

TEMPERATURE CONTROLLER TC10 SERIES
PC CONFIGURATOR SOFTWARE
Model: TC10CFG Ver. 1.1

Users Manual

M-SYSTEM CO., LTD.

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1. INTRODUCTION

1.1. GENERAL DISCRIPTION

M-System 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 x 96mm)	TC10EM	1.0
Temperature Controller (5-digit, LED display type, Size 48 x 96mm)	TC10NM	1.1

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 M-System's web site (www.m-system.co.jp) if you need higher version software.

1.3. PC REQUIREMENTS

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

PC	IBM PC compatible
OS	Windows XP / Windows Vista (32 bits) / Windows 7 (32 bits / 64bits) The software may not operate adequately in certain conditions.
CPU	Must meet the relevant Windows' requirements.
Memory	Must meet the relevant Windows' requirements.
Network port	COM port (RS-232C) 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-232C	MCN-CON
USB	COP-US

1.4. INSTALLING & DELETING THE PROGRAM

INSTALL

The program is provided as compressed archive. Decompress the archive and execute 'setup.exe' to start up the TC10CFG installer program. Follow instructions on the Windows.

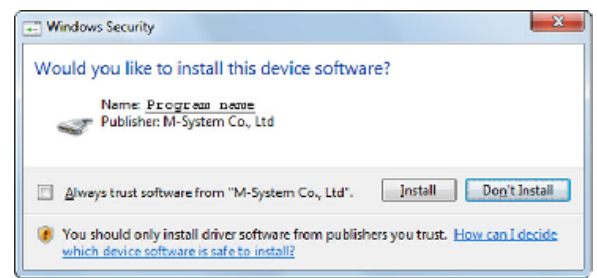
For Windows XP, log on as administrator to start installation.

For Windows Vista / Windows 7, log on as administrator but you still need to clarify your administrative right before proceeding. When User Account Control window appears, choose "Yes" or "Install".

Windows 7



Windows Vista



On the place of 'Program name', TC10CFG is displayed instead.

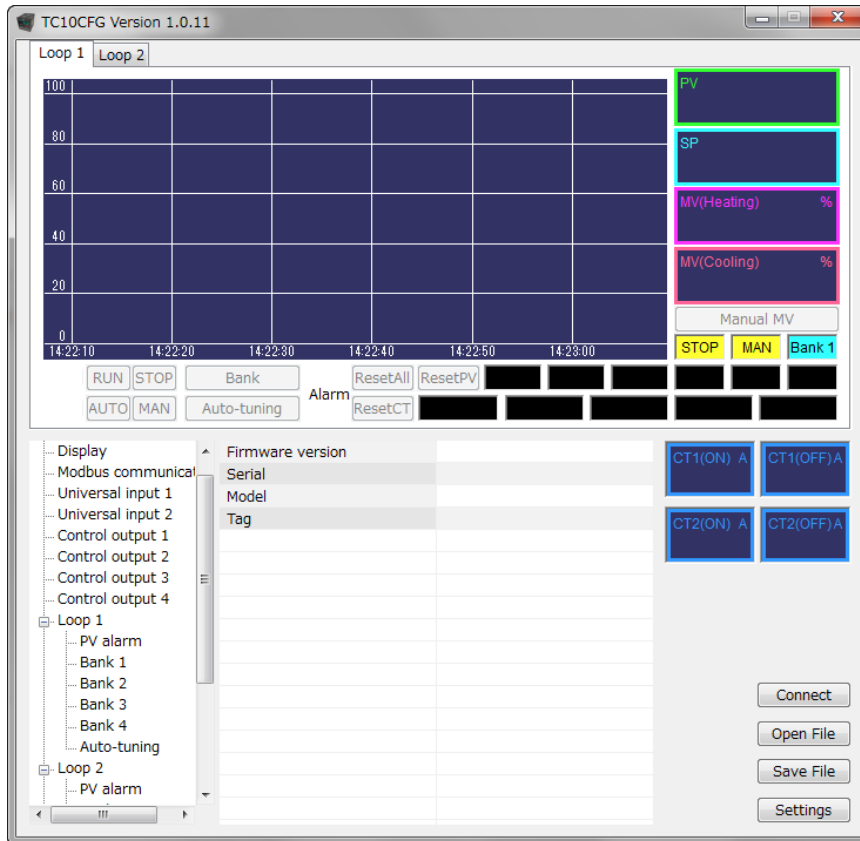
DELETE

Open Control Panel > Add/Remove Program. Select the TC10CFG from the program list and click Delete button.

2. GETTING STARTED

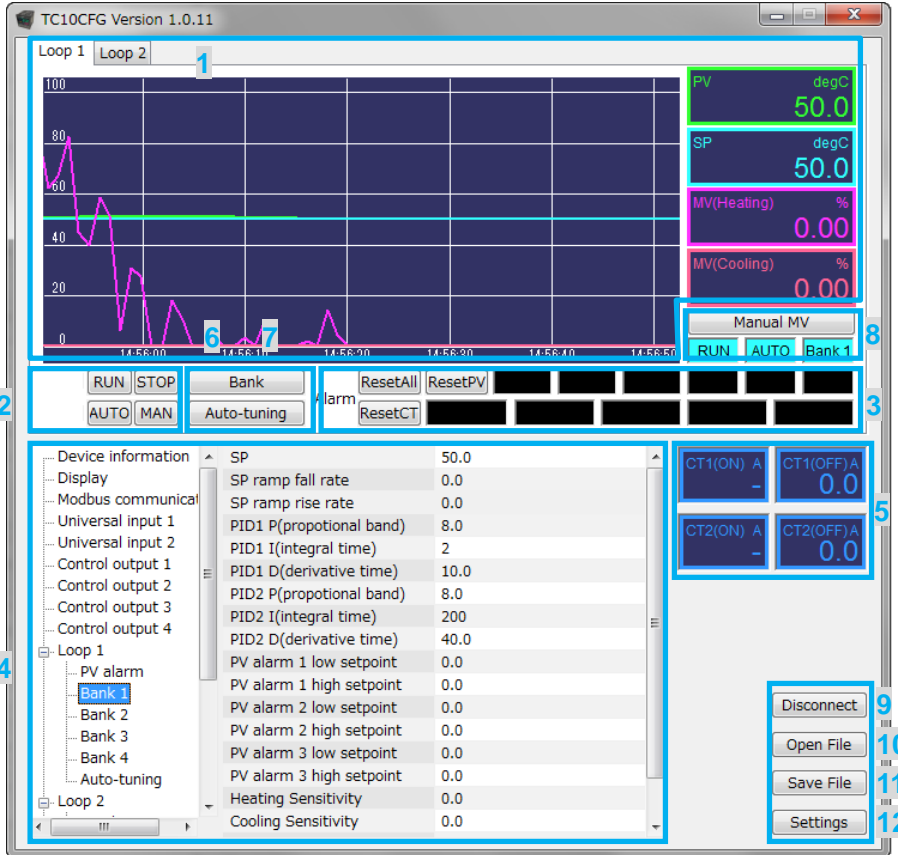
2.1. STARTING THE TC10CFG

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.

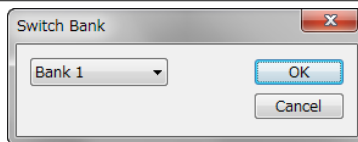


2.2. OPERATION WINDOW

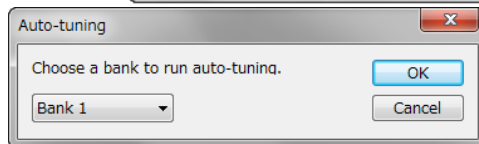
The TC10CFG operation window shows a real-time trend graph representing the PV and MV in each loop, where monitoring each operation status of the connected device is available.



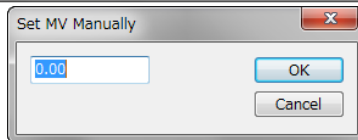
1. Monitor window
Shows graphically the PV, SP and MV in the loop 1 and 2.
[Loop 1] and [Loop 2] tabs are selectable to switch the view.
The unselected trend graph is recorded permanently in the background.
2. Switching operation and mode
Clicking the buttons switches the operation and the mode in the 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.



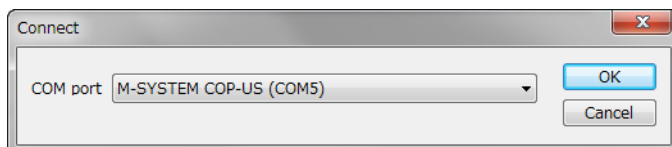
6. Switch bank
Clicking the button calls up the dialog box left.
Choose a bank and click [OK] to switch the bank in the loop.



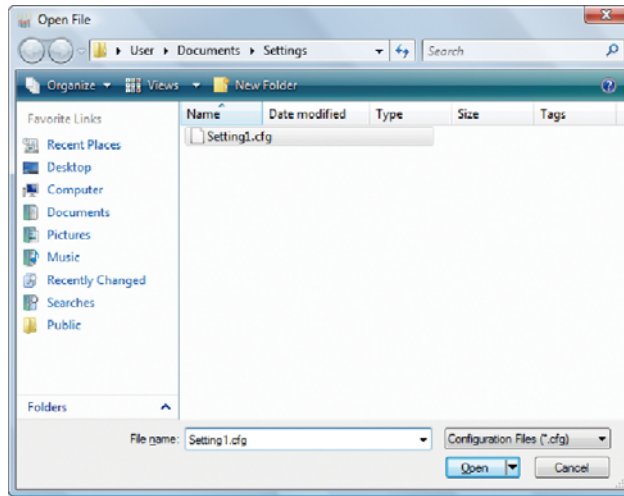
7. Auto-tuning
Clicking the button calls up the dialog box left.
Choose a bank and click [OK] to start auto-tuning in the bank.



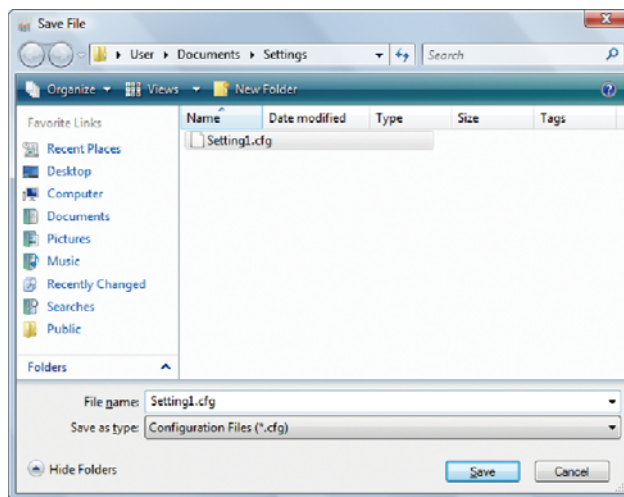
8. MV manual operation
Clicking the button calls up the dialog box left.
Enter MV value and click [OK] (in the manual mode only).



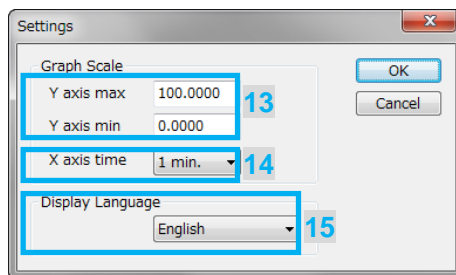
9. Connect / disconnect
When the TC10CFG does not communicate with the device, clicking the button calls up the dialog box left.
Choose a COM port to connect and click [OK] to establish the communication with the device.
Click the button while the TC10CFG communicates with the device, and the communication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

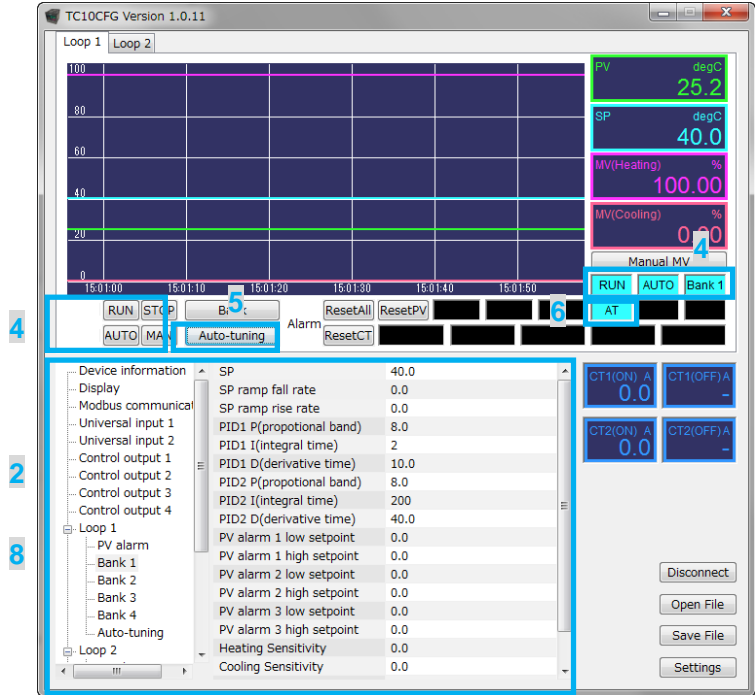
14. X-axis time
 Choose display range on the x-axis (time) among the following:

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

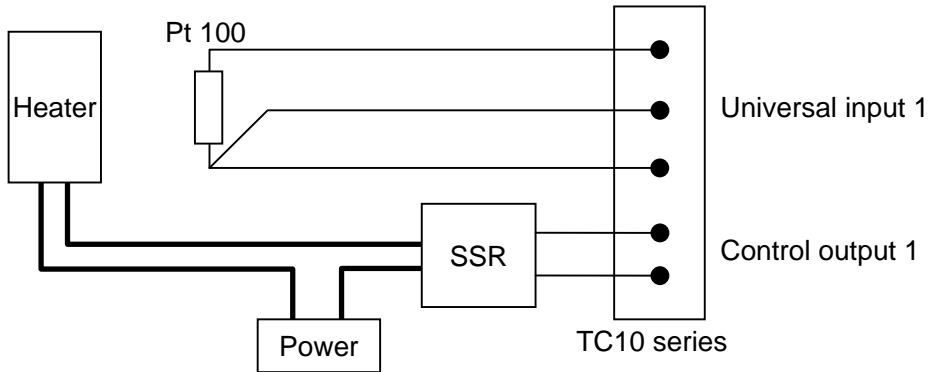
15. Language
 Choose Japanese or English to switch the display language.

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.

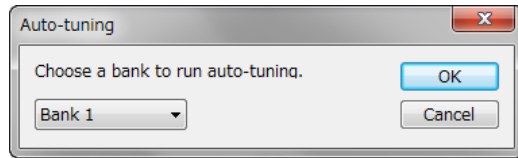


2. Specify the following settings.

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.

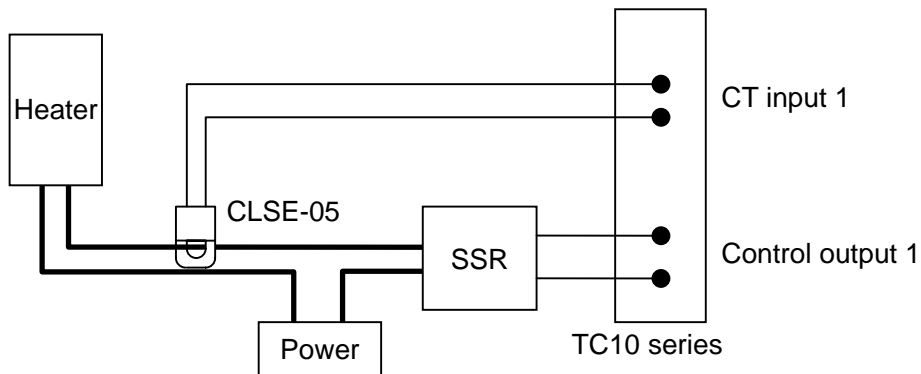
Setting tree	Setting list	Parameter
Loop 1	Control mode at startup	RUN
Universal input 1	Operation at startup	AUTO

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

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.

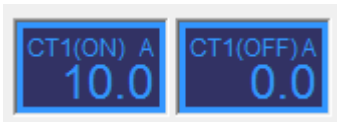
1. Choose the CT sensor model CLSE-05 (max. 50A) as the current through the heater is $1\text{kW} \div 100\text{V} = 10\text{A}$. Wire the CLSE-05 with the CT input 1 as shown in the figure below.



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.

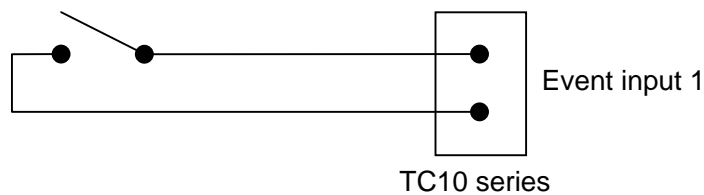
2.4. EXAMPLE 3: SWITCHING TEMPERATURE SETPOINT BY EVENT INPUT

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).

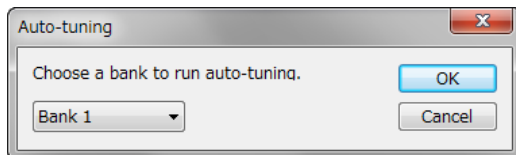
1. Connect a switch to the event input 1 of the device.



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.