



testo 420 · Flow Hood

Instruction manual



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2 Safety and the environment

2.1. About this document

Use

- > Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.
- > Keep this document to hand so that you can refer to it when necessary.
- > Hand this documentation on to any subsequent users of the product.

Symbols and writing standards

Representation	Explanation
	Warning advice, risk level according to the signal word: Warning! Serious physical injury may occur. Caution! Slight physical injury or damage to the equipment may occur. > Implement the specified precautionary measures.
	Note: Basic or further information.
1. ...	Action: more steps, the sequence must be followed.
2. ...	
> ...	Action: a step or an optional step.
- ...	Result of an action.
Menu	Elements of the instrument, the instrument display or the program interface.
[OK]	Control keys of the instrument or buttons of the program interface.
... ...	Functions/paths within a menu.
“...”	Example entries

2.2. Ensure safety

- > Do not operate the instrument if there are signs of damage at the housing, mains unit or feed lines.
- > Do not perform contact measurements on non-insulated, live parts.
- > Do not store the product together with solvents. Do not use any desiccants.
- > Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Testo.
- > Dangers may also arise from the systems being measured or the measuring environment: Note the safety regulations valid in your area when performing the measurements.

2.3. Protecting the environment

- > Dispose of faulty rechargeable batteries/spent batteries in accordance with the valid legal specifications.
- > At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.

3 Specifications

The testo 420 is used for volume flow measurements (main application), Pitot tube measurements and pressure measurements for air conditioning and ventilation systems. Thanks to its interchangeable flow hoods, the testo 420 can be used for air inlets and outlets of various sizes.

With the additional App (Android/iOS), the readings can be conveniently displayed on a tablet or smartphone, and in addition a measurement can be started, stopped and saved via the App.

4 Technical data



The use of the wireless module is subject to the regulations and stipulations of the respective country of use, and the module may only be used in countries for which a country certification has been granted. The user and every owner has the obligation to adhere to these regulations and prerequisites for use, and acknowledges that

the re-sale, export, import etc. in particular in countries without wireless permits, is his responsibility.

Feature	Values
Measurement parameters	Temperature: °C / °F Humidity: %RH / %rF / td°C / WB°C Flow velocity: m/s / ft/min Volume flow: m³/h / cfm / l/s Pressure (absolute pressure): hPa / mbar / kPa Pressure (differential pressure): Pa / hPa / mbar / mmH ₂ O / inH ₂ O
Measuring cycle	1/sec
Interfaces	Probe interface Mini DIN Micro USB
Measuring ranges	Temperature: -20 to +60 °C / -4 to 140 °F Humidity: 0 to 100% RH Wet bulb temperature: -20 to +60 WB°C Dew point: -76 to +60 td°C Flow velocity: 0 to 14 m/s / 0 to 2750 ft/min Volume flow: 50 to 4000 m³/h / 30 to 2350 cfm / 11 to 1100 l/s Pressure (absolute pressure): 700 to 1100 hPa Pressure (differential pressure): - 120 to +120 Pa
Resolution	Temperature: 0.1 °C / 0.1°F Humidity: 0.1% RH Flow velocity: 0.01 m/s Volume flow: 1 m³/h / 1 cfm Pressure (absolute pressure): 0.1 hPa / 0.1 mbar / 0.01 kPa Pressure (differential pressure): 0.001 Pa / 0.00001 hPa / 0.00001 mbar / 0.0001 mm H ₂ O / 0.000001 inH ₂ O

Feature	Values
Accuracy (nominal temperature 22°C/71.6°F)	Temperature: ± 0.5 °C (0 to +70 °C) / ± 0.8 °C (-20 to 0 °C) Humidity: $\pm 1.8\%$ RH +3% of m.v. at +22 °C (5 to 80% RH) (longer high humidity application can result in a temporary sensor drift) Flow velocity: no accuracy specification since calculated variable Volume flow ¹ : $\pm 3\%$ of m.v. +12 m ³ /h at +22 °C, 1013 hPa (85 to 3500 m ³ /h) $\pm 3\%$ of m.v. +7 cfm at +72 °F, 405 inH ₂ O (50 to 2,060 cfm) Error absolute pressure compensation: $\pm 0.04\%$ of m.v. / hPa deviating from 1013 hPa Pressure (absolute pressure): ± 3 hPa Pressure (differential pressure): $\pm 2\%$ of m.v. + 0.5 Pa (at 22°C, 1013 hPa) Error absolute pressure compensation: $\pm 0.04\%$ of m.v. / hPa deviating from 1013 hPa
Temperature coefficient	Humidity: $\pm 0.03\%$ RH / K (deviating from 22°C, in the range 0 to 60 °C) Volume flow: $\pm 0.02\%$ of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C) Pressure (absolute pressure): $\pm 0.02\%$ of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C) Pressure (differential pressure): $\pm 0.02\%$ of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C)

¹ All accuracy specifications apply under laboratory conditions or with necessary compensation (correction factor) with the standard hood 610x610 mm. Minimum outlet size of 360x360 mm

Feature	Values
Response time t ₉₀	Temperature: approx. 45 s Humidity: approx. 15 s Flow velocity: approx. 1 s Volume flow: approx. 1 s Pressure (absolute pressure): approx. 1 s Pressure (differential pressure): approx. 1 s
Operating and ambient conditions	Storage temperature: -20 to +60 °C / -4 to 140 °F Operating temperature: -5 to +50 °C/+23 - +122°F Humidity: 0 to 100% RH Pressure range: 800 to 1100 hPa
Housing / measurement setup	Measuring instrument housing material: ABS Body material: PP Standard hood material: Nylon Measuring instrument dimensions: 150x85x35 mm Body dimensions: 510x456x148 mm Dimensions of measurement setup with standard hood: 610x970x610 mm Weight of entire measurement setup approx. 2900 g
Power supply	4 x 1.5 V rechargeable/non-rechargeable batteries Type AA / alkaline manganese, mignon Battery lifetime: approx. 40h (eroing interval 10 seconds, display illumination off, Bluetooth off)
Display	Type: Dot matrix Dimensions: 3.5 inches
Directives, standards and tests	EU guideline: 2014/30/EU

5 Product description

5.1. Overview

5.1.1. Measurement setup



- 1 Volume flow hood (standard hood 610x610 mm)
- 2 Actuator for manual measurement
- 3 Measuring instrument testo 420
- 4 Measurement base with differential pressure cross
- 5 Integrated flow straightener

5.1.2. Overview of testo 420









- 1 Battery compartment, on rear of the instrument
- 2 Display
- 3 Control keys
- 4 Probe socket Mini-DIN (only for use on the measurement base)
- 5 Micro-USB port
- 6 Connection for pressure measurement

Instrument status icons:

Icon	Meaning
	Battery capacity
	Bluetooth
	Measuring mode: Pressure measurement, Pitot tube, volume flow (air pressure from above into the hood / suction outlet)
Actual	Actual volume flow: The current ambient conditions are used to calculate the volume flow. The actual barometric pressure is measured with the internal sensor. In applications with volume flow hood, the temperature is measured by the integrated temperature/humidity sensor, with Pitot tube measurement the actual temperature needs to be input manually.

Icon	Meaning
Standard	Standard volumetric flow: The standard settings for temperature and barometric pressure (21 °C / 1013 hPa in accordance with the standard conditions of the NIST, National Institute of Standards and Technology) are used to calculate the volume flow.
K-factor	Factor by which the current reading is multiplied. Depends on which outlet measurements are being taken at.
Pitot Tube factor (P-factor)	The Pitot tube factor for Pitot tubes is generally the same and must be entered: <ul style="list-style-type: none"> • Pitot tubes from Testo: 1.00 • Pitot tubes from other manufacturers: the Pitot tube factor can be found in the instruction manual or you should ask your supplier.

Control keys

Key	Function
	Menu
	Holds / starts / stops a measurement
[ESC]	Switches to the previous view / to the measurement view
	Saves the measured values
	Navigation within the menu
	Confirms a selection
	Switch instrument on/off (press and hold down) Switch illumination on/off (press briefly)

6 First steps

Inserting batteries/rechargeable batteries

1. Open the battery compartment.
2. Insert the batteries or rechargeable batteries (scope of delivery includes 4x 1.5V Type AA/ LR6).
3. Close the battery compartment.



When not in use for a long period of time, take the batteries/rechargeable batteries out.

Implementing settings

1. Press to access the menu.
2. Select the menu item you require using .

Key functions

Display	Explanation
	Change parameter, select unit
	Confirm input

1. Menu Level	2. Menu Level	3. Menu Level
Application	Flow Hood	K-factor
		Actual/Standard
	Pitot tube	Duct
		Pitot tube factor
		Pitot Temperature
	Actual/Standard	
	Pressure only	--
Measuring Program	Single Measurement	--
	Continous Measurement ²	--

² Maximum of 15 minutes, measuring cycle 1 second

1. Menu Level	2. Menu Level	3. Menu Level
	Continous/Punctual measurement (nur für Staurohr)	measuring duration ³
Memory	New Folder	--
	T420 folder	--
Display	Volume Flow	on/off
	Diff.Pressure	on/off
	Temperature	on/off
	Velocity	on/off
	Humidity	on/off
	Abs.Pressure	on/off
Device Settings	Language	English/German/Italian/French/Spanish
	Backlight Auto Off	On/Off
	Auto Off	On/Of
	Bluetooth	On/Off
	Date&Time	Date Format
		Time Format
		Set Date&Time
	Gliding average	5 – 20 sec
	Hood adjustment	Supply Air
		Exhaust Air
Zeroing int	1-20 sec	
Reset Device	--	--

³ Maximum of 25 points and 1 minute per point.

7 Using the product

7.1. Switching Bluetooth® on and off

i In order to be able to establish a connection via Bluetooth, you need a tablet or smartphone with the Testo App **testo 420** already installed on it.

You can get the App for iOS instruments in the App Store or for Android instruments in the Play Store.

Information about compatibility can be found in the relevant App Store.

i Measurements can be performed and saved with App into the instruments memory. Measuring mode and save function on the instrument itself is not available during Bluetooth communication is established with a mobile device.

Switching on Bluetooth


1. Hold **▲** down for 3 seconds.
 - Once the Bluetooth icon is shown on the display, Bluetooth is switched on.
 - If no connection is established, Bluetooth switches off after 10 mins.
- or
1. Press **☰** -> **Device Settings** -> **Bluetooth**, **▶** and using **▲/▼** -> select Off. Confirm with **↵**.
 - Once the Bluetooth icon is shown on the display, Bluetooth is switched on.
 - If no connection is established, Bluetooth switches off after 10 mins.

Display	Explanation
📶 flashes	There is no Bluetooth connection, or a potential connection is being searched for.
📶 is permanently displayed	There is a Bluetooth connection.
📶 is not displayed	Bluetooth is disabled.

7.2. Settings for the measurement


7.2.1. Damping (Gliding Average)

If the readings fluctuate widely, it is advisable to damp the readings. The time range for the damping can be set manually between 5-20 seconds.

1. Press , then select **Device settings** and **Gliding average**.
 - The damping can be set between 5-20 seconds.


7.2.2. Hood Calibration

This input is provided for the filing of calibration data by the relevant calibration laboratory. The flow hood-specific adjustment data can be input manually for supply air and exhaust air and has a direct effect on the measurement results. Input option of 0.001-9.999.

1. Press , then select **Device settings** and **Hood adjustment**.
 - Calibration of the hood can be set for supply air and exhaust air.

7.2.3. Zeroing Interval (Automatic Zeroing)

The pressure sensor carries out automatic zeroing at regular intervals. These intervals can be set via the automatic zeroing.

1. Press , then select **Device settings** and **Zeroing int**.
 - The zeroing interval can be set between 1-20 seconds.

7.3. Volume flow measurement setup

Standard hood
(610x610 mm, scope of delivery; 360x360 mm, accessories)



1. Pull the lower end of the hood over the measurement base.
2. Attach the hood at two corners using the snap fasteners.
3. Tighten the closure.
4. Screw together a short and long section of the support rods (4x) at the silver ends.
5. Push the support rods (4x) through the hood, along the markings and into the funnel in the measurement base.
6. Push the support rods (4x) on the top of the hood into the bracket
- The hood is installed.

Large hood
(1220x610 mm, 1220x305 mm and 915x915 mm, accessories)



1. Install the aluminium frame and stretch the fabric hood over the framework, so that the elastic band lies in the recess of the frame. Make sure that the elastic band fits correctly, especially at the corners.
2. Pull the lower end of the hood over the measurement base.
3. Attach the hood at two corners using the snap fasteners.
4. Tighten the closure.
5. Screw together a short and long section of the support rods (4x) at the silver ends.
6. Push the support rods (4x) through the hood, along the markings and into the funnel in the measurement base.
7. Push the support rods (4x) on the top of the hood into the bracket
 - The hood is installed.

Attaching the measuring instrument





1. Push the testo 420 completely into the instrument holder, pay attention to the catch on the right-hand and left-hand side in the bracket.


7.4. Measuring





7.4.1. Volume flow measurement



- ✓ The volume flow hood is fitted.
1. Switch on the instrument.
 2. In the instrument settings, set the application volume flow hood and also the required measurement program: Single measurement or Continuous measurement.
 3. Press ►, ■ on the testo 420, or the trigger on the measurement base to hold or start and stop the measurement.

4. Press  to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
 - The target folder and file name are displayed, confirm with  to save the measurement data under this name and in the selected folder.

7.4.2. Pitot tube measurement

1. Remove the testo 420 from the measurement base.
2. Connect the hoses to the testo 420 and to the Pitot tube.
3. Press  -> **Application** -> **Pitot tube** and there set the duct geometry, the Pitot tube factor and the temperature, and choose between actual and standard.
4. Select the required measurement program.

i With a timed/multi-point measurement program, the required number of measuring points can be recorded using , . To end the measurement, press and hold down ,  for at least 3 s. At least one measuring point must be recorded before the measurement can be terminated.


5. Carry out the measurement.
6. Press  to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
 - The target folder and file name are displayed, confirm with  to save the measurement data under this name and in the selected folder.



i The Pitot tube factor for Pitot tubes is generally the same and must be entered:

Pitot tubes from Testo, Pitot tube factor: 1.00
 Straight Pitot tubes from Testo, Pitot tube factor: 0.67
 Air flow velocity matrix 0699.7077, Pitot tube factor: 0.82

For Pitot tubes from other manufacturers, refer to the instruction manual for the Pitot tube factor or ask your supplier.

7.4.3. Differential pressure measurement

1. Remove the testo 420 from the measurement base.
2. Connect the hoses to the testo 420 at + and -.
3. Press  -> **Application** -> **Pressure only**.

4. Carry out the measurement.
5. Press  to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
 - The target folder and file name are displayed, confirm with 

7.5. Saving



A maximum of 99 measurements can be saved in one folder.


>  -> **Memory** -> 

- The folder overview is shown on the display. Create a new folder via **New Folder**.
-






A maximum 100 folders can be created.

Open folder

- > Using the arrow keys, navigate to the required folder and press .
- The selected folder is opened and the individual files are displayed.

Delete folder



1. Using the arrow keys, navigate to the required folder and press .
2. Select the menu item **Delete Folder** and confirm with .
- The folder that you want to delete is shown on the display.
3. Confirm once again with  in order to delete the folder, or cancel by pressing **Esc**.

Set as Logging Folder

This setting establishes which folder is to be specified as the standard storage location for saving the measurements.






The folder which is set as the standard storage location is marked in black.

1. Using the arrow keys, navigate to the required folder and press .
2. Select the menu item **Set as Logging Folder** and confirm with .

- The selected folder is set as the standard storage location.
- The stored location can be changed during the saving process.

Total Volume Flow

i If data from single measurements is saved within a folder, the total volume flow of all measurements can be displayed using this function.

1. Using the arrow keys, navigate to the required folder and press .
2. Select the menu item **Total Volume Flow** and confirm with .
 - The single measurements and the total volume flow are displayed.
3. Press .
 - The result of the total volume flow is saved.

7.6. Transferring measurement data to the PC

i No Bluetooth connection is possible while there is a connection to the PC. The existing Bluetooth connection is aborted.

i The PC identifies the testo 420 as a removable medium. In the event of any formatting, please make sure that the FAT format is always selected under the file system.

1. Connect the testo 420 to your PC using the USB cable.
 - The testo 420 switches on automatically, a window appears on the PC, select **Open folder** here. The folders and files saved on your testo 420 are displayed. The files are available in the file format *.txt.

8 Maintaining the product

8.1. Cleaning the instrument

i Do not use any aggressive cleaning agents or solvents! Mild household cleaning agents or soap suds may be used.

- > If the housing of the instrument is dirty, clean it with a damp cloth.

9 Tips and assistance

9.1. Questions and answers

Question	Possible causes/solution
For selected parameters, no values are shown on the instrument display (-----)	No temperature/humidity probe is connected, for instance.
Warning message Can not turn on! when selecting certain parameters in the Display menu.	<ul style="list-style-type: none"> • This parameter is not available for the application currently selected. • Four parameters are already displayed. Disable the display of one parameter to enable another one.
<ul style="list-style-type: none"> • [▶, ■] on the instrument does not work. • Warning message Function not available in Bluetooth mode. 	<ul style="list-style-type: none"> • Bluetooth connection is active, the instrument is connected to a Tablet or Smartphone via Bluetooth and the App is active. • Fully close the App or end the Bluetooth connection.

9.2. Accessories and spare parts

Description	Article no.
testo 420 differential pressure measuring instrument (stand-alone device)	0560 0420
Flow hood 360x360 mm with bag	0554 4200
Flow hood 305x1220 mm with bag	0554 4201
Flow hood 610x1220 mm with bag	0554 4202
Flow hood 915x915 mm with bag	0554 4203
Fabric cover for the hood 610x610	0400 4200
Aluminium frame for the hood 610x610	0440 4204
Tripod, extendable to 4 m	0554 4209

Description	Article no.
Connection hose, silicone, length 5 m, maximum load capacity 700 hPa (mbar)	0554 0440
Connection hose, silicone-free, for differential pressure measurement, length 5 m, maximum load capacity 700 hPa (mbar)	0554 0453
Pitot tube, length 500 mm, Ø 7 mm, stainless steel, for measuring flow velocity (Connection hose required)	0635 2045
Pitot tube, length 350 mm, Ø 7 mm, stainless steel, for measuring flow velocity (Connection hose required)	0635 2145
Pitot tube, 1,000 mm long, stainless steel, measures flow velocity (Connection hose required)	0635 2345
Connection hose	0554 0453
Tension rod	0440 4201
Air flow velocity matrix, telescope with spherical head, length 1.8 m, with 2 x 2 m connection hose, silicone-free, with Velcro fastening on the telescope	0635 8888 Testo ID no. 0699.7077/1
Air flow velocity matrix, telescope with spherical head, length 1.8 m, with 2 x 2 m connection hose, silicone-free, with Velcro fastening on the telescope and testo 420 measuring instrument	0635 8888 Testo ID no. 0699.7077/2





For a complete list of all accessories and spare parts, please refer to the product catalogues and brochures or visit our website www.testo.com

If you have any questions, please contact your dealer or Testo Customer Service. The contact details can be found on the back of this document or on the Internet at www.testo.com/service-contact.

10 Authorizations

Please note the following country-specific information for the product authorization.

Product	Testo 420
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Mat.-No.	0560 0420	
Country	Comments	
Australia		E1561
	RCM mark	Supplier identification
New Zealand	Authorized	
Turkey	Authorized	
Canada	Product IC ID: 12231A-05600420 IC Warnings	
China	CMIIT ID: 2015DP4400	
USA	Product FCC ID: 2ACVD05600420 FCC Warnings	
Korea	 MSIP-CMM-Toi-420 KCC Warning	
South Africa	Radio Equipment Type approval numer: TA-2016/3100	
Europa + EFTA	  <p>The EU Declaration of Conformity can be found on the testo homepage www.testo.com under the product specific downloads.</p> <p>EU countries: Belgium (BE), Bulgaria (BG), Denmark (DK), Germany (DE), Estonia (EE), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovakia (SK), Slovenia (SI), Spain (ES), Czech Republic (CZ), Hungary (HU), United Kingdom (GB), Republic of Cyprus (CY).</p> <p>EFTA countries: Iceland, Liechtenstein, Norway, Switzerland</p>	

Japan	Radio   201-150304 Japan Information												
Brazil	 <small>Agência Nacional de Telecomunicações</small> 00577-16-04701  (01)07898921395526 Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.												
Taiwan	NCC: CCAB16LP2190T1												
Bluetooth SIG List	<table border="1"> <thead> <tr> <th>Feature</th> <th>Values</th> </tr> </thead> <tbody> <tr> <td>Bluetooth®</td> <td>Range 15 m (free field) (varies with the used mobile device)</td> </tr> <tr> <td>Bluetooth® type</td> <td>LSD Science & Technology Co., Ltd L Series BLE Module (08 Mai 2013) based on TI CC254X chip</td> </tr> <tr> <td>Qualified Design ID</td> <td>B016552</td> </tr> <tr> <td>Bluetooth® radio class</td> <td>Class 3</td> </tr> <tr> <td>Bluetooth® company ID</td> <td>10274</td> </tr> </tbody> </table>	Feature	Values	Bluetooth®	Range 15 m (free field) (varies with the used mobile device)	Bluetooth® type	LSD Science & Technology Co., Ltd L Series BLE Module (08 Mai 2013) based on TI CC254X chip	Qualified Design ID	B016552	Bluetooth® radio class	Class 3	Bluetooth® company ID	10274
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IC Warnings

This instrument complies with Part 15C of the FCC Rules and Industry Canada RSS-210 (revision 8). Commissioning is subject to the following two conditions:

- (1) This instrument must not cause any harmful interference and
- (2) this instrument must be able to cope with interference, even if this has undesirable effects on operation.

Cet appareil satisfait à la partie 15C des directives FCC et au standard Industrie Canada RSS-210 (révision 8). Sa mise en service est soumise aux deux conditions suivantes :

- (1) cet appareil ne doit causer aucune interférence dangereuse et
- (2) cet appareil doit supporter toute interférence, y compris des interférences qui provoquerait des opérations indésirables.

FCC Warnings

Information from the FCC (Federal Communications Commission)

For your own safety

Shielded cables should be used for a composite interface. This is to ensure continued protection against radio frequency interference.

FCC warning statement

This equipment has been tested and found to comply with the limits for a Class C digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded interface cable must be used in order to comply with the emission limits.

Warning

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

KCC Warning

해당 무선 설비는 운용 중 전파혼신 가능성이 있음

Japan Information

当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している。

