TST TRAFFIC
SMARTCITY TECHNOLOGY

iStation & iStation-m

Weather Station

iStation

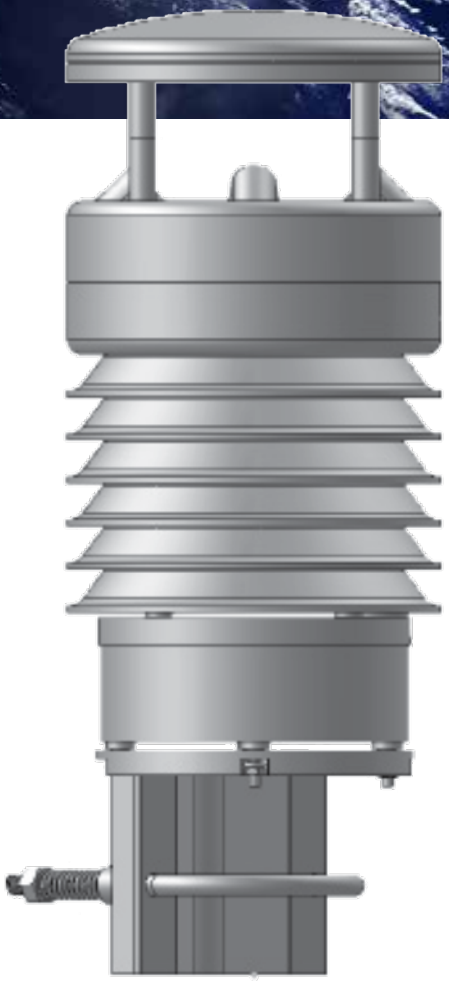
Product Description

The TST iStation is an advanced, intelligent, rugged, all round weather station, suitable for all harsh climates and environments.

TST iStation offers full functionality, it measures; temperature, noise, pollution, air pressure, humidity, rainfall, wind direction and wind speed.

- Advanced TST Sensor Technology
- Integrates main ambient gases and meteorological parameters
- Ultra low power consumption (0.2W)
- Suitable for a battery supply power system with high power requirement
- 9 – 35V power input range
- Measurement data storage function (1–12 months)
- High precision clock/calendar function
- Industrial electrical interface protection
- Standard data output protocol
- Accurate, real-time weather information directly from your installation site
- Monitor, record, and analyze all important environmental inputs
- Choose measurement intervals from 1 to 60 minutes (holds 183 days of data with a 30 minute interval)
- Integrates with TST SmartCity Platform
- Long-term field life of more than 10 years

iStation



Suggested Installation Sites Include:

- Meteorology
- Transportation
- Power Plants
- Industrial Sites
- Agricultural
- Mining
- Roads and Streets
- Airports
- Sporting Arenas and Venues
- Tunnels
- Cities & Towns etc.

zigbee LoRa

Air Temperature and Relative Humidity

Air temperature is measured by a highly accurate Air Chip 3000 while humidity is measured with a capacitive humidity sensor (accuracy < 0.8 % / 0.1 K). In order to keep the effects of external influences (e.g. solar radiation) as low as possible, the sensors are located in a ventilated housing unit with radiation protection. In contrast to conventional non-ventilated sensors, this allows significantly more accurate measurement during high radiation conditions.

Additional variables such as dew point, absolute humidity and mixing ratio are calculated from air temperature and relative humidity, taking account of air pressure.

Air Pressure

Absolute air pressure is measured by way of a built-in sensor (MEMS). The relative air pressure referenced to sea level is calculated using the barometric formula with the aid of the local altitude, which is user-configurable on the equipment.

Wind

The wind meter uses 4 ultrasound sensors which take cyclical measurements in all directions. The resulting wind speed and direction are calculated from the measured run-time sound differential.

PM2.5 & PM10

Importance of Particulate Matter Monitoring: Ultra-fine Particulate Matter (PM1), Suspended Particulate Matter (PM2.5), Particulate Matter 10 (PM10). Particulate Matter (PM) is microscopic solid or liquid matter suspended in the earth's atmosphere which may include dust particles, biological contaminants like bacteria, mold, pollen; particulate contaminants like oil-smoke, fly-ash, cement dust etc. The size of the Particulate Matter (PM) varies from 0.1micron to 100 microns.

Sources of Particulate Matter:

Thermal Power Plants, Vehicle Fuel Emission, Open Fire, Atmospheric Dust, Smog, Cement Industry, Natural Sources etc.

Health Hazard of Particulate Matter :

Larger particles are generally filtered through the nose and throat via cilia and mucus but particulate matter smaller than 10 microns, can settle in the bronchi and lungs and cause health problems. The effects of inhaling particulate matter that have been widely studied in humans and animals include; asthma, lung cancer, cardiovascular disease, respiratory diseases, premature birth, birth defects and premature death.

The TST iStation adopts the laser scattering method to collect the PM2.5 & PM10 concentration in the environment.

Noise

Importance of Noise Monitoring: Environmental noise is the accumulation of all noise present in a specified environment. These noise sources expose millions of people to noise pollution that creates not only annoyance, but also significant health consequences such as elevated incidence of hearing loss and cardiovascular disease.

Sources of Noise:

- Motor Vehicles, Aircraft, Trains, Industry, Car Horns, Loud Music etc.

Health Hazard of Noise:

- Depending on duration and level of exposure, noise may promote hearing loss, high blood pressure, ischemic heart disease, sleep disturbances, birth defects, and even decreased school performance.

Measurement Parameters

Measurement parameters are transported by RS485 protocol (factory setting).

Air Temperature

Actual temperature values:	Temperature value at current time.
Average temperature:	The arithmetic mean temperature value within a set period.
Maximum temperature values:	The maximum temperature within a set period.
Minimum temperature:	The minimum temperature within a set period.

Air Temperature	Measurement methods:	NTC
	Measurement range:	-50°C ~ +80°C
	Resolution:	0.1°C
	Sensor accuracy:	± 0.1°C

Relative humidity

Actual humidity:	Humidity value at current time.
Average humidity:	The arithmetic mean humidity value within a set period.
Maximum humidity values:	The maximum humidity within a set period.
Minimum humidity:	The minimum humidity within a set period.

Air Humidity	Measurement methods:	Capacitive
	Measurement range:	0~100% RH
	Resolution:	0.1% RH
	Sensor accuracy:	0.8% RH

Pressure

Actual pressure:	Pressure value at current time.
Average pressure:	The arithmetic mean pressure value within a set period.
Maximum pressure values:	The maximum pressure within a set period.
Minimum pressure:	The minimum pressure within a set period.

Pressure	Measurement methods:	MEMS sensor – Capacitive
	Measurement range:	10~1100hPa
	Resolution:	0.1hPa
	Sensor accuracy:	± 1.0hPa
	Unit:	hPa

Wind Speed

Actual wind speed: Wind speed value at current time.

Average wind speed: The arithmetic mean wind speed value within a set period.

Maximum wind speed values: The maximum wind speed within a set period.

Minimum wind speed: The minimum wind speed within a set period.

Wind Speed	Measurement methods:	Ultrasonic wave
	Measurement range:	0~60m/s
	Resolution:	0.1m/s
	Accuracy:	± 0.3m/s or 3%
	Response threshold:	0.3m/s
	Unit:	m/s; km/h

Wind Direction

Actual wind direction: Wind direction value at current time.

Average wind direction: The arithmetic mean wind direction value within a set period.

Maximum wind direction values: The maximum wind direction within a set period.

Minimum wind direction: The minimum wind direction within a set period.

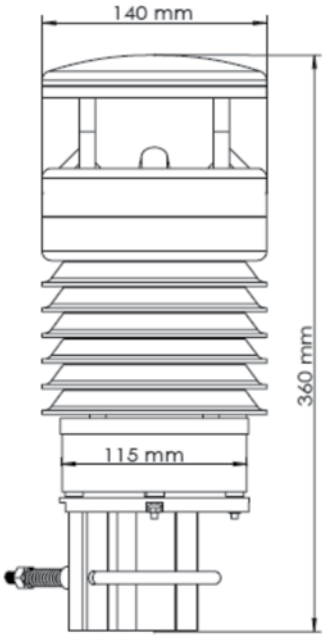
Wind Direction	Measurement methods:	ultrasonic wave
	Measurement range:	0~360°
	Resolution:	0.1°C
	Accuracy:	< 3°, RMSE from 1.0 m/s
	Response threshold:	0.3 m/s

PM2.5 & PM10

PM2.5	Measurement methods:	Laser scattering / fan
	Measurement range:	0~1000ug/m2
	Sensitivity:	0.3ug/m3
	Accuracy:	15% or ±10ug/m3
PM10	Measurement methods:	Laser scattering / fan
	Measurement range:	0~1000ug/m2
	Sensitivity:	0.3ug/m3
	Accuracy:	15% or ±10ug/m3

Noise

Noise	Measurement methods:	Semiconductor method
	Measurement range:	30~130dB(A)
	A-weighting	(simulated human ear)
	Accuracy:	1.5dB



iStation

Technical Data

Power Supply:	12 - 24VDC +/- 10%	
Current:	100mA	
Fastening:	Stainless steel mast bracket Ø 60 ~ 76mm	
Protection class:	III (SELV)	
Protection type:	IP64	
Storage Conditions:	Permissible storage temperature: Permissible relative humidity:	-50°C~ +70°C 0~100% RH
Operating Conditions:	Permissible operating temperature: Permissible relative humidity: Permissible altitude above sea level:	-50°C ~+60°C 0 ~100% RH N/A
RS485 interface, 2 wire, half-duplex:	Data bits: Stop bit: Parity: Tri-state: Adjustable baud rates: Housing:	8 (SDI-12 mode: 7) 1 No (SDI-12 mode: even, Mod-bus mode none or even) 2 bits after stop bit edge 1200, 2400, 4800, 9600, 14400, 19200etc Plastic (PC)

iStation-m

Product Description

TST iStation-m (mini) is an advanced LoRaWAN temperature and humidity sensor. It adopts dedicated digital module acquisition technology and temperature and humidity sensing technology, to ensure reliability and long-term stability. The standard unibus interface makes system integration easy and fast. The iStation-m is small in size, low in power consumption, with an excellent communication distance. Making the iStation-m the optimal choice for IoT application.

Detailed Information

The sensor includes a capacitive humidity sensing element and a high precision temperature sensing element, which is connected to a high performance MCU. Therefore, the product has advantages of high quality, super fast response, strong anti-interference ability and high cost performance. Each sensor is calibrated in a very precise humidity calibration room. The calibration factors are stored in MCU in the form of program, and the calibration factors are called in the sensor in the process of detecting the signal. Standard unibus interface makes system integration easy and fast.

Model : iStation-m

- Frequency band : 433/470/490/780/868/915MHz
- Dimension: 86mm*65mm*36mm
- Supports LoRa RF data transmission
- Supports temperature and humidity sensor detection
- RF peripheral circuit function modular design
- Built-in battery with long cycle life
- IP66 waterproof
- Integrates with TST SmartCity Platform

iStation-m Hardware

		Remarks
MCU:	MCU ARM-Cortex M3, 32bit,dominant frequency: 32MHZ, ultra low power consumption MCU	
	EEPROM:4KB	
	RAM:10KB	
	FLASH:64KB (maximum 128KB)	
LoRa Wireless : Communication	SX1276, 868MHz-915MHz,14-20dBm; Rx, sensitivity:-140dB (SF=12); Communication rate: 300bps~5kbps, support FSK, LoRa modulation mode, communication distance 200~2000m	SPI communication interface
Temperature and Humidity Control:	Operating voltage 3.3V, rated operating current: 1mA; Temperature detection range: -40° ~ +85°C, resolution: 0.1degree; Accuracy : ±1° Humidity detection range: 1% ~ 98%, resolution: 0.1%, accuracy ±3%, sampling period: 2 seconds	
I/O:	LoRa antenna input port, 868MHz-915MHz antenna, band width: ±20MHz gain: 1dBi	Built in LoRa antenna
	Battery input: 3.6/150mA	Built-in
	Temperature and humidity sensor input port	External
Battery:	Built-in 2700mAh/4000mAh, 3.6V, high temperature lithium sulphur battery	
Average Operating Current:	Average: 20mA, the maximum operating current: 110mA (LoRa transmitting status)	
Sleep Current:	Less than 20uA	
Function:	Support LoRaWAN, P2P wireless data communication	
	Excellent software architecture	
Temperature:	-40° ~ +85°C	
Humidity:	10% ~ 95%	

TST
TRAFFIC
SMARTCITY TECHNOLOGY

TST

320 Darebin Road
Fairfield VIC 3078

www.trafficltd.com.au

NSW
P: +61 2 9736 3677
F: +61 2 9736 3391
e: info@trafficltd.com.au

NT
P: +61 8 8947 0733
F: +61 8 8947 0713
e: info@trafficltd.com.au

QLD
P: +61 7 3266 1900
F: +61 7 3266 2244
e: info@trafficltd.com.au

VIC
P: +61 3 9430 0222
F: +61 3 9430 0244
e: info@trafficltd.com.au

ACT
P: +61 2 6299 7922
F: +61 2 6299 7977
e: info@trafficltd.com.au

TAS
P: +61 3 6273 1177
F: +61 3 6273 1759
e: info@trafficltd.com.au

SA
P: +61 8 8362 2385

e: info@trafficltd.com.au

WA
P: +61 8 9248 1002
F: +61 8 9209 2288
e: info@trafficltd.com.au

UNITED KINGDOM
P: +44 (0) 1159 223 797
F: +44 (0) 1159 223 836
e: info@aldridgetraffic.co.uk

ISO 9001 Quality
ISO 45001 OH&S
ISO 14001 Environmental

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