

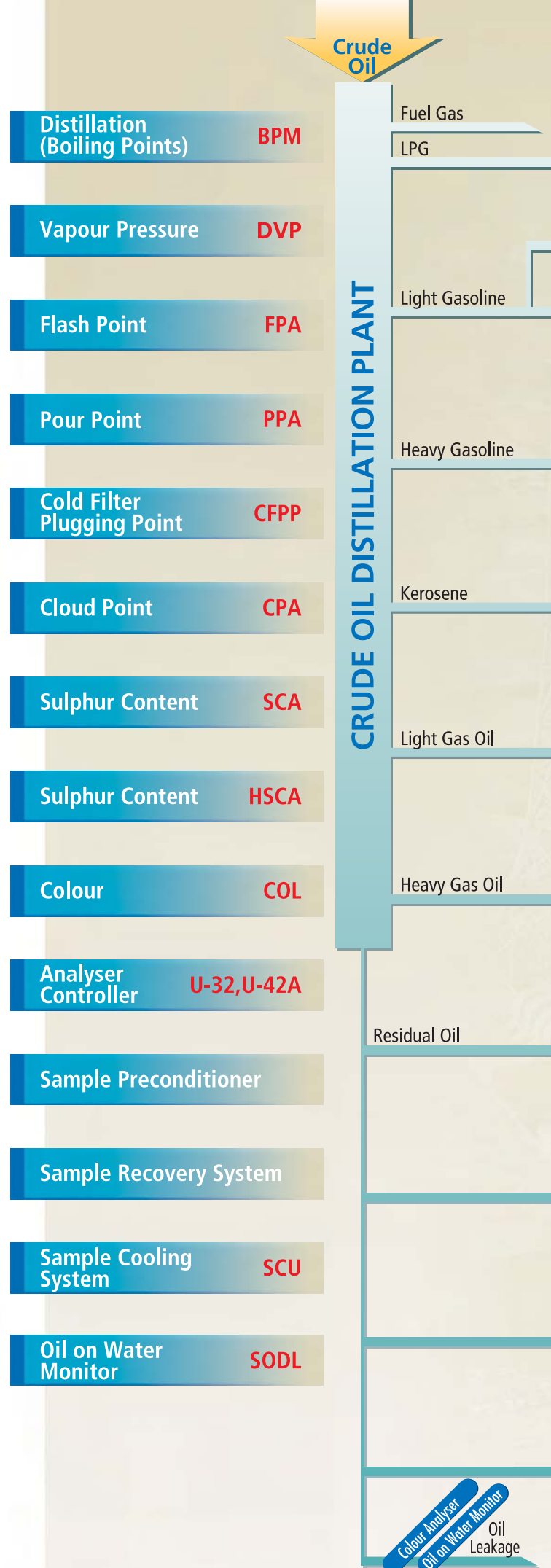
# **ANALYSERS FOR OIL REFINERIES**

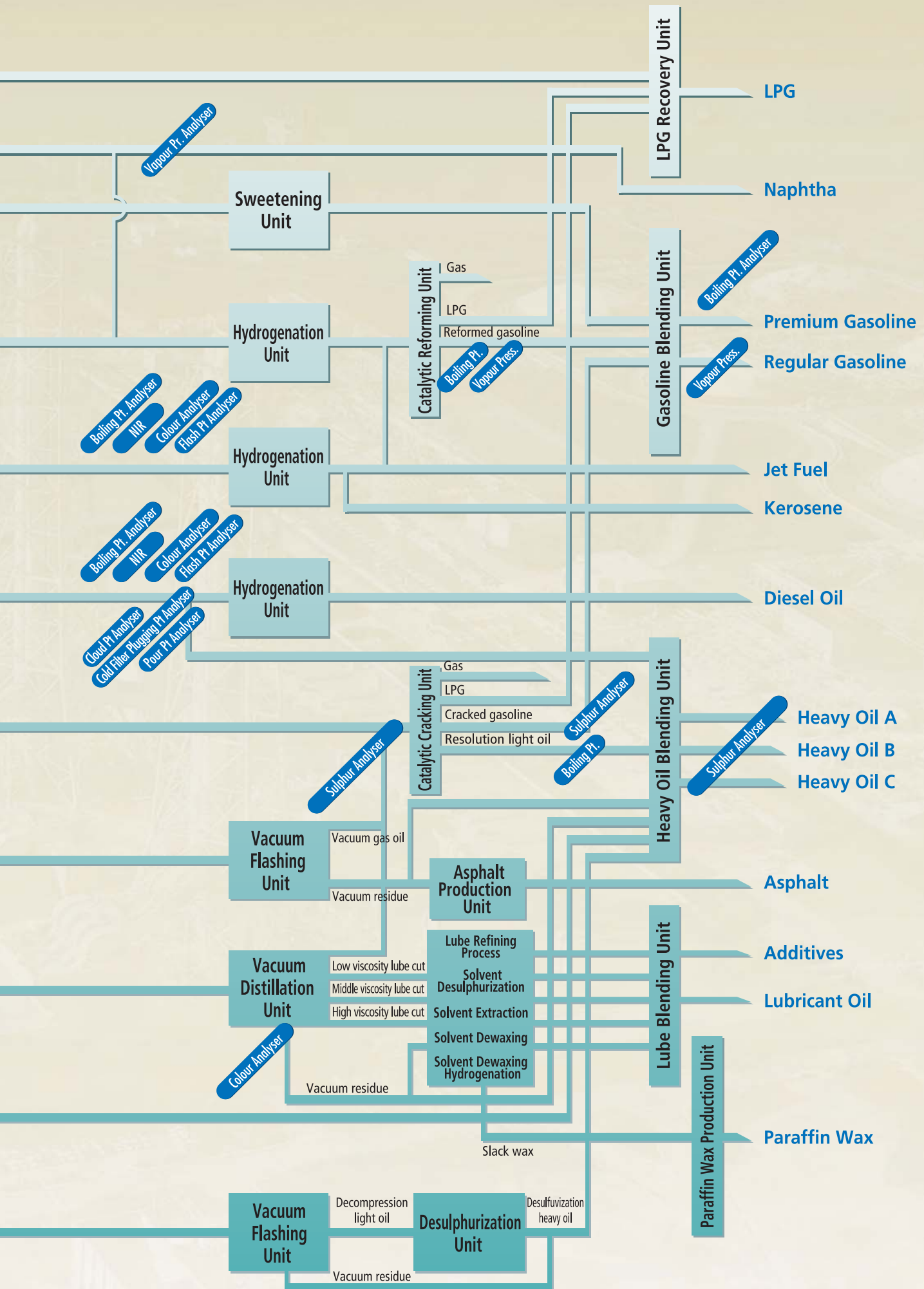
---





Since the installation of their first process distillation analyser in 1971, DKK-TOA have developed a complete range of analysers for oil refineries and have grown to be the number one supplier of oil refinery analysers in Japan. With ever stricter environmental regulations and the demand for greater efficiencies, the need for reliable, low maintenance on-line analysers has never been more apparent. DKK-TOA's range of instruments can meet these challenges





# ANALYSERS FOR OIL REFINERIES

## Boiling Point Analyser BPM-2000



This instrument measures the distillation points of petroleum products such as naphtha, kerosene, gas oil. It can be used for topping control and product quality control. It can also contribute to control systems used to increase middle cut yield.

### Features

- Automates the atmospheric distillation method and ASTM D86 distillation specified in Article 4 of JIS K 2254 "Petroleum Products-Distillation Test Method". Available with the vacuum distillation method (option) specified in Article 5 of JIS K 2254.
- Comes with a tough and durable stainless-steel flask that can be easily attached and detached. It can also be cleaned to prevent errors caused by accumulated dirt. Using the specially coated flask (option) eliminates the need for removing soot and performing other maintenance tasks.
- Pressure resistant and explosion-proof construction (TIIS fd2G4). (Type Approval No. T65T46)
- Site-installed 10-inch color touch panel allows for interactive operation, improving work productivity and cutting down on maintenance time. The display shows the distillation curve.
- Free selection of up to eight distillation points between the IBP and FBP.

### Standard Specifications

|                     |  |
|---------------------|--|
| Items measured      | Distillation characteristics of naphtha, gasoline, kerosene and aviation fuel. |
| Measuring method    | Atmospheric distillation test method (JIS K2254, Article 4)                    |
| Construction        | Pressure resistant and explosion-proof construction (TIIS fd2G4)               |
| Measuring range     | 0-400°C  |
| Measuring cycle     | 20-40 minutes (varies according to the item measured and measurement point)    |
| Repeatability       | ±2°C max.  |
| Transmission output | 4-20 mA DC (insulated type/load resistance of 600Ω or less)                    |
| Power requirement   | 100, 110, 120, 200, 220, or 240 VAC (selectable)                               |

## Vapour Pressure Analyser DVP-03



This instrument automatically and continuously measures the vapour pressure of petroleum products such as motor gasoline (mogas), aviation gasoline (avgas) and jet fuel. It can be used for topping control and product quality control. It can also contribute to control systems used in gasoline blenders.

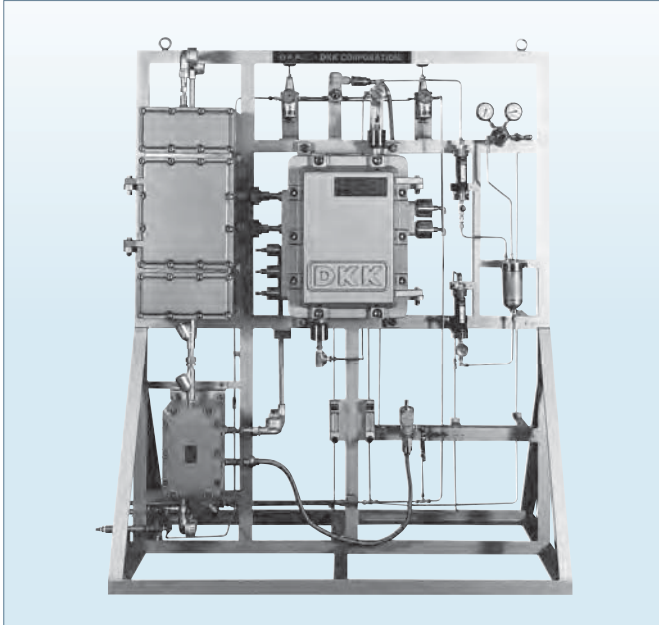
### Features

- Measurement based on ASTM D323 (JIS K2258), Correlated to Reid method.
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1)
- Continuous measurement based on determination of vapour pressure from the static pressure of the sample generated from a nozzle assembly.
- Features temperature controlled oil bath set at 37.8°C (100°F) ±0.1°C.

### Standard Specifications

|                          |  |
|--------------------------|--|
| Measurement              | Vapour pressure of petroleum products such as motor gasoline (mogas), aviation gasoline (avgas) and jet fuel |
| Measurement Method       | Continuous determination of vapour pressure from the static pressure of the sample jetted from a nozzle      |
| Explosion Protection     | Certified flameproof construction TIIS d2G4  |
| Measurement Range        | 0~100 kPa or 150 kPa   |
| Sample Pressure at Inlet | 0.5~3.54 Mpa   |
| Repeatability            | within ±1.0% FS  |
| Output Signal            | 4~20mADC (max load 600 Ohm)  |
| Power Consumption        | 2 KVA  |
| Installation             | Minimum recommended protection: 3 sided shelter  |

## Flash Point Analyser FPA



This instrument measures the flash point of petroleum products such as kerosene and gas oil. It can be used for process control and product quality monitoring.

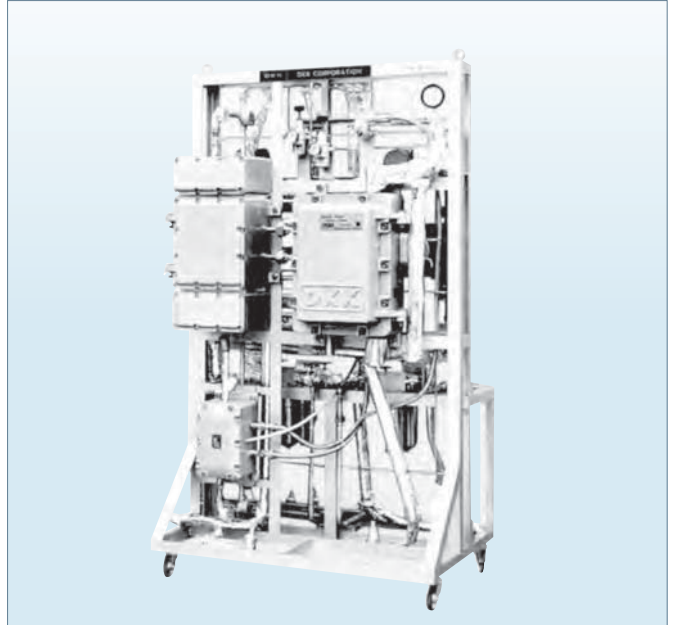
### Features

- Measurement based on ASTM D56, D93 (JIS K2265).
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Features microprocessor controller to control analyser operation and process measurement data.
- Ceramic electrode with capacitance discharge ignitor (CDI) provide reliable and stable ignition.
- Output is updated at the end of each measurement cycle.

### Standard Specifications

|                        |   |
|------------------------|---|
| Measurement            | Flash points of oil products such as kerosene, gas oil etc. |
| Measurement Method     | Batch, auto-ignition system                                 |
| Explosion Protection   | Certified flameproof construction TIIS d2G4                 |
| Measurement Range      | 0~100 °C depending on sample                                |
| Temperature Sensor     | Thermocouple type J   |
| Measurement Cycle Time | 2~10 minutes depending upon sample                          |
| Repeatability          | within $\pm 1.0\%$ FS (standard)                            |
| Output Signal          | 4~20mADC (max load 600 Ohm)                                 |
| Power Consumption      | 300 VA  |
| Installation           | Minimum recommended protection: 3 sided shelter             |

## Pour Point Analyser PPA



This instrument measures the pour point of petroleum products such as gas oil. It can be used for process control and product quality monitoring.

### Features

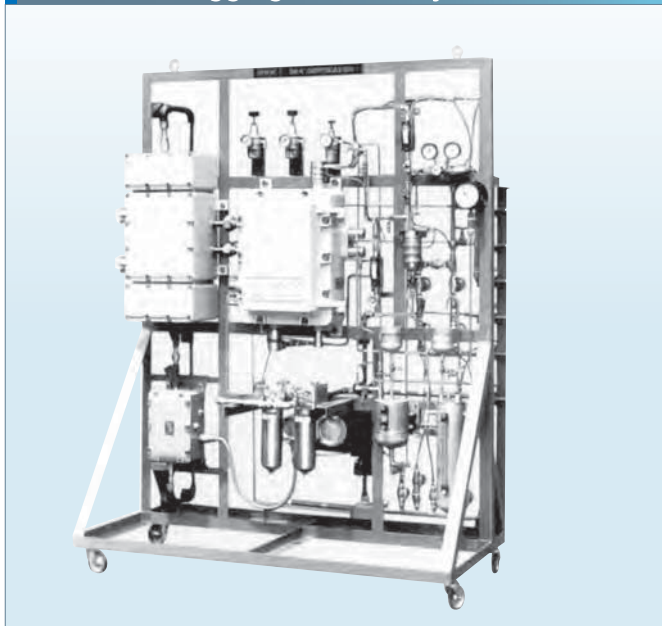
- Measurement based on ASTM D97 (JIS K2269).
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Features microprocessor controller to control analyser operation and process measurement data.
- Output is updated at the end of each measurement cycle

### Standard Specifications

|                        |   |
|------------------------|---|
| Measurement            | Pour point of oil products such as gas oil etc.         |
| Measurement Method     | Batch, torque sensing system                            |
| Explosion Protection   | Certified flameproof construction TIIS d2G4             |
| Measurement Range      | -30~+20°C (-50~+50°C for mV/l range)                    |
| Temperature Sensor     | Thermocouple type J                                     |
| Measurement Cycle Time | 10~30 minutes depending on sample pour point and sample |
| Repeatability          | within $\pm 1.0\%$ FS (for mV/l range)                  |
| Output Signal          | 4~20mADC (max load 600 Ohm)                             |
| Power Consumption      | 200 VA  |
| Installation           | Minimum recommended protection: 3 sided shelter         |

# ANALYSERS FOR OIL REFINERIES

## Cold Filter Plugging Point Analyser **CFPP**



This instrument measures the cold filter plugging point of petroleum products such as gas oil. It can be used for process control and product quality monitoring.

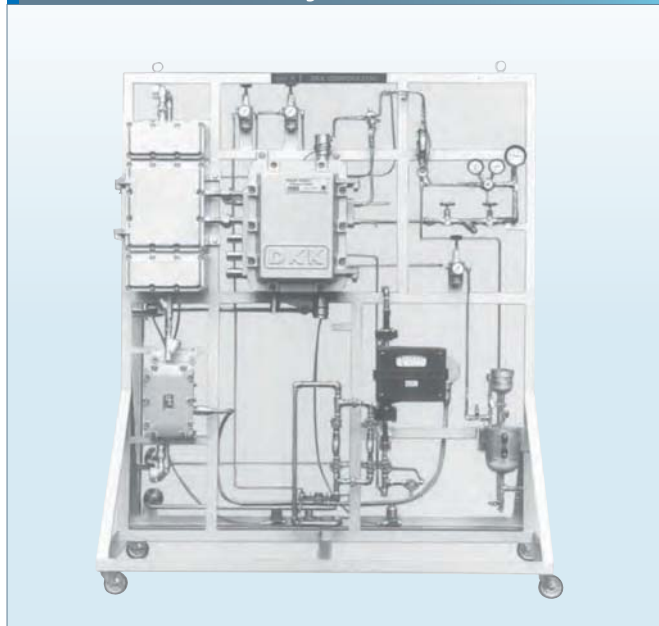
### Features

- Measurement based on ASTM IP309.80 (JIS K2288).
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Features microprocessor controller to control analyser operation and process measurement data.
- Output is updated at the end of each measurement cycle

### Standard Specifications

|                        |   |
|------------------------|---|
| Measurement            | Cold filter plugging point of oil products such as gas oil etc.     |
| Measurement Method     | Batch, filter soction system  |
| Explosion Protection   | Certified flameproof construction TIIS d2G4                         |
| Measurement Range      | -30~+20°C (-50~+50°C for mV/I range)                                |
| Temperature Sensor     | Thermocouple  |
| Measurement Cycle Time | 20~30 minutes depending on sample CFPP point and sample temperature |
| Repeatability          | within $\pm 1.0\%$ FS (for mV/I range)                              |
| Output Signal          | 4~20mADC (max load 600 Ohm)   |
| Power Consumption      | 200 VA  |
| Installation           | Minimum recommended protection: 3 sided shelter                     |

## Cloud Point Analyser **CPA**



This instrument measures the cloud point of petroleum products such as gas oil. It can be used for process control and product quality monitoring.

### Features

- Measurement based on ASTM D2500 (JIS K2269).
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Features microprocessor controller to control analyser operation and process measurement data.
- Output is updated at the end of each measurement cycle

### Standard Specifications

| Model                  | CPA-20   | CPA-21                           |
|------------------------|--|----------------------------------|
| Measurement            | Cloud point of oil products such as gas oil etc.                     |                                  |
| Measurement Method     | Batch, light scattering system                                       | Batch, light transmission-system |
| Explosion Protection   | Certified flameproof construction TIIS D2G4                          |                                  |
| Measurement Range      | -30~+20°C (-50~+50°C for mV/I range)                                 |                                  |
| Temperature Sensor     | Thermocouple   | Resistance type sensor           |
| Measurement Cycle Time | 10~30 minutes depending on sample cloud point and sample temperature |                                  |
| Repeatability          | within $\pm 1.0\%$ FS (-50~+50°C for mV/I range)                     |                                  |
| Output Signal          | 4~20mADC (max load 600 Ohm)  |                                  |
| Power Consumption      | 200 VA   |                                  |
| Installation           | Minimum recommended protection: 3 sided shelter                      |                                  |

## High Sensitivity Sulfur Content Analyzer HSCA-2000



This is on-line analyzer applicable to quality control for petroleum products lines such as gasoline, kerosene and light oil. The nation's first on-line analyzer being employed with X-ray fluorescence measurement method covers low sulfur concentration range as 0 to 10ppm.

### Features

- Analyzer for oil refinery plant
- Capable to measure low sulfur range as 0 to 10ppm
- Reliable energy dispersive X-ray fluorescence method is adopted
- Simple construction without moving parts nor furnace.
- Easy operation with touch panel system
- Combination explosion proof TIIS Exd, IIB, T4
- Measurement range  
0 to 10ppm  
0 to 500ppm

### Standard Specifications

|                        |   |
|------------------------|---|
| Measurable oil         | Gasoline/kerosene/light oil/aviation fuel               |
| Measurement Method     | Energy Dispersive X-Ray Fluorescence                    |
| Explosion Proof        | Combination explosion proof (TIIS Exd2BT4)              |
| Measurement Range      | 0~10ppm/ 0~500ppm Selectable                            |
| Detector               | Proportional counter tube (LBD)                         |
| Measurement Cycle Time | 60~900 sec. Freely adjustable                           |
| Repeatability          | Within $\pm 2\%$ F.S.                                   |
| Output Signal          | 4~20mADC (Isolated, Load resistance of 600 Ohm or less) |
| Power Source           | 100~240VAC Power consumption 100VA                      |

## Sulphur Content Analyser SCA-200



This instrument measures the sulphur content of petroleum products such as light gas oil and heavy gas oil using EDXRF method. It can be used for process control and product quality monitoring.

### Features

- Energy dispersive X-ray fluorescence measurement method. Using semiconductor X-ray sensor, Si (PIN) photo diode.
- Certified explosion proof construction to TIIS Exd IIB T4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Semiconductor sensor provides high signal to noise ratio and excellent stability.
- Compact low output X-ray tube, not subject to any special regulations.
- Adjustable time constant for signal processing provides excellent speed of response

### Standard Specifications

|                        |   |
|------------------------|---|
| Measurement            | Sulphur content of petroleum products such as light gas oil and heavy gas oil   |
| Measurement Method     | Energy Dispersive X-Ray Fluorescence  |
| Explosion Protection   | Certified explosion proof construction TIIS Exd IIB T4  |
| Measurement Range      | 0~0.1 wt% to 0~5.0 wt%  |
| Measurement Cycle Time | 60~999 sec (selectable) 1~999 sec time constant (selectable)  |
| Repeatability          | 0.001~0.1 wt% (0.001 wt%) (0.0015 wt% daily), 0.1~1.0 wt% (0.0025 wt%) (0.005 wt% daily), 1.0~5.0 wt% (0.001 wt%) (0.015 wt% daily) |
| Output Signal          | 4~20mADC (max load 600 Ohm)   |
| Power Consumption      | 300 VA  |
| Installation           | Minimum recommended protection: 3 sided shelter   |

# ANALYSERS FOR OIL REFINERIES

# PERIPHERAL

## Colour Analyser COL-330



This instrument measures the colour change of petroleum products such as kerosene, gas oil etc.. It can be used to detect heavy oil contamination and for quality control.

### Features

- Continuous measurement based on ASTM D1500 & D156 (JIS K2580)
- Certified explosion proof construction to TIIS Ex d IIB T4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Built-in spectroscope enables measurement of a wide wavelength spectrum.
- Measurement of both Saybolt colours and ASTM colours available, together with tristimulus values.
- Continuous measurement available

### Standard Specifications

|                           |  |
|---------------------------|--|
| Measurement               | Colour of gas oil, kerosene etc.                       |
| Measurement Method        | Visible light absorption spectroscopy                  |
| Explosion Protection      | Certified flameproof construction TIIS Ex d IIB T4     |
| Measurement Range         | Saybolt colour: +30--16, ASTM Colour: 0~8 (selectable) |
| Measurement Cycle Time    | 30~999 seconds   |
| Repeatability             | Saybolt colour: within 2, ASTM Colour: within 0.5      |
| Output Signal             | 4~20mADC (max load 600 Ohm)                            |
| Contact Switching Outputs | 2  |
| Power Consumption         | 100VA  |
| Installation              | Minimum recommended protection: 3 sided shelter        |

## Sample Preconditioner



This equipment is used for pre-conditioning of samples to be introduced into the oil refinery analysers. The system is custom designed and manufactured to meet the client's precise process and site conditions. The preconditioner equipment normally includes the following items:

- Cooler: water based cooler, explosion proof chiller
- Pressure reduction: pressure regulators, adjusting valves
- Water protection: coalescing filters
- Particulate protection: dust filters

### Features

- Design emphasis on reliability and minimised maintenance requirements.
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).

### Standard Specifications

|                        |  |
|------------------------|--|
| Cooler                 | Panel type water cooler                      |
| Pressure Reduction     | Pressure reducing valve                      |
| Water protection       | Compact, high performance coalescing filters |
| Particulate protection | Bucket filter                                |



## Sample Recovery System



This equipment is used to collect the spent sample that has vented from the analyser and then pumps it back to the sample return point in the process line.

### Features

- Design emphasis on reliability and minimised maintenance requirements.
- Certified explosion proof construction to TIIS d2G4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Exact configuration based on installation and site conditions.
- Open air type collection available (for analysers that need to measure samples at atmospheric pressure)

### Standard Specifications

|                     |  |
|---------------------|--|
| Operating Power     | Typically 3 phase power (AC 200V ~AC 440V)         |
| Tank Capacity       | 35L (gasoline) 68L (kerosene. light gas oil)       |
| Level switch sensor | Explosion proof float switch                       |
| Pump                | Gear pump or plunger pump (electric or air driven) |
| Alarm outputs       | Level sensor error signal                          |

## Sample Cooler System SCU



This equipment is used to provide chilled water to oil refinery analysers and the sample conditioning systems.

### Features

- Uses environmentally friendly refrigerant (non CFC type).
- Certified explosion proof construction to TIIS Ex pd IIB T4 (meets or exceeds NEC Class 1, Group D, Division 1).
- Automatic control for pre-set temperature.
- Safety trip circuits to prevent electrical overload etc..

### Standard Specifications

|                                 |   |
|---------------------------------|---|
| Freezing Capacity               | Approx 1000 Kcal/ hour (+10°C at 50Hz)              |
| Set Temperature Range           | +5°C ~ +20°C  |
| Temperature Adjustment Accuracy | ±5°C of set temp                                    |
| Explosion Protection            | Certified flameproof construction TIIS Ex pd IIB T4 |
| Operating Power                 | 3 phase power, Typical: AC 200V 50/60 Hz 2 kW       |

# PERIPHERAL

## Analyser Controller U-32



Panel Mounting

This controller is used with DKK-TOA's oil refinery analysers including BPM, FPA, PPA, CFPP. It features a digital display, interactive keyboard entry and user friendly menus and operation. The controller handles control and processing of all analyser operations including calibration and multi-stream switching.

## Analyser Controller U-42A



Field Mounting

This controller features the same specification as the Model U-32 but is enclosed in a special certified flameproof enclosure (TIIS d2G4) suitable for field installation. Although the enclosure is flameproof, it still allows full operation of the controller's keypad and viewing of the display without having.

## Analyser Controller U-221



This controller has been designed for clients who wish to upgrade their existing older controllers to the latest technology. Only minimal modifications are required to the existing analyser to upgrade to this controller. This controller can continue to be used in the future even after the analyser portion has been replaced with new instrument.

# EFFLUENT TREATMENT EQUIPMENT ANALYSERS

## Industrial pH Meters



### HBM-160 HBM-162 HBM-165H

- Site-installed multifunction pH/ORP meter in a small die-cast aluminum enclosure
- Adjustment output, RS-232C output (option), dual-circuit transmission output for water temperature and other properties
- Measuring range  
pH meter (HBM-160): pH -1~15  
ORP meter (HBM-162):  
-2000 - +2000 mV



### HDM-136A HDM-138A

- Easy-to-operate, site-installed pH/ORP meter in a small robust aluminum enclosure
- Measuring range  
pH -1 - 14 (HDM-136A)  
-2000 - +2000 mV (HDM-138A)

### pH Electrodes with Replaceable Tip

#### GSS-304B (non-KCl supply)

#### GSS-314B (KCl supply)

- Easily replaceable glass electrode tips and reference-electrode liquid junction tips
- Alkali-resistant and hydrofluoric-acid-resistant glass tips available
- Immersible, drop-in, and flow-through type electrode holders available



### ORP Electrodes with Replaceable Tip

#### PSS/ASS-304B (non-KCl supply)

#### PSS/ASS-314B (KCl supply)

- Easily replaceable metal electrode tips and reference-electrode liquid junction tips
- Platinum electrodes (PSS) and gold electrodes (ASS) available
- Immersible, drop-in, and flow-through type electrode holders available



### Immersible Electrode Holder for Electrodes with Replaceable Tip

#### HC-G70

- Clear PVC (heatproof temperature: 60°C)
- 0.5 m~3 m in length
- KCl supply holder contains KCl electrolyte solution
- Mounting brackets and mounting flanges available



### Drop-in Detector for Electrodes with Replaceable Tip

#### HC-G95

- Throw-in type for deep tanks or drop-in type with a protective tube
- Clear PVC (heatproof temperature: 60°C)
- Mounting brackets and SUS protective tube (5 m or less) available

## Dissolved Oxygen Meter



### OBM-162A/162H

- Site-installed, multifunction dissolved-oxygen meter in a small die-cast aluminum enclosure
- Dual-point adjustment output, RS-232C output (option), dual-circuit transmission output for water temperature and other properties
- Measuring range  
0 ~ 1 mg/L min.  
0 ~ 50 mg/L max.



### ODM-136A

- Easy-to-operate, site-installed dissolved-oxygen meter in a small robust aluminum enclosure
- Measuring range  
0 ~ 1 mg/L min.  
0 ~ 50 mg/L max.



### DO Detector with Water Jet Cleaner

#### JOC-711C

- Directs a jet of air or water to remove dirt from the electrodes



### DO Detector with Pulse Jet Air Cleaner

#### POC-7D

- Intermittently blows compressed air (plant air) into sample streams to generate water currents and bubbles that forcibly remove dirt from the electrodes

## pH Meter with Automatic Calibrator



### MAC-355

- Cleans electrodes, uses standard solution to automatically perform dual-point calibration, reduces the amount of maintenance work, and provides long-term, reliable pH measurements
- Elevated aerial jet cleaning/calibration improves safety and enhances cleaning effect
- Practical and appropriate self-diagnosis messages
- Measuring range pH -1 ~ 15

## COD Meter



### COD-203A

|   |
|---|
| Measuring method  |
| 100°C potassium permanganate oxygen digestion method for acid or alkaline processes |
| Measuring range   |
| 0 ~ 20, 0 ~ 2000 Maximum of 2 ranges  |

# EFFLUENT TREATMENT EQUIPMENT ANALYSERS

## Oil Film Detectors



**SODL-1600**  
(Pressure Resistant, Explosion Proof)  
**ODL-1600/ODL-1610A**  
(Non Explosion Proof/Non Explosion Proof, Long Reach)

|  |
|--|
| Detecting method                           |
| Visible-light reflection ratio measurement |
| Item measured                              |
| Oil film on water or floor surface         |

### OF-1600

|  |
|--|
| Measuring method                                 |
| Near-infrared light reflection ratio measurement |
| Item measured                                    |
| Oil film on water surface                        |

## Automatic Total Nitrogen/Phosphorus/COD Analyser



### NPW-160

|  |
|--|
| Measuring method   |
| TP: Molybdenum-blue spectrophotometry which uses potassium peroxodisulfate digestion<br>TN: Alkaline potassium peroxodisulfate digestion<br>COD(UV): Double-wavelength/ultraviolet spectrophotometry |
| Measuring range  |
| TP: 0 ~ 20 mg/L<br>TN: 0 ~ 200 mg/L<br>COD (UV): 0 ~ 500 mg/L  |

## SS Concentration Meters



**SSD-1610**  
(Low Concentration)  
**SSD-1620**  
(Medium Concentration)

- Compact piston detectors (motor-driven)
- Immersible, drop-in and tube-insertable type electrode tubes are available

|   |
|---|
| Measuring range   |
| SSD-1610:<br>0 ~ 30/500/1000 mg/L<br>SSD-1620:<br>0 ~ 5000/10000/20000 mg/L<br>Manual switch between 3 ranges |



Always read the instruction manual before operation.

Due to continuous product improvement, specifications contained herein are subject to change without notice.

### International Operations:

DKK-TOA Corporation  
29-10, 1-Chome, Takadanobaba, Shinjuku-ku, Tokyo 169-8648 Japan  
Tel: +81-(0)3-3202-0225 Fax: +81-(0)3-3202-5685

### Local Representative: