T24 Wireless Radio Telemetry

Product Catalogue

PROCTER & CHESTER (MEASUREMENTS) LTD

Authorised Distributor of

Features at a Glance...

- Exceptional performance in the harshest of conditions.
- High measurement low noise electronics.
- Long battery life of up to five years in the field.
- Proprietary license free 2.4GHz.
- Intuitive software which calibrates to sensors in under three minutes.
- Wireless transmission range up to 800m in open field site.

The T24 Wireless Telemetry Sensor System is a modular wireless solution for industrial sensor applications. This range offers high accuracy, high quality measurement is interfaced with simple yet powerful configuration and monitoring software.

T24 telemetry gives sensor manufacturers and integrators the complete flexibility to build their own sensor modules around it. The system easily replaces wired systems, reducing installation and maintenance costs.

T24 transmitter modules collect data from industrial sensors including load, pressure, torque, strain, temperature, pulse, potentiometer and 4-20mA/0-10V conditioned sensors such as pH, flow, vibration, RH, depth and inclinometers.

The T24 range has recently undergone several improvements, including:

- New integrated radio module and antenna for superior performance and coverage in challenging environments.
- Free logging and visualisation software to display and build visual representations of systems with live readings. With audible alarms, reports, logging and built-in webserver for data on the go.
- Wireless transmission range up to 800m (half a mile) in open field site.
- Improved product security for increased system isolation.

Industry applications can vary, so T24 can be constructed to fit around each requirement. Transmitter modules, base stations, robust handheld displays, serial outputs, relays, printers and analogue outputs can be simply configured to suit your needs.

High accuracy, low noise measurement electronics deliver high resolution, low drift results which can be user calibrated over nine points to enable linearization and to deliver results in user definable engineering units. The results can be transmitted at rates of up to 200 per second to other T24 devices.

Configuration of devices is simple with the user friendly Toolkit software. Configure and calibrate by using either known inputs or by table entry.

T24 modules are fitted with efficient antennas which provide superior performance and data integrity. The antenna's signal integrity and coverage overcomes challenging environmental conditions such as moving objects or high metallic environments. The license free, 2.4GHz Direct Sequence Spread Spectrum (DSSS) radio technology offers high integrity, error free communications which can co-exist with other wireless technologies such as Wi-Fi, Bluetooth® and Zigbee®, FCC, ETSI and IC approvals.

Why Wireless?

- Save time and cost compared to installing a similar wired system.
- Ideal for temporary applications and reusable.
- The ability to place transmitters in hard to reach locations without the cost and logistics of cabling.
- Maximum flexibility to respond to all types of industry applications.
- Low maintenance costs with reliable data collection for many years.

All Mantracourt transmitter enclosures offer high performance wireless sensor transmitter measurement for strain gauge (SA or SAf), current (IA), voltage (VA), temperature (TA), pulse (PA) and potentiometer (RA).

Using 2.4GHz wireless telemetry electronics, the system provides exceptional performance in the field with a battery life of up to 5 years, by either 'powering down' between transmissions or being remotely 'powered off' completely.

High accuracy, low noise measurement electronics deliver high resolution and low drift results which can be user calibrated over 9-points to enable linearization to deliver results in user definable engineering units.

Results can be transmitted at rates of up to 200 readings per second to other wireless sensing T24 devices such as handheld displays, analogue outputs and base stations etc.

The wireless transmitters are configured and calibrated (either by applying known inputs or by table entry) using free T24 Toolkit software which runs on a PC connected to a T24 base station (T24-BSu or T24-BSue).

Alternative IP rated enclosures are available to suit a range of applications and environments. If you can't see the enclosure with the required level of environmental protection, please let us know and we can offer an alternative solution.

The transmitter PCBs are also available without the enclosures if they do not suit your application. Please refer to Page 33.

Features

- Internal batteries (2 x D) or external power.
- Dimensions: 164mm x 84mm x 57mm.
- IP67 rating.
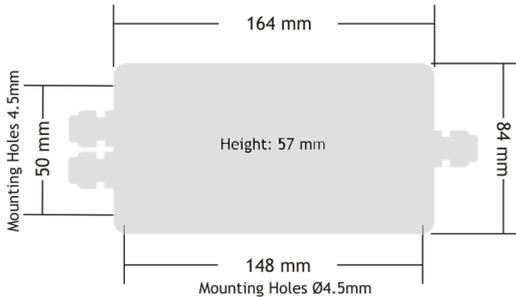
The T24-ACM is the largest of the transmitter enclosures. Featuring a compartment for a pair of alkaline 'D' cells, the T24-ACM also has a regulator circuitry for an external power supply. The batteries can also be used to provide power in case of external supply failure.

For easy wireless sensing, the unit provides connections via the 2 part screw terminals and provide environmental sealing to IP67 NEMA 4.

Ordering Codes

Strain Transmitter	T24-ACM-SA
Fast Strain Transmitter	T24-ACM-SAf
Current Transmitter	T24-ACM-IA
Voltage Transmitter	T24-ACM-VA
Temperature Transmitter	T24-ACM-TA
Pulse Transmitter	T24-ACM-PA
Potentiometer Transmitter	T24-ACM-RA

Features

- Internal batteries (2 x AA).
- Dimensions: 80mm x 62mm x 34mm.
- IP67 rating.

The T24-ACMi is a smaller transmitter enclosure with a built-in antenna. The T24-ACMi is powered by a pair of alkaline 'AA' cells and is environmentally sealed to IP67 NEMA 4.
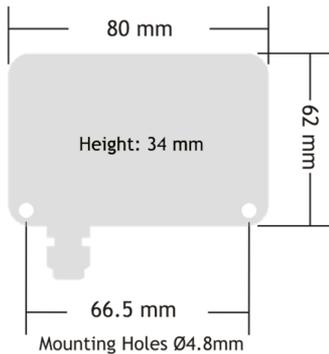
For easy wireless sensing, the unit provides connections via the 2 part screw terminals and provide environmental sealing to IP67 NEMA 4.

Ordering Codes

Strain Transmitter	T24-ACMi-SA
Fast Strain Transmitter	T24-ACMi-SAf
Current Transmitter	T24-ACMi-IA
Voltage Transmitter	T24-ACMi-VA
Temperature Transmitter	T24-ACMi-TA
Pulse Transmitter	T24-ACMi-PA
Potentiometer Transmitter	T24-ACMi-RA

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Features

- Up to 500m transmission range in open field site.
- Dimensions: 76mm x 24mm x 20mm .
- IP50 rating.

76 mm
68 mm
15 mm
35 mm
Height: 20 mm
3.2 mm
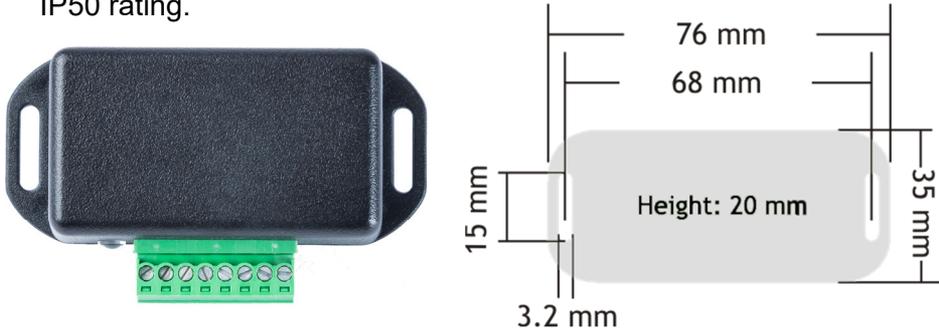
The T24-ACMm is the smallest of the T24 radio telemetry enclosures. It offers up to **500m** range. Low power modes allow the module to 'power down' between transmissions or to 'power off' completely and it can be controlled by other T24 products such as the hand held displays or base stations.

An optional battery pack (T24-BB1) can be chosen to power the T24-ACMm which uses 2 x AAA cells and can be connected via simple 2 part screw field terminals. There is also the option to fit wired completion resistors allowing a strain input to be either full, half or quarter bridge input.

The T24-ACMm-SA strain input provides direct mV/V input and 5V bridge excitation for up to 4 load cells.

Ordering Codes

Strain Transmitter	T24-ACMm-SA
Fast Strain Transmitter	T24-ACMm-SAf
Current Transmitter	T24-ACMm-IA
Voltage Transmitter	T24-ACMm-VA
Temperature Transmitter	T24-ACMm-TA
Pulse Transmitter	T24-ACMm-PA
Potentiometer Transmitter	T24-ACMm-RA

Features

- Internal batteries (2 x D) or external.
- Dimensions: 164mm x 84mm x 57mm.
- IP67 rating.
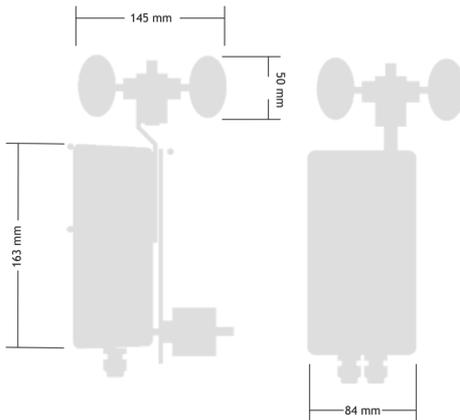
The T24-WSS wireless wind speed transmitter (anemometer) will 'power down' between transmissions to maximise battery life in the field and has a wireless range of up to 800 metres.

The T24-WSS features a high quality 3-cup rotor pressed on a stainless steel shaft with rugged Delrin body with bronze Rulon bushings. Housed in an IP67 case.

The output value of the anemometer comes pre-calibrated and can be configured to your requirements and measure over from 5mph to 125mph. Other output units available are m/s, km/h and fps.

Accuracy:

- 0.5mph from 5mph to 10mph.
- ±4% from 10mph to 125mph.

The T24-WSS is powered either from internal batteries or an external supply. For applications which require high sampling rates for long periods the T24-PP1 and T24-SP1 could be an ideal solution.

The Mantracourt wireless portable display receivers, T24-HS, T24-HA and T24-HR provide an 8 digit LCD reading from a single to unlimited T24 trans-mitter modules. Offering a wireless range of up to 800m.

T24 transmitters can be 'powered on' and 'powered off' automatically by the handheld displays and status indicators inform the user if the transmitter mod-ules have any input integrity problems, low battery, low signal, over range or any other error.

The handheld displays can toggle between gross and tared values and can also optionally be scaled to change measurement units.

All of the T24 handheld displays operate using a pair of standard alkaline AA batteries and are configured using free T24 Toolkit software which runs on a PC via a T24-BSu module.

The dimensions of the T24-HS, T24-HA and T24-HR are the same. An op-tional black leather case with clear viewing window and shoulder strap is also available (TR100-CA).

Typical Specification

POWER SUPPLY VOLTAGE	2.5 to 3.6V DC *(2 x AA 1.5V primary cells)*
BATTERY LIFE - CONTINUOUS OPERATION*	35 hours
BATTERY LIFE - STANDBY MODE (OFF)	1.5 years
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz

RADIO - TRANSMIT POWER	10mW
RADIO - RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-10°C to 50°C
STORAGE TEMPERATURE RANGE**	-40°C to 85°C
MAXIMUM HUMIDITY	95% non-condensing
IP RATING	IP67 / NEMA4

*Based on 2 Ah capacity batteries.
**No batteries.

Dimensions
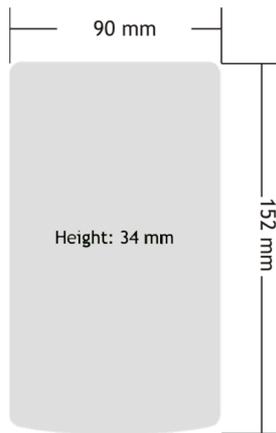
Features

- Receives data from a single transmitter.
- Two key operation offering tare functionality.
- Use to auto 'power on' and 'power off' of any remote transmitter module.
- Battery powered, up to 40 hours use.
- Simple wireless configuration and calibration.
- Wireless range of up to 800m.
- IP67 rating.

The T24-HS wireless portable display receiver provides an 8 digit LCD reading from any of the T24 transmitter modules. The T24-HS provides a point to point connection to a single transmitter. The transmitter can be woken and sent to sleep as the handheld is turned on or off.

Two AA batteries power the handheld which has been designed for low power operation. The T24 Toolkit software offers a fast and simple way to configure the display format, unit conversion, zero adjustment and transmitter selection via a T24-BSu module.

The T24-HS display can be toggled between gross and a tared value and can optionally be scaled to change measurement units.

The T24-HS handheld display is typically seen in applications requiring wireless load cell measurement or wireless strain gauge display.

Features

- Receives data from up to 12 transmitters.
- Summed total inputs feature.
- Use to auto 'power on' and 'power off' of any remote transmitter module.
- Battery powered, up to 40 hours use.
- Simple wireless configuration and calibration.
- Wireless range of up to 800m.
- IP67 rating.

The T24-HA wireless portable display receiver provides an 8 digit LCD reading for up to 12 of any of the T24 transmitter modules.

The T24-HA can be operated in two modes:

- **Result Mode** sums the values from the 'paired' acquisition modules making this sum the primary displayed value.
- **Item Mode** allows the user to select which acquisition module value to display.

T24 transmitters can be 'powered on' and 'powered off' automatically by the T24-HA handheld. Status indicators inform the user if the transmitter modules have input integrity problems, low battery, low signal, over range or any other error.

The T24-HA display can be toggled between gross and a tared value and can also optionally be scaled to change measurement units. In addition, a function key can be configured to retransmit the displayed value to other T24 modules such as a printer (T24-PR1).

The T24-HA uses a pair of standard alkaline AA batteries and is configured using free T24 Toolkit software which runs on a PC via a T24-BSu module.

The dimensions of the T24-HA are the same as the T24-HS.

PCM

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Features

- Receives data from unlimited transmitters.
- Displays the ID of the 'live' transmitter.
- Two key operation offering tare functionality.
- Use to auto 'power on' and 'power off' of any remote transmitter module.
- Battery powered, up to 40 hours use.
- Simple wireless configuration and calibration.
- Wireless range of up to 800m.
- IP67 rating.

The T24-HR wireless portable display receiver provides an 8 digit LCD reading from an unlimited number of T24 transmitters (displaying a single transmitter a time).

A simple search button is pushed on the T24-HR when in the proximity of any transmitter module. The transmitter module with the highest signal strength and is nearest to the handheld, will initially be selected and displayed. The data tag of the transmitter module being read is displayed prior to the output reading, allowing identification of the data's origin. Other transmitter modules can be displayed by scrolling.

The T24-HR is ideal for systems where a manual reading of T24 transmitter modules is required but the number is unknown or may be variable.

The T24-HR uses a pair of standard alkaline AA batteries and is configured using free T24 Toolkit software which runs on a PC connected to a T24 base station.

The dimensions of the T24-HR are the same as the T24-HS.

Features

- Displays the summed value of up to 8 transmitters.
- Large screen, four digit LED display.
- 100mm character format.
- Unit conversion using output scaling, i.e. KG to lbs.
- IP67 rating.
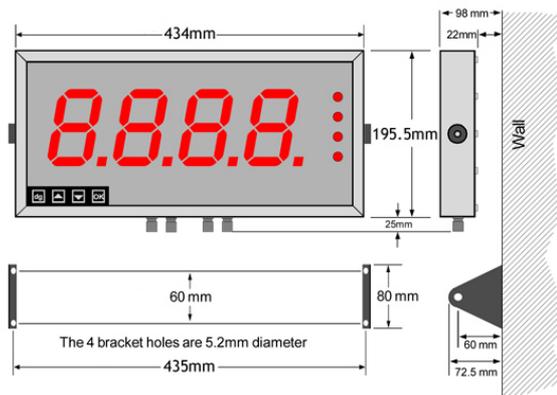- Wireless range of up to 800m.

The T24-LD1 provides the user with a large format four-digit display capable of displaying the summed value of up to eight T24 wireless telemetry transmitter modules.

The T24-LD1 only requires the connection of a 11-30 VDC power supply (not supplied). The unit conforms to IP67/NEMA4X.

Using the PC based T24-Toolkit software and T24 USB Base Station the user can quickly and easily select and configure the transmitter devices to be summed on the T24-LD1. The T24 Toolkit also provides advanced user control over the wireless aspects of the system as well as a 'System Zero' function.

Further wired Logic Inputs allow the user to remotely control Tare and Net/Gross toggle functions.

The Mantracourt wireless base stations, T24-BSi, T24-BSu, T24-BSue and T24-GW1 can be used for the configuration of all of the T24 modules along with the T24 Toolkit software. Offering a wireless range of up to 800m.

Data can also be captured by the wireless base stations from an unlimited number of T24 transmitter modules and streamed to a PC to function as a radio telemetry data logger.

The options of USB, RS232 or RS485 interfaces enables the base stations to connect to a wide range of devices such as PCs, PLCs, OEM hardware etc. The internal PCB antenna provides up to 800m (2,600ft) range.

For software developers a standard Windows DLL and COM driver are available to enable data collection from T24 transmitter modules.

The licence free 2.4 GHz direct sequence spread spectrum (DSSS) radio telemetry technology offers high integrity, error free communications which can co-exist with other wireless technologies such as Wi-Fi, Bluetooth® and Zigbee®. ETSI, FCC and IC approvals.

POWER SUPPLY VOLTAGE	9 to 32V DC
SUPPLY CURRENT (AT 12V)	100mA
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-20°C to 55°C
STORAGE TEMPERATURE RANGE	-40°C to 85°C

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Features

- USB, RS232 and RS485 interface.
- Configure and calibrate the T24 range.
- Data collection for the PC/PLC.
- Controllable baud rates.
- Wireless range of up to 800m.
- Integral antenna.
- Waterproof to IP67.

The T24-BSi is housed in an IP67 enclosure. Data can also be captured by the wireless telemetry base station (T24-BSi) from an unlimited number of T24 transmitter modules. Whilst the integral antenna on the T24-BSi offers up to 800m range in an open field site.

164 mm

84 mm

Mounting Holes 4.5mm

50 mm

Height: 57 mm

148 mm
Mounting Holes Ø4.5mm
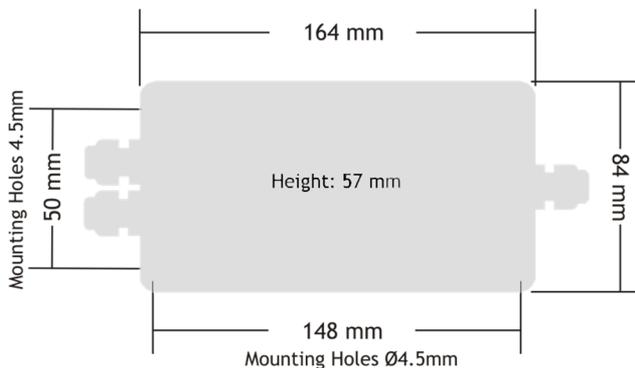
Features

- Simple plug and play USB.
- Configure and calibrate the T24 range.
- Data collection for PC/PLC.
- Wireless range of up to 400m.
- Integral antenna.
- IP50 sealing.

The T24-BSu is one of a range of base stations that are required for configuration and calibration of the T24 modular telemetry system. The T24-BSu is housed in an IP50 enclosure. Data can also be captured by the wireless telemetry base station (T24-BSu) from an unlimited number of T24 transmitter modules. Whilst the integral antenna on the T24-BSu offers up to 400m range in an open field site.
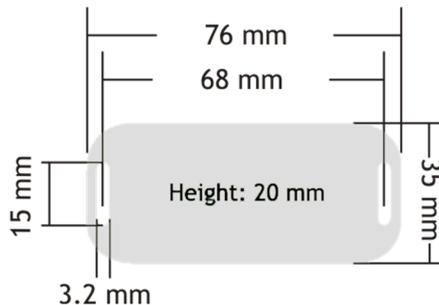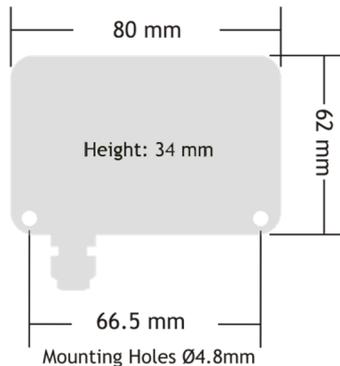
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Features

- USB, RS232 and RS485 interface.
- Configure and calibrate the T24 range.
- Data collection for the PC/PLC.
- Wireless range of up to 800m.
- Integral antenna.
- Waterproof to IP67.

The T24-BSue offers line of sight range of up to 800m for all T24 transmitter modules. The T24-BSue draws power from the USB bus and therefore no further components are required to configure and control remote devices from a PC.

The T24-BSue is supported by not only the T24 Toolkit but also with a .DLL (Dynamic Link Library) allowing customers using VB (Visual Basic) to develop their own custom software for their applications.

80 mm

62 mm

Height: 34 mm
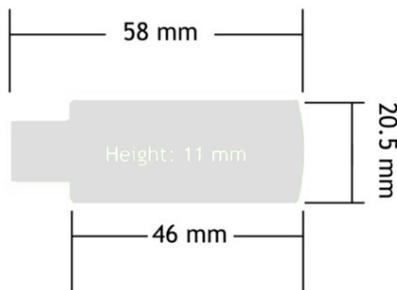
66.5 mm

Mounting Holes Ø4.8mm

Features

- USB interface.
- Configure and calibrate the T24 range.
- Data collection for the PC.
- Wireless range of up to 500m.
- Integral antenna.
- Waterproof to IP50.

The T24 wireless telemetry dongle base station (T24-BSd) is the smallest in the Mantracourt base station range and enables you to connect to the wireless telemetry modules at a line of sight range of up to 500 metres.

It provides a portable solution with no wiring that makes it ideally suited for laptops and tablets that run a full version of Windows.

It draws power from the USB bus and therefore no further components are required to configure and control remote devices from a PC.
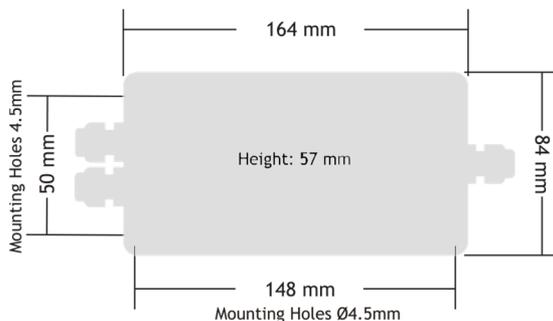
Features

- USB, RS232 and RS485 interface.
- Configure and calibrate the T24 range.
- Data collection for PC/PLC.
- Wireless range of up to 800m.
- Integral antenna.

The T24-GW1 is a wireless Modbus* gateway that provides a simple interface for users to gather data from up to 100 transmitters in a T24 network. The T24-GW1 uses either the standard Modbus interface RTU protocol or a simple ASCII protocol.

The T24-GW1 offers some simple commands available to wake, sleep, and keep awake T24 transmitters.

Modbus is a serial communications protocol which was originally designed for use with PLCs (Programmable Logic Controllers). Over time its simple and robust nature has made it a communication protocol standard. It is now amongst the most common available means for connecting industrial electronic devices.

Features

- Analogue output from a T24 transmitter.
- Configurable analogue outputs.
- Data collection for the PC/PLC.
- Wireless range of up to 800m.
- T24-AO1 IP50 sealing.
- T24-AO1i IP67 sealing.

The T24-AO1 provides a configurable analogue output for a single T24 wireless transmitter module. The output can be selected from the pre-calibrated voltage and current ranges of 0-10 Volts, ±10 Volts, 0-5 Volts, ±5 Volts, 0-20mA and 4-20mA. (All current outputs both sink and source).

The LED indicators on the T24-AO1 provide status indication of the condition of the radio link, remote battery life and remote sensor status. The T24-AO1 and T24-AO1i are configured and scaled using free T24 Toolkit software which runs on a PC connected to a T24 base station.

The T24-AO1i is an industrial version, housed in an IP67 NEMA4 sealed enclosure and offers a digital input which allows for zeroing of the incoming data value. This version also offers extended range over the desktop version.

Voltage Output Specification

VOLTAGE RANGES	0-5V, 0-10V, ±5V, ±10V
RESOLUTION/BITS	65,000/16
OUTPUT GAIN STABILITY (MAX)	±0.015% FS/°C
OUTPUT ZERO STABILITY (MAX)	±0.015% FS/°C
LINEARITY (MAX)	±0.01% FS
MINIMUM LOAD IMPEDANCE	5000Ω

Current Output Specification

CURRENT RANGES	4-20mA, 0-20mA
RESOLUTION/BITS	65,000/16

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Current Output Specification

OUTPUT GAIN STABILITY (MAX)	±0.03% FS/°C
OUTPUT ZERO STABILITY (MAX)	±0.02% FS/°C
LINEARITY (MAX)	±0.02% FS
MINIMUM LOAD IMPEDANCE	500Ω

Typical Specification

POWER SUPPLY VOLTAGE	9 to 32V DC
OPERATIONAL CURRENT	100mA
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
T24-AO1 RANGE	Up to 100m
T24-AO1i RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-20°C to 55°C
STORAGE TEMPERATURE RANGE	-40°C to 85°C
MAXIMUM HUMIDITY	95% non-condensing
IP RATING: T24-AO1	IP50
IP RATING: T24-AO1i	IP67
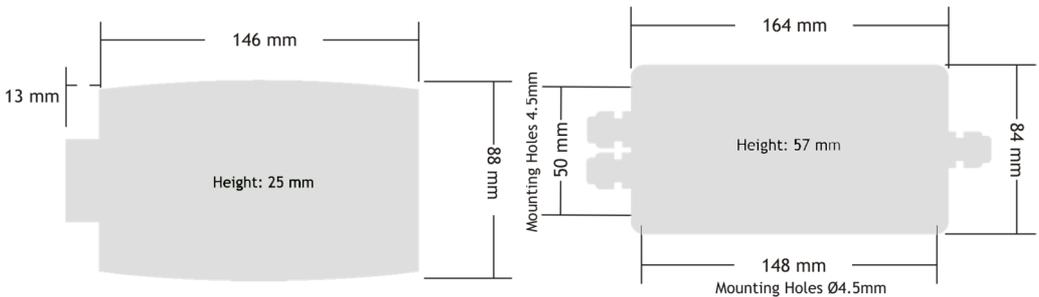
T24-AO1

T24-AO1i

Features

- Wireless thermal printer.
- Prints data from up to 8 transmitters or a handheld module
- Surface mounting enclosure.
- Wireless range of up to 800m.
- 57mm paper width.

The T24-PR1, wireless telemetry printer will generate a user designed report which can contain values from up to 8 x T24 transmitters and optionally sum them. This module has proved ideal for generating receipts and reports from various wireless weighing applications.
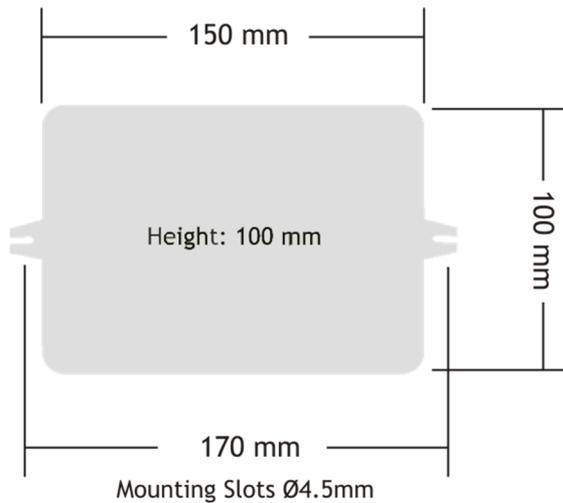
Printing can be triggered by a button press or the arrival of specific data from an acquisition module or a handheld display module. The power supply requirements make this module ideal for in-vehicle mounting.

The T24-PR1 module is configured using free T24 Toolkit software which runs on a PC connected to a T24 base station. The internal antenna offers up to 800m range in an open field site.

Typical Specification

PRINTING METHOD	Direct thermal line printing.
PAPER WIDTH	57mm
PAPER ROLL DIAMETER	35mm
PRINT WIDTH	48mm
POWER SUPPLY VOLTAGE	9 to 32V DC
SUPPLY CURRENT WHEN IDLE	100mA
SUPPLY CURRENT WHEN PRINTING (PEAK)	3A
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW

WIRELESS RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	5°C to 50°C
STORAGE TEMPERATURE RANGE	-20°C to 60°C
MAXIMUM HUMIDITY	95% non-condensing
IP RATING (EXCL. USB CONNECTOR)	IP20

150 mm

Height: 100 mm

100 mm

170 mm

Mounting Slots Ø4.5mm

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Features

- Wireless receiver with relay output.
- Receives data from up to 16 inputs.
- Choice of 3 relay operation modes.
- Configurable latching, inversion and hysteresis.
- Surface mounting enclosure.
- Sealing to IP67.
- Wireless range of up to 800m.

The T24-RM1, wireless receiver with relay output, offers dual power relays capable of mains power switching. Each relay can be configured as high, low or window alarms and can be associated with a group of up to eight T24 transmitters.

Relays can operate when the sum of the assigned transmitter modules reach a set point or when any of the modules reach the set point. There is also a mode where the difference between the lowest and highest value is compared to the set point.

The T24-RM1 is ideal for applications where you are looking for a group of weights to be within a certain band. i.e. balancing four corners of a weigh scale or a hanging truss.

Relays can be latched and a digital input or external command can be used to reset them. An alarm/error signal relay is operated if communication is lost or other selectable errors occur and this alarm resets once the source of the alarm or error is removed.

The T24-RM1 is configured using the T24 Toolkit software which runs on a PC connected to a T24 base station and is supplied in an IP67 sealed ABS case but a DIN rail option is available. The internal antenna offers up to 800m range in an open field site.

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Typical Specification

POWER SUPPLY	9 to 32V DC
SUPPLY CURRENT (AT 12V)	150mA
NUMBER OF POWER RELAYS	2
TYPE OF POWER RELAY	SPCO
CONTACT RATING (POWER RELAY OUTPUT)	5A @ 240V AC
NUMBER OF ALARM RELAYS	1
TYPE OF ALARM RELAY	SPCO
CONTACT RATING (ALARM RELAY OUTPUT)	1A @ 24V DC
NUMBER OF DIGITAL INPUTS	3
TYPE OF DIGITAL INPUT	Volt free contact
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
WIRELESS RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-20°C to 55°C
STORAGE TEMPERATURE RANGE	-40°C to 85°C
MAXIMUM HUMIDITY	95% non-condensing
IP RATING	IP67

164 mm

Mounting Holes 4.5mm

50 mm

Height: 57 mm

84 mm

148 mm
Mounting Holes Ø4.5mm
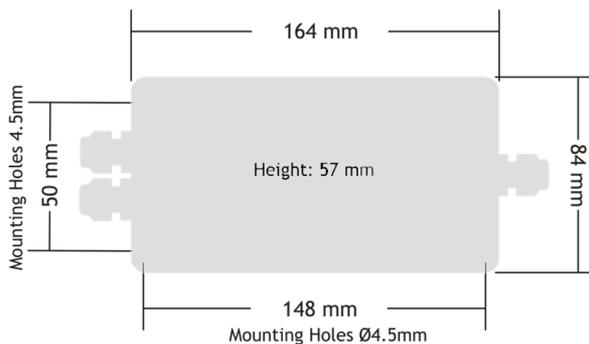
Features

- Wireless receiver with data port.
- Serial ASCII output gateway.
- Drives displays, feeds data to collection systems.
- Surface mounting enclosure.
- Sealing to IP67.
- Wireless range of up to 800m.
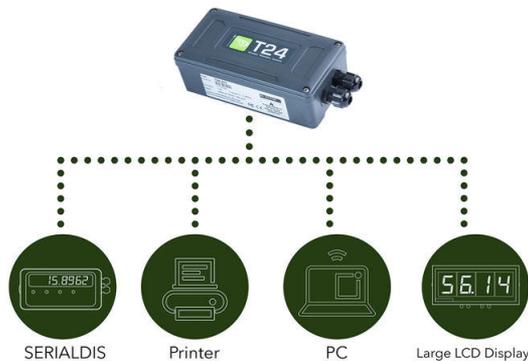
The T24-SO is a wireless receiver with data port for display or printer module and it generates a serial output ASCII string which can include data from up to 8 x radio telemetry T24 transmitters as well as optionally sum them. The output is suitable for connecting to many serial input devices that require simple ASCII data.

The actual ASCII output can be designed by the user which can include free text or tokens which can represent real data. i.e. <V1> would be the value from input module 1 when the output is triggered.

The output of the T24-SO can be triggered by the reception of user specified data. i.e. data is only outputted when data is received from a specific acquisition module or when triggered from a handheld device.

The T24-SO is configured using the T24 Toolkit software which runs on a PC connected to a T24 base station. The internal antenna offers up to 800m range in an open field site.
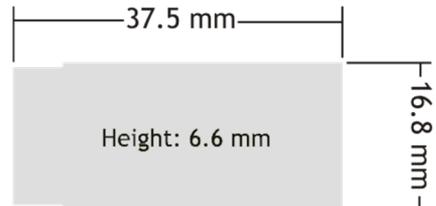
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Typical Specification

POWER SUPPLY	9 to 32V DC
SUPPLY CURRENT (AT 12V)	150mA
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
WIRELESS RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-20°C to 55°C
STORAGE TEMPERATURE RANGE	-40°C to 85°C
MAXIMUM HUMIDITY	95% non-condensing
IP RATING	IP67

164 mm

Mounting Holes 4.5mm

50 mm

Height: 57 mm

84 mm

148 mm

Mounting Holes Ø4.5mm
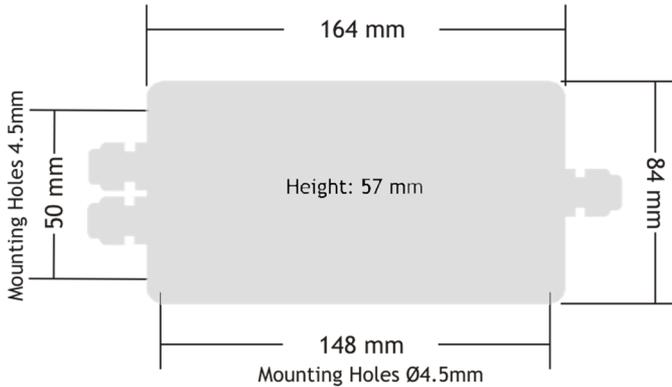
Features

- Current sensor transmitter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.

The T24 OEM PCB transmitters provides wireless measurement for a range of inputs. The results can be transmitted wirelessly at rates up to 200 per second to other T24 devices such as handheld displays, analogue outputs and base stations etc.

The transmitter modules are configured and calibrated (either by applying known inputs or by table entry) using the T24 Toolkit software which runs on a PC connected to a T24 base station.

There are two antenna options: the integral antenna option offers up to 600m range whilst the external antenna options allows up to 800m range in an open field site.

Although the T24 PCB transmitters can be used 'as is' for OEM solutions there are a number of enclosure options available too. See Page 5 of this catalogue for more information.

A low power mode allows the transmitters to 'power down' between transmissions or to 'power off' completely and can be controlled by other T24 products such as the handheld displays or a base station.

Module transmits and receives giving:

1) Full error detection and correction.
2) Ability to switch to low power modes.
3) Calibration and configuration via radio telemetry.
4) Ability to be switched from sleep to operating mode via radio.
5) Calibration stored within the module.
6) Remote battery check.

Typical Battery Life (ALL OEM MODULES APART FROM THE T24-SA)

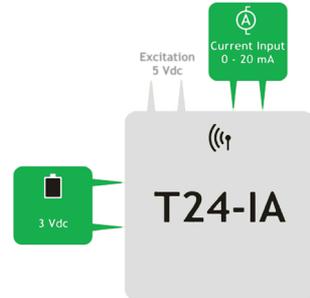Transmitting results at 3 per second, no excitation required.

PAIR AA CELLS CONSTANTLY ON	1 month
PAIR AA CELLS 12 SESSIONS PER DAY OF 5 MINS	2 years
PAIR DD CELLS CONSTANTLY ON	4.5 months
PAIR DD CELLS 12 SESSIONS PER DAY OF 5 MINS	>9 years

Typical Specification

POWER SUPPLY (OEM MODULE)	2.1 to 3.6V DC
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
WIRELESS RANGE	Up to 800m
OPERATING TEMPERATURE RANGE	-20°C to 55°C
STORAGE TEMPERATURE RANGE	-40°C to 85°C
MAXIMUM HUMIDITY	95% non-condensing

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Features

- Current sensor transmitter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.

The T24-IA wireless current sensor transmitter, provides wireless current measurement for an input range of 0-20mA. Suitable for a range of 4-20mA sensors such as pressure, inclinometer, accelerometer, temperature and displacement. The small module size allows for the option of embedding it within a sensor housing. Provides 5V sensor power.

The T24-IA can be configured to last several years on 2 x alkaline AA batteries or alternatively powered from 2 x NiMH or 1 x 3V Lithium.
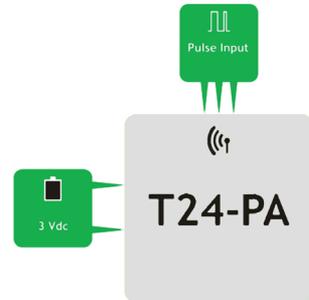
Measurement Specifications

INPUT RANGE	0-20mA
CALIBRATED RANGE	4-20mA
INPUT IMPEDANCE	47Ω
INPUT CALIBRATION ACCURACY	0.1% FR
OFFSET TEMPERATURE STABILITY (MAX)	0.5ppm/°C
GAIN TEMPERATURE STABILITY (MAX)	50ppm/°C
NON LINEARITY BEFORE LINEARISATION (MAX)	25ppm FR
INTERNAL RESOLUTION/BITS	16,000,000/24
NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	30,000/14.75
TRANSMISSION RATES	5ms to 1 day
EXCITATION AVAILABLE	5V DC @ 50mA

Ordering Codes

Current Transmitter with fitting for External Antenna	T24-IAe
Current Transmitter with Internal Antenna	T24-IAi

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Features

- Sensor pulse transmitter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.

The high performance T24-PA OEM wireless sensor pulse transmitter is specifically for the collection and processing of pulse related measurements. To provide wireless outputs in rpm, Hz and time as well as actual pulse counting and measuring the period between pulses.

The T24-PA provides 5V excitation. Inputs accept volt free contacts, open collector and 5V logic.

Measurement Specifications

PERIOD INPUT RANGE	333µℇ to 2ℇ
FREQUENCY INPUT RANGE	0.5 to 3,000Hz
RPM INPUT RANGE (1 PULSE/REV)	30 to 180,000 RPM
VOLT FREE INPUT PULL-UP RESISTOR	42KΩ
PULSE INPUT VOLTAGE RANGE	0.8 to 6V
ACCURACY AS % INPUT ERROR AT 1Hz (MAX)	0.15%
ACCURACY AS % INPUT ERROR AT 1kHz (MAX)	0.25%
INTERNAL RESOLUTION	0.25µℇ
RESET COUNT INPUT	Volt free
RESET COUNT INPUT PULL-UP RESISTOR	20 to 50KΩ
EXCITATION AVAILABLE	5V DC @ 40mA
TRANSMISSION RATES	From 5ms to 1 day

Ordering Codes

Pulse Transmitter with fitting for External Antenna	T24-PAe
Pulse Transmitter with Internal Antenna	T24-PAi

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Features

- Potentiometer sensor converter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.
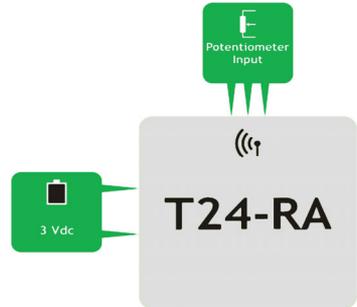
The T24-RA wireless potentiometer sensor transmitter is a high performance wireless device designed for the collection and processing of re-sistance related measurements. The T24-RA measures resistance and peri-odically transmits it. Between transmissions the device is optionally placed in a power saving sleep mode to conserve batteries.

Measurement Specifications

INPUT RANGE	500 to 100,000Ω
SENSOR EXCITATION VOLTAGE	2.5V DC
OFFSET TEMPERATURE STABILITY (MAX)	0.5ppm/°C
GAIN TEMPERATURE STABILITY (MAX)	50ppm/°C
ACCURACY	0.01% FR
NON LINEARITY BEFORE LINEARISATION (MAX)	25ppm FR
INTERNAL RESOLUTION/BITS	16,000,000/24
NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	TBC
TRANSMISSION RATES	5ms to 1 day

Ordering Codes

Potentiometer Transmitter with fitting for External Antenna	T24-RAe
Potentiometer Transmitter with Internal Antenna	T24-RAi

Features

- Strain gauge transmitter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.
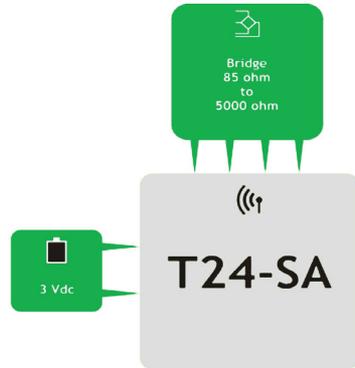
The T24-SA wireless strain gauge sensor transmitter module provides measurement system for strain gauge, pressure, load cell, linear displacement and other 4 wire bridge sensors. Providing direct mV/V input and 5V bridge excitation for up to 4 load cells.

Measurement Specifications

STRAIN GAUGE EXCITATION SYSTEM	4 wire
STRAIN GAUGE EXCITATION	5V DC
STRAIN GAUGE RESISTANCE (MIN)	85Ω
STRAIN GAUGE SENSITIVITY (MAX)	±3.2mV/V
OFFSET TEMPERATURE STABILITY (MAX)	4ppm/°C
GAIN TEMPERATURE STABILITY (MAX)	5ppm/°C
NON LINEARITY BEFORE LINEARISATION (MAX)	25ppm FR
INTERNAL RESOLUTION/BITS	16,000,000/24
NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	400,000/18.75
TRANSMISSION RATES	From 5ms to 1 day

Battery Life

PAIR AA CELLS CONSTANTLY ON	3 weeks
PAIR AA CELLS 12 SESSIONS PER DAY OF 5 MINS	2 years
PAIR DD CELLS CONSTANTLY ON	3.5 months
PAIR DD CELLS 12 SESSIONS PER DAY OF 5 MINS	5 years

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Additional Features

- 2kHz strain gauge transmitter.

The T24-SAf is a 2000 samples per second (fixed) version of the T24-SA for high speed monitoring. T24-SAf provides 5V excitation to drive transducer loads down to 85Ω. This transmitter is highly accurate, low noise and outputs in mV/V giving quality measurements from a wide range of strain bridge transducers. *(See Page 38).*

Measurement Specifications

The measurement specifications for the T24-SAf module are generally as per the T24-SA. Any specifications that fifer are demonstrated below:

NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	8,000/13
TRANSMISSION RATE	2000Hz

Battery Life

PAIR AA CELLS CONSTANTLY ON	30 hours
PAIR AA CELLS 12 SESSIONS PER DAY OF 5 MINS	30 days
PAIR DD CELLS CONSTANTLY ON	5.5 days
PAIR DD CELLS 12 SESSIONS PER DAY OF 5 MINS	4.5 months

Ordering Codes

Strain Transmitter with fitting for External Antenna	T24-Sae
Strain Transmitter with Internal Antenna	T24-SAi
Fast Strain Transmitter with fitting for External Antenna	T24-SAfe
Fast Strain Transmitter with Internal Antenna	T24-SAfi

Features

- Temperature sensor transmitter.
- Works with PT100 Type 385 sensors.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.
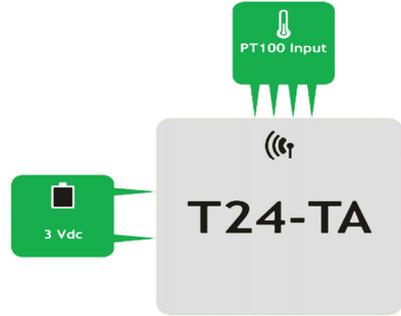
The T24-TA wireless temperature sensor transmitter is a high performance device designed for OEM integration for the collection and processing of temperature measurements. The wireless sensor transmitter requires an external platinum temperature sensor (PT100 Type 385).

Measurement Specifications

INPUT RANGE	-200 to 500°C
SENSOR TYPE	PT100
ACCURACY (TYPICAL)	0.1°C
NON LINEARITY (EXCLUDES SENSOR)	25ppm FR
INTERNAL RESOLUTION/BITS	16,000,000/24
NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	150,000/17
TRANSMISSION RATES	From 5ms to 1 day

Ordering Codes

Temperature Transmitter with fitting for External Antenna	T24-TAe
Temperature Transmitter with Internal Antenna	T24-TAi

Features

- Voltage sensor transmitter.
- Miniature PCB for fitting inside sensors.
- Remote power 'on' and 'off'.
- High speed, 200 updates per second.
- Choice of enclosures, see Page 5.
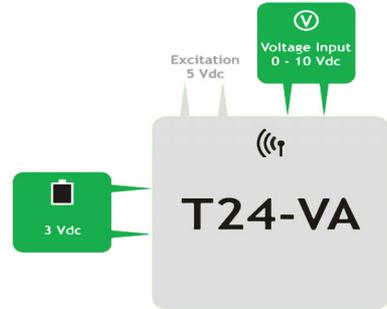
This T24-VA wireless voltage sensor transmitter, provides wireless voltage measurement for an input range of 0 to 10 Volts. Suitable for a range of 0-10V sensors including pressure, inclinometer, accelerometer, temperature and displacement. Provides 5 V sensor power.

Measurement Specifications

INPUT RANGE	0 to 10V DC
CALIBRATED RANGE	0 to 10V DC
INPUT IMPEDANCE	100,000Ω
INPUT CALIBRATION ACCURACY	0.1% FR
OFFSET TEMPERATURE STABILITY (MAX)	0.5ppm/°C
GAIN TEMPERATURE STABILITY (MAX)	50ppm/°C
NON LINEARITY BEFORE LINEARISATION (MAX)	25ppm FR
INTERNAL RESOLUTION/BITS	16,000,000/24
NOISE FREE RESOLUTION (BITS AT 1 SAMPLE PER SEC)	15,000/13,75
TRANSMISSION RATES	From 5ms to 1 day
EXCITATION AVAILABLE	5V DC @ 50mA

Ordering Codes

Voltage Transmitter with fitting for External Antenna	T24-VAe
Voltage Transmitter with Internal Antenna	T24-VAi

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Features

- Power pack and solar panel.
- Unlimited power at 12V at 50mA.
- 110-240V charge input power.
- 20W solar power.
- Fixings for pole or wall mounting.
- IP65 rating.

The T24-PP1 (Power Pack) and T24-SP1 (Solar Panel) provide dependable off-grid power generation.

Packaged in an IP65 sealed case with rugged waterproof connectors the T24-PP1 has two sources of charge for the internal battery with both solar and mains power input charging. The case also features stainless steel padlock protectors for easily securing your supply on site.

The T24-PP1 has a single 12V fuse protected output. The mating connector comes pre-fitted with 5 metres of cable and bare end connections. The T24-SP1 solar panel features hail-proof tempered glass and closely packed poly-crystalline cells, sealed into a robust aluminium frame. The junction box on the rear of the panel does not protrude beyond the frame, so installation can be simple and neat. The solar cell comes with 3 metres of cable as standard longer lengths are available on request.

The T24-PP1 and T24-SP1 combined are designed to provide a perpetual power supply for a 12V system drawing an average of 53mA, even during winter. The T24-PP1 can also be used as a mains 12V DC supply with battery back up.

Electrical Specification

OUTPUT VOLTAGE	12V DC
INTERNAL CAPACITY	33AHr
EXTERNAL POWER SUPPLY VOLTAGE	100 to 240V AC
INPUT FREQUENCY	47-63Hz

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Typical Specification

|	
12V OUTPUT CABLE TO BARE END	5m
SOLAR PANEL TO POWER PACK CABLE	5m
MAINS CHARGE CABLE (SUPPLIED WITH 13A PLUG)	0.8m
IP RATING (& CONNECTORS)	IP65
OPERATING TEMPERATURE RANGE	-20 to 50°C
OPERATING TEMPERATURE (WHEN BEING CHARGED FROM AC SUPPLY)	0 to 40°C
STORAGE TEMPERATURE	-20 to 50°C
HUMIDITY	0 to 95%RH
CASE MATERIALS	Polypropylene

Dimensions

339mm

295mm

PP 1

360mm

510mm

SP 1

PP 1

Electrical Connections
1 - Solar In
2 - 100-240 Volt AC Input
3 - 12 Volt DC Output
4 - 6 Amp Fuse

Features

- Antenna options for T24 modules.
- External antennas are weatherised.
- Low profile versions available.

The T24-ANTA, T24-ANTB, T24-ANTC, T24-ANTD and T24-ANTE are five T24 telemetry antenna options which can be integrated with any of the T24 modules which are factory fitted with UFL antenna connectors (such as the external antenna options of the transmitter modules e.g. T24-SAe, T24-IAe, T24-VAe).
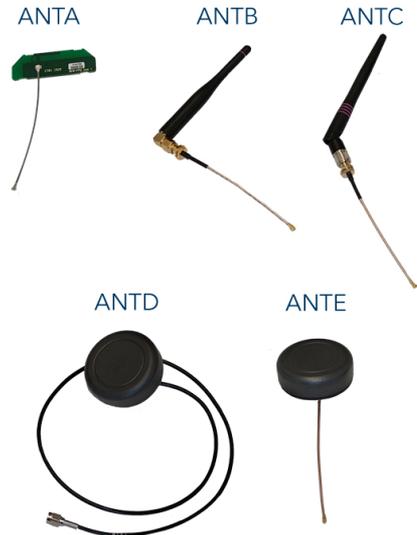
The T24-ANTA is a PCB antenna designed to be fitted inside a plastic enclosure. It comes with a 100mm cable and UFL connector.

The T24-ANTB is a whip antenna with a fixed 90° elbow designed for mounting externally. Supplied with a 100mm cable and UFL connector. Recommended operating temperature range -20°C to +85°C.

The T24-ANTC is a whip antenna with a variable angled elbow for mounting externally. Supplied with a 100mm cable and UFL connector. Recommended operating temperature range -40°C to +90°C.

The T24-ANTD is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 0.6m cable and RPSMA connector and supplied with a 100mm RPSMA to UFL adaptor cable.

The T24-ANTE is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 100mm cable and UFL connector.

Typical Specification

12V OUTPUT CABLE TO BARE END	5m
SOLAR PANEL TO POWER PACK CABLE	5m
MAINS CHARGE CABLE (SUPPLIED WITH 13A PLUG)	0.8m
IP RATING (& CONNECTORS)	IP65
OPERATING TEMPERATURE RANGE	-20 to 50°C
OPERATING TEMPERATURE (WHEN BEING CHARGED FROM AC SUPPLY)	0 to 40°C
STORAGE TEMPERATURE	-20 to 50°C
HUMIDITY	0 to 95%RH
CASE MATERIALS	Polypropylene

Ordering Codes

Antenna for OEM PCB 'e' variants only (PCB)	T24-ANTA
Antenna for OEM PCB 'e' variants only (Whip)	T24-ANTB
Antenna for OEM PCB 'e' variants only (Swivel)	T24-ANTC
Antenna for OEM PCB 'e' variants only (Puck, 0.6m cable)	T24-ANTD
Antenna for OEM PCB 'e' variants only (Puck, 100mm cable)	T24-ANTE

Features

- Wireless range extender.
- Increase overall range and coverage.
- Integrated PCB antenna.
- IP67 rating.

The T24-AR wireless range extender is designed to increase or extend range and overall coverage of T24 transmitter modules.

The T24-AR allows T24 modules to transmit around obstacles such as building or walls, etc. The T24-AR acts as transparent link between the transmitter modules and the consumer, e.g. base station or handheld display.

The T24-AR is powered by either a pair of alkaline 'D' Cells or an external power supply (5-18 Volts).

The T24-AR will allow messages to be repeated once which can effectively double the radio range. T24 has a range of up to 800m without the use of a repeater.

Adding multiple wireless range extenders will not increase the range beyond 1,600m but can increase overall coverage.

Typical Specification

POWER SUPPLY: BATTERIES	2.1 to 3.6V DC
POWER SUPPLY: EXTERNAL	5 to 18V DC
RADIO TYPE	Licence exempt transceiver
RADIO FREQUENCY	2.4GHz
TRANSMIT POWER	10mW
OPERATING TEMPERATURE RANGE	-20 to 55°C
STORAGE TEMPERATURE RANGE (NO BATTERIES)	-40 to 85°C
MAXIMUM HUMIDITY	95% non condensing
IP RATING	IP67

Dimensions

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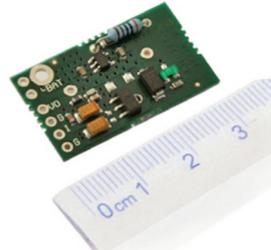## Features

- Lithium battery charger module.
- Provides 2.2V regulated output.
- Charges from 5V DC supply.
- Dimensions 37.5mm x 16.8mm.

The T24-BC1 is a battery charger and power supply suitable for the T24 range of 3V devices. The T24-BC1 is designed to supply a constant 3.3V from a Li-ion Battery while also charging the battery from an input voltage.

The unit comes pre-configured to provide a charging current of 466mA suitable for VARTA LIP653450. This module also supports additional batteries providing a charge current of 133mA via the removal of the leaded resistor (non surface mount).

Please Note:

- Batteries are not included.
- LED will only be lit when an input voltage is applied.

Typical Specification

SUPPLY VOLTAGE	4.1 to 6V
REGULATED VOLTAGE OUTPUT	3.3V
BATTERY POSITIVE CONNECTION	3.7V
MAXIMUM CABLE LENGTH	150mm
DORMANT PCB CURRENT	1.7µA

Battery Options: Varta LIP653450

RATED CAPACITY	1100mAh
DIMENSIONS	35 x 54 x 7mm
WEIGHT	20g
CHARGE TIME	3hrs @ 466mA

BATTERY LIFE (T24-SAi & T24-SAe)	1 month 25 days

Battery Options: Varta LIC18650

RATED CAPACITY	2200mAh
DIMENSIONS	18.25 Ø x 65mm height
WEIGHT	46g
CHARGE TIME	4.5hrs @ 466mA
BATTERY LIFE	3 months 20 days

Battery Options: UBC 581730

RATED CAPACITY	250mAh
DIMENSIONS	18 x 31.5 x 5.8mm
WEIGHT	6.5g
CHARGE TIME	2hrs @ 133mA
BATTERY LIFE	7 days

NOTE: Battery life is calculated with a T24-SA running in low power mode with a sample time of 5mS and transmit interval of 333mS for 2 hours out of every 8 hours, to a 1KΩ bridge.
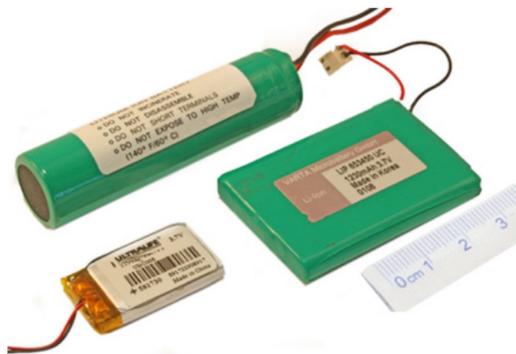
If you have any queries regarding the T24 telemetry or need advice on how to best incorporate telemetry into your application, please do not hesitate to get in touch.

PCM offer a range of telemetry solutions and would be happy to work through your requirement with you.

You can contact us via email on sales@pcm-uk.com or call us on 01926 864444. If you'd prefer to pop in and see us, you'd be more than welcome! If you call ahead to let us know you're coming we could potentially offer you a demonstration too.

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T24 Wireless Radio Telemetry Series Catalogue

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