

TECHNICAL SPECIFICATIONS

ACKCIO TILTMETER NODE BEAM-TM



MODEL	
BEAM-TM	Wireless Tiltmeter Node
MECHANICAL	
DIMENSION	100mm x 100mm x 80mm
WEIGHT	0.7kg
MATERIAL	Die-cast aluminium
SENSOR MEASUREMENTS	
SENSOR	Sisgeo self-compensated MEMS inclinometer
NUMBER OF AXES	Biaxial
MEASUREMENT RANGE	±15°
ACCURACY	±0.01° for ±15° range 0.01% FS
RESOLUTION	0.0001°
TEMPERATURE OFFSET	±0.003°/°C (From -20°C to +80°C)
SPECIFICATIONS FOR THERMISTOR	Measurement Range: -20°C to +80°C for 3K thermistor Resolution: 0.1°C Accuracy: ±0.5°C (0°C to +50°C)

LOW-POWER MCU / PERIPHERALS

MCU	Ultra-low power Arm® Cortex®-M3 48MHz 32-bit CPU
MEMORY	128KB flash, 20KB ultra-low-leakage SRAM
CLOCK	High-precision RTC self-compensated in temperature (10ppm from -40°C to +80°C)
ON-BOARD SENSORS	Temperature sensor (range: -40°C to +80°C, resolution: 0.01°C, accuracy: ±1.8°C) Barometer sensor (range: 300 to 1100hPa, resolution: 0.18Pa, accuracy: ±1.7hPa)
EXTERNAL FLASH	8MB

INTERFACES

DISPLAY / KEYBOARD	LEDs	SYS - System status indication SENS - Sensing status indication
	Buttons	TEST - to test the Node RESET - to reset the Node FORMAT - to do a factory reset of the Node
USB DEVICE PORT	USB 2.0 full speed (Micro B connector) 5V, max 500 mA for mobile OTG and data download to mobile device	
IDC10 CONNECTOR	Only for firmware programming	

RF & MESH SPECIFICATIONS

RADIO BAND	ISM Band 863 - 870MHz, 902 - 928MHz
TRANSMIT POWER	Up to 1 W (30 dBm)
MODULATION	2-GFSK
CERTIFICATIONS	FCC: 2AT8M-TM-V3X0 IC: 27349-TMV3X0 CE/RED Anatel (Brazil) MoC (Israel) RCM(Australia & New Zealand)
ANTENNA	¼ λ stub antenna with SMA connector
LINK DATA SPEED	50 kbps bitrate
DATA SECURITY	AES128 encrypted end-to-end data
HOPS	Up to 12
NETWORK SIZE	Up to 50 Nodes
RANGE*	Line-of-sight: Up to 5km Urban: Up to 1km Below ground: Up to 500m

*Ranges are based on a transmission power of 30dbm. Actual transmission distances may vary depending on deployment conditions.

SOFTWARE & FIRMWARE

FIRMWARE	Ackcio Mesh: Ackcio’s long-range low-power mesh networking firmware
SOFTWARE	Ackcio Nimbus: Android app for device setup, network monitoring, and troubleshooting

PROTECTION

CIRCUIT PROTECTION	Surge protection
	DC breakdown voltage 60V (± 20%@100V/μs)
	Impulse breakdown voltage 500V (@ 5kV/μs) typical
	Short circuit protection in power outputs
	Reverse supply protection
ESD	15kV

SYSTEM POWER REQUIREMENTS

SUPPLY VOLTAGE	2.7V to 4V
INTERNAL NON-RECHARGEABLE BATTERIES	1 x D-Cell Li-SOCl2 3.6V nominal voltage Recommended capacity 19Ah
TYPICAL CURRENT DRAIN	<20μA in system idle <100mA in system RX mode <300mA in system TX mode (depends on output RF power setting)

ENVIRONMENTAL CONDITIONS

OPERATING TEMPERATURE	-40°C to +80°C
PROTECTION	IP67

LIFETIME (MONTHS)

MODEL	SAMPLING FREQUENCY (MINS)						BATTERY
	5	10	15	30	60	360	
BEAM-TM	6	10	12	15	16	18	1 x 19Ah D-Cell Li-SOCl2

NOTE: Above table is for reference only. Estimation is done under typical Singapore weather conditions. The radio transmission power was set to 21dBm. Battery lifetimes might vary depending on deployment conditions and the formed wireless mesh topology.

MOUNTING BRACKETS / PLATES

BEAM-PL-TM-HV	Horizontal/vertical mounting plate with mounting screws
BEAM-PL-TM-R	Rail mounting double plate with mounting screws

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External view



Ackcio BEAM-TM

with our **BEAM-PL-TM-HV**
horizontal/vertical mounting
plate in vertical mount position



Ackcio BEAM-TM

with our **BEAM-PL-TM-HV**
horizontal/vertical mounting plate
in horizontal mount position



Ackcio BEAM-TM

with our **BEAM-PL-TM-R**
rail mounting double plate



Ackcio BEAM-TM

Inner view

