

# Multichannel Recorder

# MCR-4V/4TC

Voltage / Temperature (Thermocouple)



# 4-Channel Battery Operated Data Loggers Up to 16 Channels of Simultaneous Recording

Easy Connection of MCR-4V and MCR-4TC for Synchronous Measurement of Voltage and Temperature

Trend Graph for Real-Time Data Check



Easy Touch Panel Operation

Large Capacity Internal Memory  
MCR-4V: Data logging up to 480,000 readings  
MCR-4TC: Data logging up to 960,000 readings

Electrical Isolation between Channels  
MCR-4V: Capable of measuring signals of different potentials  
MCR-4TC: Possible to directly connect the exposed thermocouple junction to the measured object

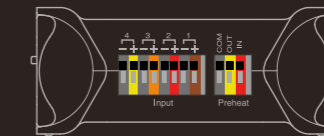
Runs on 2 AA Alkaline Batteries or USB Bus Power

SD Memory Cards for Long-Period Recording

- The latest information on memory cards whose operation has been confirmed is available on the product page of our T&D website.
- When coupling units, please prepare a memory card for each unit.

## MCR-4V Features

Preheat Function for Saving Battery Power

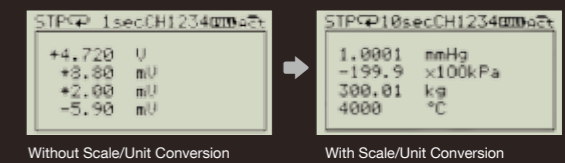


Quick and Precise Measurements Recording Interval as short as 2 msec / Resolution of 10µV

| Number of Channels | Shortest Possible Recording Interval |
|--------------------|--------------------------------------|
| 1 ch               | 2 msec                               |
| 2 ch               | 5 msec                               |
| 4 ch               | 10 msec                              |

- Number of channels determines shortest possible recording interval.
- Two recording methods: instantaneous value or average value.

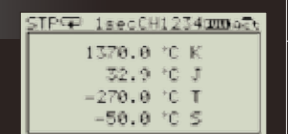
Scale and Unit Conversion for Recording and Viewing



## MCR-4TC Features

Support for Variety of Thermocouple Types (K, J, T, S, R)

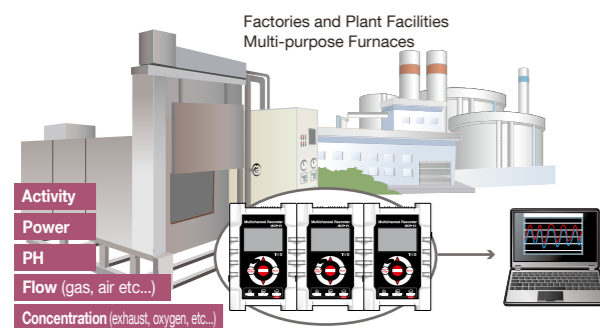
Wide Measurement Range from -270 to 1760°C (varies with sensor type)



## Application Examples

### MCR-4V

- Measure and record data for control devices and measurement instruments in factories
- Record signals from actinometers, anemoscopes and CO2 meters
- Record output signals from a variety of sensors and analyzers
- Measure voltage in electrical circuits



### MCR-4TC

- Record temperatures in pipes and ducts
- Record boiler temperatures
- Record temperatures in cooking equipment such as pans, fryers, and ovens
- For temperature management of refrigerated and frozen goods



### MCR-4V and MCR-4TC

- For temperature and pressure measurements inside slow cookers, pressure cookers, or other enclosed cooking containers.
- Measure air-conditioner gas pressure and outlet air temperature
- For measurement of engine combustion pressure and water cooling temperature.

## T&D Graph: High Performance Graph Tool

- View recorded data in colorful graph form as well as analyze data using generated cumulative values, highest, lowest, and average readings.
- Add comments and memos directly to graphs.
- Save data in CSV text format for use with spreadsheet software.





## MCR-4V Specifications

|                                   |  |
|-----------------------------------|--|
| Measurement Channels              | Voltage 4ch  |
| Input Method                      | Scanning Method, Differential Input, Each Channel Isolated   |
| Input Impedance                   | Approx. 1.1 MΩ   |
| Input Frequency                   | DC-100 Hz  |
| Measurement Range                 | ±300 mV, ±1.5 V, ±6 V, ±24 V, Auto (*1)<br>Absolute Maximum Input Voltage: ±50 V   |
| Accuracy                          | When the 50-60 Hz filter is ON, varies with the Measurement Range as follows:<br>±300 mV : ±(0.3 % + 0.06 mV)<br>±1.5 V : ±(0.3 % + 0.3 mV)<br>±6 V : ±(0.3 % + 0.6 mV)<br>±24 V : ±(0.3 % + 2.4 mV)<br>Auto : According to the range in use |
| Measurement Resolution            | 50 - 60 Hz Filter ON : 0.01 mV<br>50 - 60 Hz Filter OFF : 0.1 mV   |
| Preheat Function                  | Allowable Voltage Range : 3 to 24 V ( external power supply )<br>Allowable Maximum Current : 1.0 A   |
| Recording Method                  | Instantaneous, Average, or Ave. Fine   |
| Recording Interval                | 2, 5, 10, 20, 50, 100, 200, 500 ms. / 1, 2, 5, 10, 15, 20, 30 sec.<br>1, 2, 5, 10, 15, 20, 30, 60 min.<br>( The minimum interval will depend on the number of channels, measurement range, and 50-60 Hz filter setting. )                    |
| Logging Capacity (*2)             | When recording 1 channel : up to 480,000 readings/ch<br>When recording 2 channels : up to 240,000 readings/ch<br>When recording 3 channels : up to 160,000 readings/ch<br>When recording 4 channels : up to 120,000 readings/ch              |
| Recording Mode                    | Endless ( Overwrite the most recent data when capacity is full ) or One Time ( Stop recording when capacity is full )  |
| Recording Start Method            | Immediate Start or Programmed Start ( by individual logger or by group )   |
| Recording Stop Trigger            | ON or OFF  |
| Group Recording                   | Up to 4 units ( 16 channels ) can be recorded simultaneously.<br>( Coupling of MCR-4V and MCR-4TC is possible. (*3) )  |
| LCD Display Items                 | Measurements, Trend Graph, Battery Level, etc.   |
| Communication Interfaces          | USB Communication  |
| Communication Time                | Download Times for Full Data via USB<br>- While recording ( at recording interval of 2 ms. ) : Approx. 3 minutes 30 seconds<br>- With recording stopped: Approx. 1 minute 30 seconds<br>- From a slave unit: Approx. 4 minutes 30 seconds    |
| External Memory                   | SD Memory Card, SDHC Memory Card (*4)<br>( For Manual or Automatic Data Export )   |
| Power                             | AA Alkaline Battery x 2 ( AA Ni-MH batteries may also be used ),<br>USB Power ( 5 V 250 mA )   |
| Battery Life (*5)                 | Approx. 4.5 to 150 days ( with AA alkaline batteries )   |
| Input Terminal / Preheat Terminal | Screwless Terminals<br><Compatible Wires><br>Single Wire : φ 0.32 to φ 0.65 mm ( AWG 28 - 22 )<br>Twisted Wire : 0.08 to 0.32 mm <sup>2</sup> ( AWG 28 - 22 ), φ 0.12 mm or more in diameter<br>Stripping Length : 9 to 10 mm                |
| Isolation                         | CH1, CH2, CH3, CH4, USB, and Preheat are isolated. ( Battery terminals are not isolated from the CH1-CH4 input terminals. )<br>CH1 - CH4 Maximum Applied Voltage : ± 50 V<br>Electrical Isolation Resistance : 50 MΩ or more ( DC ± 250 V )  |
| Dimensions                        | H 120 mm x W 75 mm x D 32 mm   |
| Weight                            | Approx. 190 g ( including batteries )  |
| Operating Environment             | Temperature: 0 to 50 °C<br>Humidity: 90 %RH or less ( no condensation )  |
| Accessories                       | AA Alkaline Battery x 2, USB Communication Cable ( US-15C ),<br>Software ( CD-ROM ), Card Slot Cover,<br>User's Manual Set ( Warranty Included )   |

\*1: When "Auto" is selected, measurement range will be automatically changed according to the voltage being measured.

\*2: If the logging capacity is not filled at the end of one recording session, the logger can record up to 30 times.

\*3: Group Recording may not be started depending on the recording or measurement interval specifications of the connected Master unit.

\*4: Please check the T&D Website for information on memory cards whose operation has been confirmed.

\*5: Battery life varies depending upon multiple factors including measurement interval and 50-60 Hz filter setting. All estimates are based on operations carried out with a new battery and are in no way a guarantee of actual battery life.

## Software (MCR for Windows)

|                        |  |
|------------------------|--|
| Compatible Devices     | MCR-4V, MCR-4TC  |
| Compatible OS (*1)     | Microsoft Windows 8 32 / 64 bit (*2)<br>Microsoft Windows 7 32 / 64 bit<br>Microsoft Windows Vista 32 bit ( SP1 or later )<br>Microsoft Windows XP 32 bit ( SP3 or later ) |
| Display Languages (*3) | English  |
| Other                  | The .NET Framework 4 Client Profile is required. (*4)  |

## MCR-4TC Specifications

| Measurement Channels     | Temperature 4ch  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
|--------------------------|--|---------------------|-----------------|---------------------|---------------|--------|--|----------------|----------------|--------|--|----------------|----------------|-------|--|-----------------|----------------|-----------------|--|-----------------|-----------------|
| Compatible Sensors       | Thermocouple: Type K, J, T, S, R   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Measurement Units        | °C, °F   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Measurement Range        | Type K : -270 to 1370 °C<br>Type J : -210 to 1200 °C<br>Type T : -270 to 400 °C<br>Type S : -50 to 1760 °C<br>Type R : -50 to 1760 °C  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Input Impedance          | Approx. 1 MΩ   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Accuracy (*1)            | Thermocouple Measurement<br>Type K, J, T: ±( 0.5 °C + 0.3 % reading ) [ at -100°C or above ]<br>Type S, R : ±( 1.5 °C + 0.3 % reading ) [ at 100°C or above ]<br>( Individual sensor inaccuracies not included. )<br>Cold Junction Compensation<br>±0.5°C [ in operating environment of 10 to 40 °C ]<br>±0.8°C [ in other operating environment ]   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Measurement Resolution   | 0.1 °C   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Recording Method         | Instantaneous or Average   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Recording Interval       | 100, 200, 500 ms. / 1, 2, 5, 10, 15, 20, 30 sec.<br>1, 2, 5, 10, 15, 20, 30, 60 min.   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Logging Capacity (*2)    | When recording 1 channel : up to 960,000 readings/ch<br>When recording 2 channels : up to 480,000 readings/ch<br>When recording 3 channels : up to 320,000 readings/ch<br>When recording 4 channels : up to 240,000 readings/ch  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Recording Mode           | Endless ( Overwrite the most recent data when capacity is full ) or One Time ( Stop recording when capacity is full )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Recording Start Method   | Immediate Start or Programmed Start ( by individual logger or by group )   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Group Recording          | Up to 4 units ( 16 channels ) can be recorded simultaneously.<br>( Coupling of MCR-4TC and MCR-4V is possible. (*3) )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| LCD Display Items        | Measurements, Trend Graph, Battery Level, etc.   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Communication Interfaces | USB Communication  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Communication Time       | Download Times for Full Data via USB<br>- From the master or a single unit: Approx. 1 minute 30 seconds<br>- From a slave unit: Approx. 4 minutes 30 seconds   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| External Memory          | SD Memory Card, SDHC Memory Card (*4)<br>( For Manual or Automatic Data Export )   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Power                    | AA Alkaline Battery x 2 ( AA Ni-MH batteries may also be used ), USB Power ( 5V 250mA )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Battery Life (*5)        | For 4-Channel Measurement ( AA Alkaline Battery )<br><table border="1"> <thead> <tr> <th>Rec.Interval</th> <th>Rec.Method</th> <th>Instantaneous Value</th> <th>Average Value</th> </tr> </thead> <tbody> <tr> <td>100 ms</td> <td></td> <td>Approx. 5 days</td> <td>Approx. 5 days</td> </tr> <tr> <td>500 ms</td> <td></td> <td>Approx. 7 days</td> <td>Approx. 7 days</td> </tr> <tr> <td>1 sec</td> <td></td> <td>Approx. 21 days</td> <td>Approx. 7 days</td> </tr> <tr> <td>5 sec or longer</td> <td></td> <td>Approx. 60 days</td> <td>Approx. 21 days</td> </tr> </tbody> </table><br>( Battery life for 1-channel measurement is about 1.4 times longer than that of 4-channel measurement. ) | Rec.Interval        | Rec.Method      | Instantaneous Value | Average Value | 100 ms |  | Approx. 5 days | Approx. 5 days | 500 ms |  | Approx. 7 days | Approx. 7 days | 1 sec |  | Approx. 21 days | Approx. 7 days | 5 sec or longer |  | Approx. 60 days | Approx. 21 days |
| Rec.Interval             | Rec.Method   | Instantaneous Value | Average Value   |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| 100 ms                   |  | Approx. 5 days      | Approx. 5 days  |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| 500 ms                   |  | Approx. 7 days      | Approx. 7 days  |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| 1 sec                    |  | Approx. 21 days     | Approx. 7 days  |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| 5 sec or longer          |  | Approx. 60 days     | Approx. 21 days |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Input Terminal           | Screwless Terminals<br><Compatible Wires><br>Single Wire : φ 0.32 to φ 0.65 mm ( AWG 28 - 22 )<br>Twisted Wire : 0.08 to 0.32 mm <sup>2</sup> ( AWG 28 - 22 ), φ 0.12 mm or more in diameter<br>Stripping Length : 9 to 10 mm  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Isolation                | CH1, CH2, CH3, CH4, and USB are isolated. ( Battery terminals are not isolated from the CH1-CH4 input terminals. )<br>CH1 - CH4 Maximum Applied Voltage : ±50 V<br>Electrical Isolation Resistance : 50 MΩ or more ( DC±250 V )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Dimensions               | H 120 mm x W 75 mm x D 32 mm   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Weight                   | Approx. 190 g ( including batteries )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Operating Environment    | Temperature: 0 to 50 °C<br>Humidity: 90 %RH or less ( no condensation )  |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |
| Accessories              | AA Alkaline Battery x 2, USB Communication Cable ( US-15C ), Software ( CD-ROM ), Card Slot Cover, User's Manual Set ( Warranty Included )   |                     |                 |                     |               |        |  |                |                |        |  |                |                |       |  |                 |                |                 |  |                 |                 |

\*1: MCR-4TC has superior noise filter, but the measurement may sometimes fluctuate due to strong noise. Especially when the recording interval is set to 200 ms or less, the filtering becomes weaker and hence the fluctuation may become greater.

\*2: If the logging capacity is not filled at the end of one recording session, the logger can record up to 30 times.

\*3: Group Recording may not be started depending on the recording or measurement interval specifications of the connected Master unit.

\*4: Please check the T&D Website for information on memory cards whose operation has been confirmed.

\*5: Battery life varies depending upon multiple factors including ambient temperature, recording interval, number of measurement channels, and frequency of data export to a memory card. All estimates are based on operations carried out with a new battery and are in no way a guarantee of actual battery life.

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### Caution regarding safety

For safe operation carefully read instructions before using the product.

■ Distributor

**TANDD T&D Corporation**

817-1 Shimadachi, Matsumoto, Nagano 390-0852, Japan

Please send your inquiries to:

E-mail : sales@tanadd.com

Facsimile : (+81) 263-40-3152



2014. 01. 16304820005D (2nd Edition)