

Product Description

LEVEL-TRAC is a member of the TELE-TRAC family and allows the user to monitor the volumes in a tank to high levels of accuracy in both a static and dynamic environment. This low powered device lasts for years in the field and can work in most liquid and solid mediums including, oil, water, acids, alkaline, grains, sands/aggregates & granular food stuffs. It's on board GSM/Bluetooth/LoRa communications allows for both local area and national monitoring.

Our product is ATEX Compliant and our flexi design approach enables significant customisation.

The VARI-TRAC Level Sensor product provides in one integrated package a complete fluid, grain & powder level measurement and tracking solution that combines the best of sensory, GPS, battery, communication security and wide area communications technology.

The Sensor is a microcontroller-based capacitive fluid level measurement system, which uses GSM cellular telecommunications for long range and Bluetooth LE for local data transfer. The system also has several other sensors to allow for interaction with the operational environment. This includes a 3-axis motion sensor, accurate temperature sensor. The system is designed for long battery life operations and will utilize a non-rechargeable Lithium Thionyl battery that has a 10-year shelf life.

Combining these technologies delivers a system which can provide control applications with all necessary data and control to run supply chain visibility, asset management, and security type of operations. The Unit can be managed and controlled from central back office software console.

Architecture

- ARM Cortex M4 Microcontroller running RTOS
- MicroSD card local storage option for more than 300 Million encrypted update messages
- GPS tracking module
- GPRS communications module
- Bluetooth LE communication module
- Dedicated hardware cryptography chip for secure key storage, hardware RNG, UID, etc.
- Variety of sensors like temperature, 3D accelerometer

Network services (Optional)

VARI-TRAC may provide to Customer all Network and Carrier services including the monitoring of the network and the provision of monthly reports indicating the systems overall performance and reliability.

Please note that prices are payable annually in advance.

Network connectivity has been amortised within the pricing structure. Therefore, any changes to network provider will require the implementation of a new APN connection and system integration which shall be quoted separately.

Datasheet Specification

Environmental	Temperature:	Storage: -55°C to + 125°C Ambient		
		Operating: -40°C to +85°C Ambient		
GSM/GPRS	Altitude:	Max 15,000 m		
	GSM/GPRS Bands:	GSM 850 MHz		
		E-GSM 900 MHz		
		DCS 1800 MHz		
		PCS 1900 MHz		
	GSM/GPRS Protocol Stack:	3GPP Release 99		
	Network Operation Modes:	I to III		
Available Protocols:	TCP, UDP, FTP, HTTP			
Packet Switched Data Rate:		GPRS multi-slot class 10, Coding scheme CS1-CS4		
		Up to 85.6 kb/s DL4, Up to 42.8 kb/s UL4		
	Circuit Switched Data Rate:	Up to 9.6 kb/s DL/UL4 (Transparent and Non-transparent mode)		
	SMS:		Point-to-point MO and MT	
		Text and PDU mode		
		SMS over CSD and PSD		
GSM/GPRS Power Class:		Class 4 (33 dBm/2W) for 850/900 MHz		
		Class 1 (30 dBm/1W) for 1800/1900 MHz		
SIM form factor:		Nano SIM (4FF, ETSI TS 102 221 V9.0.0, Mini-UICC)		
Antenna internal:		SMA (3dBi)		
GPS	Tracking capability:	72 channels		
	Receiver type:		GPS L1C/A (can be operated concurrently with GLONASS L10F)	
			SBAS L1C/A	
			QZSS L1C/A – L1/SAIF	
			GLONASS L10F	
			BeiDou B1I	
			GALILEO E1B/C	
		SBAS type:		WAAS, EGNOS, MSAS, QZSS, GAGAN
		GPS accuracy:		2.5 m Autonomous, 2.0 m SBAS (CEP, 50%, -130 dBm, > 6 SVs)
	GLONASS accuracy:		4.0 m CEP, 50%	
	Accuracy of time pulse:		RMS 30 ns, 99% 60 ns (GPS)	
	Sensitivity GPS:		Tracking & Navigation GPS -166 dBm (-167 dBm GPS&GLONASS)	
			Hot Start -157 dBm (-156 dBm GLONASS) 1 sec TTFB	
			Cold Start -148 dBm (-145 dBm GLONASS) 26 sec TTFB, 2 sec aided	
Max update rate:		10 Hz (5 Hz GPS&GLONASS)		
Velocity accuracy:		0.05 m/s		
Heading accuracy:		0.3 degrees		
Anti-jamming:		Active CW detection and removal, on-board 2x SAW filter		
Antenna internal:		Onboard ceramic patch antenna (18x18mm) GPS&GLONASS		

		1575-1610MHz, 3dBi peak gain
Bluetooth LE v5.0	Type:	v5.0 BLE (compatible with 4.0 - 4.2)
	Frequency:	2.4 GHz, 40 channels
	Max Transmit Power:	+6 dBm
	Receive Sensitivity:	-95 dBm (1Mbps) -103 dBm (125 kbps)
	Antenna:	SMA (3dBi)
MCU	Encryption:	AES 128 bit using CCM encryption
	Type:	ARM Cortex M4 32-bit processor with FPU
	Architecture:	Armv7E-M, Harvard
	Speed:	64 Mhz
	RAM:	64 Kb
SD Memory Card	FLASH:	512 Kb
	Type:	Micro Secure Digital HC (microSDHC)
Operating system	Max capacity:	32 GB
	Type:	Mbed OS (RTOS)
	File system:	FAT32
Input / Output Interface	Digital I/O	4 x Digital Inputs
		4 x Digital outputs
Crypto Authentication chip	ADC	2 x 12bit max Maximum 200 ksp/s
	Type:	ECDH and ECDSA
	ECDSA:	FIPS186-3 Elliptic Curve Digital Signature Algorithm
	ECDH:	FIPS SP800-56A Elliptic Curve Diffie-Hellman Algorithm
	HASH support:	SHA-256 Hash Algorithm with HMAC Option
	ID:	Guaranteed Unique 72-bit Serial Number
	RNG:	Internal hardware High-quality FIPS Random Number Generator
	AES HW acceleration:	AES-128: Encrypt/Decrypt, Galois Field Multiply for GCM
Secure storage:	10Kb EEPROM Memory for Keys, Certificates, and Data	
Encryption	AES	AES HW encryption
Accelerometer	Type:	3-axis MEMS linear accelerometer
	Sensitivity:	1 mg/LSB (12bit ADC) @2G range
	G Range:	2/4/8 G
	Frequency:	12.5 to 400 Hz ODR
	Free fall detection	Yes
Temperature sensor	Type:	Digital Thermometer
	Range:	-40°C to +125°C
	Accuracy:	± 0.1°C
	Max resolution:	0.01°C (14 bit)
Level sensor	Type:	Capacitive level sensor
	Max depth:	0.2 - 5 m (customer specification)
	Compensated:	Temperature, air K, liquid K
	Accuracy:	0.10%

	Resolution:	28 bit (8.5 digit)
Power/Data connection:	Type:	USB-C
	External Power supply:	5-14 VDC
	Battery:	TBD
	Solar power supply:	TBD

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