



## 4-20 mA Radio receiver

### Datasheet

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Tecnosoft s.r.l.

Via Galvani, 4 20068 Peschiera Borromeo (MI) ITALY

Tel.: +39 02 26922888 Fax: +39 02 26922875

E-Mail (support): [support@tecnosoft.eu](mailto:support@tecnosoft.eu) Web: <http://www.tecnosoft.eu>

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## Description

The 4-20 mA Radio receiver is an optoisolated 2 channel module to convert temperature, read by TecnoSoft TempStickRadio and Intelligent Transducer connected to Radio Node, to 4-20 mA current output. The module can be configured using an PC and USB port. Configuration set the conversion between Celsius degree and outputted current for each of the two channels.

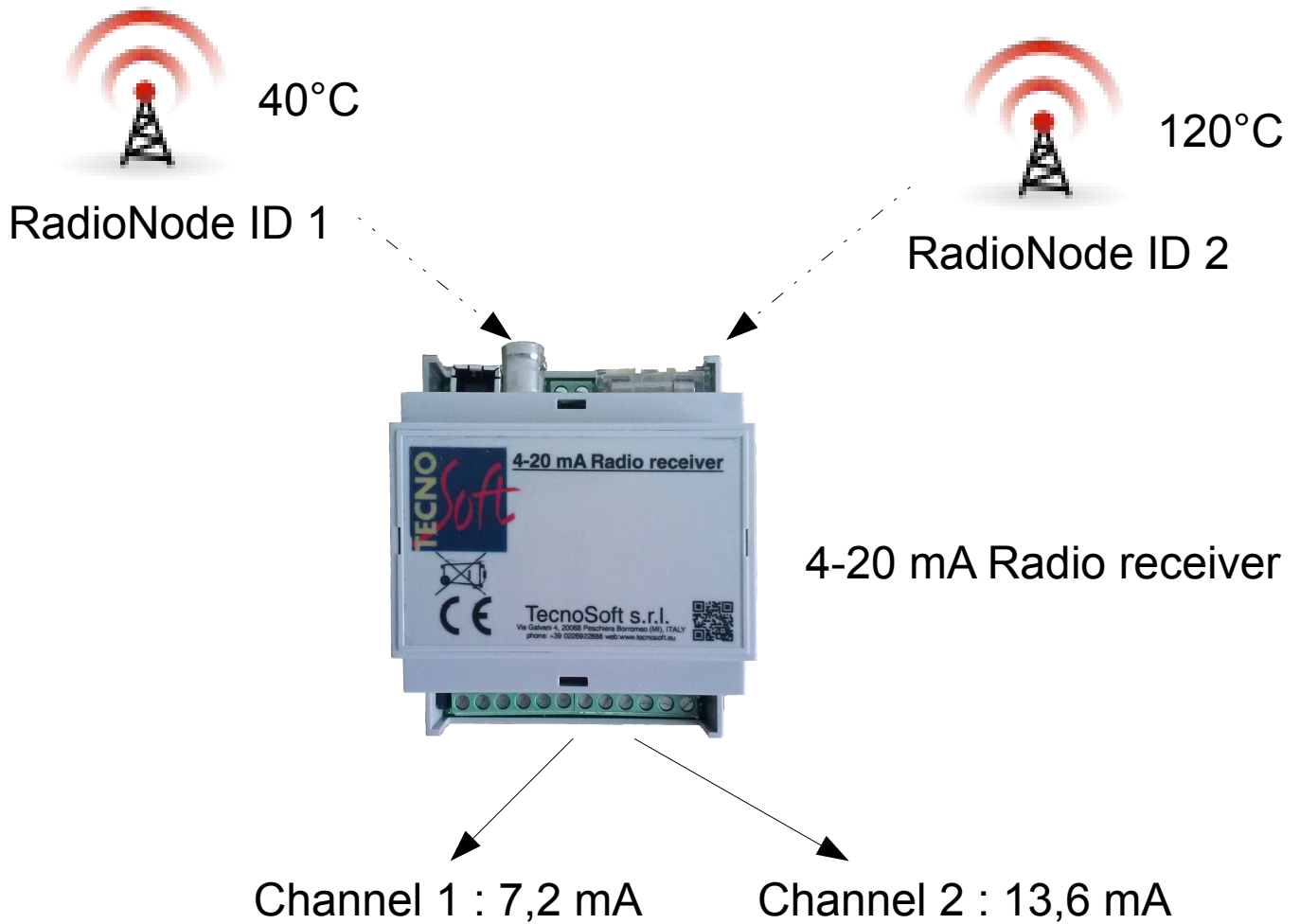
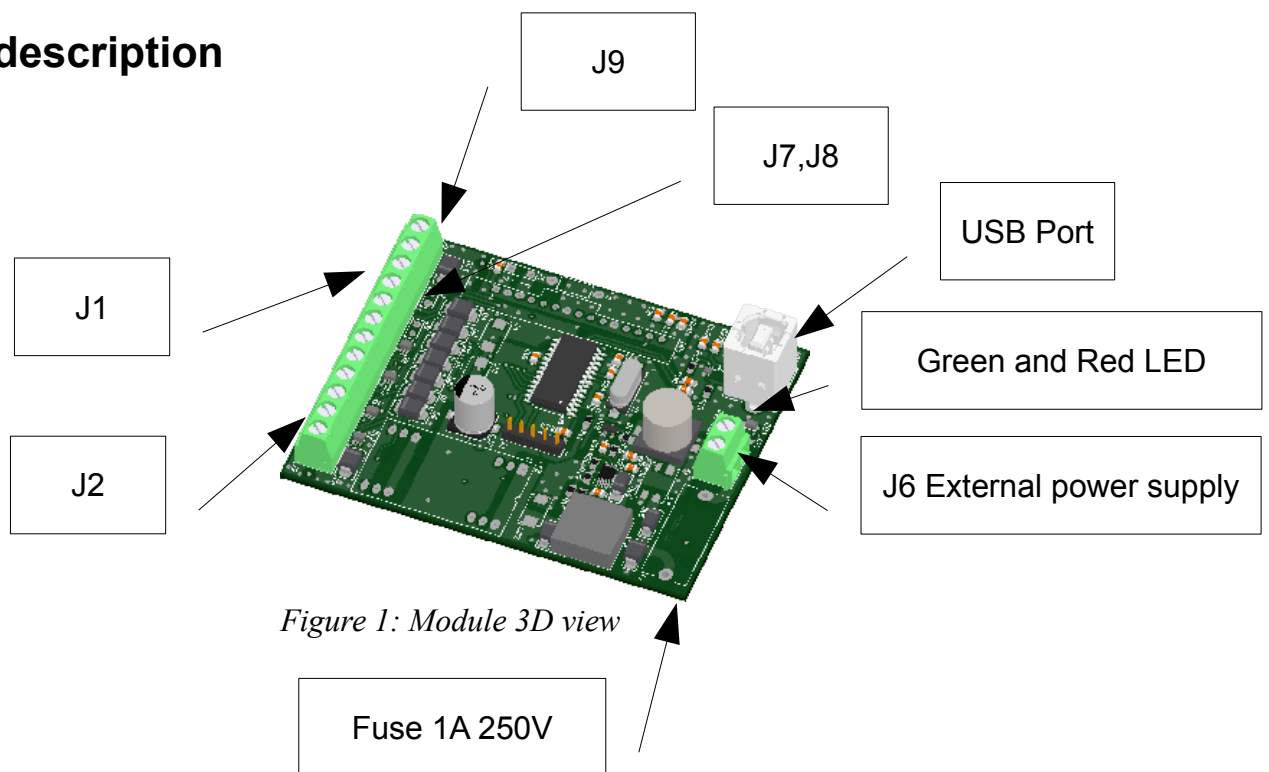


Figure 1: General function diagram (Values are for sample purpose only)

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## System description



## Technical description

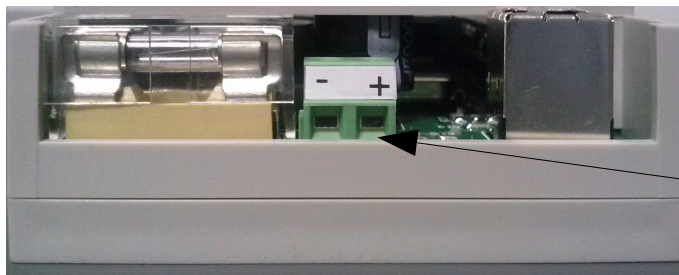
Charateristic	Value
Power supply (External)	20-30 Volt DC 150 mA
Power supply (Field)	20-24 Volt DC 150 mA
Current output	0 mA to 20 mA $\pm 0.01$ % FSR typical total unadjusted error $\pm 2$ ppm/ $^{\circ}$ C maximum
Operating temperature range	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Radio operating frequency	433 Mhz
Radio range	Up to 100mt on open field

## Connecting module

Power supply can be provided in two ways: Field power and external power.

### **External power**

Connect power supply range from 12 to 24 Volt DC to Connector J6 (see figure for polarity)



J6 External power supply

Figure 2: Upper connection view

### Field power

Field power can be provided connecting 12-24 Volt DC to Connector J1 (Pin 1 Positive Pin 2 Negative)



J1 Field power supply  
Pin 1 Positive Pin 2 Negative

Figure 3: Bottom connection view

### Connector description

#### J6 External power connector

Pin	Description
+	Positive external power supply (12-24 Volt) [+24Vin]
-	Negative external power supply (Ground) [GND EXT]

#### J1 Field power connector

Pin	Description
1	Positive field power supply (12-24 Volt) [+24VField]
2	Negative field power supply (Ground) [GND Field]
3	Unused
4	Current gnd [GND1] (same as GND Field if Jumper J9 short)
5	Unused
6	Unused

#### J2 Current output connector

Pin	Description
7	Unused
8	Channel 1 current output [Iout 1]
9	Unused
10	Unused
11	Unused
12	Channel 2 current output [Iout2]

### Jumper configuration

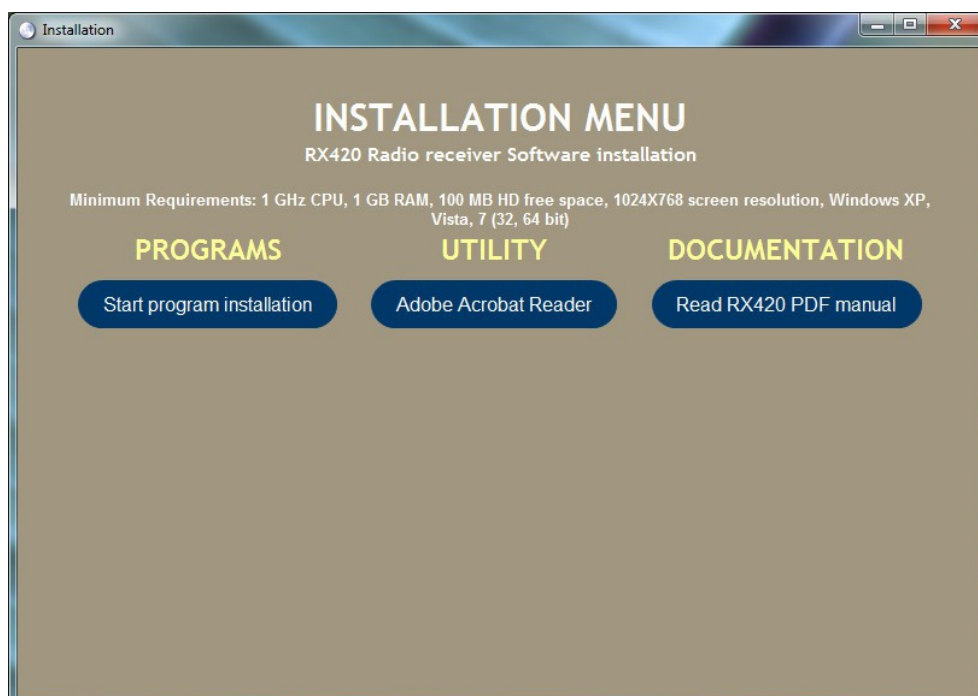
On the module are present three jumper J7, J8 and J9

Jumper	Description
J7	Must be Closed (default)
J8	Must be Closed (default)
J9	Connects GND1 to GND Field. For field supply configuration must be shortened, for external power supply configuration must be open.

### Software installation

To start program software installation insert the provided CD rom. After a while the main setup program window will appear. If no program is started browse to CD rom and launch autostart.exe.

Press the Start program installation button and follow instruction.



## Configuring module

Module can be configured to receive from one ore to transmitter, at each transmitter is assigned a current output channel, channels can be configured convert temperature to mA according to a linear conversion.

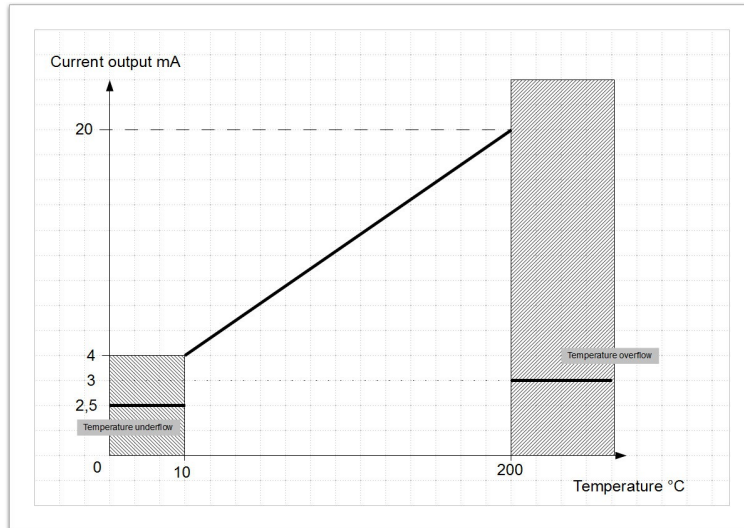


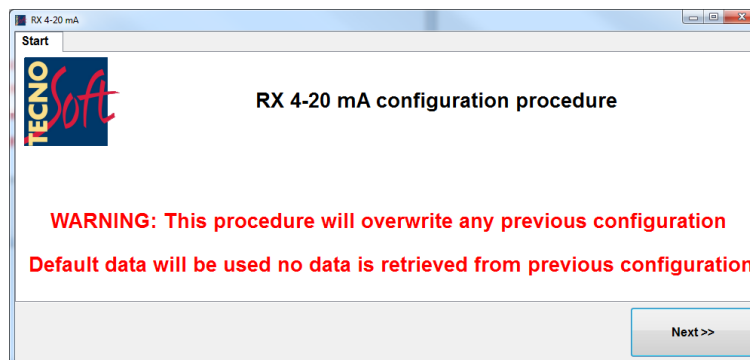
Figure 4: Linearization graph

The module will convert Celsius temperature in 4-20 mA according to a linear conversion the configuration require to provide temperature at which module will output 4 mA and temperature at which module will output 20mA these two temperature will also be used to generate underflow and overflow error currents (2,5 and 3 mA see Error codes for further information). See Linearization graph figure.

## Program start

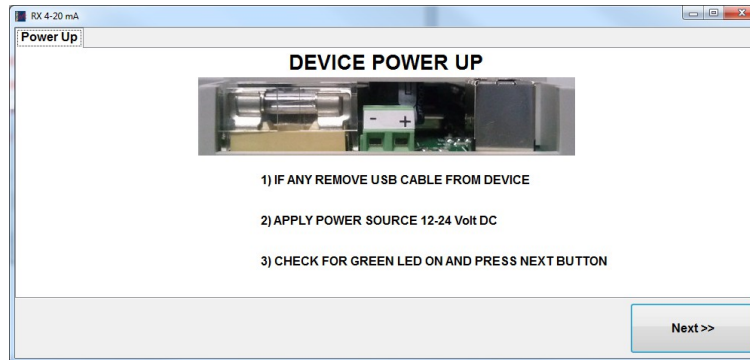
To configure module the module must be connected to a PC using an USB A-B cable (Not supplied). Locate on your PC desktop the RX420 program Icon or browse Start Menu to Programs->TecnoSoft->RX420 an launch the program. A step by step wizard will guide you to the configuration of module.

The following window will be displayed:



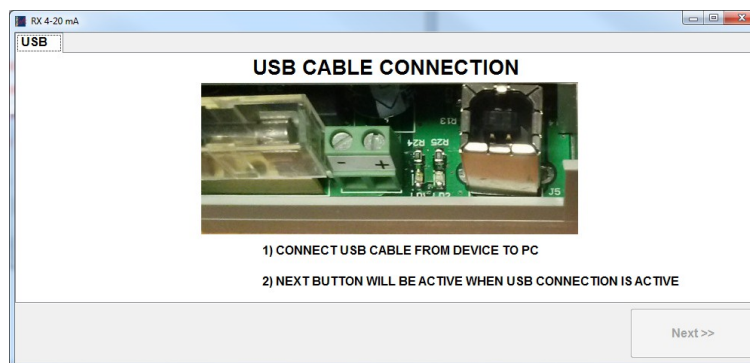
Press next button to begin configuration. You will be required to connect power (see Connecting module for power supply type).

## Power up module



If power is correctly connected the Green LED will switch on. Press Next to continue configuration.

## USB Cable connection



An USB A-B cable must be connected (The USB cable is not provided) to the module. Only if correct connection is established the next button will be enabled. Once the connection is made press next button to continue.

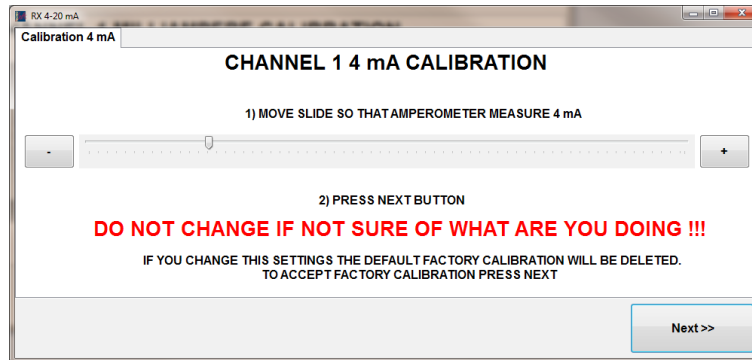
## Channel 1 milliampere calibration



Connect an amperometer to test current output.

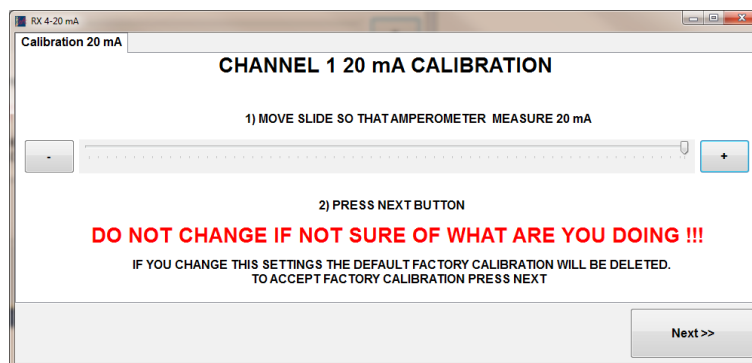


## 4mA Calibration



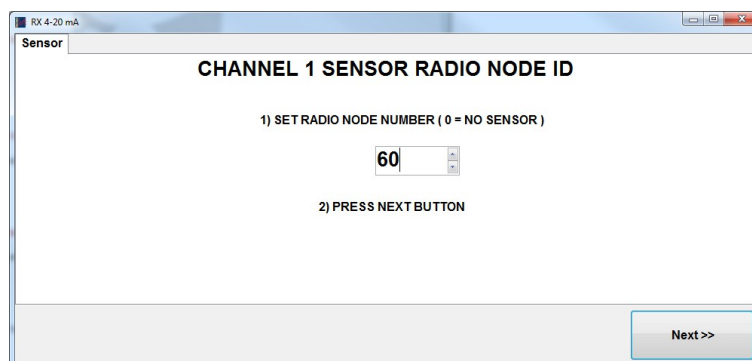
This calibration is normally not required. If you have connected an amperometer to the correct pin you will measure 4mA. If a different value of current is outputted move the slider to correct out put up to measure 4mA on the connected amperometer.

## 20mA Calibration



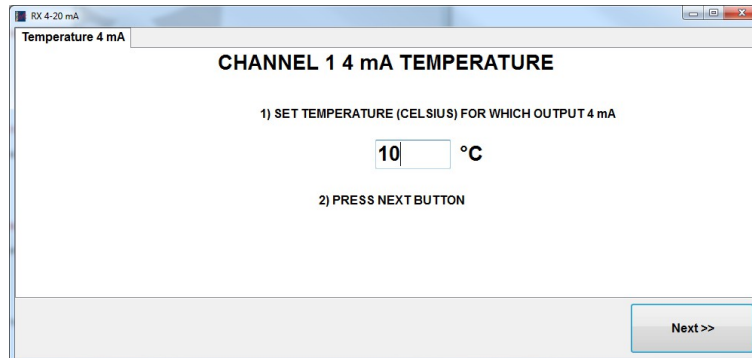
Note: Radio transmitter configuration is not covered by this manual check Tempstick Radio Manual to configure transmitters.

## Pairing radio transmitter



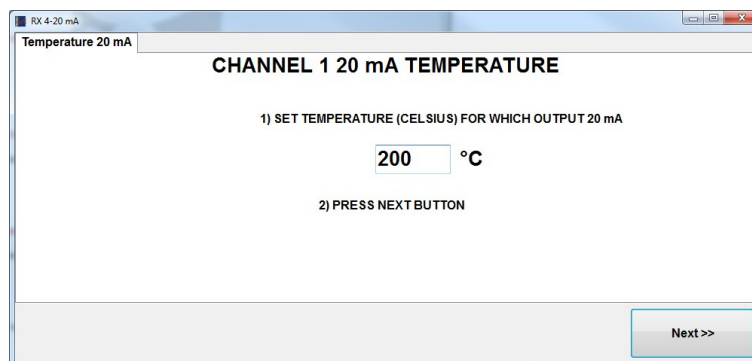
Every radio transmitter has an associated "Radio node ID" (you can find radio node ID printed on the label attached to TempstickRadio temperature sensor). The Radio node ID is a number 1 to 65535. for everyone of the two module channel you can assign a different Radio node ID. Press Next button after selecting radio node ID. If this channel is not to be used set 0 as radio node ID.

## 4 mA Temperature value



To linearize the conversion from Temperature to mA the temperature at which module will output 4 mA value is required. If sensor measure a temperature lower than this value an underflow error will be generated.

## 20 mA Temperature value



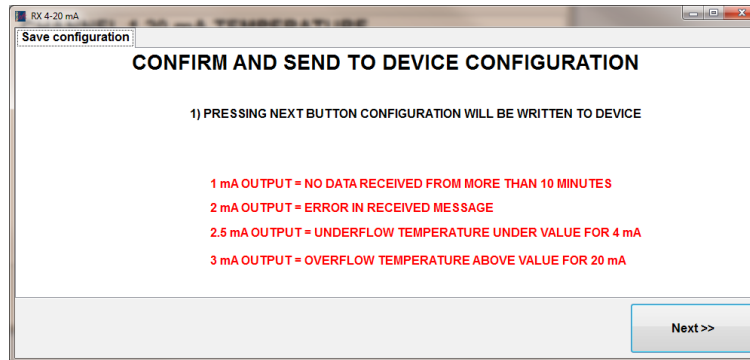
To linearize the conversion from Temperature to mA the temperature at which module will output 20 mA value is required. If sensor measure a temperature higher than this value an overflow error will be generated. Pressing Next button will configure channel 2

## Channel 2 configuration



The second channel configuration is similar to channel 1 except for the connection pin to be used. If channel 2 is not required press Next button till the end of configuration process.

## Save configuration



Pressing Next button will write configuration in the module. After the confirmation message unplug USB cable.

## Error codes

Current output values lower than 4 mA are used to report errors. The following table shows possible errors. Each channel has its own errors.

mA	Description
1	No data received from more than 10 minutes
2	Error in received message
2,5	Underflow temperature (temperature under minimum temperature for conversion)
3	Overflow temperature (temperature over maximum temperature for conversion)