

**TEMPERATURE CONTROLLER TC10 SERIES
PC CONFIGURATOR SOFTWARE
Model: TC10CFG Ver. 1.2**

USERS MANUAL

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1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The TC10CFG is used to program parameters for Temperature Controller TC10 Series (referred hereunder as 'device'). The following major functions are available:

- Edit parameters
- Download parameters to the device, upload parameters from the device
- Save parameters as files, read parameters from files
- Confirm operation status of the device

1.2 APPLICABLE DEVICES

The TC10CFG is applicable to the following product:

FUNCTION	MODEL	VERSION
Temperature Controller (5-digit, LED display type, Size 96 × 96mm)	TC10EM	1.0
Temperature Controller (5-digit, LED display type, Size 48 × 96mm)	TC10NM	1.1
Temperature Controller (4-digit, LED display type, Size 48 × 48mm)	TC10CM	1.2

The lowest software version applicable to each hardware model is indicated in the above table. Confirm that the software you have is compatible with the hardware you have.

The latest version of the TC10CFG is downloadable at our web site.

1.3 PC REQUIREMENTS

The following PC performance is required for adequate operation of the TC10CFG.

OS	Windows 10 (32-bit / 64-bit) Windows 11 (64-bit) The software may not operate adequately in certain conditions.
Network port	COM port (RS-232-C) or USB port (COM1 through COM16)

One of the dedicated cables as listed below is also required to connect the device to the PC.

PORT	PC CONFIGURATOR CABLE MODEL NO.
RS-232-C	MCN-CON
USB	COP-US

1.4 INSTALLING & DELETING THE PROGRAM

1.4.1 TO INSTALL THE PROGRAM

The program is provided as compressed archive.

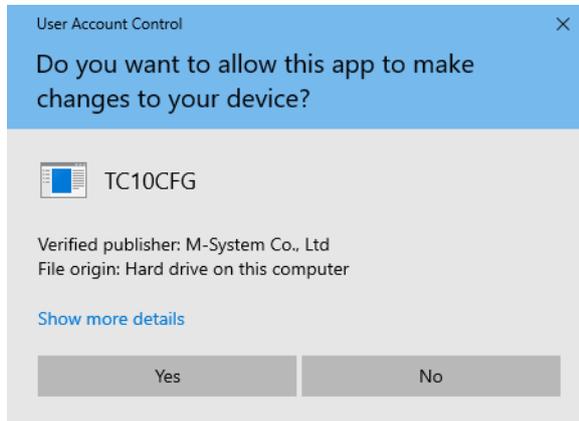
Decompress the archive and execute 'setup.exe'.

Follow the instructions on the screen to install the program.

Note that it is required to log on as administrator to install the program.

'User Account Control' window appears to clarify your administrative right before proceeding.

Click 'Yes' to complete installation.



1.4.2 TO DELETE THE PROGRAM

For Windows 10, open Settings from Start menu > Apps > Apps & features.

Select the TC10CFG from the program list and click [Uninstall] button.

Follow the instructions on the screen to uninstall the program.

For Windows 11, open Settings from Start menu > Apps > Installed apps.

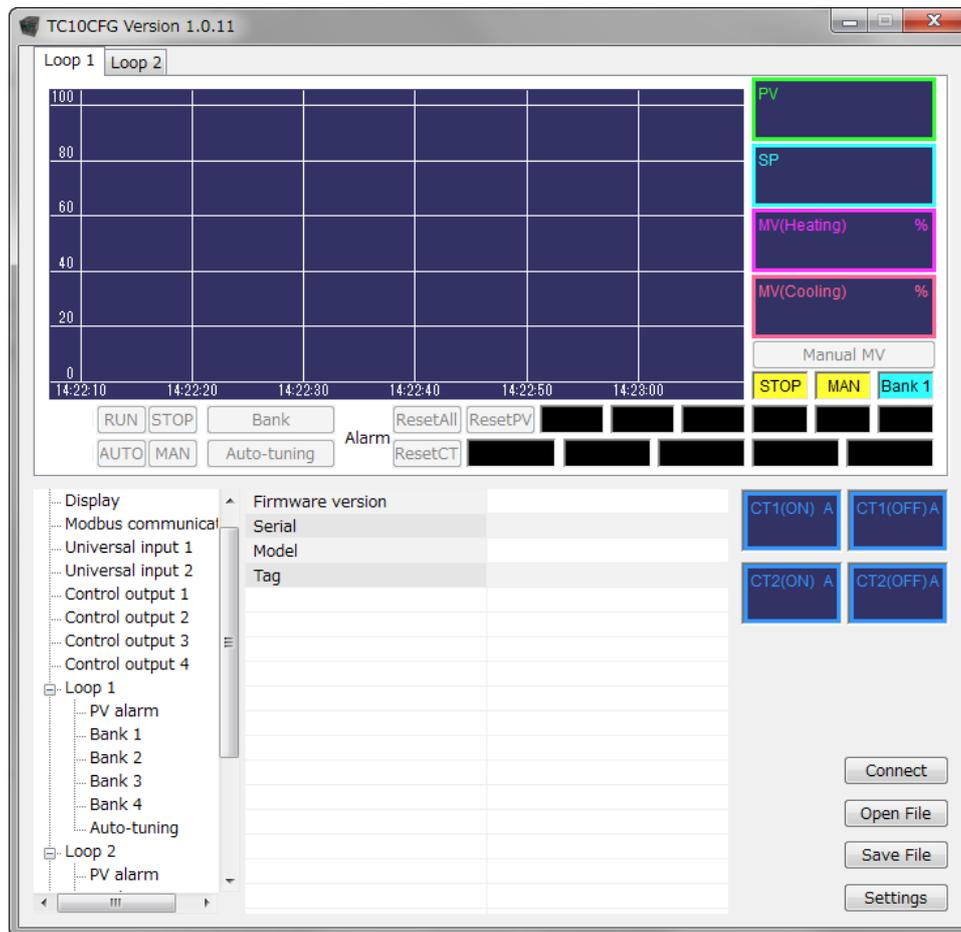
Select the [...] of TC10CFG from the program list and click [Uninstall] button.

Follow the instructions on the screen to uninstall the program.

2. GETTING STARTED

2.1 STARTING THE TC10CFG

Open Program > M-SYSTEM > Configurator > TC10CFG to start up the TC10CFG on the Windows PC. The following window shows an example when the TC10CFG is started.



2.2 OPERATION WINDOW

The TC10CFG operation window shows a real-time trend graph representing the PV and MV in each loop, where monitoring each operation status of the connected device is available.



1. Monitor window

Shows graphically the PV, SP and MV in the loop 1 and 2.

[Loop 1] and [Loop 2] tabs are selectable to switch the view.

The unselected trend graph is recorded permanently in the background.

2. Switching operation and mode

Clicking the buttons switches the operation and the mode in the loop.

3. Alarm indicators and reset buttons
Indicates the alarm status in the loop. Clicking a button resets the PV, CT or all alarms.

4. Setting tree and list

Click a group in the tree, and modify settings in the list.

The modified setting parameters are written to the device immediately.

5. CT input

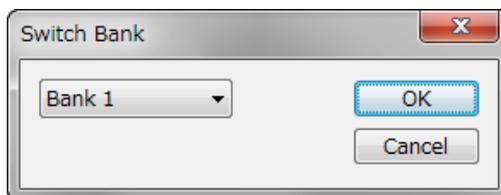
[CT (ON)] shows current with the assigned control output on, and [CT (OFF)] shows current with off.

“_” sign means the control output not turned on or off in the last cycle.

6. Switch bank

Clicking the button calls up the dialog box left.

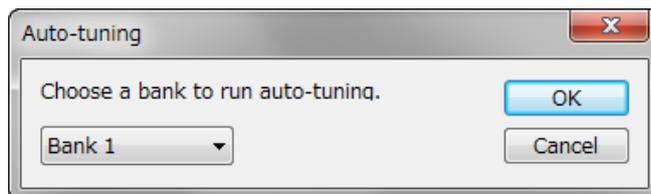
Choose a bank and click [OK] to switch the bank in the loop.



7. Auto-tuning

Clicking the button calls up the dialog box left.

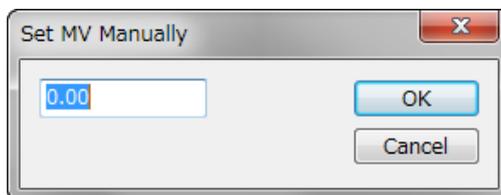
Choose a bank and click [OK] to start auto-tuning in the bank.



8. MV manual operation

Clicking the button calls up the dialog box left.

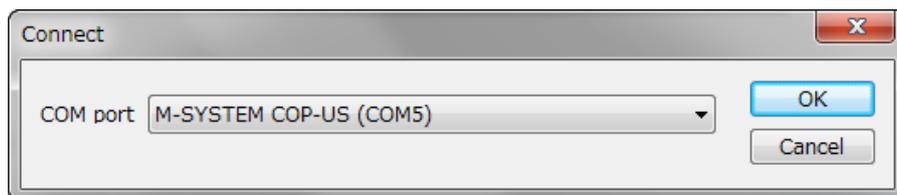
Enter MV value and click [OK] (in the manual mode only).

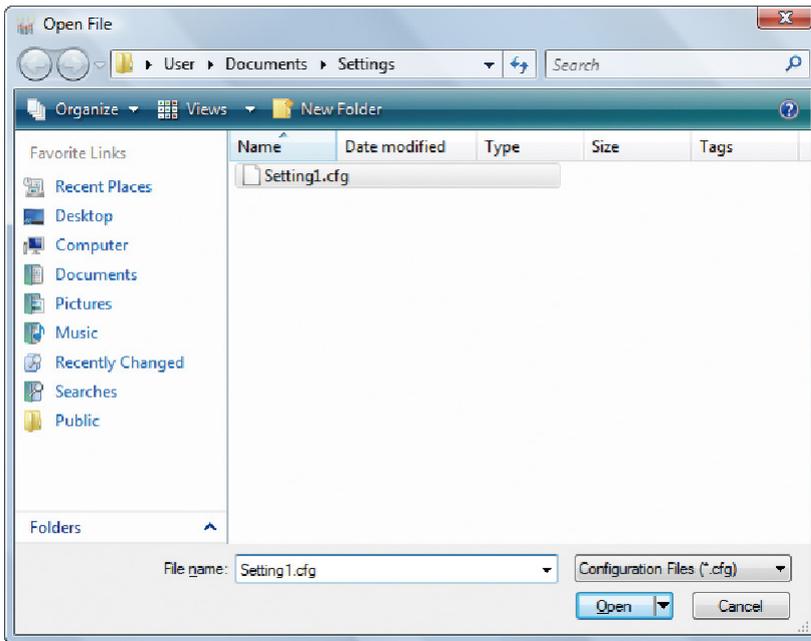


9. Connect / disconnect

When the TC10CFG does not communicate with the device, clicking the button calls up the dialog box left. Choose a COM port to connect and click [OK] to establish the communication with the device.

Click the button while the TC10CFG communicates with the device, and the communication will be disconnected.

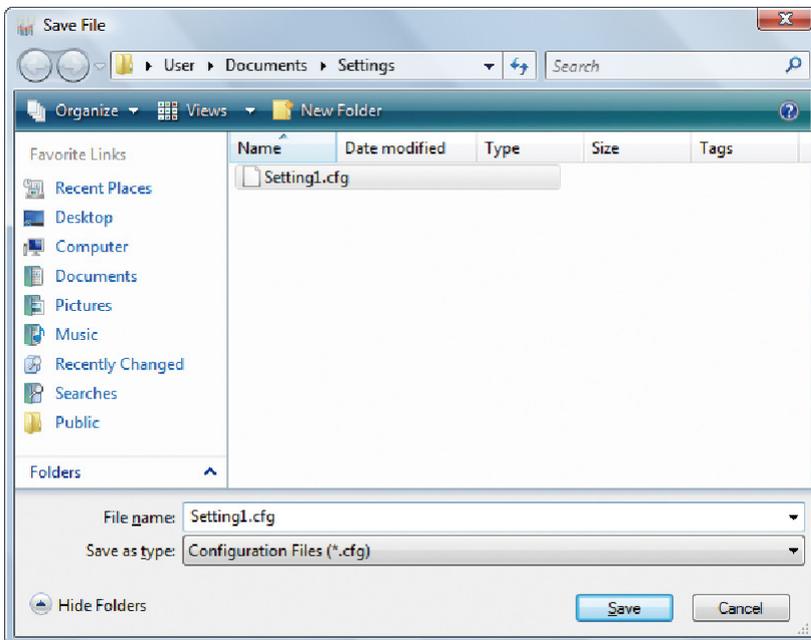




10. Open file

Clicking the button calls up the dialog box left.

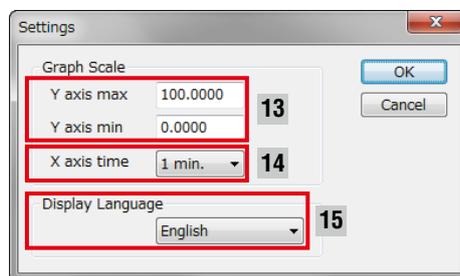
Choose a file and click [Open] to read the parameters saved in this software. While communicating with the device, open a file, and the parameters will appear on the screen and be written to the device.



11. Save file

Clicking the button calls up the dialog box left.

Choose a file or enter a desired file name to File Name field and click [Save] to store a parameter setting.



12. Settings

Clicking the button calls up the dialog box left to change the display range in the trend graph.

13. Max. / min. y axis

Enter display range on the y-axis (temperature) in the trend graph. The setting range is -9999.9999 to +9999.9999 with min. span 0.2.

14. X-axis time

Choose display range on the x-axis (time) among the following:

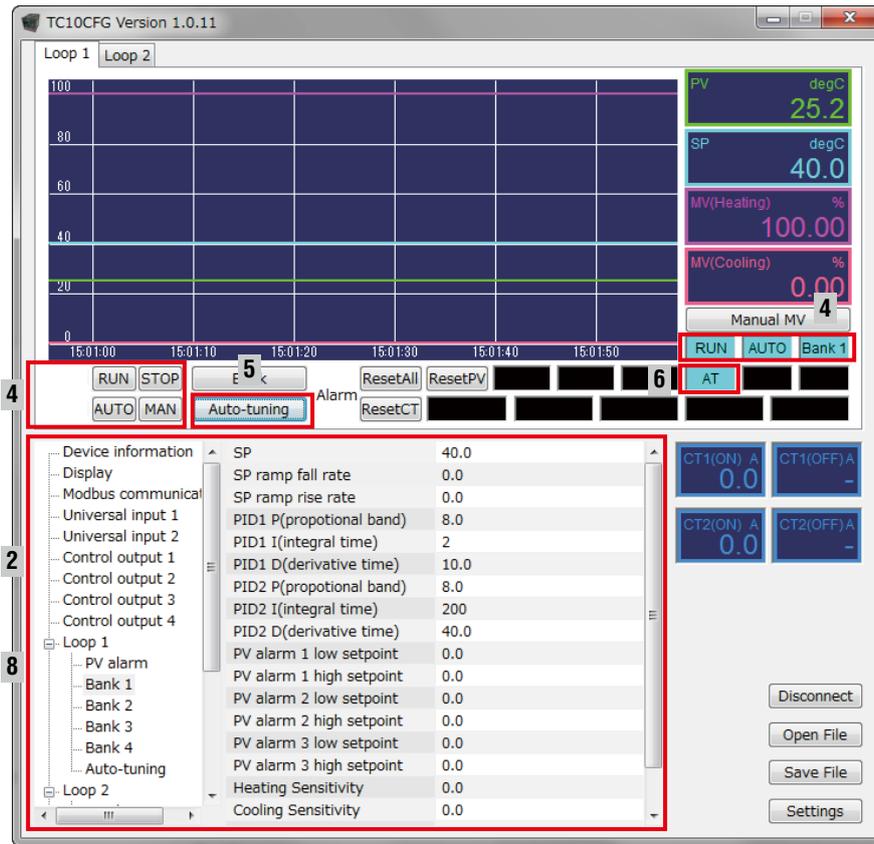
- | | |
|------------|------------|
| 10 seconds | 10 minutes |
| 30 seconds | 15 minutes |
| 1 minute | 30 minutes |
| 3 minutes | 1 hour |
| 5 minutes | 2 hours |

15. Language

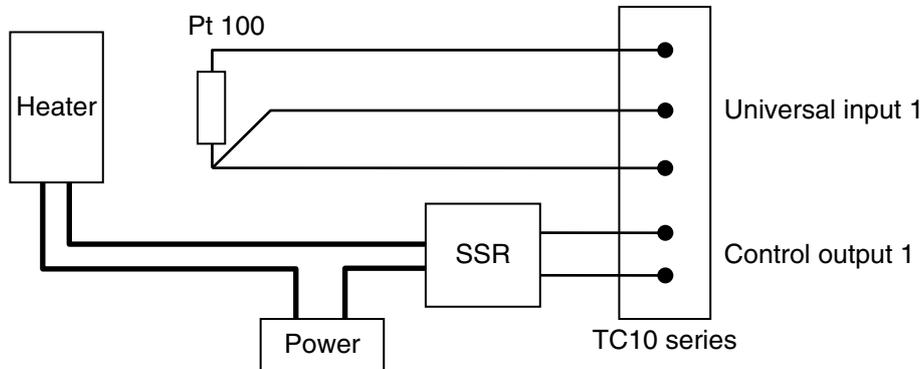
Choose Japanese or English to switch the display language.

2.3 EXAMPLE 1: CONTROLLING TEMPERATURE BY THE STANDARD PID

The following procedure shows the configuration to control the temperature at 40.0°C by the standard PID in the control loop 1.



1. Wire a Pt 100 for temperature measurement with the universal input 1 of the device, a SSR and a heater with the control output 1 as shown in the figure below.

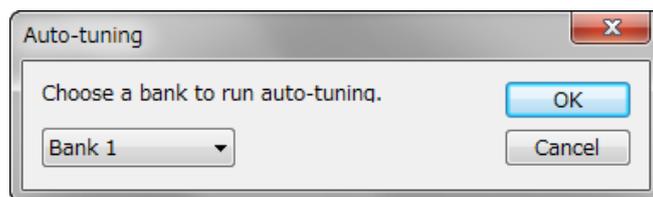


2. Specify the following settings.

SETTING TREE	SETTING LIST	PARAMETER
Universal input 1	Input type	RTD Pt 100
Universal input 1	Wiring	3 wires
Control output 1	Output assignment	Loop 1, heating control output
Loop 1, bank 1	SP (setpoint value)	40.0

3. Make sure that the Pt 100 is connected with the universal input 1 of the device, and the controlled device (heater) with the control output 1 normally.

4. Click [RUN] and [AUTO] buttons below the trend graph to start the automatic control.
When started, the indicators will be switched from [STOP] to [RUN], and from [MAN] to [AUTO].
5. Clicking [Auto-tuning] below the trend graph calls up the dialog box below. Choose [Bank 1] and click [OK].



6. The auto-tuning starts and the indicator [AT] blinks.
To stop the auto-tuning, click [STOP].
7. When the auto-tuning is completed, the indicator [AT] stops blinking and the automatic control starts.
8. Specify the following settings to start the automatic control operation at startup.

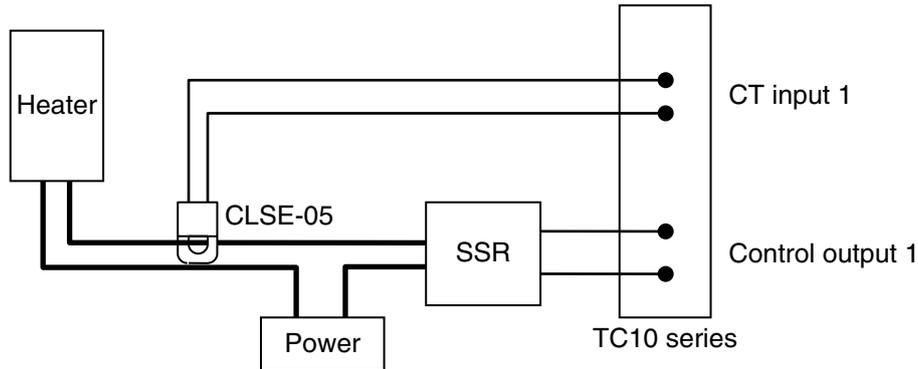
SETTING TREE	SETTING LIST	PARAMETER
Loop 1	Control mode at startup	RUN
Universal input 1	Operation at startup	AUTO

The setting to control the temperature at 40.0°C automatically is completed.

2.4 EXAMPLE 2: DETECTING THE HEATER WIRE BREAK

The following procedure shows the configuration to add a setting to detect the heater wire break to the example 1 (temperature control in the loop 1), where the heater with 100V and 1kW is driven by a SSR.

1. Choose the CT sensor model CLSE-05 (max. 50A) as the current through the heater is $1\text{kW} \div 100\text{V} = 10\text{A}$. Wire the CLSE-05 with the CT input 1 as shown in the figure below.



2. Specify the following settings.

SETTING TREE	SETTING LIST	PARAMETER
CT input 1	CT sensor type	CLSE-05
CT input 1	Output assignment	Control output 1

3. Then the TC10CFG displays approximately 10.0A on [CT1 (ON)] and approximately 0.0A on [CT1 (OFF)], measuring the current with the control output 1 on and off respectively.



4. Specify the threshold to detect the wire break.

Set 5.0A as threshold, half of the rating of the heater, approximately 10.0A.

SETTING TREE	SETTING LIST	PARAMETER
CT input 1	Heater wire break alarm	Available
CT input 1	Heater wire break alarm setpoint	5.0

5. Specify the following settings to output alarm from the control output 3 (open collector).

SETTING TREE	SETTING LIST	PARAMETER
CT input 1	Heater wire break alarm output	Control output 3
Control output 3	Output assignment	Alarm OR

The setting to detect the heater wire break and turn on the open collector of the control output 3 is completed.

2.5 EXAMPLE 3: SWITCHING TEMPERATURE SETPOINT BY EVENT INPUT

The device has two discrete inputs for event control which can be assigned for various purposes. It has also four sets of banks per loop. Temperature setpoint, PID and other parameters can be stored and switched by an external event input.

The following procedure shows the configuration to add a setting to switch the temperature setpoint 40.0°C to 50.0°C by the event input, utilizing the bank function, to the example 1 (temperature control with the setpoint 40.0°C in the loop 1).

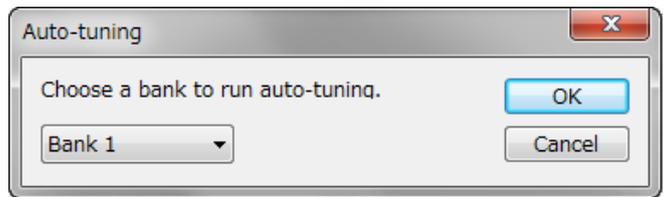
1. Connect a switch to the event input 1 of the device.



2. Specify event input assignment and temperature setpoint in switching to the bank 2.

SETTING TREE	SETTING LIST	PARAMETER
Loop 1, bank 2	SP (setpoint value)	50.0
Event input	Event input 1 assignment	Loop 1, bank bit 0

3. Clicking [Auto-tuning] calls up the dialog box below. Choose [Bank 2] and click [OK]. The auto-tuning in the bank 2 starts and when it is completed, the automatic control starts.



The setting to switch the temperature setpoint 40°C with the switch off (open) connected to the event input 1 to 50°C with on (closed) is completed.

3. SETTING ITEMS

Refer to the instruction manual of Temperature Controller for the detailed information on the setting items.