

### Stations for Heat Stress assessment of people



- ▶ System for monitoring: wet temperature, black globe temperature, air temperature (and RH%)
- ▶ Local calculation of WBGT index as defined in the ISO7243 standard (Rev.2017: with/without solar load, WBGT Effective and WBGT Reference for acclimatized/non-acclimatized subjects)
- ▶ Local calculation of Heat Index
- ▶ Local UTCI index calculation, with optional wind speed and global radiation sensors added
- ▶ Designed to withstand harsh environments
- ▶ Data storage and communication to remote PC for analysis and reporting
- ▶ Dashboard visualization on remote PC in real time via MQTT broker server
- ▶ SMS and e-mail for alerts
- ▶ Electrical outputs for local alarm activations

LSI LASTEM has developed two solutions for monitoring heat stress indices and alerting to protect the health and safety of workers and exposed people. The ISTSA2100 station is designed for fixed monitoring in outdoor environments, while the ISTSA1100 transportable station is suitable for medium and long-term monitoring both indoors and outdoors. Both systems include sensors for measuring air temperature, relative humidity, radiant temperature and wet temperature, as well as an Alpha-Log data logger and specific mounting accessories. The data logger directly calculates heat stress indices and remotely transmits measurements and calculations, generating alarms via SMS, e-mail, and activating local alert systems based on set thresholds.



**ISTSA2100**

Fix station (outdoor)



**ISTSA1100**

Portable station (indoor & outdoor)

## ► List of included items

PN	ISTSA2100	ISTSA1100
<b>Shielded air temperature &amp; RH% sensor</b>	DMA672.1+DYA230+DYA049	DMK672.1+DYA230
<b>Natural ventilation wet bulb temperature sensor</b>	DMA122 +DYA032+DYA049	DMK122
<b>Black globe temperature</b>	PRTEA4922	
<b>Data logger</b>	Alpha-Log (DLALB0100)	
<b>Pole</b>	Pole 2 m (DYA006.1)	Portable tripod with sensors' stand (BVA304 + BVA320)
<b>Pole base + pullers</b>	DYA020.1 + DYA020.1 + DYA023 + DYA028	-
<b>IP66 Box</b>	Box (ELK001)	Portable carrying case + conn. (ELK003)
<b>Solar panel</b>	OPTIONAL (see Accessories)	DYK101

## ► Sensors technical features

PN	ISTSA2100	ISTSA1100	
<b>Air temperature</b>	Model	DMA672.1	DMK672.1
	Sensor	Combined T+RH%	
	Technology	Pt100 Class A IEC60751 (DIN Class A)	
	Range	-40...60°C	
	Accuracy	±0.15 K @ 0°C	
	Cable	L.5 m free wires	L.5 m + conn. for carrying case ELK003
<b>RH%</b>	Model	DMA672.1	DMK672.1
	Sensor	Combined T+RH%	
	Technology	Capacitive	
	Range	0...100%	
	Accuracy	1% (10...30°C)	
	Cable	L.5 m free wires	L.5 m + conn. for carrying case ELK003
<b>Black globe temperature</b>	Model	PRTEA4922	
	Technology	High-precision digital	
	Range	-20...80°C	
	Accuracy	±0.1 °C @ -20..50 °C / ±0.2 °C @ 70...80 °C / ±0.15 °C @ 50...70 °C	
	Cable	L.5 m + conn. for IC2 port input in Alpha-Log	
<b>Wet bulb temperature with natural ventilation</b>	Model	DMA122	DMK122
	Technology	Pt100 Class A IEC60751 (DIN Class A)	
	Range	-20...80°C	
	Accuracy	±0.15 K @ 0 °C	
	Cable	L.5 m free wires	L.5 m + conn. for carrying case ELK003

► **ISTSA1100**



#	Products
1	DMK672.1+DYA230 Temperature + RH%
2	PRTEA4922 Globe temperature
3	DMK122 Wet bulb temperature
4	BVA304+BVA320 tripod + stand
5	ELK003 IP66 case, 18 Ah battery, power charger
6	DLALB0100 Alpha-Log
7	DYK001 Solar panel

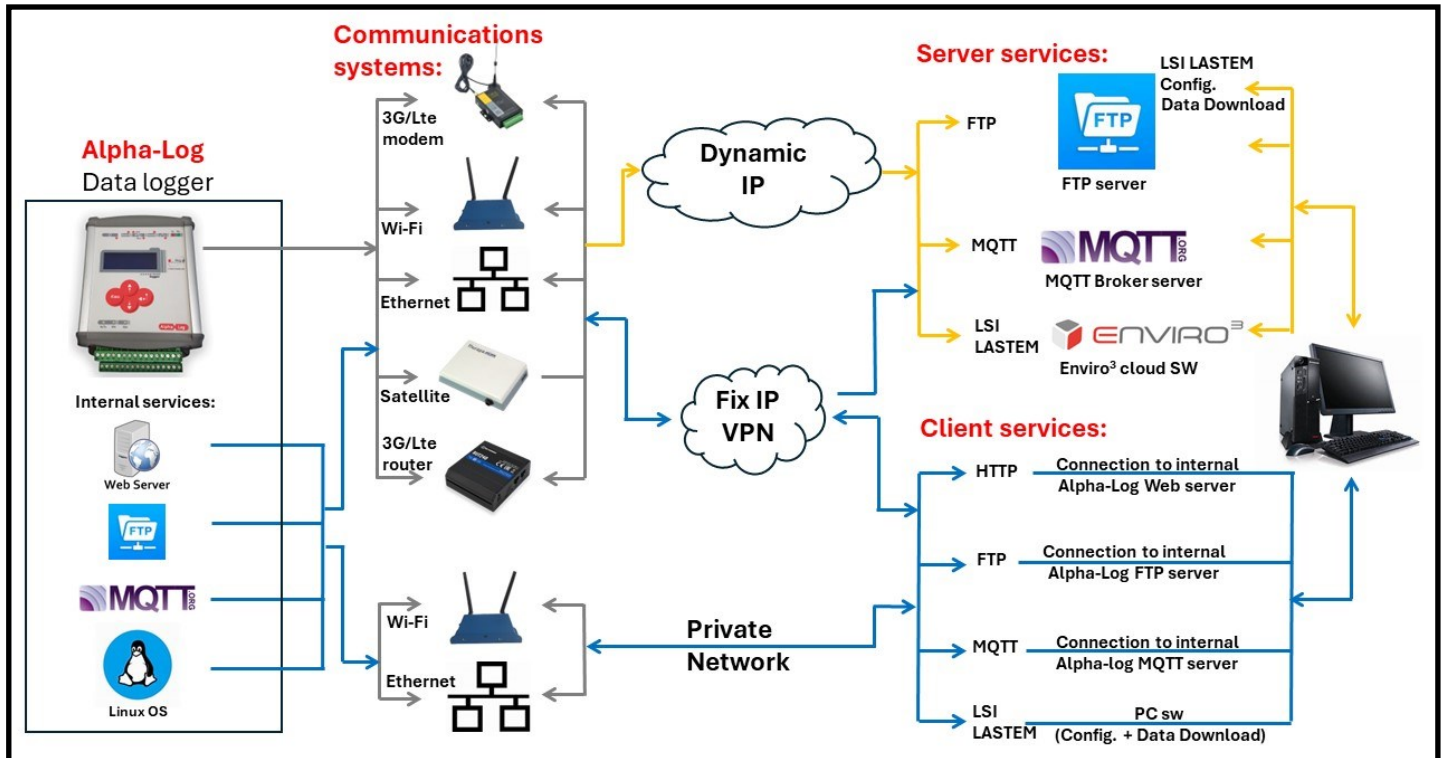
► **ISTSA2100**



#	Products
1	DMA672.1+DYA230+DYA049 Temperature + RH%
2	PRTEA4922+DYA032+DYA049 Globe temperature
3	DMA122+DYA032.1+DYA049 Wet bulb temperature
4	DYA006 Pole H.2 m
5	ELK001 IP66 Box
6	DLALB0100 Alpha-Log
7	DYA020+DYA021 Base + pullers

► All sensors can be supplied with ISO9001 and ISO17025 calibration certificates. LSI LASTEM has an in-house ISO17025 accredited laboratory.

## Alpha-Log data-logger: communication layout



Depending on the type of communication equipment chosen and the possibility of having communications only outgoing from the data logger (Dynamic IP) or also incoming (Fix IP, VPN, Private Network), it will be possible to choose how and where the data will be available within the network.

## Directly calculated microclimate indices

The Alpha-log data logger calculates, stores and transmits the following heat stress indices:

WBGT (indoor) index	According to ISO7243:2017
WBGT (outdoor) index	According to ISO7243:2017
WBGT Eff (with CAV)	According to ISO7243:2017
WBGT Ref-Eff (DTTL)	According to ISO7243:2017
Heat index	According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23)
Universal Thermal Climate Index (UTCI)	International Society of Biometeorology ISB

## Real-time remote data communication and alarms

Data communication via GPRS modem, Wi-Fi, Ethernet, Satellite or Wireless Router to remote PC, directly or via MQTT broker server and FTP server.

## Data management applications (see p. 7)

LSI LASTEM provides the following software applications (not included):

- GIDAS-Viewer: graphs, tables, measurement reports.
- X-Panel: dynamic real-time dashboards.
- ENVIRO CUBE: data analysis and alarms via web application (annual subscription).

## Internal web-server

Using an Internet browser, present in Alpha-Log, the following information is available:

- Diagnostic information (system date/time, IP address).
- Battery status, event/alarm history, output status, etc.
- Instantaneous values.
- Data download from memory (ASCII, CSV, Excel, ZIP).

## Output actuators

N.3 independent electrical outputs that can be activated with configurable logic. The outputs are useful for activation of local external devices such as alarm devices.

## Alerts via SMS, E-mail and MQTT

Notification/alarm delivery:

- E-mail: with editable text, scheduling and distribution lists. The e-mail attachment contains the file with the data that generated the event.
- SMS: with editable text, scheduling and distribution lists for up to 5 users. Active only via 4G modem.
- MQTT: delivery of messages to an MQTT Broker server.

For more information, see Alpha-Log datasheet (MW9005-ENG-01)

## Accessori

	PN		
	<b>DPA983</b>	Class C Global radiometer for UTCI calculation—OPTIONAL for UTCI calculation Accuracy: 10% Spectral range: 285....3000 nm Cable: L= 5 m	
	<b>DWA405A</b>	Cable L= 5 m	
	<b>DYA034</b>	Fixing accessory for DPA983 to DYA049	
	<b>DYA049</b>	Fixing collar for DPA983 to pole diam 45...65 mm	
	<b>DNA202.1</b>	Anemometer with 3 cups reed relay -OPTIONAL for UTCI calculation Principle: 3-cup anemometer, reed relay Threshold: 0.5 m/s Accuracy: ± 0.5 m/s (0...10 m/s); 2.5% (>10 m/s)	
	<b>DWA505A</b>	Cable L= 5 m	
	<b>DYA101</b>	Solar panel 65 Wp —OPTIONAL in fix station (ISTSA2100), INCLUDED in portable station (ISTSA1100)	
		Power	65 Wp
		Operative voltage (VMP)	15 V
		VOC voltage	22.4 V
		Dimensions	813x535 mm
		Weight	5.2 kg
		Technology	Monocrystalline
		Cable	L=5 m
	<b>DYA064</b>	Tilting bracket for pole-mounted solar panel diam. 45...65 mm - OPTIONAL in fixed station (ISTSA2100), INCLUDED in portable station (ISTSA1100)	
	<b>MG0560.R</b>	Battery Pb 40Ah—OPTIONAL in fix station (ISTSA2100)	
		Type	Rechargeable Lead-Acid battery
		Dimensions and weight	151x65x94 mm; 13.5 kg
		Box compatibility	ELK001
		Operating temperature	<ul style="list-style-type: none"> <li>• Charge: -15°C...40 °C</li> <li>• Discharge: -15°C...50 °C</li> <li>• Storage: -15°C...40 °C</li> </ul>

		PN	
	<b>TXCRB2200</b> <b>TXCRB2210</b> <b>TXCRB2200.1</b>	Dual SIM industrial 4G/LTE Wi-Fi router, 3 models depending on the number of LAN ports (ex: data logger and camera with Ethernet output) and regions covered -OPTIONAL in all stations	
		Cellular	4G (LTE)
		Max data frequency	LTE: 150 Mbps. 3G: 42 Mbps
		Wi-Fi	WPA2-PSK, WPA-PSK, WEP, MAC Filter
		Ethernet WAN port	N.1 (configurable LAN) 10/100 Mbps
		Ethernet LAN port (10/100 Mbps)	<ul style="list-style-type: none"> <li>N.1 (TXCRB2200, TXCRB2200.1)</li> <li>N.4 (TXCRB2210)</li> </ul>
		Network protocols	TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, FTP, SMTP, SSL v3, TLS, ARP, VRRP, PPP, PPPoE, UPnP, SSH, DHCP, Telnet, SMNP, MQTT, Wake On Lan (WOL)
		Region (operator)	<ul style="list-style-type: none"> <li>TXCRB2200, TXCRB2210: Globale</li> <li>TXCRB2200.1: Europe, Middle East, Africa</li> </ul>
		Frequencies	<ul style="list-style-type: none"> <li>TXCRB2200, TXCRB2210: <b>4G (LTE-FDD)</b>: B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28. <b>4G (LTE-TDD)</b>: B38, B39, B40, B41. 3G: B1, B2, B4, B5, B6, B8, B19. <b>2G</b>: B2, B3, B5, B8</li> <li>TXCRB2200.1: <b>4G (LTE-FDD)</b>: B1, B3, B5, B7, B8, B20. <b>4G (LTE-FDD)</b>: B1, B3, B7, B8, B20. <b>3G</b>: B1, B5, B8. <b>2G</b>: B3, B8</li> </ul>
		Power supply	9...30 V DC (<5W)
		Operating temperature	-40...75°C
		Weight	0.125 kg
		Compatibility	Alpha-Log
	<b>TXCMA2200</b>	Modem 4G/LTE/HSPA/WCDMA/GPRS Quadband/class 10/class12 — OPTIONAL in all stations	
		LTE FDD	Download speed 100Mbps Upload speed 50Mbps
		Frequency band (MHz)	850/900/1800/1900 MHz
		Alpha-Log connection	Via RS232 port
		Cellular antenna	Standard SMA female interface, 50 ohm, lightning protection (optional)
		SMS	Yes
		Alpha-Log connection cable	Included
		Operating temperature	-35...75°C
		Power supply	5...36 V DC dal data logger
		Energy consumption @12 V	Sleep: 3 mA. Standby: 40-50 mA. Communication: 75-95 mA

## Data management software (not included)

### BSZ309—Alpha-Log CommNET

Service application that allows data to be downloaded automatically from the FTP servers where the Alpha-Log data logger sent them. Once received, you can manage the data for different purposes:

- Use the data with LSI LASTEM programs that support the SQL-GIDAS database
- Make flexible and immediate use of the data in the SQL-GIDAS database through third-party applications made for the purpose
- Make backups of ASCII data from an FTP area to folders local or shared

### BSZ311—GIDAS Viewer

GIDAS Viewer is the program for viewing historical data downloaded from data loggers (through 3DOM, or Alpha-Log CommNET).

The program uses the data in the GIDAS SQL database and produces tables and graphs, both of the raw data and the reprocessed data, according to various user-selectable time bases.

The reprocessings can be exported as Excel files (\*.CSV) or text files (\*.TXT), and the graphs can be saved as images (\*.JPG).

The program allows saving data display filters (Views), with the possibility of including data from more than one station simultaneously.

### BSZ411—X-Panel

X-Panel is a control panel that dynamically displays instantaneous values from Alpha-Log data loggers in real time.

The software receives data directly from the MQTT broker server present in Alpha-Log, or from an external MQTT broker server where Alpha-Log sent the data. With X-Panel, the configuration of each page is fully customizable according to the data loggers and the quantities you want to display.

### SWCLA3100— ENVIRO CUBE

The ENVIRO CUBE cloud platform is a cloudbase service offered by LSI LASTEM on a subscription basis to access data from weather stations installed in the territory from any Internet location.

ENVIRO CUBE is an extensively user-configurable platform for viewing, downloading, and processing data collected from weather stations. The website is modular and allows the enabling of different users with different permissions to access to the data and different functionality.

- ▶ Saving Alpha-Log data to SQL-GIDAS database for the use via LSI LASTEM applica-
- ▶ Saving data to SQL database on local or shared folder (visible on local or remote network)
- ▶ LSI LASTEM space rental on FTP server

- ▶ Visualization and extraction of data stored in the GIDAS SQL database
- ▶ Elaborated data on different time bases
- ▶ Creation of graphs and tables
- ▶ Creation of Wind Rose
- ▶ Setting up queries to manage visualization of selected data

- ▶ Real-time information on dynamic control panel from connected data loggers
- ▶ Complete programmability
- ▶ Multi-parameter and multi-station control panel

- ▶ Extensive user configurability by 'organization (users and roles) and stations
- ▶ Multi-tenant platform open to integration into third-party systems
- ▶ Measured values of the last 72 hours with dynamic update in graphical format
- ▶ Display of historical values in graphical and tabular format from different stations
- ▶ Data export in text or Excel format
- ▶ Configurable map-based aggregation of data from different stations
- ▶ Configuration of alarms with validity range or thresholds exceeded. Alarms Module.
- ▶ Data security through database authentication and partitioning.