25	NTL5	175
18	2	10458890	GUIDE PLATE	FE-PLATE S=3	1415	205
19	1	10455330	BUSHING	D12	NTL5,1470	195
20	2	10455329	PLATE	FE-PLATE S=3	NTL5	185

21	1	10355332	LEAD	LEAD 99.9%	NTL-5	210
22	2	10455333	LEAD	LEAD 99.9%	NTL-5	230
23	2	10455334	LEAD	LEAD 99.9%	NTL-5	240
24	1	10355335	HANDLE 1	FE-PLATE S=2	NTL5	250
25	1	10255612	BACK PLATE	FE-PLATE S=1	NTL5	265
26	4	10455616	BUSHING	MS D=20	NTL5	275
27	1	10355617	INSULATION	SOLUPOLYETHEN		285
28	1	10355618	COVER 1	AL-PLATE S=2	NTL 5	295
29	1	10455632	COVER 2	FE-PLATE S=2	NTL 5	305
30	1	10355742	COVER 3	AL-PLATE S=2	NTL5	306
32	1	10360744	LID ASSEMBLY		1414	148
33	1	11710021	FLOPPY DISK DRIVE	3,5"2-P 80U/P500/250KB	FD1137H	425
34	1	10460743	HANDLE	AL SQUARE BAR 8.2x8.2	1414	149
35	1	10555672	LABEL	AL 99.5 S=1	NTL5	415
36	1	10494512	WARNING PLATE	AL-PLATE S=0,5		423
37	1	10548122	LABEL	0,5MM		421
38	1	10355677	SUPPORT	AL-PLATE S=2	NTL5	375
39	1	10355686	COVER	FE-PLATE S=1	NTL5	385
40	1	10455723	BUSHING	POM-ROD D=40	NTL5	395
41	2	10455797	SHIELD	MU S=0,1	NTL5	403
42	15	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		430
43	10	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		431
44	1	11250019	WASHER	6.4/18*1.6 FE,ZINKED		435
45	18	11251018	PIN	3*20 ST		445
46	4	11251045	LOCKRING	13*1		455
47	4	11251077	LOCKRING	16*1		465
48	2	11252008	RIVET	1.9*3 ST	KDS 0*3	475
49	8	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	485
50	6	11271016	SCREW	M 3*4 FE YELLOWPASS.		495
51	4	11271034	SCREW	M 4*5 FE YELLOWPASS.		505
52	10	11274013	SCREW	M 5*12 FE YELLOWPASS.		515
53	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		525
54	2	11274034	SCREW	M 6*30 FE YELLOWPASS.		535
55	6	11274145	SCREW	M6*12 FE YELLOWPASS.		545
56	1	11274095	SCREW	M6*25 YELLOWPASS.		555
57	10	11274139	SCREW	M4*8 FE BLACKPASS.		565
59	3	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		434
60	2	10455131	COOLING PLATE	AL-PLATE S=3	NTL5	326
61	8	11271036	SCREW	M 4*10 FE YELLOWPASS.		510
62	8	11278003	NUT	M4 FE YELLOWPASS.		585
63	1	10455897	PLATE	FE-PLATE S=1	NTL5	327
64	2	11271095	SCREW	M6*12 FE YELLOWPASS.		511
65	1	10556070	LABEL	HV	1410 WARNING	417
66	1	10556095	LABEL	AL0,08	1410 CR	418
67	1	10556071	LABEL	AL S=0,08	1410 PROGRAM CR	419
68	1	10456182	PLATE	FE-PLATE T=1	LSC-5	404
69	2	11274003	SCREW	M 3*10 FE YELLOWPASS.		514
70	1	10456382	INSULATION	SOLUPOLYETHEN S=20	NTL-5	409
71	1	10556607	LABEL	WHITE-SELF-ADHESIVE-L	NOTE !	413
72	2	10457299	BRACKET	FE-PLATE T=1	LSC	328
73	1	10457300	GUIDE	FE-PLATE T=1	LSC	329
74	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		576
75	1	10860710	RESET UNIT		10255679	119
76	1	10458898	BRACKET RIGHT	FE S=1	1409/11/15	400
77	1	10458899	BRACKET LEFT	FE S=1	1409/11/15	401
101	2	11250039	WASHER	4.3/12*1 FE, ZINKED		440
102	12	11274004	SCREW	M 4*6 FE YELLOWPASS.		513
105	2	11310047	NUT	M4 1,7-2,7		590
106	4	11290015	BOD	D4,8*4,4	14.08.040	426
115	1	10860713	DUMMY PLUG	1414	1414 10460712	120
116	1	10460762	PLATE RIGHT	FE PLATE S=2.0	1414	150
117	1	10460761	PLATE LEFT	FE PLATE S=2.0	1414	151
118	2	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		432
119	6	11274002	SCREW	M 3*6 FE YELLOWPASS.		566
122	1	10460964	SHELTER	POM-PLATE S=8, BLACK	NTL 5	402
123	2	11271053	SCREW	M4*8 FE YELLOWPASS.		490
124	2	11274156	SCREW	M6*16 ST YELLOWPASS.		530
126	2	10560656	LABEL	ST.POLYESTER 11570076	MACH.LABEL 1414-001	411
141	1	10861410	P.C.ASSEMBLY	CONNECTION BOARD	RGE 10461408	114
142	2	10461276	HOLDER	FE S=1 NICKELIZED		350
143	1	10461414	SUPPORT 1	FE PLATE S=1.0	1414	340
144	2	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603	600
145	2.300	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601	610
146	2	10461480	PLATE		1414	360
147	6	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		570
148	1	10557386	LABEL	PVC FASKAL-400 T=0,1	1410 'RESET'	428
149	1	10461613	HOLDER	FE-PLATE T=1	1409	355

10260807-23	1	10360657	COVER PLATE	POLYCARB.0.375	1414		410
10260807-37	1	11570061	LABEL	WALLAC 52X22,16STICKER			424
10355819-17	1	10355762	ID-SHIELD	FE-PLATE S=1	NTL 5		405
10355819-43	1	10457903	PLATE	ST-PLATE T=1,5	1410		406
10355819-44	1	10357902	SUPPORT	RST. T=0.8	1410		407
W24	1	10861346	FLAT CABLE	40S-40S	FC207	10461300	117
W32	1	10861411	WIRING ASS		CA210		115

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10860678	WINSPECTRAL	1414-001	10160809	960404

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
147	4	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		570	960403

1414 Alpha/Beta

1414-002

96 - 10 - 10

FOR PART NUMBER	1414-002	ALPHA/BETA	1414-002		960620

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10861383	ALFABETA	1414-002	10160809	10
	1	1410-405	SAMPLE TRAY	FOR SAMPLE RACKS	1410-405	110
	1	1410-401	RACKS, 20 ML	PACKAGE OF 10 RACKS	1410-401	120
	1	1409-411	ID KIT	1409-411		130
	0.500	1200-437	OPTIPHASE`HISAFE`3	2X5 L	1200-437	140
	1	1414-160	MONITOR STAND	600 MM / 230 MM		150
	1	10859610	PACKAGE	1415	10459611	170
	1	1411-302	PC-PROGRAM PACKAGE	SPECTRUM ANALYSIS PRG.		180
	1	1224-533	PC-PROGRAM	EASY SCAN	1224-533	190
10160809-120	1	10860862	KEYBANK ASSEMBLY	1414	10260855	160

Fig .1414 -34 Alpha/Beta

10861383

96 - 10 - 10

FOR PART NUMBER	10861383	ALPHA/BETA	1414-002	10160809	960404

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	110
	1	10856730	DCD EXPANSION KIT		DCD 10356465	121
	1	10855272	EXTERNAL STANDARD		10255273	122
	1	10861091	STD. CAPSULE		10361101 1400-SERIES	123
	0.300	10856077	INSTALL.KIT 115V	FOR 1410		124
	0.700	10856078	INSTALL.KIT 250V	FOR 1410		125
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	408
	1	10555509	LABEL SET		FC33,FC207	412
	1	10556126	LABEL	VME RACK	1410	414
	1	10551111	LABEL	CSA-APPROVED (ALO,08)	(LR52500) BRADY	416
	1	10560490	LABEL SET		CA22 12-DYN	420
	0.300	10561102	LABEL	WARNING STICK, BRADY	EU-152 10561102.LAB	422
	1	10561348	LABEL	PATENTS, BRADY -LABEL	STD B/PLATE	427
	1	10561614	LABEL	11570078 (BRADY)	CE -LABEL	429
	1	11310040	CLAMP		ACC62-A	586
	5	11310037	CLAMP		FCC-A-C8	587
	1	1215-111	UNQ.STANDARDS SET	20ML VIALS 3H/14C/BACK	1215-111	1000
	1	1224-513	SOFTWARE PACKAGE	1414 WINSPECTRAL	1224-513	1010
	1	1414-932	INSTRUMENT MANUAL	FOR 1414-002/1414-003	1414-932	1020
	1	10990045	QC CERTIFICATE		10990045	1030
1	1	10860804	BODY ASSEMBLY	1414	10160805	10
2	1	10855818	ID-UNIT	1410	10355859	11
3	1	10855338	SAMPLE CHANGER	1410	10255339	15
4	1	10859278	MEASURING UNIT	1415	10354850	25
5	1	10859369	P.C.ASSEMBLY	HV-DIVIDER UNIT	RFA10359368,10355373	35

6	1	10860806	TOP COVER ASSEMBLY	1414	10260807	45
7	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	55
8	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	65
9	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	75
10	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	85
11	2	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	95
12	1	10360749	FRONT PANEL RIGHT		1414	146
13	1	10361369	BOX ASSEMBLY		1414	130
14	1	10360774	SIDE BOX RIGHT	FE PLATE S=1.0	1414	135
15	1	10360773	SIDE BOX LEFT	FE PLATE S=1.0	1414	145
16	1	10360752	FRONT PLATE LEFT		1414	147
17	2	10455328	CAM	D25	NTL5	175
18	2	10458890	GUIDE PLATE	FE-PLATE S=3	1415	205
19	1	10455330	BUSHING	D12	NTL5,1470	195
20	2	10455329	PLATE	FE-PLATE S=3	NTL5	185
21	1	10358884	LEAD	CAST LEAD	1415	210
22	2	10358885	LEAD	CAST LEAD	1415	230
23	2	10358886	LEAD	CAST LEAD	1415	240
24	1	10458893	HANDLE 2	FE-PLATE S=2	1415	250
25	1	10255612	BACK PLATE	FE-PLATE S=1	NTL5	265
26	4	10455616	BUSHING	MS D=20	NTL5	275
27	1	10355617	INSULATION	SOLUPOLYETHEN	NTL-5	285
28	1	10355618	COVER 1	AL-PLATE S=2	NTL 5	295
29	1	10455632	COVER 2	FE-PLATE D=2	NTL 5	305
30	1	10355742	COVER 3	AL-PLATE S=2	NTL5	306
32	1	10360744	LID ASSEMBLY		1414	148
33	1	11710021	FLOPPY DISK DRIVE	3,5"2-P 80U/P500/250KB	FD1137H	425
34	1	10460743	HANDLE	AL SQUARE BAR 8.2x8.2	1414	149
35	1	10555672	LABEL	AL 99.5 S=1	NTL5	415
36	1	10494512	WARNING PLATE	AL-PLATE S=0,5		423
37	1	10548122	LABEL	0,5MM		421
38	1	10355677	SUPPORT	AL-PLATE S=2	NTL5	375
39	1	10355686	COVER	FE-PLATE S=1	NTL5	385
40	1	10455723	BUSHING	POM-ROD D=40	NTL5	395
41	2	10455797	SHIELD	MU S=0,1	NTL5	403
42	15	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		430
43	10	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		431
44	1	11250019	WASHER	6.4/18*1.6 FE,ZINKED		435
45	26	11251018	PIN	3*20 ST		445
46	4	11251045	LOCKRING	13*1		455
47	4	11251077	LOCKRING	16*1		465
48	2	11252008	RIVET	1.9*3 ST	KDS 0*3	475
49	8	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	485
50	6	11271016	SCREW	M 3*4 FE YELLOWPASS.		495
51	4	11271034	SCREW	M 4*5 FE YELLOWPASS.		505
52	10	11274013	SCREW	M 5*12 FE YELLOWPASS.		515
53	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		525
54	2	11274034	SCREW	M 6*30 FE YELLOWPASS.		535
55	6	11274145	SCREW	M6*12 FE YELLOWPASS.		545
56	1	11274095	SCREW	M6*25 YELLOWPASS.		555
57	10	11274139	SCREW	M4*8 FE BLACKPASS.		565
59	3	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		434
60	2	10455131	COOLING PLATE	AL-PLATE S=3	NTL5	326
61	8	11271036	SCREW	M 4*10 FE YELLOWPASS.		510
62	8	11278003	NUT	M4 FE YELLOWPASS.		585
63	1	10455897	PLATE	FE-PLATE S=1	NTL5	327
64	2	11271095	SCREW	M6*12 FE YELLOWPASS.		511
65	1	10556070	LABEL	HV	1410 WARNING	417
66	1	10556095	LABEL	AL0,08	1410 CR	418
67	1	10556071	LABEL	AL S=0,08	1410 PROGRAM CR	419
68	1	10456182	PLATE	FE-PLATE T=1	LSC-5	404
69	2	11274003	SCREW	M 3*10 FE YELLOWPASS.		514
70	1	10456382	INSULATION	SOLUPOLYETHEN .S=20	NTL-5	409
71	1	10556607	LABEL	WHITE-SELF-ADHESIVE-L	NOTE !	413
72	2	10457299	BRACKET	FE-PLATE T=1	LSC	328
73	1	10457300	GUIDE	FE-PLATE T=1	LSC	329
74	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		576
75	1	10860710	RESET UNIT		10255679	119
76	1	10458898	BRACKET RIGHT	FE S=1	1409/11/15	400
77	1	10458899	BRACKET LEFT	FE S=1	1409/11/15	401
78	1	10458891	BRACKET	FE-PLATE S=1	1415	254
79	1	10458887	LEAD SHIELD	LEAD CAST	1415	253
81	1	10358889	LEAD	CAST LEAD	1415	251
82	1	10358888	LEAD	CAST LEAD	1415	252
83	1	10448323	LEAD SHIELD	LEAD	1282,1480	255
101	4	11250039	WASHER	4.3/12*1 FE, ZINKED		440
102	12	11274004	SCREW	M 4*6 FE YELLOWPASS.		513
103	2	11276005	SCREW	C 4.2*9.5 FE YELLOWPASS.		570

104	2	11274010	SCREW	M 4*25 FE YELLOWPASS.			512
105	2	11310047	NUT	M4 1,7-2,7			590
106	4	11290015	BOD	D4,8*4,4	14.08.040		426
115	1	10860713	DUMMY PLUG	1414	1414	10460712	120
116	1	10460762	PLATE RIGHT	FE PLATE S=2.0	1414		150
117	1	10460761	PLATE LEFT	FE PLATE S=2.0	1414		151
118	2	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.			432
119	6	11274002	SCREW	M 3*6 FE YELLOWPASS.			566
122	1	10460964	SHELTER	POM-PLATE S=8, BLACK	NTL 5		402
123	2	11271053	SCREW	M4*8 FE YELLOWPASS.			490
124	2	11274156	SCREW	M6*16 ST YELLOWPASS.			530
126	2	10561339	LABEL	ST.POLYESTER 11570076	MACH.LABEL 1414-002		411
127	2	10461378	LEAD SHIELD	LEAD 99.9 %	1414-002		256
128	2	10361379	SUPPORT	FE-PLATE=2	1414-002		257
141	1	10861410	P.C.ASSEMBLY	CONNECTION BOARD	RGE 10461408		114
142	2	10461276	HOLDER	FE-PLATE S=1 NICKELIZED			350
143	1	10461414	SUPPORT 1	FE PLATE S=1.0	1414		340
144	2	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603		600
145	2.300	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601		610
146	2	10461480	PLATE		1414		360
147	6	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.			580
148	1	10557386	LABEL	PVC FASKAL-400 T=0,1	1410 'RESET'		428
149	1	10461613	HOLDER	FE-PLATE T=1	1409		355
10260807-43	1	10358879	SHIELD ASSEMBLY	FE-PLATE/LEAD CAST	1415		270
10260807-23	1	10361030	COVER PLATE 2	POLYCARB.0.375	1414		410
10260807-37	1	11570061	LABEL	WALLAC 52X22,16STICKER			424
10260807-42	4	11250039	WASHER	4.3/12*1 FE, ZINKED			441
10260807-41	2	11274006	SCREW	M 4*10 FE YELLOWPASS.			486
10260807-48	2	11276026	SCREW	C 3.9*9.5 FE			567
10355819-17	1	10355762	ID-SHIELD	FE-PLATE S=1	NTL 5		405
10355819-43	1	10457903	PLATE	ST-PLATE T=1,5	1410		406
10355819-44	1	10357902	SUPPORT	RST. T=0,8	1410		407
W24	1	10861346	FLAT CABLE	40S-40S	FC207	10461300	117
W32	1	10861411	WIRING ASS		CA210		115

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10861383	ALPHA/BETA	1414-001	10160809	960404

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	118	951128
147	4	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		580	960403
	1	1414-102	PC-PROGRAM PACKAGE	PSA+SPECT.ANALYS.PRG.	1414-102	1015	960402
	1	1414-931	INSTRUMENT MANUAL	FOR 1414-001	1414-931	1020	951201

1414 Guardian

1414-003

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FOR PART NUMBER		1414-003	GUARDIAN	1414-003		960620
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10861384	GUARDIAN	1414-003	10160809	10
	1	1410-405	SAMPLE TRAY	FOR SAMPLE RACKS	1410-405	110
	1	1410-401	RACKS, 20 ML	PACKAGE OF 10 RACKS	1410-401	120
	1	1409-411	ID KIT	1409-411		130
	0.500	1200-437	OPTIPHASE`HISAFE`3	2X5 L	1200-437	140
	1	1414-160	MONITOR STAND	600 MM / 230 MM		150
	1	10859610	PACKAGE	1415	10459611	170
	1	1411-302	PC-PROGRAM PACKAGE	SPECTRUM ANALYSIS PRG.		180
	1	1224-533	PC-PROGRAM	EASY SCAN	1224-533	190
10160809-120	1	10860862	KEYBANK ASSEMBLY	1414	10260855	160

Fig. 1414 -34 Guardian

10861384

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FOR PART NUMBER		10861384	GUARDIAN	1414-003	10160809	960404
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	10857653	P.C.ASSEMBLY	SW KEY MODULE BOARD	RJG 10457652	110
	1	10856730	DCD EXPANSION KIT		DCD 10356465	121
	1	10855272	EXTERNAL STANDARD		10255273	122
	1	10861091	STD. CAPSULE		10361101 1400-SERIES	123
	0.300	10856077	INSTALL.KIT 115V	FOR 1410		124
	0.700	10856078	INSTALL.KIT 250V	FOR 1410		125
	1	10446545	FOOT	PAG, BLACK, 30% GLAS	1215,1470	408
	1	10555509	LABEL SET		FC33,FC207	412
	1	10556126	LABEL	VME RACK	1410	414
	1	10551111	LABEL	CSA-APPROVED (ALO,08)	(LR52500) BRADY	416
	1	10560490	LABEL SET		CA22 12-DYN	420
	0.300	10561102	LABEL	WARNING STICK, BRADY	EU-152 10561102.LAB	422
	1	10561348	LABEL	PATENTS, BRADY -LABEL	STD B/PLATE	428
	1	10561614	LABEL	11570078 (BRADY)	CE -LABEL	433
	1	11310040	CLAMP		ACC62-A	586
	5	11310037	CLAMP		FCC-A-C8	587
	1	1215-111	UNQ.STANDARDS SET	20ML VIALS 3H/14C/BACK	1215-111	1000
	1	1224-513	SOFTWARE PACKAGE	1414 WINSPECTRAL	1224-513	1010
	1	1414-932	INSTRUMENT MANUAL	FOR 1414-002/1414-003	1414-932	1020
	1	10990045	QC CERTIFICATE		10990045	1030
1	1	10860804	BODY ASSEMBLY	1414	10160805	10
2	1	10855818	ID-UNIT	1410	10355859	11
3	1	10855338	SAMPLE CHANGER	1410	10255339	15
4	1	10859278	MEASURING UNIT	1415	10354850	25
5	1	10859369	P.C.ASSEMBLY	HV-DIVIDER UNIT	RFA10359368,10355373	35
6	1	10860806	TOP COVER ASSEMBLY	1414	10260807	45
7	1	10856466	P.C.ASSEMBLY	MICRO COMPUTER	DCD 10356465	55
8	1	10854884	P.C.ASSEMBLY	I/O BOARD	DIC 10354883	65
9	1	10854606	P.C.ASSEMBLY	MCA	DIE 10354603	75
10	1	10853316	P.C.ASSEMBLY	POWER SUPPLY	DPA 10353503	85
11	2	10854021	P.C.ASSEMBLY	MOTOR CONTROL BOARD	HPS 10354022	95
12	1	10360749	FRONT PANEL RIGHT		1414	146
13	1	10361369	BOX ASSEMBLY		1414	130
14	1	10360774	SIDE BOX RIGHT	FE PLATE S=1.0	1414	135
15	1	10360773	SIDE BOX LEFT	FE PLATE S=1.0	1414	145
16	1	10360752	FRONT PLATE LEFT		1414	147
17	2	10455328	CAM	D25	NTL5	175
18	2	10458890	GUIDE PLATE	FE-PLATE S=3	1415	205
19	1	10455330	BUSHING	D12	NTL5,1470	195
20	2	10455329	PLATE	FE-PLATE S=3	NTL5	185
21	1	10358884	LEAD	CAST LEAD	1415	210
22	2	10358885	LEAD	CAST LEAD	1415	230
23	2	10358886	LEAD	CAST LEAD	1415	240
24	1	10458893	HANDLE 2	FE-PLATE S=2	1415	250
25	1	10255612	BACK PLATE	FE-PLATE S=1	NTL5	265

26	4	10455616	BUSHING	MS D=20	NTL5	275
27	1	10355617	INSULATION	SOLUPOLYETHEN	NTL5	285
28	1	10355618	COVER 1	AL-PLATE S=2	NTL 5	295
29	1	10455632	COVER 2	FE-PLATE S=2	NTL 5	305
30	1	10355742	COVER 3	AL-PLATE S=2	NTL5	306
32	1	10360744	LID ASSEMBLY		1414	148
33	1	11710021	FLOPPY DISK DRIVE	3,5"2-P 80U/P500/250KB	FD1137H	425
34	1	10460743	HANDLE	AL SQUARE BAR 8.2x8.2	1414	149
35	1	10555672	LABEL	AL 99.5 S=1	NTL5	415
36	1	10494512	WARNING PLATE	AL-PLATE S=0,5		423
37	1	10548122	LABEL	0,5MM		421
38	1	10355677	SUPPORT	AL-PLATE S=2	NTL5	375
39	1	10355686	COVER	FE-PLATE S=1	NTL5	385
40	1	10455723	BUSHING	POM-ROD D=40	NTL5	395
41	2	10455797	SHIELD	MU S=0,1	NTL5	403
42	15	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		430
43	10	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		431
44	1	11250019	WASHER	6.4/18*1.6 FE,ZINKED		435
45	18	11251018	PIN	3*20 ST		445
46	4	11251045	LOCKRING	13*1		455
47	4	11251077	LOCKRING	16*1		465
48	2	11252008	RIVET	1.9*3 ST	KDS 0*3	475
49	8	11252019	RIVET	2.4*5.1 AL	TAP/D/BS 33	485
50	6	11271016	SCREW	M 3*4 FE YELLOWPASS.		495
51	4	11271034	SCREW	M 4*5 FE YELLOWPASS.		505
52	10	11274013	SCREW	M 5*12 FE YELLOWPASS.		515
53	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		525
54	2	11274034	SCREW	M 6*30 FE YELLOWPASS.		535
55	6	11274145	SCREW	M6*12 FE YELLOWPASS.		545
56	1	11274095	SCREW	M6*25 YELLOWPASS.		555
57	10	11274139	SCREW	M4*8 FE BLACKPASS.		565
59	3	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		434
60	2	10455131	COOLING PLATE	AL-PLATE S=3	NTL5	326
61	8	11271036	SCREW	M 4*10 FE YELLOWPASS.		510
62	8	11278003	NUT	M4 FE YELLOWPASS.		585
63	1	10455897	PLATE	FE-PLATE S=1	NTL5	327
64	2	11271095	SCREW	M6*12 FE YELLOWPASS.		511
65	1	10556070	LABEL	HV	1410 WARNING	417
66	1	10556095	LABEL	AL0,08	1410 CR	418
67	1	10556071	LABEL	AL S=0,08	1410 PROGRAM CR	419
68	1	10456182	PLATE	FE-PLATE T=1	LSC-5	404
69	2	11274003	SCREW	M 3*10 FE YELLOWPASS.		514
70	1	10456382	INSULATION	SOLUPOLYETHEN .S=20	NTL-5	409
71	1	10556607	LABEL	WHITE-SELF-ADHESIVE-L	NOTE !	413
72	2	10457299	BRACKET	FE-PLATE T=1	LSC	328
73	1	10457300	GUIDE	FE-PLATE T=1	LSC	329
74	6	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		576
75	1	10860710	RESET UNIT		10255679	119
76	1	10458898	BRACKET RIGHT	FE S=1	1409/11/15	400
77	1	10458899	BRACKET LEFT	FE S=1	1409/11/15	401
78	1	10458891	BRACKET	FE-PLATE S=1	1415	254
79	1	10458887	LEAD SHIELD	LEAD CAST	1415	253
80	1	10858914	GUARD	1415	1415	50
81	1	10358889	LEAD	CAST LEAD	1415	251
82	1	10358888	LEAD	CAST LEAD	1415	252
83	1	10448323	LEAD SHIELD	LEAD	1282,1480	255
101	4	11250039	WASHER	4.3/12*1 FE, ZINKED		440
102	12	11274004	SCREW	M 4*6 FE YELLOWPASS.		513
103	2	11276005	SCREW	C 4.2*9.5 FE YELLOWPASS.		570
104	2	11274010	SCREW	M 4*25 FE YELLOWPASS.		512
105	2	11310047	NUT	M4 1,7-2,7	2.54.329	590
106	4	11290015	BOD	D4,8*4,4	14.08.040	426
108	2	10858304	P.C.ASSEMBLY	GUARD PREAMPLIFIER	SAC 10358303	51
109	2	11760040	PHOTOMULTIPLIER	D19MM 10DYN 12PIN	R1166-10	427
110	2	10358901	LIGHT SEAL	SILICONE D21*15 BLACK	1415	330
111	12	11278002	NUT	M3 FE YELLOWPASS.		580
115	1	10860713	DUMMY PLUG	1414	1414 10460712	120
116	1	10460762	PLATE RIGHT	FE PLATE S=2.0	1414	150
117	1	10460761	PLATE LEFT	FE PLATE S=2.0	1414	151
118	2	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		432
119	6	11274002	SCREW	M 3*6 FE YELLOWPASS.		566
122	1	10460964	SHELTER	POM-PLATE S=8, BLACK	NTL 5	402
123	2	11271053	SCREW	M4*8 FE YELLOWPASS.		490
124	2	11274156	SCREW	M6*16 ST YELLOWPASS.		530
126	2	10561340	LABEL	ST.POLYESTER 11570076	MACH.LABEL 1414-003	411

141	1	10861410	P.C.ASSEMBLY	CONNECTION BOARD	RGE 10461408		114
142	2	10461276	HOLDER	FE-PLATE S=1 NICKELIZED			350
143	1	10461414	SUPPORT 1	FE PLATE S=1.0	1414		340
144	2	11240173	RF GASKET	6,35x6,35 MONEL, GLUE	01-0901-6603		600
145	2.300	11240162	RF GASKET	3,2X4,8 MONEL	01-0901-6601		610
146	2	10461480	PLATE		1414		360
147	6	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.			577
149	1	10461613	HOLDER	FE-PLATE T=1	1409		355
10260807-43	1	10358879	SHIELD ASSEMBLY	FE-PLATE/LEAD CAST	1415		270
10260807-23	1	10361031	COVER PLATE 3	POLYCARB.0.375	1414		410
10260807-37	1	11570061	LABEL	WALLAC 52X22,16STICKER			424
10260807-42	4	11250039	WASHER	4.3/12*1 FE, ZINKED			441
10260807-41	2	11274006	SCREW	M 4*10 FE YELLOWPASS.			486
10260807-48	2	11276026	SCREW	C 3.9*9.5 FE			567
10355819-17	1	10355762	ID-SHIELD	FE-PLATE S=1	NTL 5		405
10355819-43	1	10457903	PLATE	ST-PLATE T=1,5	1410		406
10355819-44	1	10357902	SUPPORT	RST. T=0,8	1410		407
W24	1	10861346	FLAT CABLE	40S-40S	FC207	10461300	117
W32	1	10861411	WIRING ASS		CA210		115

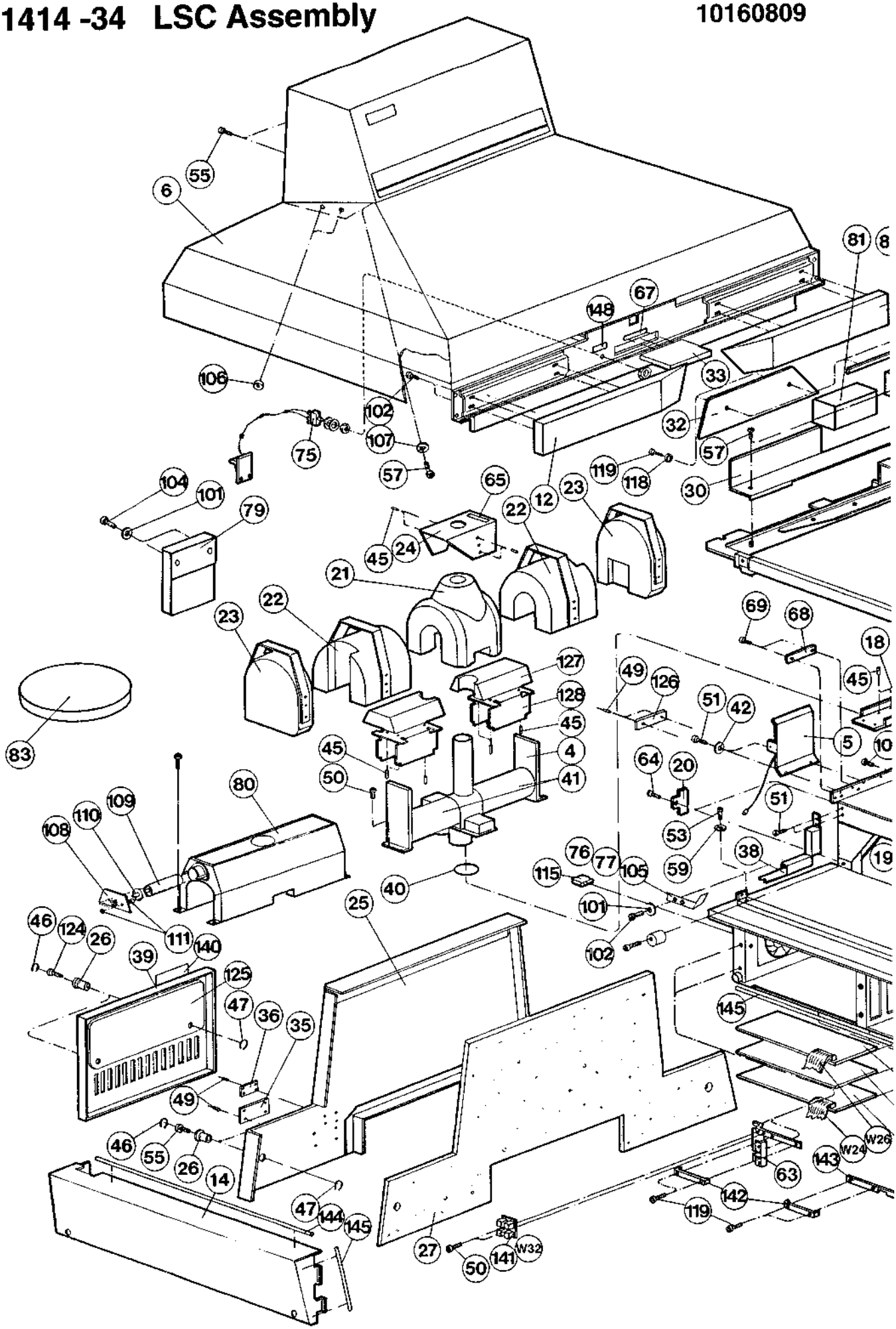
PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

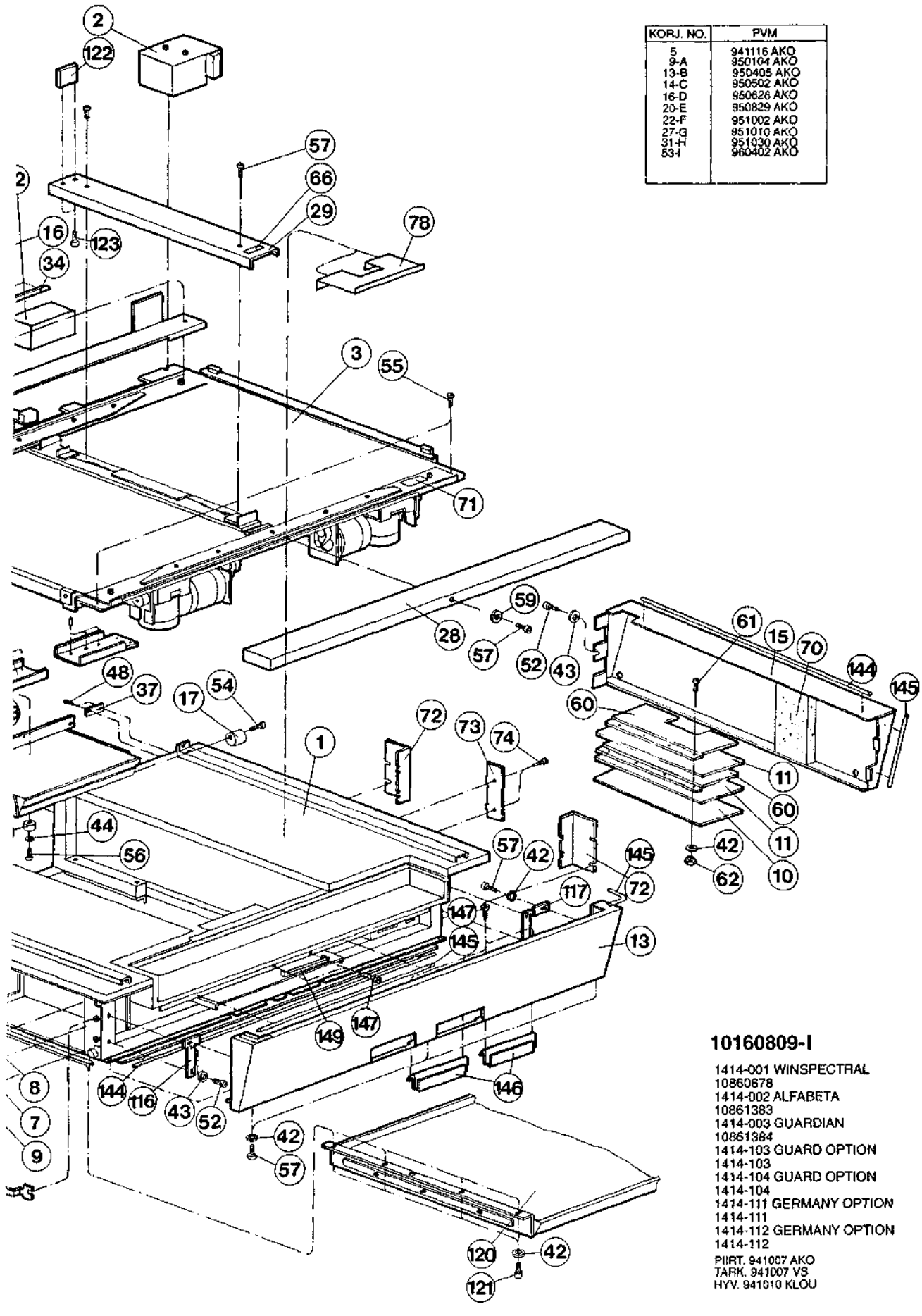
FOR PART NUMBER	10861384	GUARDIAN	1414-003	10160809	960404

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
W26	1	10855592	FLAT CABLE	50S-50S	FC35 10455666	118	951128
147	4	11276022	SCREW	C 2.9*9.5 FE YELLOWPASS.		577	960403
	1	1414-102	PC-PROGRAM PACKAGE	PSA+SPECT.ANALYS.PRG.	1414-102	1015	960402
	1	1414-931	INSTRUMENT MANUAL	FOR 1414-001	1414-931	1020	951201

Fig. 1414 -34 LSC Assembly

10160809





KORJ. NO.	PVM
5	941116 AKO
9-A	950104 AKO
13-B	950405 AKO
14-C	950502 AKO
16-D	950626 AKO
20-E	950829 AKO
22-F	951002 AKO
27-G	951010 AKO
31-H	951030 AKO
53-I	960402 AKO

10160809-I

1414-001 WINSPECTRAL
10860678
1414-002 ALFABETA
10861383
1414-003 GUARDIAN
10861384
1414-103 GUARD OPTION
1414-103
1414-104 GUARD OPTION
1414-104
1414-111 GERMANY OPTION
1414-111
1414-112 GERMANY OPTION
1414-112

PIIRT. 941007 AKO
TARK. 941007 VS
HYV. 941010 KLOU

Fig. 1414 -35 Body Assembly

10860804

96 - 10 - 10

FOR PART NUMBER	10860804	BODY ASSEMBLY	1414	10160805	960509

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
	12	11310037	CLAMP		FCC-A-C8	330
	7	11310038	CLAMP		ACC38-A	340
	8	11310040	CLAMP		ACC62-A	350
	1	10555601	LABEL SET		FC31	380
	1	10555430	LABEL SET		CA24	390
1	1	10254918	BODY		NTL5	29
2	1	10160788	BOTTOM PLATE ASS.		1414	30
3	1	10354921	COVER PLATE RIGHT	AL-PLATE S=2,5	NTL5	40
4	1	10354922	COVER PLATE LEFT	AL-PLATE S=2,5	NTL5	50
5	1	10354923	BOX	AL-PLATE S=1,5	NTL5	60
6	1	10354924	LID		NTL5	70
7	4	10454925	GUIDE ASSEMBLY		NTL5,1470,1460	80
8	4	10454928	TUBE ASSEMBLY		NTL5,1470,1460	90
9	2	10354931	SUPPORT	FE-PLATE S=1,5	NTL5	100
10	1	10454932	BOX ASSEMBLY		NTL5	110
11	1	10354935	SUPPORT RIGHT		NTL5	120
12	1	10354940	SUPPORT LEFT		NTL5	130
13	4	10454941	ADJUSTER NUT	6K14	NTL5,1470	140
14	4	11275024	SCREW	M8*60 RST.		150
15	2	10454943	BRACKET ASSEMBLY		NTL5	160
16	4	10460785	LEG	BRASS ROUND SECTION	1414	170
17	4	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		180
18	14	11250018	WASHER	5.3/15*1.6 FE YELLOWPASS.		190
19	14	11252012	RIVET	3.2*7.4 MONELL	TLP/D/BS 429	200
20	22	11252002	RIVET	3.2*8.9 MONELL	TLP/D/BS435	210
21	20	11260010	RIVETED NUT	M 5 2.0-3.0 MS	338592RIV-TI	220
22	4	11274004	SCREW	M 4*6 FE YELLOWPASS.		230
23	8	11274012	SCREW	M 5*10 FE YELLOWPASS.		240
24	4	11274013	SCREW	M 5*12 FE YELLOWPASS.		250
25	2	11274016	SCREW	M 5*20 FE YELLOWPASS.		260
26	2	11274031	SCREW	M 5*12 FE YELLOWPASS.		270
27	1	11274136	SCREW	M8*40 YELLOWPASS.		280
28	9	11278011	NUT	M 8 FE YELLOWPASS.		290
29	4	11278026	NUT	M5 NYLOC		300
30	4	10455004	BUSHING	POM BLACK D=16	NTL5	165
31	8	11250004	WASHER	A6,4 ZN		175
32	4	11274076	SCREW	M6*16 FE YELLOWPASS.		285
33	1	10854987	INSULATION SET	11 CODES = 13 PARTS	NTL5	28
34	1	10855506	P.C.ASSEMBLY	IONIZER	RRI	21
35	1	10355320	SUPPORT		NTL5	171
36	1	10355113	LEAD	LEAD 99.9%	NTL-5	172
37	4	11251018	PIN	3*20 ST		211
38	4	11250015	WASHER	8.4/17*1.6 FE YELLOWPASS.		181
39	4	11274126	SCREW	M8*35 FE YELLOWPASS.		281
40	3	11271016	SCREW	M 3*4 FE YELLOWPASS.		229
41	1	10855115	POWER UNIT		10255116	22
42	1	10855188	POWER-RACK			23
43	1	10855187	VME-RACK			24
44	1	11690045	FAN	24VDC 5W 2800RPM	4314	360
45	1	11690040	FINGER GUARD	105X105MM	9.601-43	370
46	12	11274015	SCREW	M 5*16 FE YELLOWPASS.		251
47	4	11250001	WASHER	A3,2		176
48	4	11271025	SCREW	M 3*16 FE YELLOWPASS.		228
49	4	11278002	NUT	M3 FE YELLOWPASS.		289
50	4	10455327	BUSHING	POM-ROD D30 BLACK	NTL5	166
51	2	10455938	BRACKET	FE-PLATE S=1	NTL-5	161
54	1	11274030	SCREW	M 4*8 FE YELLOWPASS.		286
56	1	11480047	FERRITE CLAMP	D 6,6 MM	28B2025-0A0	410
57	1	11480048	FERRITE CLAMP	D 13 MM	28B2024-0A0	420
58	2	11480052	FERRITE CLAMP	40-WIRE FLAT CABLE	28B2001-000	400
59	2	11480049	FERRITE CLAMP	26-WIRE FLAT CABLE	28B2022-000	405
60	4	11480050	CLAMP	FOR 26-W.FLAT C. CLAPM	M-CLIP	430
61	1	10462059	INSULATOR	TEFLON PLATE T=1		173
TR	1	11650053	TRANSFORMER	27V/4,5KV 0,45VA		310
W11-19	1	10858057	1410 FRAME WIREING	CA 23-30, SYT.		35
W20, W21, W2	3	10855441	FLAT CABLE	26S-2*26S	FC31	19
W23	1	10853250	FLATCABLE	40S-2X34S	10453252	20
W27	1	10861347	WIRING ASS		CA208	15
W30	1	10856412	WIRING ASS		CA51	26

PART HISTORY FROM: 91-09-25 TO: 96-10-10

FOR PART NUMBER	10860804	BODY ASSEMBLY	1414	10160805	960509

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
W11-19,W27	1	10861450	1414 FRAME WIREING			35	960126
59	11	11252007	RIVET	3.2*6.1 MONELL	TLP/D/BS424	195	951128
55	11	11240174	RF GASKET SPRING	BeCu 28MM*6MM	97-438-02	320	951128

Fig. 1414 -35 Body Assembly

10160805

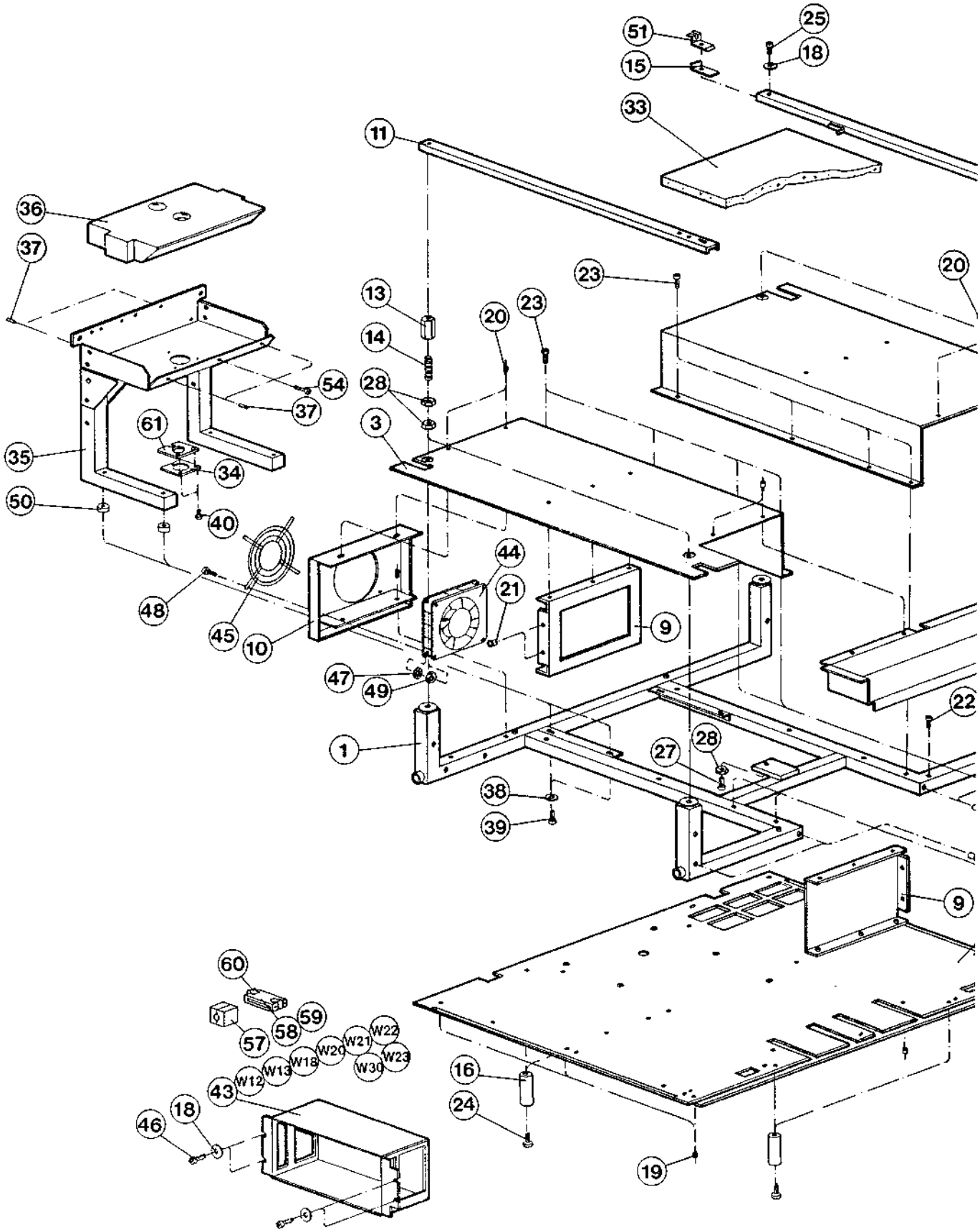


Fig. 1414 -36 Top Cover Assembly

10860806

96 - 10 - 10

FOR PART NUMBER	10860806	TOP COVER ASS.	1414	10260807	960321

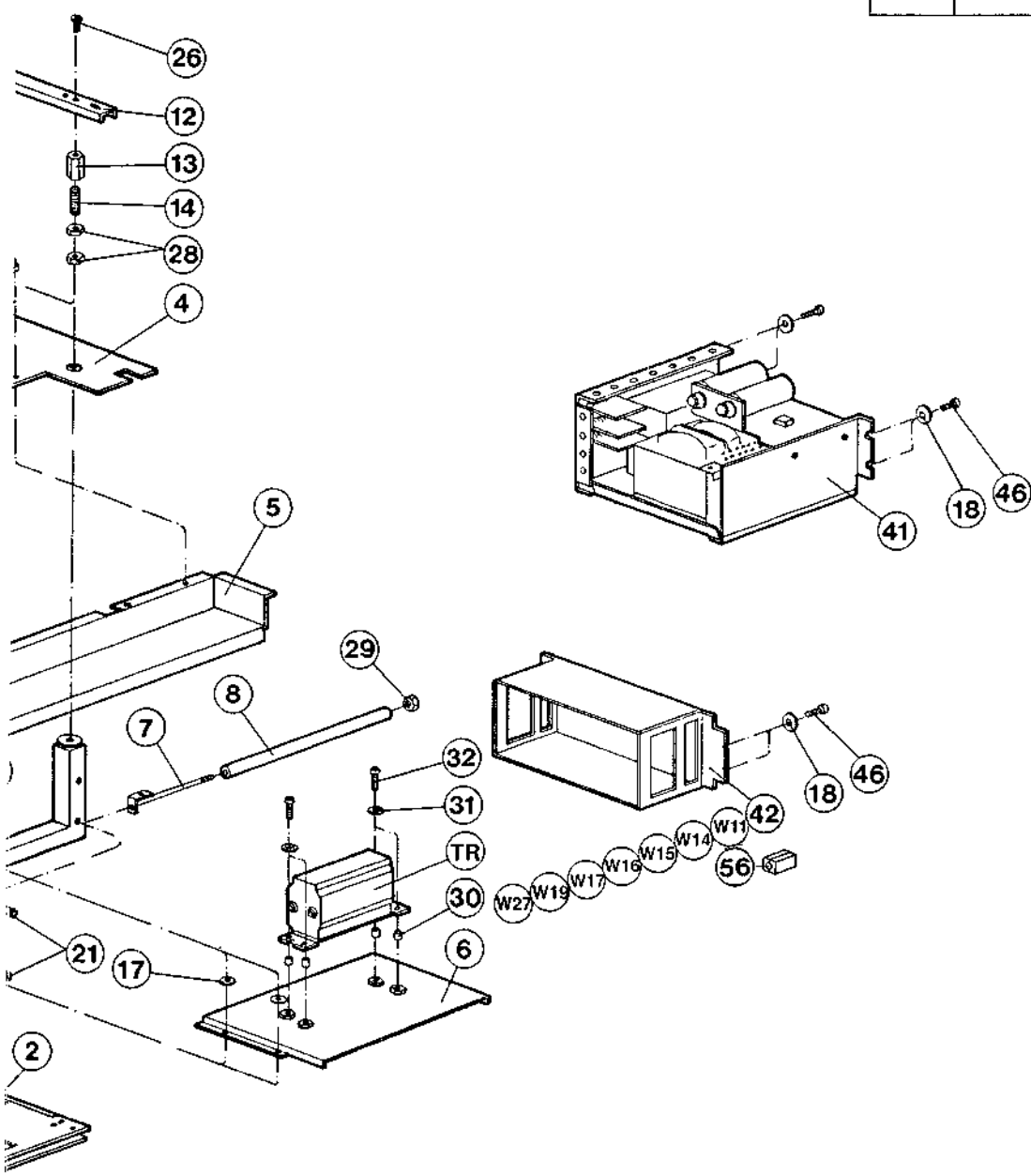
ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE
1	1	11391026	GAS SPRING		16-1-168-135-60	245
2	1	10360767	PLATE RIGHT ASS.		1414	30
3	1	10360763	PLATE LEFT ASS.		1414	40
4	1	10260754	SUPPORT PLATE ASS.		1414	50
6	2	10455474	PLATE	FE S=3	NTL-5	70
7	2	10255475	SUPPORT	AL 10X25	NTL-5	80
8	1	10355476	HINGE BODY RIGHT	FE-PLATE S=1,5	NTL-5	90
9	1	10355477	HINGE BODY LEFT	FE-PLATE S=1,5	NTL-5	100
10	2	10455000	SPRING	D2	NTL-5	110
11	2	10455478	GUIDE	D6H8	NTL-5	120
12	2	10455479	PIN	POM BLACK D=12	NTL-5	130
13	2	10455480	BRACKET		NTL-5	140
14	1	10255481	TOP COVER		NTL-5	150
15	1	10254553	COVER	S=5	NTL-5	160
16	1	10355488	HINGE RIGHT	FE-PLATE S=1,5	NTL-5	170
17	1	10355489	HINGE LEFT	FE-PLrw a=1,5	NTL-5	180
18	6	10455490	NUT	MS D18	NTL-5	190
19	2	10455491	PIN	d2,5	NTL-5	200
20	1	10455492	SUPPORT	AL 8,2X8,2	NTL-5	210
21	1	10460827	PLATE	POM BLACK (10455493)	1414	220
22	1	10360742	HANDLE	FE PLATE S=1.0	1414	230
24	1	10861714	INSULATION SET	7 CODES = 9 PARTS	1400	20
25	2	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		250
26	12	11250010	WASHER	5.3/10*1 FE YELLOWPASS.		260
27	1	11251015	PIN	2*10 ST		270
28	2	11274005	SCREW	M 4*8 FE YELLOWPASS.		280
29	12	11274012	SCREW	M 5*10 FE YELLOWPASS.		290
30	1	11274088	SCREW	M3*20 FE YELLOWPASS.		300
31	6	11274133	SCREW	M4*6 FE BLACKPASS.		310
32	4	11274134	SCREW	M5*10 FE BLACKPASS.		320
33	4	11278002	NUT	M3 FE YELLOWPASS.		330
34	1	10455763	COVER ASSEMBLY		NTL5	231
35	2	11276015	SCREW	C 2.9*6.5 FE YELLOWPASS.		340
36	1	10456094	EDGE STRIP	FE-PLATE T=1	NTL-5	241
38	6	11250041	WASHER	4.3/9*0.8 FE BLACK		360
39	2	11290013	FOOT	D12*3 RUBBER	3M SJ 5012	370
40	4	10456181	WASHER	FE-PLATE T=2	LSC-5	242
44	1	10459978	EXTENSION ARM	MS D=8	1409	10
45	1	10459979	MOUNTING PIN	MS-ROD D10	1409	15
46	4	11274031	SCREW	M 5*12 FE YELLOWPASS.		295
47	4	11250006	WASHER	3.2/7*0.5 FE YELLOWPASS.		365

PART HISTORY **FROM: 91-09-25 TO: 96-10-10**

FOR PART NUMBER	10860806	TOP COVER ASS.	1414	10260807	960321

ITEM.NO	QTY	ORDER NO	NAME	TYPE	MANUF. INF	LINE	DATE
24	1	10855453	INSULATION SET	7 CODES = 9 PARTS	NTL-5	20	960307
6	2	10460760	PLATE	FE PLATE S=3.0	1414	70	960320

KORJ. NO	PVM
6	941216 AKO
25-A	950922 AKO
27-B	951010 AKO
28-C	951020 AKO
32-D	951026 AKO
38-E	951121 AKO
52-F	960402 AKO
55-G	960508 AKO



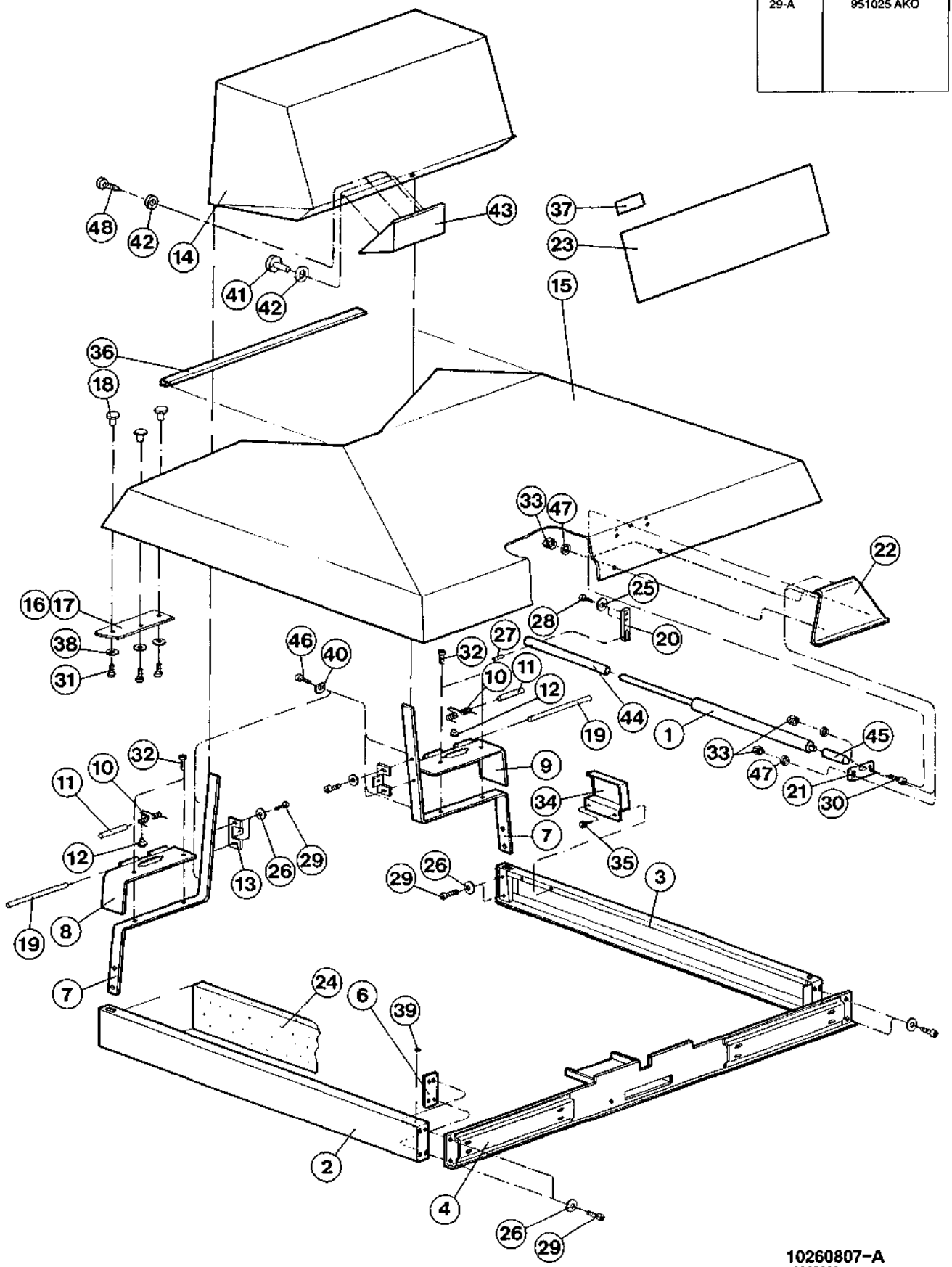
10160805-G
10860804

PIIRT. 940919 AKO
TARK. 940919 VS
HYV. 941010 KLOU

Fig. 1414 -36 Top Cover Assembly

10260807

KORJ. NO	PVM
29-A	951025 AKO



10260807-A
10860806

PIIRT. 940921 AKO
TARK. 940921 VS
HYV. 941010 KLou

Fig. 1414 -37 Keybank Assembly

10860862

96 - 10 - 10

FOR PART NUMBER		10860862	KEYBANK ASS.	1414	10260855	960205
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
	1	11560029	MOUSE MAT	194*244		120
	1	10961123	1414 KEYBANK ASS.			130
1	1	10160796	KEYBOARD BOX ASS.		1414	10
2	1	10260790	COVER ASSEMBLY		1414	20
3	1	10360786	FASTENING PLATE 1	FE PLATE S=1.5	1414	30
4	1	10360787	FASTENING PLATE 2	FE PLATE S=1.5	1414	40
5	2	10460794	LATH	FE PLATE S=3.0	1414	50
6	2	10460795	FASTENING LATH	FE PLATE S=3.0	1414	60
7	2	11310057	SLIDE	FOR BOX, WHITE	BS 220M 450	70
8	1	11450008	INLET INSULATOR	27*21*14.5*8*1	70-30017	80
9	2	11290033	FOOT	D12*3 GREY	3M SJ 5012	90
10	10	11271093	SCREW	M4*6 FE YELLOWPASS.		100
10160809-121	8	11274004	SCREW	M 4*6 FE YELLOWPASS.		110
10160809-42	8	11250008	WASHER	4.3/9*0.8 FE YELLOWPASS.		115

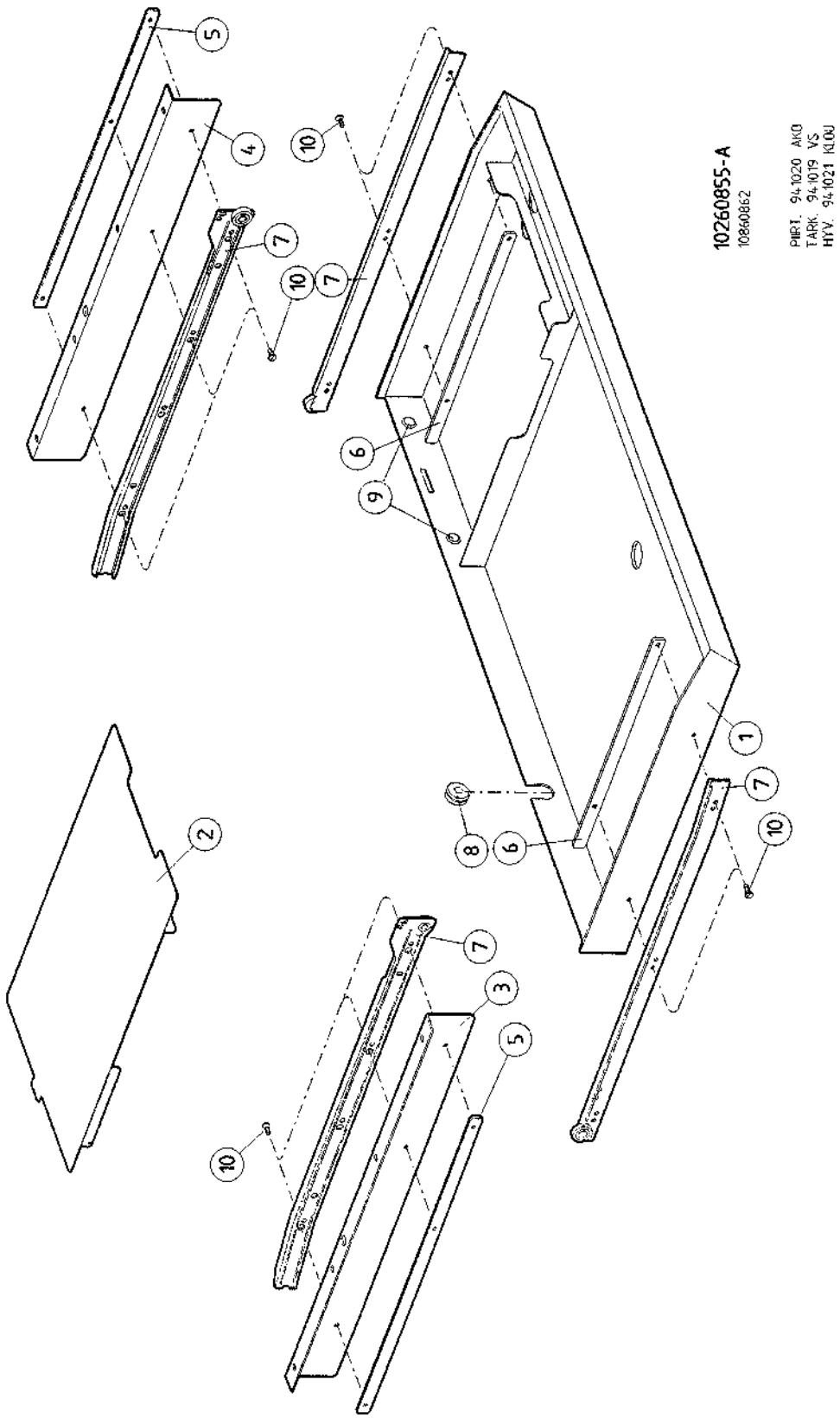
PART HISTORY **FROM: 95-01-10 TO: 96-10-10**

FOR PART NUMBER		10860862	KEYBANK ASS.	1414	10260855	960205
ITEM.NO	**QTY**	**ORDER NO**	**NAME**	**TYPE**	**MANUF. INF**	**LINE**
7	1	11310057	SLIDE	FOR BOX, WHITE	BS 220M 450	70 950907

Fig. 1414 -37 Keybank Assembly

10260855

KORJ. NO.	PVM
2	941103 AKO
9-A	950103 AKO



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