

DNP SERIES AND KIT-TITRA-RAY - INSTALLATION GUIDE

Information to consider before installing your RAYPA equipment.

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MODEL DNP-2000 TS + KIT-TITRA-RAY

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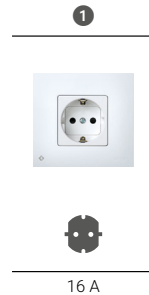


DNP-1500 TS

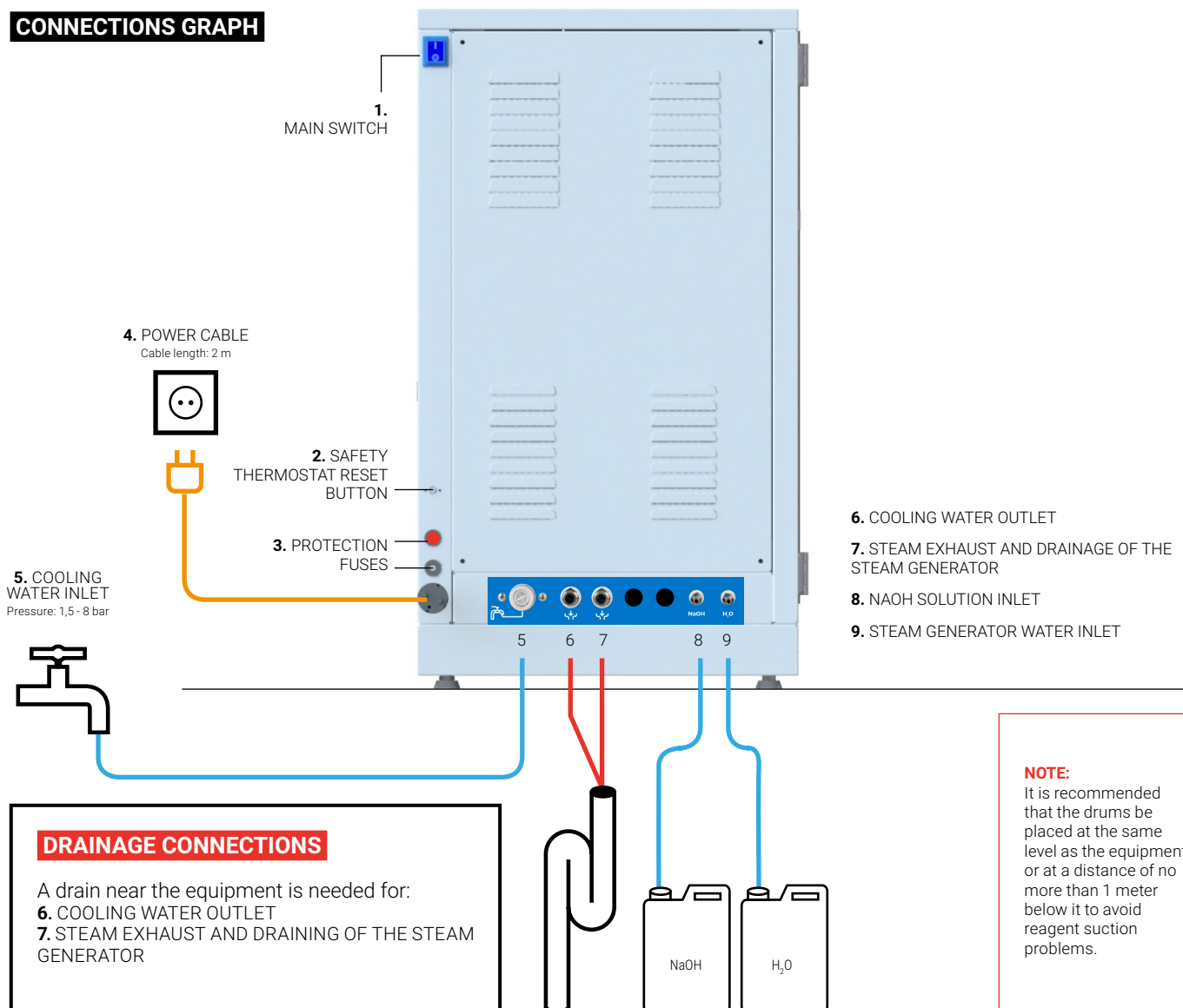
ELECTRICAL CONNECTION

The following table shows the plug configuration according to international IEC and SCHUKO standards for most European Union countries. For customers requiring other plugs and other electrical configurations, please contact our technical team at raypa@raypa.com.

MODELS	FREQUENCY	POWER	VOLTAGE	CONNECTION
DNP-1500 TS	50/60 Hz	1800 W	230 (1P+N+E) V	16 A ①
DNP-1500 TS-115V	50/60 Hz	1800 W	120 (1P+N+E) V	16 A ①



CONNECTIONS GRAPH



DRAINAGE CONNECTIONS

A drain near the equipment is needed for:
6. COOLING WATER OUTLET
7. STEAM EXHAUST AND DRAINING OF THE STEAM GENERATOR

NOTE:
 It is recommended that the drums be placed at the same level as the equipment or at a distance of no more than 1 meter below it to avoid reagent suction problems.

DNP-1500 TS

COOLING WATER SUPPLY

Decalcified water is required for cooling the equipment. Connect the COOLING WATER INLET (5) with the supplied hose* to a decalcified water supply (pressure between 1,5 and 8 bar).

It is recommended that the inlet water for cooling have a temperature equal to or lower than 25 °C.

*See section of included components for more information on the technical characteristics of this hose.

STEAM GENERATOR WATER SUPPLY

Distilled water is required to operate the steam generator and is added automatically by connecting the supplied hose* to the STEAM GENERATOR WATER INLET (9) and the other end to the quick connection of the 10 L tank.

*See section of included components for more information on the technical characteristics of this hose.

FILLING OF TANKS

FILL THE TANKS AND PERIODICALLY CHECK THEIR LEVEL:

- **Tank of H₂O.** Fill with distilled water. This container is used both to feed the steam generator and for sample dosing.

- **Tank of NaOH** Fill with 35% or 40% NaOH. Do not use higher concentrations as the density will affect the pump dosing.



TANK	DNP-1500 TS
NaOH volume L	10
H ₂ O volume L	10

REAGENTS

The reagents used, including distilled water, must be free of ammonia.

1. PREPARED REAGENTS

It is advisable to use commercially prepared reagents, especially the HCl titration solution.

We recommend using the following reagents, or their equivalents in other brands:

- **Boric acid 4% RV**
- **Indicator 5 mixed RV** (methyl red, bromocresol green)
- **Sodium hydroxide 40% RE**
- **Ammonium sulfate**(standard for validation)

2. PREPARATION OF REAGENTS

The reagents used for the analysis can be prepared from more concentrated products.

In the preparations of 40% NaOH and 4% Boric Acid with indicator, the concentration is not too critical, so it is not necessary to work with precision.

The preparation of the titration acid solutions must be carried out with the utmost precision, since any error in the preparation can affect the final result of the nitrogen detected.

DNP-1500 TS

INCLUDED COMPONENTS



1 reinforced NBR hose 2 m long with a 3/4" threaded connection both at the equipment and a tap (gaskets included).

For:
5. COOLING WATER INLET



1 black Viton® hose of Ø6 x Ø9 mm and 1 m long with a *press-fit* connection to connect to the equipment and a quick connection at the other end to connect to the tank.

For:
8. INLET FOR NAOH'S SOLUTION



1 transparent silicone hose of Ø5 x Ø8 mm and 1m long with *press-fit* connection on one end to connect to the equipment and a quick connection on the other end to connect to the water tank.

For:
9. STEAM GENERATOR WATER INLET



2 transparent silicone hoses of Ø8 x Ø14 mm and 1,5 m long with a 3/8" threaded connection (gaskets included) to connect to the equipment and a quick connection on the other end to connect to the tank.

For:
6. COOLING WATER OUTLET
7. STEAM EXHAUST AND DRAINAGE OF THE STEAM GENERATOR

DNP-1500 TS

INCLUDED COMPONENTS continuation



2 polyethylene tanks of 10 liters L x D x H: 190 x 220 x 330 mm with screw lid with quick connection.

For:

- 8.** NAOH SOLUTION INLET
- 9.** STEAM GENERATOR WATER INLET



1 anti-drip plastic tray L x D x H: 265 x 135 x 20 mm.



1 glass tube for the distillation of samples with a size of 42 x 300 mm.

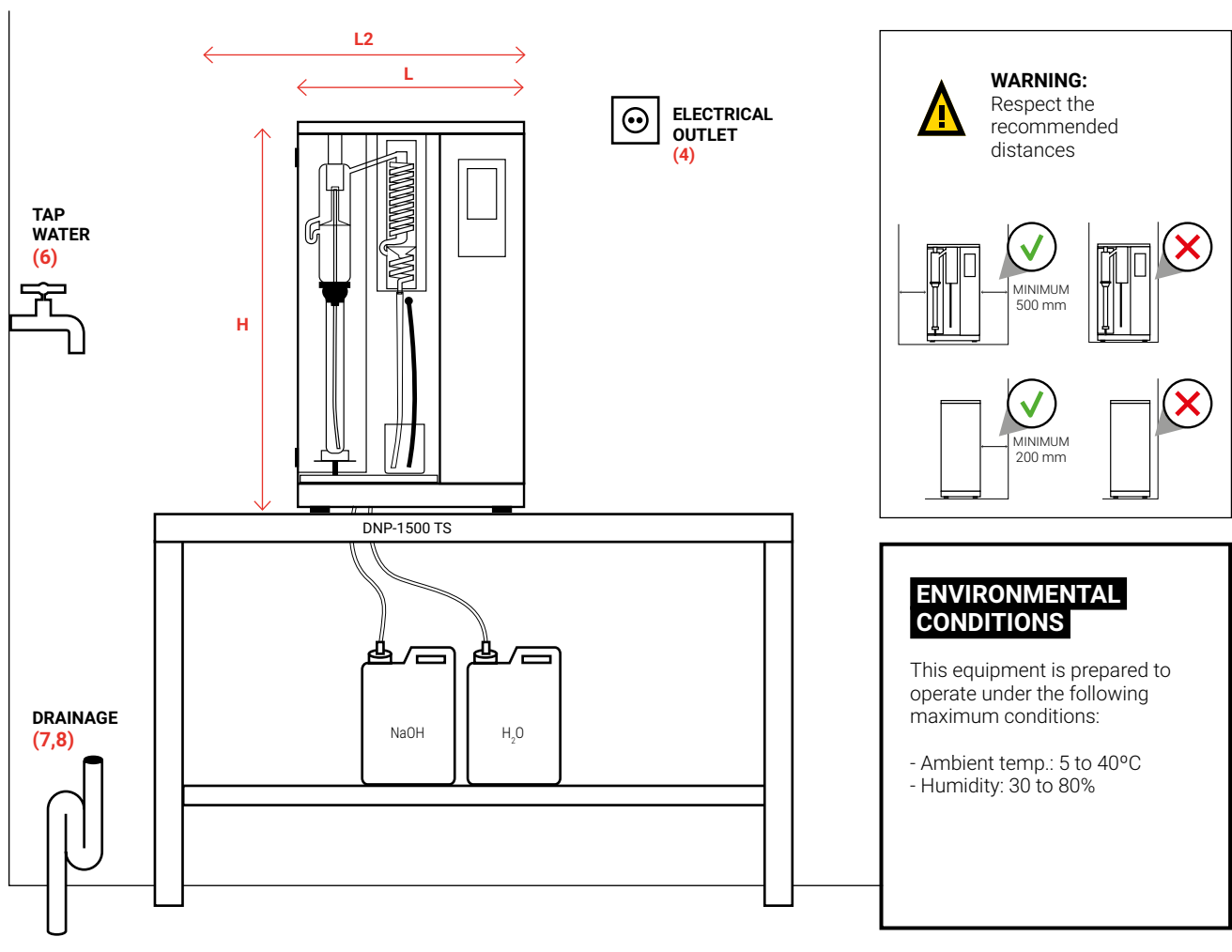
DNP-1500 TS



DIMENSIONS TO CONSIDER FOR THE INSTALLATION OF YOUR EQUIPMENT

The equipment shall be placed on a stable and flat surface suitable for the weight of the equipment. At a distance of less than 1500 mm, a water supply, a drain and an electrical outlet must be provided. For safety reasons, the distance between both sides of the equipment and the wall or any other object must be 500 mm and between the equipment and the rear wall it must be at least 200 mm. Do not place containers, chemicals or other devices behind the equipment.

MODELS	L LENGTH	L2 LENGTH with open door	D DEPTH	H HEIGHT
DNP-1500 TS	440 mm	586 mm	340 mm	790 mm
GF-10L (tanks)	190 mm	-	220 mm	330 mm



KJELDAHL DISTILLERS DNP SERIES

DNP-2000 TS

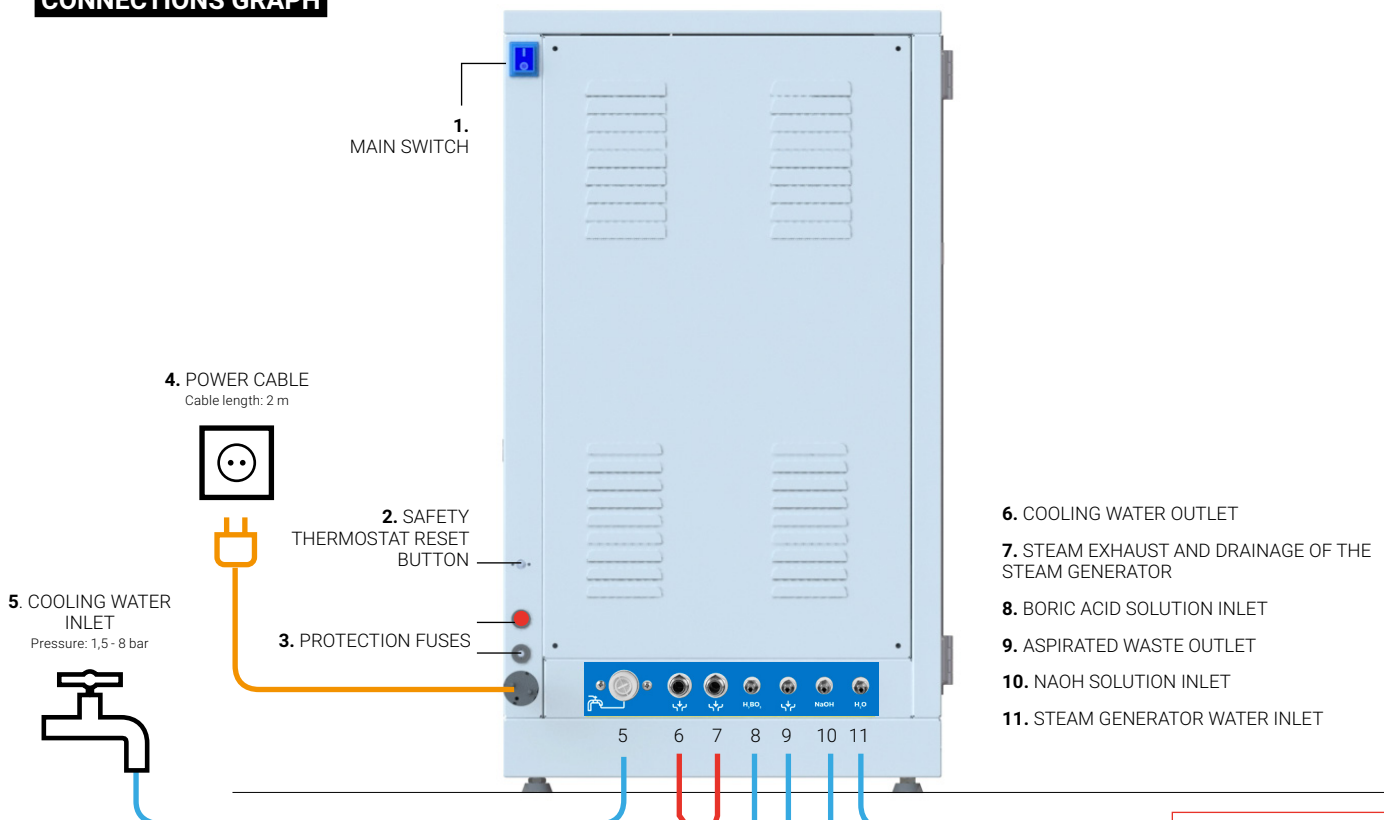
ELECTRICAL CONNECTION

The following table shows the plug configuration according to international IEC and SCHUKO standards for most European Union countries. For customers requiring other plugs and other electrical configurations, please contact our technical team at raypa@raypa.com.

MODELS	FREQUENCY	POWER	VOLTAGE	CONNECTION
DNP-2000 TS	50/60 Hz	1800 W	230 (1P+N+E) V	16 A ①
DNP-2000 TS-115V	50/60 Hz	1800 W	120 (1P+N+E) V	16 A ①

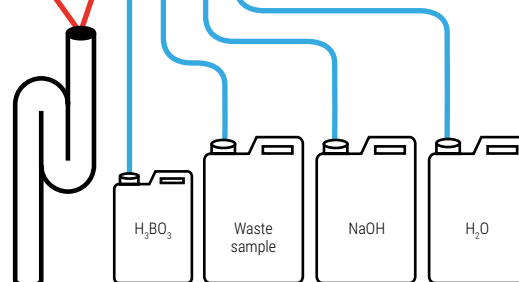


CONNECTIONS GRAPH



DRAINAGE CONNECTIONS

A drain near the equipment is needed for:
6. COOLING WATER OUTLET
7. STEAM EXHAUST AND DRAINING OF THE STEAM GENERATOR



NOTE:
 It is recommended that the drums be placed at the same level as the equipment or at a distance of no more than 1 meter below it to avoid reagent suction problems.

DNP-2000 TS

COOLING WATER SUPPLY

Decalcified water is required for cooling the equipment. Connect the COOLING WATER INLET (5) with the supplied hose* to a decalcified water supply (pressure between 1,5 and 8 bar).

It is recommended that the inlet water for cooling have a temperature equal to or lower than 25 °C.

*See section of included components for more information on the technical characteristics of this hose.

STEAM GENERATOR SUPPLY

Distilled water is required to operate the steam generator and is added automatically by connecting the supplied hose* to the STEAM GENERATOR WATER INLET (11) and the other end to the quick connection of the 10 L tank.

*See section of included components for more information on the technical characteristics of this hose.

FILLING OF TANKS

FILLING THE TANKS AND PERIODICALLY CHECKING THEIR LEVEL:

- **Tank of H₂O** Fill with distilled water. This container is used both to feed the steam generator and for sample dosing.
- **Tank of NaOH** Fill with 35% or 40% NaOH. Do not use higher concentrations as the density will affect the pump dosing.
- **Tank of H₃BO₃** Fill with a 4% boric acid solution + mixed indicator if required.



TANKS	DNP-2000 TS
NaOH volume L	10
H ₃ BO ₃ volume L	5
H ₂ O volume L	10

REAGENTS

The reagents used, including distilled water, must be free of ammonia.

1. PREPARED REAGENTS

It is advisable to use commercially prepared reagents, especially the HCl titration solution. We recommend using the following reagents, or their equivalents in other brands:

- **Boric acid 4% RV**
- **Indicator 5 mixed RV** (methyl red, bromocresol green)
- **Sodium hydroxide 40% RE**
- **Ammonium sulfate** (standard for validation)

2. PREPARATION OF REAGENTS

The reagents used for the analysis can be prepared from more concentrated products.

In the preparations of 40% NaOH and 4% Boric Acid with indicator, the concentration is not too critical, so it is not necessary to work with precision.

The preparation of the titration acid solutions must be carried out with the utmost precision, since any error in the preparation can affect the final result of the nitrogen detected.

DNP-2000 TS

INCLUDED COMPONENTS



1 reinforced NBR hose 2 m long with a 3/4" threaded connection both at the equipment and a tap (gaskets included).

For:
5. COOLING WATER INLET



3 black Viton® hoses of Ø6 x Ø9 mm and 1 m long with a *press-fit* connection to connect to the equipment and a quick connection at the other end to connect to the drum.

For:
8. BORIC ACID SOLUTION INLET
9. ASPIRATED WASTE OUTLET
10. NAOH SOLUTION INLET



1 transparent silicone hose of Ø5 x Ø8 mm and 1 m length with *press-fit* connection on one end to connect to the equipment and a quick connection on the other end to connect to the water tank.

For:
11. STEAM GENERATOR WATER INLET



2 transparent silicone hoses of Ø8 x Ø14 mm and 1,5 m long with a 3/8" threaded connection (gaskets included) to connect to the equipment and a quick connection on the other end to connect to the tank.

For:
6. COOLING WATER OUTLET
7. STEAM EXHAUST AND DRAINING OF THE STEAM GENERATOR

DNP-2000 TS

INCLUDED COMPONENTS continuation



3 polyethylene tanks of 10 liters L x D x H: 190 x 220 x 330 mm with screw lid with quick connection.

For:
9. ASPIRATED WASTE OUTLET
10. NAOH SOLUTION INLET
11. STEAM GENERATOR WATER INLET



1 5-liter polyethylene tank L x D x H: 130 x 190 x 290 mm with screw-on lid with quick connection.

For:
8. BORIC ACID SOLUTION INLET



1 anti-drip plastic tray L x D x H: 265 x 135 x 20 mm.



1 glass tube for the distillation of samples with a size of 42 x 300 mm.

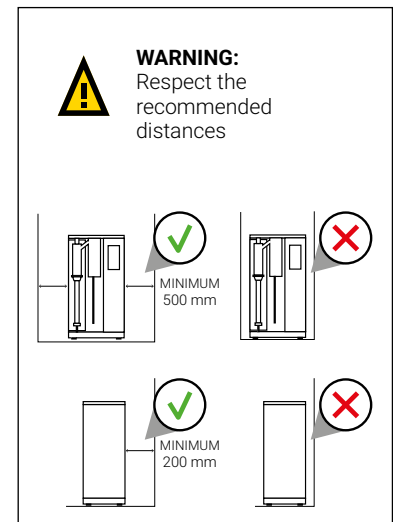
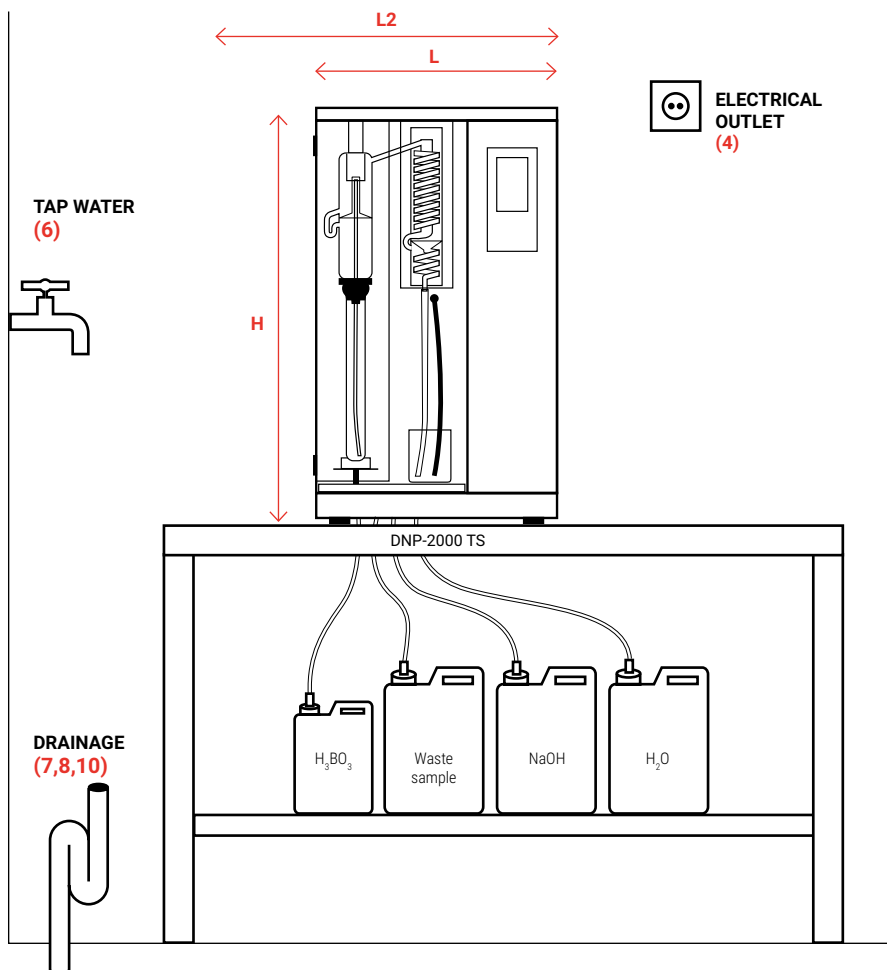
DNP-2000 TS



DIMENSIONS TO CONSIDER FOR THE INSTALLATION OF YOUR EQUIPMENT

The equipment shall be placed on a stable and flat surface suitable for the weight of the equipment. At a distance of less than 1500 mm, a water supply, a drain and an electrical outlet must be provided. For safety reasons, the distance between both sides of the equipment and the wall or any other object must be 500 mm and between the equipment and the rear wall it must be at least 200 mm. Do not place containers, chemicals or other devices behind the equipment.

MODELS	L LENGTH	L2 LENGTH with open door	D DEPTH	H HEIGHT
DNP-2000 TS	440 mm	586 mm	340 mm	790 mm
GF-10L (tanks)	190 mm	-	220 mm	330 mm
GF-5L (tank)	130 mm	-	190 mm	290 mm



ENVIRONMENTAL CONDITIONS

This equipment is prepared to operate under the following maximum conditions:

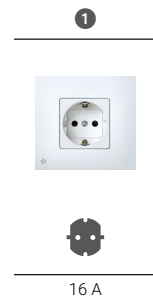
- Ambient temp.: 5 to 40°C
- Humidity: 30 to 80%

DNP-2000 TS + KIT-TITRA-RAY

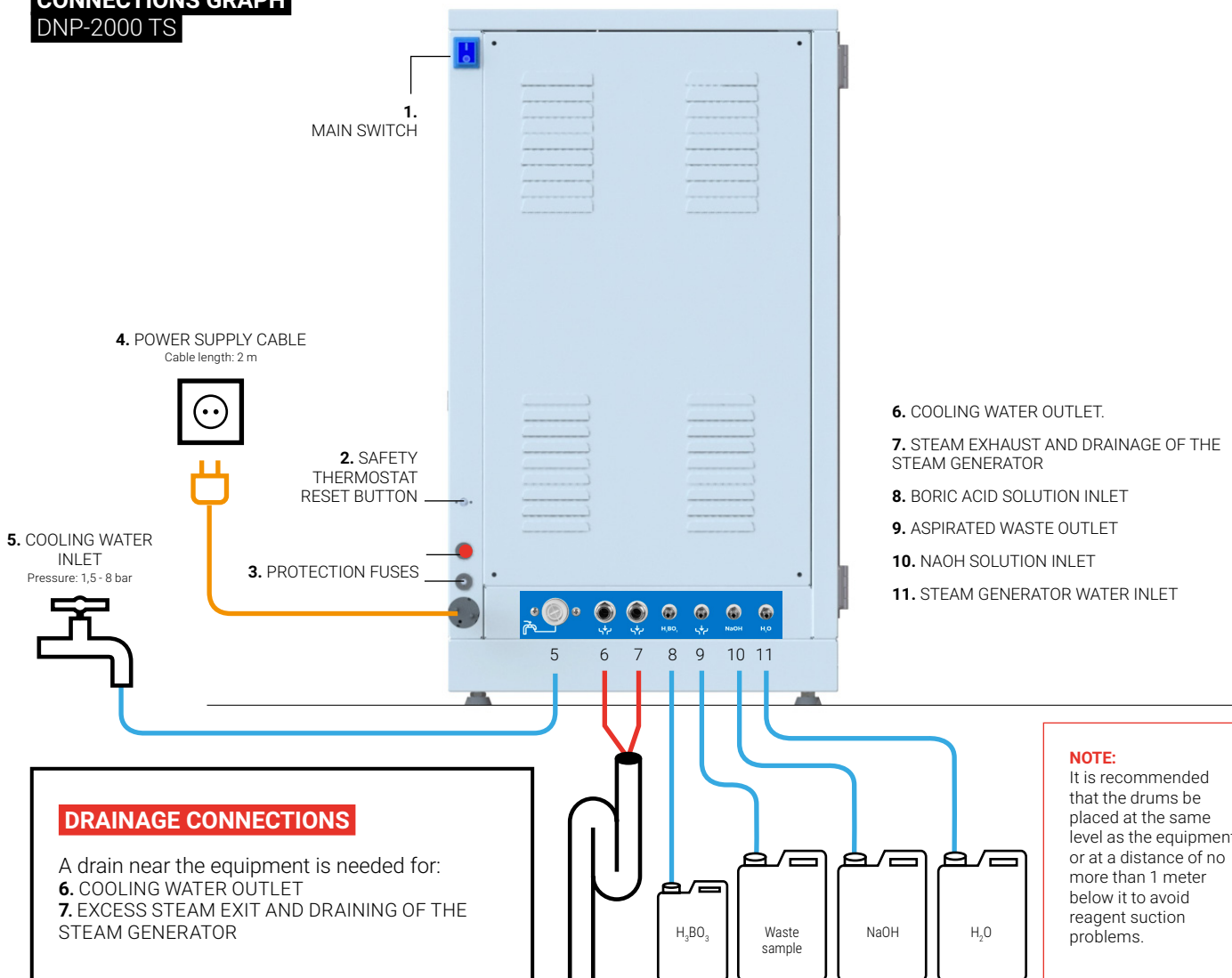
ELECTRICAL CONNECTION

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MODELS	FREQUENCY	POWER	VOLTAGE	CONNECTION
DNP-2000 TS	50/60 Hz	1800 W	230 (1P+N+E) V	16 A ①
DNP-2000 TS-115V	50/60 Hz	1800 W	120 (1P+N+E) V	16 A ①
KIT-TITRA-RAY	50/60 Hz	80 W	100-250 (1P+N+E) V	16 A ①



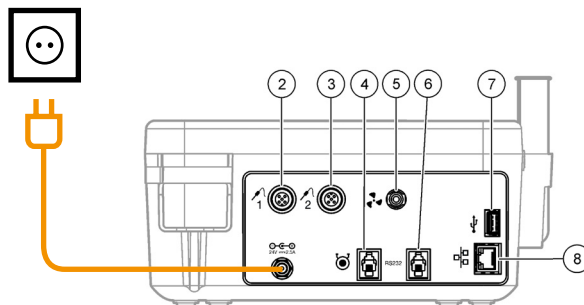
CONNECTIONS GRAPH DNP-2000 TS



DNP-2000 TS + KIT-TITRA-RAY

CONNECTIONS GRAPH KIT-TITRA-RAY

1. POWER SUPPLY CABLE
Cable length: 2 m



- 2. SENSOR PORT 1
- 3. SENSOR PORT 2
- 4. EXTERNAL PUMP PORT*
- 5. EXTERNAL THRUSTER PORT*
- 6. SERIAL PORT*
- 7. USB PORT
- 8. ETHERNET PORT

*Note: Connections not operative for this model.

**MORE INFO
KIT-TITRA-
RAY**

IMPORTANT:

For more information on the features, accessories and installation requirements of the KIT-TITRA-RAY accessory, please refer to the document:

"KIT-TITRA-RAY External Titrator Quick Installation Guide".

DNP-2000 TS + KIT-TITRA-RAY

COOLING WATER SUPPLY

Decalcified water is required for cooling the equipment. Connect the COOLING WATER INLET (5) with the supplied hose* to a decalcified water supply (pressure between 1,5 and 8 bar).

It is recommended that the inlet water for cooling have a temperature equal to or lower than 25 °C.

*See section of included components for more information on the technical characteristics of this hose.

WATER SUPPLY FOR STEAM GENERATOR

Distilled water is required to operate the steam generator and is added automatically by connecting the supplied hose* to the STEAM GENERATOR WATER INLET (11) and the other end to the quick connection of the 10 L tank.

*See section of included components for more information on the technical characteristics of this hose.

FILLING OF TANKS

FILL THE TANKS AND PERIODICALLY CHECK THEIR LEVEL:

- **Tank of H₂O** Fill with distilled water. This container is used both to feed the steam generator and for sample dosing.
- **Tank of NaOH** Fill with 35% or 40% NaOH. Do not use higher concentrations as the density will affect the pump dosing.
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TANKS	DNP-2000 TS
NaOH volume L	10
H ₃ BO ₃ volume L	5
H ₂ O volume L	10

REAGENTS

The reagents used, including distilled water, must be free of ammonia.

1. PREPARED REAGENTS

It is advisable to use commercially prepared reagents, especially the HCl titration solution. We recommend using the following reagents, or their equivalents in other brands:

- **Boric acid 4% RV**
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The reagents used for the analysis can be prepared from more concentrated products.

In the preparations of 40% NaOH and 4% Boric Acid with indicator, the concentration is not too critical, so it is not necessary to work with precision.

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DNP-2000 TS + KIT-TITRA-RAY

INCLUDED COMPONENTS

DNP-2000 TS



1 reinforced NBR hose 2 m long with a 3/4" threaded connection both at the equipment and a tap (gaskets included).

For:
5. COOLING WATER INLET



3 black Viton® hoses of Ø6 x Ø9 mm and 1 m long with a *press-fit* connection to connect to the equipment and a quick connection at the other end to connect to the tank.

For:
8. INLET FOR BORIC ACID SOLUTION
9. ASPIRATED WASTE OUTLET
10. INPUT FOR NAOH'S SOLUTION



1 transparent silicone hose of Ø5 x Ø8 mm and 1 m length withn *press-fit* connection on one end to connect to the equipment and a quick connection on the other end to connect to the water tank.

For:
11. STEAM GENERATOR WATER INLET



2 transparent silicone hoses of Ø8 x Ø14 mm and 1,5 m long with a 3/8" threaded connection (gaskets included) to connect to the equipment and a quick connection on the other end to connect to the tank.

For:
6. COOLING WATER OUTLET
7. STEAM EXHAUST AND DRAINAGE OF THE STEAM GENERATOR

DNP-2000 TS + KIT-TITRA-RAY

INCLUDED COMPONENTS

DNP-2000 TS continuation



3 polyethylene tanks of 10 liters of L x D x H: 190 x 220 x 330 mm with screw lid with quick connection.

For:

- 9.** ASPIRATED WASTE OUTLET
- 10.** NAOH SOLUTION INLET
- 11.** WATER INLET FOR STEAM GENERATOR



1 5-liter polyethylene tank L x D x H: 130 x 190 x 290 mm with screw-on lid with quick connection.

For:

- 8.** BORIC ACID SOLUTION INLET



1 anti-drip plastic tray L x D x H: 265 x 135 x 20 mm.



1 glass tube for the distillation of samples with a size of 42 x 300 mm.

DNP-2000 TS + KIT-TITRA-RAY

INCLUDED COMPONENTS

KIT-TITRA-RAY



Tube holder (one for each syringe position on the instrument).



Power supply.



Power cable.



Beakers (5 x 50 ml and 5 x 150 ml).



Syringe.



Conical adapter (1 unit).



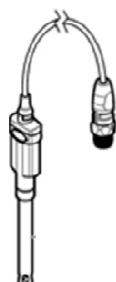
Syringe attachment ring (1 for each syringe).



Magnetic stirring rods (5 units).



USB with applications.



Sensor (type and quantity depends on the application).



Bottle caps (1 x GL45 and 1 x GL25).

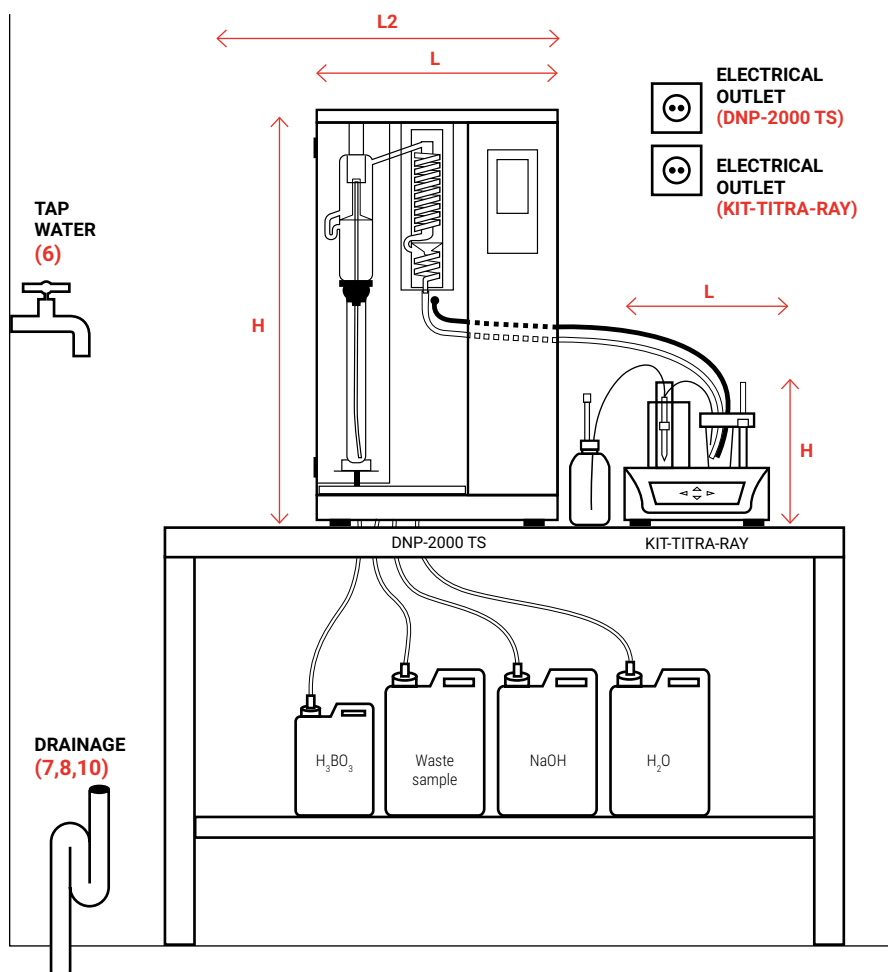
DNP-2000 TS + KIT-TITRA-RAY



DIMENSIONS TO CONSIDER FOR THE INSTALLATION OF YOUR EQUIPMENT

The equipment shall be placed on a stable and flat surface suitable for the weight of the equipment. At a distance of less than 1500 mm, a water supply, a drain and an electrical outlet must be provided. For safety reasons, the distance between both sides of the equipment and the wall or any other object must be 500 mm and between the equipment and the rear wall it must be at least 200 mm. Do not place containers, chemicals or other devices behind the equipment.

MODELS	L LENGTH	L2 LENGTH with open door	D DEPTH	H HEIGHT
DNP-2000 TS	440 mm	586 mm	340 mm	790 mm
KIT-TITRA-RAY	220 mm	-	400 mm	360 mm
GF-10L (tanks)	190 mm	-	220 mm	330 mm
GF-5L (tank)	130 mm	-	190 mm	290 mm



WARNING: Respect the recommended distances

MINIMUM 500 mm

MINIMUM 200 mm

ENVIRONMENTAL CONDITIONS

These equipment is prepared to operate under the following maximum conditions:

- Ambient temp.: 5 to 40°C
- Humidity: 30 to 80%

KJELDAHL DISTILLERS
DNP SERIES

+ info



CLICK!
ACCESS
THE DNP
SERIES
VIDEO

Find out more about our **DNP Series** distillers on our Youtube Channel

