

# Programmable controller CLARE 4.0: Communication protocol

Programmable controller CLARE can be connected to any RS232 serial interface (COM port).  
Settings for the serial interface:

Baud speed **4800 bps**  
Data bits **8**  
Parity **žádná**  
Stop-bit **1**

Programmable controller CLARE in MASTER mode sends commands for the controllers in SLAVE mode by serial interface. The automatic commands broadcast can be interrupted by any command from PC for the controller CLARE in MASTER mode.

## List of CLARE 4.0 controller commands

### 1. Controller ID (address)













Each controller connected to the same PC serial interface must have unique ID. This address of the controller can be set (mode **SETUP**, area **SEARCH**, item **SErno**).

**Before any command must be send the initial code 165 (A5h) and ID address + 128 (80h) of the current controller.**

Code: **165, 129-143** (128+ID address set in mode **SETUP**, area **SEARCH**, item **SErno**)

### 2. Controller keyboard

There is necessary to send the code of pressed key and then the code of release key. Some keys have special function when they are pressed longer time.

Release key code: <b>144 (90h)</b>			
 enter: <b>145 (91h)</b>	 down: <b>148 (94h)</b>	 start: <b>151 (97h)</b>	 right: <b>154 (9Ah)</b>
 info: <b>146 (92h)</b>	 delay: <b>149 (95h)</b>	 temperature: <b>152 (98h)</b>	 stop: <b>155 (9Bh)</b>
 up: <b>147 (93h)</b>	 ramp: <b>150 (96h)</b>	 left: <b>153 (99h)</b>	 programs: <b>156 (9Ch)</b>

### 3. Controller display

Code **157 (9Dh)** – The controller sends 10 bytes of the actual displayed characters.

Byte1 – first green character  
Byte2 – second green character  
Byte3 – third green character  
Byte4 – fourth green character  
Byte5 – fifth green character

Byte6 – individual LEDs  
Byte7 – first red character  
Byte8 – second red character  
Byte9 – third red character  
Byte10 – fourth red character



Byte1-5, Byte7-10  
Bit 0 – segment top  
Bit 1 – segment top right  
Bit 2 – segment bottom right  
Bit 3 – segment bottom  
Bit 4 – segment bottom left  
Bit 5 – segment top left  
Bit 6 – segment middle  
Bit 7 – always 0

Byte6  
Bit 0 – dot for the fourth red character  
Bit 1 – dot for the third red character  
Bit 2 – dot for the second red character  
Bit 3 – dot for the first red character  
Bit 4 – green LED (program running)  
Bit 5 – alarm 1  
Bit 6 – alarm 2  
Bit 7 – always 0

## 4. Controller information

In all cases the controller send 2 bytes. Value = 256\*byte1 + byte2

Code **158 (9Eh)** – type of the furnace (byte2=0 superkanthal furnace, byte2=1 kanthal furnace)

Code **159 (9Fh)** – maximal temperature in furnace (unit 1°C)

Code **160 (A0h)** – power of the furnace (kWh = 4500/value)

Code **161 (A1h)** – actual temperature in the furnace (unit 0.1°C)

Code **162 (A2h)** – actual program and block (byte1=program, byte2=block)

Code **163 (A3h)** – ramp set in manual mode (unit 0.1°C/min)

Code **164 (A4h)** – temperature set in manual mode (unit 1°C)

Code **165 (A5h)** – delay set in manual mode (unit minute)

Code **166 (A6h)** – temperature sample record interval (unit sec)

Code **169 (A9h)** – status of the controller

Code **170 (AAh)** – master/slave information

Code **171 (ABh)** – set point temperature

## 5. Controller management

Code **188 (BCh)** – master sends commands for the slaves (including set point temperature)

Code **189 (BDh)** – stop the furnace (only when the furnace started with code 190)

Code **190 (BEh)** – start the furnace (only when the furnace is stopped, endless delay is performed)

Code **191 (BFh)** – controller sends stored samples (no new samples: FFFFh)

Code **192 (C0h)**, **program number**, **program** – sends the program to the controller

Code **193 (C1h)**, **program number** – controller sends the required program

Code **194 (C2h)**, **Tset1**, **Tset2** – controller will regulate the temperature 256\*Tset1 + Tset2 (unit 0.1°C)

### Programming:

Program is composed of the blocks, every block has 2 bytes. Program must end with command STOP

Command	Display	short	BYTE 1	BYTE 2	unit	Range of par
Ramp	rRNP	r	9 + par/256	par mod 256	0.1°C/min	0-1200, 0=FAST
Temperature	tENP	t	0 + par/256	par mod 256	1°C	1-Tmax
Delay	dLAY	d	42 + par/256	par mod 256	min	0-4999, 0=CONT
Time	tINE	c	22 + par/256	par mod 256	min	1-4999
Jump	jUNP	j	21	par	prog no.	1-10 (75 extended)
Alarm	aL	a	15 + par/256	par mod 256	min	0-1439 (60*hour+min)
In	iN	i	62	par		1-4
Out	oUt	o	63	par		1-8
Power	p-OC	p	14	par	%	0-100 0=OFF
STOP	sTOP	e	8	8		

### Sample:

Every day from 6.00 to 18.00, the temperature in the furnace 1180°C, otherwise 400°C. The temperature should rise up one hour morning. We will use controller ID 1, program no. 5.

Program for the controller: a5.00, c60, t1180, a18.00, rF, t400, j5, e

We will send to the controller the following sequence:

**165** (initial code), **129** (controller ID 1), **192** (send program), **5** (program no.), **16**, **44** (alarm 5.00), **22**, **60** (time 60), **4**, **156** (temp. 1180), **19**, **56** (alarm 18.00), **9**, **0** (ramp Fast), **1**, **144** (temp. 400), **21**, **5** (jump 5), **8**, **8** (end)