Galcon

Computerized Control Systems

The Science of Solutions

PT 100

Climate Sensors

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Index:

Meteorological station

Galcon's meteorological station consists of 4 embedded sensors and 2 additional sensors. The sensors included in the product are:
Wind speed
Wind direction
Solar radiation
Rain pulses counter

The two additional are:
Air temperature
Relative Humidity

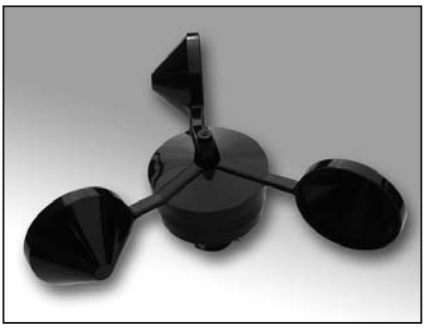
The first 4 sensors are available installed on one horizontal bar and connected by one round plug. This device has to be placed on a post, 2 meters (6 ft) above any disturbing elements. The temperature and the humidity sensors are installed in a ventilated cell, The TH-Cell has to be placed in a serviceable place, about 1.6 m (5 ft) above the ground.

Galcon's MT-ST adaptor is a converter card for the wind speed and the wind direction sensors. Its purpose is to convert the windspeed (frequency) signal and the wind-direction (conductivity) signal to a standard 4-20mA ranged signal.

MT-ST Specifications:
Minimum operation voltage: 15V DC
Maximum operation voltage: 32V DC

Maximum power consumption (varying as sensors value changes):
0.1A – Include the TH-cell.

Wind Speed Sensor



OEM specifications:

Mechanical:
3 cups of conical cross-section,51mm (2")diameter
190mm (7.5") swept diameter of rotor
51mm (3.2") overall assembly height
Moment of inertia of rotor assembly =68 x 10-6 S-ft 2
Mounting–(Using a cotter pin and set screw) on a 13mm (0.5")diameter mast with a #35 hole,11mm (.35")from the top.

Materials:
Cups– one piece injection-molded black polycarbonate (Lexan)
Body–housing is black ABS plastic
Shaft–beryllium copper, fully hardened
Bearing–modified Teflon, self-lubricating.
Rated PV factor of 20,000 (at 15 mph, PV is approx.500;at 100 mph PV is approx. 2,000).Upper bearing is centered in the plane of cup thrust for optimal loading.
Permanent magnet–Indox 1,25mm (1")dia.,13mm (0.5")long,4 poles

Threshold:
Starting threshold–0.78 m/s (1.75 mph)
Cup distance constant (63%recovery)–3.0m (10')

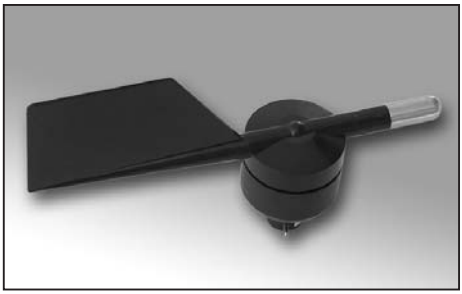
Environmental:
Operating temperature -55°C to 60°C (-67 to 150 F)
Operating humidity range 0 to 100%RH
Weight:0.1kg (0.2 lb)
Shipping Weight:0.5kg (1 lb)

Electrical:
Single coil, bobbin wound, 4100 turns of #41 wire
Voltage is a sine wave with frequency changing linearly with wind speed– 60 Hz=45.82 m/s (102.5 mph)[1.7 mph/Hz w/0.78 offset,0.765 m/s/Hz w/0.35 offset] Voltage is 2.0 VAC at 60 cycles–minimum (typical is 6 VAC P-P)
Hall Effect (#40H): A Hall Effect switch replaces the single coil. The voltage output is a square wave with the same frequency-to-wind speed relationship as the single coil. Requires a 5 to 24 VDC voltage with 5ma of current.

MT-ST adaptor:
Offset (4mA) at 0 m/s (0 Km/h)
Full scale (20mA) at 44.67 m/s (161 Km/h)

Maintenance:
No maintenance required

Wind Direction Sensor



OEM specifications:

Mechanical:
Range: Direction–360° mechanical, continuous rotation
Sensitivity: Approx.1 m/s (2.2 mph)

Materials:
Direction vane and housing–black UV stabilized injection-molded plastic
Balance weight–stainless steel
Terminals–three #4-40 solid brass studs with nuts.
Potentiometer–stainless steel shaft in two shielded precision grade, stainless steel ball bearings, conductive plastic potentiometer element mounted in a machined aluminum housing
Hardware–all stainless steel construction

Dimensions:
Overall length–21cm (8.3")
Swept diameter–27cm (10.5")
Overall height–12cm (4.3")
Vane size–6cm high x 10cm long (2.3"x 3.8")
Main housing diameter–5cm (2")
Mounting–13mm (0.5") diameter mast with cotter pin and mast set screw
Weight:0.1 kg (0.25 lb)
Shipping Weight:0.5 kg (1 lb)

Electrical:
Analog DC voltage from conductive plastic potentiometer 1K(#200), 10K(#200P);linearity 1.0%,life expectancy of 50 million revolutions (2-6 years normal operation)
Power Requirements: Regulated potentiometer excitation of 1 to 15 VDC

MT-ST adaptor:
Offset (4mA) at 1° (North placement according to the arrow on the bar)
Mid range (12mA) at 180° (South placement opposite to the arrow on the bar)
Full scale (20mA) at 360° (North placement according to the arrow on the bar)

Maintenance:
No maintenance required

Solar Radiation Sensor

Radiation sensor is a quantum sensor that is enclosed with 4-20mA adapter. The sensor may be purchased as part of a Meteorological station or as stand-alone sensor. As a quantum sensor it is designed to read velocities of radiation in the viewable spectrum; 400-700nm, which is the Photosynthetically-active radiation (mostly known as PAR). The 4-20mA adaptor is factory set to give a read of 4mA when there is no sense of radiation in the spectrum, and 20mA (full scale) at 2000 PAR. It needs DC power supply of 26-13V for its basic functionality.

OEM specifications:

Operating environment	-40 to 55 °C; 0 to 100% relative humidity. Can be submerged underwater.
Dimensions&	24 mm diameter, 25 mm tall

Adapter specifications:

Operating environmentH	-15 to 70 °C; 0 to 100% relative humidity. Can be submerged underwater.
Operating Voltage	26-13V DC
Output signal	4-20mA
Power consumption	0.1- 0.5W (according to the reading value)
Dimensions	65 x 50 x 38 mm box + Aluminum base.
Cable length	Stand alone: 10 m. On Meteorological st.: 50cm.
Output range:	
PAR (Photosynthetic ActiveRadiation)	0-2000 µmol*m-2*sec-2
Lux	0-108,000 Lux

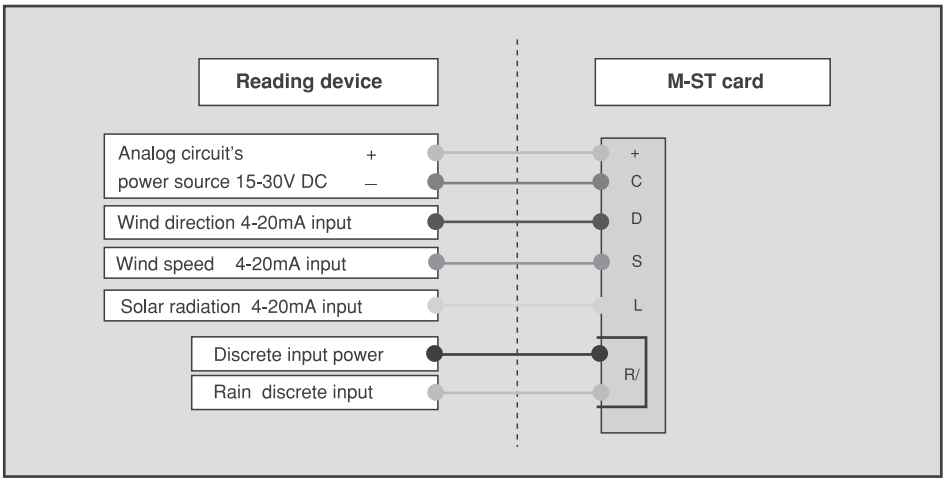
Rain Pulses Counter

Rain sensor is a simple
spoon switch, enclosed in funnel box. The original funnel size is coordinated with the spoon size to emit one pulse every 1mm of rain. Galcon provides the sensor with enlarging external funnel that emits 5 pulses for each 1 mm of rain.

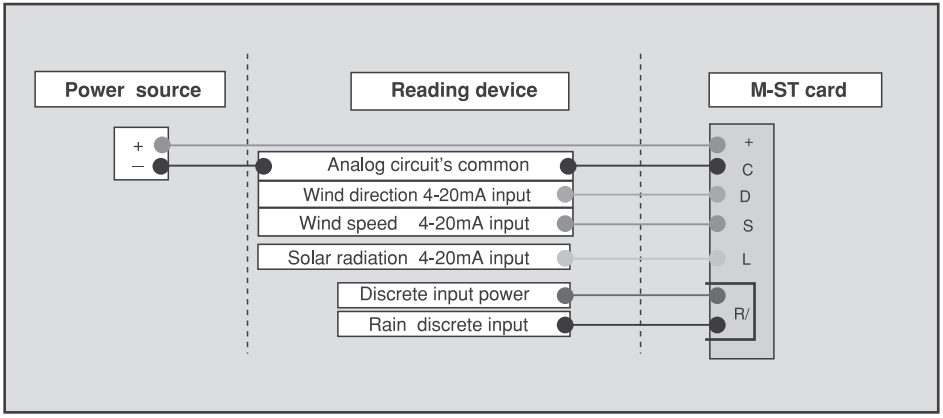
The rain sensor is connectable to any discrete or digital input.
The rain sensor is a normally-closed (NC) contact.

Maintenance:
Clean annually before the rain season.

Connection diagram (simple):



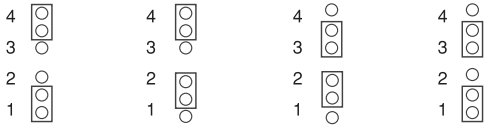
Connection diagram with an external power suppl



Temperature sensor PT100 with 4-20mA adapter card.

PT100 temperature sensor is a mechanically protected **PT100** thermistor in a stainless steel bulb and provided with a 4-20mA adapter card. The **PT100** assembly provides high accuracy and a long-term service free operation in a rough industrial and agricultural surrounding. A set of 2 jumpers on the adapter card enable the user to set a wide range of temperature measurements to achieve the best accuracy regardless of the reading controller's resolution. **PT100** is available in enclosures for Air, Fluids and soil temperature monitoring.

PT100 Temp. Sensor Selector Code Combination for Signal out measuring range



Ranges sets:

Jumper set	Offset °C	Full scale °C	Offset °F	Full scale °F
Set 1	-50	51	-58	124
Set 2	0	104	32	219
Set 3	0	211	32	412
Set 4	-100	104	-148	219

PT100 is a 2 wire passive sensor, which receives its power from the reading device and returns read value to the input. The middle connector is inactive. Please refer to "Galileo Setup" manual for connection diagram.

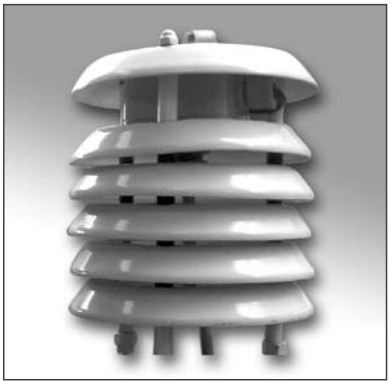
Specifications:

Accuracy	0.05%
Detection range	See table above
Response time	160 seconds
Life expectancy	10 years
Output	4-20mA
Operating voltage	19-30V DC
Operating temperature range	220ºK-350ºK
Operating pressure	Vacuum – 200 PSI

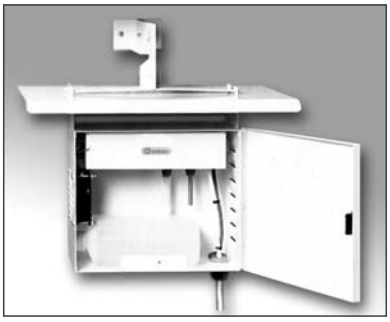
Products with PT 100

Air Temperature Measurement

The **"Pagoda"** style enclosure is suitable for applications where Humidity measurement isn't required and a certain velocity of wind can always be obtained.



The **Ventilated cell** is a closed shaded box equipped with an 80 x 80 mm fan. The fan provides a constant flow of air in the cell. This is the recommended way to monitor temperature in greenhouses and other sunlight effected places. The ventilated cell is also the ideal way to monitor Humidity in particular for controllers that can handle a dry-wet bulb calculation according to the psychrometric table.



A simple **enclosure** that is suitable for insulated chicken-coops or mushroom growing houses.

Water temperature measurement:

PT 100 can be supplied in a “MNPT treaded pipe insert

Substrate temperature measurement:

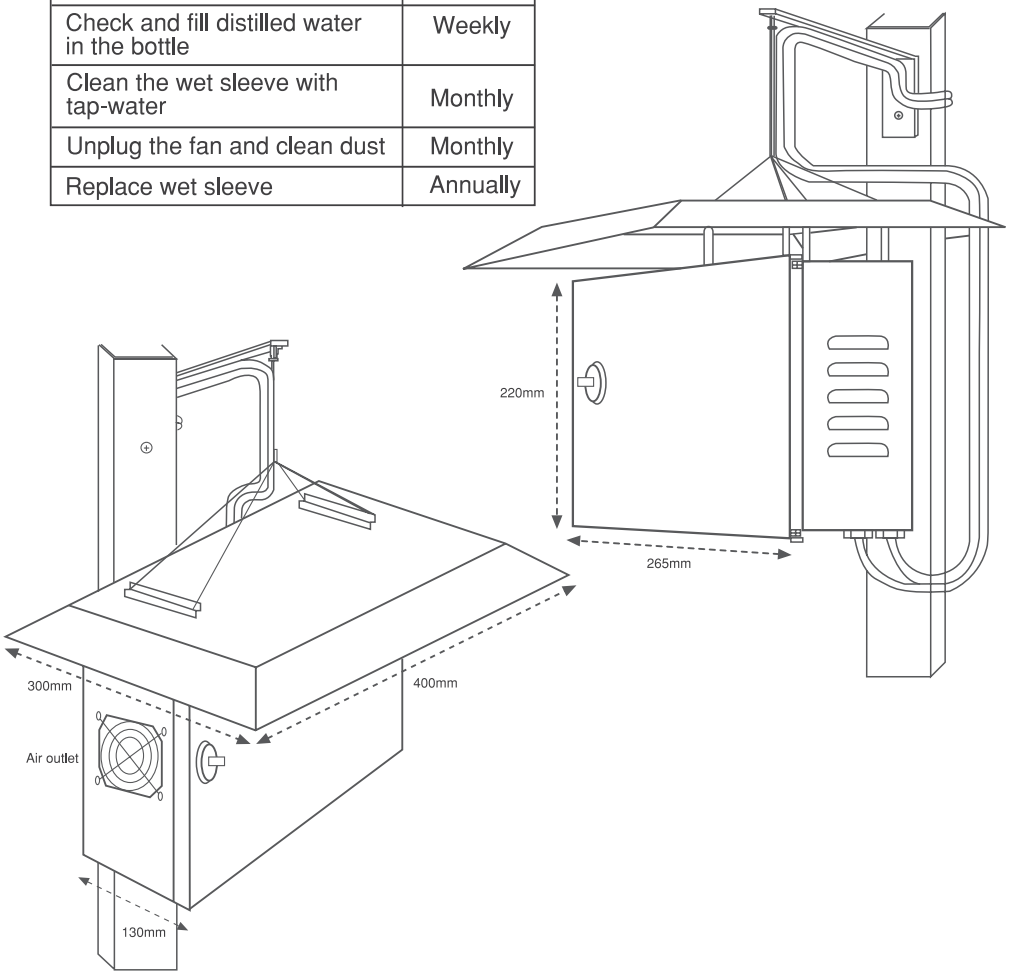
PT100 can be supplied as a 30 cm long sensor which is specially designed to apply in soil or soil-less media.

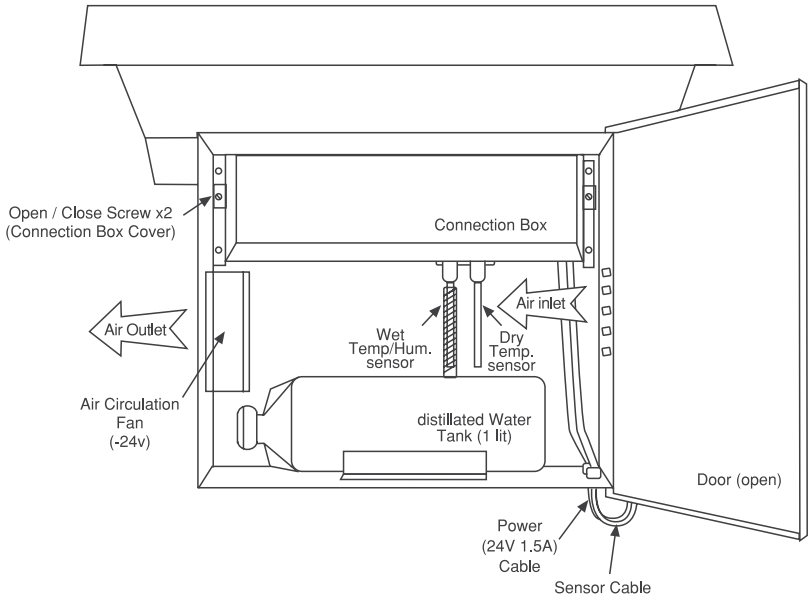
TH cell:

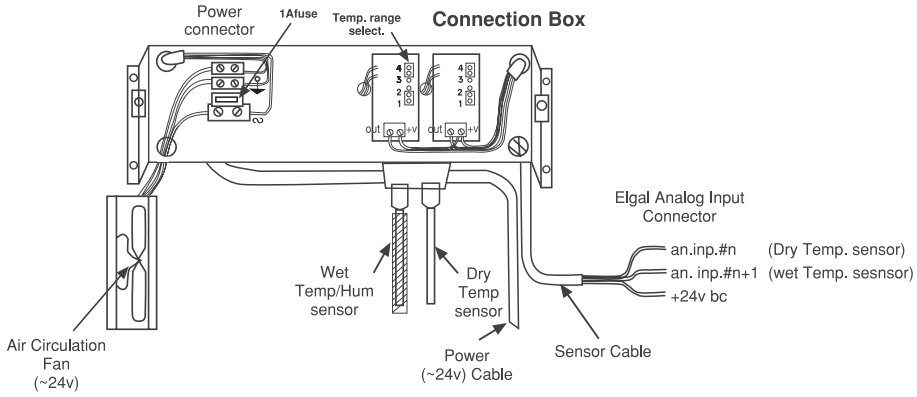
The most accurate and long term reliable measurement of Relative Humidity is according to a psychrometric table. Two identical bulbs, which were identically calibrated, are placed in an air tunnel where airflow of 0.3 m/s (1 feet/sec) is obtained. If we dress one of the bulbs (hereby "wet bulb") with a wet sleeve, we can calculate the relative humidity according to the temperature difference between the two bulbs. Dry-Wet cell is applicable with any controller that is applied with a built-in psychrometric table that enables to define the wet bulb as a sensor that takes reference from its neighbor-sensor to calculate the relative humidity.

Maintenance:

Action	Duration
Check and fill distilled water in the bottle	Weekly
Clean the wet sleeve with tap-water	Monthly
Unplug the fan and clean dust	Monthly
Replace wet sleeve	Annually




Open / Close Screw x2
(Connection Box Cover)
Connection Box
Air inlet
Air Outlet
Wet
Temp/Hum.
sensor
Dry
Temp.
sensor
Air Circulation
Fan
(-24v)
distillated Water
Tank (1 lit)
Door (open)
Power
(24V 1.5A)
Cable
Sensor Cable


Power
connector
1Afuse
Temp. range
select.
Connection Box
Elgal Analog Input
Connector
an.inp.#n (Dry Temp. sensor)
an. inp.#n+1 (wet Temp. sesnsor)
+24v bc
Wet
Temp/Hum
sensor
Dry
Temp
sensor
Air Circulation
Fan
(~24v)
Power
(~24v) Cable
Sensor Cable

Ordering Information

No.	Catalog number	Description	Comments
1	AMMS0B01	Complete Meteorological station	Items 2-6 are included
2	AMMS0B02	Meteorological station base	
3	AF0403	Wind speed sensor	Item #2 must be ordered with that item.
4	AF0402	Wind direction sensor	
5	AMGS0G01	Rain sensor assembly	
6	AMGS0R01	Quantum Radiation sensor NLS 4-20mA	
7	AMTS2A01	Temperature + Humidity Dry-Wet sensors in a ventilated cell	~24V fan
8	AMTS2A02	Temperature sensor + electronic Humidity sensor in a ventilated cell	~24V fan
9	AMTS0S01	Temperature sensor PT100 for substrate	
10	AMTS0W01	Temperature sensor PT100 for water pipe	
11	AMTS0A11	Temperature sensor PT100 in “Pagoda” style enclosure	

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