THERMODYNAMICS

T138D - Boiler Simulator with Checks and Fault Generator - Code 957000

1. General

The unit has been designed to study, on a functional model but simulated, all parameters which regulate the utilisation, conduction, maintenance and repairs on a steam generator plant with water pipe boiler.
The simulator is equipped with all the typical checking and adjustment devices generally employed in boilers. To facilitate the teaching process, a mixed gas/gas-oil burner has been fitted, as well as four different types of level regulators and a fault generating unit with warning lights.
The boiler body is made of transparent material so as to visualise the behaviour of hydraulic phenomena inside the boiler. All this plus the electrical control board, is assembled on to a wheel mounted frame.
The unit is supplied with a operating manual and exercise book .

2. Characteristics

- Gas/gas oil burner equipped with electronic control box.
- Boiler body of transparent plexiglas including the following components:
  - mechanical level regulator
  - magnetic level regulator
  - Reed contact level regulator
  - electronic 3-probe level regulator
  - min/max level probe
  - discharge valve
  - pressure gauge
  - working pressure switch
  - max pressure switch
  - safety valve

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- overflow piping

- Electrical control board with synoptic display of the functional diagram including the warning lights of all components, the main switch and the selector to operate the four different types of level regulators and the fuel type selector.
- Panel for fault simulation with a key-locked door.
- Water feed tank, 100 l capacity
- Water feed pump: max flow rate 2 m^3/h – Max head 4 m.
- Steam pressure simulation by means of pump.

3. Experiments

The unit allows the simulation of 20 faults by the most important components of the plant and the study of the unit behaviour after the failure.
On the right side of the electrical control board there are 20 switches with proper warning light for the fault introduction.
By means of these switches, it is possible to cut out regular component operation and produce a fault in the system.
Thanks to this procedure students can observe plant behaviour when one or more operating failures occur.
Locking the door of the control board, it is possible to ask for the student to find the fault by means of the instrumentation on board and to propose the possible cures.
It is possible to generate faults in the following components:

1. Burner photoelectric cell
2. Min gas pressure switch
3. Electrodes, short circuited
4. Fan motor
5. High voltage transformer
6. Gas oil solenoid valve
7. Gas solenoid valve
8. Working pressure switch
9. Max pressure switch
10. Water feed pump
11. Mechanical level regulator
12. Magnetic level regulator
13. Reed contact level regulator
14. 3-probe electronic level regulator
15. Boiler Min level safety probes
16. Boiler Max level safety probes
17. Water pump fuse
18. Burner fuse
19. Burner air inlet max pressure switch
20. Working thermostat

4. Required services

- Electrical supply: 220/240 V AC single-phase 50/60 Hz

5. Weights and dimensions

- Dimensions: 1550 x 850 x 1500 h mm
- Weight: 180 kg.

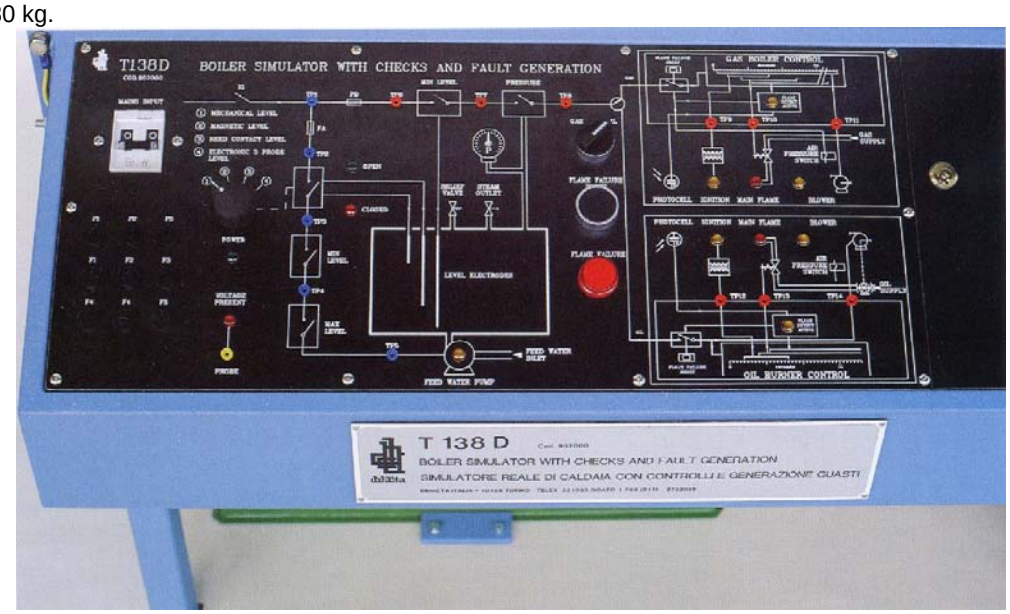
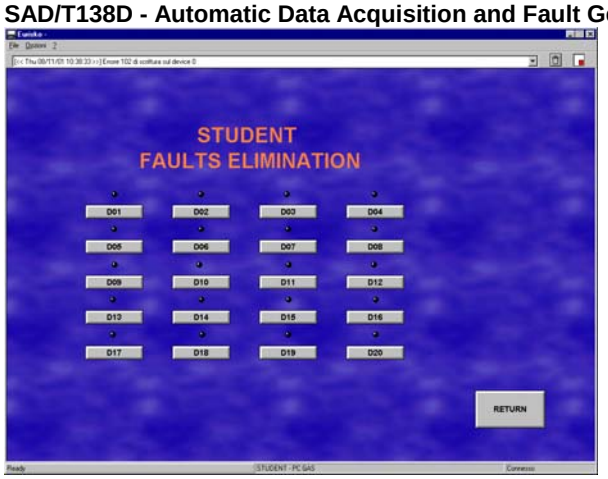


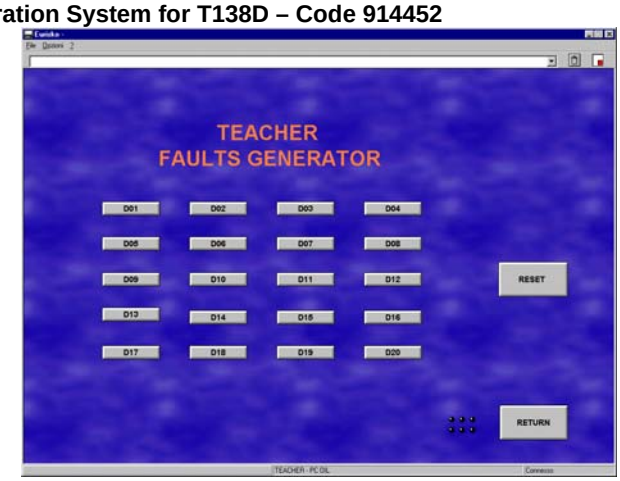
Fig. 1 - Electrical control board with synoptic

Fig. 2 - Main components

1. Electrical control panel
2. Water tank with 100 l capacity
3. Combined gas/oil burner
4. Mechanical type level control
5. Pressure control manometer
6. Safety valve
7. Max./min. level probe
8. 3-probe electronic level control
9. Magnetic type level control
10. Boiler body of transparent acrylic material
11. Reed contact type level control

SAD/T138D - Automatic Data Acquisition and Fault Generation System for T138D – Code 914452





1. General

The system allows to acquire data and generate faults on the Boiler Simulator T138D, whose technical characteristics are described in the related catalogue.

2. Composition

The system includes:

- Level sensor complete with signal converter
- Pressure transmitter
- Programmable Logic Controller (PLC) with 40 digital inputs, 4 analog inputs and 24 relay outputs
- Data acquisition and fault generation/elimination software for Windows.

3. Experiments

The software allows the generation by the teacher and the elimination by the student of 20 faults on the most important components of the plant and the study of the unit behavior after the failure.
It is possible to generate and eliminate faults in the following components:

- burner photoelectric cell
- min gas pressure switch
- electrodes, short circuited
- fan motor
- high voltage transformer
- gas oil solenoid valve
- gas solenoid valve
- working pressure switch
- max pressure switch
- water feed pump
- mechanical level regulator
- magnetic level regulator
- reed contact level regulator
- 3-probe electronic level regulator
- boiler min level safety probes
- boiler max level safety probes
- water pump fuse
- burner fuse
- burner air inlet max pressure switch
- working thermostat

4. Required services

- Electrical supply: 220/240V AC single-phase 50/60 Hz

5. Weights and dimensions

- Dimensions: 750x250x500 h mm
- Weight: 50 kg