MISTRAL 260

(SHA One)

Forced air convection oven

User manual

Version 3.12

SPIDÉ

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IMPORTANT SAFETY RULES FOR FORCED AIR CONVECTION OVEN

Risk of fire and burning:

It Is dangerous to leave the oven unattended when it is in production mode at high temperatures. The products are very hot and can start a fire if placed on lightly flammable surfaces. Protective gloves or a heat-resistant tool must be used to remove PCBs while the oven is at working temperature. In case of fire pull out the plug!

Do not put flammable materials near or on the reflow oven and do not *block the ventilation grate.*

Do not touch the glass of the oven; it can be hot. ***There is a serious risk of burning of the skin****.*

Machine location:

Do not use the oven outdoors! The oven is developed to be installed on a flat, dry surface. This surface or table must be capable of carrying a weight of at least 200 Kg. The oven should be used at normal room temperatures of 15 to 25 degrees. There must be at least 4 inches (10 cm) of clearance between the unit and the wall. Installation inside a cupboard or box is not allowed as it is dangerous. Do not install this oven near a heating element or stove or in a wet environment.

Power supply:

Be sure to install in compliance with industry standards. Incomplete or faulty installation can cause stumbling accidents or electrical shock. Put the main plug in the wall socket near the oven.

Normal use:

The oven has been developed only for soldering of PCBs and should not be used for food, animals or heating of other materials. Non-compliance invalidates the warranty.

Do not use the oven if it is damaged or not working properly.

Check the correct function of the oven by following the checklist below:

1. The inlet and outlet must free and there must be no other obstructions
2. The belt must be in good condition
3. The power cable, plug and outlet should be checked for possible damage.

High voltage – *THE CASING MAY ONLY BE OPENED BY QUALIFIED PERSONS:*

The casing must never be opened or removed. **The machine contains high voltages which can lead to serious injury or even to death!**

The plug and power cable must not be placed in any kind of liquid. Liquids or other materials must not be allowed to enter the oven through the door lock or ventilation grille. If this happens:

Switch off the oven immediately and/or pull the plug out of the wall socket.

Contact your supplier for advice.

Make sure the power cable is not suspended on anything sharp. Do not allow the power cable to come into contact with hot surfaces.

The power cable may only be replaced by qualified persons in case of damage.

Operating the oven:

This oven may not be operated by persons under the age of 18. The oven may also not be operated by people with disabilities who are not in a position to operate the oven in a safe and responsible manner.

It is strongly recommended that the operator has adequate knowledge of working with soldering machines and the use of the right paste for soldering.

Use the oven only in well-ventilated rooms. *Follow the paste supplier's safety rules. Gas and heat will be produced during the soldering process. The gases may have a negative effect on health. The purchase of our fume extractor option is strongly recommended.*

Liability for improper use:

Neither the supplier nor the manufacturer is responsible for damage to the oven or

personal injury in case of the infringement of safety rules or incorrect installation. The warranty also expires immediately in such a case.

1. Preface

Congratulations! You have purchased a high-quality machine made with dedication to meet the highest standards possible. To ensure proper operation we strongly advise you to read this manual first.
This manual is designed to help you get the most out of the Forced Air Convection Oven program in the shortest possible time. It is written with both new and experienced users in mind.

1.1 How this manual is organised

The first section of the manual explains the unpacking and installation of the oven. It includes a description of the principles and specifications of the oven.
The main section of the manual is built around questions a user might have concerning the touch screen display. The software is designed to achieve the most user-friendly operation of the oven possible simply by using your fingertips.

1.2 Illustrations

The illustrations in this manual were taken with the intention of providing the clearest possible tutorial for the program. Default screen positions and sizes were used in most cases.
Because the oven program can be configured in many different ways, do not be concerned if you detect minor differences between the illustrations in this manual and what you see on your display.

2. Setting up

2.1 Unpacking the oven

Unpack the oven carefully and save the original package in case you need to ship the unit.
Included with the oven you will find:
- Two mobile thermocouples for creating profiles
- USB stick with documentation

2.2 Before starting the oven:

Operate the oven in a well-ventilated room only. Keep people who are not operating the unit away from the oven.

2.3 Power source

- Mistral 260. Single phase 220 VAC, 16A 50/60Hz.
- Mistral 360. Three phase 380 VAC, 16A 50/60Hz. (For safety reasons use a 5-pole plug)

Make sure that the oven is connected to a well earthed power socket.

2.5 Instructions for operation

- Do not operate any switch with wet hands or you may receive an electric shock.
- Do not use combustibles (e.g. thinner), combustible gases, or volatile matter near the oven; this may result in explosion or fire.
- Do not place anything on the oven while using the oven. The heat could cause fire and/or deformation, cracking, etc.
- Consult only your dealer for repairs. Incomplete repairs can cause electrical shock, fire or stumbling.
- When removing dirt on the oven, do not use chemicals such as thinner or benzene; this may result in accidents.

2.6 Purpose of the oven

The oven was designed only to be used for soldering or drying. Do not use for other purposes.

2.7 Using an exhaust

To connect the exhaust: move the exhaust pipe over the stud at the rear end of the oven. An additional exhaust ventilation unit is required.
Note that air flow regulation may be required since excessive air exhaust can cause a temperature drop in the oven.

2.8 USB stick

When unpacking the oven, you will find a USB stick. On the stick you will find some data. Keep this stick in a safe place. You will need this stick for updates & profiles. You can make a copy of this stick and use this in practice whilst keeping the original in a save place.

3.0 Working with the touch screen

The following picture will be displayed on the screen when the machine is switched on:

After the machine has booted there are several different screens which may appear. The message "Updating screen" may appear if a screen update is found on the USB stick. In case of a screen update the screen becomes black with a red bar after a while. Here you can see the progress of the update.

Either the main screen or the login screen will pop up when the update is ready or if there was no update. This will be explained in the next chapter.

3.1 Main screen without password check

The screen below will be displayed if the "**Use user & password**" function in the "**Settings \ Display & Sound**" menu is set to "**NO**".

3.1.1 Main screen layout.

The screen layout will differ if the **Use user & password** function under **Settings / System settings** is set to **YES** (see chapter 3.2 **Main screen with password check**).
The upper left corner displays the current date, the upper right corner displays the current time. Both can be changed under **Settings / Date and Time**. (See **Machine settings and info**)

Recipe: Name of the current soldering profile.

Customer: Name of the client who "owns" the profile.

Act.(˚C): The zone actual temperature.

Set.(˚C): The zone setpoint temperature.

Sensor 1 + 2: Can be used during the production stage to measure/check the time the product is within the melting temperature of the used paste to make sure the soldered component has the correct temperature during the appropriate amount of time.
The corresponding fields are greyed out if no sensor is connected. If no sensor is connected both the sensor data and the knob will be greyed out. The field is also greyed out if the sensor is broken or wrongly connected. The reason will be displayed in the °C field.
The melting temperature can be modified in the **Recipe editor**. (See chapter 4.0).
The 1st field shows the temperature of the sensor, the 2nd field shows the time in seconds. This is the time the product was at melting temperature.

There are two different modes for this function. The mode can be changed under **Settings / System settings**. (See **Machine settings and info**)

A. The button shows **Sensor(s) OFF** or **Sensor(s) ON**
By default, the button shows the text **Sensor(s) OFF**. Pressing the button changes the text to **Sensor(s) ON** and colours it red. The value fields are reset and the sensors are activated. In this mode the sensor(s) keep track of the highest temperature measured even if the temperature is decreasing after the soldering cycle. The time fields show the time the sensor has measured the melting point temperature. To clear both fields you have to turn off the oven or press the **Sensor(s) OFF** button. Pressing once more switches to **Sensor(s) ON** and all values are cleared.

B. If the button shows **Clear melt timers**
The sensor continuously shows the actual value measured if this mode is selected. The time field shows the last value it has measured. This is the period of time that the sensor was above the melting point temperature.
To clear the timer field you have to press the **Clear melt timers** button. After this action you can use the sensor for a new solder cycle.

Belt speed: This is the speed of the belt as set in the **Recipe editor**. The belt speed can be adjusted by cm/min with the **+** and **–** buttons or in the **Recipe editor**.
If a value has to be changed the user should press the value that should be changed. This will display the **Recipe editor**. This screen will be discussed in the chapter **Recipe editor**.
Invisible button: There is an invisible button between the **Sensor** and **Recipes** buttons. Pressing this button changes the screen to **Max. brightness** mode. This option is set in the **Display & Sound** screen. Please refer to **Display & Sound** for more information.

Stop belt: With this button the belt can be stopped at any time during the process.

Shut down oven (Mistral 360 only): Pressing this button causes a message to be displayed asking if you want to power off the oven. The power off procedure is initiated by selecting **YES**.
All functions are now disabled and the message: **Waiting until all zones are below xx °C** appears at the bottom. If this is the case the oven will turn off the main power. (for **xx** see chapter 11.0)
To start the oven again you must press the start button on the left side of the machine. After the machine is powered down you can restart the machine by pressing the button on the left side of the control panel.

Important:
*The **Power off** function is controlled by software. That means that the machine can still be carrying high voltage even if it is shut down. This also applies to the **Start** pushbutton on the left side of the machine. **The machine must be disconnected from the mains supply or the main switch on the left rear of the machine switched off before maintenance is carried out inside the machine. Failing to do so can cause serious injury or even death.***

3.1.2 Functions explained.

Start: The status changes from **Stopped** to **Running** if this button is pressed. The oven is then in production mode. All zones heat up to the setpoint value.
When the button is pressed again the status changes from **Running** to **Stopped.** This indicates that the machine has returned to standby mode. All zones will cool down to the ambient temperature.

Profile: The **Make profile** screen is displayed if this button is pressed. Here the user can create a soldering profile by using thermocouples. Please refer to **Make profile** for more information. Another word often used for **Profile** is **Trend**.

Settings: Pressing this button displays the **Machine settings** screen. Please refer to **Machine settings** for more information.

Recipes: The **Recipe selection** screen is displayed if this button is pressed. This displays a list with all available profiles. Please refer to **Recipe selection** for more information.

3.2 Main screen with password check.

This screen is displayed if the **Use user & password** function in the **Machine settings \ System settings** menu is set to **YES**. This also affects the machine booting process as it will display the password screen instead of the main screen.

The **Log on to the machine** and main screens when using the password option are shown below.

3.2.1 Log on to the machine.

The use of the login screen is straightforward. Enter your username and press enter. The **Password** screen appears and the field changes colour to yellow. Enter your password and press enter. The main screen shown below appears if the username and password are correct. The logon screen is cleared and waits for input if the username and or password are incorrect. The screen below shows the layout for normal users.

Command bar if the user is an administrator

3.2.2 Functions explained.

The functions of all buttons and fields are the same as described in chapter 3.1, **Main screen without password check**. The layout depends on the user's rights. For administrators there are two new items: **Operator** and **Logout**.
For users, one item on the command bar is replaced for **Logout** and one field displays the user name in the **Operator** field. (See pictures above)

Operator: The name of the current machine operator. Operator privileges and name can be changed in the **Machine settings \ User & Passwords** menu.

Logout: Pressing this button logs the user out of the machine and returns them to the password screen. Another user can now log in to the machine. (Note: different users have different privileges)

4.0 Recipe editor

The **Recipe editor** is displayed if an editable value is pressed in the main screen. The user can change any parameter value using the **Recipe editor** to the desired value. Only administrators are entitled to use the **Recipe editor** if password protection has been enabled.

4.1 Functions explained.

Save: All changes will be saved. After all is saved the screen will display the main screen again.
Cancel: The new values will **NOT** be saved and the screen will display the main screen again.

4.2 Editing a recipe value

Ticking the value that needs to be changed causes either an ASCII or a numeric keyboard with the title **Edit recipe item** to appear depending on the value type. The current, max and min values of the pressed field are displayed on the screen. Pressing *Enter* or *Cancel* brings the user back to the **Recipe editor**. The ASCCII keyboard layout is the same as used in the login screen. Below you see the numeric keyboard for editing numbers.
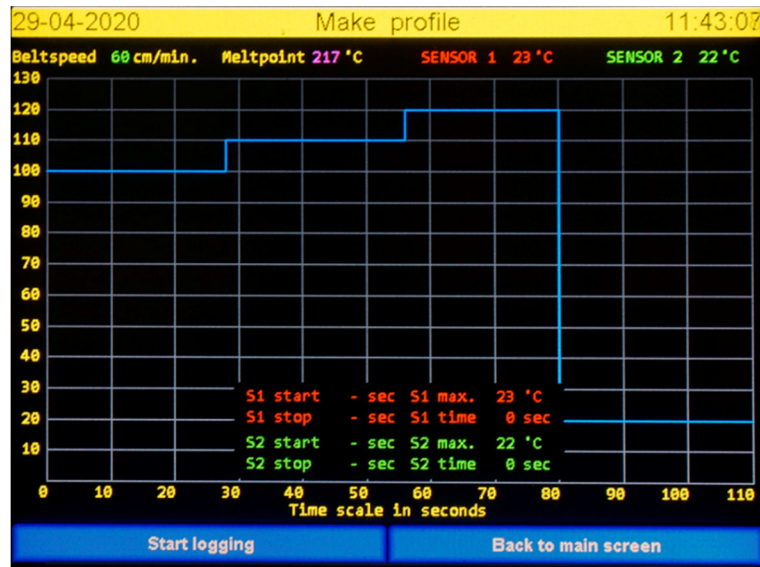
5.0 Profile or Trend screen.

The screen below will be displayed if **Profile** has been ticked on the main screen. This function allows users to get a profile of the soldering process. If a USB stick is inserted while making the profile the data will be saved on the stick for processing on a PC later on.

The Y axis displays the temperature related to the max. temperature of the recipe. The X axis displays the time related to belt speed. Both axes will change according to the values entered in the recipe. To use this option at least one thermocouple must be attached to the product and be connected to the machine. If you wish to make a hard copy of the measured profile there should be a USB stick in the USB port. The USB ports are found at the zone entrance. The user is warned if no USB stick is attached.

⚠️ The USB stick needs to have a predefined structure as described in chapter 4 **USB stick format**

5.1 Functions in idle state explained.

Start logging: The program will start logging the thermocouple values if this button is pressed. The values are represented by red (**SENSOR 1**) and green (**SENSOR 2**) lines in the graph.

Back to main screen: Pressing this button returns the user to the main screen. All unsaved data will be lost.

5.2 Layout of Make profile screen

Belt speed: The belt speed as defined in the recipe.

Melt point: The required temperature to melt the solder. Consult with your solder supplier for more information on melting temperatures. This value is also defined in the recipe.

The values on the left-hand side of the screen: This is the temperature scale. These values depend on the recipe. The screen is always a little higher than the highest setpoint so overshoots can be displayed as well. The printed temperature lines are from Sensor 1, Sensor 2, Zone 1, Zone 2 and reflow. A sensor's values are greyed out if it isn't connected or is broken.

The values at the bottom of the screen: This is the time scale. These values depend on the recipe. The end time is a bit longer than the real time.

SENSOR 1 and 2: These fields represent the current value of the thermocouples. If a sensor is broken or disconnected its field will by grey.

5.3 Other Layout issues

Use of lines:
 a. The *purple* line represents the melting temperature.
 b. The *blue line* represents the set temperature of the zones. The length represents the time the product is in the zone.
 c. The red and green lines are from Sensor 1 and Sensor 2
 d. The actual zone temperatures are green.

The time scale is a theoretical depiction of where the product is on the belt. The moment in which the **Start logging** button is pressed is important. If the button is pressed while the product is already in Zone 1 it will be out of time sync with the blue lines so while the machine "thinks" the product is in Zone 1 it is really already in Zone 2. Best practice will be to press the **Start logging** button when the point of interest (or sensor) enters Zone 1.

5.4 How to make a profile

1. Attach a thermocouple sensor to the product at a location of your choice. The best practice is to put the sensor point in a contact or other small hole so that the PCB temperature can be measured instead of the air temperature. Place the product on the belt once this is done.

2. *When the product enters the first zone* the user should press the **Start logging** button to start creating the profile**.** Below you can see how screen looks after **Start logging** is pressed.
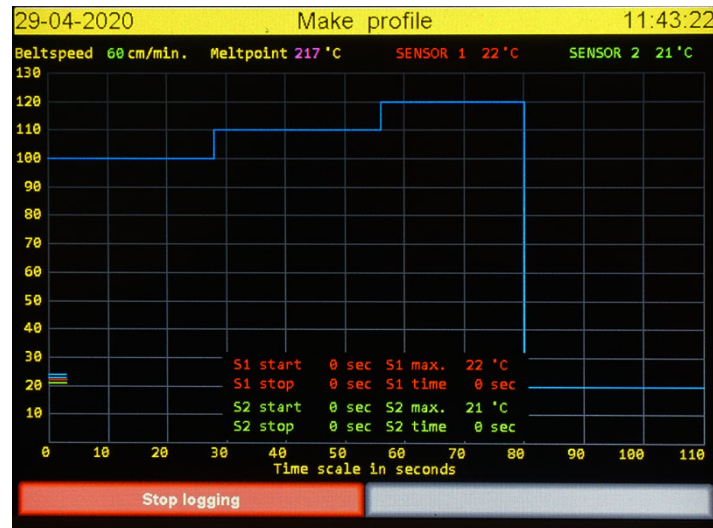
3. Once the **Stop logging** button is replaced by two other buttons, **Clear screen** and **Save log data**, you can remove the product from the belt and disconnect the sensor(s).

⚠️ **WARNING: The product will still be very hot even it is in the cool down zone. Use appropriate gloves or tools to remove it from the belt!**

5.5 Functions in logging state explained.

Stop logging: When pressed, the logging procedure is stopped <u>but not</u> the solder process. The screen below is shown after **Stop logging** is pressed.
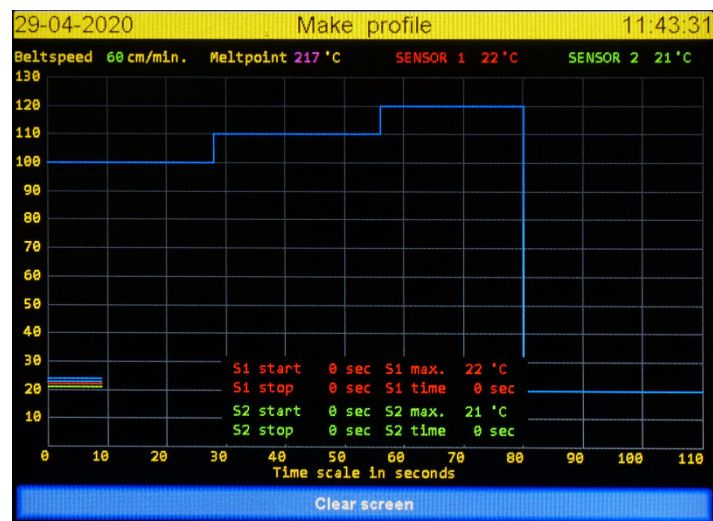
Pressing **Clear screen** returns you to the main profile screen.

After the product has gone through all zones and the max. time has reached you will see the screen below.
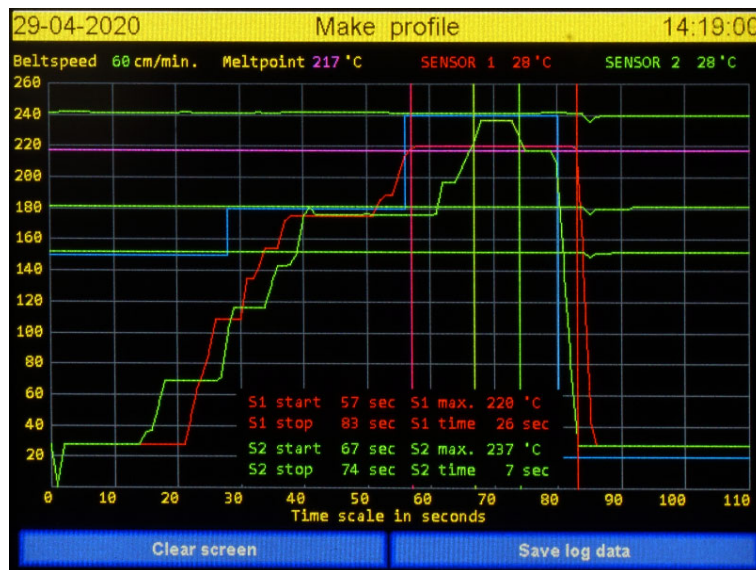
Remark: The **Save log data** button is only shown if a USB stick is present at the machine. Otherwise you only will see the **Clear screen** button.

Clear screen: Data is destroyed and the screen will be closed and the main profile screen is shown again.

Save log data: All data collected is saved in two files on the USB stick. The filenames are based on date and time. (See **Printing the profile**). A hard copy of these files can be made as explained in **Printing the profile.**
When saving the location and name of the file are displayed in the screen for a few seconds.

⚠️ **WARNING: Do not remove the USB stick immediately but leave it in the socket for at least one minute!!**

Screen layout when saving profile data to the USB stick.

6.0 Printing the profile

To print the profile, you will need a PC with the latest version of Microsoft Excel installed. You will find a folder named **Macros** on the USB stick supplied. There you will find an Excel sheet entitled **M260 Trent R0200A.xlsm.**
For this process the user is assumed to know how to work with Excel.

Insert the USB memory stick containing the data you collected with the **Make profile** option of the oven into the PC's USB port.
Double-click the macro **M260 Trent R0200A.xlsm**.
After Excel has opened the sheet it opens a navigation window. In the window, navigate to the **\Mistral\trends** folder on the USB memory stick.
You will now see a list of **.hdr** files. The name of the **.hdr** file contains production information. With this information you can find the profile you would like to view. The filename contains the logging date and time:
                    T-YYYY – MM – DD – HH – mm (year – month – day – hour – minute)

Select the file of your choice and click **OK**
Excel will then process the data and show a graph with all relevant data. You can now print the graph.

***************** WARNING *****************

The Excel macro files are not protected. The user is capable of changing the source of the macro. Make a copy of these macro files before doing so. The warranty does not cover changing or corrupting these files.

***************** WARNING *****************

7.0 Recipe selection

Ticking on **Recipes** in the main screen opens the **Recipe selection** screen. The number of possible recipes is practically limitless. There are 20 default recipes ex works.
Users can select, insert or delete recipe in this screen. It is not possible to change values in this screen. Values can be changed after the recipe is selected and placed in the main screen.
Recipe selection is shown below.

Select a row by ticking on it. A red bar marks the last ticked recipe as selected.

7.1 Functions explained

<<: One page back

>>: One page forwards

Name: Toggle between recipe- or customer name. **This will not give a sorted list!**

Ins: A new recipe is inserted at the location of the red bar. Values can be changed in the main screen.

Del: The row with the red bar is deleted

Confirm: The selected recipe will be used and **Recipe selection** is closed. The main screen shows the newly selected recipe. The values can now be changed.

Back: Go back to main screen and do not change the recipe you were using.

Remark: A conformation window pops up for the **Ins** and **De** functions.

8.0 Machine settings.

Ticking the **Settings** function in the main screen will open the **Machine settings** screen as shown below. This screen contains 5 menu options we will describe here.
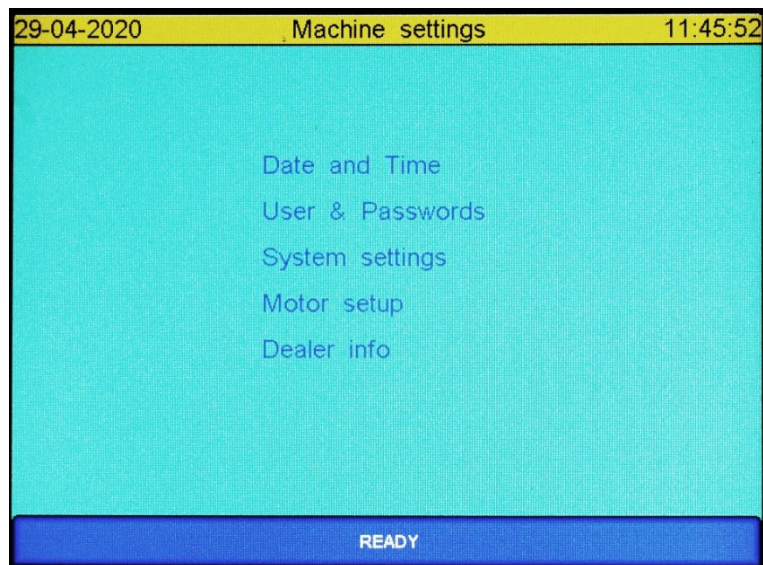
8.1 Functions explained

The **READY** function closes the screen and the main screen is shown.

Date and Time: User can change date and time values. See also **Setting Date and Time**.

User & Password: Change, insert or delete operators. See also **Setting User & Passwords**.

System settings: Several global machine settings are set here. See also **System settings**

Motor setup: Here you can set several motor settings. See also **Motor setup**

Dealer info: The user can find information for contacting their dealer here. See also **Reading Dealer info-**

9.0 Setting Date and Time

The screen below is used to set the local date and time. There is no summer or winter time functionality.

9.1 Functions explained

CANCEL: Close the screen and ignore all changes

BS: Clear the character before

CLR: Delete entire value

ENTER: Advance to next field. New values are saved in the Seconds field and the screen is closed. The actual value is shown if the Enter key is pressed.

9.2 Time and date fields explained

Year: Enter the complete year number, e.g. 2014, or enter to preserve the current value.

Month: Number of the month, e.g. 7 for July, or enter to preserve the current value.

Day: The date, e.g. 6, or enter to preserve the current value.

Hours: The hour in 24-hour format, e.g. 19, or enter to preserve the current value.

Minutes: Enter the minutes, e.g. 3, or enter to preserve the current value.

Seconds: Enter the seconds, e.g. 0, or enter to preserve the current value. The screen closes and the new values are saved and used.

10.0 Setting User & Passwords

The operators who are allowed to work with the oven can be managed in this screen. The **Use user & passwords** option in the **System setup** screen must be enabled to use these operators and this protection.
The **User maintenance** screen is shown below.

Select a row by clicking on it. A red bar marks the clicked row as selected.

10.1 Functions explained

<<: One page back

>>: One page forwards

Edit: This opens the **Edit user data** screen. See the chapter entitled **Edit user data**.

Ins: Insert a new user at the location of the red bar.

Del: Delete the user selected by the red bar.

Stop: Go back to the **Machine settings** screen.

***************** WARNING ****************
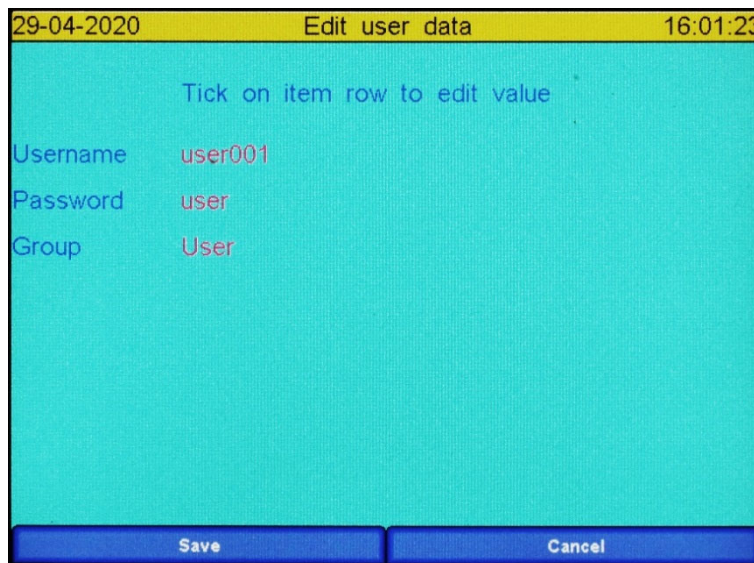
It's not a good idea to change the first user called "Admin". The standard password for this user is: sp-admin. Make a note of any change and save it carefully!!
Use this user only in special cases. If you lose this data it's possible you may never be able to enter the machine again. This situation is not covered by the warranty.

***************** WARNING *****************

10.2 Edit user data

The screen below appears if **Edit** in the **User maintenance** screen is clicked. An operator's name, password and rights can be changed here.

10.2.1 Functions explained

Save: Save all changes you've made.

Cancel: Close the screen and lose all changes.

10.2.2 Fields explained.

Username: An ASCII keyboard is opened if the user value is clicked. The name can then be changed.

Password: An ASCII keyboard is opened if the password value is clicked. The password can then be changed.

Group: Ticking on the group value toggles between **User** and **Admin**. These groups represent the rights the user will have on the machine. In this case **User** and **Admin** are not names but functions.

10.2.3 Explaining groups

If the user belongs to the **Admin** group they can change all settings and values on the machine.
If the user belongs to the **User** group they can only start or stop the machine, make a profile, select another recipe or change the belt speed.
The User group cannot change values or settings.
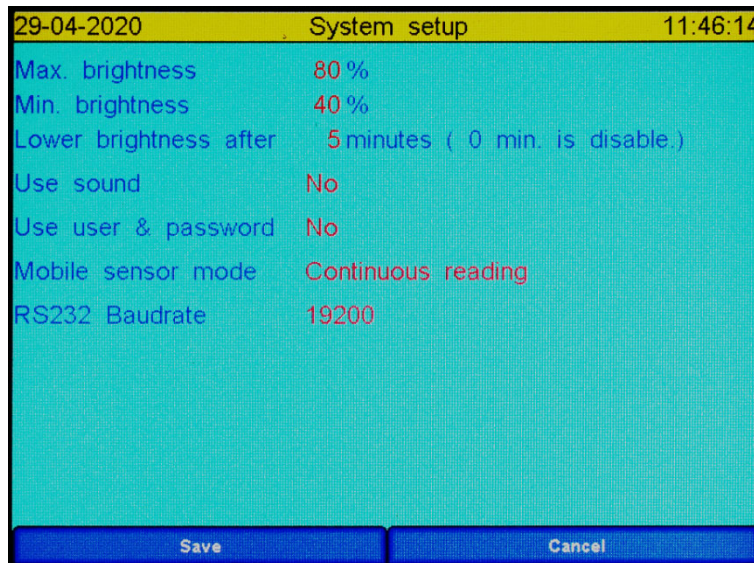
11.0 System setup

The screen below is displayed if **System setup** in the **Machine settings** screen below is clicked. Here you can set some global system functions as explained in this chapter.

11.1 Functions explained

Save: Save all changes.

Cancel: Close the screen and lose all changes.

11.2 Fields explained

It is possible to regulate the brightness of the screen. To preserve the screen's service life it is also possible to set a *sleep mode* which will set the brightness to a lower level. During a normal production run the screen will almost never be viewed. You will extend the screen lifetime by lowering the brightness in these cases.

Maximum brightness: The screen brightness when you are working on the screen. Set it so that the view is satisfactory. Don't set the screen to 100% when it isn't necessary.

Minimum brightness: The screen brightness when you do not touch the screen longer than the time defined in **Lower brightness after**. Use the lowest value available if possible.

Lower brightness after: After the time entered in this field has passed the screen brightness is lowered to the value stored in **Minimum brightness**. The timer will be reset if the user ticks on the screen. Clicking at the top right screen prevents an editor screen from being accessed but will activate maximum brightness.

Use sound: Clicking this field toggles between **YES** and **NO**. A short beep sounds if **YES** is selected.

Use user & password: Clicking this field toggles between **YES** and **NO**. if **YES**, the machine is protected against unauthorised use and the user has to log in first. The machine can be used as described in the group rights after successfully logging in.

Mobile sensor mode: Ticking on this field toggles between
    Continues reading. The sensor gives the actual value it measures.
    Fixed at highest temperature. The sensor remembers the highest value it has measured.
    The value can be cleared by ticking **Sensor(s) OFF/ Sensor(s) ON**.
    (See chapter 3.1.1 **Sensor 1 + 2**).

RS232 Baud rate: The speed at which the serial connection operates.

12.0 Motor setup.

This screen depends on the motor type selected. Normally the right motor type is set at the factory. But it may be necessary to select the right motor type if a motor needs to be replaced.
The setup screen for a machine with stepper motor is shown below.
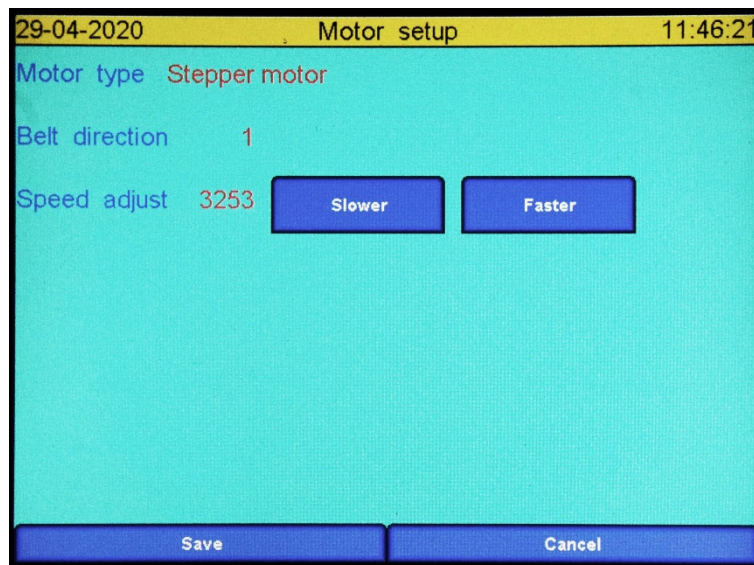
12.1 Stepper motor functions explained

Save: Save all changes.
Cancel: Close the screen and lose all changes.

12.2 Stepper motor fields explained

Motor type: This toggles between an analogue and a stepper motor. Selecting the wrong type of motor results in it not working – the motor does not respond to commands. This should therefore only be changed if either your reseller or the manufacturer instructs you to do so.

Belt Direction: This function may never be needed, but there are situations in which it can be useful to change the motor direction. It can be switched between **<<** or **>>**. The default value is 1.

Speed adjust: In normal circumstances this field is never changed because the machine was calibrated before it left the factory. However, when a motor and/or spindle is changed it may be necessary to change the calibration using this field. The number is used by the controller to calculate the number of steps/min to achieve the speed requested.

Below you see the setup screen for a machine with analogue motor. This motor is more complex to calibrate. If one or two speed value(s) need to be calibrated this can be done in the screen/option below. If the whole machine needs to be calibrated it is better to use the application on the USB stick. This makes easier to calibrate multiple values.
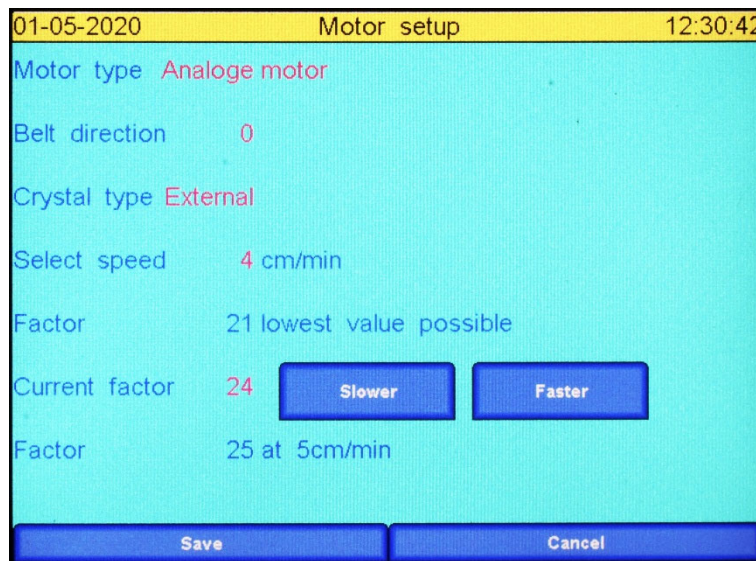
12.3 Analogue motor functions explained

Save: Save all changes.
Cancel: Close the screen and lose all changes.

12.4 Analogue motor fields explained

Motor type: This toggles between an analogue and a stepping motor. Selecting the wrong type of motor results in it not working – the motor does not respond to commands. This should therefore only be changed if either your reseller or the manufacturer instructs you to do so.

Belt Direction: This function may never be needed, but there are situations in which it can be useful to change the motor direction. It can be switched between "**<<**" or "**>>**". The default value is "**>>**".

Crystal type: This only applies to older machines. In the past a crystal was used as the time base for the controller. Later, an internal time base for the controller was used. This should only be changed if you are instructed to do so.

Speed select: the speed to be calibrated should be selected here. Click the field to change the value.

Factor: This value appears before and after **Current factor**. This is used to change the **Current factor** field. Changing it by just a few points changes the speed. The **Current factor** should be changed in small steps and the current belt speed measured after every change.

13.0 Dealer info.

This screen displays information about the reseller, serial number, construction date and the revision of the controller hardware. The software revision of the controller will be changed if an upgrade or downgrade is installed.
The **Dealer info** screen is shown below. The information shown in this screen is only mentioned as an example. The information on your machine depends on the reseller and soft- and hardware revision. This also applies to the serial number, construction date and hardware revision.

If you report an issue or have a question, the machine always sends information about revisions, programme revisions and system software with the report.
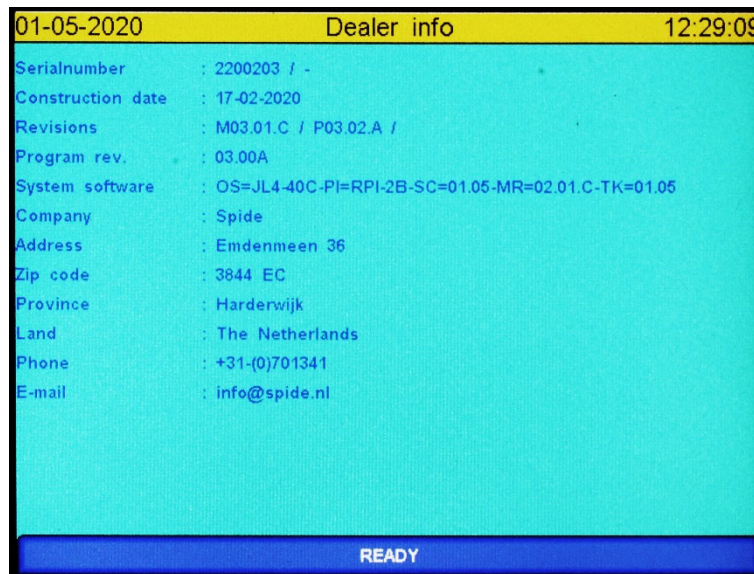
14.0 USB stick format

Under the machine settings is an option to format the USB memory stick. Insert the USB stick into the USB port on the machine. Open the "Machine settings" menu. Press the "Format USB" option. The program will now start formatting and this may take a few minutes. Only USB stick up to 8Gb are supported. When formatting is complete the program returns to the main menu.

15.0 Controlling oven by serial communication.

It is possible to control the oven with commands sent by serial communication. On the USB memory stick which was delivered with your oven, you will find instructions on how to install the application. The RS232 application has its own manual which will be installed together with the application. This manual shows the syntax of the commands used to control the oven. These commands can be used to write an application. Normally, a USB to RS232 chip is used for serial communication. This USB port is visual on the I/O panel on the left side of the machine. On new machines the I/O card is equipped with a legacy RS232 port as well. To use this, follow the instructions in the RS232 manual which is downloaded with the RS232 program.

16.0 Specifications

The **MISTRAL 260** reflow oven has been developed for *lead free* reflow soldering of SMT boards, hybrid boards or curing adhesives.

Transport system
The boards are transported through the oven on a conveyor belt (spring wires or mesh belt) made from high-grade stainless-steel. The conveyor belt speed can be varied between 2 and 60 cm/min (+/- 0.78 to 23.62 inch/min). Resolution goes in steps of 1 cm (+/- 0.39 inch). For analogue motors the minimum speed is 4 cm/min. (+/- 1.56 inch/min).
The maximum permissible hight of the product is 25mm (+/- 1 inch)

Heating system
Heating is provided by forced air convection. This reduces shadow effects and results in no colour sensitivity, no hot spots and no cold solder joints. The heating system is suitable for lead-free soldering.

Cooling system
Bottom cooling fans in the offload section ensure circuits cool down below melt point before leaving the transport belt. ***However, the product might be hot enough to cause burning. Protective equipment should be used to avoid burning.***

Control
All functions are controlled by a touch screen display which is easy to programme with a user-friendly interface. This control is also equipped with a USB 2.0 master port for data output to a storage device such as a USB stick or hard disk.
The second USB 2.0 (slave) port is used for control by external devices, for example a PLC. The Ethernet port is not used.

Exhaust
The integrated exhaust system transports fumes to an outdoor ventilation or filtration unit.

Thermocouple wire
The enclosed thermocouple wire can be used to monitor temperature progress when attached to a PCB or any other object running through the oven on the conveyor belt.

17.0 Maintenance

17.1 General.

The machine requires very little maintenance. It may, however, be advisable to keep a small stock of spare parts for all eventualities and ensure continuous function. These should include spring wires and heaters. These elements are subjected to a high degree of stress because they often change from very hot to low temperatures.
With time, spring wires lose their strength and heaters burn out. There is no means of predicting how often this may happen. It depends on a number of parameters.

17.2 Calibration of sensors.

There is no need to calibrate the sensors. The amplifiers used are laser trimmed and cannot be re-calibrated. On delivery, the thermocouples are certified but will of course age and need to be replaced. A reference source is required to be able to judge whether the sensors need to be replaced.

17.3 Glass.

In order to be able to view the soldering process it is a good idea to clean the glass inside regularly. Accumulated flux residues are more difficult to remove from the glass if left too long. Extracting the smoke will also help to keep the glass clear.

17.4 Spring wire belt

In time, the spring wires can become stretched and lose their strength and need to be replaced. There is no means of predicting how often this will be necessary. It depends on the temperature and weight of the product.

17.5 Mesh belt

In time, the belt can become stretched. It can be retensioned with the adjusting roller. This should not be overdone. It will affect the life time of the motor and can cause choppy movement of the belt.

17.6 Updates.

Normally, the machine software does not need to be updated as long as the machines fulfils your needs. However, an update may occasionally make sense. The USB stick formatted as described above in chapter 3.13 is needed for this. Place the update file into the **?:\MISTRAL\mistral\update** folder where ? represents the drive letter on your PC. Your reseller can provide further instructions if needed.

18.0 Appendix

Thermocouple outlet | USB connector | TFT Touch screen display | Main switch

TOP VIEW

Fume extraction pipe Ø **70mm**

Conveyor direction
15 − 60 cm/min

Preheat zone I
Max. temp 300°C

Preheat zone II
Max. temp 300°C

Reflow zone III
Max. temp 300°C

Cool-down blowers

220VAC

NULL

PE

GND

FS1
Filter 20A
W1
W2
W1
W2
W3
W4

Power switch
Residal circuit
breaker

16A + N

W1 = Brown-2.5qmm
W2 = Blue -2.5qmm
W3 = Black-2.5qmm
W4 = Blue-2.5qmm
W5 = Red-2.5qmm
W6 = Purple-2.5qmm
W7 = Green-0.75qmm
W8 = Orange-0.75qmm

P4-L1
P4-N2

P5-Z1
P2_Z2
P2_Z3
P4-N3
P1_L4
P2_N4

P1-L2
P2_N2

P1-L3
P2_N3

P1_L1
P2_N1

P23_HCTRL

Solidstate & power distribution

P5-Z1
P5-Z2
P5-Z3
P4-N3
P1-L4
P2-N4

PE

Heater unit

GND

Power supply
L 12V
N
PE 0V

GND

+12

Power supply
L +24V
N
PE 0V

GND

V24
0V
MCTRL

Motor unit

P1-L2
P2-N2
PE

Fan front right + cool down unit

P1-L3
P2-N3
PE

GND

Fan front left + rear fans

+5

PS2
Power supply
L 5V
N
PE 0V

GND

UN4
V5 MCTRL

HCTRL

P4-T1A
P4-T1B
P4-T2A
P4-T2B
P4-T3A
P4-T3B

P4-S1A
P4-S1B
P4-S2A
P4-S2B

ETHER
SERIAL
USB

GND L-Ctrl

Mainboard w. 5.7" touch screen

GND

+
-
+
-
+
-
Thermocouples type K

+
-
+
-

+5

V5
EHTER
SERIAL
USB
GND

IO Interface

+12

V12
GR
RED
OR

L-Ctrl

0V GND

Lamp driver

GND

GREEN
RED
ORANGE

GND

Lamp unit

GND

P1-L2
P2-N2
PE

L
N
PE
Front case right fan 120 x 120

L
N
PE

L
N
PE

L
N
PE

Cool down fans 80 x 80

P1-L3
P2-N3
PE

L
N
PE
Front case left fan 120 x 120

L
N
PE

L
N
PE
Rear case fans 120 x 120

P5-Z3

P5-Z2

P5-Z1

P4-N3

HEATER

HEATER

HEATER

L
N
PE
Fan?

L
N
PE
Fan?

L
N
PE
Fan?

Z1 - Preheater 1

Z2 - Preheater 2

Z3 - Reflow

P1-L4

P2-N4

PE

P12
R24
C17
C18
C19
MOTOR

P9
HEATERS
1 = 5V
2 = Z1
3 = Z2
4 = Z3
5 = Z4
6 = Z5

I2C
1 = V+
2 = DATA
3 = V0
4 = CLK

C20 T6
D6
R27 R26 R25

HEATERS
2
1

P20 1   P33
I2C

2   2
1   1

P26
NULL

220VAC

P13

C26

U4   C14 C15 C16   U5

R12

R40

R70 R69
R72 R71

PE
0VDC

C55
C57
U10

L4
R80
R20
R21

D4

C53
X1
C54

R66
R64
C40

P11
REQ
P29

T4
D11

R22 C35 R56 R50 C38 R53
D5   R77
R78 C56 R79

I2C POWER SOURCE
P19 / P21
CLOSED = INT. 5V
OPEN = EXT. 3.3 to 5V

U3
CS-5V
T5

P30 = M-RST
OPEN = DEBUG

T12

R43 R44 C29 C30

R39 U6
P19   P21

BAT1

C8
SCL SDA

C28
R41
R42

C47 C46
C49
U9

C48
R67

U7

P17
REQ

R35
C22
T9
R34
R33

TEST

P18

BUZ1

D8

R31
T7

DPOM
P14

P24

5VDC

P15

P16

R48 C31
R47 R46 R45
D9   T11

R58   C33
R55
R52   C36

GND
L-CLK
L-MI
L-MO
L-CS
R30
D7

L1   R9
P4   R5
C1 C3   T3
TK-CS
T2
R6
R3 R2

R1
D3
D1
D2

P5 = T-RST
OPEN = DEBUG

C34 R57 R51 C37 R54 R8 C2 R7

U1
T1 R4
REQ P2
R61
C39
R65

P1

C45

R68
L3
C50

R23

C41
R63

C42 R62 R60 C43

R10
U2

DP1
T8
R32 R29 C21

C5 C4

T10

R36 C23
R28 C24
R37

C12 R13
C11 R14
C10 R15
C9 R16
C8 R17

1 = OUT20
2 = SMEMA
3 = RED
4 = GREEN
5 = ORANGE
6 = GND

C44
ZD1
F1

5VDC 0VDC 5VDC

C51 R74 R73 C52 R75
R59
C32

D10
P28
1

P23 (SPI)
1 = GND
2 = MOSI
3 = MISO
4 = CLK

IO-CTRL
1 = 5V
2 = POWER
3 = HEATERS
4 = GND

R18   R19

R11 C6
P6

P8
2   6
1   5

P7
1 = 5V
2 = SMEMA
3 = OUT1
4 = GND

P27
1 = TXD
2 = RXD
3 = GND

C7

P25

(c) SPIDE 2023
MISTRAL 04.00.C

RS232 Legacy —

SERIAL IN —

USB IN —

NETWORK IN —

RS232
TXD
RXD
1

P11

P3

USB-RX
USB-TX
0V

P7
+5V

0V

P1

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SHA-IO-03.01.B

LD3
LD4

R10 R9 R8

R14 Z1
C17 C15 C9
U4

C16
C7

LD2

P10 P9

P10 P9

LD1

USB

C6 C8

C11

R7

U2

R6

R17 C20
L5

C18
R4
C19
R5

LED-ROOD = TXD
LED-GROEN = RXD

L3
C2 C3
C1

P5
BR
BR/W
BL
BL/W

P8
OR/W
OR
GR/W
GR

P4

R1 L1
R2 L2

GND
D+
D-
5V

P2

R3 L4

P6

USB-B (RS232)

USB-A (Memory device)

NETWORK OUT

P9 & P10
2-1=USB
2-3=RS232

ZONE1

RL1

ZONE2

RL2

P5

P5-Z1-GREY-1.5q

P5-Z2-GREEN-1.5q

P5-Z1-RED-1.5q

REFLOW

RL3

P2

P2-N1-WHITE-0.75q

P2-N2-BLUE-0.75q

P2-N3-BLUE-0.75q

P2-N4-BLUE-0.75q

P4

P4-N1-BLUE-2.5q

P4-N2-BLUE-2.5q

P4-L1-BLACK-2.5q

P3-Z3-RED-0.44q

P3-Z2-GREEN-0.44q

P3-Z1-GREY-0.44q

P3-V5-BROWN-0.44q

P3

P1

P1-L4-YELLOW-0.75q

P1-L3-YELLOW-0.75q

P1-L2-YELLOW-0.75q

P1-L1-ORANGE-0.75q

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SS3R3P0

P23

P23-CTRL