

Fermentation Measurement System

Fermograph II



AF-1101-10W Fermograph

Fermograph II is an automated multi-channel gas monitor to evaluate gas production ability of microorganisms such as baker's yeast for research, screening, and/or quality control of yeast strains, bread formula, culture conditions, etc.

This product won the prize for distinguished-services person in technology promotion (the prize awarded by Minister of Education, Culture, Sports, Science and Technology) in 2001.

Code No.	Type	Name
4101150	AF-1101-10W	Fermograph II, 10-ch
4101155	AF-1101-20W	Fermograph II, 20-ch

Please see the specification table on page 95 for system composition.
200-240V version is also available.

*Thermostatic Bath and Refrigerating Temperature Controller shown in below are options. A PC is not included in this product and needed to be locally purchased.

**AF-1101-20W includes 2 unit of AF-1101-10W.



Summary

AF-1101 Fermograph II has been approved as the official Baker's Yeast testing method by the Japan Yeast Industry Association. The gas volume produced by fermentation of microorganisms measured with this equipment provides valuable information on the metabolic activity of microorganisms and how the product quality is affected by the leavening conditions.

Therefore AF-1101 Fermograph II can be useful in many of industrial/academic research and quality testing, for example, characterization of yeast, breeding and screening of freeze-thaw resistant strains, optimization of formula of dough or media in baking or brewing.



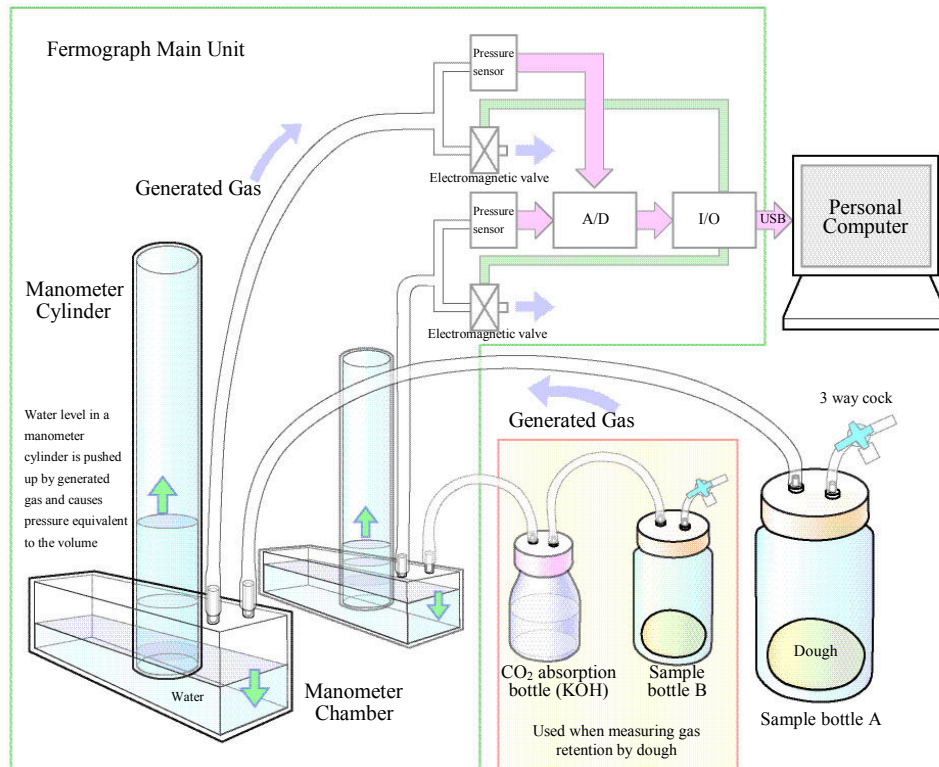
Features

1. Gas volume quantification and data processing are totally automated. Up to 20 samples (AF-1101-20W) can be measured with one PC.
2. Measurement interval of gas volume and total counts can be selected (5 to 120 min / 24 to 60 counts). Gas retention by the sample dough can also be measured using CO₂ absorption bottle.
3. Automatic temperature measurement with a temperature sensor inside the equipment can be selected for correction of environment temperature.
4. Sample quantity is 20 g flour basis (225 ml sample bottle capacity) in standard method.
5. Small and lightweight equipment with improved maintainability.

Fermentation Measurement System

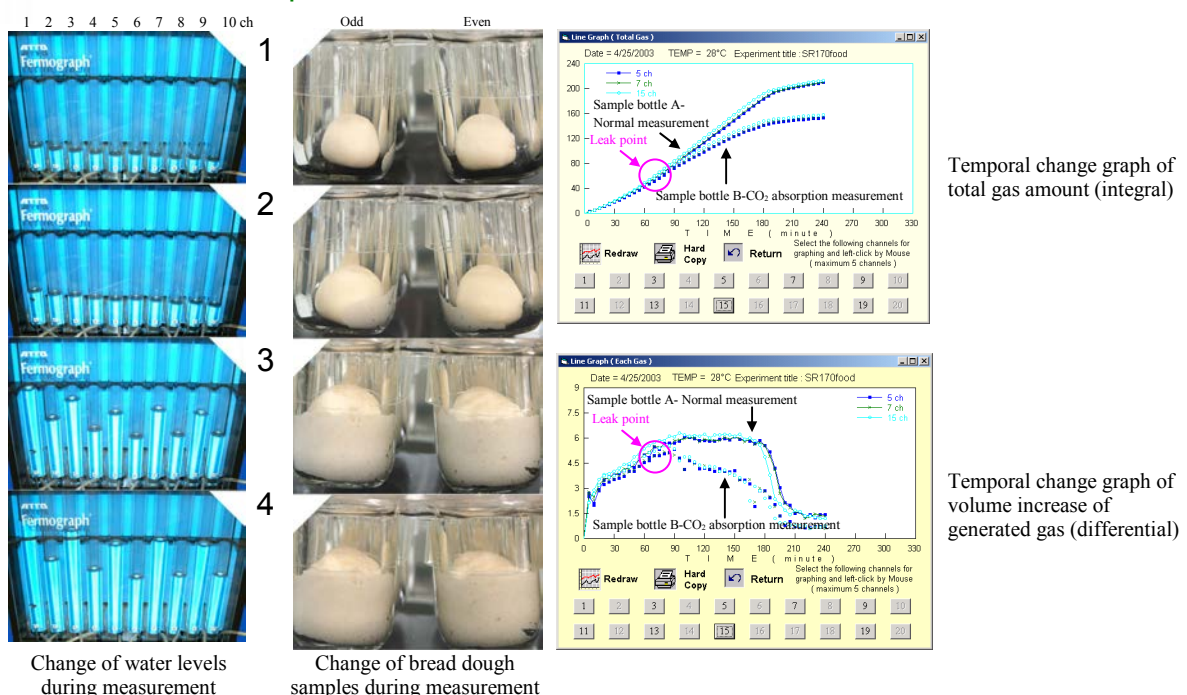
Measurement Diagram of Fermograph

Details of Product



Fermograph measures the amount of produced gas with gas-liquid displacement - pressure caused by water pushed up by gas is converted into volume. Fermograph is a compact and light weight device by employing pressure sensors. Total gas amount produced by the dough/yeast and volume increase of gas at each measurement interval are displayed on PC screen. Gas retention by dough can be measured by setting one of 2 identical samples into an even-numbered channel through a CO₂ absorption bottle and the other into an odd-numbered one without an absorption bottle.

Measurement Example



In photo 1 and 2 shown above, the amounts of produced gas are same in both of normal measurement (odd numbered channels) and CO₂ absorption measurement (even numbered channels). However, in photo 3 and 4, dough surface breaks and produced carbon dioxide gas starts leaking out, which causes volume difference between these 2 measurements due to absorption of carbon dioxide gas at the even numbered channel.

Fermentation Measurement System

Fermograph

Specifications

Name	AF-1101-10W Fermograph II	Af-1101-20W Fermograph II
Main Unit		
Measurement method	Gas-liquid displacement Pressure detection with pressure transducers	
PC interface	USB (A/B connector)	
Total number of Measurement	Up to 60 measurements	
Interval of measurements	5 to 120 minutes	
Number of measurement channels	Up to 10 channels	Up to 20 channels
Measurable gas volume	No limit for total (gross) gas production Max 3 mL per minute for gas production rate	
Resolution	0.2 mL, approx.	
Accuracy	$\pm 2\% + 0.2\text{mL}$ (for standard sample volume)	
Sample weight	20g, wheat flour basis	
Sample bottle size	225 mL	
Electric power specification	AC 90-110 V or 200-240 V, 50/60 Hz, 30 VA	AC 90-110 V or 200-240 V, 50/60 Hz, 60 VA
Dimensions	400(W) X 200(D) X 400(H) mm	400(W) X 200(D) X 400(H) mm X 2units
Net weight	12 kg	24 kg
Thermostatic bath (Option)		
Temperature range	From room temperature + 5 °C to 50 °C	
Temperature accuracy	± 0.1 to $0.5\text{ }^{\circ}\text{C}$	
Electric power specification	AC 90-110 V or 200-240 V, 50/60 Hz, 900 VA, with power transformer	
Dimensions	270(W) X 360(D) X 150(H) mm excluding a temperature controller, 6 kg	

Composition

Name	AF-1101-10W Fermograph II	Af-1101-20W Fermograph II
Main unit	1 main unit	2 main units
Standard accessories		
Software/drivers CD for Windows 2000/XP/Vista	1 CD	
225 mL sample bottle	[4108210] 60 /set	[4108310] 120 /set
225 mL sample bottle cap	[4108215] 10 /set	[4108315] 20 /set
CO ₂ absorption bottle assembly	[4108220] 5 /set	[4108320] 10 /set
Tygon tube (R-3603) 1/8" – 1/16"	[4108225] 5m X 2 /set	[4108325] 5m X 4 /set
Interface cable	1 USB cable with A/B connector	
Options		
Thermostatic bath with a heater unit	[4108235] 1 /set	2 /set
Cooling circulator	[4108240] 1 /set	2 /set
Personal computer running on Windows 2000/XP/Vista	1	

Dough Mixing Monitor

Versa-Logger

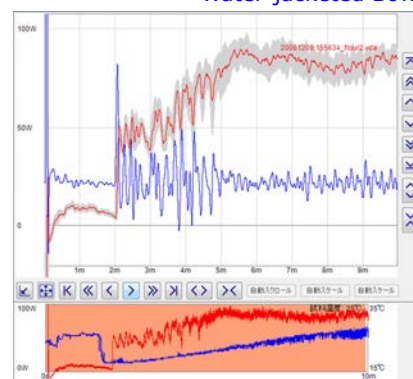
Versa-Logger is a mixing monitor system which visualizes the rheological change of various foods, such as bread dough, whipped cream, or cake batter, or chemical products, etc., by probing change of the mixer power consumption during mixing/whipping process.

Fig.1. Versa-Logger System (center) with 200g Swanson-type Mixer (right)



Code No.	Type	Name
4101701	AF-1700-V1	Versa-Logger for 100V mixer
4101702	AF-1700-V2	Versa-Logger for 200V mixer
4173056		National MFG 200g Mixer

Fig.2. Mixing Curve of Bread Dough with a 100V mixer– showing dough development (Right)
Top: Main graph shows moving average of mixing power (Red line), width of the curve (Grey area), and first differential (Blue line). Mixing power varies on the dough development.
Bottom: Sub graph shows whole trend of mixing power (Red) and temperature (Blue)



Composition (*: optional)

Versa-Logger	Main unit including a power meter, A/D converter, and USB interface
Software	Windows XP/Vista, .NET framework 2.0 or later
200g mixer*	Swanson-type mixer manufactured by National MFG (TMCO)
Water-jacketed mixing bowl*	Specifically designed for the 100-200g Swanson-type mixer
Cooling Circulator*	AB-1600 SuperStat Mini for cooling dough in the mixer bowl
Minimum requirement for Personal computer*	1.5GHz Celeron (Core 2 Duo or later recommended), 1GB RAM, 10MB HDD at least, USB

*)If you would like to use a 200V mixer on your site, setting of connector part will be necessary. Please contact us in the case.

Features

1. Easily installed with simply connecting the mixer power cable to the equipment.
2. Measuring effective power consumed by the mixer – resulting mixing curve visualizes the mixing process and rheological change of the sample.
3. Calculates moving average, Curve width (Max-min), Differential of the curve, etc.
4. Overlays up to 5 measurements on the display.
5. Converts the measured result into CSV format that can be handled with Microsoft Excel.
6. Baseline/background of power can be corrected by idle operation before and after measurement
7. You can choose a 100V or 200V model for a variety of mixers, from a desktop type to a large one.

Specifications

Product name	AF-1700 Versa-Logger
Power to be measured	1200W (Standard for 100V), different power specification available for 200V mixers
Voltage to be measured	100-110V or 200-240V AC, 50/60 Hz
Sampling interval	10, 20, 50, 100, 200, 500msec, 1, 2, 5, 10sec
Max sampling points	65,000 points
Power specification for Versa-Logger	100V AC, 50/60Hz, 20VA, *Contact if different power spec needed
Interface cable	USB
Software	Running on Windows XP/Vista (32bit)

Please note that power consumption may not always fully represent the rheological change of the sample under certain conditions due to quantity and quality of the sample, mixer type (hook, beater, wire whip) and speed profile, formula, temperature, circumstances, etc. You might need to make preliminary experiments for exploring some optimum conditions.