# 200 MKIII SERIES
# Tachometers

## Model 200T/DC

## User Guide

*Reliability, Guaranteed*

Logitech Electronics Limited
e: sales@logitechelectronics.com
t: +44 (0)1952 820444

*Design and Manufacture of Electronic Systems and Instrumentation. Supply of Sensors and Transducers*

www.logitechelectronics.com
Lane End | Church Aston | Newport | Shropshire | TF10 9JJ | UK

# Specification

| | |
|---|---|
| **Display** | 4 decade 7-segment high brightness red LED, 14mm high |
| **Display Update** | Programmable via display to 100ms, 250ms, 500ms or 1s |
| **Decimal point** | Programmable via display |
| **Scaling** | Programmable via display, retained in non-volatile memory. |
| **Signal inputs (A and B)** | Protected to 100V |
| **Standard sensitivity mode** | From 90mV @ 10Hz, 170mV @ 1kHz, 870mV @ 10kHz |
| **High sensitivity mode** | From 12mV @ 10Hz, 20mV @ 1kHz, 70mV @ 10kHz |
| **Frequency Mode** | 1Hz minimum (standard model) |
| | 40kHz maximum with single input (200Hz in Reed Mode) |
| **Ratio Mode** | 1Hz minimum (standard model) |
| | 20kHz maximum with dual inputs (200Hz in Reed Mode) |
| **Impedance** | 15kΩ minimum |
| **Accuracy** | <0.01% with square wave at 1V peak |

**Optional Outputs**

| | | |
|---|---|---|
| **2 x Configurable Alarms** | 60Vdc maximum, 200mA maximum (open collector) | |
| **Digital Pulse** | Pulse to supply, 200mA maximum | |
| **Analogue Voltage & Current** | User selectable as | 0 - 5V, or 1 - 5V, or 0 - 10V, or 2 - 10V |
| | | 0 - 20mA, or 4 - 20mA |
| **Connections** | Screw terminals on rear panel. | |
| **Power requirement** | | |
| **DC** | 12 to 30Vdc via power connector or Vs and 0V terminals | |
| **Temperature range** | **Operating** | -20°C to +70°C |
| | **Storage** | -20°C to +85°C |
| **Dimensions** | 96 x 48 x 72mm (panel cut-out 92 x 43mm). | |
| **Weight** | 150g | |

# General description

The 200T MKIII SERIES Tachometers are 4-decade seven segment high brightness red LED display instruments. They are built into half DIN (96 mm x 48 mm) panel mounting housings and operate on 12V-30Vdc power supplies, or from 110Vac/230Vac supply using the supplied power adapter.

Two signal inputs are available, Input A and Input B. The two inputs share a common input mode setting and sensitivity value (see page 6). If using only a single input signal then this should be connected to Input A. The inputs can be set to operate in one of three modes: standard sensitivity, high sensitivity and reed switch.

200T MKIII SERIES Tachometers are available with factory fitted options which must be specified when ordering. These include alarms, analogue voltage and current outputs and digital output. See the Specification section for more detail on these options. Additionally, Logitech will customise the programmed operating modes of these Tachometers to suit specialised applications. Many variations on the standard software have been developed – please contact the Sales Office if this service is required.

## 200T MKIII SERIES Variants

**200T** - Standard 200 MKIII Series Tachometer

**200TL** - 200 MKIII Series Tachometer with Alarm Outputs

**200TA** - 200 MKIII Series Tachometer with Analogue Voltage/Current Output

**200TAL** - 200 MKIII Series Tachometer with Analogue Voltage/Current & Alarm Outputs

**200TD** - 200 MKIII Series Tachometer with Digital Output

**200TDL** - 200 MKIII Series Tachometer with Digital & Alarm Outputs

## Panel

The panel has two touch switches, select and increment. The increment switch can also used to reset the count in the 200C (counter) and 200TC (combined tachometer and counter) models.



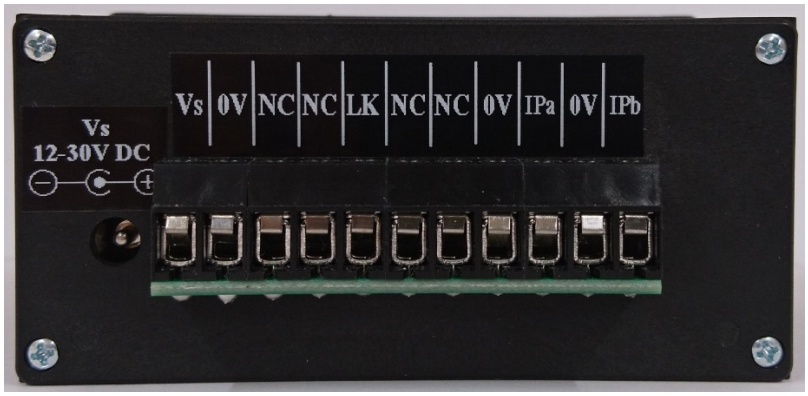

## Protecting Settings (Tamper Protection)

The touch switches can be disabled to prevent the unit's settings from being modified. Once the lock is activated, it is not possible to change any of the units settings, or to adjust the sensitivity of the inputs. With the exception of 200TD and 200TDL which lock via the settings menu, all 200 Series MK3 models have a lock terminal (marked "LK") on the rear panel. A wire should be connected between LK and 0V in order to lock the unit. If the unit is powered on when the connection is made, the power must be cycled in order to activate the lock.

When the lock (LK) terminal is connected to 0V on power-up, the touch switches are disabled. To release the lock, disconnect the LK input from 0V and cycle the power.

Note: A unit that has been factory reset will attempt to enter set mode on power up. If the lock is active, the unit is prevented from doing so and will not start correctly. Remove the connection between LK and 0V then cycle the power. The unit can then be configured.

## Rear panel terminals




1. **Vs** = supply voltage, passed through from power connector, or apply 12-30V DC to power unit
2. **0V** = 0V/ground passed through from power connector or connect to 0V if powering unit from rear terminals
3. **NC** = No Connection
   **Io** (200TA/200TAL) = Analogue Current Output
4. **NC** = No Connection
   **Vo** (200TA/200TAL) = Analogue Voltage Output
5. **LK** = Lock input, connect to 0V to disable front panel touch switches and prevent the settings from being tampered with.
   **Dout** (200TD/200TDL) = Digital Pulse Output
6. **NC** = No Connection
   **AI1** (200TL/200TAL/200TDL) = Configurable Alarm Output 1 (Open Collector)
7. **NC** = No Connection
   **AI2** (200TL/200TAL/200TDL) = Configurable Alarm Output 2 (Open Collector)
8. **0V**
9. **IPa** = Input A
10. **0V**
11. **IPb** = Input B

# Programming the instrument

**D = Displayed Value**
**R = Rate (Frequency)** **Ra = Input A Rate** **Rb = Input B Rate**
**S = Scaling Factor**

## Choice of CALC setting

For applications where a low number of pulses per second will be displayed as a speed (RPM etc) use multiplication mode (MUL) where **D = R x S**.

For applications where there are a large number of pulses per displayed unit, such as flow metering applications, use division mode (DIV) where **D = R / S**. Then, for flow metering applications, **S** is simply programmed as the K-FACTOR of the flowmeter.

If the RATIO function is needed, then the mode setting should be changed from A to A/B and the displayed value is then calculated as follows:

MUL: **D = (Ra/Rb) x S**

DIV: **D = (Ra/Rb) / S**

## Calculating a scaling factor

The displayed value is calculated as **D = R x S** or **D = R / S** where **S** is the scaling factor and **R** is the measured rate of input signal in pulses per second (pps) or Hertz (Hz). The scaling factor is most easily calculated by considering the maximum input frequency expected and by deciding what the display should read at this frequency.

The scaling factor is then calculated as:

MUL: **S = D / R**

DIV: **S = R / D**

The scaling factor range is 0.001 to 9999 and it may be necessary to round off the calculated value to fit within this range.

## Changing Settings

On first power up from factory settings, the unit will enter set mode. Set Mode can also be accessed after initial configuration by holding the select touch button ← (A) and then pressing the increment touch button ↑ (B). In set mode press select ← to move between digits and between settings and increment ↑ to modify the value. Hold the select touch button ← (A) and then press increment ↑ (B) at any time to update the settings and return to Run Mode.

Text highlighted in red below shows what will appear on the display. Settings will be displayed in the order below. If the unit does not support the listed setting it will not be displayed and will instead move to the next applicable setting in the sequence. Once all settings have been stepped through the unit will return to setting 1. The unit will remain in set mode until run mode is entered as described above.

1. **MODE** – Set frequency mode [Default A]
   Press increment ↑ to select from the below options.
   **A** = Frequency A
   **A/B** = Ratio A/B

2. **IPUT** – Set input mode [Default HS]
   Press increment ↑ to select from the below options.
   **STD** = Standard sensitivity (from 100mV)
   **HS** = High sensitivity (from 10mV)
   **REED** = Reed switch (max. input frequency 200Hz)

3. **CALC** – Set calculation mode [Default DIV]
   Press increment ↑ to select from the below options.
   **MUL** = Multiply by scaling factor
   **DIV** = Divide by scaling factor (useful for entering 'K' factor directly)

4. **SCLE** - Set scaling factor. [Default 1.000]
   Enter the scaling factor to be applied to the measured frequency value. Depending on the calculation mode selected the measured frequency will either be multiplied or divided by this value.
   Press select ← to select digit and increment ↑ to change value. After cycling through all four digits the decimal point position can be altered by pressing increment ↑.
   Set all digits to 0 to restore default settings (the position of the decimal point does not matter when performing a restore to default).

5. **DSDP** – Set display decimal point position [Default 1DP]
   Select the number of decimal points to display the scaled frequency value to. The decimal point position can be altered by pressing increment ↑. This limits the range of values that can be displayed. The unit will display "high" when the calculated value is greater than can be displayed on the number of digits available.
   NOTE: This setting is now independent of the scaling factor value, e.g. a setting of 1 decimal place does not require the scaling factor to be multiplied by 10.

6. **AL 1** – *(200TAL/200TL/200TDL only)* Set alarm output 1
   Press increment ↑ to select from the below options.
   **HI** = High alarm (output switched to 0V when scaled frequency value ≥ value)
   **LO** = Low alarm (output switched to 0V when scaled frequency value ≤ value)
   Press select ← once the alarm type is selected to then set the alarm value.
   Enter the scaled frequency value below which the low alarm will be activated.
   Press select ← to select digit and increment ↑ to change value. The decimal point position is locked to the display value set under DSDP.

7. **AL 2** – *(200TAL/200TL/200TDL only)* Set alarm output 2
   Press increment ↑ to select from the below options.
   **HI** = High alarm (output switched to 0V when scaled frequency value ≥ value)
   **LO** = Low alarm (output switched to 0V when scaled frequency value ≤ value)
   Press select ← once the alarm type is selected to then set the alarm value.
   Enter the scaled frequency value below which the low alarm will be activated.
   Press select ← to select digit and increment ↑ to change value. The decimal point position is locked to the display value set under DSDP.

8. **AOUT** – *(200TA/200TAL only)* Set the analogue output mode [Default OFF]
   Press increment ↑ to select from the below options.
   **OFF** = Analogue output off
   **0-5** = 0V to 5V
   **1-5** = 1V to 5V
   **0-10** = 0V to 10V
   **2-10** = 2V to 10V
   **0-20** = 0mA to 20mA
   **4-20** = 4mA to 20mA
   If one of the voltage output modes is selected the analogue voltage output will be on terminal "Vo".
   If one of the current output modes is selected, the analogue current output will be on terminal "Io".

9. **REF** – *(200TA/200TAL only)* Set the reference (minimum) value for the analogue output. [Default 0.000] Enter the displayed (scaled) value, below which the analogue output will be at the minimum for the selected voltage/current range.
   Press select ← to select digit and increment ↑ to change value. After cycling through all four digits the decimal point position can be altered by pressing increment ↑.

10. **FS** – *(200TA/200TAL only)* Set the full scale (maximum) value for the analogue output. [Default 1000.] Enter the displayed (scaled) value, above which the analogue output will be at the maximum for the selected voltage/current range.
    Press select ← to select digit and increment ↑ to change value. After cycling through all four digits the decimal point position can be altered by pressing increment ↑.

11. **DOUT** – (200TD/200TDL only) Set the digital frequency scaling factor.
    This can be set between 0 (digital output off) and 0.5 (digital output frequency equal to half of the input frequency). Values greater than 0.5 will be set to 0.5 automatically.
    Press select ← to select digit and increment ↑ to change value. After cycling through all four digits the decimal point position can be altered by pressing increment ↑.

12. **UPD** – Set the display and analogue/digital output update interval. [Default 1000]
    Press increment ↑ to select from the below options.
    **100** = 100ms (0.1s)
    **250** = 200ms (0.25s)
    **500** = 500ms (0.5s)
    **1000** = 1000ms (1.0s)

13. **LOCK** – (200TD/200TDL only) Lock settings
    Press increment ↑ to select from the below options.
    **NO** = Lock is disabled
    **YES** = Settings are locked and the unit will no longer enter set mode
    To disable the lock, follow the procedure for entering set mode during the "Init" stage on power-up.

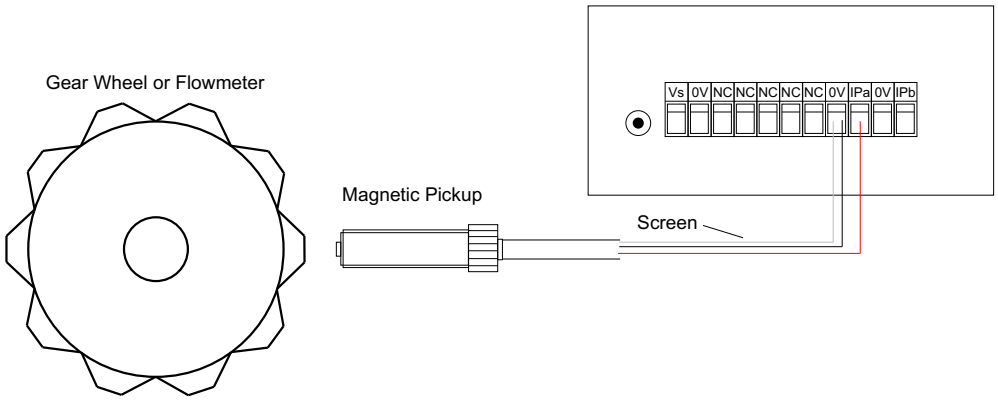
## **Sensitivity** [Default 45]

Press and hold the increment button ↑ (B), then press the select ← button (A) to enter sensitivity mode. The display will show **SENS** and then the current value is displayed. Sensitivity ranges from 0 (least sensitive) to 63 (most sensitive). Press select ← to reduce the value or increment ↑ to increase it. After 2s of neither button being touched the unit will apply the selected sensitivity value and return to run mode. It is recommended that the sensitivity level is set only as high as necessary to obtain a steady signal. This minimises the risk of detecting spurious signals.

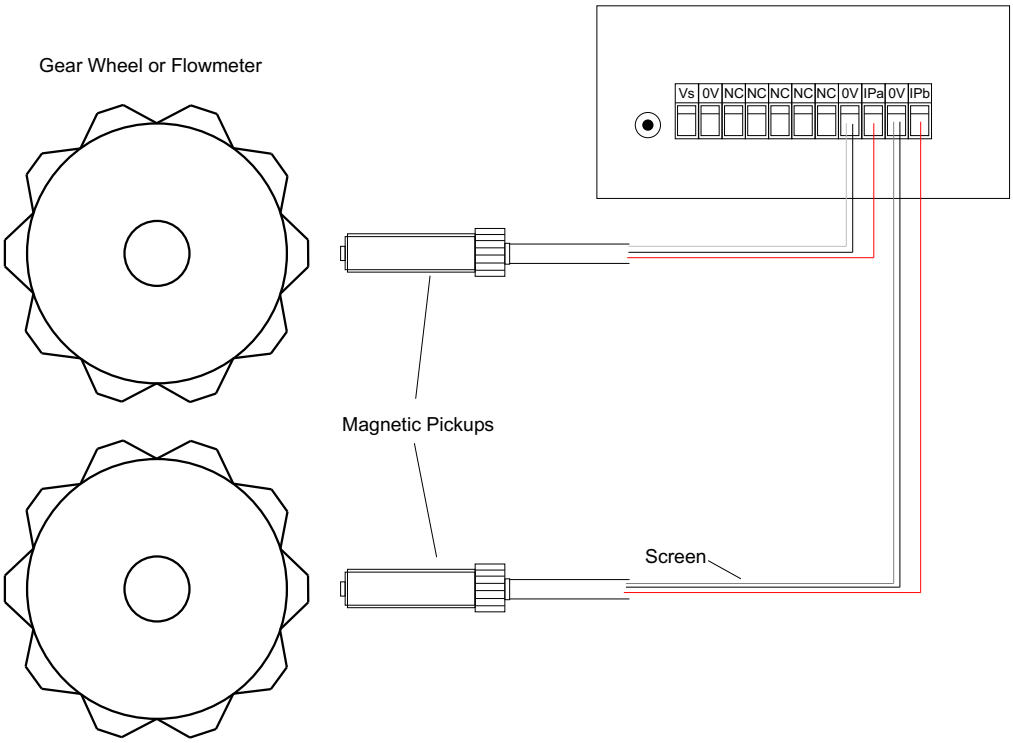
# Variable Reluctance Magnetic Pickups

Set input type (IPUT) to standard sensitivity (STD) or high sensitivity (HS) depending on target diameter and rotational speed. Connect the cable screen and one of the two wires from the magnetic pickup to the common 0V terminals (shown as the black wire below). Connect the other wire from the magnetic pickup to the input. Adjust sensitivity to ensure that the correct value displayed at the minimum rotational speed.

## Single Channel Operation

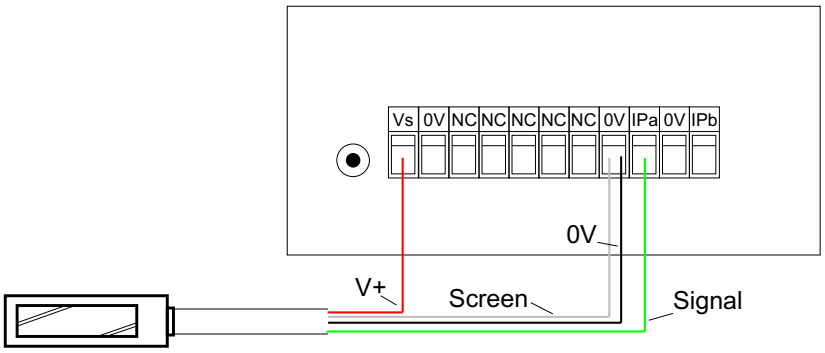



## Dual Channel (Ratio) Operation



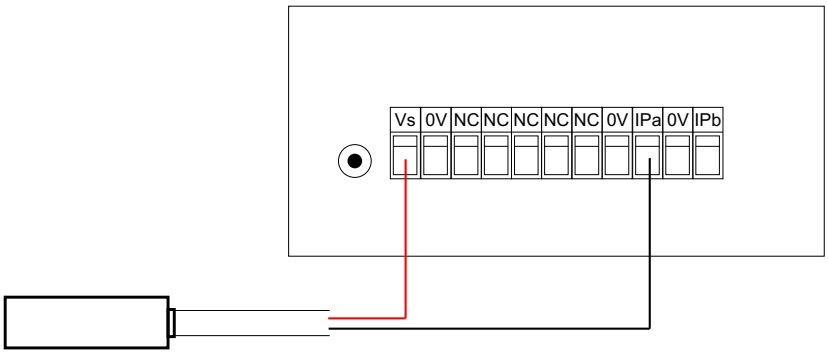
## Electronic Sensors and Rotary Encoders

Set input type (IPUT) to standard sensitivity (STD). The sensor/encoder can be supplied from the Vs terminal, provided that the sensor is rated to operate at this voltage. The sensor/encoder's 0V connection should be made to any of the common 0V terminals, along with the cable screen if this is not connected to 0V at the sensor/encoder end. The signal should be connected to IPa for single channel operation. Adjust the sensitivity until pulses are correctly detected. As the low output from the sensor may be offset from 0V, the output may not be correctly detected at high sensitivity values. Reduce the sensitivity until the output is detected correctly.




## Reed Switch

Set input type (IPUT) to reed switch (REED). Connect one switch terminal to the supply voltage (Vs) and the other to the input terminal IPa for single channel operation. The maximum frequency is limited to 200Hz. Adjust the sensitivity until the correct value is displayed at the maximum frequency of operation.



## Electro-Magnetic Precautions

A great deal of noise immunity has been designed into the product in accordance with the EMC directive 2014/30/EU, the Electromagnetic Compatibility Regulations 2016, BS EN IEC 61000-6-2 and BS EN IEC 61000-6-4.

However, it is still vital to use good EMC (Electro-Magnetic Compatibility) techniques on installation of both this and other associated electronic equipment and sensors in order to ensure reliable operation.

It is important to note that if used with systems that radiate high levels of harmonic noise such as DC Drives, AC Inverters and Servo Drives then the levels of imposed interference can greatly exceed that of the European Standards.

In such cases it is important to ensure that mains leads are routed as far as possible from all cables carrying power to such equipment and that the supply should, if viable, be taken from a clean source. Where this is not possible, it is advisable to use a good quality mains filter mounted as close to the instrument as possible, ensuring that the cable between the filter and the instrument is kept separate from any cables carrying high levels of current or any fast-switching transients.

All signal connections to the instrument should be made using a screened lead with the screen connected to ground/0V at one end only.

## Warranty

200T MKIII SERIES Tachometers carry a two-year warranty that is only valid where there is no damage caused by accident, negligence, misapplication, or repairs/modifications attempted by unauthorised personnel. The warranty only extends to the original user.

Copyright © **Logitech Electronics Limited 2021-2022**

Document No: 200T-MKIII_hb v1.4 August 2022