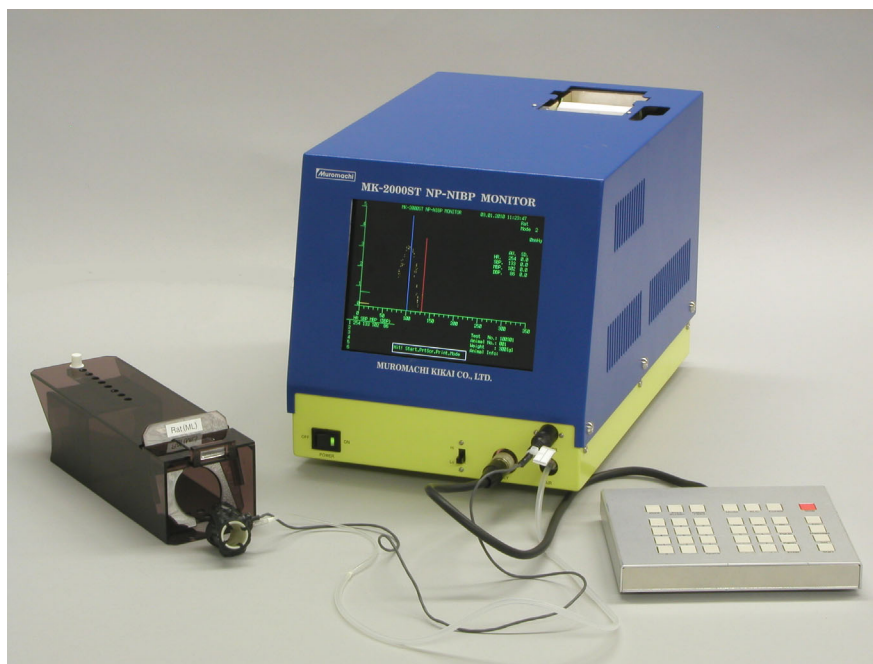


Model MK-2000ST

NP-NIBP MONITOR FOR MICE & RATS

*Introducing the first and only Non-Preheating, Non-Invasive
Blood Pressure Monitor for Mice and Rats in the world*



Capable of recording from neonatal mice (1.4 g) to aged rats (1 kg)

Introduction

To measure blood pressure of small animals such as rats or mice using conventional BP Monitors, animals had to be preheated by some means. However, **the advent of MK-2000 has made it possible to measure blood pressure without preheating animals provided that the room temperature is at least 23 degrees C.** MK-2000ST is the successor to MK-2000 and has become more compact than ever before.

MK-2000ST is ideal for investigating the effects of drugs on animals. Once the animals are restrained properly, just press the START key and HR (Heart Rate), SBP (Systolic BP), MBP (Mean BP) and DBP (Diastolic BP, calculated value) will be automatically measured.

It photoplethysmographically measures pulsatile blood pressure of tail arteries. Pulses are stored into the computer memory and the peak levels of the pulses are plotted on the display. X-axis indicates cuff pressure, and Y-axis indicates amplitude of pulses. Using this method, the operator can decrease the risk of selecting artifacts and BP measurement is made more objective compared to the conventional digital display method.

SBP is initially estimated by inflating the cuff at approximately 25 mmHg/sec. During cuff deflation at about 4-5 mmHg/sec, SBP is determined precisely. SBP is defined as the point when the pulse reappears.

MUROMACHI KIKAI CO., LTD.

Main Features

1. Two operation modes are available.

With Mode 1 HR (Heart Rate) and SBP (Systolic Blood Pressure) are measured. With Mode 2 HR, SBP, MBP (Mean Blood Pressure) and DBP (Diastolic Blood Pressure, calculated value) can be measured.

MODE1	HR		SBP	
MODE2	HR	SBP	MBP	(DBP)

NOTE : HR (Heart Rate), SBP (Systolic BP), MBP (Mean BP), DBP (Diastolic BP, calculated value)

2. Continuous Measurement Function

Continuous measurement can be performed up to ten (10) times. Further, continuous & rapid measurement can also be performed in order to shorten the measuring time.

3. Rapid Printout Function

Onscreen data including average (AV) and standard deviation (SD), are printed out in about one (1) second by the high-performance thermal printer. Data may also be deleted at the operator's discretion.

4. Colored mice such as C57BL/6, neonatal mice weighing 1.4 grams, hamsters (anaesthetized) and guinea pigs (non-anaesthetized), of which blood pressure was so far considered difficult to measure, can be measured.

5. Sick animals can be measured. (e.g. animal with cardiac infarction)

6. Multi-channel system is no longer needed. Just prepare multiple restrainers, and measurement can be done one after the other.

7. Auto-Sequence Function

Blood pressure of a tail artery of an animal can be monitored automatically at specified time intervals, which can be 1 - 99 minutes in length. At each interval, anywhere from 1-10 measurements can be made. This function invokes a series of procedures automatically--- measurement, printout of data and transfer to a PC.

8. Time-Stamp Function

The MK-2000ST precisely records the time of each BP measurement.

9. Hard Copy Function

The screen on the display can be captured to the thermal printer using the PrtScreen key.

10. An RS-232C interface is provided on the rear panel of the main unit. Using the optional **DCS-2000 Data Collection Software (Windows Version)** the data obtained can be exported to a personal computer and stored as a CSV file.

11. The animal holders are made of dark brown acryl, allowing BP measurement under relatively stress-free conditions.

12. Operation is very simple.

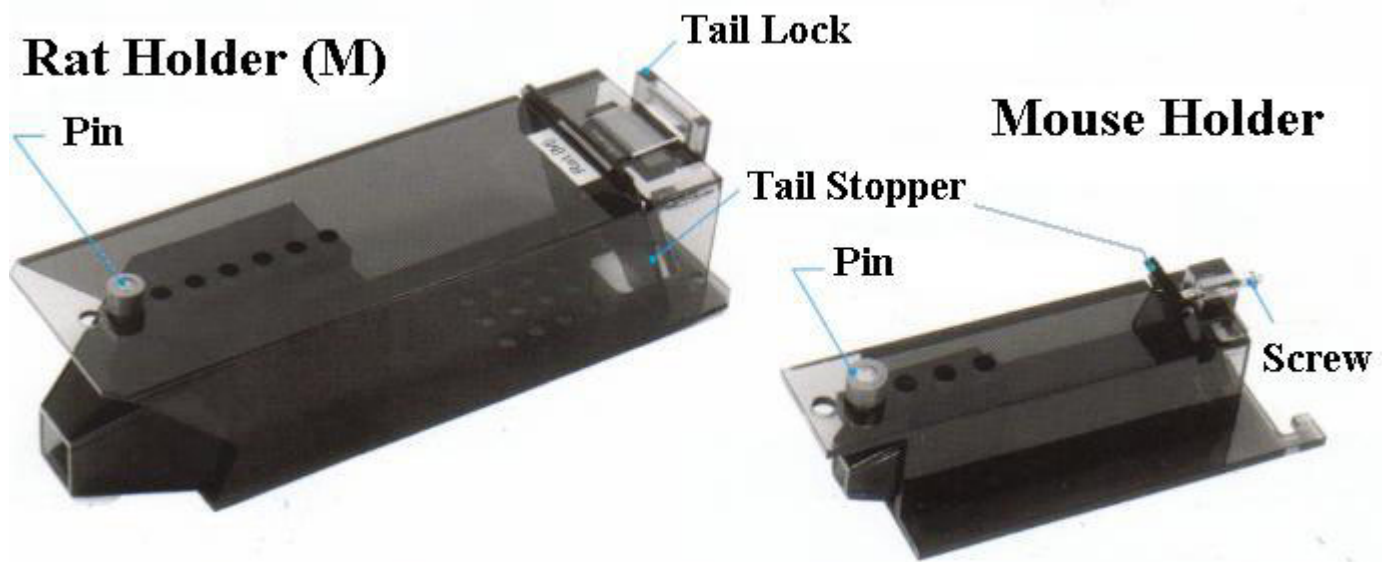
SPECIFICATIONS

Main Unit (MK-2000ST)	
SBP	Cuff pressure when pulse reappears
MBP	Cuff pressure when pulse amplitude becomes largest
DBP	Calculated value based on SBP and MBP $(3MBP-SBP)/2$
Detection	LED, Photo Transistor
Inflation Range	0 - 350 mmHg
Printer Outputs	Date, Time, Animal No., Weight, Operation Mode, Interval, No of Measuring Trials, Raw Data, Average and S.D.
Chart Paper	Thermo-sensitive 58 mm Wide x 25 m Long
Power	AC100-130V 50/60Hz
Dimensions	210W x 310D x 210 mm H
Weight	Approx. 8 kg

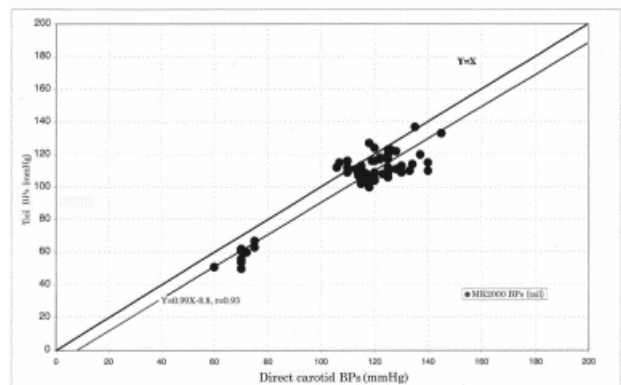
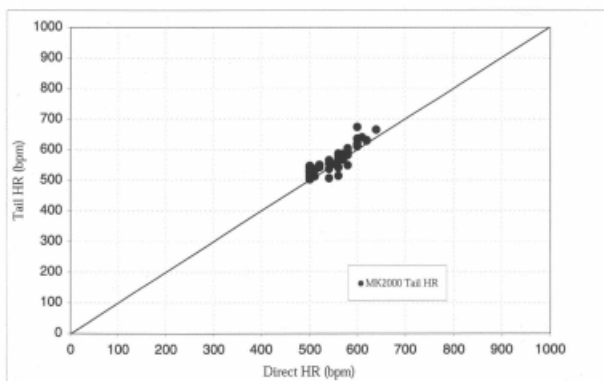
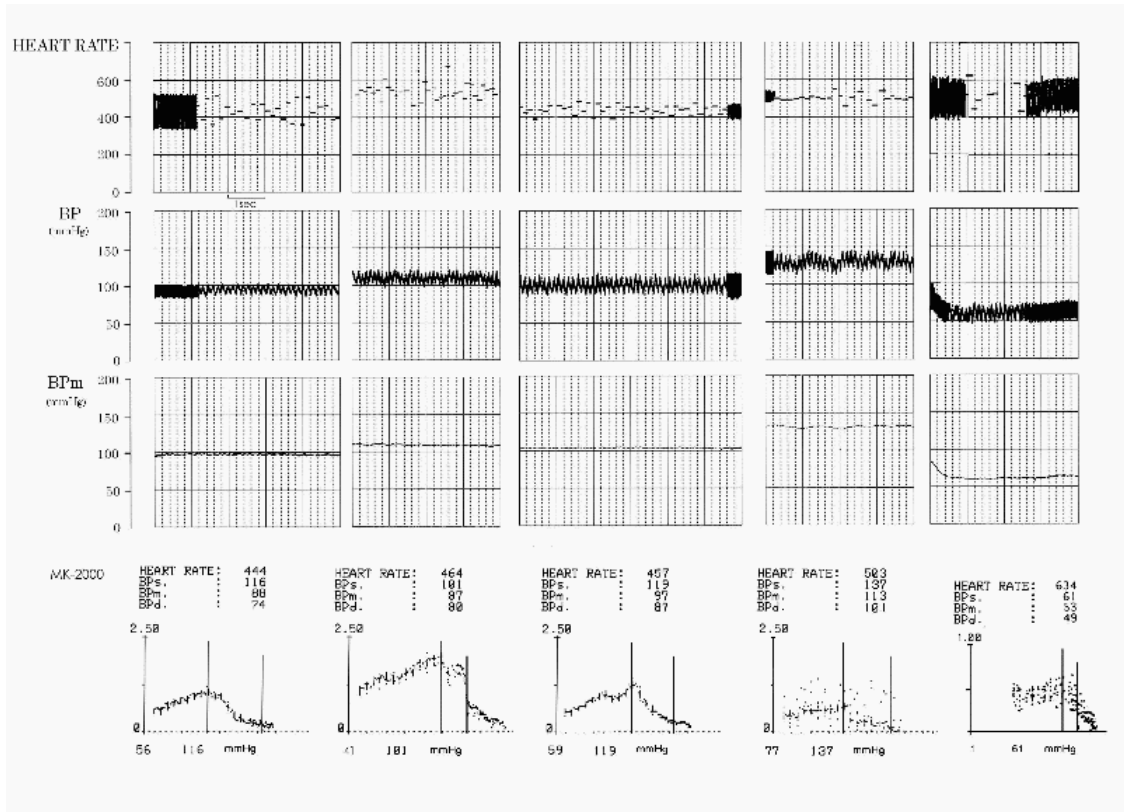
Keyboard	
Function Keys	33
Dimensions	145W x 120D x 20 mm H
Weight	Approx. 0.4 kg

The Standard System Comes Supplied with:	
Main Unit (Printer included)	1
Keyboard	1
Animal Holder (Any one from the list)	1
Cuff-pulse Sensor (Any one from the list)	1
Measuring Stand for Rats	1
TSP-10 Chart Paper (Pack of 5 Rolls)	1
APC-2000 Accessory Case	1
Dust Cover	1

Animal Holders		Cuff-Pulse Sensors	
Mouse Holder (3S)	5-10 g	Neo24NH	1.4 - 2 g
Mouse Holder (SS)	10-20 g	Neo32NH	2 - 5 g
Mouse Holder (S)	20-30 g	Neo40NH	5 - 10 g
Mouse Holder (M)	30-40 g	Mouse NH	20-50 g
Mouse Holder (L)	40-50 g	OB Mouse NH	OB Mouse & Mouse 5-20 g
Rat Holder (3S)	50-70 g	C57 Mouse NH	C57BL6 Mouse
Rat Holder (SS)	70-90 g	Hamster (S) NH	Approx. 60-80 g
Rat Holder (S)	90-150 g	Hamster (M) NH	Approx. 80-120 g
Rat Holder (SM)	150-210 g	Hamster (L) NH	Approx 120-160 g
Rat Holder (M)	210-270 g	Rat (S)NH	90-210 g
Rat Holder (ML)	270-350 g	Rat (M)NH	210-350 g
Rat Holder (L)	350-500 g	Rat (ML)NH	350-500 g
Rat Holder (LL)	500-800 g	Rat (L)NH	500-800 g



Correlation between simultaneously recorded blood pressures (BP) from carotid catheter and BP measured with the Model MK-2000 in mice. Good correlation was seen in a wide range of BP, which was induced by i.v. infusions of pressor or depressor agents.



The data was offered courtesy of Prof. Tomoyuki Kuwaki, Ph.D.,
Department of Molecular and Integrative Physiology, Graduate School of Medicine,
Chiba University

Specifications are subject to change without notice.

REFERENCES:

1. Design and production of genetically modified soybean protein with anti-hypertensive activity by incorporating potent analogue of ovokinin (2-7) (FEBS Letters 24860 (2001) 1-5)
2. Syndecan-4 Deficiency Leads to High Mortality of Lipopolysaccharide-injected Mice (The Journal of Biological Chemistry, Vol. 276, No. 50, Issue of December 14, pp. 47483-47488, 2001)
3. Validity and Application of Noninvasive Measurement of Blood Pressure in Hamsters (Exp.Anim. 52(4), 359-363, 2003)
4. Progressive Development of Pulmonary Hypertension Leading to Right Ventricular Hypertrophy Assessed by Echocardiography in Rats (Exp. Anim. 52(4), 285-294, 2003)
5. Role of host angiotensin II type 1 receptor in tumor angiogenesis and growth (The Journal of Clinical Investigation July 2003 Vol.112, No. 1)
6. Growth hormone-releasing peptide can improve left ventricular dysfunction and attenuate dilation in dilated cardiomyopathic hamsters (Cardiovascular Research 61 (2004) 30-38)
7. Development of an in vivo Bioassay Method for Allergy-Preventive Substances using HEL-induced Blood Flow Decrease (Biol. Pharm. Bull)
8. Salt-sensitive hypertension is triggered by Ca^{2+} entry via Na^+/Ca^{2+} exchanger type-1 in vascular smooth muscle (NATURE MEDICINE Volume 10 Number 11 November 2004)
9. The vascular relaxing effects of sevoflurane and isoflurane are more important in hypertensive than in normotensive rats (Canadian Journal of Anesthesia 51: 979-985, 2004)
10. Angiogenesis and Vasculogenesis Are Impaired in the Precocious-Aging *klotho* Mouse (American Heart Association *Circulation*. 2004;110:1148-1155.)
11. Effects of Captopril on Cardiac and Renal Damage, and Metabolic Alterations in the Nitric Oxide-Deficient Hypertensive Rat (Kidney Blood Pressure Research 2005; 28: 243-250)
12. Rat Phenome Project: The untapped potential of existing rat strains (J Appl Physiol 98: 371-379, 2005)
13. An X-Ray Diffraction Study on Mouse Cardiac Cross-Bridge Function In Vivo: Effects of Adrenergic β -Stimulation (*Biophysical Journal* 90:1723-1728 (2006)
14. Prostacyclin agonist with thromboxane synthase inhibitory activity (ONO-1301) attenuates bleomycin-induced pulmonary fibrosis in mice (Am J Physiol Lung Cell Mol Physiol 290: L59-L65, 2006.)
15. Antihypertensive Effect of Angiotensin-Converting Enzyme Inhibitory Peptide Obtained from Hen Ovotransferrin (Journal of the Chinese Chemical Society, 2006, 53, 495-501)
16. Evaluation of Blood Pressure Measured by Tail-Cuff Methods (without Heating) in Spontaneously Hypertensive Rats (Biol. Pharm. Bull. 29(8) 1756-1758 (2006) Vol. 29, No. 8
17. Mechanical ventilation with 40% oxygen reduces pulmonary expression of genes that regulate lung development and impairs alveolar septation in newborn mice (Am J Physiol Lung Cell Mol Physiol 293:1099-1110, 2007.)
18. Mechanical ventilation uncouples synthesis and assembly of elastin and increases apoptosis in lungs of newborn mice (Am J Physiol Lung Cell Mol Physiol 294:L3-L14, 2008.)