HEAT STRESS AUTOMATIC STATIONS

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 ISTSA1200 station
- 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 three 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 outdoor monitoring, while the transportable ISTSA1100 station is suitable for medium and long-term monitoring in both indoor and outdoor environments. 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 thermal stress indices and remotely transmits the measurements and calculations, generating alarms via SMS, e-mail and activating local alert systems based on set thresholds. The ISTSA1200 station is designed for portable monitoring in both indoor and outdoor environments and, in addition to the sensors of the other two stations, measures solar radiation and wind speed, with these sensors it calculates the UTCI index.

		
ISTSA2100	**ISTSA1100**	**ISTSA1200**
Fix station (outdoor)	Portable station (indoor & outdoor)	Portable station (indoor & outdoor)

List of included items

PN	ISTSA2100	ISTSA1100	ISTSA1200
Shielded air temperature & RH% sensor	DMA672.1+DYA230+DYA049	DMK672.1+DYA230	
Natural ventilation wet bulb temperature sensor	DMA122+TYA200+TYA050	DMK122	
Black globe temperature	PRTEA4922		
Global solar radiation	-	-	DPA983+CCDCA4200
Wind speed	-	-	DNA202.1+CCDCA0502A
Data logger	Alpha-Log (DLALB0100)		
Pole	Pole 2 m (DYA006.1)	Portable tripod with sensors' stand (BVA304 + BVA320)	
Pole base + tension ropes	DYA020 + DYA020.1 + DYA023 + DYA028	Tension ropes and pegs (DYA023 + DYA028)	
IP66 Box	Box (ELK001)	Portable carrying case + conn. (ELK003)	Portable carrying case + conn. (ELK004)
Solar panel	OPTIONAL (see Accessories)	DYK101	

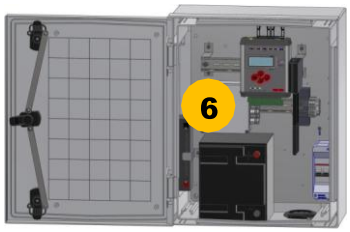
Sensors technical features

PN		ISTSA2100	ISTSA1100	ISTSA1200
Air temperature	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	L.5 m + conn. for carrying case ELK004
RH%	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	L.5 m + conn. for carrying case ELK004
Black globe temperature	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		
Wet bulb temperature with natural ventilation	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	L.5 m + conn. for carrying case ELK004

PN		ISTSA2100	ISTSA1100	ISTSA1200
Global solar radiation	Model	-		DPA983
	Technology	-		Thermopile
	Range	-		0...1500 W/m^2
	Classification ISO 9060 2018	-		Class C
	Estimated achievable accuracy for WMO daily sums			10%
	Spectral range	-		285...3000 nm
	Cable	-		L.5 m + conn. for carrying case ELK004
Wind speed	Model	-		DNA202.1
	Technology	-		3 cups anemometer with Reed Relay
	Range	-		0...75 m/s
	Accuracy	-		± 0,5 m/s (0...10 m/s), 2,5% (>10 m/s) ± 0,1 m/s o ±1% (with transfer function)
	Cable	-		L.5 m + conn. for carrying case ELK004

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

ISTSA2100





#	Products
1	DMA672.1+DYA230+DYA049 Temperature + RH%
2	PRTEA4922+TYA200+TYA050 Globe temperature
3	DMA122+TYA200+TYA050 Wet bulb temperature
4	DYA006 Pole H.2 m
5	ELK001 IP66 case, 18 Ah battery, charger
6	DLALB0100 Alpha-Log
7	DYA020+DYA020.1 Base and anchor bolts DYA023+DYA028 Tension ropes and pegs

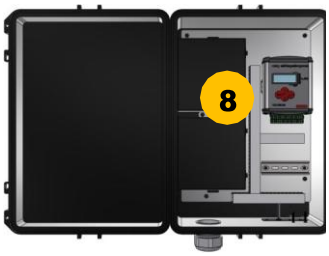
ISTSA1100





#	Products
1	DMK672.1+DYA230 Temperature + RH%
2	PRTEA4922 Globe temperature
3	DMK122 Wet bulb temperature
4	BVA304+BVA320 Tripod and stand DYA023+DYA028 Tension ropes and pegs
5	ELK003 IP66 case, 18 Ah battery, power charger
6	DLALB0100 Alpha-Log
7	DYK001 Solar panel

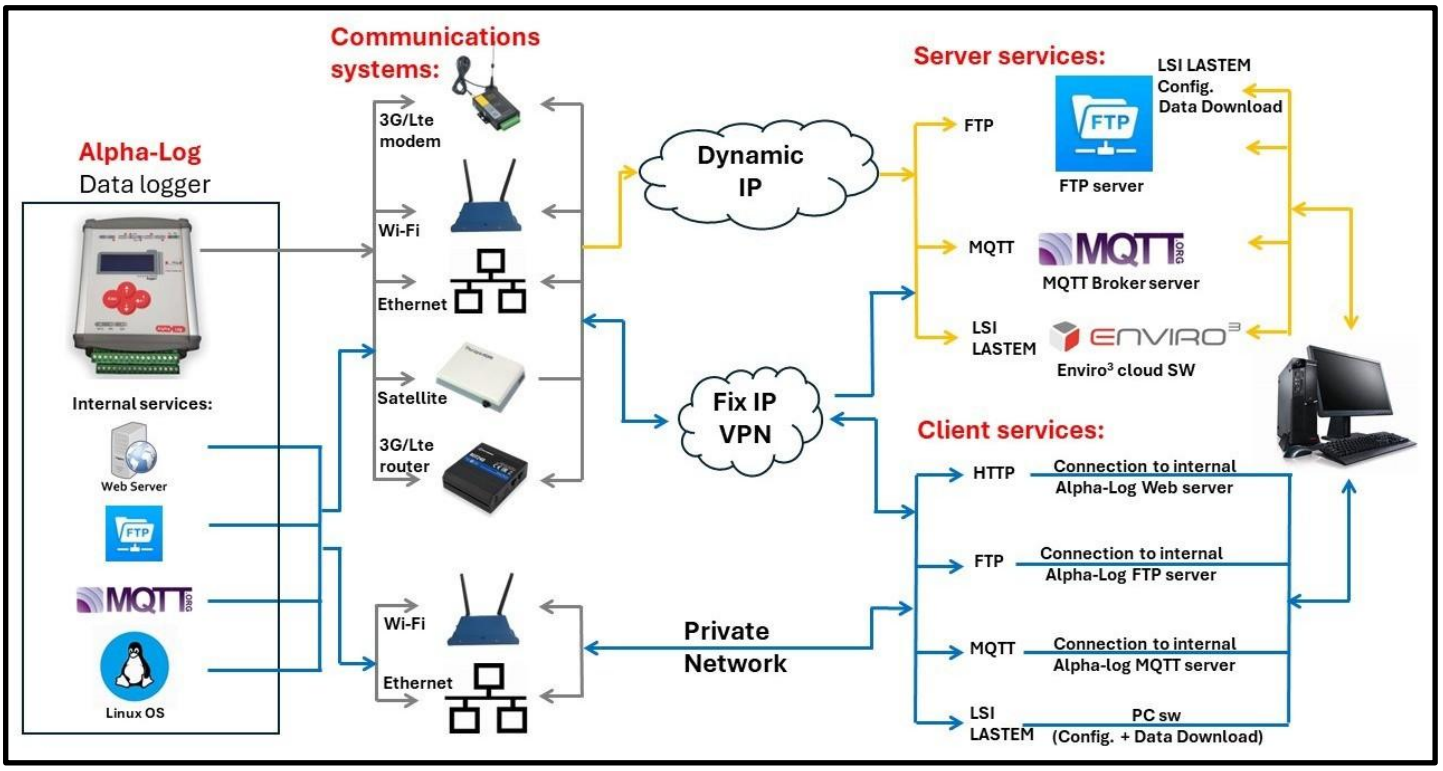
ISTSA1200





#	Products
1	DMK672.1+DYA230 Temperature + RH%
2	PRTEA4922 Globe temperature
3	DMK122 Wet bulb temperature
4	DPA983+DYA034.2 Global solar radiation
5	DNA202.1 Wind speed
6	BVA304+BVA320 Tripod and stand DYA023+DYA028 Tension ropes and pegs
7	ELK004 IP66 case, 18Ah battery, charger
8	DLALB0100 Alpha-Log
9	DYK001 Solar panel

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 WBGT (outdoor) index	According to ISO7243:2017
WBGT Eff (with CAV) 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 follo-wing 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)

Accessories

	PN		
	**DYA109**	Solar panel 80 Wp —OPTIONAL in fix station (ISTSA2100), INCLU-DED in portable station (ISTSA1100)	
		Power	80 Wp
		Operative voltage (VMP)	21.57 V
		VOC voltage	25.45 V
		Dimensions	815x535 mm
		Weight	4.5 kg
		Technology	Monocrystalline
		Cable	L=5 m
	**DYA064**	Tilting bracket for pole-mounted solar panel diam. 45...65 mm - OPTIONAL in fixed station (ISTSA2100), INCLUDED in portable station (ISTSA1100)	
	**TXCRB2200** **TXCRB2210** **TXCRB2200.1**	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)	• N.1 (TXCRB2200, TXCRB2200.1) • N.4 (TXCRB2210)
		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)	• TXCRB2200, TXCRB2210: Global • TXCRB2200.1: Europe, Middle East, Africa
		Frequencies	• TXCRB2200, TXCRB2210: 4G (LTE-FDD): B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28. 4G (LTE-TDD): B38, B39, B40, B41. 3G: B1, B2, B4, B5, B6, B8, B19. 2G: B2, B3, B5, B8 • TXCRB2200.1: 4G (LTE-FDD): B1, B3, B5, B7, B8, B20. 4G (LTE-FDD): B1, B3, B7, B8, B20. 3G: B1, B5, B8. 2G: B3, B8
		Power supply	9...30 V DC (<5W)
		Operating temperature	-40...75°C
		Weight	0.125 kg
		Compatibility	Alpha-Log

	PN		
	**TXCMA2200**	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 Ω, 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

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

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 raw data and the reprocessed data, according to various user-selectable time bases.
The reprocessing can be exported as Excel files (*CSV) or text files (*TXT), and the graphs can be saved as images (*JPG).
The program allows data display filters (Views), with the possibility of including data from more than one station simultaneously.

- 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

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 pre-sent 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.

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

SWCLA3100— ENVIRO CUBE

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

- 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 exports in text or Excel format
- Configurable map-based aggregation of data from different stations
- Configuration of alarms with validity range or thresholds exceeded with alarms module.
- Data security through database authentication and partitioning.

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