

SINPAR FTC-M2 Combination Research and Motor Method Octane Rating Unit





SINPAR **Professional Manufacturer of Octane Rating Engines**

Locates in Shanghai, China, is a high-tech company integrated with researching, manufacturing, sales and service for [Combination Research and Motor method Octane Rating Unit \(ASTM D2699 RON & ASTM D2700 MON\)](#).

Since SINPAR was established, it has been devoted to R&D of the high quality Octane Rating Engines in China and committed to providing the perfect solutions to customers.

In Shanghai, SINPAR has set up an [R&D Center](#) which composed of experienced experts from National Petroleum Research Institute and professors from Petroleum Colleges. The R&D Center integrates advanced technology into product innovation and offers the best technical support.

[SINPAR FTC Octane Rating Unit](#) which owning independent intellectual property rights in China, is in full compliance with [ASTM D2699 \(ISO 5164\)](#) and [ASTM D2700 \(ISO 5163\)](#) standard methods. In the years since it was first introduced to market, the FTC Octane Rating Engine has been updated regularly with features that enhance test accuracy and accurate fuel octane ratings.

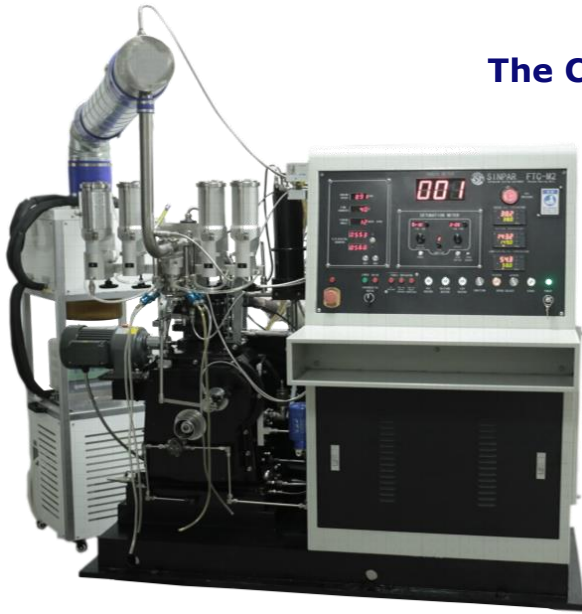
[SINPAR FTC Octane engines](#) are widely accepted and used in many countries and regions with their stable performance.

SINPAR offers world-class products and world-wide services focused on building long term satisfaction and commitment for international customers and partners.



Combination (Research and Motor Method) Octane Rating Unit SINPAR FTC-M2

The Complete Solution For Octane Testing



Combination (Research & Motor Method) Octane Rating Unit FTC-M2 is used as a complete system for determining octane number of motor fuels, conforming to ASTM D2699(ISO 5164) and ASTM D2700(ISO 5163) Standard Test Methods.

The Combination Octane Rating Unit FTC-M2 provides the convenient conversion between Research Method and Motor Method.

With either method, testing capabilities cover the 40-120 octane number range.

ASTM D2699 (Research Method), **ASTM D2700** (Motor Method)
ISO 5164 (Research Method), **ISO 5163** (Motor Method)
IP 237 (Research Method), **IP 236** (Motor Method)

FTC-M2 Octane Engine applies to the user who has the requirements of wide source test samples, large test quantity, long continuous test time, performing to ASTM standard test procedures. With excellent test accuracy and stable performance, it is widely accepted and used in fuel testing laboratories.



FTC-M2 Combination Octane Rating Unit produces test results under standard operating conditions:

Research Method (ASTM D2699)	Motor Method (ASTM D2700)
Engine Speed: 600 RPM \pm 1%	Engine Speed: 900 RPM \pm 1%
Spark Timing: 13° BTDC	Spark Timing: Variable Based on Cylinder Height
Intake Air Temperature: 52°C \pm 1°C	Intake Mixture Temperature: 149°C \pm 1°C
Coolant Jacket Temperature: 100°C \pm 1.5°C	
Oil Temperature: 57°C \pm 8.5°C	
Oil Pressure: 172 kPa-207 kPa (25 psi-30 psi)	
Intake Air Humidity: 25-50 grains of water per lb. of dry air	
Power Supply: 380/440V 50Hz/60Hz; 3 Ph	

Technical Parameters

Basic Information	
Standard	ASTM D2699 RON and ASTM D2700 MON
Working Range	40-120 octane number
Operation Conditions	
Engine Speed (Motor)	900±9 rpm
Engine Speed (Research)	600±6 rpm
Ignition Timing (Motor)	Variable as Cylinder Height (C.R.) is Changed
Ignition Timing (Research)	13° BTDC
Intake Air Temperature (Motor)	38°C±1°C
Intake Air Temperature (Research)*1	52°C ±1°C at Standard Barometric Pressure
Intake Mixture Temperature (Motor)*2	149°C±1°C
Cylinder Jacket Coolant Temperature	100°C±1.5°C
Crankcase Oil Temperature	57°C±8.5°C
Crankcase Oil Pressure	172 kPa-207 kPa (25 psi-30 psi)
Intake Air Humidity	25-50 grains of water per lb. of dry air
NOTE: *1 If IAT tuning is used to qualify the engine as fit-for-use, the temperature can be adjusted within ±22°C from the base temperature specified for the prevailing barometric pressure, and this temperature shall then be maintained within ±1°C when CR or KI results used for octane determination on each fuel are recorded. See ASTM D2699 for details.	
NOTE: *2 If intake MIXT tuning is used to qualify the engine as fit-for-use, the temperature can be adjusted between 141°C-163°C, and this temperature shall then be maintained within ±1°C when the CR or KI results used for octane determination on each fuel are recorded. See ASTM D2700 for details.	
Engine Information	
Compression Ratio (C.R.)	4:1-18:1
Cylinder Bore (Diameter)	82.55 mm (Standard)
Stroke	114.30 mm
Carburetor Venturi (Research)	14.30 mm (9/16 in.)
Intake/Exhaust Valve Clearance (Hot)	0.20 mm±0.025 mm
Intake Valve Opens Timing	10°±2.5° ATDC
Intake Valve Closes Timing	34° ABDC
Exhaust Valve Opens Timing	40° BBDC
Exhaust Valve Closes Timing	15°±2.5° ATDC
Crankcase Internal Pressure	25-150 mm H2O
Function Information	
Compression Ratio Adjustment	Motor-Driven
Compression Ratio Display Device	Dial Indicator & Digital Counter
Engine Speed Conversion	Dual-Speed Motor
Carburetor	Four-Bowl (with the cooling function)
Ignition Timing Display	Digital (Auto-Set)
Crankcase Oil Pressure Display	Yes
Crankcase Oil Heater	Yes
Oil Temperature Display	Yes
Air Humidity Control System	Yes
Unit Safety System	Yes

Operation Panel



Parameters are adjustable via operation panel according to ASTM D2699(RON) and ASTM D2700(MON) test method specifications.



The professional and clear design of the operating area makes octane rating operation convenient, and the data is easy to read and record.



The auto-setting function of model FTC-M2 Octane Engine effectively simplifies operational procedures and improves the efficiency of octane testing.



The operation panel is equipped with an E-STOP protection system and a set of push-button switches for anti-misoperation.



Function Features

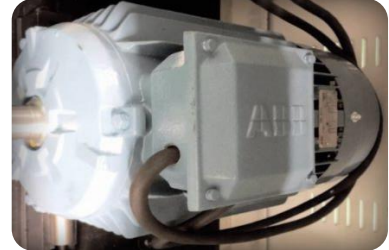
Research/Motor Method Conversion

is easily accomplished by the use of Dual-Speed Motor provided with the Combination Octane Rating Unit. Switch the engine speed to meet either Research (600 RPM) Method or Motor (900 RPM) Method.



Synchronous and Dual-Speed Motor

mounted on slide base steadily provides constant engine speed as per ASTM D2699 and ASTM D2700 standard test methods during octane rating operation.



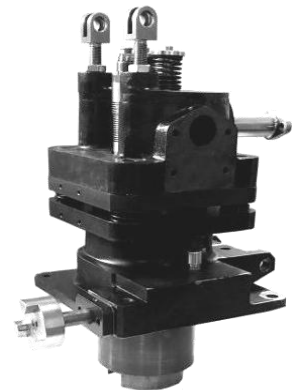
Engine Crankcase

is a heavy-duty cast-iron, box-type design with high strength and rigidity for running octane tests of various types of fuels. A long-lasting sealing system ensures long service life and carefree operation & maintenance. Removable side doors allow one to easily check the internal components for inspection, maintenance and overhauls.

Variable Compression Cylinder and Sleeve Assembly

allows the Compression Ratio to be changed by adjusting the Cylinder Height during the engine operation. The available range is 4:1 to 18:1, which allows testing a wide range of fuels.

The Cylinder Height is expressed as C.R. Digital Counter Reading which is directly correlated to a specific octane value according to ASTM D2699 and ASTM D2700 methods specifications.



Cylinder Height

is adjusted via an Electric Motor assembly. It is the most convenient method for turning the worm shaft in either direction to adjust the engine Cylinder Height (C.R. Digital Counter Reading).



C.R. Digital Counter and Ignition Timing are directly displayed on the control panel for easy reference and recording.

C.R. Digital Counter has two indicating counters to establish the differential between compensated reading and uncompensated reading according to barometric pressure.

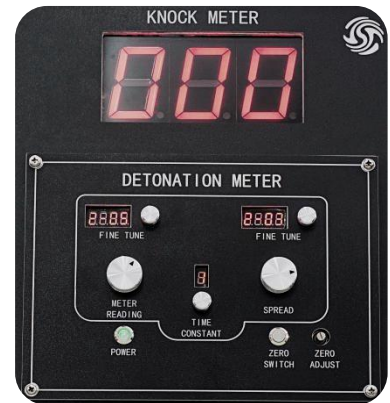
The Ignition Timing System is a SINPAR factory setting system with automatic setting function performing to ASTM MON & RON test methods. No manual adjustment is required.

Knock Measurement Equipment

is cabinet-mounted in the octane unit panel and connected to knock pickup assembly mounted directly in the cylinder's combustion chamber.

SINPAR Factory-Calibrated Detonation Meter

converts changes in combustion knock to a stable and accurate analog signal. The 0 to 100 K.I. readings are displayed on the knock meter. The digital meter adjustment effectively improves octane test accuracy and test efficiency.



Four-Bowl Carburetor

is available in multiple jet and venturi sizes for all applications. The fuel flow control system is used to permit adjustment of fuel-air ratio. The fuel level that produces maximum Knock Intensity is from 0.7 in. to 1.7 in.

The carburetor is equipped with a cooling system connected with the air control unit.

Falling Level Model (option in Combination Octane Rating Unit FTC-M2 with SXCP) provides more sensitive fuel flow adjustment for obtaining more accurate result and delivers an efficient and accurate falling level test.

It allows determining maximum knock intensity without manual adjustment of fuel level. Operator can run accurate octane tests by PROCEDURE B (Bracketing-Dynamic Fuel Level) in ASTM D2699 & ASTM D2700.

The Safety System

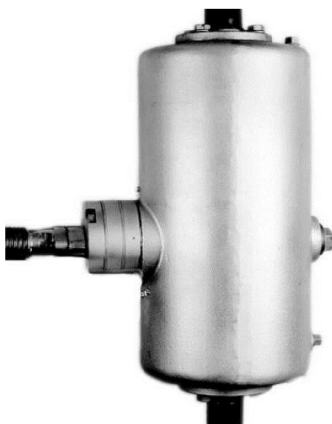
provides engine **automatic shut-down** with the fault indications to protect the unit, when any of follow conditions occurs on octane rating unit: abnormal oil pressure, abnormal cooling water pressure, abnormal high temperature of coolant, electrical power loss or electrical system overload.



The Sensors Assemblies

are connected to the control unit safely, reliably and conveniently through waterproof aviation connectors. The connection panel is clearly labeled for each sensor. It's very easy for operators to perform the maintenance and replacement.

Armored Cables have great tensile strength and corrosion resistance for maximum service life.



Exhaust Surge Tank System

can eliminate resonance pulses and back pressure during the engine operation. Eliminating the interference of the variables makes the test result more consistent and accurate. Meanwhile, this system can effectively reduce noise and air pollution.

Intake Air Humidity Refrigeration Unit

with an adjustable refrigeration system is supplied to regulate the moisture content of intake air into octane engine at a constant 25-50 grains of moisture prescribed of dry air as specified by ASTM D2699 and D2700. The cooling circulation system can be connected to the carburetor for its cooling.



Combination Octane Rating Unit FTC-M2 with SXCP™ Digital Control Panel



ASTM D2699 (Research Method)
ASTM D2700 (Motor Method)

Combination Octane Rating Unit with SXCP™ Digital Control Panel

is the latest model of octane engine with many easy-to-use features including automatic functions and enhanced documentation capabilities, conforming to the latest ASTM D2699 (RON) and ASTM D2700(MON) Standard Methods.

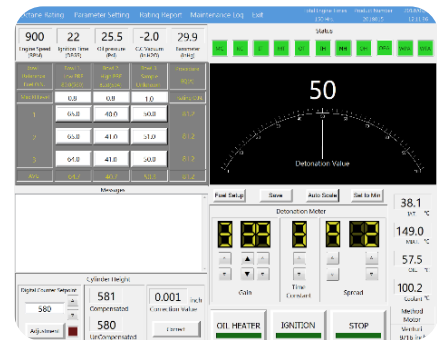
SXCP™ Octane Digital Control Panel

delivers consistent and reliable test results, with standard features including on-screen operation, on-screen reports, falling level program, automated data recording, auto-set & auto-calculation system, integrated maintenance logs, and comprehensive safety system.

Function Features and Benefits:

- ✓ **Easy-to-use** touch-screen control panel simplifies the operation process.
- ✓ **Auto-Set** of intake temperatures, Ignition Timing and C.R. Digital Counter.
- ✓ **Professional Software** provides user-friendly interface and simple fuel rating procedures of ASTM RON and MON test methods.

Automatic calculation and optimization system can minimize human errors and other failures.



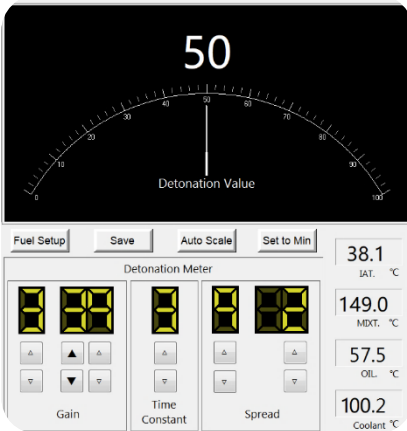
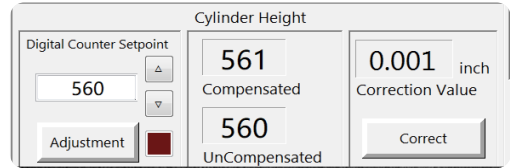
- ✓ **Falling Level Program** is used with a four-bowl variable-level carburetor, that allows determining maximum knock intensity without manual adjustment of fuel level. The operator can efficiently and accurately run a falling level test by PROCEDURE B (Bracketing-Dynamic Fuel Level) in ASTM D2699 and D2700.

Electronic On-Board Barometer

displaying barometric pressure value, is used for C.R. Digital Counter Automatic Correction as per ASTM method specifications.



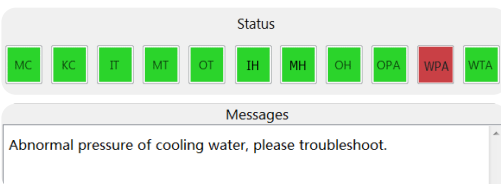
Cylinder Height is measured and auto-adjusted accurately. And the results are displayed on-screen in dual dimension values (compensated reading and uncompensated reading) that are recorded in the test reports.



Digital Knock Meter displays actual and accurate knock intensity value as well as real-time waveform, thus realizes more consistent and reliable test results. This software eliminates the need to center on 50 KI or be constrained by 0-100 KI. Meanwhile, the data and calculation results are recorded automatically to generate octane number rating report.

Automated Data Records with octane rating reports including KI values, octane numbers, environmental data, fuel level values and critical operating parameters, are automatically captured and presented in a PDF report. That can avoid human recording and calculating errors. The report is easy to review and print.

Time	Sample name	Operator	Sample Rating	Method	Standard	Procedure
2018/09/17 11:06:07	SINPAR_001	Operator_01	81.2	MON	ASTM D2700	CR
2018/09/17 10:29:17	SINPAR_001	Operator_01	81.2	MON	ASTM D2700	FL
2018/09/17 09:47:24	SINPAR_001	Operator_01	81.2	MON	ASTM D2700	EQ
2018/09/17 09:09:17	TSF	Operator_01	81.6	MON	ASTM D2700	FL
2018/09/17 08:47:06	TSF	Operator_01	81.7	MON	ASTM D2700	EQ
2018/09/17 08:10:15	TSF	Operator_01	81.6	MON	ASTM D2700	CR
2018/09/17 07:28:45	TSF	Operator_01	89.4	RON	ASTM D2699	EQ
2018/09/17 06:30:08	TSF	Operator_01	89.3	RON	ASTM D2699	CR
2018/09/17 05:10:29	TSF	Operator_01	89.4	RON	ASTM D2699	FL



More Safety System protects octane engine with failure indication system and E-stop, that ensures long service life and carefree operation.

Date/Time	Service Operation	Comments
2018/05/27 11:31:29	Replace Oil Filter	
2018/05/26 16:37:29	Replace Air Filter	
2018/05/11 12:34:12	Maintenance	SINPAR Service
2018/05/27 14:02:01	Oil Change	

Maintenance Logs (including records of engine hours, cylinder hours, oil-change intervals and maintenance/service operation comments) are displayed on the screen for easy review.

SXCP Octane Rating Parameters

Basic Information	
Standard	ASTM D2699 RON and ASTM D2700 MON
Working Range	40-120 octane number
Operation Conditions	
Engine Speed (Motor)	900±9 rpm
Engine Speed (Research)	600±6 rpm
Ignition Timing (Motor)	Variable as Cylinder Height (C.R.) is Changed
Ignition Timing (Research)	13° BTDC
Intake Air Temperature (Motor)	38°C±1°C
Intake Air Temperature (Research)*1	52°C±1°C at Standard Barometric Pressure
Intake Mixture Temperature (Motor)*2	149°C±1°C
Cylinder Jacket Coolant Temperature	100°C±1.5°C
Crankcase Oil Temperature	57°C±8.5°C
Crankcase Oil Pressure	172 kPa-207 kPa (25 psi-30 psi)
Intake Air Humidity	25-50 grains of water per lb. of dry air
NOTE: *1 See ASTM D2699 for details.	
NOTE: *2 See ASTM D2700 for details.	
Engine Information	
Compression Ratio (C.R.)	4:1-18:1
Cylinder Bore (Diameter)	82.55 mm (Standard)
Stroke	114.30 mm
Carburetor Venturi (Research)	14.30 mm (9/16 in.)
Intake/Exhaust Valve Clearance (Hot)	0.20 mm±0.025 mm
Intake Valve Opens Timing	10°±2.5° ATDC
Intake Valve Closes Timing	34° ABDC
Exhaust Valve Opens Timing	40° BBDC
Exhaust Valve Closes Timing	15°±2.5° ATDC
Crankcase Internal Pressure	25-150 mm H2O
Function Information	
Operation Panel	SXCP Digital Control Panel
Knock Meter	Automated Digital Knock Meter
Compression Ratio Adjustment	Motor-Driven (Auto-Adjust)
Compression Ratio Display Device	Digital Counter
Engine Speed Conversion	Dual-Speed Motor
Carburetor	Four-Bowl Falling Level (with the cooling function)
Ignition Timing Display	Digital (Auto-Set)
Crankcase Oil Pressure Display	Yes
Electronic Barometer	Yes
Crankcase Vacuum Display	Yes
Oil Temperature Display	Yes
Report Generation	Yes
Maintenance Log	Yes
Air Humidity Control System	Yes
Exhaust Surge Tank System	Yes
Unit Safety System	Yes

Automatic Reference Fuel Blending System

Automatic Reference Fuel Blending Unit SINPAR FTC-AD1

equipped with a modern computerized automatic control system, is used for the automated preparation of octane and cetane reference & standardization fuels blends for octane & cetane number testing according to ASTM D2699, ASTM D2700, and ASTM D613 standard test methods.

Automatic Reference Fuel Blending System is a Necessary Option for Octane/Cetane Rating Engines

As is known to all, the accuracy of the reference fuel blend directly affects the result of the cetane/octane rating. A device that can prepare the fuel blend *accurately* and *efficiently* is very important to ensure the accuracy of octane/cetane number determination.

SINPAR Automatic Reference Fuel Blending System makes fuel blending *more accurate, faster* and *without human error*, and saves you a lot of time. It is increasingly becoming a *must-have* in octane/cetane LABS.

Features & Benefits

■ Standards

ASTM D2699, ASTM D2700, ASTM D2885, and ASTM D613

■ High Precision

An electronic balance with the high precision of *0.01g* is used for gravimetric measurement to ensure the accuracy of blending.

■ Simple Operation

A built-in touch-screen computer panel with *easy-to-use* installed software simplifies the blending operation.

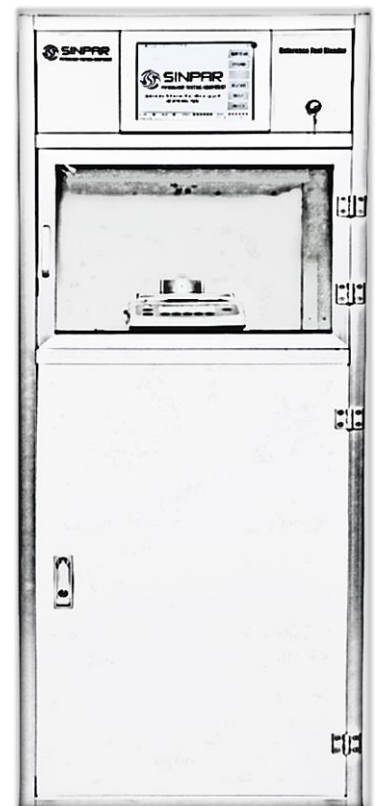
■ Accuracy and Efficiency

The automatic calculation program controls the whole blending process to *eliminate human error* and improve the efficiency of octane/cetane testing.

■ Safety and Real-Time Monitoring

The unit is equipped with electrical protection & temperature monitoring system to meet labs safety requirements.

Fuel temperature and level in the tanks are monitored in real time, with *low fuel level* & *overflowing* warnings.



Automatic Blending By Weight

The blending unit prepares the reference fuel blends by weight (using a precision electronic balance) based on the ASTM test methods.

With the automatic calculation and control program, it delivers the accurate and reliable fuel blend value with the precision of 0.01 ON/CN.



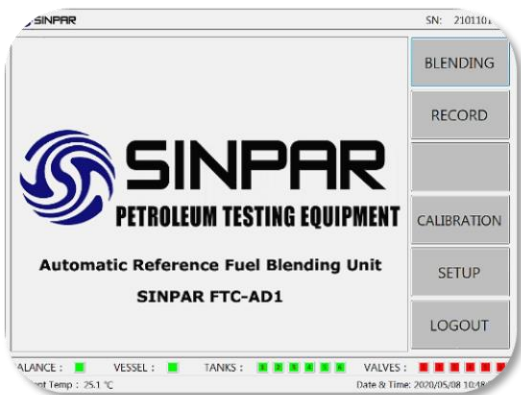
Automatic Reference Fuel Blending System

Professional Blending Software

The software was developed by SINPAR specifically for fuel blending. It is simple, clear, easy to use and requires no training.

From the main screen can access octane or cetane "BLENDING" operation, view blending "RECORD", perform pumps "CALIBRATION" and necessary "SETUP".

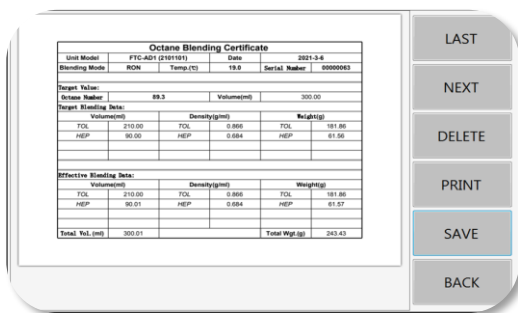
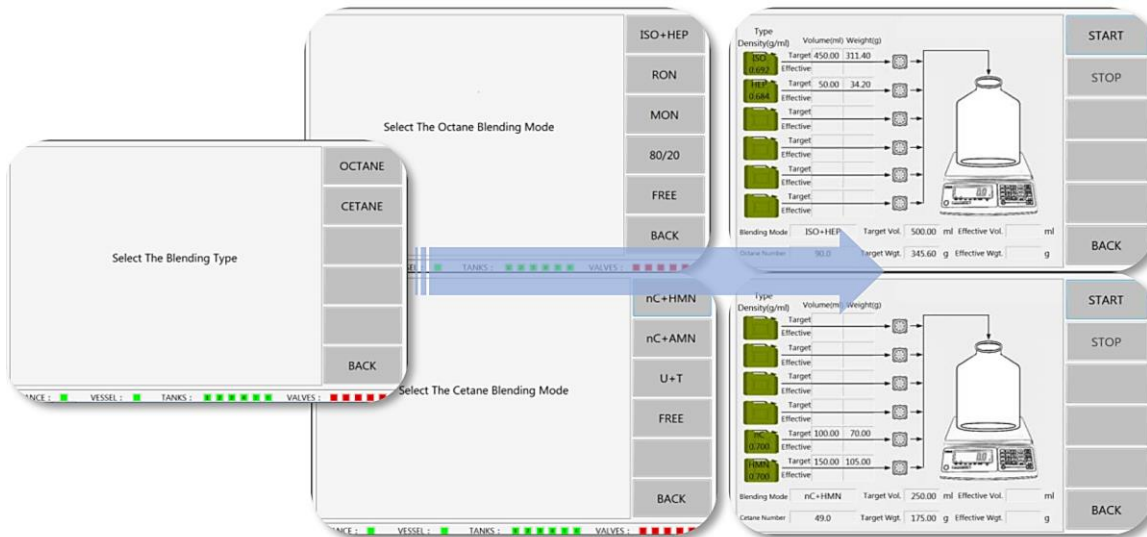
Status indicators of balance, vessel, tanks and valves are displayed in real time.



Octane/Cetane Blending Operation

The operator just needs to select the blending mode, enter the target blending parameters, and press "START" to begin the blending. The automatic computational control system controls the whole blending process. An accurate blend is delivered to the vessel automatically.

Free Blending mode is provided for special fuels blending.



Blending Record/Certificate

After the blending process is complete, the blending record is automatically saved in the computer.

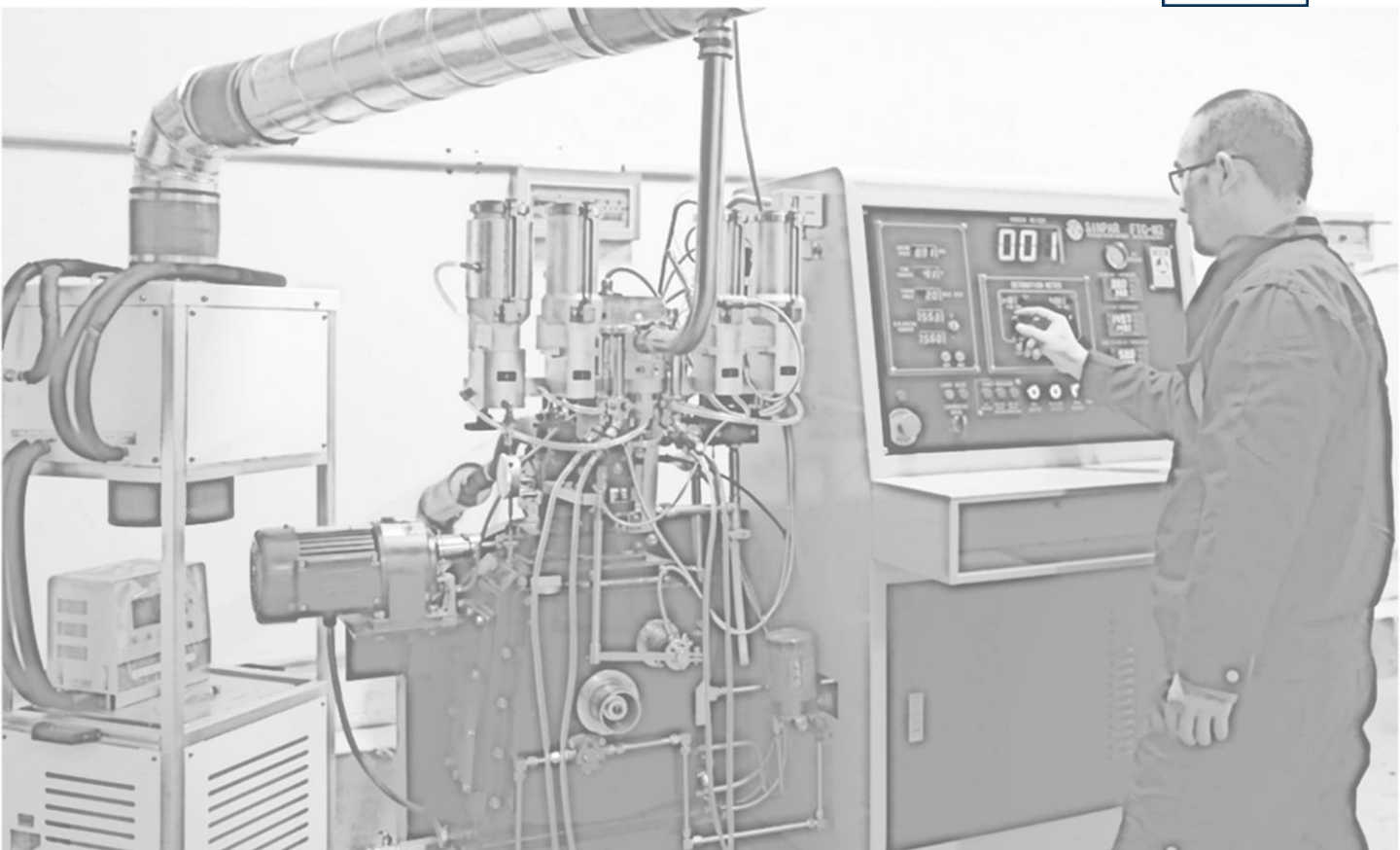
The blending certificate containing all necessary data can be printed or saved to a mobile storage device.

Technical Specifications

Applicable Standards	ASTM D2699, ASTM D2700, ASTM D613
Application	For Octane and Cetane Number Determination
Measurement Mode	Gravimetric Measurement by Precision Balance
Fuel Blending Mode	Automatic Fuel Blending System with Software
Operating Mode	Built-in Touch Screen Computer
Tank Quantity	Optional Quantity (3/4/5/6) of Tanks with 10 L. Each
Blend Accuracy	±0.01 ON/CN
Blending Speed	1~2 min/500 ml
External Refilling System	Automatic Refilling Internal Tanks from External Tanks under Nitrogen Pressure (<i>option</i>)
Monitoring System	Real-Time Monitoring Fuel Temperature and Level; Low Fuel Level & Overfilling Warnings
Calibration Function	Precision Electronic Balance and Dosing Pumps
Blend Data	Auto-Saved Blending Certificate
Power Supply	100~240VAC 50Hz/60Hz with Single Phase
Safety System	Electrical Protection System & Temperature Monitoring
Ventilation System	Available to Connect with Aspirator or Ventilation Duct
Weight	200.00 kg (with six empty tanks)
Dimension	85.0x65.0x168.0 cm



**Due to continuing products development, the illustrations used may differ from actual products, and specifications are subject to change.*



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