GPS Radiosonde

iMS-100

Outline

GPS radiosonde is an upper-air sounding instrument to measure various types of meteorological data; wind speed, wind direction, pressure, temperature and humidity. Wind speed, wind direction and pressure are calculated from the travel speed and altitude obtained by GPS positioning techniques. Every 1 second measured data are transmitted to ground receiving system via 400-406 MHz band.

Compact and commonly-used devices are aggressively adopted in iMS-100 to achieve downsizing (just only 38 g including one battery) and its cost reduction. iMS-100 also serves for total operation cost saving by using smaller balloon and reducing the gas amount depending on the target height. Furthermore, the lightweight package greatly enhances safety in the sounding operation even without parachute when it accidently falls down on land, especially.

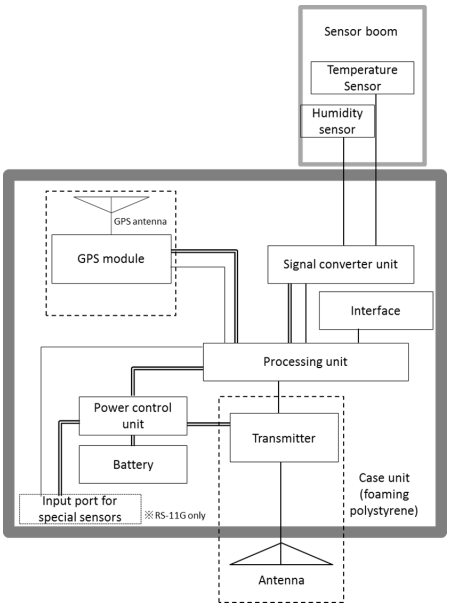
Improved sensor boom achieves higher accuracy in temperature measurement. Also, newly developed high response humidity sensor enables more accurate humidity measurement even in low temperature environment (below -40°C). In addition to the advantages of cost and safety, the innovative downsizing can minimize pendulum motions and heat contamination from the sonde itself during launch, which improves the measurement performances in terms of wind and temperature.

Features:

Compact & Light Weight Radiosonde

- Much higher accurate measurements of temperature and humidity, wind for the upper-air soundings
- Light weight 38 g iMS-100 helps enhancing safe operation especially when it falls down to the ground.
- Tiny iMS-100 effectively reducing overall operational costs (smaller balloon, fewer gas consumption) depends on the target height
- Downsized iMS-100 can contribute to reduce environmental burden through the entire life cycle (manufacturing, transportation, storage, and disposal)
- One lithium battery enables more than 4 hours sounding operation.
- High stability transmitter complying with ETSI (EN 302 054 V1.1.1)
- Easy preparation through wireless infrared communication (IrDA) between radiosonde and sonde checker unit before launch
- Biomaterial package, which is environmental friendly, is optionally available

Block Diagrams



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Specifications (Uncertainty evaluation[*1])

Temperature	Measurement range	-95℃ to +60℃
	Resolution	0.1℃
	Uncertainty[*2,3]	0 to 16km : <0.4℃ Above 16km : <0.8℃
	Response time	< 0.4 s (1,000 hPa, 5 m/s)
Humidity	Measurement range	0%RH to 100%RH
	Resolution	0.1%RH
	Uncertainty[*2,3]	0 to 12km : <5%RH[*4] 12 to 17km : <5%RH
	Response time	< 0.2 s (Absorbing, 1,000 hPa, 6 m/s , 0℃) < 14 s (Absorbing, 1,000 hPa, 6 m/s, -60℃)
Pressure	Measurement range	1050.0 hPa to 3.0 hPa
	Resolution	0.1 hPa
	Uncertainty[*2,3,5]	1km : <1.2hPa 10km : <1.0hPa 16km : <0.5hPa 24km : <0.2hPa 32km : <0.1hPa
Geopotential Height	Measurement range	-500 m to 40,000 m
	Resolution	0.1 m
	Uncertainty[*2,3,5]	1km : <11gpm 5km : <11gpm 10km : <11gpm 16km : <11gpm 20km : <11gpm 32km : <11gpm
Wind Direction	Measurement range	0° to 360°
	Resolution	0.01°
	Uncertainty[*3,5,6]	0 to 16km: <1°with speed <10m/s <1° with speed >10m/s Above 16km: <1°with speed <10m/s <1° with speed >10m/s
Wind Speed	Measurement range	0 m/s to 200 m/s
	Resolution	0.01 m/s
	Uncertainty[*3,5,6]	0 to 16km : <0.15m/s Above 16km : <0.15m/s
GPS Receiver	Frequency	1574.25 MHz ±1MHz L1-C/A code
	Number of channels	24 channels
	Positioning Technology	DGPS (SBAS)
Usage Environment	Pressure	1050.0 hPa to 3.0 hPa
	Temperature	-95℃ to +60℃
	Humidity	0%RH to 100%RH

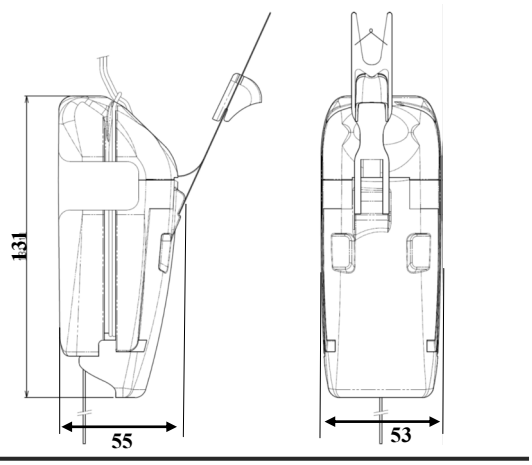
Transmitter	Center freq.	404.5 MHz
	Tuning range *[7]	400 MHz ~ 406MHz
	Band width	< 15 kHz
	Output power	< 100 mW
	Transmitter type	FM
	Standard	EN302 054 V1.1.1
Modulation	Modulation type	Digital PCM
	Baud rate	1,200 bps
	Range	>300 km (with Yagi antenna)
	Sampling	1 second
Power	Voltage	3.0 VDC
	Current	< 200 mA
	Battery type	Lithium battery × 1 (CR-123)
	Operating time	> 240 min.
Size & Weight *[8]	Dimensions	55(W)×53(D)×131(H) mm
	Weight (Including a battery)	38 g (EPS) 40 g (Bio-based package)[*9]
Accompanying items	Unwinder	10m/ 15m/ 30 m
	Balloon/parachute	Optional, please contact us.

Note

*1) The uncertainty values are calculated by the latest (April, 2016) JMA-GRUAN evaluation
*2) Expressed with coverage factor, k=2, unless otherwise explicitly specified.
*3) Including all significant sources of uncertainty described in WMO No.8(updated 2017).
*4) Expect rapid humidity change around tropopause
*5) Under optimal conditions of GPS reception : PDOP = 1
*6) 1σ statistical uncertainty evaluated with GPS simulator by using sonde sounding scenario
*7) Frequency can be changed every 100 kHz within the tuning range of 400 MHz and 406 MHz. Applicable Radio Law/Regulations should be complied.
*8) Dimensions excluding antenna and sensor boom. Weight includes a battery, etc.
*9) Bio-based material package type is optionally available.

Outline View

Unit (mm)



Cautions

- For safe and correct usage, please read the "Operation Manual" prior to the use of the products.
- The specifications and appearances might be changed without prior notice, which please understand.
- The specifications shown in the catalog are of our standard products. We are pleased to customize it to meet customer's requirements. For the details, please contact us.
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- The color of the product photography on catalog might be different from that of actual product because of printing.

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