

Step by Step Manual

PILODIST PD 107



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		NOTE
	Important! - Read carefully before use - Keep for future reference! This operating manual is a component of the system and must be available to the operating and maintenance personnel at all times. The safety instructions contained therein must be observed. In case of a resale of the attachments, this operating manual must always be supplied.	

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1. Plant identification (type plate)

		NOTE
	The instructions given in this manual are valid only for the plant that type number is specified on the title page. The type plate with the type number is located on the control box of the plant. When used for a different type, technical differences can lead to property damage or serious / fatal injuries. Important for all queries is the correct information: - the designation "PD 107", - the type no. "PD 107", This is the only way to ensure perfect and fast processing.	

2. System Description

Fig. 1: PD107

Picture may not show all special customized features

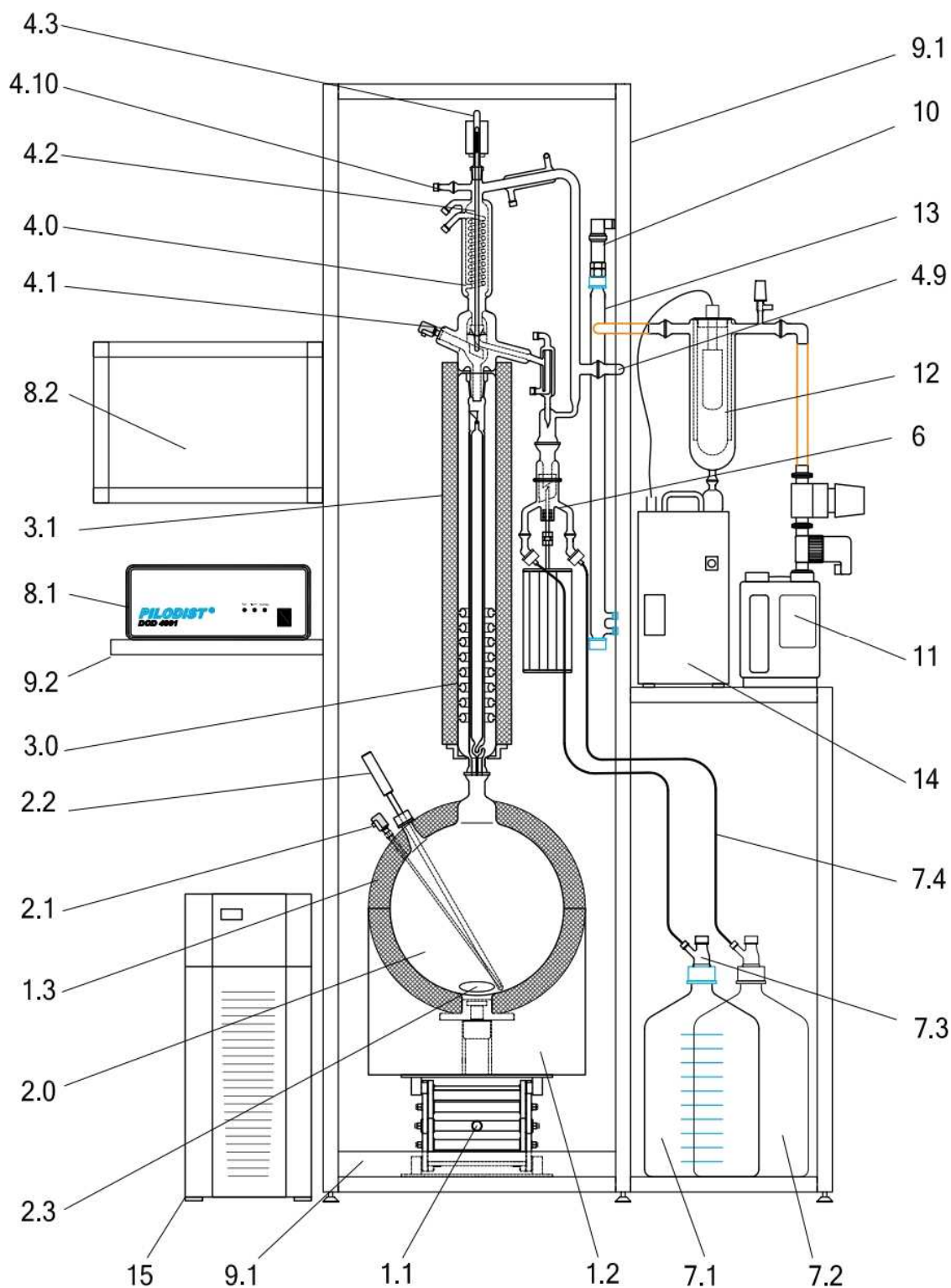
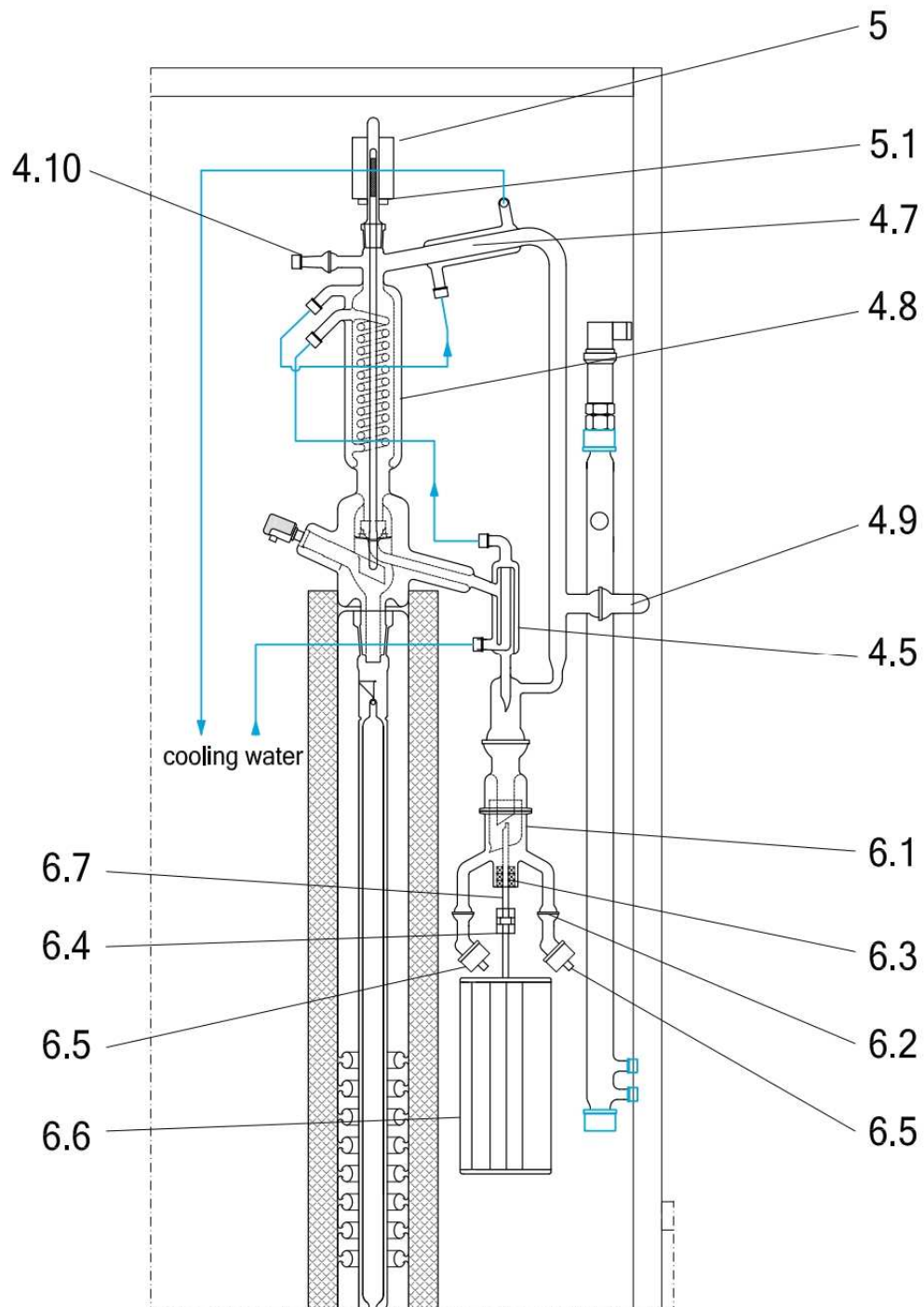


Fig. 2: PD107 - Fraction Collector

Picture may not show all special customized features

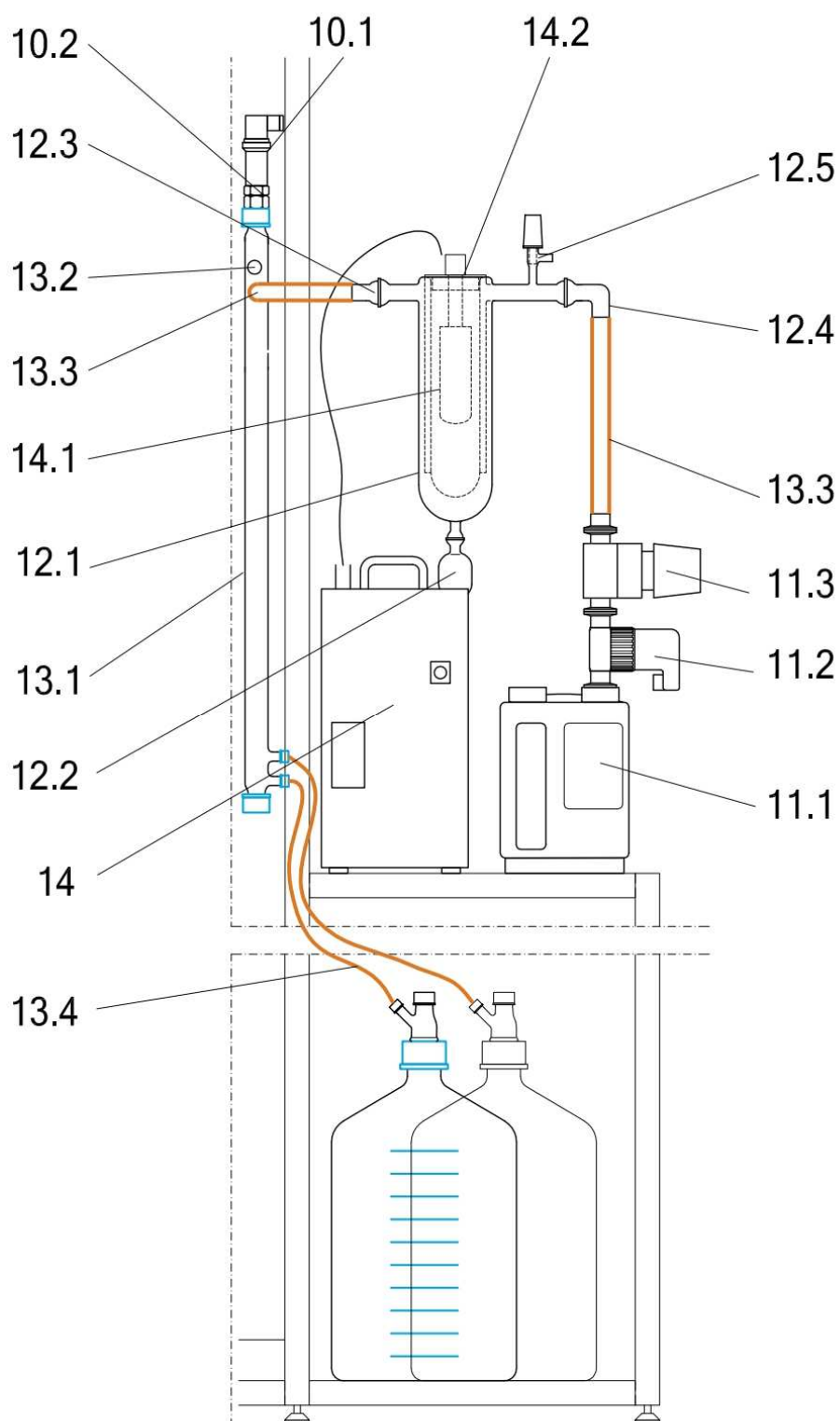


Legend to Fig. 1 + 2

1.1	manual flask lift
1.2	flask heater with stirrer drive
1.3	insulation hood
2.0	distillation flask
2.1	flask temperature sensor
2.2	level sensor
2.3	stirrer bar
3.0	distillation column
4.0	distillation head
4.1	head temperature sensor
4.2	valve plunger
4.3	valve plunger hood
4.5	distillate cooler
4.7	cooler
4.8	condenser
4.9	blind cap or connection piece vacuum
4.10	blind nozzle
5	solenoid coil
5.1	solenoid adjusting silicone rubber
6	fraction collector:
6.1	upper part of fraction collector
6.2	distributor fraction collector
6.3	glass insert
6.4	clutch
6.5	distillate lines, hose connector
6.6	drive
6.7	shaft
7.1	receiver bottle 1
7.2	receiver bottle 2
7.3	connection piece receiver bottles
7.4	distillate hoses
8.1	control device DCD 4001
8.2	laptop
9.0	mounting frame / safety cabinet
9.1	tray
9.2	support for control device
9.3	upper part of mounting frame (option)
10	vacuum sensor (see fig. 3)
11	vacuum equipment (see fig. 3)
12	cold trap (see fig. 3)
13	vacuum lines
14	immersion cooler (option)
15	circulating cooler (option)

Fig. 3: PD107 - Vacuum Equipment (Option)

Picture may not show all special customized features



Legend to Fig. 3: Vacuum Equipment (Option)

10.1	vacuum sensor
10.2	connection piece vacuum sensor
11	vacuum equipment:
11.1	vacuum pump
11.2	solenoid valve
11.3	throttle valve
12	cold trap system:
12.1	cold trap
12.2	condensate trap
12.3	vacuum connection piece, glass
12.4	vacuum connection piece, glass
12.5	ventilation cock
13	vacuum lines:
13.1	glass vacuum distributor line
13.2	connection nozzle to distillation head (4.9)
13.3	vacuum hoses to cold trap
13.4	vacuum hoses to receivers
14	immersion cooler (option)
14.1	cooling finger (part of immersion cooler)
14.2	centering piece for cooling finger (option)

3. Step-by-Step Manual to operate PILODIST 107 Distillation System

3.1 General Preparation

1. Switch on the System at the main switch
2. Start the PC
3. Start the software with the “DCD-4001” shortcut on the desktop
4. Start the thermostat (option) or cooling water flow
5. Connect the receiver bottles to the distillate lines (6.5) in the safety cabinet
6. The fraction collector (6) can be moved by pressing the “Next Receiver”-Button. With the “Init”-button the fraction collector will turn to the receiver No.1 (7.1)

3.2 Sample Preparation

1. Fill the sample into the flask (2.0) (approx. 50% of flask volume)
2. Put the flask into the flask heater (1.2) and install the temperature sensor (2.1) and level sensor (2.2).
3. Ensure that the stirrer bar (2.3) is able to rotate.
4. Install the flask insulation hood (1.3) (option)

3.3 Software Settings (Vacuum Equipment optional)

1. Fill in your required cut points in the “Cuts”-table for the first pressure stage. The cuts must be sorted from the lowest to the highest temperatures. The standard temperature and pressures limits for hydrocarbon samples are the following:

ATM: Atmospheric Distillation up to 200°C

VAC1: Vacuum Distillation at 100Torr up to 270°C AET

VAC2: Vacuum Distillation at 10Torr up to 370°C AET

VAC3: Vacuum Distillation at 2Torr up to 400°C AET

Not all pressure stages needs to be used. After the final cut a “0” needs to be filled in. In the PD107 maximum 2 cuts can be selected. The first cut will be collected in the first receiver bottle (7.1) (light volatiles). In the second receiver (7.2) the main fraction will be collected up to the second cut temperature. The heavy fraction remains as residue in the flask (2.0).

2. The most important setting in the software is the “delta-T” of the flask heater. This is the standard operation mode to control the flask heater for samples with a wide boiling range. The delta-T is the temperature difference between the flask (sample) temperature and the flask heater. This affects the heat up speed and distillation rate and the heater temperature will follow automatically the boiling point of the sample.
3. The “heater”- controller is just available, if an additional heater (for example receiver) is mounted.
4. The vacuum set point needs to be set for vacuum operation and the daily pressure can be filled in to get an automatic boiling point correction for hydrocarbon samples.
5. With the reflux divider the efficiency of the column and the yield are defined. Usually a ratio between 1:2 and 1:10 (offtake/reflux) is used.
6. The sets of parameters and cut-tables (also for washing run) can be saved and reloaded with the “Save Parameters” and “Load Parameters”-buttons

Parameters are available when logged in as “Pilodist”, PW: “4711”

3.4 ATM-Distillation

1. Open the ventilation valve (12.5)
2. Open the fraction collector lines (4.6)
3. Start the flask heater (delta-T, constant, or isotherm mode) and the stirrer drive (1.2)
4. Set the required cut-points in the cut-table
5. When the vapors reach the head of the distillation column (increase of head temperature), the take-off process can be started by activation of the automatic mode.
6. The distillation rate needs to be checked manually and adjusted by modification of the delta-T (or %, °C, depending on heating mode).
7. When the first cut temperature is reached, the system will switch to total reflux, and after a drain time it will change the receiver and start automatically the take-off for the next fraction.
8. When the final cut is reached the system will shut down all heaters automatically.
9. The system will shut down, if the volume sensor (2.2) doesn't recognize liquid level in the flask.

3.5 Vacuum-Distillation (Option)

1. Close the ventilation valve at the cold trap (12.5)
2. Open the distillate line cock (4.6) to the fraction collector (6)
3. The cold trap (12.1) must be clean and filled with dry ice if no immersion cooler is used. In case of an electrical immersion cooler, it must be filled with a nonfreezing alcohol (please check the concentration of water caused by moisture frequently).
4. Start the vacuum pump (11.1) and adjust the vacuum throttle valve (11.3) until the preselected vacuum value is stabilized.
5. Start the flask heater (delta-T, constant, or isotherm mode) and the stirrer drive (1.2)
6. Set the required cut-points in the cut-table
7. When the vapors reach the head of the distillation column (increase of head temperature) the take-off process can be started by activation of the automatic mode.
8. The distillation rate needs to be checked manually and adjusted by modification of the delta-T (or %, °C, depending on heating mode).
9. When the first cut temperature is reached, the system will switch to total reflux, and after a drain time it will change the receiver and start automatically the take-off for the next fraction. The receiver will also change, when a complete filling is detected by the sensor.
10. When the final cut is reached the system will shut down all heaters automatically.
11. After a cooling phase the vacuum system can be stopped and the system can be ventilated with the ventilation valve (12.5).

3.6 Turn off the System

1. The System can be turned off, if the software is in “Standby” position by pressing the “Exit program” button.
2. Shut down the PC
3. Switch off the unit with the main switch
4. Switch off the thermostat (option)