

Main Body

Front

ECOPIA HALL EFFECT ME	ASUREMENT SYSTEM	HMS-3000
	 (a) MAIN FOWER (b) OPERATION 	© RESET

- ⓐ Main power LED
- (b) Operation LED
- \bigcirc Reset button

Back

() ()	(3)	(b) (i) (k) (i)
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- d) USB / RS232 Select S/W.(h) Power S/W.
- RS232 Port
- (f) USB Port (j)
- (g) Sample connect
-) Power cord
- (k) Earth

(i) Fuse

Magnet set



- ① Liquid Nitrogen Inlet
- Sample Board Connector
- (n) Main Body Connector
- \bigcirc Sample Board
- D MagnetSet Case
- (9) Permanent Magnet

2. Measuring a Device

Connect the (AC Power Connector cable to Main Body

Power supply : AC 100 - 240V / 50 - 60Hz 2A

C f ®	h	
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■ Connect the sample connection cable between the ⓑ sample connect (5pin connector in rear of Main Body) and ⓐ Main body connector located on top of the white Magnet Set cover.



Connect the Main body to PC

Connect ①RS232 Port of Main body to Serial port of PC using 9pin serial cable supplied. (@ USB / RS232 : Select Port switch RS232 in this case)



Or connect ③USB Port of Main body to PC USB Port using USB Cable supplied. (④ USB / RS232: Select the switch USB in this case)



4

■ Install the CD ROM software program that is supplied with the system onto a MS Windows based PC.

Setting up the programming should be finished before measurement (Refer to set up the programming)

Measuring at 77K

Have some liquid nitrogen available if you are planning on measuring at 77K.



- In case of connecting with RS232C cable
- $1. \hspace{0.1 cm}$ Select Switch to RS232 in the rear of the Main body.



Confirm the com port driver.

2. Confirm if there is not-using COM1~6 Port in PC and confirm the Port available.

* In case the setting up program is not operated due to user's PC environment, OS error, ask service center of the PC manufacturer.

- 3. Start setting up the program of Hall Effect Measurement System
 - ① Insert CD supplied into CD-ROM.

And it executes program setup wizard automatically.

If it does not be executed automatically, pls execute "Setup.exe" in CD-ROM driver.



Installing Files	
Extracting file to C:\HMS3000\HMS3000	
96%	
Cancel	



	MEASUREM	IENT DATA			
DATE USER NAME	AB [mV]	BC [mV]	AC [mV]	MAC [mV]	-MAC [mV]
06-28-2004 USER1	0.000	0.000	0.000	0.000	0.000
SAMPLE NAME COM PORT TEMP SAMPLE1 COM1 77K V	0.000	0.000	0.000	0.000	0.000
	CD [mV]	DA [mV]	BD [mV]	MBD [mV]	-MBD (mV)
= 0.0000 🗘 mA DELAY= 0.5 [S]	0.000	0.000	0.000	0.000	0.000
= 0.000 [um] B= 0.000 [T]	0.000	0.000	0.000	0.000	0.000
Nb = 0.000E+0	[/Cm ²] [Cm ² /Vs] [GCm] [m ² /C]	Ns =	 0.000E+0 0.000E+0 0.000E+0 0.000E+0 	[/Cm ²] [1/ឆCm] [m ² /C] [m ² /C]	
AR = 0.000E+0	[Ω]	α =	0.000E+0		

In case of connecting with USB cable.

1. Select Switch to USB in the rear of the Main body.



 Connect the USB cable between Main body and PC and turn on the power of Mainbody. The "New hardware set up" screen will pop up.
 Set it up to the position of CD driver supplied.



Check it as picture and click the "Next" button.

Found New Hardware Wizard			
Please choose your search and installation options.			
 Search for the best driver in these locations. 			
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.			
Search removable media (floppy, CD-ROM)			
Include this location in the search:			
D:\ Browse			
O Don't search. I will choose the driver to install.			
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.			
< Back Next > Cancel			

Check it as picture and click the "Next" button.



It is searching USB <-> Serial.



It is setting up the file to set up on window.



Click the "Finish" button and first setting up is finished.

Found New Hardware Wizard		
	Welcome to the Found New Hardware Wizard	
	This wizard helps you install software for:	
664	USB Serial Port	
	If your hardware came with an installation CD or floppy disk, insert it now.	
A Carlos and	What do you want the wizard to do?	
	 Install the software automatically (Recommended) Install from a list or specific location (Advanced) 	
	Click Next to continue.	
< Back Next > Cancel		

Check it as picture and click the "Next" button.

Found New Hardware Wizard			
Please choose your search and installation options.			
Search for the best driver in these locations.			
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.			
Search removable media (floppy, CD-ROM)			
Include this location in the search:			
D:\ Browse			
O Don't search. I will choose the driver to install. Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.			
< Back Next > Cancel			

Check it as picture and click the "Next" button.

Found New Hardware Wizard		
Please wait while the wizard searches		
USB Serial Port		
	3	
	<pre></pre>	

It is searching required file.



It is setting up the file to set up on window.



Click the "Finish" button and the setting up is finished.

< The following process is about checking setted up USB Serial Port>



Click the "Properties" on "My Computer" as picture.

Systemin	estore Autor	natic Updates	Remote
General	Computer Name	Hardware	Advanced
Add Hardwa	are Wizard		
۲ 🏂	he Add Hardware Wizard	helps you install hards	ware.
		Add Hardwar	re Wizard
Device Mar	ager		
	he Device Manager lists a	all the hardware device	es installed
pi	operties of any device.	Device Manager to cl	hange the
	Driver Signing	Device Manager to cl	hange the
Pi Pi Hardware P	n your computer. Use the operties of any device. Driver Signing rofiles	Device Manager to cl	hange the
Hardware P	operties of any device. Driver Signing rofiles ardware profiles provide a fferent hardware configur.	Device Manager to cl Device Ma Device Ma Device Ma Device Ma	hange the
Hardware P	Driver Signing Driver Signing nofiles ardware profiles provide a freent hardware configur.	Device Manager to cl Device Ma a way for you to set up ations. Hardware	hange the anager and store Profiles

Click the "Device Manager" on Hardware tap as picture.

🚇 Device Manager	. 🗆 🛛
File Action View Help	
E- 🚇 DVK-JQHEKFYLYXI	
🕀 😼 Computer	
主 🖘 Disk drives	
庄 😼 Display adapters	
🗄 🥝 DVD/CD-ROM drives	
🖻 🗃 Floppy disk controllers	
🕀 🍶 Floppy disk drives	
🗉 🗃 IDE ATA/ATAPI controllers	
庄 🦢 Keyboards	
🖅 🐚 Mice and other pointing devices	
🗈 😼 Monitors	
主 🎟 Network adapters	
😑 🚽 Ports (COM & LPT)	
Communications Port (COM1)	
- 🖉 Communications Port (COM2)	
ECP Printer Port (LPT1)	
+ Processors	
The sound video and name controllers	
The System devices	
The second secon	

Click the "Ports(COM&LPT)" and click the "USB Serial Port"

🚇 Device Manager		
File Action View Help		
	. 🕿 🗶 🛃	
DVK-JQHEKFYLYXI Gomputer Obsd drives Disday adapters Disday adapters Diplay adapters DVD/CD-ROM drives DVD/CD-ROM drives DUD ATA/ATAPI controllers DID EATA/ATAPI controller Mice and other pointing d Monitors Monitors Ports (COM & LPT) Communications Port COmmunications Port CCP Printer Port (LPT)	: vices COM1) COM2))	
	Update Driver Disable Uninstall	
🗄 🚭 Universal Serial Bus conl	Scan for hardware changes	
Opens property sheet for the currer	Properties	

Click the "Properties" button as picture.

USB Serie	al Port (COM	3) Properties	? 🔀
General	Port Settings	Driver	
Ţ	USB Serial Por	t (COM3)	
	Device type:	Ports (COM & LPT)	
	Manufacturer:	FTDI	
	Location:	on USB High Speed Serial Converter	
Devic	e status		
This If you start	device is working a are having prob the troubleshoote	g properly. Ilems with this device, click Troubleshoot to er.	
		Troubleshoot	
Device	usage:		
Use thi	is device (enable)	~
		ОК	Cancel

Click the "Port Settings" tap.

USB Serial Port (COM3) Properties	2 🛛
General Port Settings Driver	
Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	None
	vanced
	OK Cancel

Click the "Advanced" button.

Select low	ier settings to	o correct co	nnection problem	15.				OK Cance
Select hig	her settings I	for faster pe	rformance.					Defaul
Receive Buffer:	Low (1)	1		+	— Q	High (14)	(14)	Deraul
Transmit Buffer:	Low (1)	1		<i>E</i>	— Q	High (16)	(16)	

In above "COM Port Number", select "COM1" or "COM2"

Advanced Settings for COA	13					? 🛛
Use FIFD buffers (requ Select lower settings to Select higher settings Receive Buffer: Low (1) Transmit Buffer: Low (1)	uires 16550 d o correct cor for faster per	compatible UAR Innection problem formance.	T) ns. ,	 High (14) High (16)	(14) (16)	OK Cancel Defaults
COM Port Number: COM3	¥ ^					2
C0M4 C0M5 C0M6 C0M7 C0M8 C0M9						

Select and click "OK".

< The followings are for deleting USB driver>



Click the "Ftdiunin" as picture.



Click the "Continue" button.

TDI Uninstalle	r Version 2.1		
Uninstal Deleting Deleting	ling VID_0403&PID_ registry entries files	_6001	
Uninstal	l complete, press Fi	nish to exit.	
	Continue	[Finish]	

Click the "Finish" button and USB driver deleting is finished.



- 4 1. Hall Effect Measurement System Program
- * The first screen shot *



- 1) Click "START MEASUREMENT" to move to measurement page.
- 2) "EXIT" Finishing the measurement.

SOFIA HALL EFFECT MEASUREMENT STOTEM (HMS-3000 VEN 3.0	1)			
HALL EFFECT	MEASU	JREM	ENT :	SYST	EM
INPUT VALUE	MEASUREME	ENT DATA			
DATE USER NAME	AB [mV]	BC [mV]	AC [mV]	MAC [mV]	-MAC [mV]
03-10-2005 USER1	-22.409	-5.569	-16.856	-16.975	-16.752
SAMPLE NAME COM PORT TEMP SAMPLE1 COM3 300K	22.353	5.486	16.792	16.898	16.678
1 0000 Tma DELAY= 0 100 ISI	CD [mV]	DA [mV]	BD [mV]	MBD [mV]	-MBD [mV]
• • • • • • • • • • • • • • • • • • • •	-22.412	-5.571	-16.857	-16.752	-16.973
	22.348	5.483	16.792	16.675	16.898
RESULT					
Nb = -2.873E+20	[/ Cm ³]	Ns =	-2.873E+15	[/ Cm ²]	
μ = 3.989E+1	[Cm ² /Vs]	σ =	1.836E+3	[1/ ΩCm]	
ρ = 5.447E-4	[🔍 Cm]	Rh =	-2.173E-2	[m ² /C]	
Rh12167E-2		Ph2 =	-2.178E-2	(m ² /C)	
AR = 11005-1	[0]	nii2 -	2.4705-1		
		-	1 2.4700-1		
OPERATING DISCRIPTION The calculation is completed.		PROGRESS [%]		GoTo	V CURVE
COM.TEST MEASURE STOP	CACU	L SAVE	PRINT	CLOSE	HELP

■ INPUT VALUE PART

INPUT VALUE	
DATE	USER NAME
03-10-2005	USER1
SAMPLE NAME	COM PORT TEMP
l= 1.0000 🗘 mA	DELAY= 0.100 [S]
D= 0.100 [um] MASUREMENT NUMBER=	B= 0.510 [T]

DATE : Date is shown in a month-day-year order.

USER NAME : Input user name.

SAMPLE NAME : Input sample name.

COM PORT : Select the Com port of PC.

TEMP: Temperature condition selection.

 I : If you apply input current over range (0 ~ 20mA), "Over range" warning message appears in text window.

DELAY : The time that takes from applying input current to measurement. (Not important). "0.1" second will be recommended.

- **D** : Sample thickness input window.
- **B** : Magnet flux density input window.

MEASUREMENT DATA PART

MEASUREN	IENT DATA	I		
AB [mV]	BC [mV]	AC [mV]	MAC [mV]	-MAC [mV]
-22.409	-5.569	-16.856	-16.975	-16.752
22.353	5.486	16.792	16.898	16.678
CD [mV]	DA [mV]	BD [mV]	MBD [mV]	-MBD [mV]
-22.412	-5.571	-16.857	-16.752	-16.973
22.348	5.483	16.792	16.675	16.898

Hall voltage is measured as user apply "INPUT VALUE".

RESULT PART



The electrical properties of the sample(carrier concentration, mobility, and etc) is calculated based on raw data(hall voltage) using a numerical formula.

Order button part

OPERATING DISCRIPTION	PROGRESS [%]	GoTo I/V CURVE
COM.TEST MEASURE STOP C	LEAR CACUL SAVE PRINT	CLOSE HELP

GoTo I/V CURVE

Diversion to I-V Curve window





available.

MEASURE

Start measurement after entering up input values.



Save measured data and results value.



Changing raw data(hall voltage) makes other results value change as calculated formula.



Toggle between STOP operating when measuring, and

CONTINUE measuring when stopped.



Clear measurement data and results value.



Print the screen contents

CLOSE

Program ending.

HELP

Open the help window.



ECOPIA HALL EFFECT MEASUREMENT SYSTEM (HMS-3000 VER 3.01)
HALL EFFECT MEASUREMENT SYSTEM
DATE USER NAME SAMPLE NAME COM PORT TEMP CONT. REF[%] DELAY TIME 03-10-2005 USER1 SAMPLE1 COM1 300K • \$1000 0.100
INPUT CURRENT INITIAL -1.000000 \$ mA FINAL 1.000000 \$ mA STEP \$ 10
ab bc da da ab bc da
3.26E+0 2.00E+0 1.00E+0 -1.00E+0 -2.00E+0 -3.26E+0 -1.00E+6 -1.00E+6 -1.00E+6 -1.00E+6 -1.00E+6 -1.00E+6 -1.00E+0
I-V CURVE DATA VIEW I-R CURVE
OPERATING DISCRIPTION PROGRESS [%] Go To HALL
COM.TEST MEASURE STOP CLEAR LOAD REDRAW SAVE PRINT CLOSE HELP

I-V measurement program screen

It shows s/w screen composition to measure I-V. The features of each part is as follow.

■ INPUT VALUE PART

DATE 07-07-2004	USER NAME USER1	SAMPLE NAME SAMPLE1	COM PORT	TEMP 300K 🔻	CONT. REF[%]	DELAY TIME 0.100
INPUT CURRENT	INITIAL 0.000	\$ mA	FINAL 0.000	mA	STEP 🗘 🕻	

DATE: Date is shown in month-day-year order.

USER NAME: User name input window.

SAMPLE NAME: Sample name input window.

COM PORT: Computer com port creation window

TEMP: Temperature condition creation window.

CONT. REF: Contact Fail condition creation window. Input the rate of the minimum and maximum value as condition.

DELAY TIME: The time that takes from applying input current to measurement. (Not important). "0.1" second will be recommended.

INITIAL: The initial applied current creation window (-20 mA \sim +20mA)

FINAL: Final applied current creation window (-20 mA ~ +20mA)

STEP: Current value applied stages (Including initial and final current value)

* Tips) Put "-1mA" in "INITIAL" blank and put "1mA" in "FINAL" blank. And then, put "10" in "STEP". If so, this system measures I-V and I-R value and it shows with graph and text data as well in 10 step.

■ I-V CURVE Menifestation Part

It indicates hall voltage change as applied current change as graph.



■ I-R CURVE Manifestation Part

It indicates sheet resistance change as applied current change as graph.



DATA VIEW	DATA VIEW			
In I-V CURVE s	creen shot, Clic	K DATA VIEW	And,	data results is
shown as below				

			PRINT		CI	_OSE		
DATE 03-10-205 current -1,000-03 -7,777e-04 -5,555e-04 -3,333e-04 -1,111e-04 +3,333e-04 +5,555e-04 +5,555e-04 +5,777e-04 +1,000e-03	Username USERI Vab -8. 7794-02 -6. 794-02 -4. 8538-02 -2. 914-02 -9. 744-03 -9. 744-03 -9. 744-03 -9. 744-03 -9. 744-03 -9. 721e-03 +0. 721e-03 +0. 732e-02 +0. 773e-02	Samplename SAMPLE1 Vbc -7,7008-02 -5,5558-02 -4,2578-02 -4,2578-02 -8,4939-03 -8,4739-03 -8,4739-03 -8,4739-03 -8,4739-02 +5,9578-02 +7,5948-02	Temperature 300K -9,671e-02 -7,464e-02 -3,209e-02 -3,209e-02 -1,072e-02 +1,071e-02 +5,344e-02 +5,344e-02 +9,650e-02	Initial_current //00000mA Vda -7.385e-102 -5.716e-102 -4.083e-102 -2.451e-102 -8.125e-03 +2.445e-102 +8.125e-03 +2.445e-102 +5.713e-02 +7.378e-02	Final_current 1,00000mA Bab +8,779e+01 +8,735e+01 +8,742e+01 +8,742e+01 +8,749e+01 +8,734e+01 +8,732e+01 +8,732e+01 +8,773e+01	Step 10 Rbc +7,700±+01 +7,652±+01 +7,652±+01 +7,652±+01 +7,649±+01 +7,653±+01 +7,653±+01 +7,653±+01 +7,654±+01	Rcd +9,671e+01 +9,522e+01 +9,522e+01 +9,553e+01 +9,553e+01 +9,525e+01 +9,520e+01 +9,550e+01	Rda +7.385e+01 +7.349e+01 +7.350e+01 +7.335e+01 +7.335e+01 +7.345e+01 +7.345e+01 +7.345e+01 +7.345e+01

Order button part

OPERATING DISCRIPTION	PROGRESS [%]	Go To HALL
COM.TEST MEASURE STOP CLEAR	LOAD REDRAW SAVE PRINT	CLOSE HELP



Diversion to Hall effect measurement window.



Confirm if system is connected and the communication is

available.



Start measurement after setting up input value

SAVE

Save measured data and results value.



Recursion existingly saved graph data.



Get the graph into line and regraph it again.



Toggle between STOP operating when measuring, and

CONTINUE measuring when stopped.



Clear measurement data and results value.



Print the screen contents.



Program ending.

HELP

Open the "Help" window.



■ An outline of the measurement sequence is as follows. Please refer to single step explanations for details.

- 5 1. Measurement Sample Arrangement.
- 5 2. System POWER On
- 5 3. Injection of liquid nitrogen (only 77K measurement)
- 5 4. PC Program operating and measurement.

5 - 1. Measurement Sample arrangement.

This following procedure should be completed before turning on the (i)power of the device.

Cut the sample to be measured into a square that is a maximum of 20 mm x 20 mm, and then bond it to the ⁽ⁱ⁾ Sample Board.

It is possible to measure samples that are not exactly square in shape, however, the measurement results will not accurately represent the true properties of the material. The resistivity of the material will especially be affected.

Bond the four vertexes of the sample.

Proper sample bonding is performed to insure good ohmic contact. An Indium compound is normally used in bonding the vertexes so that good ohmic contact is maintained at LN2 temperatures.

Annealing of the sample at the appropriate temperature and length of time can also improve ohmic contact.

The recommended way of bonding of the sample is presented below.







< Name of sample bonding part >

Bond the material sample to the Sample Board and then insert ^OSample Board into the my white magnet set lid as shown. Make sure that the shorter arm on the sample board edge connector is inserted towards the N direction (the lid has a

drawing to show this)







This equipment is a precision measurement instrument, so please allow a 10 minutes warm-up time before starting measurements.

All the measurements should be taken in a state that Sample Board is connected to.

After closing the lid of the magnet set measuring case with the sample board installed, turn the (i)Power "On".

Check to see if the Main power LED is turned on and Doperation LED is turned off (every single 0.4 second) in the main body front side. Check to see if Contact Failure LED in main body front side is turned off.

If Contact Failure LED is on, measurements can not be made, so

please check the following.

Is the contact between the sample and (s)Sample Connect Board prepared correctly for good Ohmic contact?

Ohmic contact is okay if the resistance measurements are similar when checking each terminal using a DVM.

Is the OSample Board correctly installed into Othe Sample Connect Slot?

Refer to "1-1. Preparations for Measuring Sample" for further explanation.

Is the Current Range set correctly?

Reset by pressing the @Reset button in if there was a previous operation.



5-3. Liquid Nitrogen Input.

The following procedure is only necessary if you are interested in performing the Hall effect measurement at 77K (LN₂ temperature). It is not necessary for measuring at 300K.

Pour the liquid nitrogen through the (i)Liquid Nitrogen Inlet using funnel.

Pour enough to submerge the sample.

Fill the sample measuring case considering that some liquid nitrogen will evaporate during the test time. It takes approximately 10-15 minutes for the entire reservoir to evaporate.





and Making Measurements.

Start the PC program.

Click the "Comm. Test" button in program.

Select the current range and input value of the current

Input the applied magnetic flux density and the thickness of the sample.

Click the "Measure" button (prior to inserting the magnet.) The data of horizontal, vertical, and diagonal directions will be measured.

After the first data measurements, the measured values will be displayed automatically and the message, 'Insert Magnet N \triangleright S', will be shown on the screen (It takes under two minutes)

After inserting the magnet in the forward direction (N \rightarrow S), please click the "OK" button.

The system measures the data of the diagonal direction.

After the second data measurements, the measured values will be displayed automatically and the message, 'Insert Magnet $S \triangleright N$ ', will be shown on the screen (It takes approximately one minute)

After the magnet is inserted in the reverse direction, please click the

"OK" button.

The system measures the data of the diagonal direction.

The Measured values are gradually displayed on screen and the results is automatically displayed on results part.

If the input data need to be changed after finishing the measurement, enter the revised data into the program and click the 'CALCUL.' button. The revised results will be displayed. (Ex : D; $3 \rightarrow 6$)

In order to stop the measurement while the system is running, click on "Stop". If you click "Stop" again, it restarts at that point.

In case the "Contact Failure" lamp turns on during the measurement, check the ohmic contact of the sample and click the "Reset" button on the front of the Main Body. The system will reinitialize.

The "Clear" button in the program makes all of values become zeros.



Use a standard AC outlet.

The inside of the magnet set has a strong magnet field. Be careful not to place objects that are sensitive to magnetism such as credit cards or electronic devices near the magnet.

Keep the surface of the sample clean. Touching its surface with fingers can affect the accuracy of data value.

Use proper safety procedures in storing and handling liquid nitrogen. Ecopia does not accept responsibility for any injuries that occur from the use of liquid nitrogen.

Avoid using or keeping this product under conditions where the product is exposed to the direct rays of the sun or any hot, humid place, or where a vibration hazard may exist.(25°C recommendable)

Do not attempt to repair or disassemble this equipment on your own without express instructions from the factory.

In the event that an unauthorized person dismantles or attempts to repair this equipment, malfunctions can occur and the normal warranty will be void.

Putting on glove is actually needed when measuring.. It protects user's unexpected damage. And, it also protects magnet's oxidization.

We are not in charge of damage from handling magnet carelessly.

Use proper fuses.

To prevent failure or fire from over-current, a fuse (j) is built in-line with the AC power source.

If you need to replace a fuse, remove the power cable connected to the AC power and remove the fuse(j) located at the rear of the Main Body.

When changing on account of broken wires, use the product with 250V/2A.



7. Product Specification & Composition

Product Specifications

Size (W×D×H): 360×300×105 [mm] (Main Body) Magnet flux density: 0.51T (options: 0.31T, 0.37T, 0.51T, 1T) Measurement Temperature: 300K and 77K (Liquid Nitrogen) Sample Size: Max. 20mm × 20mm Measurement Material: Si, SiGe, SiC, GaAs, InGaAs, InP, GaN and besides semiconductors (N type & P type can be measured) Power Supply: AC 110 - 240 V / 50 - 60Hz 2A

S/W Operation Environment & Measurement Information

Operation Environment : Windows 98 / Me / 2000 / XP Measurement Types : Bulk Carrier Concentration, Sheet Carrier Concentration, Mobility, Hall Coefficient, Bulk Resistivity, Conductivity, Magnetoresistance, V/H ratio of resistance.

Product Composition

Main Body Funnel for liquid nitrogen Power source cord. Manual Book Magnet Set (Permanent magnet, Magnet Set case, Magnet Set cover) Connection cable between Main Body and Magnet set. Sample Board Hall Effect Measurement Program CD (S/W) Serial Cable, USB Cable

<u>WARRANTY</u>

Hall Effect Measurement System	Model NO: HMS-3	3000
Puchase Date: .		
Customer Name :	Tel No:	Address:
Dealer Name :	Tel No:	Address:

Keep this book for the case that you call to request repairs. You need to have this book with purchase date recorded for appropriate service.

1. Lengh of warranty is one year.

2. Service is provided according to the contents in this warranty.

3. Length of free warranty is from purchase date. So please record purchase date. (In case that purchase date is not recorded, length of free warranty starts from 3 months after the date of manufacture)

4. This warranty is not reissued.

Consumer Damage Compensation

				Compensations		
Kinds of Damage			Within length of warranty	After length of warranty		
In the case of function/perf- Ormance failure in the normal use	In case that within 10d	at repairs to major parts should be needed ays after purchase	Product replacements	<u>s</u>		
	In case that	at exchange is not available.	Refund			
	Defects in	Repairs are possible.	Free Repair	Repair to be paid for		
	product	Repairs are impossible.		Fixed depreciation According to the		
	In case that the dealer loses the product that customer asks for repairs.		Product replacement	Years of product used.		
	In case that of the proc	at damage happens by delivery or installtion duct.		-		
In case that performance/function failure by the customer's carelessness or deliverate intention.			Repair to be paid for	Repair to be paid for		
 In case that damage happens by natural disasters(ex. fire, flood, earthquake etc.) Replacement of expendable parts. Damage by other exterior causes that are not of product's. 			Repair to be paid for	Repair to be paid for		

Particulars relevant to usage manuals are not applied to damage compensation warranty

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Hall Effect Measurement System

HMS - 3000 MANUAL Ver 3.1

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