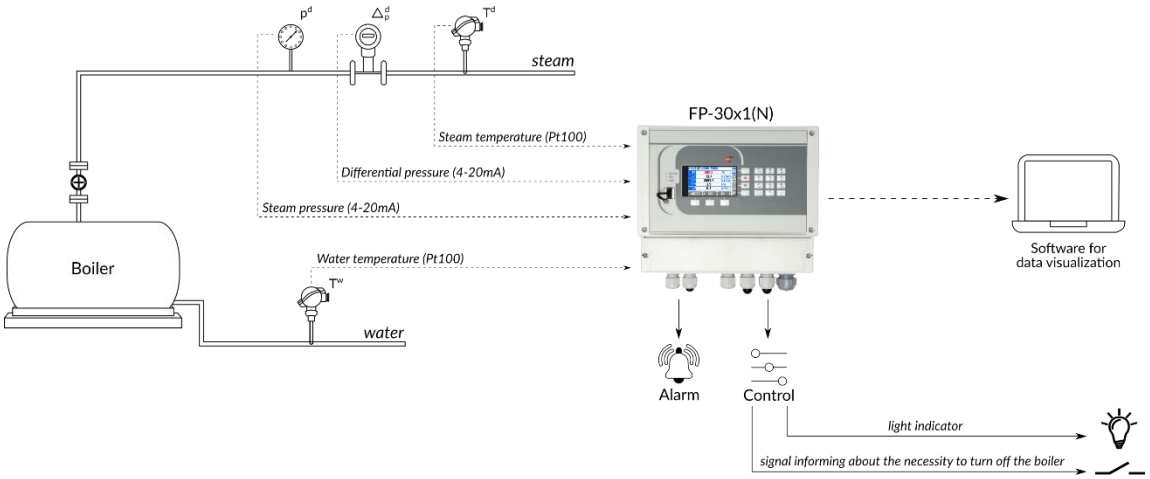
BOILER POWER LIMITATION CONTROL

To fulfillment the requirements of the European Parliament directive on the limitation of emissions of some pollutants into the air from medium combustion plants, it may be necessary to limit the boiler power. The use of the FP-30x1(N) flow computer, measuring sensors and relays can switch off the boiler after exceeding the indicated value of the selected process value, in particular power. The FP-30x1(N) device enables advanced recording and analysis of measurement results, which can be used to confirm the operating conditions of the system. The flow computer is an independent measuring unit that can cooperate with the supervising system. The device is equipped with relay outputs, which enables the implementation of several-stage warning before exceeding selected alarm levels or the realization of a simple control system.

An example of using the FP-3011N flow computer for limiting boiler power, flow computing and data archiving is described below. The flow computer can be used in similar applications where it is necessary to monitor and record system parameters and boiler operation.



• Description

The FP-3011N calculates the flow, energy and other system parameters based on measured values. The data are displayed on the flow computer screen and are archived according to the entered settings.

Up to 4 alarm thresholds can be set for each measured and calculated value. The flow computer has 4 relay outputs. Exceeding the alarm threshold level causes a change of state on the assigned relay output (closed/open). The described application enables the implementation of a two-stage warning system:

1. Exceeding alarm threshold 1 for steam thermal power – closing the RL1 relay output (light indicator),
2. Exceeding alarm threshold 2 for steam thermal power – opening of the RL2 relay output (generating a signal informing about the necessity to turn off the boiler).

It is possible to change the state at the relay output due to a failure of the measuring sensor connected to the analog input. The relay output can be assigned several times, e.g. RL2 relay output active (open) after exceeding the alarm threshold for steam thermal power and in the event of a differential pressure sensor failure.

Depending on the order, the device can be equipped with an 4-20mA analog output, with allows retransmission of the current value of the channel (e.g. steam thermal power).

• Settings protection

Setting changes are possible only after logging in and entering the password. The device allows adding several users with different authorization levels, which prevents from changing the device parameters by unauthorized persons. Settings changes are saved in the archive (registration of date and time).

After logging in, on the display of the flow computer it is possible to view the event log and authorization log (without downloading files and using a computer).

• Recording results

The FP-30x1(N) calculates the parameters of the measured medium as an independent unit of the control system. The flow computer archives the read and calculated values and exceeding the alarm thresholds in accordance with the settings. Archive files are secured with checksum against modification (CRC check).

• Reading results

Archive files can be downloaded from the device using a portable memory (USB memory stick) or using Ethernet connection and FP-3000-Raport software. Ethernet and web server enable reading current values. Additional software on the PC enables visualization of archived data or current values (FP-3000-Raport, mLog). The FP-30x1(N) flow computer can be included in the SCADA master system.

• Example configuration

The flow computer can be configured on a computer with using a dedicated program or from the device front panel keypad.

An example configuration of the FP-3011N flow computer is described below. The description applies to the system presented in the drawing (measurement of the flow and delta heat in a closed steam-condensate installation). It is possible to measure the flow of any medium, an analogous configuration should be made taking into account the measured quantity.

1. Configuration of settings is possible from the administrator level (→ **MAIN MENU** → **Login** → *password* → **OK**),
2. Configure system as *The flow and delta heat in a closed steam-condensate installation* and select the type of flowmeter (**MAIN MENU** → **Settings** → **Main applications** → **A.** → **Installation** → ***The flow and delta heat in a closed steam-condensate installation*** → **NEXT** → *select the type of steam (for the system presented in the drawing **SUPERHEATED**)* → **NEXT** → ***DIFFERENTIAL PRESSURE*** → **NEXT**),
3. Set the differential pressure flow meter parameters (**MAIN MENU** → **Settings** → **Main applications** → **A.** → **Diff pres device for $\Delta_p{}^D$** → *configuration*),
4. Relay outputs RL1 and RL2 should be set in the *Control* mode:
   a. RL1: **MAIN MENU** → **Settings** → **Relay outputs** → **Output RL1** → **Mode** → ***Non-latched*** *(Control)* → **Active** → ***Closed***,
   b. RL2: **MAIN MENU** → **Settings** → **Relay outputs** → **Output RL2** → **Mode** → ***Non-latched*** *(Control)* → **Active** → ***Open***,
5. Configure the channels. For the selected parameter (e.g. for the thermal power of the steam P^D) select the alarm threshold, level, hysteresis and assign the relay outputs: **MAIN MENU** → **Settings** → **Alarms and control** → **A.** → **A.P^D** → **Threshold 1** → **Mode** → ***High*** → **Level** → *value for which the state of the relay output should change* → **Hysteresis** → *value* → **Control** → ***RL1*** *(relay output configured in point 4.)* → **Threshold 2** → **Mode** → ***High*** → **Level** → *value for which the state of the relay output should change* → **Hysteresis** → *value* → **Control** → ***RL2*** *(relay output configured in point 4.)*,
6. Configure the other system parameters. Totalizers can be enabled and configured for selected parameters: **MAIN MENU** → **Settings** → **Totalizers** → *configuration*,
7. Assign channels to the measurement inputs: **MAIN MENU** → **Settings** → **Inputs** → **Assign**.

Example of application for monitoring boiler operation.

• Information from the Manufacturer

All functions of the recorder are subject to modifications for the benefit of technical progress.

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