S.T.A. BRANCA IDEALAIR

Mercallo (VA) ITALY

BRANCA RAYLS 37X

"OPERATING MANUAL"

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0. INTRODUCTION

The operating manual has to be considered as an integral part of the instrument and it has to be conserved together with it; we suggest that the reading of the operating manual just to the qualified users who has to work with the instrument.
Remember that it is very important to read carefully this manual before using the instrument avoiding any mistakes and anomalous operations.
We suggest to consider "**GENERAL RULES AND NOTICES**" listed in the manual strictly; they describe executive modalities of particular operations and if they are not followed correctly, they could give damages to people and instrument too.
Following all indications presented in this manual, the user operates correctly and acquires the servicing management too.
Remember that using original spare parts you will grant a good instrument efficiency, reliability and a long operating life to instrument itself.

0.1. Guarantees

Every furnished instrument is regularly tested and it is guaranteed for a period of 12 months from the date of the delivery, except if otherwise established in the contract.
Such guarantee is exclusively applied, if the Customer respects the contractual and administrative norms; if the installation has been performed by the Customer, the guarantee has validity only if all the instructions contained in the manual have been respected.
Such guarantee hocks the company **STA BRANCA IDEALAIR** to repair or to replace all the damaged parts or those originally defectives.

1. GENERAL RULES AND NOTICES

1.1. Symbols in the text

SYMBOL	CONDITION	EXPLANATIONS, SUGGESTIONS AND ADVISES
	**DANGER**	It shows the presence of a danger with accident risk like the user death too.
	**WARNING**	It represents an advice of possible danger for the user.
	**NOTICE**	It shows a notice, a carrying function indication or suitable information for the operator. Please pay much attention to those paragraphs where this symbol is shown.
	**FURTHER INFORMATION**	It shows that there are further indications. These indications have not a direct relation with a function description or an activity development but knowing them it could be interesting to deep in an argument; they send you to read further documentation too.

1.2. Safety general rules

We advise the user to read carefully the operating manual and to understand the meaning of paragraphs explanations.

	Before carrying out any maintenance service where instrument can be off, unplug the cable of power supply;
	Do not put any materials, gas, inflammable or explosive liquids closes to the instrument.
!	Before cleaning the instrument, disconnect the power supply cable. Clean the instrument with a damp cloth. Do not use liquid or spray products. Do not work with the instrument closed to water source. Do not place the instrument on unsteady surfaces. It could fall and get seriously damaged. Do not place the instrument on soft surfaces or in poorly ventilated environments. To safe instrument connecting cables from any damages, install it in a correct way. Pay attention to the electrical supply marked on the instrument label and use the same. Contact the technical service in case you are not sure. Do not obstruct right side filtering panel during the operations. Do not put any kind of objects inside the instrument, they could cause a short-circuit or damage internal parts affecting its correct functioning. Do not spill liquids on the instrument. Do not carry out technical operations on the instrument without consulting scheduled maintenance operations indicated in the user manual. Disconnect the instrument from the power supply and repair it by a specialized technician if any of the following conditions should occur: A) the power supply connector has been damaged; B) the liquid has penetrated inside the instrument; C) the instrument has been exposed to rain or water; D) the instrument is not working correctly despite user's manual instructions have been well followed; E) the instrument has been dropped and its case damaged; F) the instrument does not work.

1.3. Destination of the operating manual

This operating manual is referring to the following figures:

- **QUALIFIED USER,** who knows very well all general safety rules shown in this manual and all necessary operations for the right use and the programmed maintenance plan;

- **QUALIFIED TECHNICIAN,** who can execute preventing and correcting maintenance operations, just in accordance with suitable training stage and having original spare parts.

	The operating manual reports just necessary instructions for the qualified personnel and for a correct instrument operation (Qualified user). For more detailed information, contact the supplier always mentioning details written on the identification nameplate
	The operating manual includes drawings defined with a reference number. Components shown on the photos could be associated to a legend; in this case each component has an identification number which is associated to the electrical drawings. The components are indicated in the text in square brackets and identified with a Ref. number

1.4. Suitable use and unsuitable use

1.4.1. Suitable use

Branca Rayls 37X allows to perform the following test procedures:

1) **Specific airflow resistance** or “Acoustic impedance”, expressed in MKS Rayls or CGS Ohms (referred to 1 cm2), representing the result of pressure difference across the sample divided by the linear velocity of the airflow;
2) **Non-Linear factor**, which allows to check the behavior of the sample at a very high air velocity (turbulent air flow);
3) **Air permeability** which pass perpendicularly across a sample under examination, under a determined pressure and time according to the norm **Standard ISO 9237:97**.

For this reason the instrument has to be exclusively used:
- with monofilament woven mesh for acoustic use (SAATI materials);
- with other textile materials having thickness up to 3 mm;
- within temperature limits described on this manual;
- with power supplies listed in the instrument nameplate;
- with all lateral inspection panels closed;
- far from heat sources;
- with all safety devices on;

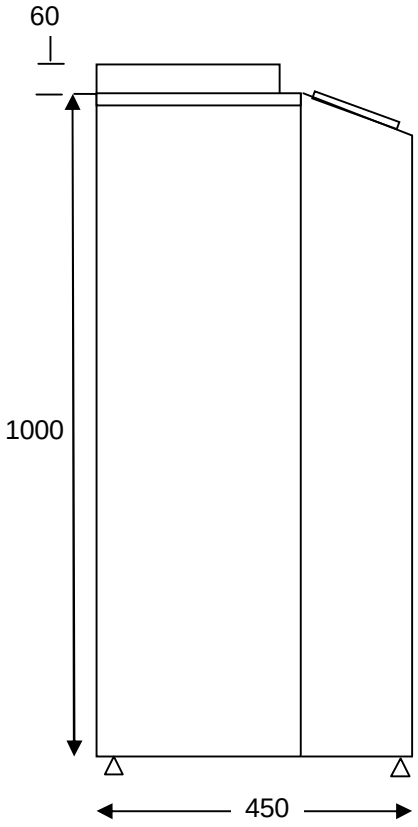
	To guarantee a long life of the instrument, please do the preventive maintenance operations regularly according to the servicing plan shown at paragraph **5.1**
	A wrong use of the instrument could cause irreversible damages causing dangerous conditions to the operator;

1.4.2. Unsuitable use

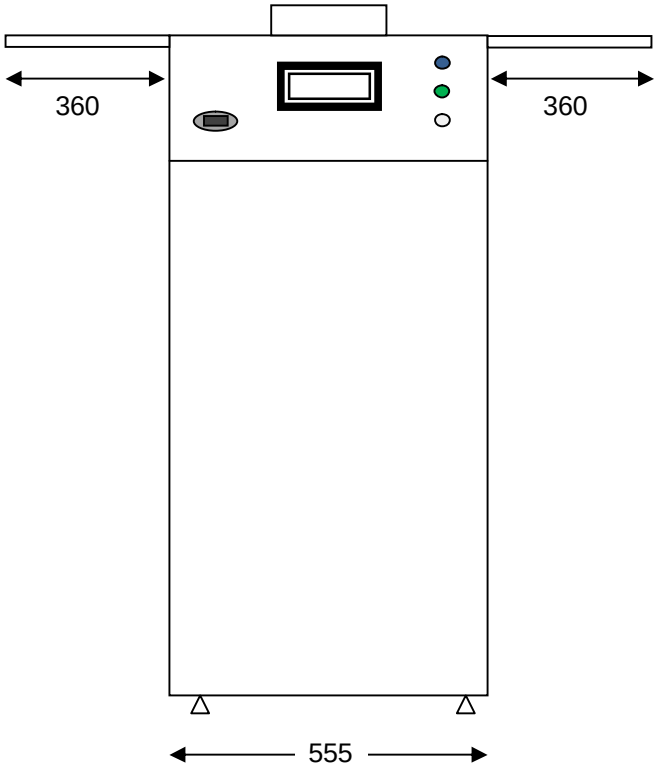
The instrument is not used with the following conditions:
- Different conditions from those mentioned at paragraph **2.4.1**;
- Explosive atmosphere, high dusts concentration or oil substances presence in the air;
- Atmosphere with high burning risk;
- Bad weather exposure;

1.5. Overall size

Here below drawings No. **1A** and **1B** show overall sizes on front view and side view of Branca Rayls.
The overall sizes measure unit are expressed in millimeter (mm).



Drawing No. 1A: Side view

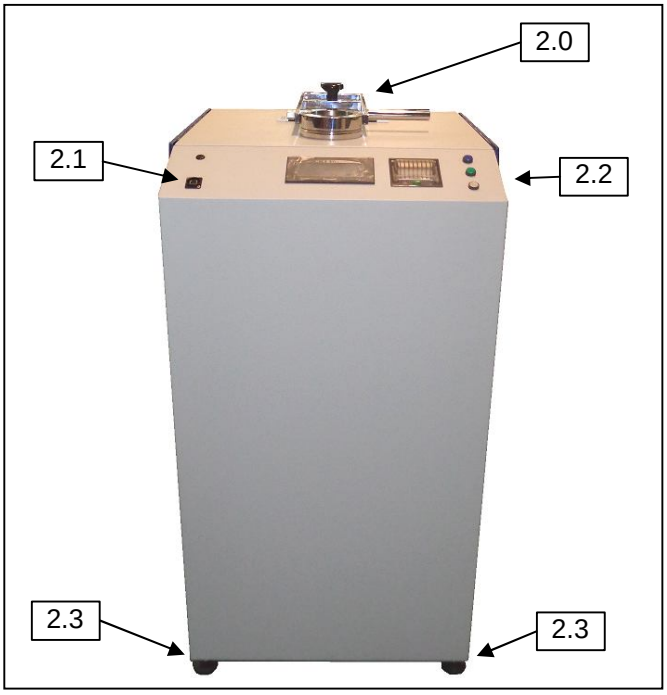


Drawing No. 1B: Front view

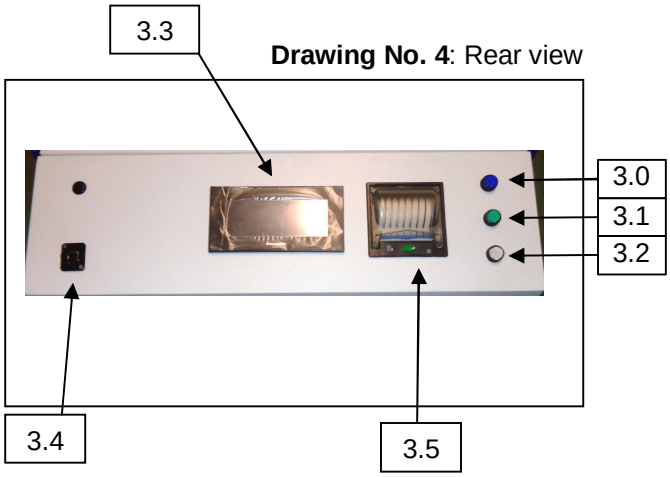
3. GENERAL DESCRIPTION AND TECHNICAL DETAILS

3.1. General purpose

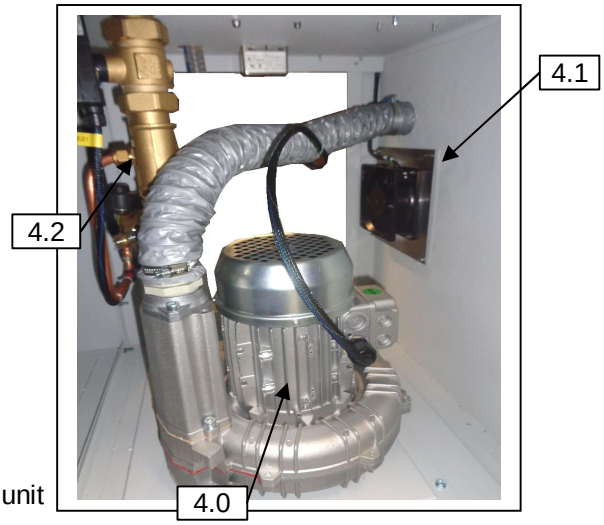
The instrument BRANCA RAYLS was designed and built by **S.T.A. Branca Idealair** according to directions from SAATI Spa, in order to develop specific testing procedures on acoustic materials like **SAATIFIL ACOUSTEX**.
The original test area is 50 cm2 and together with the instrument they are supplied also the test area reductions of 20, 10, 5, 2, 1 cm^2; the user can find five pairs of test area reductions for the upper and lower flanges inside an auxiliary tray supplied with instrument itself; [2.4].
The BRANCA RAYLS is equipped with a monochromatic liquid crystal 5" HMI display (**LCD 3 color touch screen**) [2.5] suitable for user interface which allows to set parameters configuration, checking and monitoring test operations and evaluating test results at the end of each test procedure.



Drawing No. 2: Front view



Drawing No. 4: Rear view



Drawing No. 3: Suction unit

LEGEND:

2.0	Test area 50 cm2 with magnetic clamping	2.2	Control board panel
2.1	USB port	2.3	Adjustable feet

3.0	Presence of voltage signaling lamp	3.4	External USB slot
3.1	ON/OFF switch	3.5	ASCII printer
3.2	Magnetic clamping switch		
3.3	HMI panel operator		

4.0	Suction unit	4.2	Air flow circuit
4.1	Suction unit cooling ventilator		

3.2. Technical specifications

The Branca Rayls resumes the following technical specifications:

Measure unit:	**MKS Rayls** (Acoustic impedance and NLF); **CGS Ohms**/1cm2 (Acoustic impedance and NLF); **NLF** (Non linear factor); **mm/s** (Air permeability); **m/s** (Air permeability); **l/min** (Airflow for air permeability test);
Measuring range:	For **Specific Airflow Resistance** (Acoustic impedance): Air velocity range: from 0,1 to 0,5 m/s; For **NLF**: Air velocity range (R1): from 0,1 to 0,5 m/s; Air velocity range (R2): from 0,8 to 2 m/s; For **Air permeability**: Test area 50 cm^2: from 2,8 to 322 mm/s (test area); Test area 38 cm^2: from 3,7 a 424 mm/s (with reduction); Test area 20 cm^2: from 6,9 a 806 mm/s (with reduction); Test area 10 cm^2: from 13,9 a 1611 mm/s (with reduction); Test area 5 cm^2: from 27,8 a 3222 mm/s (with reduction); Test area 2 cm^2: from 69,4 a 8056 mm/s (with reduction); Test area 1 cm^2: from 139,1 a 16112 mm/s (with reduction);
Pressure drop:	Range from 0 to 900 Pa (from 0 to 90 mmWG)
Test area:	50 cm^2 (std value for specific airflow resistance and NLF test)
Test area reductions:	38 cm^2 ; 20 cm^2; 10 cm^2; 5 cm^2; 2 cm^2; 1 cm^2;
Minimum volumetric counter air flow:	50 liters per hour
Maximum volumetric counter air flow:	5800 liters per hour
Volumetric counter air volume:	10 liters or 100 liters Checking periods
Maximum permitted error (**MPE**):	± 3 % (Air permeability test) ± 0,5 (MKS Rayls) ± 0,05 (CGS Acoustic Ohms/1cm2)
Power supply:	110V (Single phase AC) - 60 Hz
Dimensions (L x W x H):	555 X 450 X 1060 mm
Net weight:	60 kg

3.3 Noise information

The *A-weighted* sound pressure level made by the instrument during the operation is lower than **70 dB** (A).

4. INSTALLATION AND TRANSPORT

4.1. Adjustment and transport

Branca Rayls is usually well protected by special shockproof materials during packaging operation and, if required on order, it could be packed in a suitable wooden case.
The instrument can be transported at a temperature from (–5 ÷ 45)°C;
verify such limits as soon as it is placed in a stock.
To move the Branca Rayls till its final place, carry it by an elevator trolley or a trans pallet. We advise you to do these moving operations by qualified personnel.
As soon as you receive goods, check packaging is safe and verify that there are no damages caused by the transport. Inform the shipping agent for each compared damage within and not later than 8 (eight) solar days from goods acknowledgement; if you suspect an internal damage, accept goods with a checking reservation. The responsibility for each damage caused by the transport is only due to the shipping agent.

4.2. Installation

Branca Rayls has to be placed in a suitable room; the floor has to be solid and in level, in any case, suitable to sustain the instrument.

!	**WARNING:** it is absolutely prohibited to expose the instrument outside even if under a roof, unless it has been produced for this purpose.
!	**WARNING:** it is dangerous if in the room there are heating sources, explosive atmosphere, burning risk, high dusts concentration or oil substances presence in the air
!	**WARNING:** Transport, installation, maintenance and starting on working have to be done by qualified personal and checked by responsible technical personal too. Be sure to observe all technical and specification data mentioned in the present operating manual, the instrument mark and all enclosed documentation.

5. START UP AND USE

5.1. Preliminary operations

Place the instrument in a fixed position and put it in level acting by adjustable feet.
Block the nuts of adjustable feet to prevent it by any vibrations and/or bumps.

Be sure that the main switch isn't on;

Connect the instrument plug to an electrical socket in accordance with the power supply marked on the instrument label. Pressing the main switch the instrument shows the presence of voltage through the lamp AST.

Switch on the instrument just pressing the switching on interrupter **142ST** and the HMI panel operator and lamp **AVV** switches on too.

Before performing the test choose the test area in according with the following instructions:

- Permeability value between 2,8 to 322 mm/s: use 50 cm^2 (**test area**)
- Permeability value between 13,9 to 1611 mm/s with 20 cm^2 (**reduction**)
- Permeability value between 27,8 to 3222 mm/s with 5 cm^2 (**reduction**)
- Permeability value between 69,4 to 8056 mm/s with 2 cm^2 (**reduction**)
- Permeability value between 139,1 to 16112 mm/s with 1 cm2 (**reduction**)

Place one of chosen supplied reduction and the testing sample between the flanges fixing it by the knob (2.6).

TEST PROCEDURES

[PRELIMINARY OPERATIONS BY THE OPERATOR]

1) Place the sample between the two flanges checking its correct position on the test area;
2) Close the upper flange in order that the sample is tightly fixed closing any later passage of the air;
3) Push the button **142MAGN** to activate the magnetic closure and check if the sample is correctly fixed (for different sample thickness it might be necessary to adjust the magnetic clamp leverage);
4) Select the desired test procedure;
5) Configure correctly test parameters;
6) [**START TEST**]

MKS RAYLS TEST

SPECIFIC AIRFLOW RESISTANCE [MKS Rayls]
also called "Acoustic impedance"

MKS Rayls test procedure states to calculate the ratio between pressure drop (Pascals) and air velocity (meters per second) crossing the sample material.
The airflow must be sufficiently low to obtain laminar, non turbulent airflow through the sample, in order to properly define the airflow resistance in a linear range.

The output of the measure is the value of:

MKS Rayls = Pa*s/m

Defined as ratio between pressure drop and air velocity.

The higher the MKS Rayls value, the higher the sound dampening through the mesh.

ATTENTION!

When the 24th result is stored the machine shows a warning that the results buffer is full. No more tests can be done until the results are saved (on the PC via the software or printed) or cleared.

NON-LINEAR FACTOR

NON-LINEAR FACTOR [NLF]
The second test method is the measure of the **NLF** - **Non Linear Factor**.
When turbulence happens, the measured airflow resistance is higher than in the linear range. This might lead to an undesired change of the acoustic performance of the final component .
It is possible to measure this deviation by calculating the ratio between two measured values of specific airflow resistance, respectively at laminar and turbulent airflow (usually, at 0,2 m/s and 2 m/s airspeed).

Examples of applications requiring NLF measures:

- Acoustic devices - performance across narrow slots;
- Acoustic devices - nonlinear performance at very high Sound Pressure Level;
- Sound suppression panels working at high SPL;

AIR PERMEABILITY

The air permeability measure is mainly aligned to common Standards for Textiles (ISO 9237).
It states to measure the airflow through the sample at assigned pressure drop (usually 200 Pa or 0,5"WG = 127 Pa).
This is not fully representative of the expected acoustic behavior, but it is a very popular and widely used measure for Textiles.

6. MAINTENANCE

6.1. Preventing maintenance

Branca Rayls doesn't need any particular maintenance operations. Carry out preventive maintenance according to the servicing plan (programmed maintenance) here below mentioned. A good maintenance plan guarantees a long time operation preventing it from eventual damages or bad operations.

FREQUENCY	OPERATOR	SERVICING OPERATIONS
Every six months	**Qualified user**	The instrument is equipped with an air pre-filter to avoid the presence of dust inside the volumetric counter. It is necessary to clean the filter with compressed air and the inner spaces too. In order to do it, please disconnect the power supply cable and remove the filter on the right side of the instrument.

6.2. Corrective maintenance

In presence of failures or malfunctions please contact the technical assistance service "S.T.A. BRANCA IDEALAIR" mentioned at paragraph **0**.

6.3. Auto calibration

At the start up and every 30 minutes period the system runs an automatic calibration check of the pressure transducer; it might require to go on with the full automatic calibration procedure as shown in the following screens. The entire calibration cycle will take less than 30 seconds.

6.4. Periodical calibration check with reference template

IMPORTANT! Carry out the instrument check using the calibration template periodically. Input the test area written on the template and regulate the correct pressure drop according . The air permeability value has to be the same written on the supplied template with an uncertainty of ± 3 %.

7. OUT OF ORDER, DEMOLITION AND DISMANTLING

7.1. Out of order

As soon as you want to put Branca Rayls out of order, follow all operations mentioned at paragraph 4.2 but beginning by the last operation and always remember the safe and precaution indication. These operations have to be done by qualified personal. As soon as you want to work with the instrument once more follow chapters 4 and 5.

7.2. Demolition

AP is equipped with metallic assembled components above all, set off the instrument and do further disconnecting operation as per the material manufacture. Divide plastic material parts by iron ones so that to send them to the differentiating collection.

7.3. Dismantling

Wooden case, paper, carton and plastic material compose the instrument package. To respect the environment, divide these materials by plastic and iron ones before dismantling them. All materials have not to be getting away in domestic dustbin but in suitable dismantling centers.

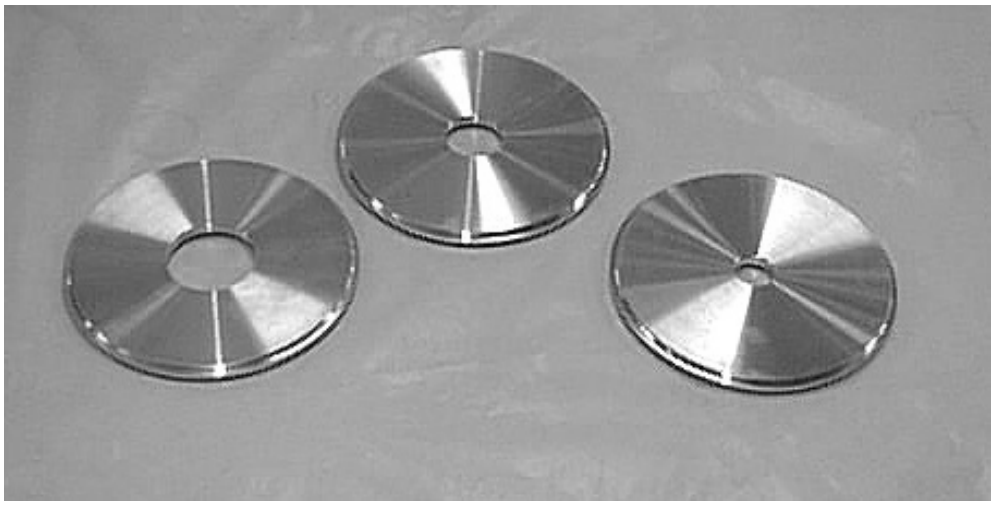
8. SPARE PARTS LIST

Here below we list all using materials and spare parts:

9. ENCLOSURES

9.1. Enclosure A: test surface reductions view

Testing surface reductions to be used for samples with absence of air lateral passage.



Correct installation on testing surface area for reductions and sample.