KENZEN

Kenzen Device
User Manual

Rev A

XXXXXXXX_RevA

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메모 포함[SO1]: Should we remove this text, ie. if we are going to link this manual on the website it will be counter-intuitive. Note that I don't see us printing this manual unless we change the format to be much smaller which then gets poor feedback who say "the text is too small to read".

메모 포함[CR2R1]: I agree, but this also applies to the PDF version they can download. For instance, if they download and print it, this covers that situation.

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Preface

This user manual provides instructions for operating and taking care of the Kenzen wearable device.

Document Conventions

This manual uses the following conventions.

Convention	Purpose
Signal Words: • Danger • Warning • Caution • Notice	Signal words call attention to a safety message and the degree of hazard as follows: **DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury. **WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury. **CAUTION**, used with the safety alert symbol, indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. **NOTICE** is used to address practices not related to personal injury.
⚠	**Safety Alerts** **Safety Alerts** highlight hazards to humans. Each safety alert is accompanied by the safety alert symbol and a signal word. If listed precautions are not followed, an injury may occur.
IMPORTANT NOTICE	Important notices highlight information that is critical to the user experience, expectations, preventive measures, or is necessary for the device's optimal performance.
Note:	**Notes** highlight tips for performing procedures and provides information of general interest.
Bold	It is used for: Screens, dialogs, dialog items, menus, controls, keys, fields, and software controls.
Italics	Are used for: Emphasis.

Kenzen General Safety and Compliance

The Kenzen Device is designed to be used in industrial environments. However, it is not intrinsically safe and should not be used in **any** potentially explosive environment. Kenzen device users should follow general safety precautions and comply with any special instructions that may be specific to their environment. The user may be at risk if the device, its controls, features, options, or accessories are used in ways that are not specified either in the

⚠ CAUTION

If the device, its controls, features, and options, or its accessories are used in ways not specified either by this manual or by KENZEN, hazardous conditions that exceed the protection provided by the supplied and specified equipment may occur.

⚠ CAUTION

This device is not serviceable by users. Any repairs must be performed by KENZEN or other authorized service personnel. Improper or faulty repairs could result in damage to the instrument and possible danger to users.

If parts, including batteries, are removed, dispose of them as required by all local authorities and jurisdictions.

⚠ CAUTION

Important Battery Information

Lithium-Ion Battery

The rechargeable Li-Ion battery is encased in the device and ***not*** removable. The battery and system include protection against short circuits, overcharging, and excessive discharging. Charge the device battery with the supplied or an approved charging adaptor. MSDS documentation is available upon request.

메모 포함[CR3]: @Skip Orvis Skip, please include any battery warnings that are available from the manufacturer

메모 포함[SO4R3]: There are no other specific items other than those listed. One item we could not is that the battery MSDS is available upon request.

⚠ CAUTION

Kenzen Patch contains a lithium-ion battery that has been designed to be safe under normal operating conditions. Due to the nature of Li-ion batteries, please consider the following safety precautions:

- Avoid shorting the battery.
- Do not immerse the battery in water.
- Do not disassemble or deform the battery.
- Do not expose to or dispose of the battery in fire.
- Avoid excessive physical shock or vibrations.
- Never use a device that appears to have suffered abuse.
- The device battery must be charged with an appropriate charger.
- Never use modified or damaged charger.
- Store in a cool, dry, and well-ventilated area.
- Dispose of in accordance with local regulations.

메모 포함[CR5]: @Skip Orvis Skip, please review these comments. These are general warning for batteries

메모 포함[SO6R5]: Along with the previous comment I would say that this is generic enough to cover the product.

IMPORTANT NOTICE

If the device is damaged by either consistent or occasional impact or exposure to any of the following conditions, the warranty will be voided.

- Steam
- High humidity or moisture condensing conditions (RH >95%)
- Extreme ambient temperatures above 122°F (50°C) or below -4°F (-20°C)
- Strong electromagnetic (motors or transformers) or electrostatic fields
- Strong vibrations and impacts
- Contact with oxidative, corrosive, and caustic liquids including, but not limited to:
    - Chlorine gas
    - Hydrochloric acid
    - Ammonia
    - Concentrated hydrogen peroxide
    - Sulfuric acid
    - Aqueous sodium hydroxide

Contacting Kenzen

Contact us between 9:00 AM and 5:00 PM Eastern Time Zone (UTC-04:00) for information and assistance:

Customer Support Contact Information	
Telephone:	+1-415-413-0080
Email sales:	sales@kenzen.com
Email service:	support@kenzen.com
Website:	www.kenzen.com
Address:	Kenzen, Inc. 11 Times Square Suite 1500A New York, NY 10036

Introduction

Kenzen Device

The Kenzen Device is wearable smart Personal Protection Equipment (PPE) for industrial workers who need a complete continuous safety monitoring solution. The Kenzen device provides real-time safety alerts by monitoring each worker's key physiological indicators, such as core body temperature, heart rate, and exertion levels. Unlike other PPE devices, Kenzen uses machine learning and advanced algorithms to analyze millions of individualized data points to provide actionable alerts to prevent heat-related injuries and illnesses. Kenzen empowers individual workers to self-monitor their health while offering a cloud-based dashboard to employers to improve safety, reduce risk, and increase team productivity.

Kenzen Device package includes:

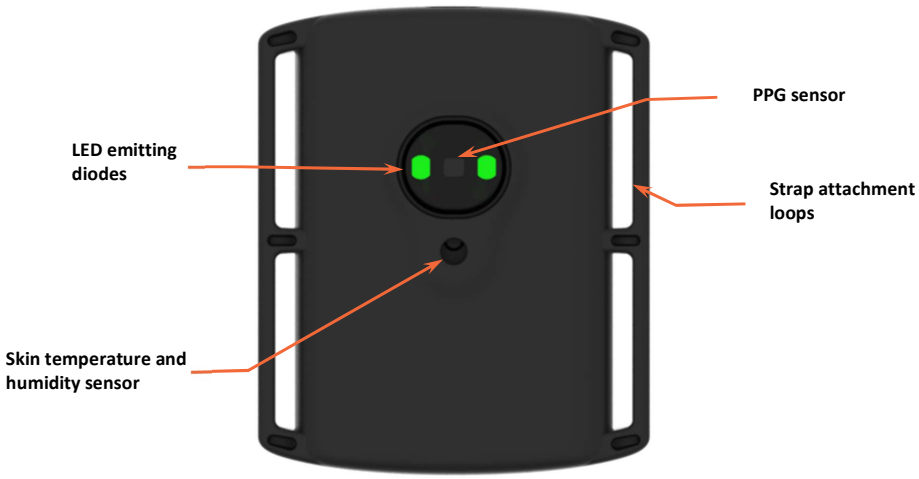
- Kenzen wearable device
- Kenzen *Quick Start Guide* *(Download a copy* here)
- Small arm strap
- Large arm strap
- USB-A to micro-USB Cable
- USB charging adaptor
- Carry case

메모 포함[SO7]: @Claude Robotham in this case we will need a "printable" formatted version to put into the kits that we ship out. The first 2k units will not have this QSG in printed form. Should we have a link?

메모 포함[CR8R7]: I'll find a cloud location and update with a link. I'll also add a link for the PDF version of this manual once reviewed

Figure 1: Top Device View

Figure 2: Bottom Device View



메모 포함[CR9]: @skip Please check labels

메모 포함[SO10R9]: For the "K" label it is also the "Power Button"

I would simplify the two labels for the LED/Photodetector into one named "PPG Sensor"

메모 포함[SO11R9]: Do we need to add a view that shows the micro-USB charging port?

메모 포함[SO12R9]: I see it in Figure 3, never mind

Background

Workers in many industries across the world are exposed to dangerously hot working conditions. Heat-related injuries such as exertional heat stroke, dehydration, and even death impact global workforces and cost billions of dollars each year in medical care and productivity losses. For example, 30% of individuals who work in elevated temperature environments report productivity losses. The Occupational Safety and Health Administration (OSHA) recently noted that millions of U.S. workers are exposed to heat stress in their workplace.[i] While there are some guidelines related to heat stress exposure upper limits, research has shown that one size does not fit all when it comes to heat stress management.[ii] Existing guidelines do not consider individualized factors such as age, weight, sex, fitness, medications, and previous medical conditions. In addition, Personal Protective Equipment (PPE) clothing designed to keep industrial workers safe can increase the danger of heat-related illnesses in hot, humid, and even cool work environments.

As the climate changes worldwide, workers who work outside are at higher risk for heat-related injuries. Researchers analyzing the Census of Fatal Occupational Injuries identified 285 construction worker deaths directly related to heat from 1992 to 2016. 78% of those deaths occurred during the hot summer months between June and August.[iii] As global warming is leading to hotter temperatures across the globe, the risk of heat-related deaths is also increasing. For context, for each 1-degree Fahrenheit increase in summer temperatures, the likelihood of heat-related deaths increases up to 37%. Technology that monitors and predicts when workers are at risk can save lives.

Getting Started with your Kenzen Device

The section contains instructions to get to know your device, such as charging, registering, and navigating through basic mobile application functionality.

Charging the Device Battery

Before using your device, Kenzen recommends you charge the device for 4 hours.

1. Insert the micro-USB cable into the device USB port (Figure 3).
2. Plug the USB power adapter into an appropriate electrical outlet (120/240V).

   The Kenzen "K" LED indicator will be visible:

   - If your device is charging, the LED indicator will flash green and blue during charging.
   - If your device is fully charged, the LED indicator will remain green.

Figure 3. Device and USB Power Supply

Note:

- A full charge takes approximately 3 - 3 ½ hours.
- The device may be connected to the mobile application while charging with a USB rated charger.

IMPORTANT NOTICE
The device battery is non-removable and is located inside the sealed device enclosure.

Mobile Application Software

Apple iOS Software

On your mobile device, download and install the Kenzen Application from the Apple App Store

- Visit https://apps.apple.com/us/app/kenzen/id1512544065

Create a New User Account (All Users)

1. Launch the Kenzen Application
2. Select **Create Account** on the Sign In page

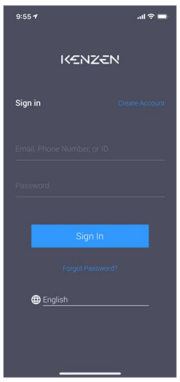


Figure 4: Sign-In

3. Enter your First and Last name, sign-up code (optional if provided by admin)
4. Accept the medical device and terms of conditions policies and press **Next** to continue.

5. Enter your email address and select **Get Code.**

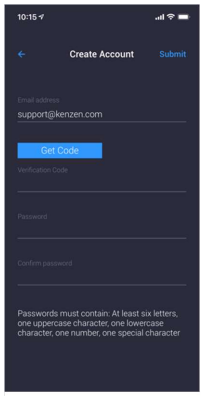
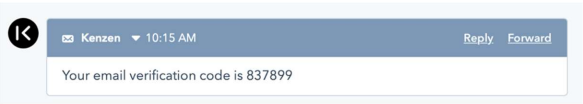


Figure 5: Create Account

Note:

- Your email address must match the email address provided to your Administrator or Kenzen representative. If Get Code returns an error, this indicates that the email address is not registered. Please contact your Administrator or Kenzen representative.

6. Check your email for a one-time code.



7. Enter the six-digit Verification Code and your user password. The Work Rest Calculator will display upon successful account creation (Figure 6).

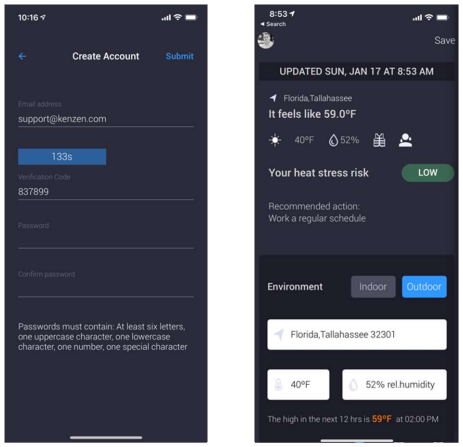


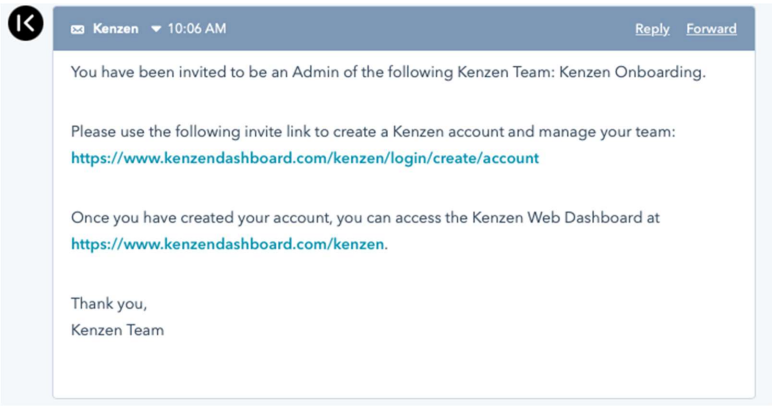
Figure 6: Verification Code

Password Requirements
▪ Six minimum characters (128 max) ▪ lowercase letters ▪ At least one uppercase letter ▪ At least one number ▪ At least one of the following symbols ~!@#$%^&*_-+=`|(){}[]:;”’<>,.?/

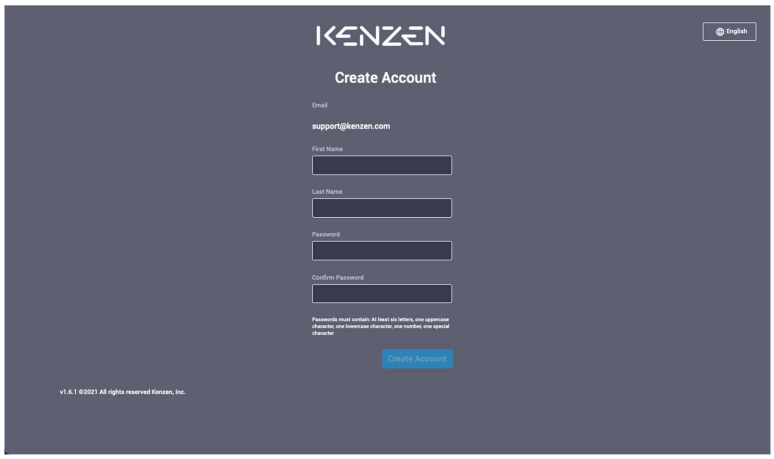
Create a New Administrator Account

IMPORTANT NOTICE
Administrator Account creation requires an invitation from a Kenzen onboarding specialist or your company administrator. Contact your representative if you have not received an Administrator invitation before proceeding.

1. From a personal computer, follow the unique Admin link sent to your email address.



2. Enter your first name, last name, password, and select **Create Account.**
3. After Admin account creation, you can now access the Kenzen Team Dashboard at: https://www.kenzendashboard.com/kenzen



Powering ON the Device

Powering On

1. Quickly press and release the Kenzen “K” LED Power Button to turn on the device.
2. The Kenzen “K” LED light will blink

   The Kenzen “K” LED behavior will vary depending on the following:
   - If your device has never been connected to your mobile device, the LED indicator will flash green and blue after power on.
   - If your device has previously been connected to your mobile device, the LED indicator will flash blue after power on.
3. Confirm the Kenzen “K” LED is blinking, and the two green LEDs are flashing on the bottom of the device. If not, your device is off; quickly press and release the Kenzen “K” button to turn on the device (**오류! 참조 원본을 찾을 수 없습니다.**7).

Figure 7. Device Power ON Indicators

Powering OFF the Device

Powering Off

1. Press and hold down the Kenzen “K” LED Power Button for 5 seconds and then release.
2. The device will vibrate, and the LED lights will turn off.

Kenzen Device Placement

IMPORTANT NOTICE
The Kenzen device placement is critical for accurate physiological monitoring. Improper placement will cause erroneous alerts and will not protect you.

Attaching Device to Your Arm

1. Determine which strap size fits your arm; small or larger strap sizes are provided.
2. With the device Kenzen “K” logo on the top side facing you (Figure 8).
3. Insert each one of the four straps into each device loop from the back of the Kenzen device facing away from you (Figure 9).

Figure 8: Device Top

Figure 9: Straps inserted

4. Secure the Velcro straps enough to allow for the device to slide up your arm in the next step.
5. Carefully place your hand through the Kenzen straps with the Kenzen ”K” logo facing outward, away from your skin.
6. Slide the device up to your arm and position it anywhere below your shoulder and above your elbow, as shown in **Figure 10**. The device can be placed on either arm.

Figure 10: Device strap positions

IMPORTANT NOTICE
Adjust the straps as needed for a comfortable fit but ensure that the device is in intimate contact with your skin and there is no gap. You can test this by carefully sliding two fingers between the device and your skin. Your fingers should feel some pressure between the device and your skin. If not, tighten the strap.

Kenzen Device Connection

Bluetooth Pairing

1. Power ON the Kenzen device by quickly pressing the Kenzen “K” button.
2. The Kenzen “K” LED will quickly blink Blue if the device has not been paired to your mobile device.
3. Open the mobile Kenzen Application.
4. Log into your account with your email and password.
5. Go to Main Menu by pressing the Kenzen “K” logo or your custom image in the upper left corner of the Live View screen (Figure 11).
6. If prompted, accept the Bluetooth settings request to allow your device to pair to your phone.
7. Select “Connect” when the device appears. If a device does not automatically appear, select ”Scan New Devices” and repeat the step if necessary (Figure 12)
8. Select “**Back**” in the upper left corner when your device has successfully connected, indicated by Connected! in green lettering (Figure 12).

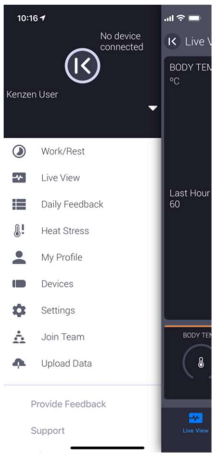


Figure 11: Main Menu

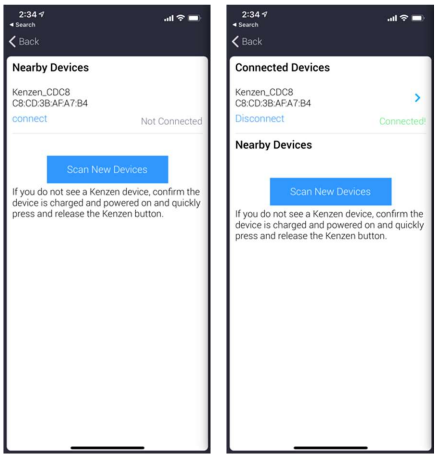


Figure 12: Device Connection Status

Create a User Profile

User Profile and Medical Questionnaire

1. Log into the Kenzen mobile application.
2. Go to **Main Menu** by pressing the Kenzen "K" logo or your custom image in the upper left corner of the Live View screen.
3. Select **My Profile**.
4. Enter your profile information, including Country of Residence, Typical Workday Length, Typical Workday Start Time, Gender, Date of Birth, Measurement units, Height, and Weight (Figure 13).

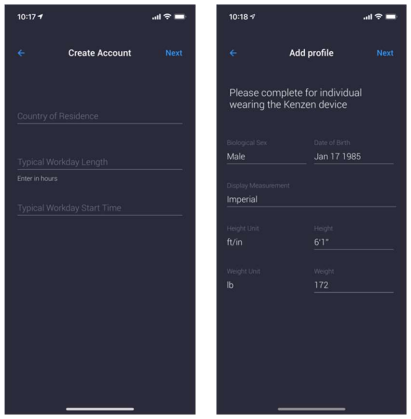


Figure 13: Profile Information

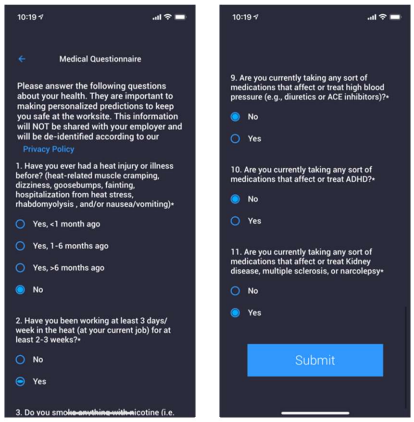


Figure 14: Medical Questionnaire

5. Complete the medical questionnaire (Figure 14).
6. Once you have completed your profile information and medical questionnaire, you are ready to use the Kenzen device

IMPORTANT NOTICE
At Kenzen, your privacy is critical to us. We do not share your medical question answers with your employer; the information is used to improve the Kenzen Alert system's accuracy and keep you safe. Please review our complete worker privacy details https://kenzen.com/kenzen-solution-privacy-policy/.

메모 포함[SO13]: Do we need a user-readable URL link as well?

Kenzen Device Live View

When the Kenzen device is adequately secured on your arm and successfully connected to the Kenzen mobile application, the Live View window will display your Body Temperature and Heart Rate. You can monitor your real-time data in the Live View window. Switch between each view by selecting the corresponding icon at the bottom of the Live View window (Figure 15).

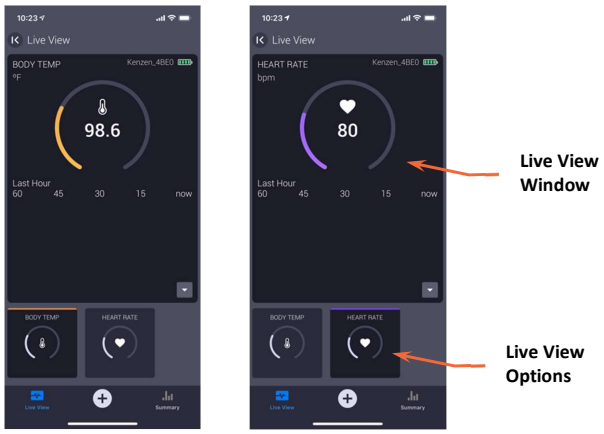


Figure 15: Live View Options

Work Rest Calculator and Kenzen Device Alerts

The Kenzen Work Rest Calculator gathers your workday information, including your clothing and local environmental information, to help Kenzen algorithms create an individualized alert system to help prevent heat stress injuries.

메모 포함[SO14]: Should this portion go above the web info (ie. before creating a team)?

메모 포함[CR15R14]: I'm open to it. All of the sections or just certain parts should go before creating team?

Indoor and Outdoor Setting

1. Log in to the Kenzen Mobile Application
2. Go to the Main Menu and select **Work/Rest**.
3. Select the environment you are working in, **Indoor** or **Outdoor (**Figure 16).

If you are working Outdoors (Figure 17):

i) Enter your location by typing your city or zip code into the location field. The location will update with the closest match to your city. Select the closest match.

ii) Select your sun exposure, clothing type, and work activity.

iii) Confirm the location settings, temperature and humidity are correct and select **Save.**

If you are working Indoors (Figure 18):

i) Enter your inside temperature and humidity manually.

ii) Select your clothing type and work activity.

iii) Confirm temperature and humidity are correct and select **Save.**

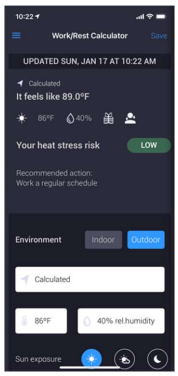


Figure 16: Work/Rest

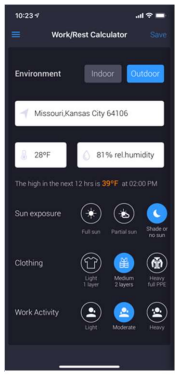


Figure 17: Outdoor

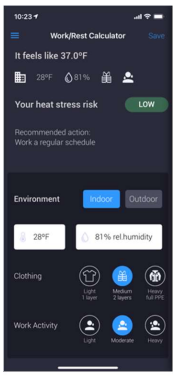


Figure 18: Indoor

Note:

- When you log into the mobile application, join a new team, or submit daily feedback, you will be prompted to update the Work Rest calculator to ensure your work environment details are updated daily.

Kenzen Device Alerts

Stop Work alerts are triggered automatically based on individuals' body temperature, heart rate, environmental conditions, and other individualized physiological information.

1. Stop Work alerts are delivered to the phone via an app notification and by the device via haptic vibration on your arm.
2. When a Stop Work alert is received, select ***I will rest*** (recommended, or ***I feel Ok to work*** (Figure 19).

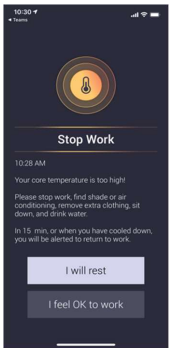


Figure 19: Stop Work

IMPORTANT NOTICE
Kenzen recommends all users follow the direction of Kenzen alerts. Stop Work alerts are based on scientific research and backed up by industry-leading data analytics. Stop Work alerts are designed to keep you safe.

3. After you acknowledge the Stop Work notification, complete the Symptom Checker questions (Figure 20).
4. Based on the Symptom Checker responses, Kenzen will display possible non-medical treatments (Figure 21).

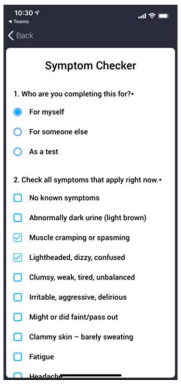


Figure 20

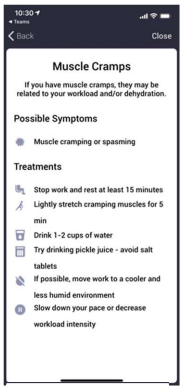


Figure 21

Mobile App Alert Summary (All Users)

1. On the Main mobile application window, select the **Summary** icon located in the lower right corner of the mobile app (Figure 22).
2. Select the **Alerts** icon to view your alert summary for the past 24 hours (Figure 23).

Figure 22: Summary

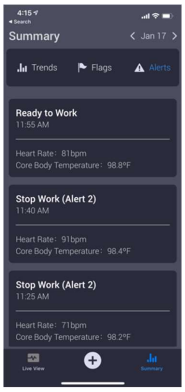


Figure 23: Alerts

Mobile App Team Alerts (Admin Users)

1. Go to the Main Menu and select **Team Alerts** (Figure 24).
2. Select a **Team** from the drop-down menu to view Team Alerts or select **All Teams** to view all alerts (Figure 25).

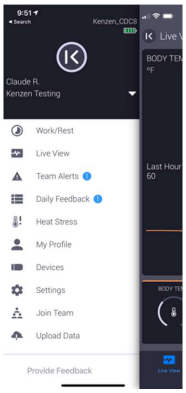
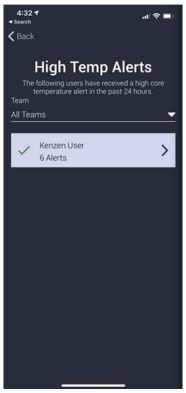


Figure 24: Team Alerts



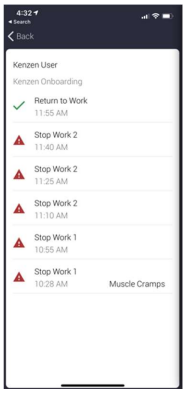


Figure 25: Team Alert Summary Details

Kenzen Team Dashboard Alerts (Admin Users)

Team administrator accounts can view team alerts via the mobile application and the Kenzen Team Dashboard.

1. On your computer, go to https://www.kenzendashboard.com/kenzen/
2. Log in with your administrator account credentials.
3. The Team Dashboard displays **All Team** members that you have permission to see as a Team Administrator (Figure 26).

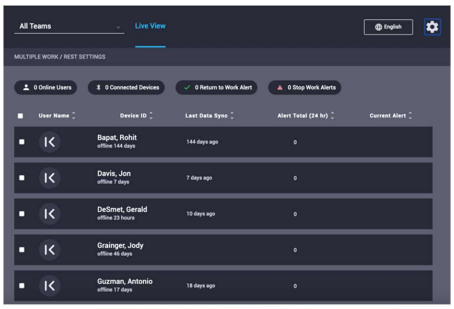


Figure 26: Kenzen Team Dashboard

4. Select the drop-down menu in the upper left to view all members of the selected team (Figure 27).
5. Select a team member to view individual alert details (Figure 28).

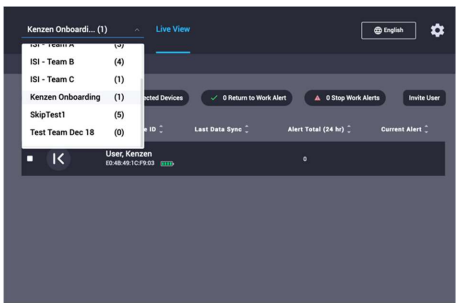


Figure 27: Select individual teams

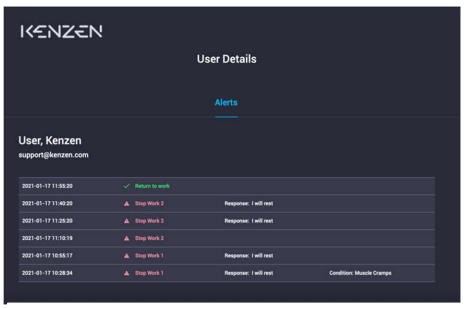


Figure 28: Individual team member alert details

Activity Flags

Flags are available to identify important points in time and activities.

1. To add a Flag, Select the Plus sign icon located at the bottom of the main app Main Window (Figure 29).
2. Enter the **Flag Label** details to identify a specific point in time (Figure 30).
3. View Flags under the **Summary** page by selecting the **Flag** icon (Figure 31).

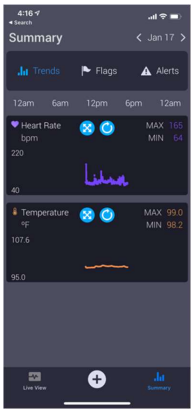


Figure 29: Add Flag

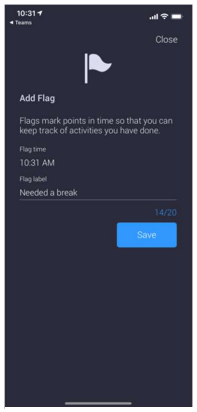


Figure 30: Flag Label

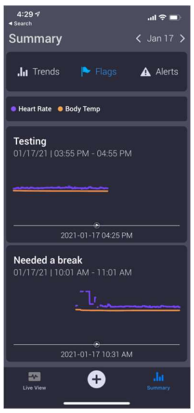


Figure 31: Flag Summary

Kenzen Symptom Checker

Kenzen provides a Heat Stress Symptom Checker to provide non-medical treatment recommendations based on your heat stress symptoms.

1. To view the Heat Stress Symptom Checker, go to the **Main Menu** and select **Heat Stress**
2. Select the **Heat Stress Symptom** Checker, answers the questions for treatment recommendations (Figure 32).

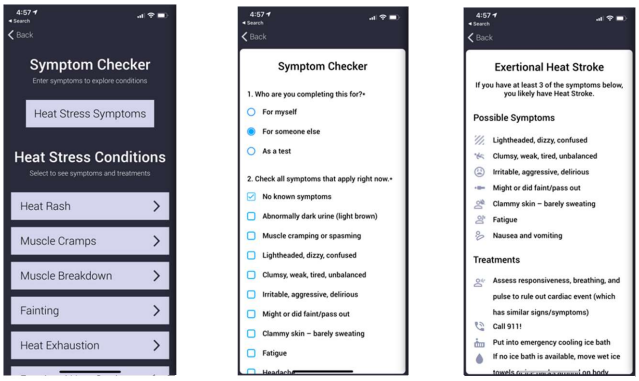


Figure 32: Heat Stress Symptom Checker

3. Alternatively, select the **Heat Stress Condition** that best describes your symptoms (Figure 33).

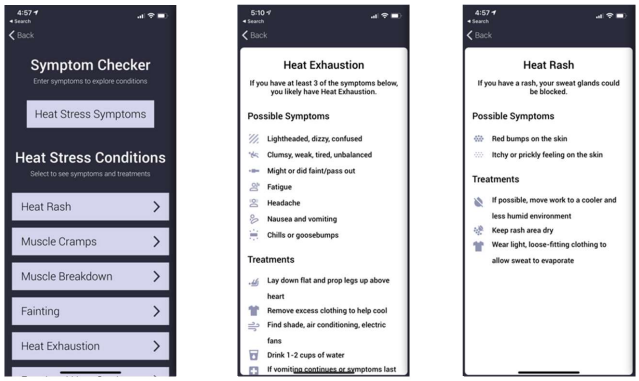


Figure 33: Heat Stress Conditions

Note:

- Kenzen does not provide medical based recommendations. Please consult your healthcare representative for medical diagnosis and treatment.

Kenzen Daily User Feedback

Daily feedback is anonymous and is used to improve Kenzen's solutions and services. Registered users will be prompted daily to enter user feedback.

1. To manually enter feedback, go to the Main Menu and select Daily Feedback.
2. Answer the short questions to Submit Feedback (Figure 34).

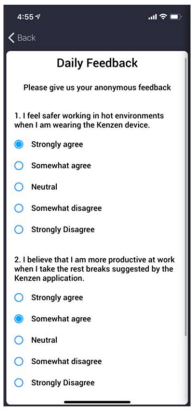


Figure 34: Feedback

Signing Out the Kenzen Mobile App

To sign out of the mobile application, go to Main Menu and select **Sign Out** at the bottom of the menu (Figure 35).

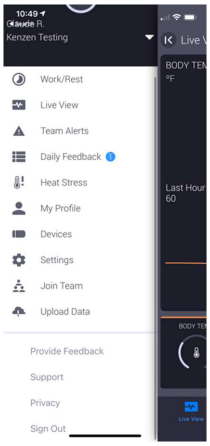


Figure 35: Sign Out

New Team Onboarding

Creating a New Team

Create a Team

A team is a group of workers. Kenzen has developed an onboarding website to facilitate the creation of teams

Note:

- Creating a team is only available to administrators. If you need to create a team, please contact your company administrator to provide you with administrator privileges.

1. On your computer, go to https://www.kenzendashboard.com/kenzen/
2. Log in with your administrator account credentials.
3. Select the gears setting icon in the upper right corner and select **Create Team** (Figure 36).

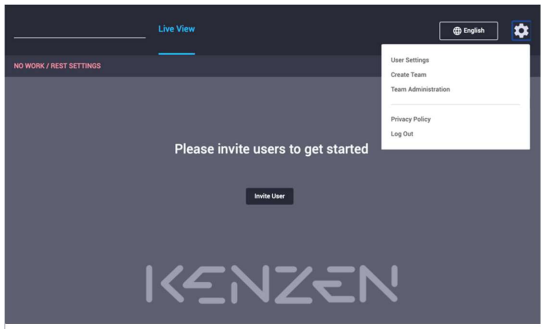


Figure 36: Create Team

4. Enter team information, including a unique short **Team Name**, **Team Location,** and **Units** (Figure 37).

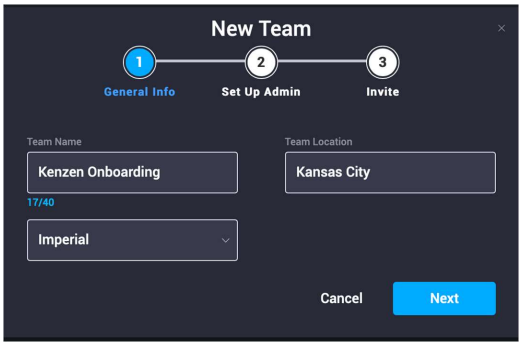


Figure 37: Team Information

5. Select **Next**.
6. Invite Administrators to the team by entering the new admin's email address. Select **Add Another Admin** to add additional email addresses (Figure 38).

Note:

- Step 6 is optional. Team Administrators can view all team members' alerts and device connection status. Please reserve admin privileges to managers and health care members.

7. Select **Next** to continue.
8. Invite new team members by entering the team members' email addresses. Select **Add Another Member** to add additional email addresses (Figure 39).
9. Select **Submit** when finished.

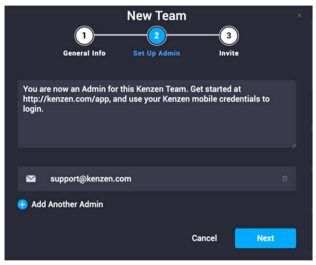


Figure 38: Add Admin Users

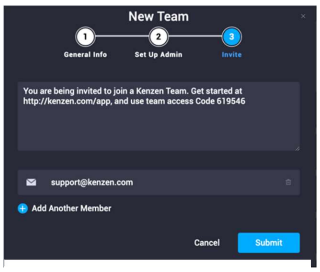


Figure 39: Add Team Members

10. A new team is created. Team members will appear when the team is selected from the drop-down menu of the main dashboard window (Figure 40).

Note:

- Team members will only appear when they accept the invitations and join the new team

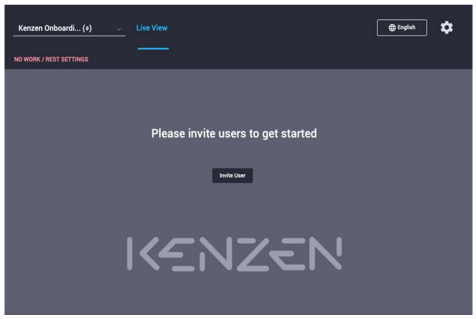


Figure 40: Team Dashboard

Join a New Team

Your Team Administrator will send an email inviting you to a team (Figure 41). If you haven't received an email invitation, please contact your team administrator or a Kenzen Representative.

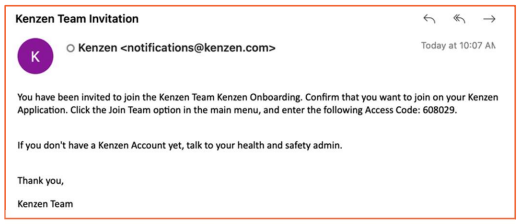


Figure 41: Team invitation email

1. Log in to the Kenzen Mobile Application
2. Go to the Main Menu and select **Join Team** (Figure 42).
3. Enter the six-digit **Access Code** from the email and select **Join Now** (Figure 43).

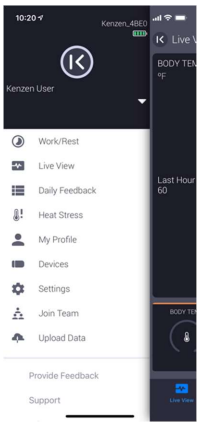


Figure 42: Join Team

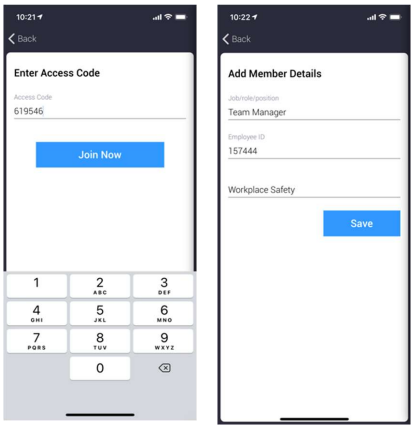


Figure 43: Access Code and User Details

Troubleshooting and Maintenance

If you encounter a problem with your device, please contact a Kenzen representative at support@kenzen.com.

Resetting Account Password

1. Launch the Kenzen Application
2. Select **Forgot Password** on the Sign In page (Figure 44).
3. Enter your email address and select **Get Code** (Figure 45).

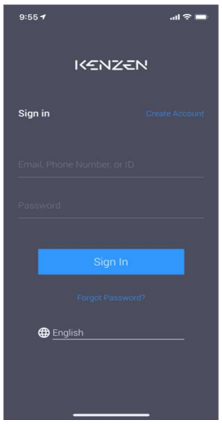


Figure 44: Sign-In

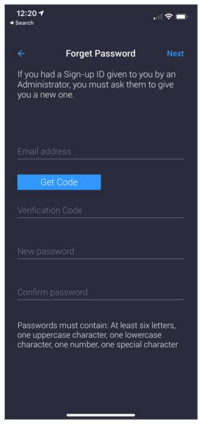


Figure 45: Get Code

Password Requirements
▪ Six minimum characters (128 max) ▪ lowercase letters ▪ At least one uppercase letter ▪ At least one number ▪ At least one of the following symbols ~!@#$%^&*_-+=`|(){}[]:;”’<>,.?/

4. Enter your email address and select **Get Code.**

Note:
- Your email address must match the email address provided to your Administrator or Kenzen representative. If Get Code returns an error, this indicates that the email address is not registered. Please contact your Administrator or Kenzen representative.

5. Check your email for a one-time code.

6. Enter the six-digit Verification Code and your new user password.
7. Sign-in with your new user password.

Verifying Your Device Mac Address

Your Kenzen device has a unique network Mac Address. Please identify your MAC address before contacting Kenzen Support.

1. Power On you Kenzen Device.
2. Launch the Kenzen mobile application.
3. Go to the Main Menu and select **Devices**.
4. Record the unique 12-digit MAC address listed below your Kenzen Device Name (Figure 46).

Note:

- If your device is not connected to your mobile device, select **Connect** or select **Scan New Devices.**

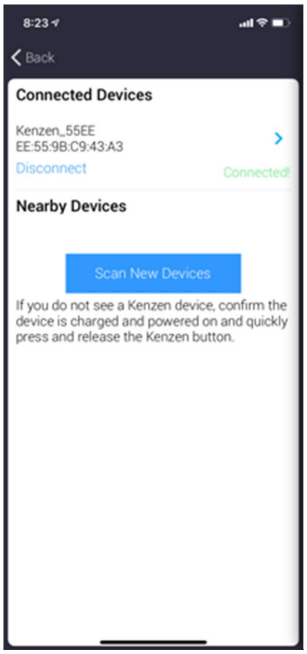


Figure 46: Device Information

Kenzen LED Status Indicators

The Kenzen device provides visual status indicators by displaying various LED colors, flashes, and haptic feedback. The table below describes the device status and corresponding Kenzen "K" LED behavior and haptic feedback if available.

Device Status	LED Behavior and Haptic Feedback
Device is OFF	No LED light
The device is turning ON	**State 1:** The device is turning On and in pairing mode but has NEVER been paired with a phone or Bluetooth hub. ▪ LED flashes Blue at a frequency of 1Hz and 50% duty cycle. **State 2**: Device is turning On, in pairing mode, AND has been previously paired with a phone or Bluetooth hub. ▪ LED alternates between Green and Blue at a frequency of 1Hz and 50% duty cycle.
The device is operating and connected to a phone or Bluetooth hub	Once successfully paired to mobile phone or Bluetooth hub, LED flashes Blue every 5 seconds
The device is out of range of mobile device or Bluetooth hub after successful pairing	LED flashes White once and Blue twice, repeats every 5 seconds
The device is connected to a USB power adaptor and NOT fully charged and NOT connected to a phone or Bluetooth hub	LED flashes Green in a breathing pattern, from bright to dark, dark to bright.
The device is connected to a USB power adaptor and FULLY charged and NOT connected to a phone or Bluetooth hub	Solid Green LED
The device is connected to a USB power adaptor and NOT fully charged and CONNECTED to a phone or Bluetooth hub	LED flashes Blue in a breathing pattern, from bright to dark, dark to bright.
The device is connected to a USB power adaptor and FULLY charged and CONNECTED to a phone or Bluetooth hub	Solid Blue LED
The device battery is low	LED flashes Red every 3 seconds
The user receives a STOP WORK alert	LED flashes Red rapidly until the user acknowledges alert -AND- The device vibrates several short, fast pulses
The user receives a READY TO WORK alert	LED flashes Green rapidly until the user acknowledges alert -AND- The device vibrates several long pulses
The device is collecting data	Device sensor LED Diodes on bottom of the device, flash Green rapidly
The device is off the user body	Device sensor LED Diodes on the bottom of the device are dark

Cleaning Your Device

Maintaining a clean Kenzen Device helps ensure that the device operates properly. Kenzen recommends cleaning your device after each workday or at minimum every 20hrs of wear-time. To clean your device please follow the following guidelines.

1. Turn off the device by the press and holding the Kenzen logo button on the top of the device for 5 seconds.
2. With a 70% Isopropyl alcohol sanitary wipe, clean all surfaces of your devices.
3. When finished, let your device air dry.

Appendix A. Operating Specifications

It is recommended that you review these specifications before operating your KENZEN Device.

Sensor Specifications

Specification	Value
Temperature Range (upper and lower)	0 C – 90 C
Temperature Accuracy (upper and lower)	±0.2 C
Humidity (upper and lower)	0-100%
Humidity (upper and lower)	±2% RH
PPG Heart Rate Range	25—220 BPB
PPG Heart Rate Accuracy	92% of data w/in ±5 BPM of a chest strap

메모 포함[CR16]: @Skip Orvik Please confirm all specifications

메모 포함[SO17R16]: These are checked / good

Accessory Specifications

Specification	Value
Large Arm Strap (Lycra)	260 mm - 450 mm arm circumference
Small Arm Strap (Lycra)	150 mm - 340 mm arm circumference

메모 포함[SO18]: It is hard to say the exact circumferences but we did extend these straps a bit so I think that this updated range is slightly better.

Physical Specifications

Hardware	Specification	Value
Kenzen Device	Enclosure	Sabic Lexan™
	Length	2.5 in. (64 mm)
	Width	2.2 in. (56 mm)
	Height	0.3 in. (7.5 mm)
	Weight	30 grams

Electronics and Data Processing Specifications

Specification	Value
Processor	Embedded ARM® Cortex® M4M4 Core processor
Connectivity	Bluetooth 4.2
Wireless	Bluetooth 5, Compliant 4.2 and above *BT5 not fully enabled
Wired	Micro-USB
Accelerometer	3-axis
Gyroscope	3-axis

Specification	Value
Magnetometer	3-axis
Algorithm	Proprietary machine learning and alert system
Software	KENZEN Mobile iOS and Android application

Environmental Specifications

Specification	Value
Storage temperature	-20°C to +55°C
Operating Temperature	-10°C to +50°C (Operation above 50°C may affect data quality)

Electrical Specifications

Name	Value
Internal Battery	3.7VDC 150mAh / 3.7VDC 240mAh
Battery life	14-16 hrs. at 25°C, rechargeable
Kenzen Device	USB-A to micro-USB (data and power)
Battery Charger	Input: 100-~240VAC, 50-60Hz Output: 500 mA max

Appendix B. Software and Firmware Upgrade

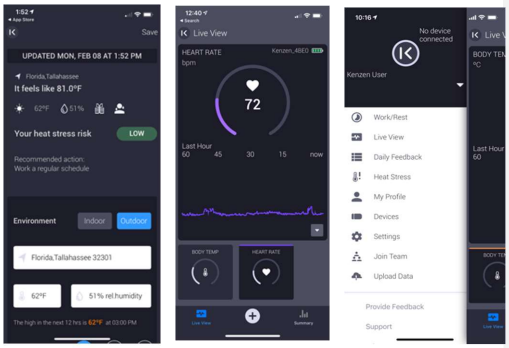
Upgrade Mobile Application

1. From your mobile device, download the new Kenzen App from the Apple App Store (version 1.5.1 and higher) https://apps.apple.com/us/app/kenzen/id1512544065

2. Sign into the Kenzen application with you user credentials or contact your manager to create a new account.

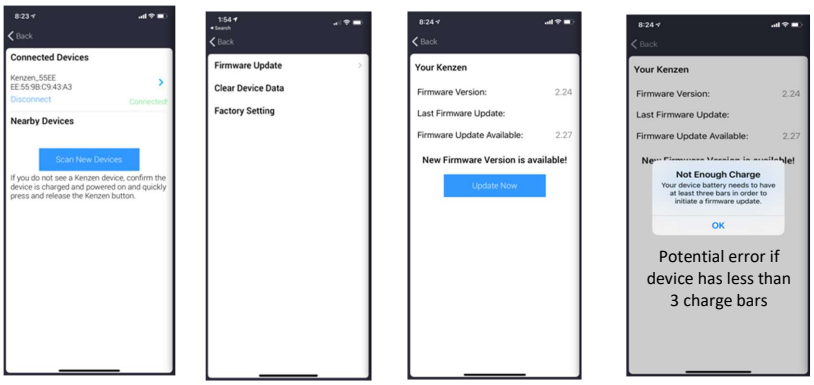
Upgrade Firmware

1. Log into the Kenzen Application
2. Confirm your site location is correct and select save.
3. Confirm device battery has at least 3 green bars
4. Go to main menu by selecting Kenzen icon or your profile picture.
5. Select **Devices**.
6. Connect to your device and tap the blue arrow.
7. Select **Firmware Update**.
8. If a new firmware update is available for your device, select **Update Now**.
9. Do not exit the application during the update.



2 3 & 4 5

The device will reboot and automatically reconnect to the device. In some cases, the user may have to manually reconnect to the device by selecting 'connect'.



6 7 8

NOTE: The error message may appear if the device does not have at least 3 charge bars. Charge the device before updating

Appendix C. Regulatory Statements

FCC and Industry Canada Statements

-. This Class B digital device meets all requirements of the Canadian Interference-Causing Equipment Regulations.

-. Information to user.
The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

-. 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.

-. NOTE: This equipment has been tested and found to comply with the limits for a Class B 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:
1) Reorient or relocate the receiving antenna.
2) Increase the separation between the equipment and receiver.
3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4) Consult the dealer or an experienced radio/TV technician for help.

IMPORTANT NOTICE
This is a Class B product. In a domestic environment, this product may cause Kenzen interference, in which case the user may be required to take adequate measures.

Export Regulation Statements

IMPORTANT NOTICE
The technical information contained with this document is subject to the Export Administration Regulations. Export of this technical information to foreign persons or foreign companies, within or outside the United States, may require prior written authorization by the U.S. Department of Commerce, Bureau of Industry and Security. Contact Kenzen prior to such a transfer.

EC Statements

This equipment is in conformity with the provisions of the following EC Directives:

- Electromagnetic Compatibility and Radio Spectrum Matters: ETSI EN 300 328 V2.1.1:Ed.2016
- Electromagnetic Compatibility (EMC) Standard For Radio Equipment and Services: ETSI EN 301 489-1:2017 Ed.V2.1.1
- Assessment of the Compliance of Low Power Electronic and Electrical Equipment with the Basic Restrictions related to Human Exposure: CENELEC EN62479*AEI
- Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Requirements: IEC 62368-1:2018 Ed.3
- Waste of Electrical and Electronic Equipment (WEEE) 2002/96/EC
- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) 2002/95/EC

European WEEE Recycling and RoHS

The following sections provide the KENZEN compliance statements for European WEEE and RoHS regulations.

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:

메모 포함[CVR19]: @Skip Orvis Not sure what we need here but this is standard for most electronic equipment.

메모 포함[SO20R19]: Also reviewing the best process for RoHS and WEEE certs. WEEE can get a little complicated depending on if we need an agent in Europe or not. I will work that out.

메모 포함[SO21R19]: I added my interpretation under the EC Statements. The test lab will let us know if we are incorrect.

WEEE Konformität

Dieses Prudukt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96/EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet:

Kenzen hat Vereinbarungen mit Verwertungs/Entsorgungsfirmen in allen EU-Mitgliedsstaaten getroffen, damit dieses Produkt durch diese Firmen wiederverweret order entsorgt warden kann. Füer mehr infromationen bitte kontaktieren sie Kenzen oder Ihre öertliche Vertretung.

Conformité DEEE

Ce produit doit être conforme à la directive européenne (2002/96/EC) des Déchets d'Equipements et Electroniques (DEEE). Il est marqué par le symbole suivant:

Kenzen s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Pour de plus amples renseignements, veuillez contacter Kenzen ou bien ses représentants locaux.

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[i] https://www.osha.gov/heat-exposure

[ii] Notley, SR, Flouris, AD, Kenny, GP. Occupational heat stress management: Does one size fit all? *Am J Ind Med*. 2019; 62: 1017– 1023. https://doi.org/10.1002/ajim.22961

[iii] Dong, XS, West, GH, Holloway-Beth, A, Wang, X, Sokas, RK. Heat-related deaths among construction workers in the United States. *Am J Ind Med*. 2019; 62: 1047- 1057. https://doi.org/10.1002/ajim.23024