HITACHI CONFIDENTIAL

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Rev. 0.21

Hitachi Finger Vein Authentication Device

Data sheet

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PRELIMINARY

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Urban Planning and Development Systems,
Hitachi, Ltd.

Revision History

No.	Date	Chapter	Description	Remarks
0.1	June 8, 2009	-	New release	Based on Japanese Ver. 02
0.2	Oct. 2, 2010	1,3,4	Revised model name (PCT-KCC5001 to PCT-KCC50*1)	Based on Japanese Ver. 03
		3,4,	Changed marking of finger guide	
		3	Added remarks about EMI.	
		4.2	Added maximum number of enrollment fingers	
		4.2.15, 4.3	Added verification time of PCT-KCC5031/9031.	
		4.4	Added remarks for usage condition	
0.21	June 17, 2011	5,	Changed firmware version from 02-00 to 02-01	Based on Japanese Ver. 04

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1. 介绍

本文档描述了嵌入型指静脉认证设备PCT-KCC50*1和PCT-KCC90*1的详细规格。

2. 功能

本嵌入型指静脉认证设备采用透射光学方法读取静脉图案，适用于多种安全产品。

1. 容易使用
   - 为适应手指而设计的手指引导槽
   - 手指引导槽上的标记引导用户手指放到正确的位置上
   - LED放在两侧的开放结构设计

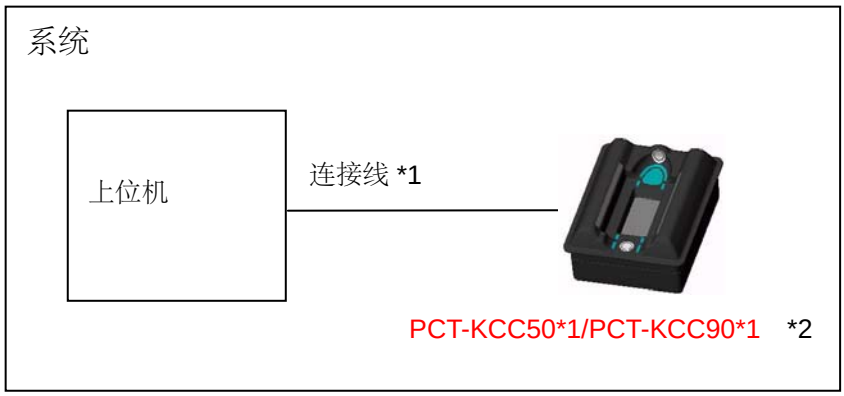
2. 高准确度
   - 透射方法捕捉清晰的静脉图案
   - 手指引导槽减少了手指位置引起的错误
   - 两个触摸传感器减少了手指悬浮引起的错误

3. 低功耗
   - 使用一片定制的指静脉认证芯片 (Hitachi FVP1000)
   - 使用CMOS 传感器

4. 其他
   - 在设备中完成认证
   - 指静脉的模板数据保存在设备的非易失性存储器上
   - 使用串口进行上位机通信 (3.3V CMOS 电平)

3. 连接配置

该设备应到按照下图进行连接。



*1 连接线要短于200mm.

如果需要更远距离的通信，推荐把通信接口改为RS-232C 电平。推荐在接口线缆上增加铁氧体磁环，线缆通过磁环绕上一圈。

*2 Hitachi 只提供指静脉认证设备。

4. 配置和功能

4.1 外观和尺寸

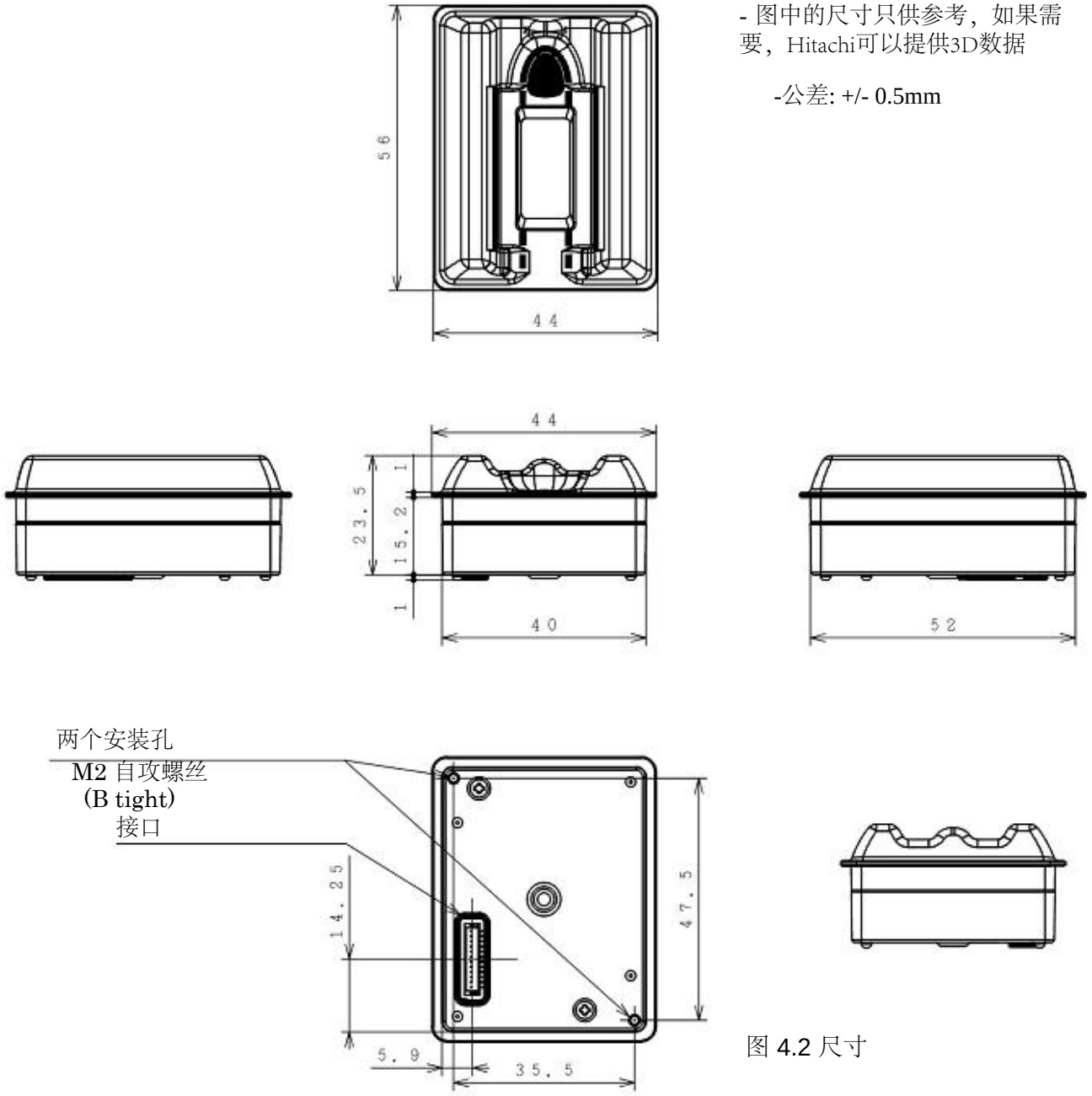
(1) 外观

PCT-KCC5001（F/W Ver.01-00） PCT-KCC9001（F/W Ver.01-00） PCT-KCC5011（F/W Ver.01-01） PCT-KCC9011（F/W Ver.01-01）	PCT-KCC5021（F/W Ver.01-02） PCT-KCC9021（F/W Ver.01-02） PCT-KCC5031（F/W Ver.02-01） * 1 PCT-KCC9031（F/W Ver.02-01） * 1
	

图 4.1 外观

* 1：PCT-KC5031/9031 的模板数据与其他模块不兼容。

(2) 尺寸



- 图中的尺寸只供参考，如果需要，Hitachi可以提供3D数据

-公差: +/- 0.5mm

图 4.2 尺寸

(3) 标签说明

	标签说明	备注
Label 1	Size:20 x 10mm Factory's internal model number 3100HI KJ18B 00001 LotNo. 4 digits Serial No. 5digits Product Ver. (B.C・・・) QR code	- There is no version character print if the product version is "A". - Serial number (5 digits) is for factory's internal use.
Label 2	Size: 33 x 11mm Model name PCT-KCC50*1 製番 ******** Serial number 8 digits	- Model PCT-KCC50*1 : Comm. speed 57.6kbps PCT-KCC90*1 : Comm. speed 19.2kbps The following example shows the detail of 8 digits serial number shown in the left figure. Example :81100001 Serial number Month Year : 1st digit of the year

4.2 基本技术指标

No.	指标				备注
1	外形尺寸		(W)44 x (D)56 x (H)23.5 mm		Except for the protruding part
2	重量		32g		
3	材料 - 外壳 - Filter - LED cover		- PC+ABS (Mitsubishi Engineering-Plastics Co. MB1700) - PMMA (Mitsubishi Rayon Co., Ltd. PF079)		
4	防水等级		Corresponds to IEC IPX3		The host system needs waterproof mechanism to assemble the device.
5	供电电压		DC 5.0V +/- 5%		
6	供电电流	待机	MAIN_PWR_ON: High	120mA Typ.	
			MAIN_PWR_ON: Low	75micro A Typ. *1	When sensor does not detect.
		登记，认证	230mA Typ. *2		
			470mA Max. *3		Reference value
7	通信接口类型		异步串行通信		
8	通信接口电压		3.3V CMOS input/output level		Except for open collector signal
9	接口连接器		JST Mfg. Co., Ltd. BM12B-SRSS-TB		12pin
10	通信速率		57.6kbps	PCT-KCC50*1	
			19.2kbps	PCT-KCC90*1	
11	指静脉采集系统		Infrared LED + optical camera Transmissive type		
12	存储的模板数据		存储在设备中。 <最大登记模板数> 两次扫描模式: 150 fingers (360 fingers) 三次扫描模式:100 fingers (230 fingers)		上位机也可以存储模板数据。 最大存储数会根据登记模式而不同。 括号中的数据是 PCT-KCC5031/9031.。

13	认证方法	1:1 to 1:15 认证. -两次登记模式: 1:15 -三次登记模式: 1:10 (假设组认证模式)	推荐每个应用都使用1：1认证。 The device can verify over plural groups.
14	准确性	拒真率 0.01% 认假率: 0.001% 拒 登率: 低于0.03%	1:1 认证测量基于 ISO/ IEC 19795-1
15	认证时间	1:1 认证 (推荐): 大约 1 秒 1:N 认证 (组认证) ： 大约 1 到 2 秒。 下面是跨组认证100指的认证时间，以供参考。 -两次登记模式: 低于 3 秒. (低于 2.5 秒) -三次认证模式: 低于 4 秒. (低于 3.0 秒)	超时: 5 秒. 括号中是 PCT-KCC5031/9031 的数据。
16	环境条件 环境温度和湿度	0 to 40 deg. C 运行 0 to 50 deg. C 没有运行 -20 to 60 deg. C 存储 20 to 80% RH 运行 20 to 80% RH 没有运行 10 to 90% RH 存储	在没结露的情况下
17	使用时环境条件	不要在阳光直射条件下进行操作。	

*1 根据环境温度而改变

*2 根据手指会有改变

*3 红外LED最大光照时测量的数据

4.3 准确性

项目		说明
认证时间		Approx. 1 to 2 sec. *1, *2 For your reference, verification time over plural groups with 100 fingers is 3 to 4 sec. *4
认证准确度	FRR (拒真率)	0.01% *3 In case of standard threshold (i.e. Middle)
	FAR (认假率)	0.001% *3 In case of standard threshold (i.e. Middle)
拒登率(FTE)		Less than 0.03%

*1 “Verification time” is the time between taking image and completion of verification.

*2 The time varies depend on the number of fingers. The number of fingers is less than 15.

Twice enroll mode: 1:15 verification

3 times enroll mode: 1:10 verification

*3 In case of 1:1 verification.

The measurement method is based on international standard for biometric performance testing ISO/IEC 19795-1.

*4 Approx. 2.5 to 3 seconds for PCT-KCC5031/9031.

4.4 使用环境

下列环境可以保证准确度

项目	说明
太阳 (非直射)	Less than 4000 Lx
灯泡	Less than 1,000 Lx
荧光灯	Less than 2,000 Lx

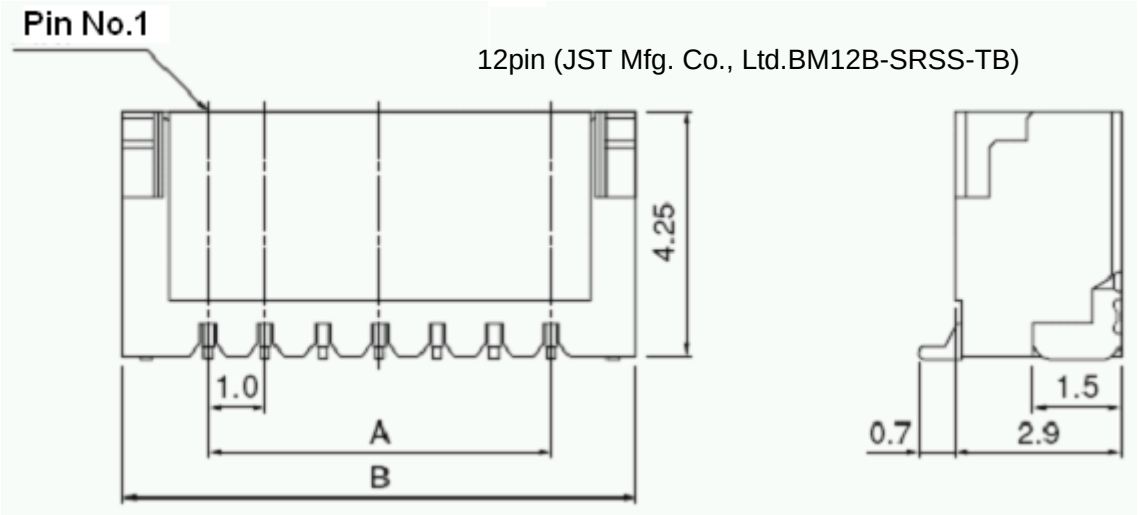
条件: 不能有光直射入图像采集区域。

不要将设备安装暴露于强光中，例如直射的阳光或者靠近窗户的地方。
如果无法避免安装在这种地方，那么请设置采集模式为 “Strong light mode”，可以更容易保证认证成功。然而，例如手指放置位置，个体差异，强光进入采集区域有可能导致认证失败或者错误接受。在安装前一定要确保这种错误不会对用户的操作引起麻烦 。

* “Strong light mode” is available only for PCT-KCC5031/9031.

4.5 接口说明

1) 连接器说明



Recommended housing: JST Mfg. Co., Ltd. SHR-12V-S-B or SHR-12V-S

Recommended wire: AWG28

2) 连接器引脚分配

No.	信号名称	I/O	功能	说明
1	VCC	-	供电	5.0V +/- 5%
2	VCC	-	供电	
3	RX	I	串口数据	异步接受数据. 3.3V CMOS level
4	TX	O	串口数据	异步发送数据 3.3V CMOS level
5	GND	-	地	GND
6	MAIN_PWR_ON	I	供电控制输入	3.3V CMOS level “H”: Power ON, “L”: Power OFF * 这个信号通过电平控制来控制供电 (非边沿触发)
7	BUSY	O	Busy 输出	3.3V CMOS level “H” means the device is busy. In this case, do not turn power off. *1 “L”: In this case, power can be turned off. *1 这个信号表明设备内部正在处理数据请求上位机不要关闭电源
8	TOUCH_OUT1	O	触摸传感器输出 (手指引导槽顶部)	开漏输出 Note *1) 手指放上: GND Others: Open (Hi-Z)
9	PASS_DRVER	O	认证结果输出	开漏输出 Note *2) 认证通过: GND Others: Open (Hi-Z)
10	TOUCH_OUT2	-	触摸传感器输出 (手指引导槽底部)	Same as pin #8
11	RESET	I	硬件复位引脚	GND: Reset Open: Normal operation Note *3)
12	GND	-	地	GND

Note *1) ***TOUCH_OUT1 和 TOUCH_OUT2*** 信号在设备关闭状态也可以正常运行(MAIN_PWR_ON ="L")

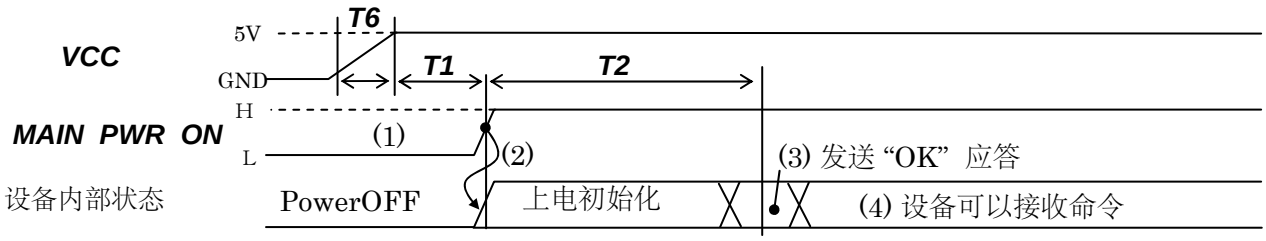
Note *2) ***PASS_DRVER*** 用来驱动外部机械部件。当信号为低时表示认证成功，但是不会自动恢复高阻状态。确保在认证后发送“Release PASS_DRIVER”使信号恢复高阻状态。

“***PASS_DRVER***” 引脚的额定规范是最高电压 24V，最高电流 100mA。

Note *3) 上位机必须通过开漏设备控制RESET信号，因为信号在设备内部上拉。

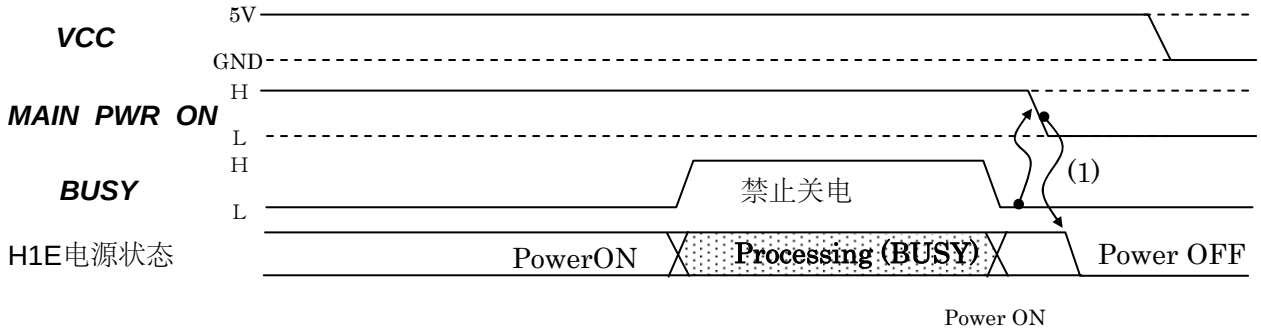
4.6 控制时序

1) 上电时序



(1) VCC 必须在 T6 时间内从 0 升到 5V 。
(2) 在VCC升到 5V T1时间后， ***MAIN_PWR_ON*** 信号变为 “H” ，设备上电。
(3) 上电 T2 时间后，设备发送 “OK” 到上位机。
(参考串行接口说明)
(4) 以上时序结束后，设备可以通过串口进行通信。

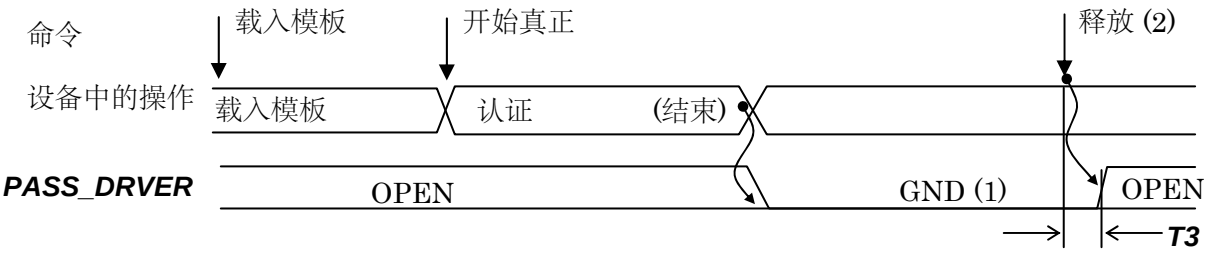
2) 关电时序



(1) 当***MAIN_PWR_ON*** 变为 “L” 电平或者切断电源，设备将进入powerOFF状态 。

上位机不应在***BUSY*** 为 "H" 时关闭设备，因为设备内部还在进行处理。
因此，在将***MAIN_PWR_ON*** 变为 ’L”时，请确保***BUSY***在“L”电平上。如果 ***BUSY*** 信号是 "H", 那么上位机应该等待***BUSY***信号变为“L”。

3) ***PASS_DRVER*** 输出说明

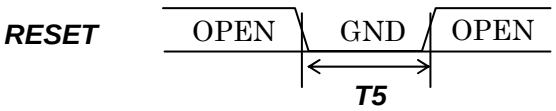


(1) ***PASS_DRVER*** 信号变为 GND，当手指与登记的模板认证成功，如果失败，仍然OPEN状态。
(2) ***PASS_DRVER*** 恢复为 OPEN ，当设备受到 “PASS_DRVER release” 命令。

这是 ***PASS_DRVE*** 变为 OPEN 状态的唯一途径。

4) 硬件复位

上位机在设备没有反应的情况下，可以通过 ***RESET*** 信号来硬件复位设备。 ***RESET*** 信号正在提供 ***VCC*** 并且 ***MAIN_PWR_ON*** 在“H” 状态下可用. (i.e. Power in the device is ON state)



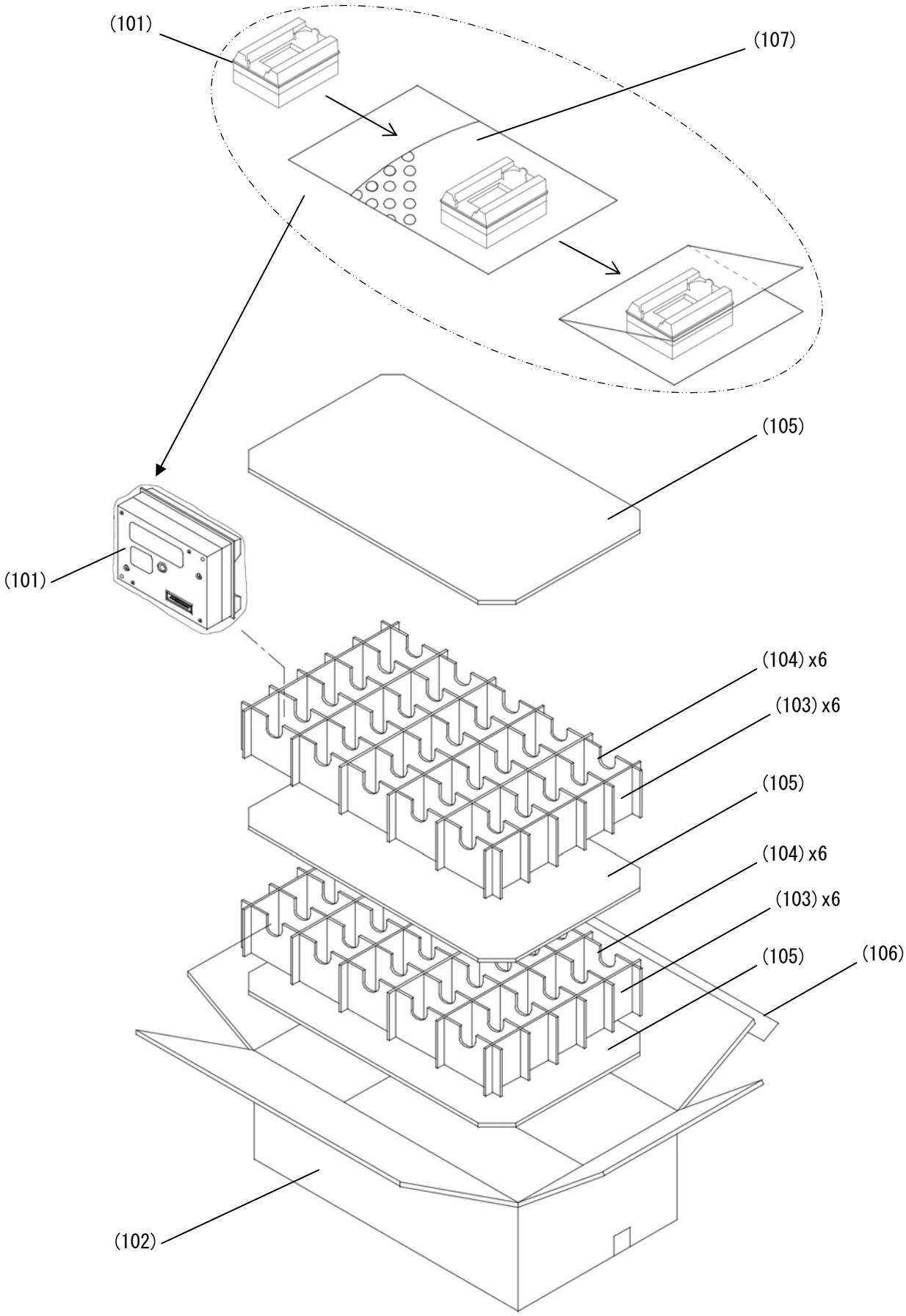
5) 健康检查

“Get information” 命令 (12h) 可以用来检查设备是否在正常工作。

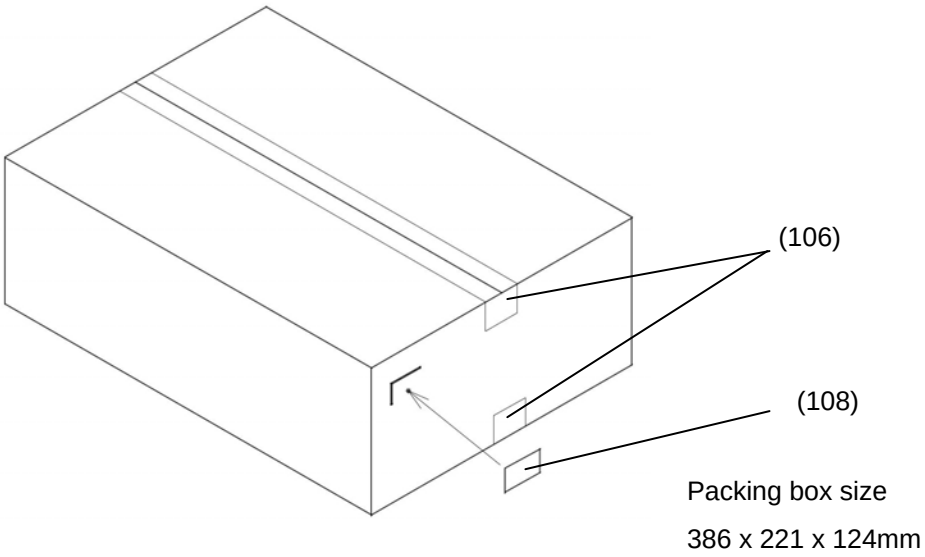
6) 时间说明

No.	Symbol	Minimum	Maximum	Unit	Remarks
1	***T1***	0	-	ms	
2	***T2***	-	1000	ms	OK response from the device indicates the end of initialization. (Reference value)
3	***T3***	-	3	ms	Release time of ***PASS_DRVER*** signal
4	***T4***	-	20	s	Timeout of serial command
5	***T5***	5	-	ms	***RESET*** pulse width
6	***T6***	-	5	ms	***VCC*** rising time

4.7 Packing specification



50 pieces max. in a box



No.	Item	Remarks
101	Finger vein authentication device	
102	Packing case	
103	Partition (big)	
104	Partition (small)	
105	Partition (floor)	
106	KU tape (transparent)	
107	Air bug	
108	Shipping label	

4.8 Others

A host system equipped with the device requires the following functions for security purposes.

1) The host system must be equipped with one of the following functions.
   - Invalidate the user.
   - Reject verification requests for specific time frame.
   - Send a warning to the administrator.
   - Record the rejection log.

   This function is necessary to avoid illegal verification such usages of a forged finger

2) Operations involving template data, such as enrollment and/or deletion of template data, should be performed by the administrator.

   e.g. setting user identification and/or limiting access to curtain level of information, etc.

3) A host system equipped with the device requires a way to identify whether the module has been intentionally removed or illegally modified.
e.g. adhere a tamper evident seal at the joint of the device and the host system.

Refer to “Serial Interface Specification” for serial communication command.
Refer to “Application note” for designing hardware.

5 Conforming regulations

No.	Item
1	RoHS

6. Quality

Item	Specification	Remarks
Reliability	Product life: 5 years	
Vibration	- Operating 2.45m/s^2, Frequency: 5 to 55Hz/min X,Y,Z direction No failure under the condition above. - Transportation/Storage 7.35 m/s^2 , Frequency: 5 to 500Hz, Sine sweep	
Packing box drop spec.	0.6m drop tests with 1 corner, 3 edges and 6 surfaces. No damage, no loose of screws and no failure under the condition above.	