Industrijska elektronika SPIN d.o.o.

Temperature Control System

M a n u a l

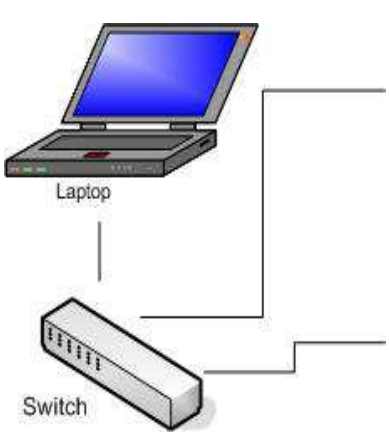
KRAH d.o.o.

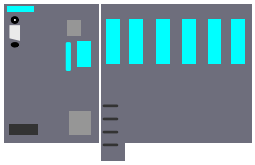
Version: 10-2011

Introduction

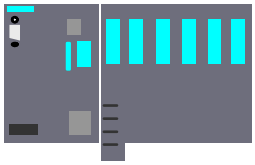
Temperature Control System controls the temperatures of seven sensors connected to the Programmable Logic Controler (PLC S7-1200). Control program controls the two PLCs simultaneously and they are completely independent in work.

PLC Configuration





PLC1



PLC2

Software and hardware:

PLC:
Equipment: **Siemens S7 1200**
Program: **TIA portal**

PC:
Equipment: Laptop
Program: **WinCC flexible RT**

Communication: **Wireless**

The program starts with the start screen, indicated by the blue background.

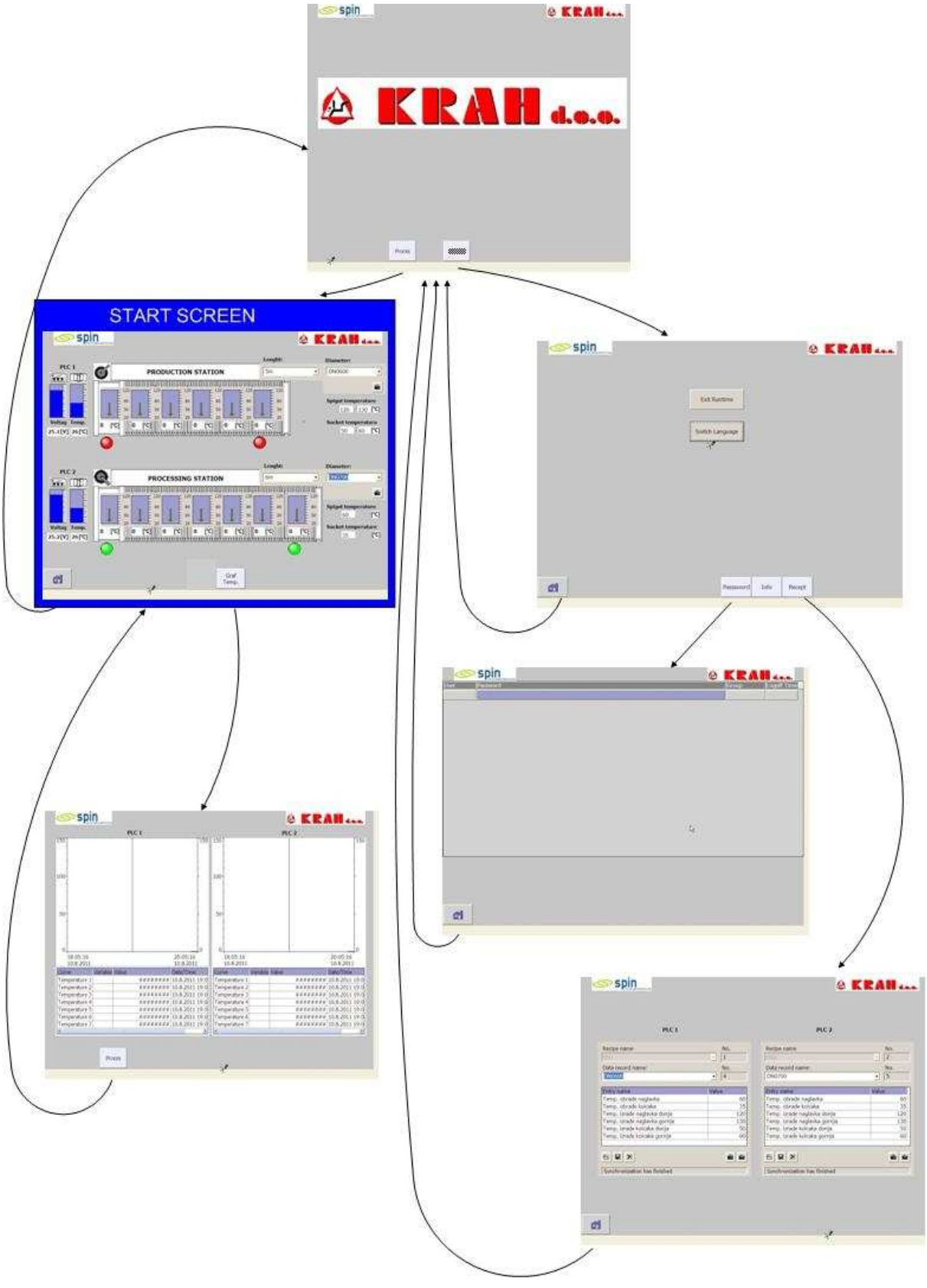


Fig. 1. All program screens

Screen – Start Screen

There are two working modes, two production operations:

1) Tube Wrapping on the Toolkit
2) Socket and Spigot Processing

The selection is done using the switch from PLC cabinet.
There is a switch setting icon information on Start Screen (2).

The Start Screen shows some more information:

- storage battery status (capacity for PLC power supply),
- PLC cabinet inside temperature value (1).

If any of those values is lower than the alert value the value graph will be coloured in red.

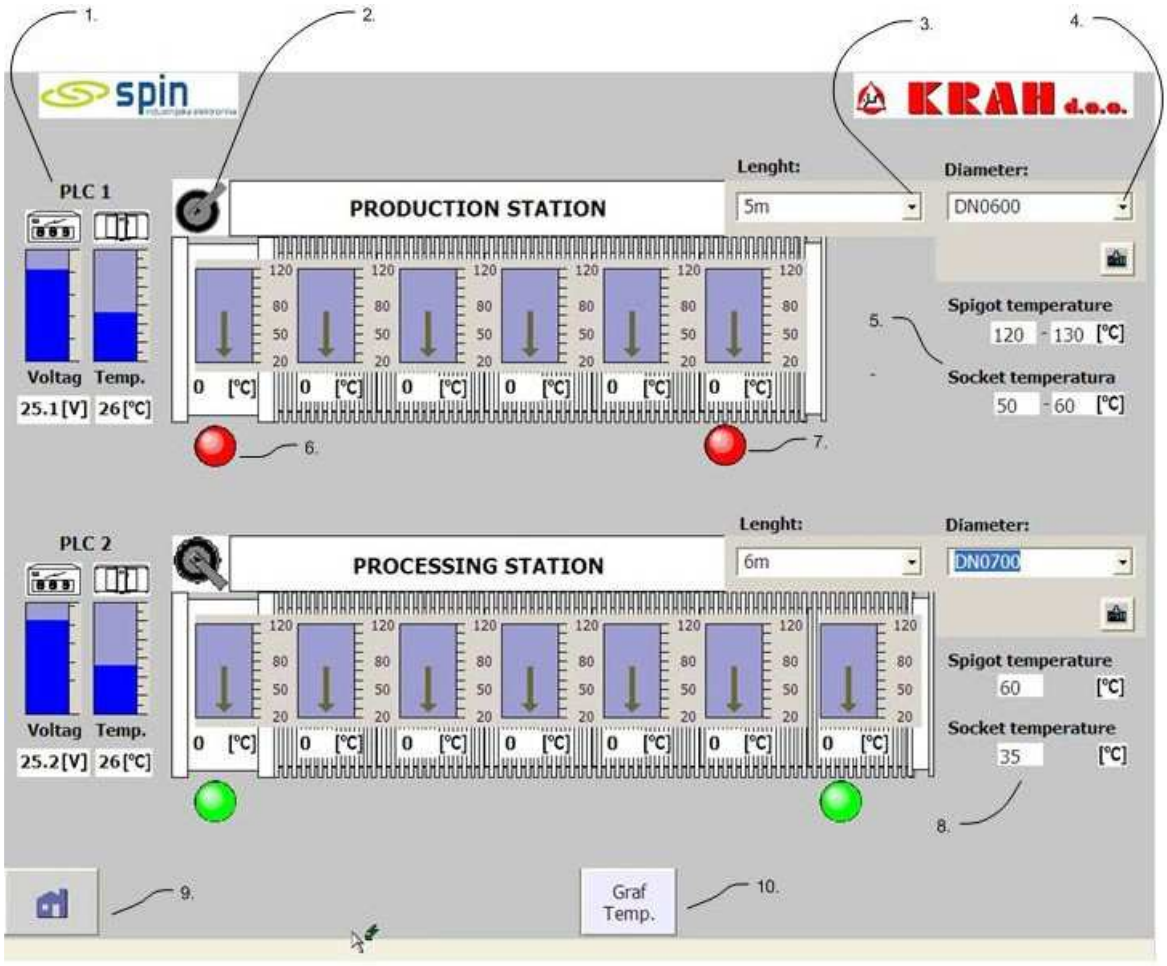


Fig. 2. Start Screen

Start Screen allows the choice of production recipes used by PLC for working temperature setting. It is possible to choose the tube length (3) and tube diameter (4). It is shown automatically all the temperature values – socket temperature and spigot temperatures. Both of them are important for system working depending on working modes i.e. production activity - Tube Wrapping on the Toolkit (5) or Socket and Spigot Processing (8).

If one of temperature values is in alert status then the alert icons – socket temperature (6) and/or spigot temperature (7) - will be coloured changed from green to red .

The temperature value is shown with numeric value and bar graph. Each graph presents the temperature value proportionally to choosen length.

This screen allows to chose another new screen, Temperature Diagram or to back (Start Screen).

Screen – Temperature Diagram

Left part of screen shows the temperature diagram from PLC1 sondes (1) and right diagram shows the temperature diagram from PLC2 sondes (2).

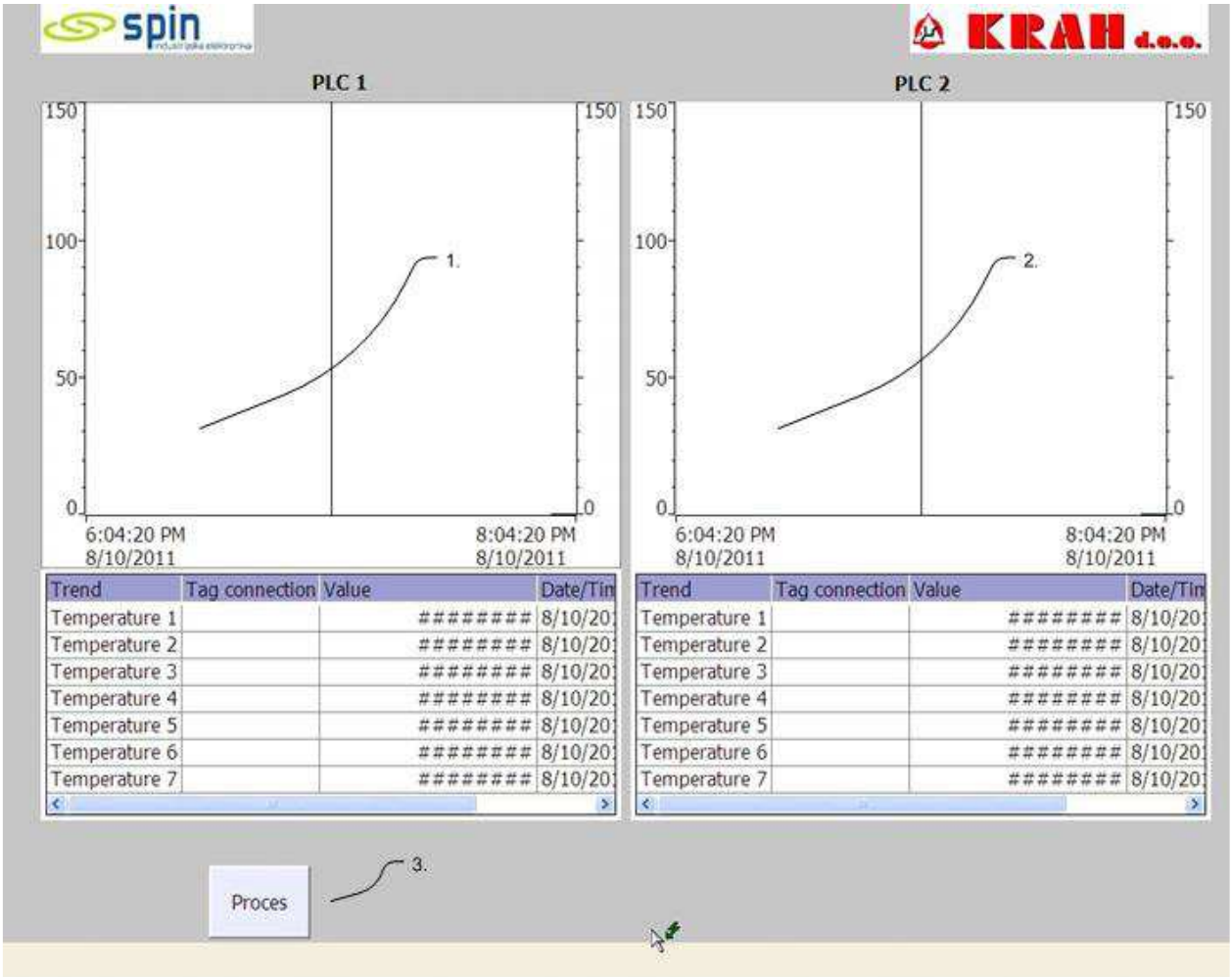


Fig. 3. Screen: Temperature Diagram

Each temperature is shown with own diagram in real time. X-osis is updated in real time automatically – so it is possible to see the two last hours data. User can move the vertical line on time scale by mouse and according to its position the numeric values and temperature measurement time for each event will be shown in the table.

There is an option icon Process (3) at the bottom of the screen – it allows the Start Screen again.

Screen – Main Screen

Fig. 4. Main Screen Icon

Main Screen Icon shows the Main Screen from any other program screen.
Thereafter it is possible to choose:

- Process Screen (1), or
- System Screen (2).

Fig. 5. Main Screen

Screen – System Screen

1 – Exit

2 – Language Selection (every mouse click will change the language: Croatian, German or English.

3 – Main Screen,

4 – Pasword Screen

5 – Info Screen

6 – Recipe Screen

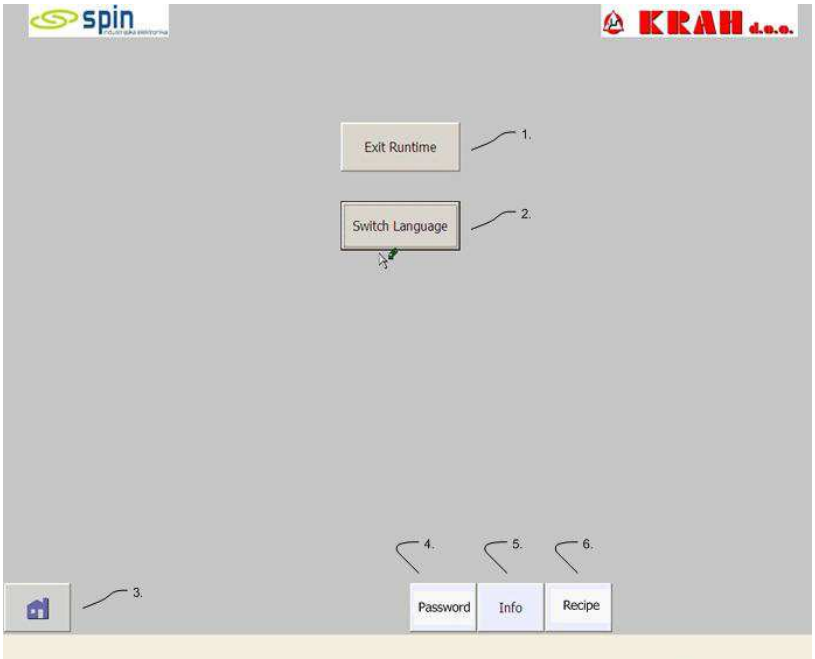


Fig. 6. System Screen

Screen – Password Screen

The Password Screen allows
- the password definition (2) to every user (1) and
- the authorization level.

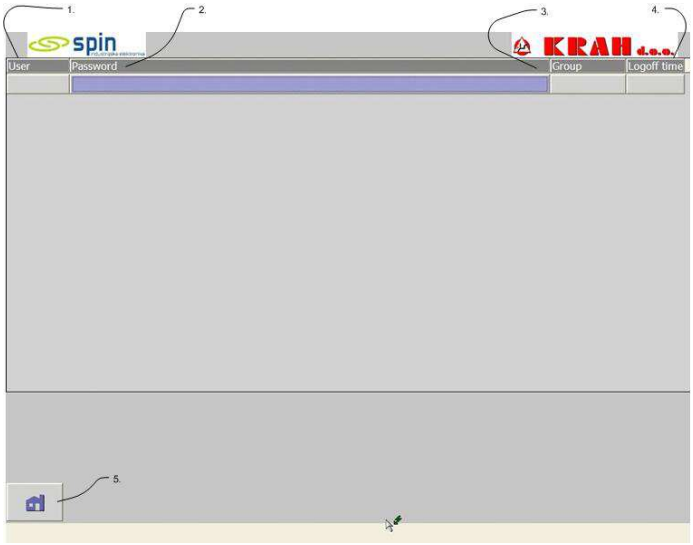


Fig. 7. Password Screen

Screen – Info Screen

Info Screen consists of program info and program author data.

Screen – Recipe Screen

Every tube diameter (1) is determinated with:
- socket temperature,
- spigot temperature,
- lower limit, and
- upper limit.

Above mentioned characteristics depend on working mode (Tube Wrapping on the Toolkit or Socket and Spigot Processing).
Temperature values are determined for each PLC and they will be saved (3) in the computer memory.

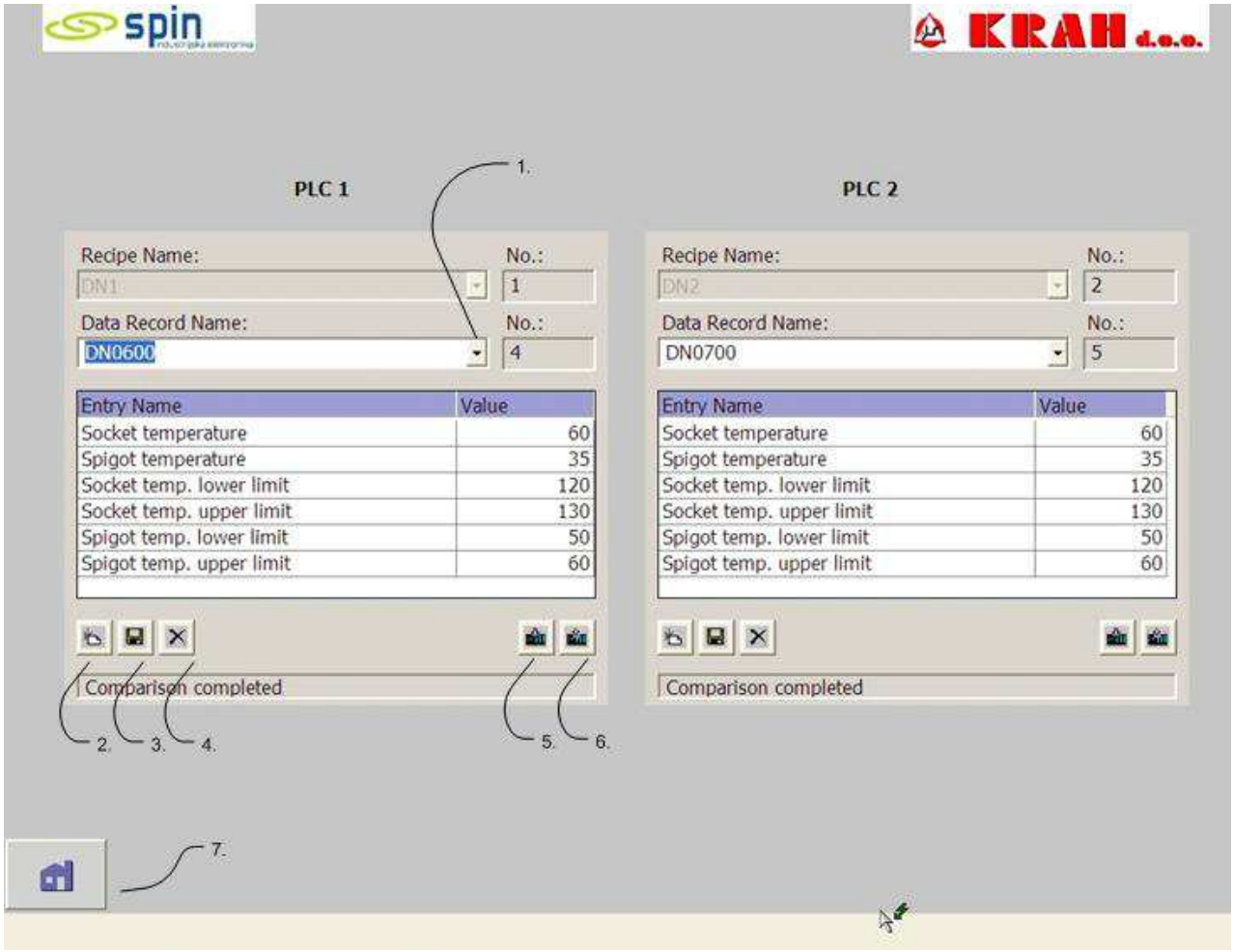


Fig. 8. Recipe Screen

Icons (5) and (6) are used for direct data saving in PLC or for data taking from PLC.
There is one recipe only in PLC, so it is not necessary to use those icons.
Main Screen option allows to choose the tube diameter – that means the temperature values will be moved in PLC automatically.
Icon (7) will change the screen to Main Screen.