

HeatManager Pro V4.01

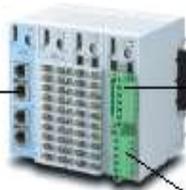
User Manual



HMI



6 OR 12 PROGRAMMERS / CONTROLLER



6 OR 12 TC INPUTS

6 OR 12 TC OUTPUTS

CasCade® Automation Systems B.V.

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Heatmanager Pro software versions :

- V1.05: Improved thermocouple break detection
- V1.06: Improved of channel 1 remote/local settings
- V1.07: Improved profile editor
- V1.08: Improved profile editor
- V1.09: Separately start/stop channels (previously all were started/stopped at once)
- V1.10: Removed F1-F6 buttons
- V1.10a: Ramp changed from 1200 to 1500 degrees C. per hour
- V2.00:
 - Standardized initialization procedure and parameter settings
 - Improved master-slave configuration
 - Improved start/stop of channels
 - Improved translation of multi languages
 - Use area 1-7 for profile and area 8 for stop-area for unused of slave channels
 - Reset holding when programmer is switched off
 - Setting screen for control action
 - Force all channels in auto mode in initialization
- V2.01: Improved communication error detection
- V2.02: Force all channels in area 8 (stop area) after channel configuration finished
- V2.03:
 - Improved startup procedure
 - Improved minor visualisation issues
 - Improved profile configuration
- V2.04: Improved startup procedure
- V3.00:
 - **12 channel version**
 - Improved master-slave control with 1 decimal point
 - Improved operation responsiveness
 - Improved startup of TIO (integration sum reset)
- V3.01: Corrected minor visualisation issues
- V3.02: Improved start->stop and stop->start
- V3.03:
 - **Easy mode operation for channel 1-12**
 - Improved startup of channels
 - Limit PVbias to +/- 50.0C
- V3.04: Type error corrected in channel xx selection
- V3.05: Extra communication device added for datalogging
- V4.00: **Master-slave intercommunication between** heatmanager(s) via Modbus TCP
- V4.01:
 - **Extended datalogging** capabilities for CasCade Reporter tool via Modbus TCP
 - Added batch-related data entry for exporting .CSV file

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1) Introduction

First of all, we would like to thank you for purchasing our HeatManager Pro®. We are confident that it will meet 100% of your expectations for heat treatment applications. The HeatManager pro® is a state of the art controller for heat treatment applications and combines user friendly operations with the newest technology. The heart of the HeatManager Pro® is the full colour TFT touch screen from which you can set-up and run your system. The control is done by a dedicated DIN rail-mounted system that is located inside the cabinet. The HeatManager Pro® is available as a 6-loop and a 12 loop system.

Basic features of the HeatManager Pro®:

- Colour TFT touch-screen
- 6 or 12 loop controller
- Free selectable programmer/slave combinations
- Up to 7 ramp/soaks per program when in normal mode
- Auto hold and manual hold function
- Step function
- Thermocouple break and reverse detection
- Calibration function
- Real-time trend charts (paperless recorder)
- Output status monitor
- Lock function against unauthorized operations
- Data logging function with export to Excel and automatic report generation with CasCade Reporter tool.
- Interconnection between separate HeatManager Pro 4 units. Up to five 12 channel units can be interconnected enabling a 60 channel system.

2) Initialization

When you start the system for the first time you will first need to go through an initialization procedure.

Here you'll be asked the following questions:



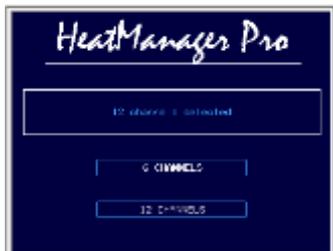
Please select your language. You can choose English, German and Dutch.



Select your operation mode. This can either be Easy or Normal.

When you choose the Easy mode Heatmanager you can only program one ramp and one soak per channel.

When you choose the advanced mode you've got eight ramp and eight soak program options per channel.



Next you'll be asked to choose between 6 and 12 channels.

Please select the correct number of channels. When you only would want to use 8 channels, please select 12 channels and then in the program settings you can select channel 9 to 12 as unused.



When you have selected all the correct options the following screen will appear.

This is the initialization for the control modules. With a 12 channel unit this can take up to 30 minutes the first time so be patient.

Note: When this screen appears, please wait while the screen is initializing the TIO's and other control components. When you cut the power to the touch panel in this phase of the initialization you will need to redo the complete initialization again.

3) Main menu

When the initialization is complete you will see the “GENERAL INFORMATION” screen. On this screen you will find the contact information from your supplier. To exit this screen, just touch the screen and you will swap to the main menu.

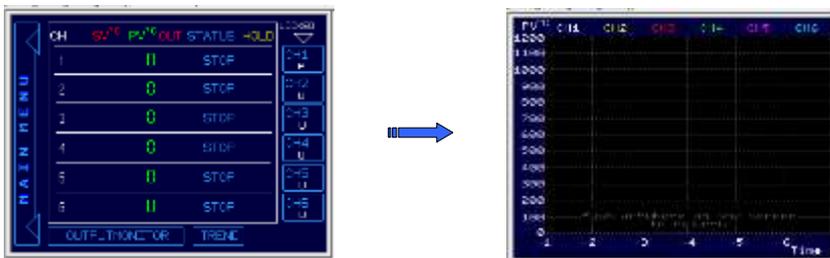


From the main menu you can choose to go to the Operation mode, the Program settings, Master-Slave interconnection configuration, Basic settings, Copy data, General information, PV offset and PID settings.

**Note:* When you push and hold the top left corner in the main menu for five seconds you can re-init the touch panel.

3a) Screen lock function

When you push and hold the bottom left corner in the main menu for five seconds the screen will automatically change to the operation lock screen, where the start/stop buttons are disabled. To return from the operation locked screen, push and hold the bottom left corner again for five seconds. In lock mode the operator can still go to the trend screens by pushing the “TREND” button.



4) Operation mode



Push the “OPERATION” button in order to swap to the operations menu where you can RUN and STOP one or all of your programmers by pushing the corresponding channel number button. For each channel the “P”, the “S”, the “R” or the “U” indicates whether that channel is a Programmer, Slave, Controlled by a Remote Heatmanager or set to Unused. Programmers can easily be recognized by their blue rectangle surrounding the channel number.

4a) How to run or stop a program



To run or stop a program, keep the corresponding programmer channel button for more than *one* second. The one second delay on this button is to prevent a operator from stopping/staring a program by accident. The slave(s) that belong to the programmer will automatically follow the run or stop status of the programmer.

In the status column you can easily see if a channel is in run or in stop mode. In the “OUT” (output) column a red rectangle will tell you whether a channels output is active or not. In the “HOLD” column you can see if programmer is in hold by the word “ON”. A yellow light will indicated witch of the slave(s) channel(s) is responsible for the programmers hold. This can either be the programmer itself or one of it slaves. When a heatmanager that is interconnected via the master-slave function puts the programmer in hold, you will see this with the letter “R” and then the slave number of the interconnected slave-heatmanager.

4b) Output monitor

When you touch the “OUTPUTMONITOR” button on the operation run/stop screen you will swap to the output monitor screen. Here you can view the output percentages per channel and also the thermocouple break indicator. Both screens look similar to each other however, the function of the channel number buttons (CH1 ~ CH12) has changed.

**Note: when a thermocouple break appears while in RUN mode, the heatmanager pro will automatically swap to the “OUTPUTMONITOR” screen.*

4c) Profile settings

On the “OUTPUTMONITOR” screen you can use the CH1 ~ CH12 buttons to enter the profile setting mode for the programmer channels. Slave and unused channels will be ignored. Also note that this is only possible when the programmer is not in hold status. After pushing the channel number button of a programmer that is not in hold, you will swap to the corresponding setting screen, even when that channel is in RUN mode. You are now able to change the running step, or one of the other steps.

Pushing the “Back” button will bring you back to the “OUTPUTMONITOR” screen. Pushing the “OPERATION” button on the output monitoring screen will bring you back to the operation RUN / STOP screen.

4d) Trend-charts

Touch the “TREND” button on both the RUN/STOP or OUTPUTMONITOR screen to swap to the “all channels trend” screen where you can view 6 Process values at the same time over the last 6 hours. In case of the 8 and 12 loop system, push the same “ TREND” button on the corresponding channel screen. Touching the trend screen just anywhere will return the operator to the previous screen.

To view a trend of one specific channel go to the “detail channel screen” from a specific channel and select “TREND CH(x)”.

4e) Detail channel screen

To swap to the “DETAIL CHANNEL SCREEN”, you have to touch the blue rectangle program channel number. This means you can see the detailed information of all different programmers by touching the corresponding channel.

On the “DETAIL CHANNEL SCREEN” you can find useful information about the status of the programmer. Push the “BACK” button to return to the Operation RUN/STOP or OUTPUTMONITOR screen.

4f) Next segment

Push the “NEXT SEGMENT” button to activate the step function. The running program will continue directly to the next segment, remember that each segment exist of one ramp and one soak, so when you push the “NEXT SEGMENT” button you will automatically go to the start of the next ramp.

**Note: The step function will only work when the programmer is not in hold.*

***Note: The elapsed soak time will reset when changing from ramp to soak state. This means that when you “STEP” while a soak is running, and jump to the start of a new ramp, the elapsed soak time of the previous step will be shown until the ramped set point has reached the target set point of that step and start soaking.*

4g) Hold function

Push the program hold button to activate the hold function manually. Pushing the button again will release the manual hold function.

4h) Calibration

Push the “PV OFFSET” button to swap to the calibration screen. On the calibration screen the operator can add or subtract some degrees of the process values to calibrate the controller with your paper trend chart recorder. Touch the number to set the value by the pop-up keypad. Touch the up and down keys to directly add or subtract one degrees. Push the reset screen to “zero” the applicable channels. Push “BACK” to return to the detail channel page.

4i) PID settings

Push the “PID SETTINGS” button to enter the PID settings menu where you can edit the PID settings. Please note that the factory settings are carefully chosen for this application and will work well in most situations.

**Note: you can set different PID settings for each segment of each channel. By touching the segment number a small touch pad will pop-up to change the segment. After you have changed the segment, you can edit the PID values for that segment. Push “BACK” to return to the previous screen.*

4j) Password protection

As the “CALIBRATION” and “PID SETTINGS” screens are password protected, type “USER” in CAPITAL letters to enter these screens. After 1 minute not touching the screen, the password is timed-out and the operator has to type “USER” again if he wants to enter again or leave the calibration screen.

5) Program settings

5a) Easy mode program setting

Push the “PROGRAM SETTINGS” to swap to the profile settings menu, where you can start setting the profile of channel 1.

***Note:** you can select whether a channel is a programmer, slave, remotely controlled by another heatmanager via the interlink or unused. Channel one is always a programmer or remote, but all other channels can be set to programmer, slave or unused. This makes it possible to have one programmer and eleven slaves.

****Note:** once you've entered the “PROGRAM SETTING” mode, you have to go through all the channels in order to get back to the “MAIN MENU”.



On the profile setting screen there are five parameters which can be set. You can set your parameters by touching the numbers in the bottom screen or by pressing the numbers on the graph.

You can set the ramp speed in deg. per hour and the dwell time in minutes.

5b) Normal mode program setting



On the profile setting screen, there are four parameters that can be set for each segment. First select the segment you want to set by touching the segment number. The keypad will pop-up and you can select the segment you want to program, from segment 1 to segment 7 (segment 8 is the stop-segment and cannot be used). Always start your program in segment number one!

Next, program the target set point for that segment, the ramp to set point in deg. per hour and the dwell time in minutes. Use the small “dwell time help” to calculate your minutes and save them in the dwell time by pushing the “copy to dwell time” button. Max. is 99 hours and 59 minutes. Remember to do so for each segment! Don’t forget to set the correct link segment number. That is the next segment that will be performed after the current one is completed. Putting a 0 here will leave the channel on the last value and it will not continue to another segment.



On the “Channel selection screen” you can select each channel to be a programmer, slave of the previous programmer, remotely controlled by another master-heatmanager or unused, by pushing the corresponding button. You can go back to the previous channel at any time, by pushing “BACK” button.

Also, if you have selected that channel is to be a slave, you can set a set value offset compared to the setvalue of the previous channel.

After setting the channel function, push “NEXT”. If you choose “PROGRAMMER”, you will automatically swap to the channel 2 profile setting screen. If you have selected “UNUSED” or “SLAVE”, you will swap to the next channel selection screen.

From here, you repeat the same procedure to set all channels up to a maximum of 6 (or 12) depending on the type of heatmanager you are using.



After you have set all channels to be a programmer, slave, remote or unused you will enter the “End Program setting” page that confirms that all channels have been set.

Also, if you are not sure you did set all channels in a proper way, you can go back to the previous channel by pushing the “BACK” button. Push “NEXT” to swap to the “MAIN MENU”

6) Master-slave configuration

**Note: the Master-slave setting can only be changed with all channels in stop status.*

Please note that the heat manager can operate in the so called “stand alone”, master- or slave mode.

There can only be 1 master and a maximum of up to 4 slaves.



The stand-alone mode is used if the Heatmanager does not have to be interconnected to other heatmanagers. Please select this option because if you set it to master or slave, it tries to interconnect to other heatmanagers, so only set it to master- and or slave when this is necessary.

When you set the heatmanager to master, it will act as the master-programmer heatmanager for other interconnected slave-heatmanagers.

Please note, that the actual setpoint of channel 1 of the master-heatmanager will be used as the setvalue for the slave-heatmanagers.

Don't forget to set channels on the slave-heatmanagers to remote in the channel config.

The communication between the master and slave heatmanagers is via ethernet cabling and/or a switch to interconnect them.

The master heatmanager must have an IP address of 10.0.0.210.

The IP addresses of the slaves must be set to:

Slave 1: 10.0.0.211

Slave 2: 10.0.0.212

Slave 3: 10.0.0.213

Slave 4: 10.0.0.214

These IP addresses are fixed into the software of the heatmanager and can therefore be changed.

If you select a setting the heatmanager will give advice on how to set the corresponding IP address must be set. If it is not set correctly the heatmanager will give an orange “IP not set correctly” message if it is not correct.

Always check if these addresses are set correctly. This must be done in the offline menu of the touchpanel. Use the [config help] button to get more information on setting this IP address: This is done in case you need to set this “in the field” without any manual.



Use the [go offline] button for setting the touch-screen in offline mode.

Here is a list on how to set the master-slave configuration in the right order:

- 1) Set the correct IP addresses for the master and slave(s). Push the [config help] button on the heat manager for extra explanation.
- 2) Connect the master and slaves with an ethernet connection with help of a switch (note that when only 1 master and 1 slave is used, only 1 ethernet cable, either crossed or straight, can be used for this purpose, when more than 1 slave is used you need a switch)
- 3) Set the corresponding heat manager configuration to master- slave (or standalone, with no interconnections)

- 4) On the master/slave configuration screen, push [next]. The master will scan how many slaves are connected and the slave(s) are going to look for a master.



- 5) If all is ok you will see the message “detected”. If not, check the cabling and IP addresses and the interconnection network.
- 6) When all this is ok, the master/slave(s) are connected to each other and see each other. Now you must program in the master heatmanager a profile in channel 1, that will be used for the slaves.
- 7) On the slave modules, set the channels that must be connected to channel 1 of the master heatmanager in the channel config to “remote”.
- 8) When all these configurations are done and ok you can start the channel 1 of the master heatmanager, the slaves will follow this master with setvalue and can also put the master in hold (when enabled)

Don't forget to put the heatmanager(s) back to “stand alone” after the work is finished, otherwise somebody else can have a problem when he wants to use the heatmanager for another job.

You can also set this configuration in the workshop prior to operation in the field. When the heatmanager starts up and when it is not set to stand alone, it will first show the master/slave/stand alone configuration screen before actually starting to test the connections. That way you can also put it back to stand alone when somebody forgets to do so.

Please note, then when a master-slave connection is present, the master- and/or slave(s) monitor the connection and gives an error when it is not present anymore.

When a slave detects that the master heatmanager is not communicating anymore, it will automatically stop the remote channels connected to it. The other channels, that are not set to remote, keep on running.

7) Basic settings

In the main menu you can choose for the basic settings menu. To access this menu you will need a password, this password is “MASTER” in capital letters.



7a) Hold settings

In the hold settings menu you can insert a maximum deviation between the set point and the process value. When this maximum deviation is reached, the auto hold function will prevent the set point from ramping too far away from the process value.

The factory settings of the auto hold function is set on a maximum deviation of 100 degrees and it is set to off.

To set the auto hold on, just press the used button and insert a maximum deviation of 100 degrees or a minimum of 3 degrees.

7b) Hot/cold start selection



In the “hot/cold start selection screen” you can select whether you want to hold your set-up after a power failure or directly continue your set-up.

To stop the set-up just select “COLD START” and the set-up stops after a power failure. To continue your set-up please select “HOT START”.

7c) Alarm settings



You can set a alarm per channel per segment. To do so, first select a segment from which you would like to set an alarm and then select the alarm column. You can insert a minimum of 0.0 degrees deviation high alarm, and a maximum of 1200.0 degrees.

Note: When you would like to use the Alarm function, you will need to install additional DIO modules in order for the alarm functionality to work.

7d) Language selection



On the “LANGUAGE SELECTION” page you can switch between English, German, French and Dutch. In the future there will also be other languages available.

7e) Date and time



On the “DATE AND TIME SETTINGS” page you can set the correct date and time that will be used in the automatic data logging feature. This will make sure that the correct date and times are used in the .csv file that you can create on the “COPY DATA” page. The blue numbers are the current settings, the white settings are the new settings. Just touch the white numbers, and type in the desired date and time. The new values are immediately active.

7f) Switch Easy/Normal operation mode



To switch to a different mode (easy or normal) go to the “switch easy/normal” menu.

The difference between easy and normal is the number of segments you can enter. In easy mode you can only set one segment (one ramp and one soak), in normal mode you can set-up to eight segments per channel.

7g) Copy data



To copy your trend data to a USB storage device you'll need to go back to the main menu and press the “COPY DATA” button.

Here you can change the file number (this is the number your file will get when it is saved to your USB stick), copy

your data to your USB, enter batch-related data (will be saved as ASCII file with the same number as the file number), delete the trend data and set your measurement interval for your trends.

Please note that the data (.CSV file with the measurements and a separate file with the entered batch data) is stored on the USB stick in the \samp01 directory. The file number is automatically incremented after the save procedure has been completed.

7h) General information



To view your suppliers general information just select the “GENERAL INFORMATION” button in the main menu. You can have your own Information here for your customers.

8) Process value offset



Push the “PV OFFSET” button to swap to the calibration screen. On the calibration screen the operator can add or subtract some degrees of the process values to calibrate the controller with your paper trend chart recorder. Touch the number to set the value by the pop-up keypad. Touch the up and down keys to directly add or subtract one. Push the reset screen to “zero” the applicable channels. Push “BACK” to return to the main menu.

The password for this screen is “MASTER” in capital letters.

9) PID settings



Push the “PID SETTINGS” button to enter the PID settings menu where you can edit the PID settings. Please note that the factory settings are carefully chosen for this application and will work well in most situations.

**Note: you can set different PID settings for each segment of each channel. By touching the segment number a small touch pad will pop-up to change the segment. After you have changed the segment, you can edit the PID values for that segment. Push “BACK” to return to the previous screen.*

Appendix A. Passwords

This is a list with the passwords that are used with the Heatmanager:

Level 1: USER

Level 2: MASTER

Level 10: REINIT

Level 15: CASCADE

Appendix B. Manually force a re-init

The Heatmanager can be forced into a re-init mode with the following procedure.

Warning, only do this when you are familiar with the initial setup procedure of the heatmanager. All settings, incl. the programmed profile, PID settings and heat manager configuration will be reset back to factory default. This cannot be undone so write down the modified parameters before starting this procedure.

- 1) Switch the control on all channels to stop
- 2) Go to the main menu
- 3) Keep the invisible red rectangle pressed for more than 5 seconds



- 4) The re-init procedure will be started. Note that when completely new TIO modules must be initialized, this can take up to 30 minutes for a 12 channel heatmanager. When you do it again later it will take about 10-15 minutes. See chapter 1 for more explanation on the setup procedure. Please note that the stored heating profile that is inside the TIO modules is also reset back to the default when this procedure is executed. So check your heating profile carefully before starting again after this re-init.

If this is not possible, you can also clear the backup memory in the heat manager touchscreen with the following procedure:

- 1) First, stop all channels
- 2) Go to the main menu – master – slave config
- 3) Keep the [go offline] button pressed for more than 5 seconds, the screen will go offline.
- 4) The screen will ask for the password level 15. This is CASCADE
- 5) The screen will ask for the System Password, this is 15
- 6) When you see the header with [Home], [Main Unit] and [Peripheral], push the arrow right button
- 7) When you see the header with [Password], [Initial] and [Maintenance], push [Initial]
- 8) **Now be very careful, ONLY push the [Initialize Backup SRAM] button.** (Not the other one, then the software is cleared and you need to send the screen back for repair).
- 9) When you see the header [User Memory] and [Backup SRAM] enter the password in the white field. Enter 15.
- 10) Push [Start] and confirm that you wish to clear the battery backup memory
- 11) Push [Close], [Exit] and [Yes]. The heatmanager will now restart and the re-init procedure will automatically start.

Appendix C. Changing IP address

When the heatmanager needs to communicate with the CasCade reporter tool, or when you wish to interconnect a master-heatmanager with several slave-heatmanagers, you need to configure and set the IP address to a **fixed IP address configuration**. This procedure describes how to get to the right part of the touch-screen software for that.

When the heatmanager needs to operate in the master-slave mode, the IP addresses must be set as follows:



This screen comes up when you configure the master-slave configuration. Put the heatmanager back to stand-alone if it needs to operate without the slaves again, otherwise you will get communication errors.

The IP address of the touch-screen can only be set in the so-called offline menu. Push the [GO OFFLINE] button for more than 5 sec. Enter the level 15 password CASCADE and the system password: 15.

You will now see a screen with the header [Home], [Main Unit] and [Peripheral].

Push [Main Unit] and select [Ethernet].

Here you can enter the IP address, for example, you need to set the Master heatmanager as follows:

IP Address: 10 0 0 210

Subnet Mask: 255 255 255 0

Port: 8000

Push the arrow right [->], and enter there:

Gateway: 10 0 0 254

Push [Exit], [Yes] and the touch-screen will restart, now with the newly configured IP address.

Please note, that you only see IP addresses when they are configured in the same range. Consult your IT expert on advice if you don't know how to set this.