

Manual of the Refrigerating Unit Controller LGSA - 02

8.3. Pressure reading display.

When the user's function FU=2 is selected the control unit displays the pressure reading from the analogue sensor. In order to exit from the pressure display mode one has to press the button .

8.4 Evaporation temperature display for selected refrigerating media.

When a user's function from FU=3 to FU=7 is selected the control unit displays the evaporation temperature reading for selected refrigerating media (UF=3 - R22; UF=4 - R407; UF=5 - R507; UF=6 - R404; UF=7 - R134a). In order to have these functions activated it is necessary to connect to the control unit an appropriate pressure sensor and configure it in function F18 SETUP.

In order to exit from this display mode one has to press the button .

8.5 Software version display.

When the user's function FU=9 is selected the control unit displays the software version. In order to exit from this display mode one has to press the button .

9 „Dripping” Status Signalling

After completion of thawing process the controller keeps the compressor off for few more minutes in order to allow dripping of water left after thawing of the cooler. Dripping time is fixed by service (F25 SETUP).

Blinking diode signals dripping status .

Attention! Dripping status signalling is available in controllers in program version 1.20 or higher.

10 Alarms signalling.

- The control unit LGSA-02 controls the appearance of the following alarms:
- Temperature infringement alarm (upper temperature limit), signalling **A 0**
 - Temperature infringement alarm (lower temperature limit), signalling **A 1**
 - Open door alarm, signalling **A 2**
 - Open control input no 2 alarm, signalling **A 3**

In case of alarms described above the alarm relay is switched on and a diode with a bell pictogram lights on. If the button  is pressed, the alarm signal is switched off for a period of 1 minute and the alarm number (as indicated above) is displayed. The sequential pressing of the button  displays in-turn all the alarms that occurred till now.

11 Switching off the control unit - „STOP”.

It is possible to switch off temporarily the control unit functions (in such a state all the control unit's inputs are switched off, the control unit does not analyse alarms, it does not perform recording of measurements, it does not realise the defrost process). This function is specially useful if the refrigerating installation is put into operation or in case of periodic maintenance or any brakes in refrigerating system operation.

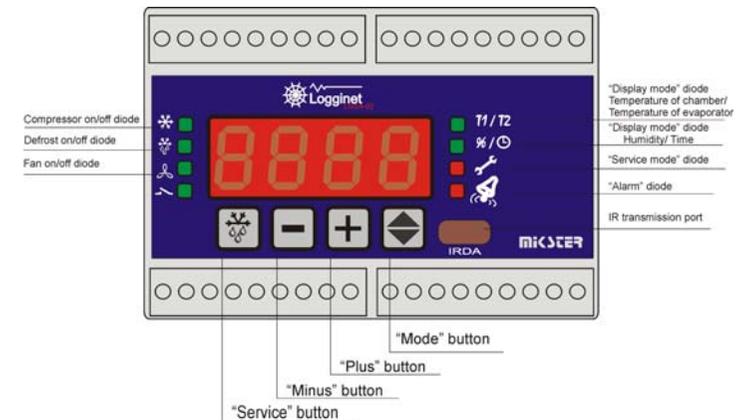
In order to switch off the control unit, one has to press the button  four times (with intervals of about 0,5 second). The label **StoP** appears on the display. When any button is pressed the control unit returns to its normal mode of operation.

1. Description of operation

The control unit is designed as a controller of the refrigerating device and it realises the following functions:

- temperature adjustment inside the cold chamber (switching the compressor + fans on / off),
- controlling the defrost process start at a given time, through switching on the heaters with the fan switched on or of (possibility to program up to 12 defrost processes per 24 hours)
- controlling the defrost process end on the basis of the radiator temperature measurements or on the basis of the infringement of permissible defrost time,
- measurements of suction pressure (if the pressure sensor is installed) that is then converted into corresponding to this pressure vaporisation point (temperature) for selected refrigerating media,
- measurement and adjustment of humidity inside the chamber (if the humidity sensor is installed),
- recording of events and manipulations done on the control unit (e.g. the door opening, "up" and "down" infringements of permissible temperatures, power drop, change of the controller parameters),
- recording and monitoring the temperature, pressure and humidity,
- wireless transmission (through IRDA port) of data stored in the control unit by means of the service terminal or through a computer equipped with an IRDA adapter.

2. Operator panel of the control unit.



3. Start-up.

The control unit starts up automatically when the temperature sensors are connected to it (according to the labels placed on the unit, PT-1000 as standard) and power is switched on. Chamber temperature is displayed on the control unit display, control functions of the refrigerating unit are consistent with factory settings, the diodes indicate the proper state of the devices. In case the symbols **uuuu** or **nenn** are displayed on the unit display one should check the correctness of electrical connections and service settings if they are appropriate to the type of the temperature sensor (functions F36,F37,F38 – item 8 of the instruction manual). In case the start-up time of the control unit is identical with one of the pre-set defrost times (functions F40-F52 SETUP), the control unit will be in the defrost state.

4. Display / Adjustment of the required temperature of chamber and compressor hysteresis parameters

Single press of the button  or  will display the required value. The continuous pressing or holding down the button will increase or decrease the required value. In case the function enabling adjustment of compressor hysteresis parameters at a required temperature is activated, one should press the button  first, and then set the hysteresis parameters by pressing the buttons  or .

5. Readings display: chamber temperature, evaporator temperature, humidity, real time clock.

LED display mode may be changed by pressing the button .

Continuous pressing the button  will cause sequential display of cycle parameters on the LED display:

CHAMBER TEMPERATURE (the diode  T1/T2 is continuously on, the diode  % /  is off).

EVAPORATOR TEMPERATURE (the diode  T1/T2 pulsates, the diode  % /  is off).

HUMIDITY (the diode  T1/T2 is off, the diode  % /  is continuously on).

CLOCK (the diode  T1/T2 is off, the diode  % /  pulsates).

6. Humidity regulator.

6.1 Configuration of the humidity regulator.

In order to activate functions of the humidity regulator, the digital sensor of humidity has to be connected to the control unit and the functions: SETUP F57=1 and hysteresis parameters (function F58 as standard $\pm 1\%$, symmetric hysteresis) have to be set. The adjustment function is realised through switching on/off the relay connected to the connector 16 of the control unit, according to the required value and set hysteresis parameters (below the lower hysteresis the relay is switched on, and above the upper hysteresis the relay is switched off).

6.2 Change of the required humidity setting.

If the control unit is correctly configured according to item 6.1, it is possible to set the required humidity.

In order to do this one has to press several times the button  and display the humidity reading (the diode  % /  is continuously on).

At this moment a single press of the button  or  will display the symbol **Hu** followed by the required value on the control display.

Sequential pressing or holding down the button  or  will change the value of required humidity in the range from 0 to 99%.

7. Forced switching on/off the defrost process.

The control unit LGSA - 02 has the possibility to switch on automatically the defrost process 12 times per 24 hour at programmed times. In case of necessity to force the defrost process at a given moment (if the defrost process is actually off) or to stop the defrost process

(if it is actually on) one has to press and hold down for about 2 seconds the button , which will cause switching on or off the defrost process.

8. Service functions accessible for the user.

The user has access to the following functions.

UF=0	Real time clock set.
UF=1	Change of the password for user's functions.
UF=2	Value of pressure displayed in bars. (if the sensor is connected and the upper limit value of the pressure sensor is correctly entered in function F18, the standard value is 20 bars).
UF=3	Evaporation temperature display for the refrigerating medium R22.
UF=4	Evaporation temperature display for the refrigerating medium R407.
UF=5	Evaporation temperature display for the refrigerating medium R507.
UF=6	Evaporation temperature display for the refrigerating medium R404.
UF=7	Evaporation temperature display for the refrigerating medium R134a.
UF=8	Free.
UF=9	Software version display.

In order to enter the service mode one has to press and hold down the button , press and hold down the button .

The word "CODE" will be displayed and then an access code has to be entered. If the access code is entered correctly, the number of the user's service function will be displayed. UF=0.

Pressing the buttons   one should set the required user's function number.

Selection of the function is done by pressing the button . In order to exit from the service mode the button  has to be pressed.

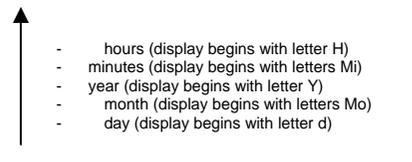
8.1 Real time clock setting (UF=0)

As standard the control unit LGSA - 02 is equipped with a real time clock. The correct setting of the clock is important for the correct work of the device and specially for the performed recording of events and defrosts steered by the real time clock. When the user's function FU=0 is selected the control unit enters the mode of real time clock setting and the letter **H-** is displayed followed by a pulsating value of hour.

The value of a proper real time clock parameter should be set by pressing the buttons  .

By pressing the button  one enters the edition mode of sequential clock parameters.

In turn:



In order to exit from the real time clock setting mode, one has to press the button .

8.2. Changing the password to the user's service functions.

When the user's function FU=1 is selected the control unit enters the mode of password change and a current valid password is displayed.

Pressing the buttons   one can change the password. The new password is stored when the button  is pressed.

In order to exit from the password setting mode one has to press the button .

Service functions SETUP.

The control unit LGSA-02 is equipped with an internal memory that stores its configuration parameters necessary for the correct work of the device (Table 1). Change of these parameters should be done only by a qualified person who knows the meaning of these functions and their influence on the operation of the refrigerating system.

In order to enter into the service mode one has to press and hold down the button  , to press and hold down the button .

The label "CODE" will appear on the display and the access code has to be entered.

If the access code is entered correctly the letter **F-** followed by a pulsating number of the service function will be displayed.

Change of the service function number is done by pressing the buttons  .

Selection of the function for edition is done by pressing the button .

The value of the selected function will be displayed on the display.

Change of this value may be done by pressing the buttons  .

In order to accept the change the button  should be pressed.

If the value of the function is accepted the unit returns to the function number selection mode.

Pressing the button  ends the mode of selection and edition of service functions.

The table of service parameters (Table 1)

Function number	Function description	Parameter range	Typical value	Comment / notes
F00	Control unit address in the net RS-485	1..128	1	This function determines the controller address in the monitoring net RS485
F01	Transmission speed to PC	0..4	0	0-9600 ; 1-19200 ; 2- 38400 3-57600; 4-115200;
F02	Free			
F03	Type of the alarm signal.	0..1	0	This function determines if the generated alarm signal has to be continuous or dashed. 0 – continuous signal 1 – dashed signal
F04	Free			

F05	Hysteresis setting.	0..1	0	0- service user
F06	Hysteresis of switching on.	0..10,0°C/F	2,0 °C/F	
F07	Lower limit of required temperature.	-60,0..10,0 °C/F	-20,0 °C/F	
F08	Upper limit of required temperature.	-60,0..+60,0 °C/F	+50,0 °C/F	
F09	Correction of the chamber temperature reading.	- 10,0..+10,0° C	0°C/F	
F10	Correction of the evaporator temperature reading.	- 10,0..+10,0° C	0°C/F	
F11	Temperature unit.	0..1	0	0- Celsius 1- Fahrenheit
F12	Upper alarm	-50,0..+50,0 °C/F	50,0 °C/F	
F13	Lower alarm	-50,0..+50,0 °C/F	-50,0 °C/F	
F14	Delay of temperature alarm.	0..30min	1	
F15	Delay of open door alarm.	0..30min	1	
F16	Maximal operation time of the compressor if the temperature sensor is damaged.	0..240min	60	
F17	Minimal switch off time of the device.	0..60min	3	
F18	Upper limit of the pressure sensor.	5..20bar	6	The upper pressure limit is the pressure for which the output current of the sensor is 20mA.
F19	Switching off the compressor and fans when the door is open.	0..1	0	0- the compressor is on if the door is open. 1- the compressor is off if the door is open.
F20	Free			
F21	End temperature of defrost process.	0..40°C/F	12°C/F	
F22	Minimal start temperature of defrost process.	-20..+20°C/F	10,0°C/F	Minimal radiator temperature below which start of the defrost process is possible.
F23	Maximal defrost time.	0..120min	30min	

F24	Free		0min	
F25	Dripping time.	0..59min	5min	
F26	Delay time of the fans start after dripping.	0..59min	2min	
F27	The radiator temperature (after dripping) at which the fans start.	-20.0..20.0°C	0.0°C/F	
F28	The fans on/off at the defrost process.	0..1	0	0- The fans at the defrost process are off. 1- The fans at the defrost process are on.
F29	The defrost temperature sensor is/is not connected.	0..1	1	0- The defrost temperature sensor is not connected. 1- The defrost temperature sensor s connected.
F30	The delay of the temperature alarm after the defrost process.	0..59min	0	
F31	The delay of temperature display.	0..30min	0	The delay of actual temperature display after end of defrost process. If value 0 is entered the function will be off (all the time a real temperature is displayed). If value greater than 0 is entered the temperature measured before the defrost process is displayed during the defrost process and during the period (given in F31) after the defrost process has started.
F32	The fans on/off when the compressor is off.	0..1	0	0- The fans are on when the compressor is off. 1- The fans are off when the compressor is off.
F33	The delay of switching the fans off after switching the compressor off.	0..59min	0	Active if F32=1
F34	Free			
F35	The delay of switching the control unit on in case of power drop.	0..59min	0	All the devices are switched off for time given in F35 after switching on the control unit. The purpose of

				this function is to adjust the switch on times of all devices in case there is a great number of these.
F36	Switch on/off the digital sensor.	0..1	0	0- digital sensor is off. 1- digital sensor is on.
F37	Type of the analogue sensor.	0..1	1	0-PT-100 ,1-PT1000
F38	Type of chamber temperature sensor.	0..1	0	0- analogue,1- digital
F39	Start hour Defrost 1	-1..23 hour	0	Value of the function = -1 will cause the pass over the defrost time.
F40	Start hour Defrost 2	-1..23 hour	4	as above
F41	Start hour Defrost 3	-1..23 hour	8	as above
F42	Start hour Defrost 4	-1..23 hour	12	as above
F43	Start hour Defrost 5	-1..23 hour	16	as above
F44	Start hour Defrost 6	-1..23 hour	20	as above
F45	Start hour Defrost 7	-1..23 hour	-1	Value of the function = -1 will cause the pass over the defrost time.
F46	Start hour Defrost 8	-1..23 hour	-1	as above
F47	Start hour Defrost 9	-1..23 hour	-1	as above
F48	Start hour Defrost 10	-1..23 hour	-1	as above
F49	Start hour Defrost 11	-1..23 hour	-1	as above
F50	Start hour Defrost 12	-1..23 hour	-1	as above
F51	Frequency of measurements recording.	0..360 min	15 min	
F52	Frequency of alarms recording.	0..360 min	1 min	
F53	The delay of measurements and alarms recording after power drop.	0..60min	0	
F54	Password to the service functions.	0.9999	0123	
F55	The frequency of air mixing in the chamber.	0..240min	60min	The frequency of switching the fans on if the "mixing" compressor is off.
F56	Operation time of the fans if air mixing in the chamber is active.	0..60min	5min	
F57	Switch the humidity regulator on/off.	0..1	0	0- regulator is off. 1- regulator is on.
F58	Hysteresis of the humidity regulator.	0..20	1	
F59	Free			