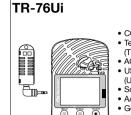
CO2 Recorder TR-76Ui **Getting Started Guide**

Package Contents



• CO2 Recorder TR-76Ui

- Temperature and Humidity Sensor (THA-3001) AC Adaptor (AD-06A1 or AD-06C1)
- (US-15C) Software CD-ROM
 AA Alkaline battery x 4 Getting Started Guide (Warranty

TR-76Ui-H

- CO2 Recorder TR-76Ui Humidity Sensor (HHA-3151) AC Adaptor (AD-06A1 or AD-06C (US-15C)
 - Software CD-ROM AA Alkaline battery x 4 Getting Started Guide (Warrant

accuracy and may cause the case to break resulting in bodily injury. The measurement accuracy of the CO2 sensor can not be guaranteed for CO2 concentrations of 5,000ppm or more.

Do not expose the unit to a strong impact. This will adversely affect measurement

This product has been designed for use in normal living conditions, and is not suited

for controlled environments such as a CO2 incubator. When measuring outdoors, avoid exposure to sunlight, dust, rain, or wind. Also make sure to use in the operating

This product cannot measure CO or O2. Do not use the unit for purposes such as

For one to two weeks after installation of the TR-76Ui, CO2 concentration measurements

may fluctuate suddenly. This is due to the normal operation of Auto Calibration and is not

Do not use or store the unit in areas exposed to direct sunlight and abrupt changes in

To help prevent deterioration of the unit, do not use or store the unit in areas exposed to

Do not allow the unit to become wet. Do not use or store the unit in places where

cigarette smoke, corrosive, explosive or organic gases or dust in the air.

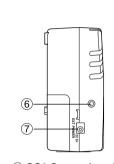
avoiding O2 deficiency, CO intoxication or any other health related purpose

The Warning Monitoring function provided in the TR-76Ui is for informational purposes only. By clicking "I Agree" button you confirm your understanding that it is not to be relied upon for human health or safety.

T&D Corporation

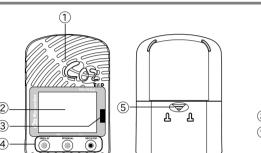
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Part Names and LCD Display

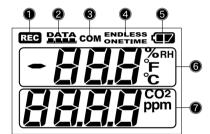


1 CO2 Sensor Area (Internal)

- 2 LCD Display 3 Infrared Communication Port
- 4 Operation Buttons **DISPLAY** Button
- (INTERVAL) Button $\langle\,\textbf{REC/STOP}\,\rangle\,\text{Button}$



- (5) Battery Cover 6 Temperature and Humidity Sensor Jack
- (7) AC Adaptor Jack
- **8 USB Communication Cable Jack**
- 9 Serial Communication Cable Jack (RS-232C)
- (10) External Alarm Terminal (EXT ALM) **⟨POWER**⟩ Switch



[REC] Mark

Shows recording status

ON: Recording in progress

BLINKING: Waiting for programmed start

OFF: Recording stopped

② Data Scale At the beginning of every 2,000 readings the scale will be marked from left to right.

Logging capacity is 8,000 readings.

(COM) Mark Shows communication status but not displayed normally.

ON: The unit is connected to a PC with a USB cable

RAPID BLINKING: The unit is in communication with the computer via USB or

Recording

Recording mode settings can be made by using the supplied software. Mode Upon reaching the logging capacity of 8,000 readings, the oldest data will be Endless:

overwritten and recording will continue. Upon reaching the logging capacity of 8,000 readings, recording will automatically stop and in the LCD the current measurement and the word "FULL" will alternately

 Battery Mark Shows source of power and voltage level

ON: Running on external power source BLINKING: Running on battery power

OFF: No battery

O Current Shows the current readings for temperature (°C or °F) and humidity (%RH). Temperature Pressing the (DISPLAY) button will change the measurement item to be displayed. By using the supplied software, the unit of temperature can be changed. is also and Humidity Readings Area used to display messages

© Current CO2 Shows the current readings for CO2 concentration (ppm). is also used to display Readings Area messages.

Messages and Display on the LCD

Settings Messages



Button Lock

When "Button Lock" has been set to ON in

CO2 Recorder for Windows, operational buttons are not active.



Memory Full

When recording mode has been set to "One Time" and the unit reaches its logging capacity of 8,000 readings, the measurement and the message [FULL] will alternately appear in the LCD. Stop recording and download the recorded data before re-starting

When this happens, measurement will continue so battery power will be consumed.

Button Operations

Notes about Operation

a malfunction of the unit.

condensation occurs.

environment indicated in the specifications.



Upon the start of recording, all previously recorded data in the TR-76Ui will be deleted.

If "Button Lock had buttons will not be active. If "Button Lock" has been set to ON in the CO2 Recorder for Windows, the operational

(REC/STOP) Button: Starting and Stopping Recording

Starting Recording

Press the (REC/STOP) button for about two seconds until the [REC] mark appears on the display.

• It is possible to start recording even while waiting for a programmed recording to start.

Stopping Recording

Press the (REC/STOP) button for about two seconds until the [REC] mark disappears from the display.



738.

(DISPLAY) Button: Changing the LCD Display Pattern

It is possible to change the current readings display for temperature and humidity (upper row). CO2 concentration (lower row) is always displayed.

1. With each pressing of the (DISPLAY) button the item on the display will change.

Temperature and Humidity: The display will alternate every one second.

Temperature only

Humidity only

2. When the desired display pattern appears, stop pressing the button.

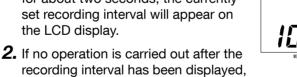
(INTERVAL) Button: Checking Recording Interval

It is possible to check the recording interval during recording or while waiting for a programmed recording to start.

1. By pressing the **(INTERVAL)** button for about two seconds, the currently

the current measurement readings

will return to the LCD display.





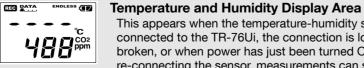


(INTERVAL) Button: Changing the Recording Interval Setting

Recording interval settings cannot be changed while a recording session is in progress.

- **1.** Stop recording.
- 2. Press the (INTERVAL) button for about two seconds to display the currently set recording interval on the LCD screen.
- **3.** With each pressing of the (INTERVAL) button the recording interval time will change; stop pressing the button when the desired interval appears.
- **4.** Restart the recording session.

When [---] appears in the following:



This appears when the temperature-humidity sensor is not connected to the TR-76Ui, the connection is loose, the wire is broken, or when power has just been turned ON. If after re-connecting the sensor, measurements can still not be displayed, it is very possible that the sensor or the logger is defective or has been damaged.



CO2 Concentration Display Area

This appears when power has just been turned ON. If measurements don't appear in the display after waiting for a considerable time, there is a possibility that the sensor is defective or has been damaged. Also, the CO2 sensor will not work if battery power is low.

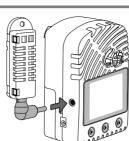
• Measurement and recording will continue in this situation, so battery power will be

Setting up the TR-76Ui



Make sure to install the provided software before connecting the TR-76Ui to your PC.

Connect the Temperature and Humidity Sensor



Turn On the Power

AC Adaptor

When measuring and recording over long periods of time, please use a supplied AC adaptor.

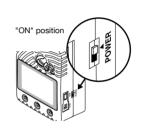
Four AA Alkaline Batteries

Keeping batteries in the unit allows a backup source of power * for when and if electrical power is cut from the AC adaptor. If running on only batteries, the estimated battery life is about two days.

* Leaving alkaline batteries in the unit for a long period of time may cause battery leakage and corrosion. When using as a backup source, we recommend that you change the batteries every few

Turn On the (POWER) Switch

After setting up the power supply, turn on the (POWER Switch.



Warm-up Time for CO2 Sensor

After switching on the unit, it will take about one minute to display the normal CO2 concentration.

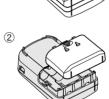
Install the Batteries



1) While pressing down on the triangular mark, slide the cover to the bottom of the unit.

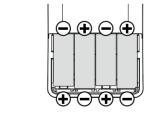
1. Remove the battery cover from the back of

② Lift off the cover.



- **2.** Insert the batteries.
- Make sure to use four new batteries of the same
- Make sure not to mistake + / -.
- Do not insert or change batteries with wet hands.

• Be sure to completely close the cover.



Interpreting the Battery Mark

Checking the Power Supply Condition

Whether the battery mark is "blinking" or "on" indicates the source of power.

BLINKING (Running on battery):

The battery mark will blink on the LCD display when measuring and recording by battery power.

ON (Running on external power):

The battery mark will be on when measuring and recording by AC adaptor



Checking the Battery Level

The battery level will be shown in three stages as below.

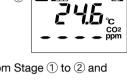
Battery Power - OK





Battery Power - Too Low

Battery power is too low to carry out measurement and recording of CO2 concentration.



• When running on batteries only, it will take about 24 hours to go from Stage ① to ② and another 24 hours from Stage 2 to 3.

4 Sleep Mode (stopping measurement and recording) After Stage ③, if the battery is not changed but it remains in use, the unit will enter sleep mode and stop measurement and

recording in order to protect recorded data until this point. • To continue recording, it is necessary to change the batteries before the unit enters sleep mode.

• If the unit is already in sleep mode, download the recorded data into the PC before re-starting recording.

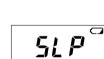
(5) Erasing recorded data If the battery is further left unchanged, the display will

automatically shut off and all previously recorded data will be lost. • Recording settings will remain. (See STEP 4 in the back side of this



- 1. If the batteries are removed when running on battery power only, the unit will start a sixty-second countdown.
- **2.** To continue recording, before the countdown comes to an end, insert new batteries or connect the AC adaptor to supply power.

3. If power is not supplied within 60 seconds, the unit



Disabled

Turning Off the (POWER) Switch

During recording or when the "Button Lock" is set to ON in the CO2 Recorder for Windows

1. Stop recording.

2. Turn off the (POWER) Switch.

will enter sleep mode.

Standby Power

If the TR-76Ui is connected to an AC adaptor, standby power will be supplied even after turning off the (POWER) switch, allowing the CO2 sensor to continue operation.

Notes on Special Functions

Getting Ready for Using Infrared Communication

In order to download recorded data from the TR-76Ui via infrared communication, it is necessary to purchase the dedicated Data Collector TR-57DCi (sold separately).

Getting Ready for Using the Warning Monitoring Function

It is possible to connect an external device such as siren or lamp to the TR-76Ui. Please make sure to check specification details of the external alarm terminal before purchasing or getting an external device ready for connection.

Upper and Lower Limit Settings

To use the warning monitoring function, go to the [Start Recording] tab in the Judgement Time. When the measurement exceeds one of the set upper and lower limits, the TR-76Ui will turn ON the external alarm terminal. Upon a warning, the measurement value on the display will also flash.

About the External Alarm Terminal (EXT ALM)



	Enabling Warnings	1	• •	Internal Pull-up: 3V 100kΩ Maximum Input Voltage: 30V
		2	GND	
E	Warning Output (OUT)	3	Output Terminal (Warning Output)	Open Drain Output Voltage when OFF: DC less than 30V Current when ON: less than 0.1A Resistance when ON: 15Ω
		4	GND	

Output is enabled or disabled. If a warning condition occurs while Warning Output is

enabled, a connection between 3 and 4 will be established and a warning will be output.

About the Compatible Connector

The JST Connector PAP-04V-S is compatible with the external alarm terminal. For questions concerning sales of the connector, please directly contact JST

• Go to [P Operation Guide] to see how to download data via data collector.

CO2 Recorder for Windows and make settings for Upper and Lower Limits and



The connection between 1 and 2 decides whether Warning 1-

Mfg. Co., Ltd. (http://www.jst-mfg.com/)

Using the Software



Do not connect a TR-76Ui to your computer until the software has been installed.

Install the Software



- For installation of the supplied software, it is necessary to have Administrator (Computer Administrator) rights.
- 1. Start Windows and place the CD-ROM into your CD or DVD drive.
- 2. In a few seconds, the [Install Program] window will appear.
 - If the [Auto Play] window appears, click on [Run start.exe]
 - If the [Install Program] window does not automatically open, please open it by double clicking on the [start.exe] icon in your CD or DVD drive.



3. Select "Install CO2 Recorder for Windows" and click the [Execute] button to start the installation. Follow the directions to install.



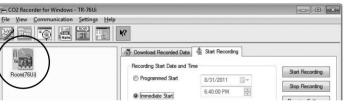
4. If a window appears such as the one below during installation, click the [Install]



5. After installation, "CO2 Recorder for Windows" will appear in the Windows Start Screen or Start Menu.

Connect the TR-76Ui to a PC

- **1.** Connect the device with the supplied USB cable to your computer. The USB driver installation will start automatically
- It is not necessary to connect AC adaptor at this point.
- 2. Open CO2 Recorder for Windows and confirm that the TR-76Ui icon appears in the main window



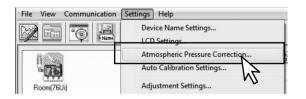
• If the icon does not appear, please check whether the USB driver has been properly installed. (Refer to Property Help for Unit Recognition Failure)



Make Atmospheric Pressure Correction Settings

Measurement results of CO2 concentration are affected by atmospheric pressure. When high measurement accuracy is required, we recommend that Atmospheric Pressure Correction be carried out before a recording session is

- 1. Connect a TR-76Ui to your PC and open CO2 Recorder for Windows.
- 2. From the [Settings] Menu, select [Atmospheric Pressure Correction] to open the settings window.





Enter Atmospheric Pressure at Measurement

Directly enter the pressure (hpa) in the [Atmospheric Pressure] field.

Calculate Atmospheric Pressure from Altitude: This setting can also be made by having the software calculate the estimated pressure at the altitude (meters) entered by the user.

3. Click the [Send Settings] button to transmit the settings to the TR-76Ui.



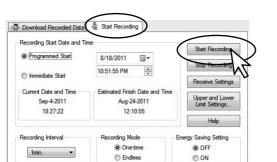
Make Settings and Start Recording

Upon the start of recording, all previously recorded data in the TR-76Ui will be deleted.

1. Connect a TR-76Ui to your PC and open CO2 Recorder for Windows.

2. Make recording settings in the [Start Recording] tab window.

3. Click the [Start Recording] button to transmit the settings to the TR-76Ui.



4. Disconnect the TR-76Ui from the PC and place in the desired measurement

Recording Settings

Recording Start Date and Time

Programmed Start: Recording will begin on the set date and time. As the current date and time of your computer are used, make sure that your computer clock settings are correct.

Recording will start when the [Start Recording] button is clicked.

Recording Mode

One Time: Upon reaching the logging capacity of 8,000 readings, recording will automatically stop. Upon reaching the logging capacity of 8,000 readings, the oldest data will be overwritten

Recording Interval

There are 15 choices for the recording interval

Below are some examples of recording interval and maximum recording time.

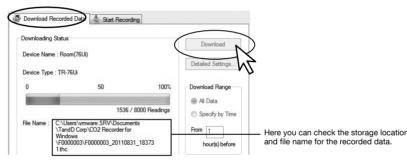
second	(2 hr 13 min 20 sec)	10 minutes	(55 days 13 hr 20 min 00 sec)
30 seconds	(2 days 18 hr 40 min 00 sec)	15 minutes	(83 days 8 hr 00 min 00 sec)
l minute	(5 days 13 hr 20 min 00 sec)	30 minutes	(166 days 16 hr 00 min 00 sec)
5 minutes	(27 days 18 hr 40 min 00 sec)	60 minutes	(333 days 8 hr 00 min 00 sec)



Download Recorded Data to a PC

Prescription (P. 76Ui.) Even after downloading recorded data, the data will remain in the TR-76Ui.

- 1. Connect a TR-76Ui to your PC and open CO2 Recorder for Windows.
- 2. In the [Download Recorded Data] tab window, click the [Download] button.



3. When a completion message appears after downloading, click the [OK] button to view the graph for that data.

Storage Location of Recorded Data and File Name (Default Settings)

Internal ID is a unique number assigned to each product, which can

Documents (or My Documents)\TandD Corp\ CO2 Recorder for Windows\Internal ID(folder)\ Internal ID*+ Downloading Date and Time.thc

be found on the sticker on the reverse side of the product.

C02 Recorder TR-76U*i* Serial No. 520E0001

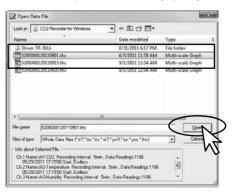
6 View and Print Graphs

Viewing Saved Data in Graph Form

1. Open the Multi-scale Graph. From the [File] Menu, select [Open].



2. Select the data file you wish to open, and click [Open] to view in graph.



Printing the Graph

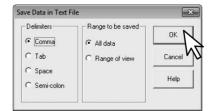
- 1. While the graph is open, click [Graph Print Preview] in the [File] Menu to view a preview image of the printed page.
- **2.** If you wish to change the aspect ratio of the graph, change the size of the graph window.

3. Click the [Print] button to start printing.

Saving Recorded Data as Text for use with Spreadsheet Software

It is possible to convert recorded data to a text file (CSV format) which can be read by common spreadsheet software.

- 1. While the graph is open, click [Save Data in Text File] in the [File] Menu.
- 2. After having made the desired settings, click the [OK] button.



3. Make storage folder and file name settings, and click the [Save] button to output

Tips Auto Calibration Function for CO2 Sensor

What is "Auto Calibration"?

Auto calibration is a function designed to enable long-term accurate measurements for the TR-76Ui by gradually adjusting the lowest measured CO2 concentration over a 180 hour period, to the global average concentration (atmospheric CO2 level of 400 ppm).

• The factory default setting for auto calibration is ON.

Turning ON and OFF Auto Calibration

Turn off auto calibration (*1) when continuously measuring in an environment where the lowest CO2 concentration differs greatly from the global average concentration of 400 ppm.

In this case, to ensure accurate measurement results, periodically place the TR-76Ui in fresh air outside and check if the measured CO2 concentration values are close to 400 ppm or not. If not, we recommend that you carry out manual calibration (*2).

- *1: The factory default setting for auto calibration is enabled. To change this setting, go to the [Settings] menu and select [Auto Calibration Settings].
- *2: The measurement of the CO2 sensor may have a slow drift. It is recommended to perform manual calibration about once a month. For details about manual calibration, please refer to [Operation Guide]- [Available Settings]

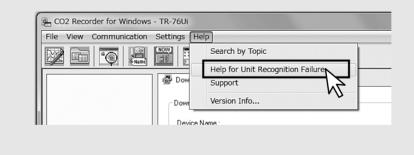
For more detailed information

Operation Guide:

Operation Guide contains detailed information about basic settings as well as details about advanced settings for many useful functions. Access if from the Start Screen/Menu or from the [Help] button in the application window.

Help for Unit Recognition Failure:

[Help for Unit Recognition Failure] contains detailed information about installing and checking the USB driver as mentioned in [Using the Software: STEP2]. Access is via the [Help] menu in CO2 Recorder for Windows.



Specifications

Channels	Tempe	rature 1ch	Humidity 1ch	Temperature 1ch	Humidity 1ch			
Units of Measurement	°C	C, °F	%RH	°C, °F	%RH			
Measurement Range (*1)	0 to	55 °C	10 to 95 %RH	-30 to 80 °C	0 to 99 %RH			
Accuracy	±0).5 °C	±5 %RH [at 25 °C, 50 %RH]	±0.3°C [at 0 to 50 °C] ±0.5°C [at all other temperatures]	± 2.5 %RH [at 25 °C, 10 to 85 %RH] ± 4.0 %RH [at 25 °C, 0 to 10 % or 85 to 99 %RH] For temperatures other than 25 °C and between 0 °C and 80 °C, add ± 0.1 %RH per degree difference from 25. Humidity Hysteresis: ± 1.5 %RH or lower (*2)			
Measurement Resolution	0.	.1 °C	1 %RH	0.1 °C	0.1 %RH			
Responsiveness			se Time (90%): rox. 7 min.	Response Time (90%): Approx. 7 min.	Response Time (90%): Approx. 20 sec.			
CO2 Sensor (Internal)								
Sensor		NDIR						
Measurement Cha	nnels	CO2 Conce	02 Concentration 1ch					
Units of Measuren	nent	ppm						
Measurement Ran	ige	0 to 9,999	ppm					
Accuracy		±(50 ppm -	- 5 % of reading) [at 5,00	0 ppm or less] (*3)				
Measurement Res	olution	Minimum o	of 1 ppm					
Responsiveness		Response	Time (90%): Approx. 1 mi	n.				
Unit Specifications								
Logging Capacity		8,000 data sets (One data set consists of readings for all channels in that type of unit.)						
Recording Interval			, , . , . ,	5, 20, 30 sec. or 1, 2, 5, 10				
Recording Mode (*4)			<u> </u>	ne (Stop recording when capacity is full)			
Communication In	iterfaces		nunication, Serial Commu ommunication (IrPHY 1.2					
Communication Ti	ime	Downloadii - Via USB o - Via infrare						
External Alarm Ter (*6)	minal	Output Terminal: Open Drain Output (Voltage when OFF: DC less than 30V / Current when ON: less than $0.1A$ / Resistance when ON: about 15Ω)						
Power		AC Adaptor (AD-06A1 or AD-06C1), AA Alkaline Battery (LR6) x 4						

Temperature-Humidity Sensor (External)

1: Make sure to use the data logger within the operating environment as listed in the specifications

Microsoft Windows Vista 32 bit (SP1 or later

Microsoft Windows 8 32/64 bit

Approx. 120 g

Approx. 2 days (batteries only without AC adaptor) (*7

Recording Mode: Endless, Recording Interval: 10 mir

H 96 mm × W 66 mm × D 46 mm (excluding protrusions and senso

Temperature: 0 to 45 °C, Humidity: 90 %RH or less (no condensation

2: When used in environments where temperature and humidity are over the values of 50°C 75%, 60°C 50%, 70°C 35%, and 80°C 25%, sensor hysteresis may fluctuate by values greater than ±1.5%RH. Under certain circumstances, it may take some time to return to normal measurement capability.

3: Stated value is the measurement accuracy of the CO2 sensor when Auto Calibration is operating properly. A change in atmospheric pressure directly

CO2 Recorder for Wind

influences the reading of CO2, which can cause measurement errors; a decrease in pressure by 10 hPa results in a relative decrease in CO2 by 1.6%. In such a case, we recommend carrying out the "Atmospheric Pressure Correction" function found in CO2 Recorder for Windows.

4: Customers wishing to write their own software, please contact your local distributor for the serial communications protocol specifications. (Note: Optional

serial communication cable TR-07C is also required.) If you wish to use infrared communication to download recorded data, it is necessary to purchase the Data Collector TR-57DCi (sold separately *6: In order to use the external alarm terminal, please prepare a compatible connector: JST PAP-04V-S.

: Battery life varies depending upon the ambient temperature in which it is used, the recording interval, the frequency of communication, and the battery performance. All estimates are based on operations carried out with a new battery and are in no way a guarantee of actual battery life. Battery life may be

shortened if the unit is used under inverter type fluorescent lighting. *8: For installation, it is necessary to have Administrator (Computer Administrator) rights.

*9: We recommend using an operating system in the same language as the display language. Operation in different languages is not guaranteed. The specifications listed above are subject to change without notice.

Cautions about using the Temperature-Humidity Sensors

- If extremely severe temperature changes occur, the humidity measurements may appear abnormal. Once the sensor's temperature

Battery Life

Dimensions

Compatible OS (*8)

Display Languages (*9) English

becomes stable, the measurements will return to normal. Do not connect the sensor to any data logger other than those specified by T&D Corporation.
 Do not expose the sensor to a strong impact. This may adversely affect measurement accuracy and cause damage or malfunction - When the sensor is not to be used for a long period of time, please store it at normal temperature and humidity

- Do not allow the sensor to become wet. If the sensor gets wet, immediately remove it from the unit. - Do not use the sensor on the human body.

- Do not expose to condensation, dampness, corrosive gases, or organic solvents (or insecticides for High Precision Temperature

- Continued use may cause a decrease in the sensor's accuracy and sensitivity even under normal operational conditions. If the sensor is being used in a bad environment (smoky or dusty places) it may be necessary to change the sensor sooner.

- The HHA-3151 is not water resistant. If the sensor gets wet, immediately remove the sensor from the unit and wipe it with a clean

cloth as soon as possible. Then allow the sensor to dry in normal room temperature before using it again - When using the THA-3001/3151 in an environment where the humidity is under 30%RH, the measurements may somet

fluctuate. This is not abnormal.

Options

Data Collector: TR-57DCi For Infrared Communication



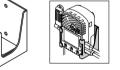
USB Communication Cable (US-15C) erial Communication Cable (TR-6C10) AAA Alkaline Battery x 2

Temperature-Humidity Sensor: THA-3151



nperature: 0 to 55 °C / Humidity 10 to 95 %RH (No condensation)

Wall Attachment: AT-76K1



Material: Aluminum

Sensor Extension Cable: TR-1C30



For Temperature-Humidity Sensor THA-3001/3151, HHA-3151 (Possible to use up to three extension cables per sensor) Material: Vinyl Coated Electrical Wire