

TECHNICAL DESCRIPTION

MICROPROCESSOR *« EASY CONTROL »*

V. 1.0

CONTENTS:

1 MAIN FEATURES	3
1.1 GENERAL	3
1.2 USER INTERFACE	3
1.2.1 KEYS (LOCATED ON THE MEMBRANE)	3
1.2.2 SUMMARY OF FUNCTIONS ACTIVATED BY KEY COMBINATIONS	4
2 FUNCTIONS	5
2.1 USAGE OF THE MACHINE	5
2.1.1 START-UP	5
2.1.2 SHUTDOWN PROCEDURE	5
2.2 CONTROL OF CYLINDER ROTATION	6
2.3 HEATING	7
2.3.1 ELECTRICAL HEATING	7
2.3.1.1 Heating by a single resistor group	7
2.3.1.2 Heating by two resistor groups	7
2.3.2 GAS HEATING	7
2.3.3 INDIRECT VAPOUR HEATING	8
2.3.4 PROGRAMMING THE OPERATING TEMPERATURE	8
2.4 PROGRAMMING PARAMETERS	9
2.4.1 TEMPERATURE MEASUREMENT UNIT	10
2.4.2 MAXIMUM SET TEMPERATURE	10
2.4.3 OPERATING TEMPERATURE	10
2.4.4 REGULATION HYSTERESIS	10
2.4.5 STOP TEMPERATURE	11
2.4.6 HEATING TYPE	11
2.4.7 NUMBER OF RESISTOR GROUPS	11
2.5 ALARMS	12
2.5.1 INSUFFICIENT AIR FLOW (AL1)	12
2.5.2 SAFETY TABLET (AL2)	12
2.5.3 THERMAL WARNING FAN (AL4)	12
2.5.4 SPEED REGULATOR ALARM (AL5)	13
2.5.5 NO FLAME (AL6)	13
2.5.6 OVERHEATING OR SENSOR NOT CONNECTED (AL7)	13
2.6 RESETTING THE PARAMETERS	14

1 MAIN FEATURES

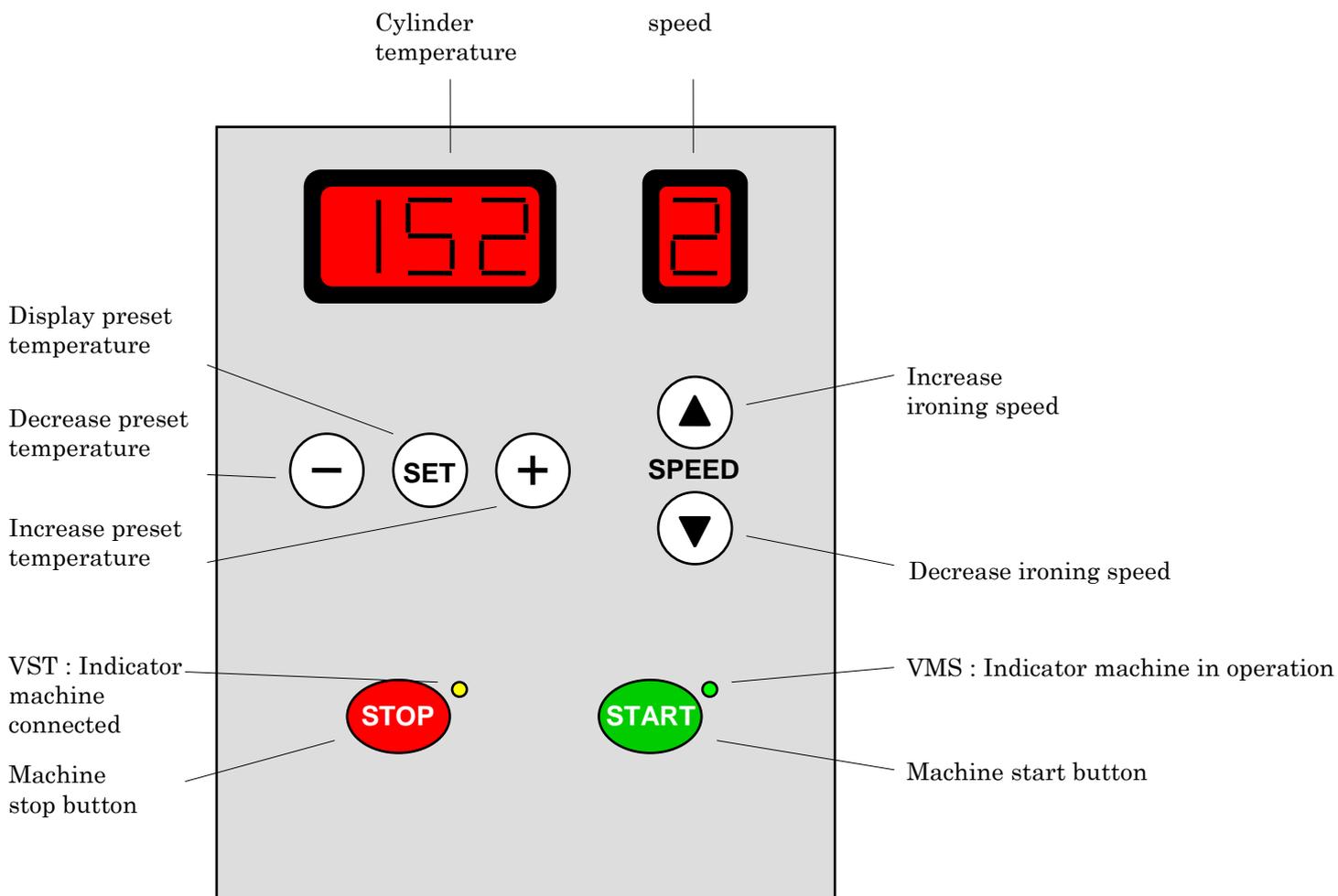
1.1 GENERAL

This microprocessor controls the drying and ironing machines TYPE MICRA / DELTA AND MAXIMA, manufactured by Danube International.

A single processor card is capable of controlling models that differ with respect to the cylinder diameter or the heating method (electrical, gas or vapour).

1.2 USER INTERFACE

1.2.1 KEYS (LOCATED ON THE MEMBRANE)



1.2.2 SUMMARY OF FUNCTIONS ACTIVATED BY KEY COMBINATIONS

START + STOP + 0###1	programming machine parameters
START + SET + 0###1	reset data
(-) + (+)	reset gas device

0###1 means activating the card by connecting it.

2 FUNCTIONS

2.1 USAGE OF THE MACHINE

2.1.1 START-UP

To start the machine, press the START button:



- the indicators light up and show the current temperature and the preset speed (cf. chapter "Control of cylinder rotation")
- the indicator VMS lights up (VST is always on)
- the fan starts working
- the cylinder starts rotating
- after 15 seconds, the heating is authorized

2.1.2 SHUTDOWN PROCEDURE

To stop the machine, press the STOP button.



The shutdown procedure depends on the current temperature.

- if the temperature is \leq automatic shutdown temperature TA (by default 80°C), the machine switches off.
- if the temperature is $>$ temperature TA, only the heating is switched off. When the temperature drops below the temperature TA, the whole machine will switch off.
During this time interval, the temperature indication and the VMS indicator will blink.

The value of TA may be programmed by the manufacturer or during the installation (see "Programming parameters").

2.2 CONTROL OF CYLINDER ROTATION

The cylinder motor is controlled by a speed regulator.

You may select 7 different factory preset speeds, while speed 0 is used for the optional SMART SYSTEM (DANUBE patent: speed adjustment according to humidity).

The speed may be adjusted by the user when the machine is ON by pressing the two arrow keys « up » and « down ». The result is shown on the speed display.



The current selected value will even be recalled after a power interruption.

When the selected speed is not 0 upon starting the machine, the cylinder will rotate at speed 1 while the detected temperature remains below the operating temperature TF (130°C by default); once this temperature is reached, the programmed speed will be activated.

When the temperature drops below TF during the operation of the machine, the speed will not be readjusted.

When the selected speed is 0, the cylinder will rotate at speed 0 (i.e. the speed required by the SMART SYSTEM), regardless of the temperature.

2.3 HEATING

2.3.1 ELECTRICAL HEATING

Depending on the model, the electrical heating consists in modifying the current through one or two groups of resistors, controlled by the heating switches.

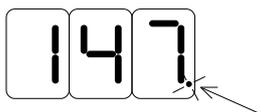
The choice between 1 or 2 resistors is made by setting a parameter (see "Programming parameters").

2.3.1.1 Heating by a single resistor group

When the machine is set up to work with a single resistor group, a special control function is activated (closing and opening the heating relay switch around the set point) in order to be able to achieve and maintain the preset temperature correctly and to avoid the thermal overshoot associated with this kind of heating.

It is therefore not an anomaly when you hear the heating relay switch switching frequently when you select this functionality.

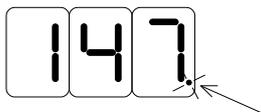
To show that the heating is activated, the decimal point of the temperature indication lights up.



2.3.1.2 Heating by two resistor groups

When the machine is set up to work with two resistor groups, the temperature regulation switches the first group just as if it were the only control group, while the second resistor group is operated continuously when the temperature is below the set temperature, and switches off when the set temperature is attained. The second group is again activated below a preset hysteresis (see "Programming parameters").

To show that the heating is activated, the decimal point of the temperature indication lights up continuously when both heating groups are on, and blinks when only one group is on.

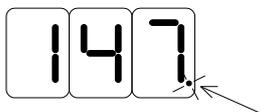


2.3.2 GAS HEATING

When the heating is performed using a gas heater, the machine is fitted with a special electronic device that controls the ignition and working of the heater. The microprocessor controls the gas heater directly when the temperature is lower than the preset temperature.

The procedure for resetting the gas heater is given in the alarm section.

To show that the heating is activated, the decimal point of the temperature indication lights up.



In the section "Alarms" you will find what to do in case there is no flame.

2.3.3 INDIRECT VAPOUR HEATING

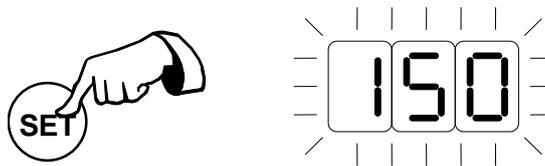
When the heating is done using the indirect vapour method, the machine will not perform any heat regulation (and the temperature will be directly proportional to the vapour pressure of the vapour feed of the machine). The microprocessor simply indicates the temperature of the cylinder but will not act on the heating itself.

2.3.4 PROGRAMMING THE OPERATING TEMPERATURE

The operating temperature may be set when the machine is on, using the following procedure:

Press SET

The current set value blinks in the display



Use the + and – keys to change this value. Hold the key down to change the number rapidly.



3 seconds after releasing the + or – key, the displayed value is stored, after which the display again shows the current detected temperature.

Programmable range: 0...Tmax °C (32...Tmax °F)
Precision: 1°C

The maximum value that the user may set (Tmax) is established by the manufacturer or during the installation using a special procedure. See "Programming parameters".

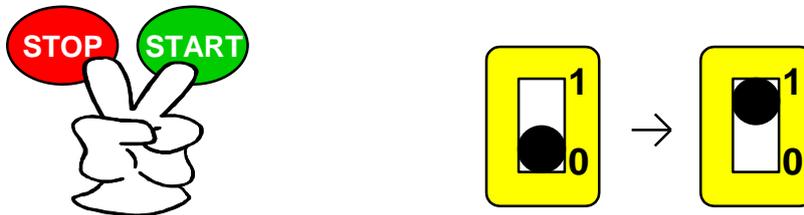
When the selected heating method is electrical, a special system is activated to reduce the overshoot of the heating, such that the preset temperature can be obtained within a range of plus or minus 5°C. This system switches the heating on and off repeatedly as the preset temperature is approached. Therefore, with this type of heating the sound of the relay switching on and off repeatedly is not indicative of a fault condition.

2.4 PROGRAMMING PARAMETERS

Some parameters, which normally need not be modified by the user, can be programmed by a special procedure:

- 1- Temperature measurement unit
- 2- Maximum preset temperature: TMax
- 3- Operating temperature: TF
- 4- Temperature regulation hysteresis: H
- 5- Temperature for automatic shut-down: TA
- 6- Heating type
- 7- Number of resistor groups installed

To enter the parameter setting mode, keep the STOP and START buttons pressed simultaneously and switch the machine on.



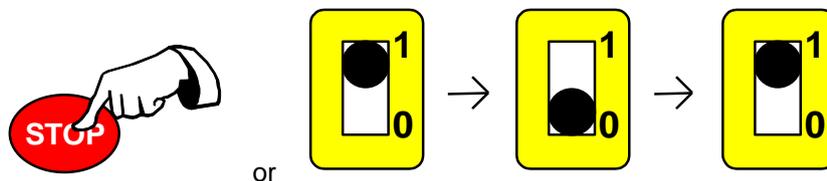
The temperature display shows the value of the first parameter to set, while the speed display shows a letter or a number that identifies the parameter.

The value blinks to indicate that it may be modified.

Use the keys + and – to modify the set value. Press SET to confirm the current value and proceed to the next parameter.



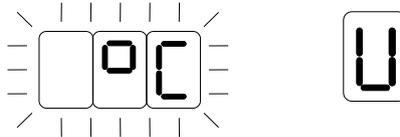
When pressing SET after setting the last parameter, the first parameter is shown again. To exit the parameter setting mode, press STOP or switch the machine off and on.



The setting of the last parameter is only stored if you have confirmed it by pressing SET before leaving the parameter setting mode.

2.4.1 TEMPERATURE MEASUREMENT UNIT

The actual setting is shown on the TEMP display, while "U" is shown on the VIT display.
E.g.:

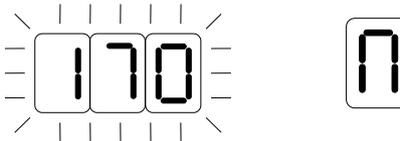


Available values: °C / °F
Default value: °C

2.4.2 MAXIMUM SET TEMPERATURE

This setting is the maximum value the user may select (Tmax, see "Programming the operating temperature").

The current value is shown on the TEMP display, while "M" is shown on the VIT display.
E.g.:

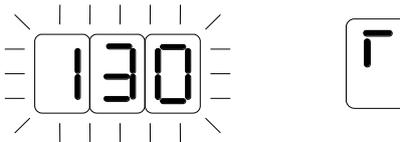


Default value: 180
Parameter range: 1...180 °C (34...356 °F)
Precision: 1°C

2.4.3 OPERATING TEMPERATURE

This setting establishes the operating temperature (TF, see "22.1 cylinder start-up modes").

The current value is shown on the TEMP display, while "r" is shown on the VIT display.
E.g.:

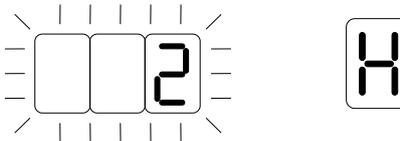


Default value: 130
Parameter range: 1...180 °C (34...356 °F)
Precision: 1°C

2.4.4 REGULATION HYSTERESIS

This setting defines the hysteresis for the temperature regulation.

The current value is shown on the TEMP display, while "H" is shown on the VIT display.
E.g.:



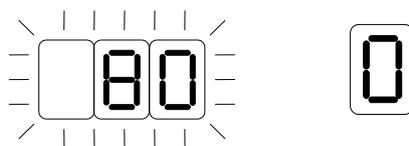
Default value: 2

Parameter range: 1...5 °C (2...9 °F)
Precision: 1°C

With electrical heating with 2 resistor groups, the hysteresis only affects the second group, while the first is controlled in the usual manner.

2.4.5 STOP TEMPERATURE

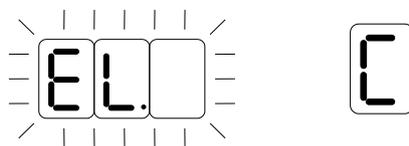
This setting establishes the maximum stop temperature of the machine, TA (see "Shut-down procedure"). The current value is shown on the TEMP display, while "0" is shown on the VIT display.
E.g.:



Default value: 80
Parameter range: 1...180 °C (34...356 °F)
Precision: 1°C

2.4.6 HEATING TYPE

This setting establishes whether the heating is electrical (and the same for vapour) or by gas. The current value is shown on the TEMP display, while "C" is shown on the VIT display.
E.g.:



Default value: EL
Available values: Electrical ("EL. ") / Gas (and vapour) ("GAS")

2.4.7 NUMBER OF RESISTOR GROUPS

This setting establishes the number of heating resistor groups installed on the drying and ironing machine. The current value is shown on the TEMP display, while "n" is shown on the VIT display.
E.g.:



Default value: 2
Available values: 1 / 2

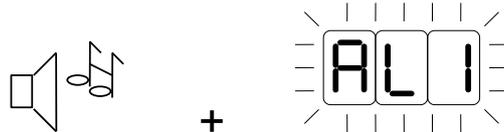
NOTE: This parameter is only displayed when the electrical heating method has been selected previously.

2.5 ALARMS

2.5.1 INSUFFICIENT AIR FLOW (AL1)

This alarm is only activated when the card is set up to work with gas heating.

When the pressure valve in the chimney opens for 2 seconds or more, the buzzer is activated for 1 minute while the display shows "AL1".



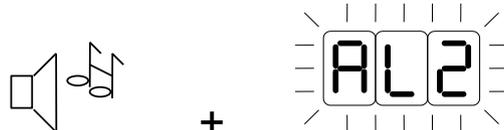
In this case, the heating is switched off. You should now check the direction of rotation of the fans (arrows indicated on the motor), if you have just installed the machine, or check your exhaust system (if the alarm stops when you disconnect the gas exhaust pipe on top of the machine, it is likely that your exhaust is too narrow or blocked).

The alarm is not activated during the first 10 seconds after starting the fan, in order to allow the air flow to settle.

The alarm is cancelled automatically when the pressure switch returns to its normal position or when the machine is switched off.

2.5.2 SAFETY TABLET (AL2)

When the hand protection system is activated (safety tablet), the buzzer is activated for 1 minute and the display shows "AL2".



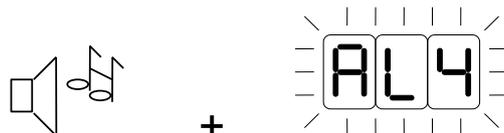
The machine switches off automatically.

Attention: this device is for your safety. Do not override this safety device in order to avoid serious injury to the user!

The alarm is cancelled by restarting the machine or switching the machine off and on.

2.5.3 THERMAL WARNING FAN (AL4)

When the thermal relay of the fan is activated, the buzzer is activated for 1 minute and the display shows "AL4" :



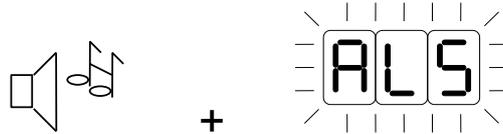
The fan and the heating are switched off, while the machine remains on.

The alarm is automatically cancelled when the machine returns to a normal situation (the thermal relay is closed) or when the machine is switched off.

Usually, this alarm is caused by dirt on the fan.

2.5.4 SPEED REGULATOR ALARM (AL5)

When the speed regulator alarm is activated, the buzzer is activated for 1 minute and the display shows "AL5" :



The machine switches off automatically.

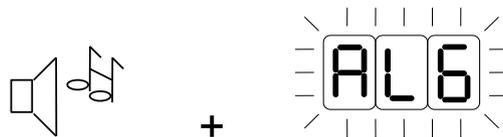
The alarm is cancelled by restarting the machine or switching the machine off and on.

This fault condition may be due to an overload of the cylinder motor caused by a thick object inside the machine, or by dirt in the cylinder motor.

2.5.5 NO FLAME (AL6)

This alarm is only activated when the card is set up to work with gas heating.

When the burner is on or being ignited and the condition no flame occurs, the buzzer is activated for 1 minute and the display shows "AL6".



The command for ignition remains active and the machine remains on.

To try to re-ignite the burner, press the keys + and – simultaneously after the alarm stops.



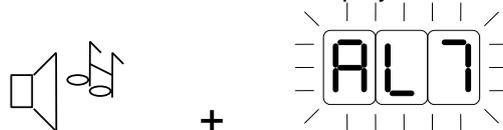
When the gas device cancels the fault indication, the alarm stops. If this reset fails, the alarm is activated again and one of the following fault conditions occurs:

- No gas supply: check that the manual valve of the gas feed is open
- The gas pressure is insufficient or the type of gas is incorrect (see the installation section)
- The ignition electrode is broken: replace it

To cancel the alarm without re-igniting the burner, stop the machine by pressing STOP.

2.5.6 OVERHEATING OR SENSOR NOT CONNECTED (AL7)

If the temperature sensor is not connected or broken, or if it detects a temperature above 210°C continuously for 2 seconds, the buzzer is activated for 1 minute and the display shows "AL7".



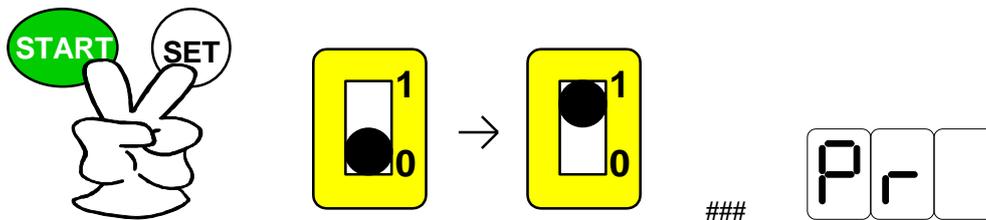
The machine still works and the alarm can be cancelled by switching the machine off.

2.6 RESETTING THE PARAMETERS

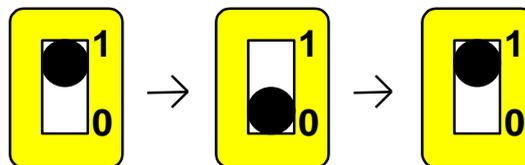
If needed, you may reset the parameters to standard values.

To activate the standard values, you must start the card up while pressing the keys START and SET simultaneously.

The display shows "Pr" to confirm the command and the machine remains in this mode and is not activated.



To return to the normal working condition, switch the machine off and on again.



PARAMETER	For electric or steam heating	For gas heating
temperature measurement unit	°C	°C
max. set temperature	180°C	180°C
Operating temperature	130°C	130°C
temperature regulation hysteresis	2°C	1°C
stop temperature	80°C	80°C
heating type	electrical	gas
number of resistor groups	1 for MICRA/DELTA 2 for MAXIMA	