

| IWTxT Series

WIRELESS TRANSMITTER WITH TX SUPPLY ADDS WIRELESS FUNCTIONALITY TO ANY 4-20 mA TRANSMITTER



Whilst every effort has been taken to ensure the accuracy of this document, we accept no responsibility for damage, injury, loss, or expense resulting from errors or omissions, and reserve the right of amendment without notice.

Information for users

This equipment has been tested and found to comply with the limits for a Class B device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Caution: To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance operation at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. No other antenna may be used with this equipment other than the PCB antenna supplied with this equipment.

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Cynergy3 Components Ltd
7 Cobham Road, Ferndown Industrial Estate, Wimborne
Dorset BH21 7PE, United Kingdom
Tel: +44(0)1202 897969, email: sales@cynergy3.com
www.cynergy3.com

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1. INTRODUCTION

1.1 Safety Information

This manual contains information that must be observed in the interest of your safety and to avoid damage to assets. Please read this manual before installing and commissioning the device and keep the manual in an accessible location for all users.

Contains FCC ID: W70MRF24J40MDME

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Please see the Certifications section for more information on RF Exposure Compliance

1.2 Hardware Features

The IWTxT Wireless 4-20 mA Transmitters has been designed to provide an excitation voltage to any standard 4-20 mA transmitter, take a reading and transmit the value to one of the IWR range of receivers where the value can be outputted as either a 4-20 mA or 1-5 V dc signal, or to an IWR-PORT or IWR-USB receiver.

The IWR-1 has a single output and the IWR-5 has five outputs, each of which can be linked to an IWTxT transmitter.

The IWTxT current transformer transmitter works on the license-free 2.4 GHz band.

Ranges of up to 500 m are possible using the standard transmitter and receiver unit with the optional 3dBi antenna giving a range of up to 750 m.

The transmitter is powered by a 3.6 V lithium cell and care must be taken to insert the battery in the correct polarity.

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Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA.

CONTACT US

EUROPE

+44 (0)1202 897969

c3w_sales@sensata.com

Cynergy3 Components Ltd.

7 Cobham Road,

Ferndown Industrial Estate,

Wimborne, Dorset,

BH21 7PE, United Kingdom

USA

+1 310 561 8092 / +1 866 258 5057

c3w_sales@sensata.com

2. UNPACKING

The instrument should be carefully inspected for signs of damage that may have occurred in transit. In the unlikely case that damage has been sustained, DO NOT use the instrument, but please retain all packaging for our inspection and contact your supplier immediately.

3. PRODUCT IDENTIFICATION LABEL

The unit delivered should be carefully inspected to ensure it is suitable for the application required. Detailed information on the product is included in the identification label and the user manual.

Please ensure, that the temperature range of the IWTxT is suitable for the intended application and that the IWTxT unit will not be subjected to temperatures and/or temperatures greater than those specified in this manual.

4. INSTALLING/CHANGING THE BATTERY

A Lithium 3.6 V battery is included inside the IWTT transmitter. The battery may be changed at any time, but the correct polarity must be observed at all times! After the battery has been changed, the unit should be switched on using the SW3 push button and then SW1 should be pushed for 5s. This is to ensure the battery life count is reset correctly when a new battery is installed.

The internal LED will flash 5 times to indicate this procedure has been carried out successfully.

The battery life is determined by the rate the transmitter sends the Temperature value to the receiver, this update rate can be selected using Dip Switch 1 and the default value is 10s.

A second set of batteries is used to provide the excitation supply to the external 4-20 mA transmitter. Polarity should again be observed when installing this battery pack.

Please dispose of all batteries as specified by the legislator according to the Closed Substance Cycle and Waste Management Act or country regulations.



**! WARNING !
MAKE SURE THE CORRECT
BATTERY POLARITY IS OBSERVED!**

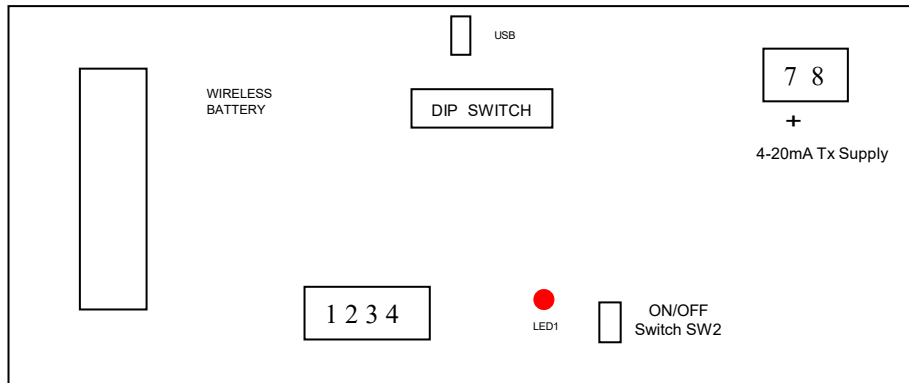


**! WARNING !
INCORRECT BATTERIES MAY DAMAGE THE UNIT
USE ONLY THE SPECIFIED BATTERIES**

5. SETTING UP THE IWTxT WIRELESS TRANSMITTER

The IWTxT instrument is shipped in a default configuration which allows the unit to connect with any default IWR receiver unit and transmit the measured 4-20 mA signal every 1 minute simply by switching the unit on using S2 on the internal circuit board.

If a different update rate is required, or a different network frequency channel is required these parameters can be selected using the 12-way DIP Switch as detailed below:



Dip Switches 1, 2, & 3 on the 12 -way Dip Switch selects the RF Network the IWTxT will transmit on. The default network for both the IWTxT transmitter and IWR receiver is network 1.

RF NETWORK	1	2	3
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

Switches 4, 5, & 6 select the Transmission rate of the unit. This effectively sets how often the 4-20 mA value is sent to the receiver. Note that selecting a transmission rate of below 1 minute substantially reduces the battery life.

At 1 and 5 second rate, a power save option is available (on by default) that changes the transmit time to every 30 seconds if the IWR is switched off or out of range for more than 3 minutes. This option can be changed using the IWT-SET program.

Transmit time	4	5	6
10 seconds	0	0	0

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EUROPE
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5 seconds	0 0 1
1 seconds	0 1 0
30 seconds	0 1 1
60 seconds	1 0 0
2 minutes	1 0 1
5 minutes	1 1 0
10 minutes	1 1 1

Switches 7 and 8 control the settling time of the 4 – 20 mA transmitter. This is the time that the transmitter is powered up from the transmitter supply before a reading is taken.

Settling time	7 8
0.5 seconds	0 0
1 second	0 1
2 seconds	1 0
4 seconds	1 1

Switches 9,10,11,12 control the channel number

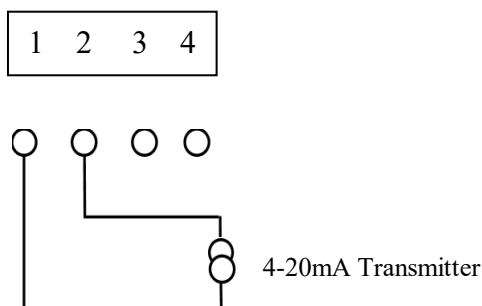
Channel	9	10	11	12	Channel	9	10	11	12
1	0	0	0	0	9	1	0	0	0
2	0	0	0	1	10	1	0	0	1
3	0	0	1	0	11	1	0	1	0
4	0	0	1	1	12	1	0	1	1
5	0	1	0	0	13	1	1	0	0
6	0	1	0	1	14	1	1	0	1
7	0	1	1	0	15	1	1	1	0
8	0	1	1	1	16	1	1	1	1

The IWTxT transmitter is now set up and ready to be used. Install the unit as required and switch the unit ON using SW2. Pushbutton switch S1 can be pushed to force the unit to transmit its current temperature and LED 1 will flash twice if the transmission has been received and acknowledged by an IWR receiver unit.

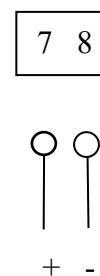
If the unit has successfully transmitted the output of the connected receiver unit will output a value reflecting the 4-20 mA level of the transmitter connected.

5.1 Connections

4-20mA Transmitter Connection



Internal/External Tx Supply Connection



5.1 Battery life +

The update rate and settling time affects how long the Excitation and Wireless batteries will last. The following gives the battery life in days with various configurations.

4-20 mA Transmitter Excitation Battery Life

2 off PP3 10.8 V Lithium Thionyl Chloride batteries in series (assume 1000 mAh capacity)

Sleep Time (Sec)	60	120	300	600	30
Sleep Time (Min)	1	2	5	10	0.5
Settling Time (S)					
0.5	440	882	2205	4412	220
1	222	445	1112	2225	110
2	112	225	565	1130	58
4	58	118	292	582	30

So, with a settling time of 0.5 seconds, and a sleep time of 120 seconds, the expected excitation battery life is 882 days.

Wireless Transmitter Battery Life

AA Lithium Thionyl Chloride battery (assume 1000 mAh capacity)

Sleep Time (Sec)	60	120	300	600	30
Sleep Time (Min)	1	2	5	10	0.5
Settling Time (S)					
0.5	1773	2283	2759	2965	1225
1	1308	1858	2485	2799	822
2	859	1355	2072	2517	496
4	509	878	1556	2095	276

So, with a settling time of 0.5 seconds, and a sleep time of 120 seconds, the expected AA battery life is over 6 years.

5.2 Operation of the IWTxT 4-20 mA Wireless Transmitter

Remove the pull tab from the battery terminal.

Push and release the push button to wake the sensor and observe the LED.

- **LED does a double green flash – successful send**

The button wakes the sensor up and the first green flash is seen. The sensor powers up the mA transmitter and waits for the settling time. The mA value is then read and transmitted to the IWR Receiver. If the data send is successful a second green flash is seen. It will now sleep for the sleep time, then wake and repeat this process.

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CONTACT US

EUROPE

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- **LED does a single green flash – failed to send**

The button wakes the sensor up, and the first green flash is seen. After the settling time and reading of the mA value, it sends the data to the IWR Receiver. The data send failed, so there was no second flash. It will now sleep for the sleep time, then wake and repeat this process.

- **LED does one or two long red flashes followed by six short red flashes – successful join to network**

When the IWTxT is first switched it tried to join a network and was successful. It will now sleep for the update rate time, then wake, read the input, and send the data to the IWR Receiver.

- **One or two long red flashes – failed to join the network**

When the IWTxT is first switched on it tried to join a network but in this case, it was unsuccessful. The IWTxT will now sleep for eight hours to conserve battery life before waking up and trying to join again. The push button can be used to wake it up to force it to try and join a network again.

5. Push button use

If the push button is pushed and released quickly the sensor is woken from sleep to read the mA value. The led will flash green once or twice as described above.

If the push button is pushed and held for 5 seconds the Z-Head can be forced to leave the network, it was joined to. It will then try and join again, indicated by long then short red flashes as described earlier. This action may be required if routers are used in the network.

6. TROUBLE-SHOOTING GUIDE

Problem encountered	Possible Causes
LED1 doesn't flash when pushbutton SW1 is pressed	Unit not switched on, switch on using SW2. The battery is not installed correctly. The battery needs replacing.
LED1 only flashes once when SW1 is pressed	IWR receiver not switched on. IWR receiver is not set up for the same RF network. IWR receiver not within range of the transmitter. If an IWR-1 receiver is used, ensure that the transmitter is set to Tx Channel 1
Output from the IWR receiver isn't equivalent to the 4-20mA transmitter being monitored	IWR receiver set up incorrectly, see IWR user manual for further details. Check that the green external LED on the receiver is flashing when the transmitter push button is pressed as the receiver may be out of range.

7. SYSTEM PART NUMBERS

Part Number	Range	Connection
IWTxT-000	4-20 mA with Tx Supply	1. +ve 2. -ve

Part Number	Number of Output Channels
IWR-1	One
IWR-5	Five
IWR-USB	Data from 128 channels
IWR-PORT	Data from 128 channels
IANT-3	3 dBi Antenna
IoT-GATEWAY-000	Data From 128 Channels

System Performance

Accuracy (non-linearity & hysteresis)	<±1.0 %
Setting Errors	Zero & Full Scale, <± 1.0%
Media mV ac range	0 to 500mV ac (depending on range selected)
Ambient Temperature	-20 to +80 °C
Storage Temperature	-20 to +80 °C
Weight	310 g
RF Transmitter	Contains FCC W70MRF24J40MDME
Power Requirements	Lithium Thionyl Chloride C 3.6 V Cell
Battery Life	5 Years (10s transmission rate)
Dimensions	79 mm x 79mm x 52mm (L x W x D)
Mounting	Any Orientation

8. SPECIFICATIONS

United States FCC

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WIRELESS 4-20mA TRANSMITTER OPERATING MANUAL

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- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Warning: Changes or modifications not expressly approved by Cynergy3 could void the user's authority to operate the equipment.

RF Exposure

Contains FCC ID: W70MRF24J40MDME

In this equipment, the antenna supplied is a PCB antenna and an alternative antenna must not be used.

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Canada (IC)

English

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of the type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

French

Le présent appareil est conforme aux CNR d'industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Europe

The MRF24J40MD/ME wireless module used in this equipment has been tested and is in conformity with the essential requirements and other relevant requirements of the RED Directive 2014/53/EU. That module is in conformity with the following standards and/or other normative documents:

Certification	Standards	Article
Safety	EN60950-1-2006 / A11:2009 / A1:2010 / A12:2011 / A2:2013	(3.1(a))
Health	EN 300 328 V2.1.1 / EN 62479:2010	(3.1(a))
EMC	EN 301 489-1 V2.1.1 EN 301 489-1 V2.2.0 EN 301 489-17 V3.1.1 EN 301 489-17 V3.2.0	(3.1(b))
Radio	EN 300 328 V2.1.1	(3.2)

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USA

+1 310 561 8092 / +1 866 258 5057

c3w_sales@sensata.com