

TECHNICAL SPECIFICATIONS

ACKCIO VIBRATING WIRE NODES BEAM-VW-S1 & BEAM-VW-S8



MODELS

BEAM-VW-S1	Supports 1 sensor (1 vibrating wire channel, 1 pulse counter, and 1 thermistor channel)
BEAM-VW-S8	Supports 8 sensors (8 vibrating wire channels and 8 thermistor channels)

MECHANICAL	BEAM-VW-S1	BEAM-VW-S8
DIMENSION	100mm x 100mm x 80mm	220mm x 140mm x 80mm
WEIGHT	0.7kg	1.7kg
MATERIAL	Die-cast aluminium	Die-cast aluminium

VIBRATING WIRE MEASUREMENTS

VIBRATING WIRE MODULE	12-bit differential analogue-to-digital converter
MEASUREMENT RATE	5 samples per second data acquisition with variable size moving average filter after resonant frequency lock
MEASUREMENT DURATION	5s per measurement cycle
VIBRATING WIRE READING SPECIFICATIONS	Excitation Wave: 8V peak-to-peak sweep Measurement Range: 450 - 6000Hz Resolution: 0.01Hz Accuracy: $\pm 0.04\%$ FS
THERMISTOR READING SPECIFICATIONS	Measurement Range: -20°C to +80°C for 3K thermistor Resolution: 0.1°C Accuracy: $\pm 0.2^{\circ}\text{C}$
SUSTAINED INPUT VOLTAGE W/O DAMAGE	3.6V DC max
SENSOR RESISTANCE	50 Ohms

INPUT	BEAM-VW-S1	BEAM-VW-S8
ANALOGUE DIFFERENTIAL INPUTS	1 vibrating wire channel, 1 thermistor channel, and 1 pulse counter	8 vibrating wire channels and 8 thermistor channels
WIRING	Push-in CAGE CLAMP (0.2 - 1.5 mm² / 24 - 16 AWG)	
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	BEAM-VW-S1 FCC: 2AT8M-VW-S1-V3X0 IC: 27349-VWS1V3X0 CE/RED RCM(Australia & New Zealand) Anatel (Brazil)	BEAM-VW-S8 FCC: 2AT8M-VW-S8-V3X0 IC: 27349-VWS8V3X0 CE/RED RCM(Australia & New Zealand) Anatel (Brazil) MoC (Israel)
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	BEAM-VW-S1 1 x D-Cell Li-SOCl2 3.6V nominal voltage Recommended capacity 19Ah	BEAM-VW-S8 2 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-VW-S1	3	6	8	12	14	18	1 x 19Ah D-Size Li-SOCl2
BEAM-VW-S8	1	2	3	6	9	24	2 x 19Ah D-Size 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-BK-SM

Small multi-purpose mounting bracket (vertical/horizontal/pole) with mounting screws

BEAM-BK-LG

Large multi-purpose mounting bracket (vertical/horizontal/pole) with mounting screws



Ackcio BEAM-VW-S1

External view



Ackcio BEAM-VW-S8

External view



Ackcio BEAM-VW-S1

with our **BEAM-BK-SM** small multi-purpose mounting bracket for vertical/horizontal or pole mounting



Ackcio BEAM-VW-S8

with our **BEAM-BK-LG** large multi-purpose mounting bracket for vertical/horizontal or pole mounting

Ackcio BEAM-VW-S1

Inner view



Ackcio BEAM-VW-S8

Inner view

