H411V3
User manual

Contents

1 Parameter list

Rem.	Parameter	Description	Minimum	Maximum	Default	Unit
	S_ _	Functions about storage				
	St_	Functions about storage temperature				
	_t0	storage room temperature	-55.0	145.0	12.0	°C
	_db	dead band	0.0	50.0	0.0	K
	dbd	differential	0.0	50.0	0.2	K
	_tH	safety maximum room temperature	-55.0	45.0	21.0	°C
	_tL	safety minimum room temperature	-55.0	45.0	10.0	°C
	_td	safety temperature differential	0.0	50.0	0.2	K
	SMM	storage room humidity	0.0	100.0	90.0	%
	SMd	differential	0.0	50.0	5.0	%
	SA_	Functions about air renew during storage				
1	SAH	enable air renew during storage - reset timers	oFF	_on	oFF	/
	dA6	immediate delay before first air renew	0	194 4:20:15	0	dd hh:mm:ss
	dA7	on-time duration in the air renew cycle	0	194 4:20:15	30:00	dd hh:mm:ss
2	dA8	period of air renew cycle	0	194 4:20:15	12:00:00	dd hh:mm:ss
	SAh	enable forced air renew by keyboard short cut	oFF	_on	_on	/
	dAF	forced air renew duration	0	194 4:20:15	30:00	dd hh:mm:ss
	SAo	start / stop forced air renew	oFF	_on	oFF	/
	r_ _	Functions about ripening				
	rH_	Enable ripening functions and short cut				
3	rrH	enable ripening functions - reset timers	oFF	_on	oFF	/
	rrh	enable toggling between ripening and storage by keyboard short cut	oFF	_on	_on	/
	rt_	Functions about ripening temperature and humidity				
	_d0	immediate delay before starting ripening	0	194 4:20:15	0	dd hh:mm:ss
	_t1	ripening temperature nr. 1	-55.0	45.0	16.5	°C
	_d1	duration of temperature nr. 1	0	194 4:20:15	4 0:00:00	dd hh:mm:ss
	_t2	ripening temperature nr. 2	-55.0	45.0	15.5	°C
	_d2	duration of temperature nr. 2	0	194 4:20:15	1 0:00:00	dd hh:mm:ss
	_t3	ripening temperature nr. 3	-55.0	45.0	14.5	°C
	_d3	duration of temperature nr. 3	0	194 4:20:15	0	dd hh:mm:ss
	_t4	ripening temperature nr. 4	-55.0	45.0	14.5	°C
	_d4	duration of temperature nr. 4	0	194 4:20:15	0	dd hh:mm:ss
4	_t5	ripening temperature nr. 5	-55.0	45.0	14.5	°C
	rMM	ripening humidity	0.0	100.0	90.0	%
	rMd	ripening humidity differential	0.0	50.0	5.0	%
	rY_	Functions about ethylene				
5	rYH	enable ethylene injection - reset timers	oFF	_on	oFF	/
6	YYb	use ethylene probe to control injections	oFF	_on	oFF	/
	rYY	ripening ethylene concentration	0.0	99.0	25.0	10*ppm
	rYd	ripening ethylene concentration differential	0.0	99.0	5.0	10*ppm
7	dY0	immediate delay before starting ripening	0	194 4:20:15	0	dd hh:mm:ss
8	_tY	minimum temperature before injecting ethylene	-55.0	45.0	16.0	°C
	dY2	first ethylene injection duration	0	194 4:20:15	30:00	dd hh:mm:ss
	_nY	number of following ethylene cycles of injection	0	255	0	/
9	dY3	delay between first ethylene injections end and following cycles	0	194 4:20:15	1 0:00:00	dd hh:mm:ss
	dY4	on-time duration of following ethylene injection cycles	0	194 4:20:15	30:00	dd hh:mm:ss
10	dY5	period of following ethylene injection cycles	0	194 4:20:15	12:00:00	dd hh:mm:ss
	rYh	enable forced ethylene injection by keyboard short cut	oFF	_on	_on	/
	dYF	forced ethylene injection duration	0	194 4:20:15	30:00	dd hh:mm:ss
	rYo	start / stop forced ethylene injection	oFF	_on	oFF	/
11	rYA	first ethylene injection performed but air renew not yet	oFF	_on	oFF	/
	rA_	Functions about air renew during ripening				
	rAH	enable air renew cycles during ripening - reset timers	oFF	_on	oFF	/
	_nA	number of air renew cycles	0	99	8	/
9	dA3	delay between first ethylene injection end and first air renew end	0	194 4:20:15	1 0:00:00	dd hh:mm:ss
	dA4	on-time duration in the air renew cycle	0	194 4:20:15	30:00	dd hh:mm:ss
10	dA5	period of air renew cycle	0	194 4:20:15	12:00:00	dd hh:mm:ss
	rAh	enable forced air renew by keyboard short cut	oFF	_on	_on	/
	rAF	forced air renew duration	0	194 4:20:15	30:00	dd hh:mm:ss
	rAo	start / stop forced air renew	oFF	_on	oFF	/
	n_ _	Functions about fans				
	nU_	Functions about depression fans				
	nUS	number of depression fans during storage	0	3	2	/
	nUr	number of depression fans during ripening	0	3	3	/
	nE_	Functions about evaporator fans				
	nEH	force evaporator fans when refrigeration is off	oFF	_on	oFF	/
	P_ _	Functions about master preferences				
	Pd_	Functions about network address				
	PdM	master address for global network communication	0	254	1	/
	PdS	number of slaves connected to this master	1	2	2	/
	Pd2	number of auxiliary masters connected to this master	0	2	2	/

Rem.	Parameter	Description	Minimum	Maximum	Default	Unit
	Pg_	Functions about saving preferences				
	Pgg	save actual preferences as program 1 ... 99	1	99	1	/
	Pj_	Functions about loading preferences				
	Pjh	enable preferences load by keyboard short-cut	oFF	_on	oFF	/
	Pjj	load preferences as program 0 ... 99 (0 is factory setting)	0	99	0	/
	PO_	Output assignment				
	PO2	assign out-2 relay to: 0=alarm / 1=humidifier	0	1	1	/
	c_ _	Functions about door and light				
	cO_	Functions about door				
12	cOh	enable door operation from keyboard	oFF	_on	_on	/
13	cOF	enable door flashing light in case of alarm	oFF	_on	_on	/
14	cOd	delay between pushing button and door opening or closure	0	194 4:20:15	2	dd hh:mm:ss
	cOH	enable door automatic closure	oFF	_on	oFF	/
	cCd	delay of door automatic closure	0	194 4:20:15	30	dd hh:mm:ss
	cOU	enable depressure, refrigeration and other output when door is not closed	oFF	_on	oFF	/
	cOY	enable door opening after first ethylene injection and before first air renew	oFF	_on	_on	/
	cl_	Functions about light				
15	clO	switch on the light during door operation	oFF	_on	_on	/
	clH	switch on the light when the door is open and off when closed	oFF	_on	_on	/
16	clo	switch off the light automatically if it has been switched on from outside	oFF	_on	_on	/
	cld	delay of light automatic switch off	0	194 4:20:15	30	dd hh:mm:ss
	cc_	Functions about curtain operation				
17	cch	enable curtain operation from keyboard	oFF	_on	oFF	/
18	ccc	keyboard in curtain mode	oFF	_on	oFF	/
15	ccO	enable curtain operation when door is not open	oFF	_on	oFF	/
15	ccl	enable curtain operation when light is off	oFF	_on	oFF	/
	v_ _	Functions about electronic expansion valve				
	vP_	Functions about electronic expansion valve preference				
19	vPH	enable electronic expansion valve	oFF	_on	_on	/
	vt_	Functions about electronic expansion valve temperature				
20	vtt	wanted overheating (similar to Danfoss thermostatic overheating spring regulation)	0.0	99.0	8.0	K
	vtU	maximum pressure allowed in the suction line (similar to Danfoss MOP)	0.0	30.0	10.0	(gauge) bar
	vd_	Functions about electronic expansion valve timing				
21	vd1	on-off duty cycle duration	0	194 4:20:15	8	dd hh:mm:ss
22	vd2	on duty cycle duration at refrigeration start (set to 0 for previous stop value)	0	194 4:20:15	5	dd hh:mm:ss
23	vdd	on duty cycle adaptation speed (low value for slow adaptation and small swinging)	0	255	8	/
	b_ _	Functions about probe calibration				
	b1_	Probe nr. 1				
	b1C	calibration offset	-9.0	9.0	0.0	K
	b1A	use probe to calculate product average temperature	oFF	_on	oFF	/
	b1S	use probe for safety temperature	oFF	_on	_on	/
	b1L	use probe for alarm temperature	oFF	_on	_on	/
	b2_	Probe nr. 2				
	b2C	calibration offset	-9.0	9.0	0.0	K
	b2A	use probe to calculate product average temperature	oFF	_on	_on	/
	b2S	use probe for safety temperature	oFF	_on	_on	/
	b2L	use probe for alarm temperature	oFF	_on	_on	/
	b3_	Probe nr. 3				
	b3C	calibration offset	-9.0	9.0	0.0	K
	b3A	use probe to calculate product average temperature	oFF	_on	oFF	/
	b3S	use probe for safety temperature	oFF	_on	oFF	/
	b3L	use probe for alarm temperature	oFF	_on	oFF	/
	b4_	Probe nr. 4				
	b4C	calibration offset	-9.0	9.0	0.0	K
	b4A	use probe to calculate product average temperature	oFF	_on	_on	/
	b4S	use probe for safety temperature	oFF	_on	_on	/
	b4L	use probe for alarm temperature	oFF	_on	_on	/
	b5_	Probe nr. 5				
	b5C	calibration offset	-9.0	9.0	0.0	%
	b5A	use probe to calculate room humidity	oFF	_on	_on	/
	b6_	Probe nr. 6				
	b6C	calibration offset	-9.0	9.0	0.0	10*ppm
	b6A	use probe to calculate room ethylene	oFF	_on	oFF	/
	b7_	Probe nr. 7				
	b7C	calibration offset	-9.0	9.0	0.0	bar
	b7A	use probe to calculate suction pressure	oFF	_on	_on	/
	L_ _	Functions about alarm and stand-by				
	Lt_	Temperature alarm				
24	LtL	low temperature alarm set point	-55.0	145.0	-2.0	°C
25	LtH	high temperature alarm set point	-55.0	145.0	14.0	°C
	Ltd	alarm delay	0	194 4:20:15	30:00	dd hh:mm:ss
	Lo_	On / stand-by status				
26	Loo	actual status: stand-by or on	oFF	_on	oFF	/
	d_ _	Functions about delays				

Rem.	Parameter	Description	Minimum	Maximum	Default	Unit
	dF_	Delay from previous stop				
	dF6	delay from request to activation of OUT-6: heating	0	194 4:20:15	3:00	dd hh:mm:ss
	h_ _	Functions about keyboard				
	hL_	Keyboard lock				
27	hLH	keyboard lock / unlock	oFF	_on	oFF	/
	hLP	keyboard lock / unlock password	0	99	22	/
	hLI	extend lock to light operation	oFF	_on	oFF	/
	hLc	extend lock to curtain operation	oFF	_on	_on	/
	hLO	extend lock to door operation	oFF	_on	_on	/
	I_ _	Functions about input-output and machine state (read only)				
	IA_	Analog inputs				
	IA1	analog input 1 (temperature)	-55.0	145.0	-55.0	°C
	IA2	analog input 2 (temperature)	-55.0	145.0	-55.0	°C
	IA3	analog input 3 (suction temperature)	-55.0	145.0	-55.0	°C
	IA4	analog input 4 (temperature)	-55.0	145.0	-55.0	°C
	IA5	analog input 5 (humidity)	0.0	100.0	0.0	%
	IA6	analog input 6 (ethylene)	0.0	999.0	0.0	10*ppm
	IA7	analog input 7 (low pressure)	0.0	999.0	0.0	(gauge) bar
	IA8	analog input 8 (average temperature)	-55.0	145.0	-55.0	°C
	Id_	Digital input				
	Id1	digital input 1 (ethylene hardware safety)	oFF	_on	oFF	/
	Id2	digital input 2 (evaporator hardware safety)	oFF	_on	oFF	/
	Id3	digital input 3 (heating hardware safety)	oFF	_on	oFF	/
	Id4	digital input 4 (unused)	oFF	_on	oFF	/
	Id5	digital input 5 (phase-1 software safety)	oFF	_on	oFF	/
	OS_	Machine status				
	LLA	actual alarm - read only (0 means no alarm)	0	255	0	/
	OA_	Analog output				
	OA1	analog output fan (reserved for aux master inp status)	0	255	0	/
	OA2	analog output I out (water valve - 4...20 mA - reserved for aux master output status)	0	255	0	/
	Od_	Digital output				
	Od1	digital output 1 (refrigeration solenoid)	oFF	_on	oFF	/
	Od2	digital output 2 (steam producer)	oFF	_on	oFF	/
	Od3	digital output 3 (air renew)	oFF	_on	oFF	/
	Od4	digital output 4 (ethylene)	oFF	_on	oFF	/
	Od5	digital output 5 (evaporator)	oFF	_on	oFF	/
	Od6	digital output 6 (heating)	oFF	_on	oFF	/
	Od7	alarm - eventually connected to relay nr. 2	oFF	_on	oFF	/
	E_ _	Functions about slave preferences				
	Ed_	Functions about network address				
	EdS	slave address for local network communication	1	254	1	/
	EY_	Functions about display				
	EYY	input to show on display: 8=average temperature / 5=humidity ...	1	8	8	/

2 Parameter remarks

Nr.	Remark
1	During off-time counters continue to count and output is disabled. At reset command they stop and their value is reset. They are restarted by on command. The minus sign on display ("-") means that you already reset timers.
2	The period of each cycle includes on-time + off-time, that is the overall duration of the cycle.
3	The "oFF" command disables the ripening functions and enables the storage. The ripening timers continue however to run also if their output is disabled. To restart the ripening timers, please do the "rES" (reset) command. The "on_" command enables the ripening functions without restarting the timers. To begin a new ripening cycle, please do the "rES" command. The minus sign on display ("-") means that you have already reset the timers.
4	At the end of the ripening cycle the temperature is set to t5 until the manual reset of the ripening cycle.
5	The stop command resets forced operation counter.
6	In case of probe control, ethylene timers and settings are not used. You can still activate forced injections. In case of disabled probe, rYY is used to control curtain string motor when curtain is idle.
7	To synchronize ethylene injection and ripening start, set dY0 = _d0.
8	First ethylene injection is delayed until room temperature reaches _tY. _tY has no effect over following ethylene injections.
9	To synchronize the beginning of further ethylene injections and air renews, set dY3=dA3.
10	To synchronize the cycles of further ethylene injections and air renews, set dY3=dA3.
11	Set by the microcontroller - can be manually overwritten.
12	Door operation disables every other keyboard operation.
13	The first pressure of push button inside the room - near the door - switches on the light, the second one opens the door, the third one activates the "man in room" alarm.
14	During the delay the flashing light is on.
15	For your safety, do not modify this parameter. This setting is supposed to be used just in case of emergency or testing.
16	No action if the light is switched on from inside the room.
17	Curtain operation disables every other operation keyboard operation.

Nr.	Remark
18	For safety reason, door operation is disabled when curtain is enabled. Unrolling can be started also by a push button located near the depressure box, inside the room.
19	When off, the refrigeration solenoid is steadily on during cooling, as long as overheating is higher then vtL or b3A is off.
20	Caution! Low overheating causes liquid return and compressor damage.
21	Caution! Short duty cycle reduces valve life.
22	Caution! Low overheating causes liquid return and compressor damage.
23	Caution! High adaptation speed causes swing in the suction line and damage to the compressor.
24	The low temperature differential is fixed, and alarm status stops at 0.2 °C above the set point.
25	The high temperature differential is fixed, and alarm status stops at 0.2 °C under the set point.
26	Passing from stand-by to on and at power on, there is a 5 second delay spent in a virtual stand-by.
27	When keyboard is locked it is possible to read parameters but is not possible to modify them. To exit the lock it is necessary to write the password.

3 Alarm list

Display	Alarm	
A01	low temperature	Low temperature limit has been reached.
A02	high temperature	High temperature limit has been reached.
A03	ethylene alarm	The ethylene safety device has disconnected.
A04	evaporator alarm	Evaporator thermal relay, or other evaporator safety device has disconnected.
A05	heating alarm	The heating safety device has disconnected.
A06	door open	Time limit for door opening has been reached.
A07	phase alarm	Heating overload/thermal relay disconnected, or missing mains phase - manual reset.
A08	fan 1 alarm	Depressure fan overload/thermal relay disconnected.
A09	fan 2 alarm	Depressure fan overload/thermal relay disconnected.
A10	fan 3 alarm	Depressure fan overload/thermal relay disconnected.
A11	man in room alarm	Somebody remained trapped inside the room.
A12	RTC memory loss	Memory loss of real time clock [RTC] - timer reset.
A13	EEPROM invalid	EEPROM invalid.
A14	EEPROM read start	EEPROM read start failure
A15	EEPROM read end	EEPROM read end failure
A16	EEPROM write start	EEPROM write start failure.
A17	EEPROM write end	EEPROM write end failure.
A18	EEPROM write max	EEPROM failure - reached the maximum number of writing attempts.

4 Slave alarm list

Display	Alarm	
A96	slave EEPROM	Failed write operation onto the slave EEPROM.
A97	out of range	The slave address EdS might be out of the master range, the latter going from 1 to PdS.
A98	no link	The slave does not receive any message from the master.
A99	lost link	The slave lost the communication with the master.

5 Button list

Push button		Function
B1	esc - stop - silence	Exit without saving from any menu - door/curtain stop - alarm buzzer silence.
B2	up - open	Up navigation in the menu - door opening.
B3	on / stand-by	Toggle between on and stand-by.
B4	left - light - roll	Left navigation in the menu - switch the light on and off - roll the curtain.
B5	down - close	Down navigation in the menu - door closure.
B6	right-menu-set-unroll	Right navigation in the menu - display and modify set point - enter the menu - unroll the curtain.
B7	light - door - alarm	Remote button near to the door inside the room: switch on the light, open the door, and trigger man-in-room alarm.
B8	curtain	Remote button near to the depressure box inside the room: switch on and off the curtain unrolling.

6 Led list

Led		Function
L1	cooling	On during cooling.
L2	depressure	On when all depressure fans are running.
L3	humidity	On when humidification is active.
L4	air renew	On during air renew - blinking slowly during pause and delay.
L5	heating	On during heating - blinking slowly during activation delay.
L6	ethylene	On during ethylene injection - blinking slowly when waiting for three events: temperature threshold (_tY), following injections (_nY), first air renew (rYA).
L7	light	On when lighting is on - blinking slowly during deactivation delay.

7 Soft command list

Soft command	Function

8 How to ...

How to ...	Function
Switch between on and stand-by.	Keep pressed B3 button, to activate and deactivate stand-by. In stand-by every output is disabled except light, leds from L1 to L6 blink, timers continue to count.
Program the menu.	Keep pressed B6 to enter the menu. Navigate up and down with B2 and B5. Select the submenu by B6. Change the parameter by B2 and B5, press B6 to confirm, or B4 to go back without saving. The changes will have effect after the exit from programming pressing B4 repeatedly. Press B1 to exit immediately without saving any parameter.
Show or change temperature set.	Press shortly B6 - the display shows the current set point - change it by B2 and B5, and confirm it by B6. As alternative, enter the menu program as explained above, modify the parameter t0, then confirm it.
Reset timers.	For the resettable controls in the menu program, confirming "rES", then confirming "on_" or "oFF", has the joint effect of resetting timers and going into the enabled or disabled status.
Enter ripening mode.	Keep pressed B6+B3. As alternative, enter the menu program as explained above, set the parameter rrH, reset it in case it is a new ripening, then confirm it.
Enter storage mode.	Keep pressed B6+B1. As alternative, enter the menu program as explained above, set to oFF the parameter rrH, then confirm it.
Door operation.	Push B2 to open, B5 to close, and B1 to stop. If you are inside the room and the door is closed, press B7 once to switch on the light, press again to open the door, and again to trigger the man in room alarm. During door operation display shows "OPE" or "CLO". By default, when the door is open, the light is on and every other output is off. By default, door operation is disabled after the first ethylene injection and before subsequent air renew.
Curtain operation.	For safety reason, the curtain can be operated only when the door is fully open and the light is on. To activate the keyboard for the curtain, keep pressed B6+B4, then press shortly B6 or B8 to unroll, B4 to roll, B1 to stop, and again B1 to exit curtain mode. During curtain operation, every output is disabled. The display shows "Cur" with the curtain idle, "Unr" during unrolling, and "rOL" during rolling.

9 Shortcut list

Buttons to press	Shortcut description - keep pressed 5 seconds
B6+B3	Enter ripening mode.
B6+B1	Enter storage mode.
B6+B4	Activate the keyboard for curtain operation.
B6+B2	Force an immediate air renew.
B6+B5	Force an immediate ethylene injection.

10 Led and push button location