MANUAL Cold Facts-3000BX Weather Station

Version 1.9 January 2015





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Product overview

Introduction

Polar explorer Marc Cornelissen, Technical University of Delft and Leap Development teamed up to develop an autonomous battery powered polar weather station. Once deployed the station provides scheduled meteorological- and position reports via satellite. Special design and materials make the station light weighted, compact for transportation and easy to deploy and install.

Applications

Monitoring of sea ice movements and key parameters such as: air pressure and wind (optional sensor). Monitoring climate and seasonal changes in temperature.

Product specifications

Physical	Size triangle mounting base Height Weight	213x213x123 cm 215 cm 7.5 kg, without wind meter
Environmental	Operating temperature Storage temperature Humidity	-40°C /+65° C -40°C /+65° C Relative 100%
Electrical	Working voltage Battery pack voltage Battery pack capacity (2 packs in parallel) Battery chemistry	7 to 24 Volts 11.6 Volts max 31,2 Ah 2 years of operation (est.) LI-SO2
Sensors	Temperature & humidity Barometric pressure Wind speed & direction	Vaisala HMP155 R.M. Young 61302V Vaisala WM30
Satellite	Iridium constellation Frequency Transmission	True Global Coverage 1616 - 1626.5 MHz Short Burst Data (TDMA/FDMA)
	Communication Iridium RX/TX Antenna	Direct IP or email Integrated Patch Antenna
	GPS (L1band) Accuracy GPS RX Antenna	uBlox IT-500 1.8 m Integrated Patch Antenna







Pre-mount the wind meter before continuing standard procedure!



Step1: screw the wind meter mount onto the electronics housing using the 4 screws.
Step 2: push the cable through the tube of the mount. Step 3: align wind meter connector and push in gently. Screw it tight with your fingers (don't force). Step 4/5: place wind meter on the mast tube. Secure alignment, don't force. Step 6/7: Screw down the tube connector (be careful to not force or break it). Step 8: align the connector on the lower end of the cable with the plug connector below the electronics housing. You are now ready to follow the procedure as if you were deploying a weather station without wind meter.

NOTE: Point the adjustment screw * True North to acquire correct wind direction. (See red marker at step 7). This can be done by either by rotating the entire instrument or loosening and fastening the screw after rotating the wind meter correctly. In any case fasten the screw to prevent rotation of the sensor around the mast.





How to set it up?



How to set it up

Step 0

Select a suitable location and clean away the snow layer till you have an even patch of sea ice, large enough to place the tripod's base.

Step 1

Unpack the instrument. The weather station consists of 2 sections: the tripod base (A) and upper section with electronics housing, sensor and antenna dome (B). Please note there is a power cable running from the upper section's tube through the tripod's central tube (C).

Step 2

Unfold the tripod by moving the sliding hinge down. Push it down firmly to the very end until the spring lock clicks. (There should be a metal ball pushing through the hole.)

Step 3

Place the tube of the upper section in the middle hinge. Make sure the spring lock is aligned and locks in the hole when the tube is fully inserted. While doing so, make sure the power cable is pushed further down, out from the tube. You will need the full length to plug it in the battery pack (Step 5).

Step 4

Clamp the foldable battery pack as low as possible around the tripod's mast. Fasten the clips. (The clamped battery pack also serves to lock the spread of the tripod.) Please note that the white power cable coming out from the battery pack should be positioned low (see picture).

Step 5

Connect the power cable from the battery pack (bridge lead) to the opposite housing unit. Connect the plug to the lower inlet (5a). Only when male and female plugs are aligned correctly they will fit. Screw the connecter tightly but don't force it. Now you can also connect the power cable coming out from the central tube of the tripod (main power lead). Use the remaining higher plug inlet (5b). (Actually you will not cause a malfunction or a hazardous situation if you reverse the connecting order. This is only to describe the easiest way to connect the cables)

Step 6

Directly after plugging in the main power lead and thereby powering up the instrument, you should check the behaviour of the control LED. (See next page.) If it works correctly, you can secure the tripod with ice screws (or snow stakes, depending on the surface).

Step 7

Firmly push down the ice screws through the holes of the connector feet while turning slowly. Keep the ice screws vertical in the process so they 'eat in' and get a grip. Screw them in fully until the white plastic tube sections touch the metal base plate. In case of a snow surface: use bamboo sticks of around 70 cm long to secure the tripod. Place them at an angle of 45°.





Start-up sequence

At the bottom of the weather station measurement unit, there is one red LED. This LED is only active at startup (battery being plugged in) and can be used to test if the weather station is working correctly after installation. In the table below the startup sequence and corresponding LED behavior is shown.

Start-up sequence state	LED behaviour
Plug in battery	LED continuously on (+/- 60 sec.)
Taking GPS fix and measurements	LED blinks (1 / sec)
Waiting for Iridium network	LED blinks fast (4 / sec)
Message sent	LED is off
Error	LED continuously on (+/- 60 sec)

Please Note:

The LED behaviour as described above is sequential. When everything works correctly the LED will not flash after having blinked 4 / sec. It will switch off. Only when there is a malfunction it will finish it's sequence by lighting up another 60 seconds.

If that happens, de-power the instrument by unplugging the power cable coming out of the mast from the battery pack. Re-connect it again after 2 minutes to restart the procedure.





Deployment of the first Cold Facts-3000B Weather Station May 7, 2013. Position: 83°48.74 N / 63°52.98 W Courtesy: Justin Beckers





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- Cold Facts: an initiative of Marc Cornelissen -

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