# REVOLVING TABLE TYPE
# RT/HS-DGA – 20 V II

# USER'S MANUAL

Contents

# 1 Generals

The Revolving Table system (Type RT – HSDG – 20V II) has been developed to optimize the sample preparation step of insulating liquids for DGA (Dissolvd Gas Analysis) with Head Space technique.

Main features of the system are:

1. sample handling and dosing under inert gas flow and controlled atmosphere
2. interferences from air gases ($O_2$, $N_2$, $CO_2$) dramatically reduced
3. 20 sample prepared per one man-hour, even by non-skilled personnel
4. suitability for insulating mineral oils, synthethic insulating liquids, askarels, silicones
5. enhanced samples storage delay (2 weeks from sample preparation to sample analysis)
6. high repeatability (even with different analysts)
7. small size, easily handled

Tachnical and manufacturing general specifications:

1. Material: transparent plexigass, delrin, stainless steel AISI 304.
2. Size: Ø 350mm, h. 240mm.
3. Weight: 8 Kg.

# 2 System description

The Revolving Table is essentially composed by a turning drum (of a revolving type) equipped with 20 seats for 20 ml headspace vials, combined with the relevant airtight sealing plugs.

**List of components** *(see enclosed drawing)*

1) Canister
2) Cover
3) Sealing knobs
4) Turning handle
5) High-flow flowmeter
6) low-flow flowmeter
7) Sample injection point
8) Horizontal slide for seal positioning
9) Vertica slide for vial lifting
10) Plug clamping position.

The revolver can turn inside the transparent canister, so that all the manual manoeuvres required are performed (**dosing** of the sample, **positioning** of the sealing plug and **sealing** of the vial) for the filling in an Argon gas inert atmosphere (or any other gas inert to TCD and FID gascromatographer monitors, characterised by a low solubility in oil).

The system operates in a controlled ambient for ensuring a good repeatability of sample preparation, with sample labelling and a controlled flow of the inert gas.

# 3 Set up of the system

Before using it, the system must be prepared in the following manner (see figures below):

1. place the equipment on a firm workbench, under a fume evacuation hood
2. connect the inert gas delivery hose to the connection located on the front panel (*Gas inlet point*).


# 4 Use

The sequence of operations for sample preparation involves four main steps, performed on the stations of the Revolving Table:

a. Station for vial flushing
b. Station for sample injection
c. Station for caps positioning
d. Station for vial sealing (plug crimping).

The movements of the drum during the various sequential phases are done by actuating the turning handle, positioning the vials in the different workstations.

**Operation sequence:**

1. Chech if the Set Up of the system (see § 3) has been dome correctly
2. Open the Revolving Table by removing the 6 upper knobs and insert in the drum **20 numbered vials** with their assigned plug. The vials and the plug must be previously

weighted (at the nearest 0.01 g) for the subsequent identification of the quantity of sample injected

3. Close the Revolving Table, installing the cover, checking that the marks on the cover and on the base coincide, then tighten the securing knobs.
4. Start the inert gas (Argon) flushing to remove all the air into the system; open the high-flow flowmeter at a flow rate 40 to 60 l/min: the inert gas enter the table from the bottom positioned hole. Flow for 10 minutes.
5. Turn the wheel handle on the cover, positioning Vial n° 1 under the vial flushing station, under the inert gas inlet pipe.
6. Close the high-flow flowmeter and start vial rinsing: open the low-flow flowmeter at a rate 2 to 4 ml/min. The inert gas enter the table from the cover. Flow for 2-3 minutes.
7. Filling the vials:
   a) Turn the wheel handle on the cover, positioning Vial n° 1 under the sample inject point (*see figure*).
   b) Inject the sample into the vial (about 15 ml) using a stainless steel needle.


8. Positioning the plug on the vial:
   a) Turn the wheel handle on the cover, positioning Vial n° 1 under the Vial plug positioning station.
   b) Using the black slide (press, move toward the vial, press to full stroke) position the plug on the vial.
9. Sealing the vial
   a) Turn the wheel handle on the cover, positioning Vial n° 1 under the *sealing cap tightening point* station.
   b) Lift the vial using the outer knob.

c) Seal the vial using the crimper. The vial is sealed and ready for the chromatographic analysis.

10. Repeat steps 8. – 10. for all the sample to be analysed.
11. At the end of the operation, shut-off the flow of inert gas, open the equipment loosening the cover knobs and remove the numbered vials ready for the analysis.
12. The vials filled with oil can now be weighted. By deducting the weight of the empty vial and the relevant plug, the weight (and the volume, once the density is known) of the oil to be analysed is defined.

# 5 Notes

It is recommended to include in the sequence of the 20 sample an empty vial (without sample oil) to be analysed by gas chromatography to check traces of atmospheric gases eventually present in the equipment.

The values obtained can be deducted as "bias" from the instrumental analytical results.

Typical bias values are:

$O_2$ = 500 ppm

$N_2$ = 1500 ppm

$CO_2$ = 50 ppm.

In the event the bias values obtained are greater, increase the flow rate of inert gas in the equipment and increase the vial "flushing" time (item 6).

# 6 Precauzioni di utilizzo

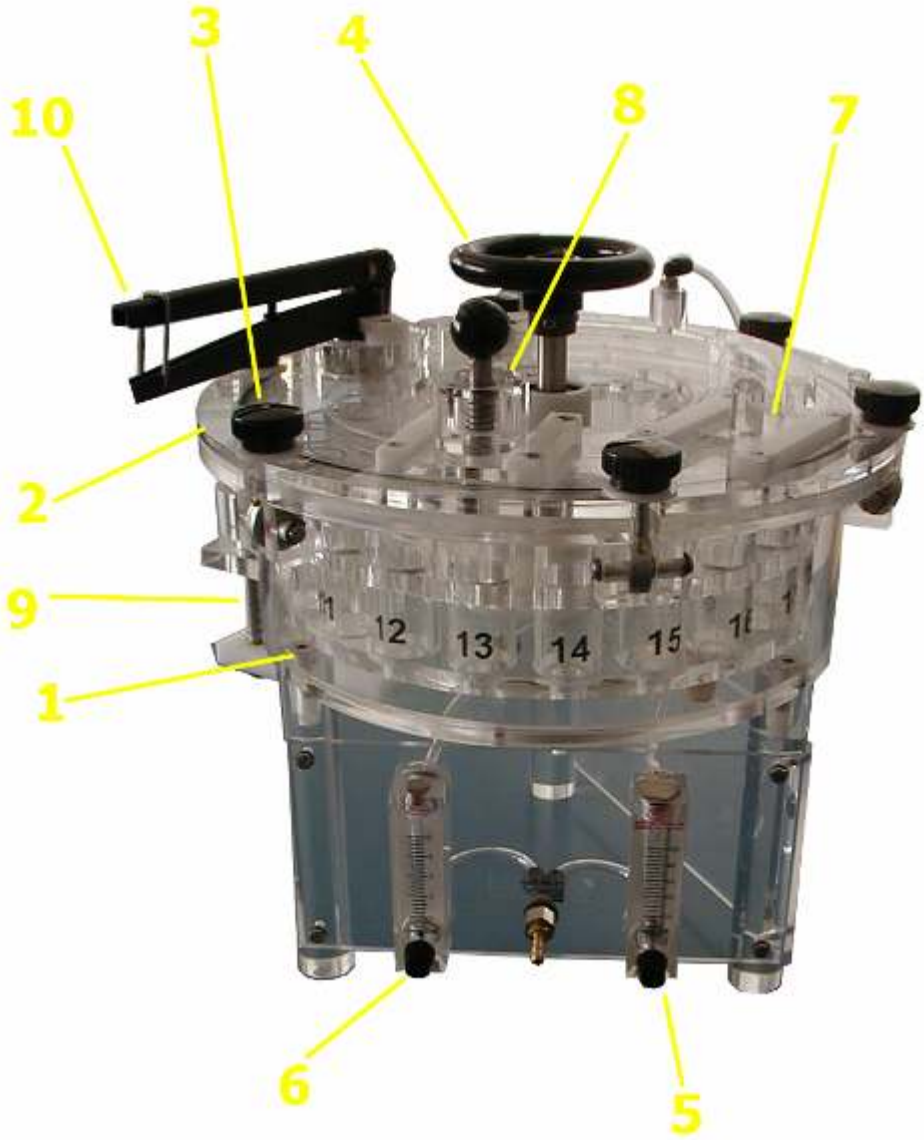
During the operations described here above, the system is involved with potentially dangerous chemicals.

Always comply with the current safety rules and regulations, in particular:

a) Always wear laboratory gloves

b) Wear protective glasses during sample injection.

# 7 Enclosure




**Enclosure 1 –Revolving Table 20 V II**