

# IATROSCAN™ MK-6

TLC-FID/FPD Dual Detection System

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AN

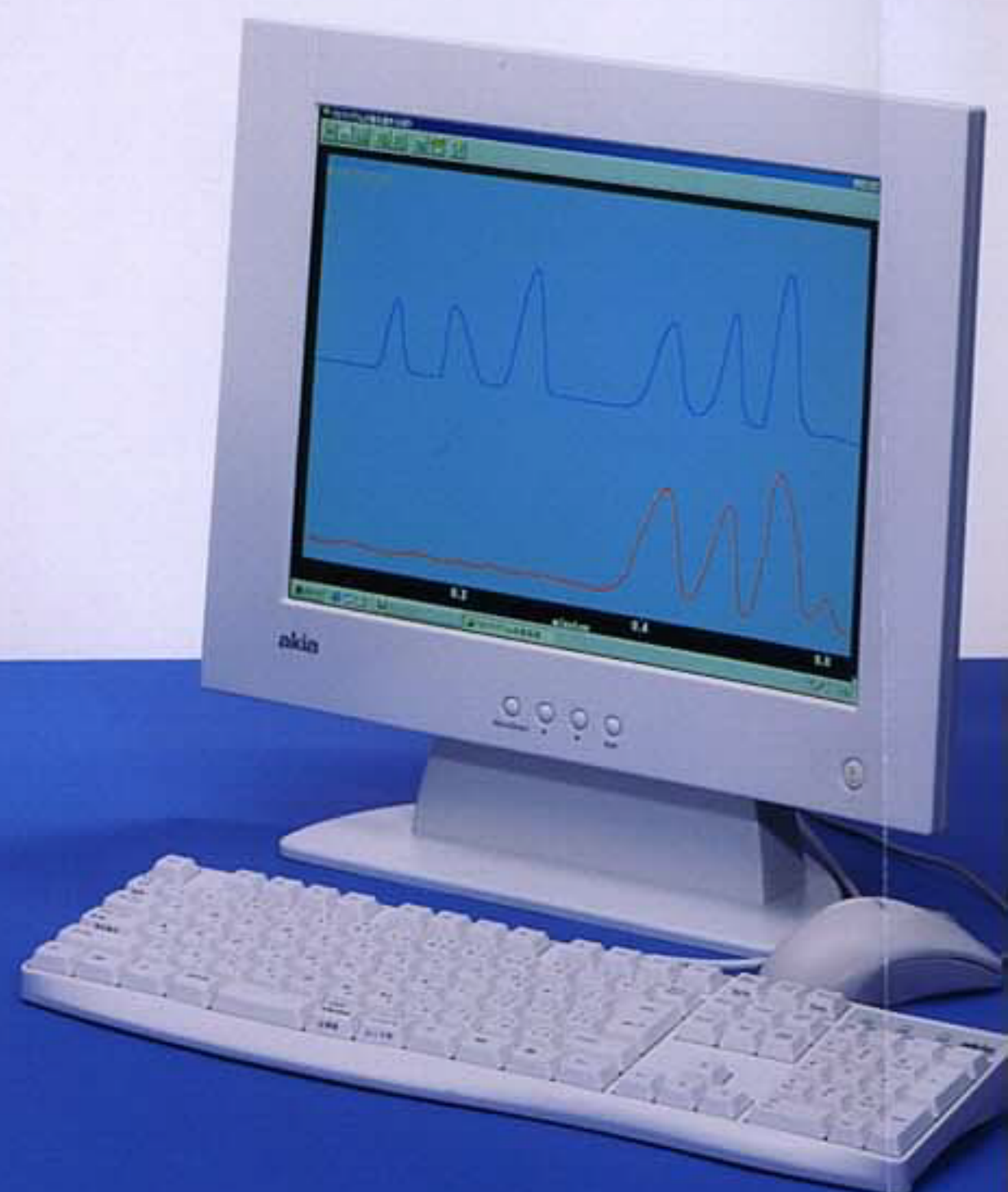


IATRON LABORATORIES, INC.

# The first in the TLC World! IATROSCAN™ mounted FPD does break down preconceived idea on TLC.

IATROSCAN became new. The new model IATROSCAN MK-6 with FPD (flame photometric detector) detects the hetero-atoms such as phosphorous and sulfur selectively. Furthermore, the simultaneous measurement by both FPD and FID (flame ionization detector) is possible. Organic compounds on the thin-layer are surely captured by means of two eyes of FID (patented) and FPD (under patent application) without omission.

The addition of FPD to the former TLC-FID IATROSCAN with improved quantification and reproducibility enables to acquire a wealth of analytical information much more than ever.



## Procedure

### 1 Blank scan

The CHROMAROD can be cleaned and activated by hydrogen flame through the blank scan on IATROSCAN.

### 4 Solvent removal

After development, the development solvent adsorbed on the CHROMAROD(s) is removed.



### 5 Measurement

After solvent removal, start measurement by pressing START key.



### 2 Sample spotting

Approx. 1 $\mu$ l of the sample solution is spotted on the CHROMAROD by means of a micro-dispenser.



### 3 Separation

The components in the sample on the CHROMAROD(s) are separated through development procedure in the development tank.



## IATROCORDER TC-21

IATROCORDER TC-21 is an integrator exclusively used for IATROSCAN, which makes it possible to get analytical results following its easy operational procedure provided, however, that it additionally requires a print circuit board of A/D converter (option) for dual measurement.

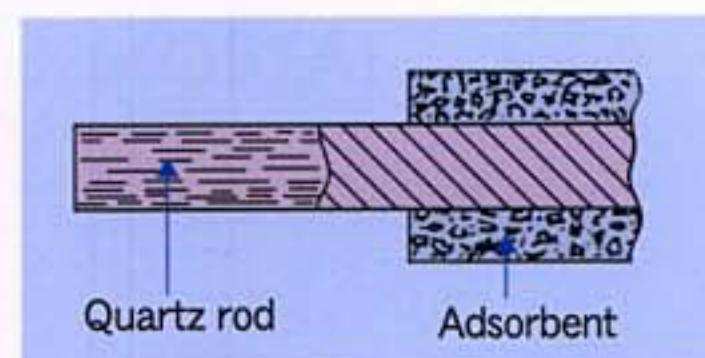
The chromatograms, information on peaks of components and their quantitative analytical results can be stored for long period owing to the clear output recorded by ink-jet printer plotter on the paper for common use. It is easy to automatically identify the measuring mode set by IATROSCAN in advance, and easily calculate the average of analytical results of plural rods as well.



## CHROMAROD™



The CHROMAROD, developed exclusively for the IATROSCAN, is a thin layer in the form of thin quartz rod evenly applied and sintered inorganic binder and adsorbent on it. Usually, the cleaning and activation of CHROMARODs can be achieved by Blank scan on the IATROSCAN, which enable CHROMARODs to be used repeatedly. The CHROMARODs give excellent separability of components and exhibit stable reproducibility. Special types of thin-layers, such as those suitable for separating triglycerides in accordance with their unsaturation degrees or glyceride isomers, can be easily prepared simply by immersing CHROMARODs in silver nitrate or boric acid solution respectively.

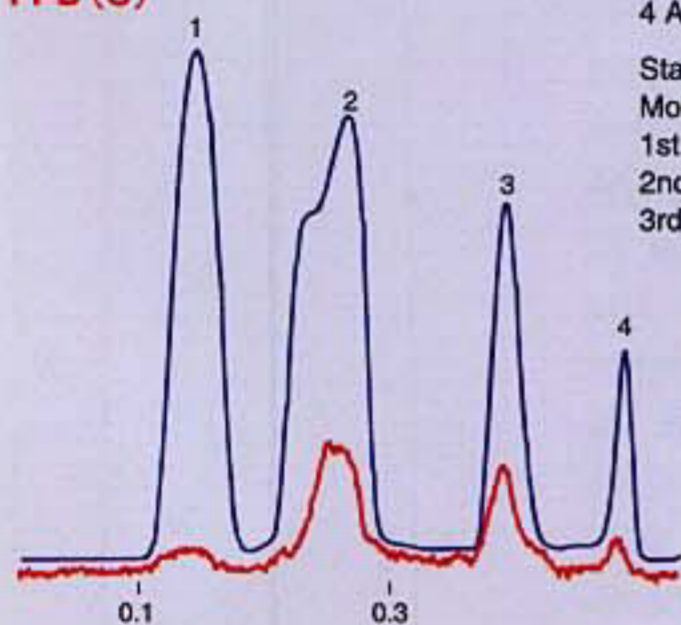


## Examples of Applications

IATROSCAN can cover the whole range of organic compounds' TLC analyses and is optimal especially for heavy oil type analysis, tracking organic synthetic reactions and so forth. It is also available with versatility for crude materials' analyses under open atmosphere, which are difficult to be done by GC and/or LC. Furthermore, the sample spotted on the CHROMAROD can be simply quantified without development.

### Heavy oil type analysis (FID/FPD:S)

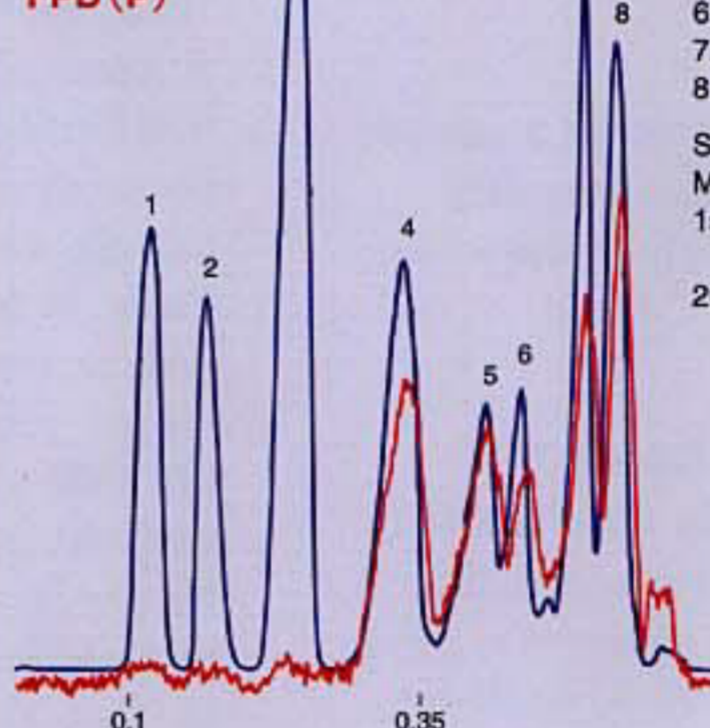
FID  
FPD (S)



Sample: Bitumen  
1 Saturated H.C.  
2 Aromatic  
3 Resin  
4 Asphaltene  
Stationary phase: Chromarod -S III  
Mobile phase:  
1st. Hexane 100% 10cm  
2nd. Toluene 100% 6cm  
3rd. Dichloromethane: Methanol 57:3 2.5cm

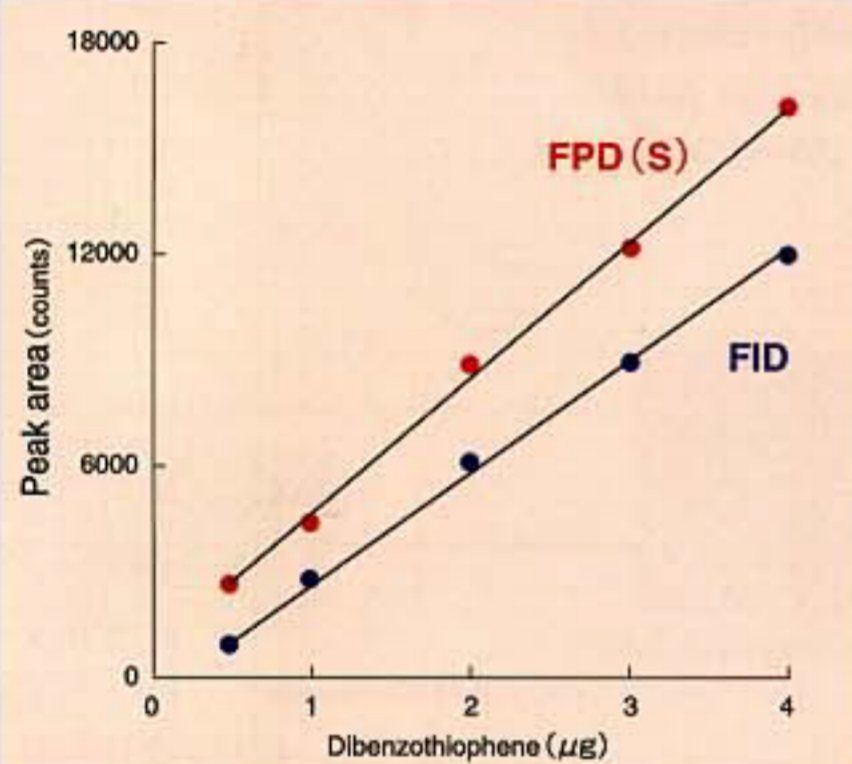
### Lipids analysis (FID/FPD:P)

FID  
FPD (P)

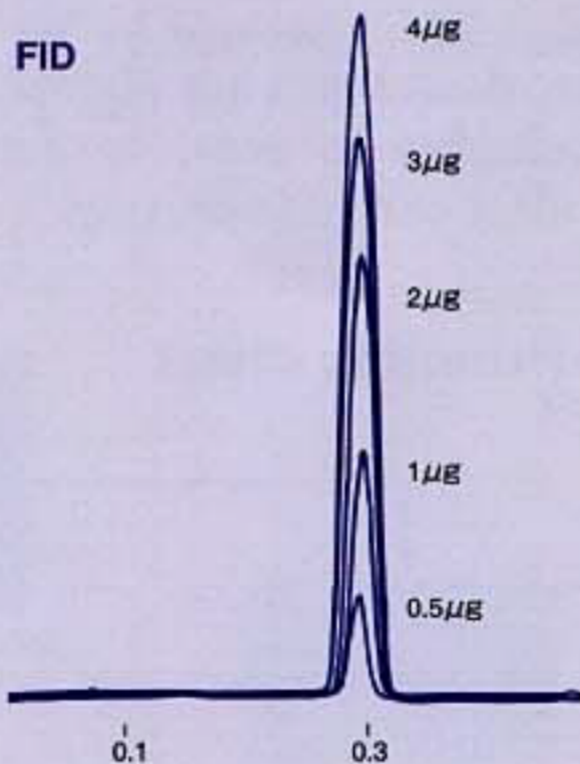


Sample: Standard mixture  
1. Cholesterol ester  
2. Triglyceride  
3. Cholesterol  
4. Phosphatidyl ethanolamine  
5. Phosphatidyl choline  
6. Phosphatidyl inositol  
7. Sphingomyelin  
8. Lysophosphatidyl choline  
Stationary phase: Chromarod -S III  
Mobile phase:  
1st. Chloroform: Methanol: Water: 25% Ammonia 47:20:2.5:0.28 7cm  
2nd. Hexane: Diethyl ether 63:7 10cm

### Calibration curve of S-compound (FID/FPD:S)



FID

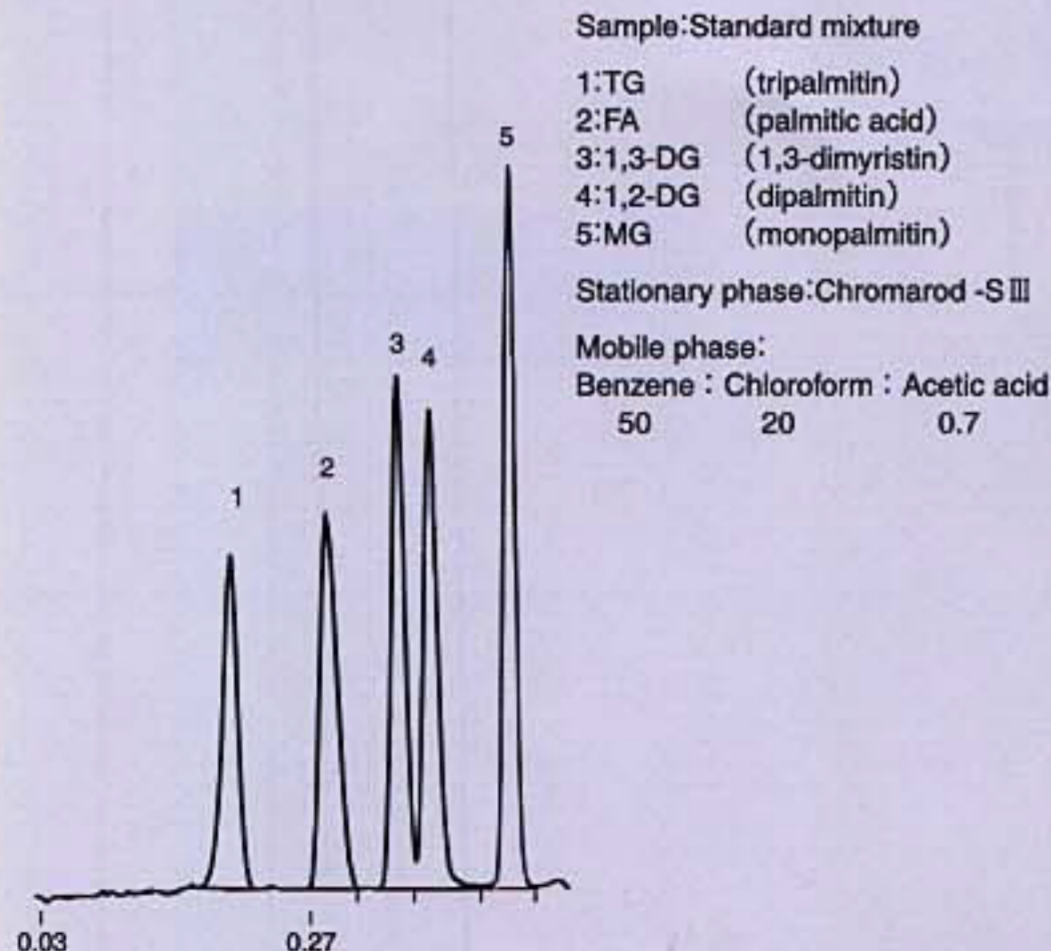


FPD (S)



Sample: Dibenzothiophene  
Stationary phase: Chromarod -S III  
Mobile phase: Hexane 100%

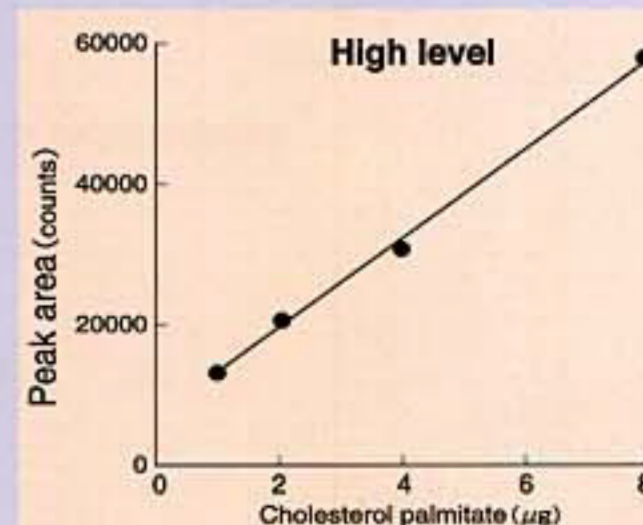
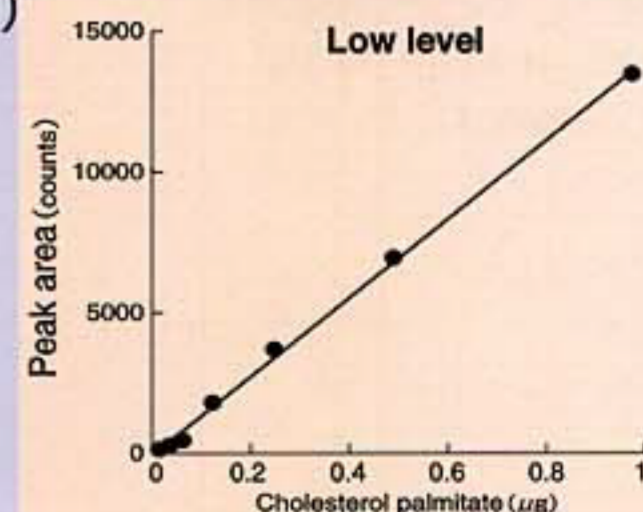
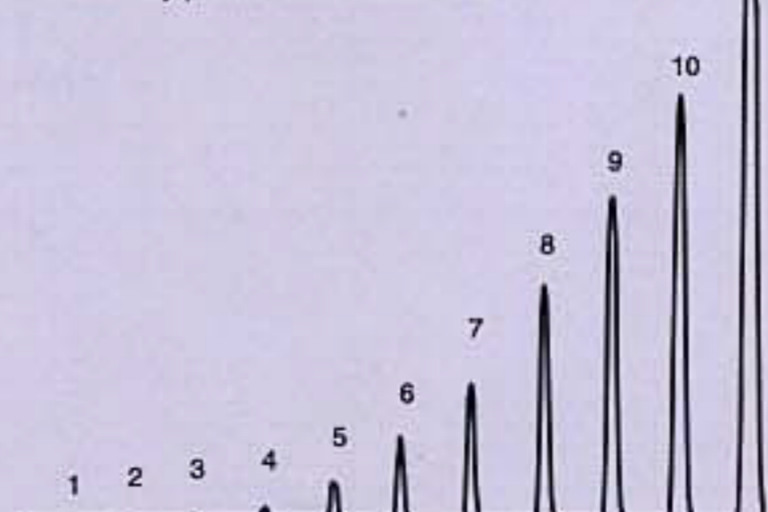
### Glycerides analysis (FID)



Sample: Standard mixture  
1: TG (tripalmitin)  
2: FA (palmitic acid)  
3: 1,3-DG (1,3-dimyristin)  
4: 1,2-DG (dipalmitin)  
5: MG (monopalmitin)  
Stationary phase: Chromarod -S III  
Mobile phase:  
Benzene: Chloroform: Acetic acid  
50 20 0.7

### Simple quantification method (FID)

Spotted sample:  
Cholesterol palmitate  
1: 0ng 2: 16ng 3: 31ng  
4: 63ng 5: 125ng 6: 250ng  
7: 500ng 8: 1 µg 9: 2 µg  
10: 4 µg 11: 8 µg  
※ Spotted by Micro-dispenser (Drammond)  
Stationary phase: Chromarod -S III



## Features

### Simple Operation

- Speedy detection of component(s) in a sample
- Easy to acquire related chromatogram(s)
- No need for troublesome coloring procedure required for conventional TLC after development

### Wide-ranging application fields

Not only the organic compounds analyzable by TLC, but also the organic compounds with high boiling points (oligomers, polymers, etc.) hardly analyzed by GC and those difficult to be detected by LC (oils and fats, lipids, etc.) are analyzable.

### High efficiency

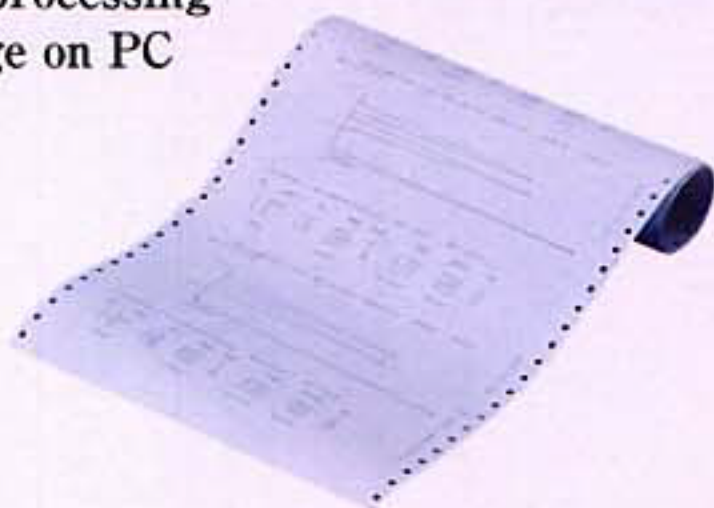
- Simultaneous development and detection of components in a samples on ten (10) CHROMARODs mounted on one rod-holder are possible.
- The measuring time required for one sample is approx. 30 seconds, which is enable quite efficient analysis.

### Cost effective

CHROMAROD can be used repeatedly.

### Easy quantification

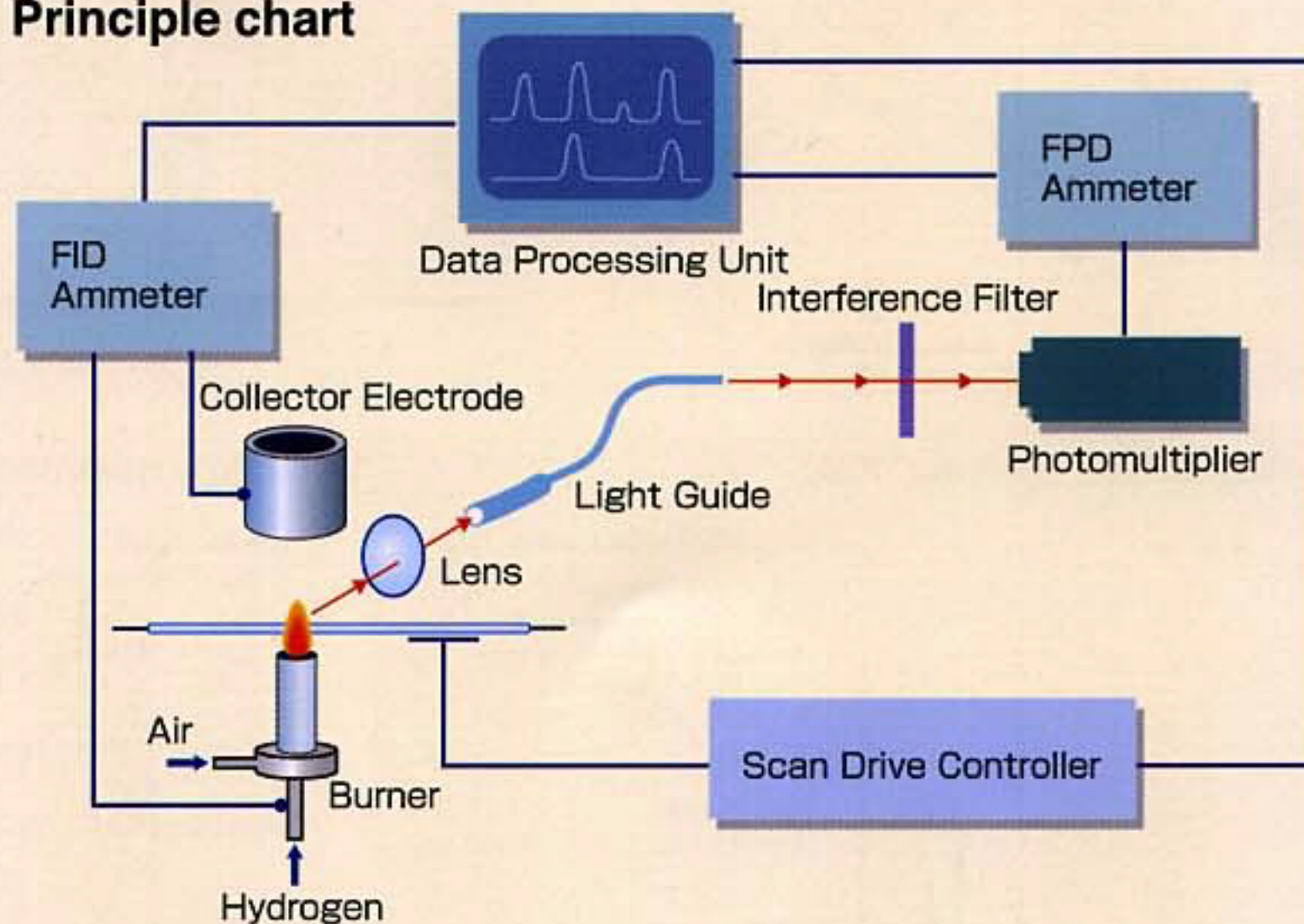
Peak identification and quantification are easy since the analytical results are output to the exclusive use integrator (option) or chromatogram processing software package on PC basis (option).



## Principle of Measurement

A specially designed thin layer quartz rod (CHROMAROD™) traverses the hydrogen flame at constant speed after developing the sample and separating its components on it. Each organic compound separated on the rod is ionized by the energy of hydrogen flame, which generates electric current on the FID electrodes in between. This electric current proportional to the amount of substance in the flame is multiplied and thereby enables quantitative determination. In case the organic components on the rod contain phosphorous and/or sulfur elements, they emit their inherent lights during being burnt in the hydrogen flame. After spectroscopically separated by the interference filter, those lights are multiplied by the photomultiplier in order to detect phosphorous and/or sulfur selectively.

### Principle chart



## Principle of Measurement

### IATROSCAN MK-6

Components' separation : by thin-layer chromatography using CHROMAROD (special thin-layer rod)

Detectors : Hydrogen flame ionization detector (FID) and Flame photometric detector (FPD)

Detection time : 25, 30, 35, 40, 50, 60sec.

Hydrogen flow monitor : electronic flow meter (digital display)

Air flow monitor : air flow meter (float type)

Rod holder : available for loading 10 rods

Measuring modes : Normal scan / Blank scan / Origin scan / Partial pyrolysis scan

Power source : AC 100, 120, 220 & 240V, 50/60Hz

Power consumption : approx. 50VA

Temperature / Humidity requirements : 10~35°C / 20~80%

Dimensions : 520(W)×430(D)×265(H) mm

Weight : 25kg

**IATROSCAN MK-6s with only FID is available as well.**

### IATROCODER TC-21

Measurement : peak area / peak height

Indication of retention time : 1/1000min.

Dinamic range :  $10^6$

Sensitivity of peak area measurement :  $0.1 \mu V \cdot sec./count$

Calculation methods : area % / Simple internal standard / Area % with correction factors / Internal standard / External standard / Exponential calculation (Calibration by 1, 2, or Max 8 levels using average of each level)

Input voltage : -10mV~1V

Recording system : Ink-jet printer / plotter

Power source : AC 90~240V

Power consumption : approx. 100VA

Temperature / Humidity requirements : 10~35°C / 20~80%

Dimensions : 340(W)×420(D)×170(H) mm

Weight : 7.6kg

**Caution:** All customers are requested to use the instrument properly upon fully understanding the contents of the operation manual.

※ The manufacturer reserves the right to alter the appearance and specifications without prior notice in pursuit of product improvement.

IATRON LABORATORIES provide substantial application data and detailed reference materials, and are ready to carry out customer sample analysis, experiment and demonstration at our site for customer's confirmation of equipment performance.

For more information, please contact us.

## Standard Sets

6000 :	IATROSCAN MK-6	
	IATROSCAN MK-6	1
	CHROMAROD-S III	10pcs
	Rod holder SD-5	1
	Development tank DT-150	1
	Interference filter for sulfur	1
	Interference filter for phosphorous	1
	Spotting guide	1
	Micro-dispenser	1
	Hydrogen lead pipe	2m
	Cables (power, signal, earth)	1
	Tweezers	1
	Fuse	1
	Allen keys (1.5, 2, 3mm)	1
	Operation manual	1
6001 :	IATROSCAN MK-6s	
	IATROSCAN MK-6s	1
	CHROMAROD-S III	10pcs
	Rod holder SD-5	1
	Development tank DT-150	1
	Spotting guide	1
	Micro-dispenser	1
	Hydrogen lead pipe	2m
	Cables (power, signal, earth)	1
	Tweezers	1
	Fuse	1
	Allen keys (1.5, 2, 3mm)	1
	Operation manual	1

## Optional Equipment and Accessories

2100 :	IATROCODER TC-21	
	Cables (power, signal, earth)	1
	Remote cable	1
	Parallel data cable	1
	Print cartridge	1
	Recording paper	1 roll
3246 :	CHROMAROD-A (10pcs./box) Alumina	
3248 :	CHROMAROD-S III (10pcs./box) Silica	
3201 :	Development tank DT-150	
3202 :	Hanging type development tank DT-250	
3221 :	Rod storage chamber DE-3	
5101 :	Rod dryer TK-8	
5321 :	Rod holder SD-5 ( 2pcs.)	
F001 :	Interference filter for sulfur	
F002 :	Interference filter for phosphorous	
2113 :	Additional 2nd channel board ( for TC-21)	
5921 :	Start controller ( remote interface for PC )	
6100 :	Micro-dispenser ( DRAMMOND) for spotting	



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