Ice Star
Quick start user manual

- ISPort installation
- Communication ports in Ice Star units
- Creating and controlling new heating project
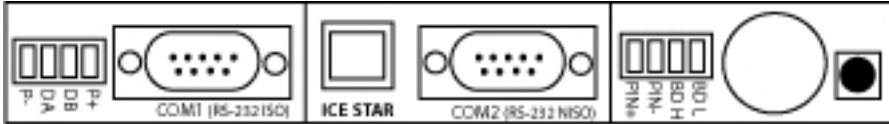
ISDOK:

QS_EN_V20

Directory

Operation power in Ice Star units

**Operation power 24VDC
blue -
red +**

24V operating voltage is connected to the "PIN" terminals

The voltage must be at least 20V and not over 28V. If the voltage is less than 20V, the device is running, but the flash memory can not be used (not recording events or temperatures) and also ex. ISQ controller's display is not working.

Operating power can be checked later by the ISPort program from unit's IO- configuration.

The Indicator Led:

Light on -> Device starting.
This occurs when the power is connected, or if the voltage is less than five volts.

Flashing slowly -> Low supply voltage.
The controller is only partially operational

Flashing rapidly -> The Device is in Programming Mode
The device is stopped for the update

Flash every 1.5 s intervals -> Normal operation.

Flash every 1.5 s intervals + short blink -> Normal operation.
The device is synchronized to other devices via RS-485 bus .

ISPort installation

ISport program can be installed on the PC in two different ways (A), by copying the necessary files, or (B) by Using the ISPortLoader program.

(A) Copying
   Copy all provided files on your computer example:
   C: \ ISPort, C: \ Program Files (x86) \ ISPort.

(B) Using the ISPortLoader program
   Use ISPortLoader program to extract necessary files from provided ISPort.zip file.

Upd	DIR	
Text	DIR	
Project	DIR	
Layout	DIR	
Archive	DIR	
Svenska.bat	136	
Suomi.bat	130	
README.txt	867	
Raportti.tab	7 181	
ISPortLoader.exe	ISPORT~1.EXE	90 112
ISPortIO.txt	7 892	
ISPortC.txt	6 885	
ISPort2S.exe	1 825 280	
ISPort2.exe	1 825 280	
ISPort.txt	53 757	
ISPort.ini	12 698	
ftd2xx.dll	220 016	
English.bat	136	
DEFPROJECT.TB1	DEFPRO~1.TB1	12 344
cw3230.dll	303 104	

ISPort program files:
- ISPort2C.exe   ISPort program Calibration
- ISPort2S.exe   ISPort program Setup
- ISPort2.exe   ISPort program
- cw3230.dll   Needed library for program
- ftd2xx.dll   Needed library for program
- ISPort.txt   Program text defination
- ISPortIO.txt   I/O field defination
- ISPortC.txt   Info field defination
- ISPort.ini   Program defination and settings
- Suomi.bat /English.bat etc.   Language for ISPort.
                        By doubleclicking the file, the language will be used in ISPort

- Project (file)   All active projects from ISPort
- Layout (file)   Layouts for prints
- Archive (file)   Heated projects that are archived (moved to archive)

- Upd (file)   Needed moduls for updating hardware
- Text (file)   Program text defination
- DEFAULT.TB1   Contains saved configurations
- DEFPROJECT.TB1   Contains saved templates for projects
- Raportti.tab   Contains reports

Starting ISPort

   ISport program is started by double-clicking the file ISPort.exe or by double-clicking the desktop icon.

Login ISPort

First time starting ISPort, the program asks acceptance for Using Rights.
In Using Rights bottom, there must set "Activation code (Licence)", it can be find from README.txt file.

Next opens ISPort Login window.
User field must be filled when starting ISPort the first time.
Later Its possible to set it as a optio from ISPort's PC settings.
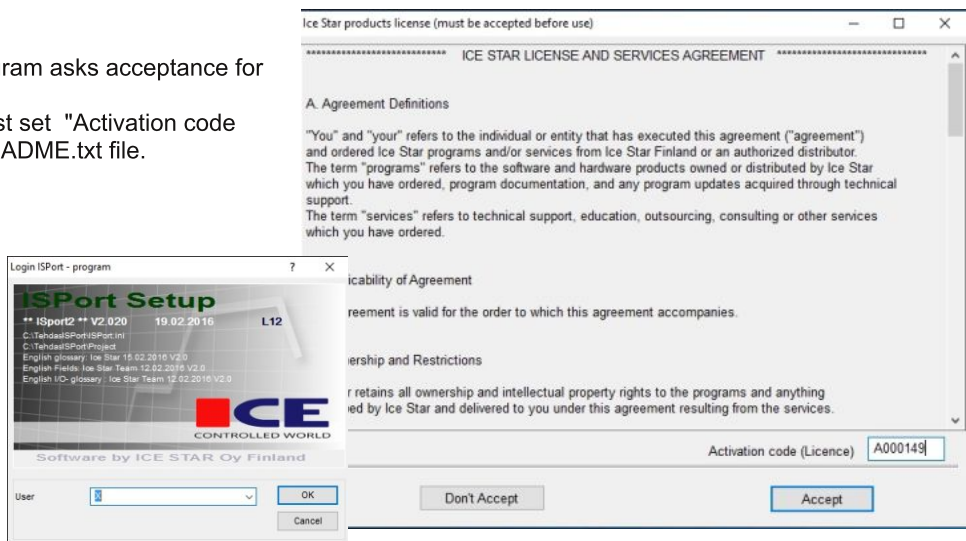
Communication ports in Ice Star units

RS-232 Serial port

- RS-232 bus is used to connect PC and a communication modem to the system
- RS-232 is significantly more sentive to external shocks than RS-485, so the devices' maximum distance is practically about 10 m. It's possible to connect a seperate local modem to RS-232 bus, when the distance can be increased up to kilometers
- RS-232 port recovers from the failure much better than USB, so it's better in fixed connections
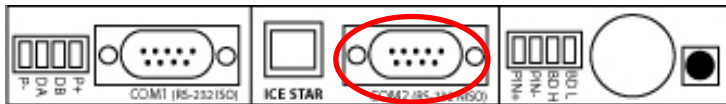
ISC controller

ISC is equipped with two RS-232 connectors, one of which is galvanic isolated. To the port, which is not galvanic isolated, should not connect any other devices if power is connected. Also devices' differences in voltage at ground cabel would be good to check before connecting. Galvanic isolated port tolerate external shocks better and it should be used always when connecting to PC
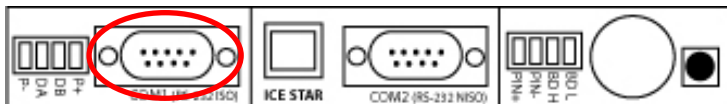
RS-232 connector (COM1) in ISC controller

COM1:
- Galvanic isolated
- Connect pins 2=Rx, 3=Tx 5=GND speed 38400
- GSM modem can be connected
- ISM modem can be connected
- PC can be connected directly or with external USB-to-RS-232 converter
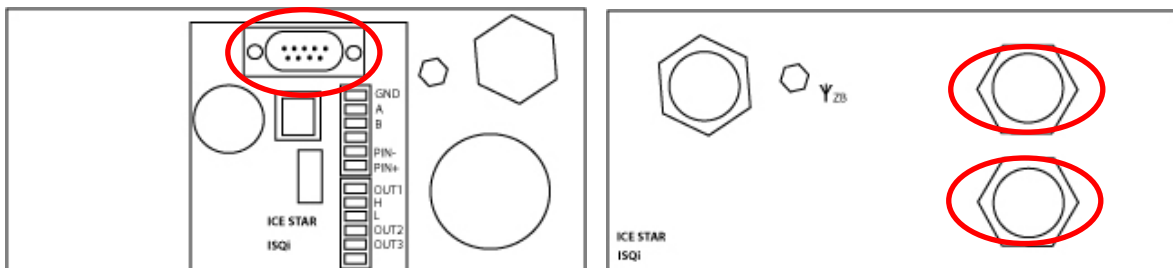

RS-232 connector (COM2) in ISC controller

COM2:
- Connect pins 2=Rx, 3=Tx 5=GND speed 38400 and pin 9 has 3.3V power for Zigbee modem
- ZigBee modem can be connected
- ISM modem can be connected
- PC can be connected directly or with external USB-to-RS-232 converter

ISQ controller
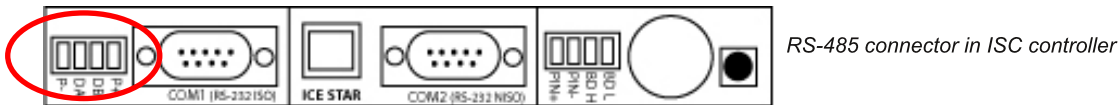
RS-232 connector in ISQ controller

- Connect pins 2=Rx, 3=Tx 5=GND speed 38400
- Connect pins in front panel 9=Rx, 10=Tx, 1=0V GND and pin 2 has +24 V power for GSM modem
- GSM modem can be connected
- ISM modem can be connected
- PC can be connected directly or with external USB-to-RS-232 converter

RS-485 Serial port (Data expansion bus)

- RS-485 communication bus is used to transfer control information and synchronize information between controllers
- RS-485 is a fieldbus, designed for factory conditions. Its differential drive mode allows trouble-free connection for longer transmission ranges. Using a shielded pair cable, range can be up to 100m
- Bus consists of two data conductors A and B, and one GND conductor (connect the data conductors). Devices are connected by connecting the similar connectors (A-A, B-B and GND (ISC/ISD marked P-)-GND) together
- When using a shielded pair cable, connectors A and B connect with pair cable and GND with single conductor. The shield is connected to one end to the GND conductor. If possible, the devices should be connected point-to-point, and a so-called star network is not recommended
- ICE's devices is equipped with end resistors (820R), so only with more than 20m range should use seperate 100R end resistors
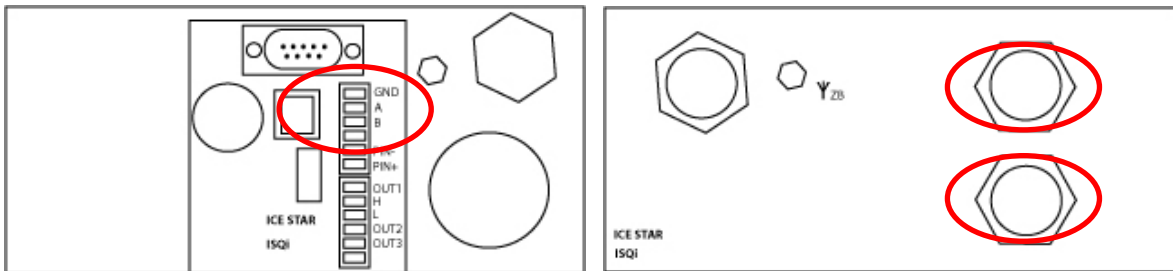
ISC controller

RS-485 connector in ISC controller

- PC can be connected directly or with external USB-to-RS-485 conductor
- ISN displays can be connected
- ISD expansion unit can be connected

ISQ controller
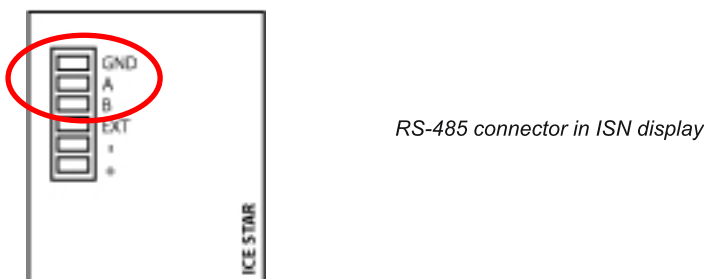
RS-485 connector in ISQ controller

- Connect pins in front panel 3=GND, 4=A, 5=B
- PC can be connected directly or with external USB-to-RS-485 conductor
- ISN displays can be connected
- ISD expansion unit can be connected

ISD expansion unit

RS-485 connector in ISD module

ISN Displays

RS-485 connector in ISN display

USB

- USB is used to connect PC to the system
- USB is used to make a temporary connection within devices
- USB's advantages is easy to connect and most PCs have USB ports. When connecting device to the PC at the first time, should install the drivers for device. ICE uses in devices FTDI usb chip, so needed drivers can install from FTDI website
- All ISC and ISQ devices uses the same serial number, then it's not neccessary to install drivers to all devices seperately. Also all ZB modems uses the same serial number
- USB connection is relatively sensitive to shocks and in a failure situation cabel often needs to reconnect. PC's high speed USB ports are sensitive to cabels load, so it's not recommended to use more than 5 metres cabels
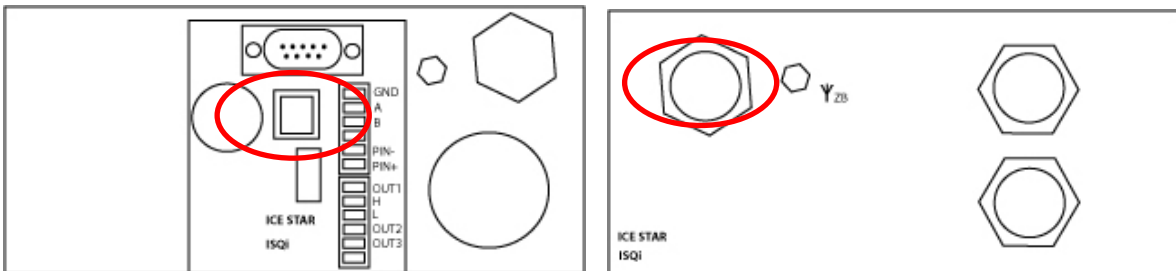
ISC controller

USB connector in ISC controller

- PC can be connected directly

ISQ controller

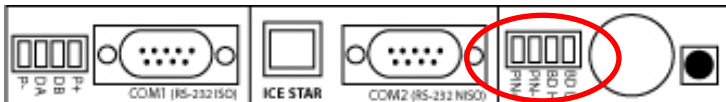*USB connector in ISQ controller*

- PC can be connected directly
- In front panel mini B-type USB

CAN (IO expansion bus)

- Control information transfer within units with CAN bus
- Differential CAN bus is suitable for short real time messages sending in factory conditions
- With CAN bus the controller and expansion unit is connected to each other. It's not possible to connect more than one controller to the same bus, because controllers uses fixed IDs (addresses) for system information
- With more than two meters range should use shielded pair cable. Expansion units are connected to controller by connecting the similar connectors (L-L and H-H) together
- CAN bus is not galvanic isolated, so ground cabel formed of devices powers 0-level (-)
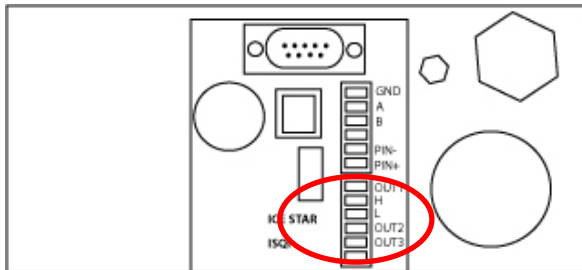
ISC controller

CAN connector in ISC controller

- ISD expansion unit can be connected

ISQ controller

CAN connector in ISQ controller

- ISD expansion unit can be connected

ISD expansion unit

CAN connector in ISD module

Making connection to ISD with ISPort
• Connect ISD to controller
• Start ISPort and choose the communication port for controller (in which ISD is connected)
• Click controllers device line and choose from device information "controller's settings (ISC)"
• Set ISD unit's serial number (ID) and use
• Add the ISD to the device list if it's not already there (by clicking right button with mouse)
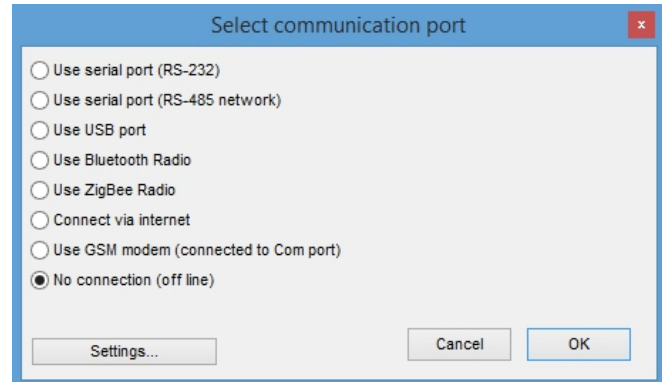• Connection to ISD OK

Select communication port

Every time the program is started, it will ensure the connection method.
ISPort opens the defined port, or does not open the connection at all (offline).
"Cancel" do not change the setting, but will use the selected setting. If the port was already open (Not at Start), so it will not be closed.
"Ok" to close the earlier port (Not at start) and open the specified port. The setting can be changed later by ISPort

Select communication port

○ Use serial port (RS-232)
○ Use serial port (RS-485 network)
○ Use USB port
○ Use Bluetooth Radio
○ Use ZigBee Radio
○ Connect via internet
○ Use GSM modem (connected to Com port)
● No connection (off line)

Settings...   Cancel   OK

RS-232 Serial port

Making connection with ISPort
• Connect unit with PC and check the number of COM-port from PC's device control (serial port)
• Start ISPort and choose communication port: RS-232 serial port. Click Settings (Opens communication ports settings) and set the COM port number (serial port)
• Add the device to the device list if its not already there (by clicking right button with mouse)
• Connection OK

RS-485 Serial port

Making connection with ISPort
• Connect unit with PC and check the number of COM-port from PC's device control (serial port)
• Start ISPort and choose communication port: RS-485 serial port. Click Settings (Opens communication ports settings) and set the COM port number (RS-485)
• Add the device to the device list if its not already there (by clicking right button with mouse)
• Connection OK

USB

Making connection with ISPort
• Connect device to PC
• Start ISPort and choose communication port: USB port
• Device comes automatically to device list
• Connection OK

Bluetooth

Making connection with ISPort
• Connect the device to PC with Bluetooth and check outgoing COM port number from PCs bluetooth settings
• Start ISPort and choose communication port: Bluetooth
• Add the device to the device list if it's not already there (by clicking right button with mouse)
• Doubleclick on the device's line (opens communication ports settings)
• Set the COM port number (bluetooth)
• Click the device's connection square and wait until the connection is OK

ZigBee radio

Making connection with ISPort
• Connect the other ZB to PC's USB port and the other ZB ISC's RS-232 connector (in ISQ built-in ZB)
• Start ISPort and choose communication port: ZigBee radio
• Add the device to the device list if it's not already there (by clicking right button with mouse)
• Click on the device's line
• Connection OK

Internet

GSM modem

Making connection with ISPort
• Connect the other GSM modem to PC's USB port and the other GSM modem controller's RS-232 connector and check COM port number from PC's device control
• Start ISPort and choose communication port: GSM modem. Click Settings (Opens communication ports settings) and set the COM port number (GSM modem)
• Add the device to the device list if it's not already there (by clicking right button with mouse)
• Click on the device's line
• Connection OK

Communication link

Set the device list visible by the "Devices" button.

Clicking the icon at beginning of the line, the device is activated or deselected. ISPort will communicate only with activated devices.

Icon explanations

The device is not connected (activated)

The device is selected. Not connection

The device is selected, and the communicatin is working normally

The device is selected, but no communication. The program is offline, or a port problem.

The unit is responding incorrectly or no respond at all. The device is deselected after three attempts.

Communication is working, but the device can not be used, because the wrong PIN code.
If there is no wrong PIN code, check your drivers. Drivers for devices can be found from www.icestar.fi/drivers
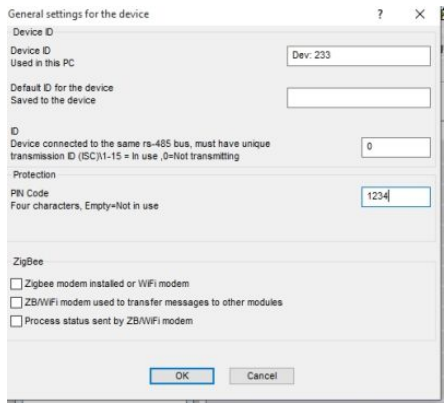
Set the Pin code:
The Pin code can be setted in "General settings for the device" dialog.
You find the dialog by clicking the device row in devicelist --> from device info tab, click "Settings"

Note! there must be connect with the device when setting the Pin code.
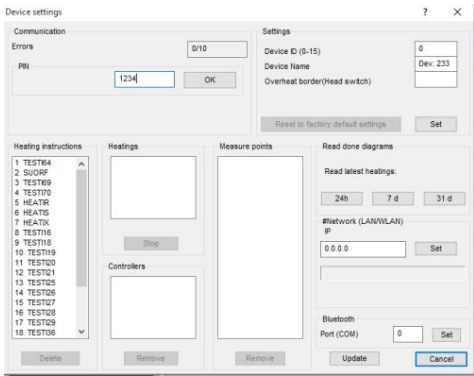
Open the Pin code device:
Write the earlier setted Pin code in "Device settings" dialog.
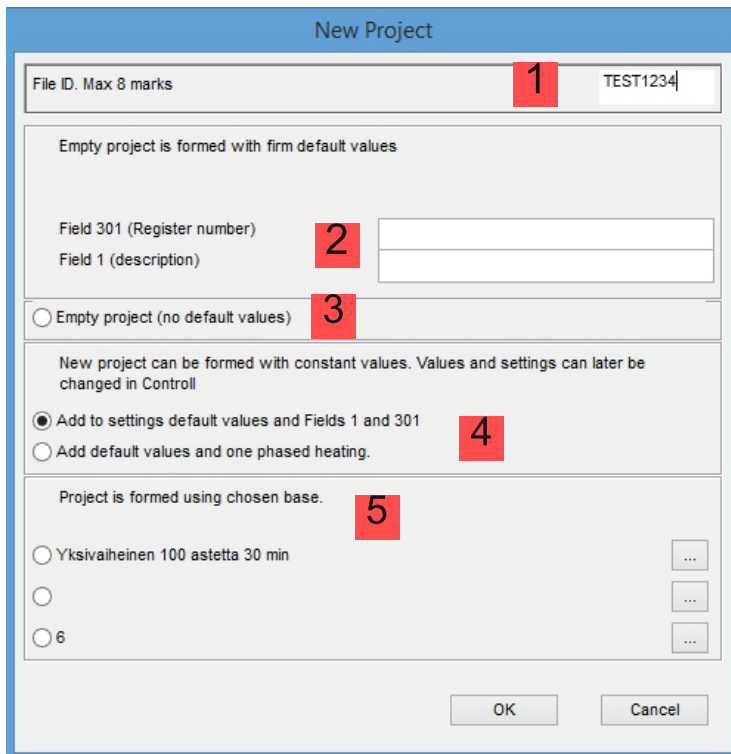You find the dialog by doubleclicking the device row.

Start a New Project

Every heating is a project. The "Project list" is set visible by clicking the "Projects" button

Create a new project

New Project

Click the "New Project" button.

[1] **Register numer**
ISPort sudges to a new projec a registernumer. The registernumber can max be 8 marks, marks can be A-Z and 0-9.

[2] **Form empty project**
At this point can the project allready be formed with default values. Register number (field 301) and description (field 1), theese fields can be changed in projects "Project Information" tab.

[3] **Empty project**
No default values will be added and no heating phase.

[4] **Form with constants values**
A new project can be formed with constant values, choose to add default values to settings and Fields 1 and 301, or a one phased heating and default values.

[5] **Form a project with saved template.**
A project can be based at the same time as it is created. Choose template with "..." button. A template can also later be added with the "Load template" button.

The same registration number cannot be used for two different projects, as it is guaranteed to lead to confusion.

Project control panel
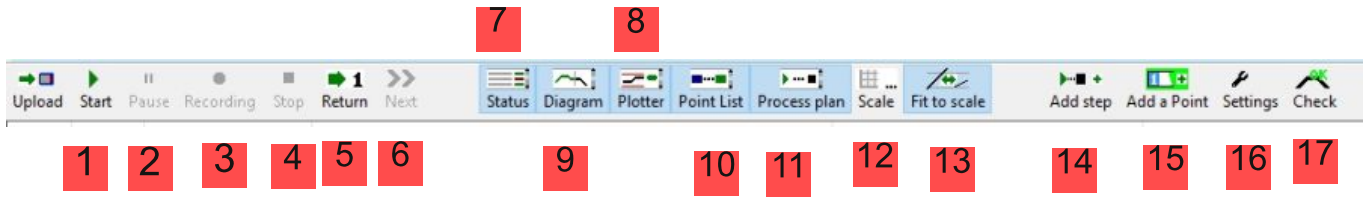
[1] Start: The heating can be started when there is at least one controller selected to the project
[2] Pause: Heating Program execution (Heating) can be stopped temporarily. Reference temperature (during heating or cooling) will also stay at the current value
**[3] Recording:** Recording (capture) can be set on manually
[4] Stop: Stops the heating immediately, or moves the execution to the defined end point (stop start)
[5] Return: Sets the start to the first step (1)
[6] Next: Heating can be moved to next phase. Used only after start.
[7] [8] Status, Plotter: Switch information screens On/Off during heating
[9] Diagram: Diagram dispaly On/Off
[10] Point list: The list of the controllers and measuring points On/Off
[11] Process plan: The heating plan (step list) On/Off
[12] Scale: It's possible to change diagram values and the program will scale the X and Y cordinates to wanted values. When the heating is running values can be changed also by clicking the mouses right button on the Diagram window.
[13] Fit to scale: Fits the size of the heating plan to the diagram display
[14] Add step: Opens the dialogue to add steps to the heating plan. Heating plan (step list) must be visible in order to directly add steps to it
[15] Add a point: Opens the dialogue to add measurement points and controllers to the project
[16] Settings: Opens the dialogue to change the settings for the heating
[17] Check: Opens the dialogue for checking the setted values for heating

Selecting Controllers and measurement points

Open the dialog to select a point
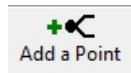
Select the controllers and the measurement points. Select those one by one.
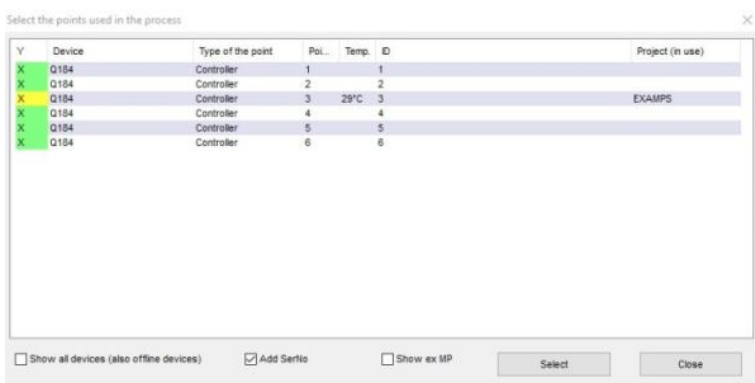
Points are added to the project in the order they are selected.

If the point of the first column is green, then the point is free and the heating can be started immediately.

If the points are chosen from two different controllers, will the controller, from where the first point is selected, be the Master (Controlling controller, set the pace)
Master is shown in point list in a light green background before starting heating.

Selected controllers and measurement points are added to the "Point list".

Unnecessary points can be removed from the list by the DEL-key before starting the process.
Points can not be removed from the list on the "Devices" tab.

Creating a Heating plan
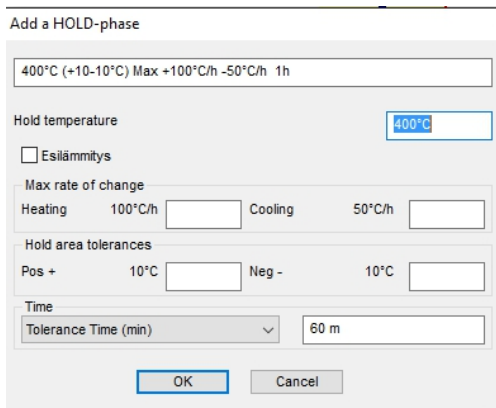
Heating Plan can be created in three different ways:
- By using mouse's right button
- By using the step list
- By using controlpanel. In This way, It's not actually a process plan, The heating is made step by step when it's running.

Creating the project by using mouse's right button is fast and the easiest way.

Start by clicking mouse's right button on diagram area --> opens dropdown menu

Add 1. hold phase/ Hold phase to the end
Add a hold phase to the heating/ cooling phase
Add a heating/ cooling rate change
Add the end of heating
Remove phase
Remove the last phase

Choose "Add 1. hold phase/ hold phase to the end" --> opens "Add a HOLD phase" -window (picture below)

"Pre-heating" is used, when pre-heating is wanted to a chosen hold-phase. Settings affects the PID parameters, does not care about alarm limits or the positive tolernace limit during the hold
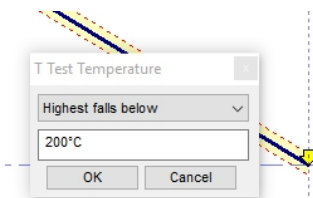
Add the values you want

Note!the first rowand the values that are shown before the test fields are default, that are used, if the fields leaves empty.

When you are finished press "OK"

Next add the end to the heating plan. Click mouse's right button on the diagram area and coohe from the dropdown meno "Add the end of heating".
ISPort adds automatically end temperature to the heating plan. Value can be changed by clicking the yellow arrow in the end of heating plan --> opens dialog (picture below), where you can change the temperature and choose the value measure(highest falls below, average falls below...)

More phases can be added by clicking the mouse's right button. Ex. choose place from the heating plan and add there heating rate change.

All values can be changed by clicking the yellow arrows and yellow squarres on the heating plan.

Editing the step list

The Heating Plan can be modified through the step list. More step types are available compared to graphic design assistant. The step list must be first visible, then "Add step" dialogue can be opened. A new step is inserted to the list before the selected step, or if nothing is selected then, added at end of the list. The order of steps in the list can be changed by dragging them with the mouse. Extra steps may be removed by the DELETE key.

The step list can be edited before the start, but not during the heating.

No	And/Or	Type	Function	Comment
1		D Start of capture		
2		H Set Heating Param	Temp: 300°C Max heating rate: 200°C/h Max cooling rate: 100°C/h Pos.Tol: 5°C Neg.Tol: 5°C	
3		T Test Time	When the holding time exceeds 30m then continue	
4		H Set Heating Param	Temp: 0°C	
5		T Test Temperature	If the highest temperature under 100°C then continue	
6		P End of heating	End of the process	

Step types and functions

1 D Start capture
Starts the storage of the process data. Every time the process executes this step, the storage number increases and data storage on a new number is initiated.

2 D Stop capture
Stops capturing the data. The capturing is also stopped when the process is stopped.

3 H Heating parameters
Changes the process's set values. Only those values are changed for which a new value has been given.

4 T Test temperature
Tests the process temperature. Holds the process's progression until the condition is fulfilled.

5 T Time
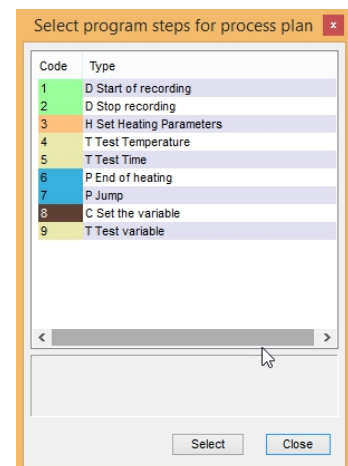Tests the time. Holds the process's progression until the condition is fulfilled.

6 P Stop
Stops the process and releases the points.

7 P Jump
Sets the next executed step (jump).

8 C Set value.

9 C Test value.

The values can be changed from "Set values panel" also after starting the heating

[1] Set temperature
Reference value for the process temperature. When the reference value is missing, the powers of connected controllers are in zero. When changing the set value, the new value is immediately set as the reference value of controllers if the rate of change has not been limited. If the rate of change has been limited, the process moves either to the rise phase or the drop phase, depending on the change.

[2] Largest rate of heating
As the process's set value rises (the new set temperature), the rise of the controllers' reference value is limited to the given value. If the value is missing, i.e. the field is empty, the rate of rise will not be limited, but the process's set value immediately becomes the reference value of controllers. With the set value 0 the reference value of controllers and the temperature will not change. Largest setting 999.

[3] Largest rate of cooling
Same as above, but the value is used when the temperature is reduced.

[4] Process instructions either wait for the time or the temperature
Used in connection with the process instructions. The execution of the process instructions waits until the temperature achieves the given limit or until the given time limit has been reached. Only one of them at a time can be set as the condition. The comparison method (list) cannot be changed, whereas the value (temperature or time) can be changed.

[5] Tolerance Pos (Over)
Forms the holding temperature's upper limit together with the set value. If some involved point exceeds the limit, the temperature is off the hold area, and the hold time will not increase.

[6] Tolerance Neg (under)
Otherwise the same as above, but the hold temperature's lower limit. The given value is positive (+).

Checking the heating plan

It's possible to check all the setted values befire starting the heating by clicking the "Check" button.

It's not possible to change any values from this dialog, It's only for checking.

Start point of the heating plan

If the starting point for the heating plan is not specified, then the execution begins from the step one (1)

For next (second, third..) heating in the project, its recommended to press "return" -button before starting. If the button is not pressed, there can come an extra holding area in the start of heating.

Heating plan start point is shown in step list with a green arrow.

Set the end of the heating plan

Heating is closed by the step "End of heating". If the heating is stopped manually by the "Stop" button the heating is stopped where its execution is. If necessary, for heating plan can be set a point where execution is moved to stop (The start point of stopping). Allways the "End of heating" step must be the last step in the heating plan.

Starting the heating

Heating can be started when at least one controller is selected to the project

If for the heating has made a heating plan, then executiont will start from the specified step. If the heating plan has not been made , then the heating uses "Set values", which must be set manually to the "Set values panel".

Heating is started by "Start" button. If the step list is visible, the start step will be marked by green arrow in step list.

When pressing "Start", the program will ask if all the settings is OK.
--> Opens "Start confirmation" dialogue

The heating will start, only if "Special instructions checked" is chosen.

Then press "OK" and the heating starts.

Stopping the heating

Heating stops automatically when it executes the "End of heating" step. Heating can be stopped at any time by the "Stop" button.