FASAR elettronica
AZIENDA CERTIFICATA UNI EN ISO 9001: 2015

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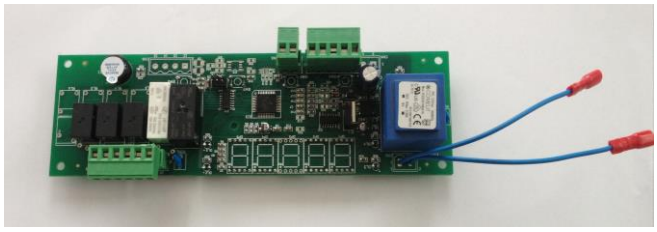

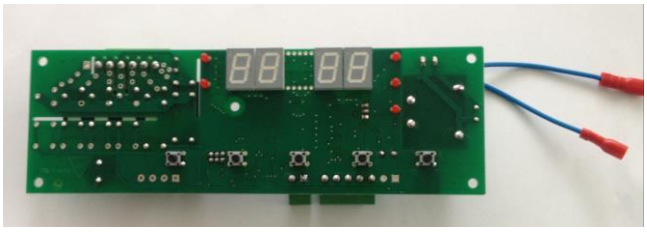

FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE ELECTRONIC BOARD for DRYING-SEASONING CABINET p/n FE1043

HARDWARE SPECIFICATIONS drying-seasoning cabinet board

- Mains power supply 230Vac +/- 10% 50 / 60Hz.
- Electronic microcontroller control system with flash on chip technology.
- Storage of operating parameters.
- 2 RED LED display 2 digit (or 1 3/4 digit RED LED display) for temperature / humidity display.
- Up to 5 red signaling LEDs.
- Controls via 5-button keyboard (SET, DOWN, UP, LIGHT, SELECT).
- Digital input for door opening switch.
- 3 analog inputs for NTC thermistor type temperature sensors (one of which is not used and one used as an analog input for humidity probe).
- up to 6 digital relay outputs:
    - compressor relay, N.O.contact 250Vac - 16A;
    - resistance relay, N.O.contact 250Vac - 10A;
    - Condensate drain resistance relay, N.O. 250Vac - 5A;
    - fan relay, N.O.contact 250Vac - 5A;
    - light relay, N.O.contact 250Vac - 5A;
    - relay not used, N.O.contact 250Vac - 5A.
- Acoustic signals via piezoelectric buzzer.
- RS485 or TTL serial communication port for the management of a possible external peripheral (print terminal, GSM modem, etc ..., currently not managed).
- Phoenix type connections for removable screw terminals.
- Terminal identification by screen printing on the printed circuit board.
- The card is provided with holes for fixing to the panel using spacers (available on request).

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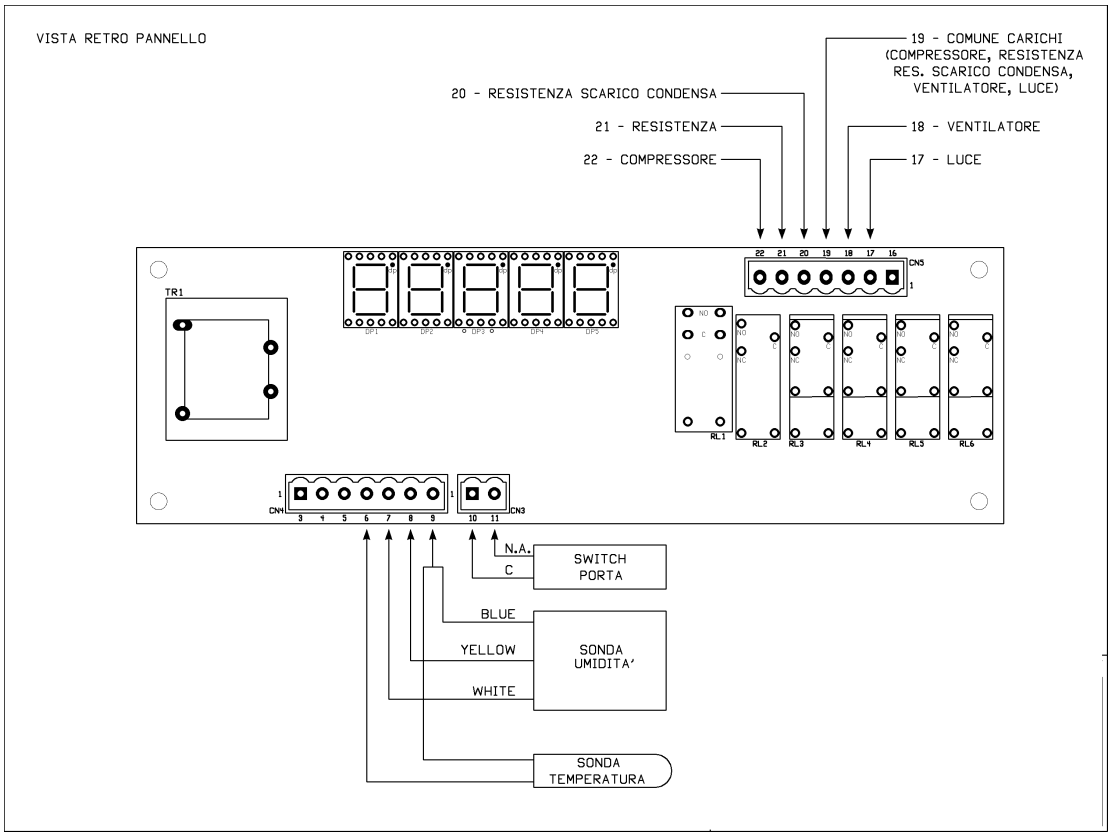
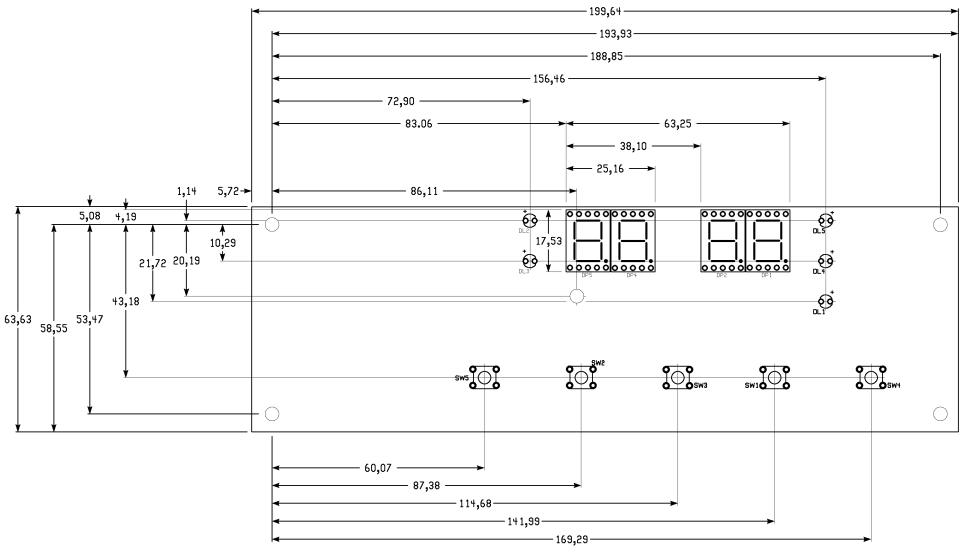
Input-output scheme:



Electronic board dimensions (all dimensions are expressed in mm)



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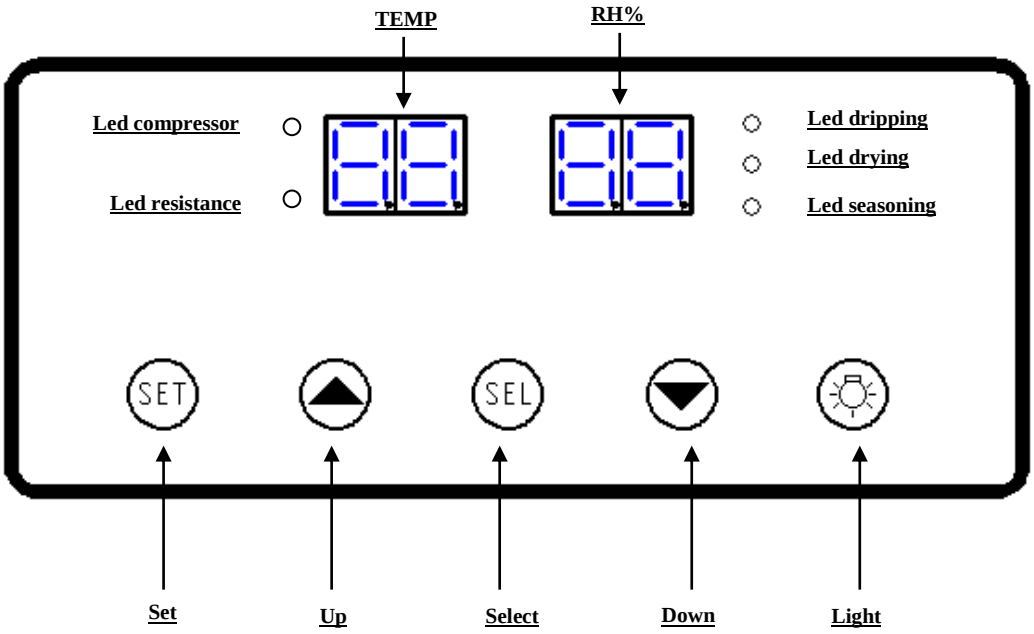
PLEASE NOTE: Read the following instruction manual carefully. The working parameters currently set by default are a standard configuration, check and possibly configure the parameters appropriately for your application.

FUNCTIONAL SPECIFICATIONS

The electronic board manages two probes: NTC probe for temperature measurement and HM1500LF probe for RH% humidity measurement.
The outputs available are five relay loads: cell light, resistance, compressor + fan, fan, condensate drain resistance.
The options provided, but currently not mounted, are: a sixth relay output and a TTL or RS485 serial output for remote assistance, data printing or interfacing with a supervisory system.
The user interface consists of 2 two-digit red displays, 5 red leds and 5 keys.
In operating mode, the display on the left indicates the temperature in the cell while the one on the right shows the relative humidity. When setting the parameters, the displays are used to view the labels and parameter values.
The 2 red LEDs on the left have the function of signaling when the compressor and heating element loads are active, while the other 3 on the right indicate the work phases (dripping, drying, seasoning).
As for the 5 keys, the functions they perform are shown below.

SUMMARY OF USER INTERFACE COMMANDS



When the machine is powered, a LAMPTEST phase is performed to check the correct operation of the inputs and outputs: this phase (which lasts 4 seconds) is highlighted by the simultaneous intermittent flashing of the LEDs and digits.

If the SET key is pressed 3 times during the LAMPTEST phase, the default parameters are loaded: as confirmation the display shows the "LOAD" label accompanied by an acoustic signal.

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SET KEY
When pressed briefly, the S1 label appears on the temperature display and the 1st flashing set temperature setpoint appears on the humidity display. Pressed briefly again, it displays the S2 label and the 2nd flashing set temperature setpoint (used if the selected control mode is independent or dependent setpoints). Pressed briefly a third time, it switches to display the label S3 and the set humidity setpoint flashing. Pressed again briefly, it exits the setpoint setting phase and stores any modified data. If you do not press the key to exit the work setpoint setting, the system automatically exits after 5 seconds.

By keeping this button pressed for 2 seconds, you enter the menu for accessing the temperature and humidity control parameters. Whenever you want to access the menu, the PASSWORD is requested first (currently selected value = 16). To enter the password you have 3 attempts at the end of which, if the password is not correct, the system automatically exits.
The parameter setting menu is organized in folders:
- folder C1 for compressor temperature control parameters (thermostat function);
- folder C2 for the temperature control parameters of the resistance (thermostat function);
- folder C3 for compressor humidity control parameters (humidistat function);
- folder Cn for the configuration parameters.

As soon as you enter the menu, the name of the first cell appears (eg "C1") on the temperature display on the left, while on the humidity display, on the right, dashes "- -" are displayed. With the UP and DOWN keys you can scroll through the other folders "C2", "C3" and "Cn". Select the folder by pressing the SET button. At this point the first label of the parameter appears on the display on the left, and the lit fixed value on the display on the right. With the UP and DOWN keys you can scroll through all the labels in the folder, or by pressing the SET key you can change the value of the selected parameter. In this case the value shown on the display on the right will flash and with the UP and DOWN keys it can be changed. By pressing the SET key again, the data is stored (returns on steady) and the scrolling of the labels can be resumed.
To return to the folder selection menu, press the LIGHT key (ESC function).
To exit the parameter setting phase, you can press the LIGHT key several times, you can press the SET key for 2 seconds or the system automatically exits after about 30 seconds.
For the meaning of the various parameters, refer to the table at the bottom of this document.

UP KEY
In the parameter setting menu and in the setpoint modification mode, this button operates as UP, used to scroll through the labels and to increase values.

SELECT KEY (PHASE SELECTION)
This button is used to select, sequentially and cyclically, one of the 3 work phases of the appliance: DRIPPING, DRYING, SEASONING. Each phase is signaled by the lighting of the relative LED on the right of the humidity display.
Once the work phase has been chosen, the system will load the appropriate setpoints and become operational.

DOWN KEY
In the parameter setting menu and in the setpoint modification mode, this button operates as DOWN, used to scroll through the labels and to decrease the values.
In any situation in which the buzzer acoustic signal is activated (start DRYING; probe alarm faulty), by pressing this button it is possible to silence it.

LIGHT KEY
Turns the light inside the cell on and off. This command is enslaved to the door opening switch: the light turns on when the door is opened and goes off when it is closed.
With the door open, you can turn off the light inside the cell by briefly pressing the dedicated button.
With the door closed, it is possible to turn on / off the light inside the cell by briefly pressing the dedicated button.
In parameter setting mode, this key takes on the ESC function: returns to the previous menu or exits completely from the mode.
By holding the button down for 2 seconds, the STAND-BY mode is activated: all the functions are deactivated and the loads off.
In this case the two displays will show the stand-by status (dashes “- -“).
To exit STAND-BY, simply press the key briefly.

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WORK PHASES

The three work phases are all timed by means of three parameters reported in the folder Cn (configuration).
The duration of DRIPPING is controlled by parameter d4 expressed in hours. The dripping led is on. At the end of this time, the system automatically passes to the next DRYING phase. The passage to this new phase is signaled with an acoustic warning by a buzzer for 1 minute. The buzzer can be silenced by briefly pressing the DOWN key. The DRYING duration is controlled by parameter d5 expressed in days. The drying led is on. At the end of time d5, it automatically passes to the last phase: SEASONING. For this you can choose whether to have it timed or not by means of parameter d6. If d6 is different from 0 the SEASONING duration is expressed in days and at the end of the time the appliance goes into STAND-BY, while if d6 is set to 0, the SEASONING has an indefinite duration. The seasoning LED is on.

PROBE FAILURE

In the event that the system detects an anomaly in the analog reading of the probes, or due to breakage or reading of values outside the measurement range, an alarm is signaled by an acoustic warning for 1 minute (which can be silenced with the DOWN key), and visualization on the code display (flashing) E0 for the temperature probe, E1 for the humidity probe.
If both probes are faulty, both the compressor and the resistance are activated in time according to parameters t9 and ta for the compressor, r9 and ra for the resistance. If only the temperature probe is faulty, the compressor continues to be controlled by the humidity probe, while the resistance activates in time. If only the humidity probe is faulty, the compressor and the resistance are checked in temperature.

DOOR OPENING MANAGEMENT

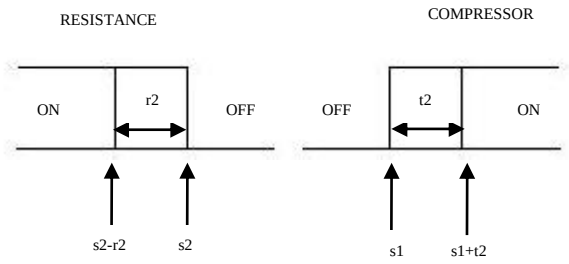
In normal operation, door opening is signaled immediately: the display shows the flashing "door" label. After one minute from its opening, the event is also signaled by an acoustic signal for 1 minute (which can be silenced with the DOWN key, the alarm signal remains active). The alarm stops automatically when the door is closed again.

COMPRESSOR and RESISTANCE MANAGEMENT

The management of the 2 outputs is of the ON-OFF type. The parameter d3 is used to configure the link between the two outputs, in particular:

- Independent ON-OFF regulation (d3 = 0).
- ON-OFF dependent regulation (d3 = 1).
- Neutral Zone ON-OFF regulation (d3 = 2, this configuration is the default).

Independent ON-OFF regulation (d3 = 0)



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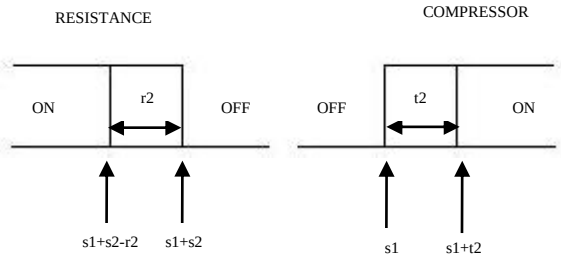
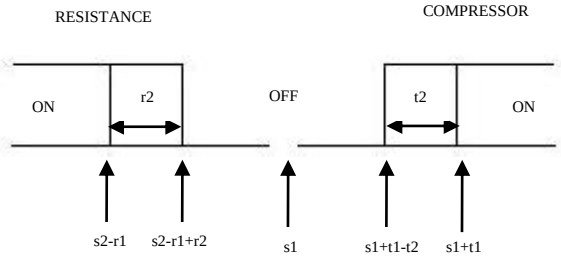
ON-OFF dependent regulation (d3 = 1)



Neutral Zone ON-OFF regulation (d3 = 2)



The compressor setting also depends on the humidity probe and the set point S3, see parameters u0, u1 in folder C3.
Since both the temperature and humidity probes regulate the compressor, the ignition command always has priority, that is, if the ignition conditions are verified for at least one probe, the compressor switches on; if the switch-off conditions for both probes are verified, the compressor switches off.

CONDENSATE DISCHARGE RESISTANCE MANAGEMENT

The condensate drain resistance always remains on during machine operation.

FAN MANAGEMENT

The fan remains switched on when the compressor or resistance are lit; the fan remains off when both (compressor and resistance) are off.
3 new parameters u4, u5 and u6 have been introduced to manage the fan and make it independent in the 3 work phases (dripping, drying, seasoning). Each parameter can have the value 0 or 1. If the parameter is set to 0, the fan works in parallel with the compressor and the resistance; if the parameter is set to 1, the fan is always on.
The introduction of a timer allows you to manage the fan even when the loads are off. By setting 2 new parameters u7 and u8 which correspond respectively to the fan's t-on and t-off time, the fan is turned on and off periodically. If the parameters are both set to 0, the timer function is disabled.

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C1 FOLDER PARAMETERS

PARAMETER	DESCRIPTION	RANGE	DEFAULT	MEASUREMENT UNIT
t0	Compressor temperature regulation mode (H = hot; C = cold).	H/C	C	flag
t1	Intervention band with ON-OFF regulation set to Neutral Zone (d3 = 2).	0…30	1	°C/°F
t2	Compressor intervention differential. The compressor stops when setpoint 1 is reached and restarts at a temperature value equal to setpoint 1 + or - (according to parameter t0) the value t2.	0…30	1	°C/°F
t3	Maximum value attributable to setpoint 1.	t4…99	99	°C/°F
t4	Minimum value attributable to setpoint 1.	0…t3	0	°C/°F
t5	Power on delay. The time indicated by t5 must elapse between the request to switch on the compressor and effective switching on.	0…99	1	sec
t6	Delay time after shutdown. The time indicated by t6 must elapse between the compressor switching off and the subsequent switching on.	0…99	0	min
t7	Delay time between starts. The time indicated by t7 must elapse between two successive starts of the compressor.	0…99	0	min
t8	Shutdown delay. The time indicated by t8 must elapse between the request for shutdown of the compressor and shutdown.	0…99	0	sec
t9	Compressor on time for faulty probe. If t9 = 1 and ta = 0, the compressor is always on. If ta> 0 the compressor is time controlled in duty-cycle mode.	0…99	0	min
ta	Compressor switch-off time for faulty probe. If ta = 1 and t9 = 0, the compressor is always off. If t9> 0 the compressor is timed controlled in duty-cycle mode.	0…99	1	min

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C2 FOLDER PARAMETERS

PARAMETER	DESCRIPTION	RANGE	DEFAULT	MEASUREMENT UNIT
r0	Compressor temperature regulation mode (H = hot; C = cold).	H/C	H	flag
r1	Intervention band with ON-OFF regulation set to Neutral Zone (d3 = 2).	0…30	1	°C/°F
r2	Compressor intervention differential. The compressor stops when setpoint is reached and restarts at a temperature value equal to setpoint + or - (according to parameter r0) the value r2.	0…30	1	°C/°F
r3	Maximum value attributable to setpoint 2.	r4…99	99	°C/°F
r4	Minimum value attributable to setpoint 2.	0…r3	0	°C/°F
r5	Power on delay. The time indicated by r5 must elapse between the request to switch on the compressor and effective switching on.	0…99	0	sec
r6	Delay time after shutdown. The time indicated by r6 must elapse between the compressor switching off and the subsequent switching on.	0…99	0	min
r7	Delay time between starts. The time indicated by r7 must elapse between two successive starts of the compressor.	0…99	0	min
r8	Shutdown delay. The time indicated by r8 must elapse between the request for shutdown of the compressor and shutdown.	0…99	0	sec
r9	Compressor on time for faulty probe. If r9 = 1 and ra = 0, the compressor is always on. If ra> 0 the compressor is time controlled in duty-cycle mode.	0…99	0	min
ra	Compressor switch-off time for faulty probe. If ra = 1 and r9 = 0, the compressor is always off. If r9> 0 the compressor is timed controlled in duty-cycle mode.	0…99	1	min

C3 FOLDER PARAMETERS

PARAMETER	DESCRIPTION	RANGE	DEFAULT	MEASUREMENT UNIT
u0	Compressor temperature regulation mode (H = hot; C = cold).	H/C	C	flag
u1	Compressor intervention differential. The compressor stops when setpoint 3 is reached and restarts at a temperature value equal to setpoint 3+ or - (according to parameter u0) the value u1.	0…30	2	RH%
u2	Maximum value attributable to setpoint 3.	u3…90	90	RH%
u3	Minimum value attributable to setpoint 3.	0…u2	20	RH%
u4	Dripping fan function (if = 0, in parallel with compressor / resistance; = 1 fan ON)	0 - 1	0	Flag
u5	Drying fan function (if = 0, in parallel with compressor / resistance; = 1 fan ON)	0 - 1	0	Flag
u6	Seasoning fan function (if = 0, in parallel with compressor / heater; = 1 fan ON)	0 - 1	0	Flag
u7	On time of the fan T-on with compressor and heating element off (if = 0 function excluded)	0 - 99	0	Min.
u8	Off time of the T-off fan with compressor and heating element off (if = 0 function excluded)	0 - 99	0	Min.

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u9	Not used (possible future expansions).	-	0	-

Cn FOLDER PARAMETERS

PARAMETER	DESCRIPTION	RANGE	DEFAULT	MEASUREMENT UNIT
d0	Probe type selection, 0 = NTC or 1 = PTC. Currently only NTC is available.	0/1	0	flag
d1	Selection of ° C or ° F for the temperature read by the probe.	°C/°F	°C	flag
d2	Delay outputs to power-on. The time indicated by d2 must elapse between switching on the instrument and activating the relay outputs. If d2 = 0 this delay is deactivated.	0…99	1	min
d3	Link between the compressor and resistance outputs (0 = independent; 1 = dependent; 2 = Neutral Zone)	0/1/2	2	num
d4	Duration of dripping phase.	20…48	24	hours
d5	Duration of drying phase.	5…15	7	days
d6	Duration of seasoning phase. If d6 = 0 the duration is indefinite.	0/5…15	0	days