

IMPORTANT!
**Before taking this instrument in use we strongly
advise you to read this manual carefully.**



Operating Instructions for the **Comprehensive Abrasion Test**

v1.2 0517



This product complies to

- Machinery Directive 2006/42 / EC
- Low Voltage Directive 2006/95 / EC
- EMC Directive 2004/108 / EC



This product is RoHS 2 compliant (2011/65/EU)

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1 GENERAL

1.1 Importance of operating manual

This manual is written in order to become familiar with all the functions and possible applications of the instrument. It contains important instructions about how to use the instrument safely and economically; according to the purpose designated. Following these instructions is not only essential to avoid risks. It also reduces repair costs and down-time and increases the products reliability and service-life.

Anyone who works with the instrument should follow the instructions in this manual, particularly the safety related instructions. Additionally local rules and regulations relating to environmental safety and accident prevention should be observed.

1.2 User responsibility

The user should

- a) only allow persons to work with the instrument who are familiar with the general instructions on how to work safely and to prevent accidents. The use of the instrument should have been instructed duly. The safety chapter and the warnings in this manual should have been read and understood; acknowledged as evidenced by their signature.
- b) regularly check the safety-awareness of personnel at work.

1.3 Responsibility of personnel

Before commencing work anyone appointed to work with the instrument should pay attention to the general regulations relating to working safety and accident prevention. The safety chapter and the warnings in this manual should have been read and understood; acknowledged as evidenced by their signature.

1.4 Dangers

This instrument has been designed and constructed in accordance with state-of-the-art technology and the acknowledged safety regulations. Nevertheless, working with the instrument may cause danger to the life and health of the operator or to others, or damage to the instrument or other property. Therefore the instrument should only be used for its designated purpose, and in a perfect technical condition. Any defect that could have a negative effect on safety should be repaired immediately.

1.5 Designated purpose

The TQC Comprehensive Abrasion Test is exclusively designed to test films of paint and coatings on beverage cans following the instructed procedure. Other applications constitute improper use. TQC will not be held liable for damage resulting from improper use. Designated purpose also includes properly observing all instructions in the operation manual, and adherence to inspection and maintenance schedules.

1.6 Copyright

The copyright of this operating manual remains with TQC.

This operating manual is intended solely for the user and his personnel. Its instructions and guidelines may not be duplicated, circulated or otherwise passed on to others, neither fully, nor partly. Infringement of these restrictions may lead to legal action may be taken if this restrictions are infringed upon.




1.7 Manufacturer's/Supplier's address

TQC - Molenbaan 19, 2908 LL Capelle aan den IJssel - The Netherlands,
T +31(0)10 7900100, F +31 (0)10 7900129

2 SAFETY INSTRUCTIONS

2.1 Meaning of Symbols

The following symbols for dangers are used in this instruction manual.

Symbol	Explanation	Warning
 Danger	Possible immediate danger to the life or health of personnel	If this guideline is not noted it can lead to severe danger to health, up to fatal injury
 Warning	A dangerous situation could be caused	Non observance of this guideline can lead to injury or to damage to equipment.
	Special tips and particular information	Guidelines to make optimal use of the instrument.

2.2 Availability of Safety Information

The instruction manual should be kept at the place where the instrument operates.

In addition to the information contained in the instruction manual, general and local regulations for accident prevention and environmental protection shall be kept available and observed.

Always ensure all guidelines in respect of safety and dangers on the instrument are in readable condition.

2.3 Training of Personnel

- Anyone who operates the instrument should be trained properly.
- It has to be clear who has which responsibility regarding commissioning, set-up of maintenance and repairs, installation, and operation.
- Anyone who hasn't finished training should be supervised by an experienced person while working with the instrument.

2.4 Dangers from Electrical Energy

- Work on the electrical supply may only be done by a qualified electrician.
- The electrical equipment of the instrument must be checked regularly. Loose connections and cable damaged by heat must be corrected immediately.
- Always make sure the instrument's power is turned off and the mains is unplugged while adjusting any electrical component.

2.5 Points of Special Danger



Do not tamper any safety switches of the machine !

Do not use excessive water nor high pressure washing and make sure the machine is unplugged while cleaning.

2.6 Care, Maintenance, Repairs

- Always make sure the instrument is connected to an earthed socket.
- Maintenance and inspection should be carried out at the correct intervals
- Operating personnel should be informed before starting with maintenance or repair work

- Always make sure the instruments power is turned off and the instrument is not connected to a socket while adjusting any electrical component whenever maintenance, inspection or repair work is done.
- Do not open the instrument. In case of malfunction always consult the manufacturer.

2.7 Modifications to the Equipment

- Any modifications or additions or alterations to the instrument may solely be made with permission from the manufacturer.
- All measures involving modifications require written confirmation of approval from TQC
- Instruments which are not in fault-free condition must immediately be switched off
- Only use replacement parts from the original supplier. Parts used from other sources aren't guaranteed to take the loading and meet the safety requirements.

2.8 Cleaning of the Instrument and Disposal of Materials

- Do not use compressed air to remove loose particles or metal dust as this brings the particles inside the mechanism of the machine.
- Try to keep the instrument as clean as possible to prevent distortions of functions. In case of leakage of a beverage clean spill immediately with hand warm water. Note that especially liquids that contain sugar may cause failures over time when not removed.
- Cleaning materials must always be used and disposed of correctly.

2.9 Safety measure

Safety first is TQC's motto. Hence all TQC is equipped with an array of safety measures. TQC CAT is equipped with the following:

- 1 Emergency stop switch that instantly cuts the machine's power once pressed.
- 2 Front door that prevents the users from touching moving parts whilst the machine is in operation.
- 3 Safety switch on the front door that stops the machine when the door is opened during operation.
- 4 Safety switch on the side panel that shuts down the machine once opened.

3 TRANSPORT AND STORAGE

3.1 Packing

Please take note of pictorial symbols on the packing.

3.2 User: Check on Receipt

- Check packing for damage
- After unpacking check complete supply.

3.3 Reporting Transport Damage and Documentation

Any damage should be documented as accurately as possible (possibly photographed) and reported to the relevant insurers or, in the case of sales "delivered to customers works", to the supplier.

3.4 Storage and Protective Measures when not in use

The instrument must be stored in a dry place at a temperature between 10 - 40°C / 50 - 104 °F.

4 INSTRUMENT DATA

4.1 Scope of Supply

Description
TQC Comprehensive Abrasion Test + Power cord + User and installation manual
Laptop computer with Windows 10 + CAT control application + USB cable
Three sets (60, 80 and 100 mm) of two side plate assembly + top pressure plate assembly + bottom can carrier plate
5 m air tube Ø6 mm + 4 mm hexagonal wrench + can positioning bar

4.2 Specifications

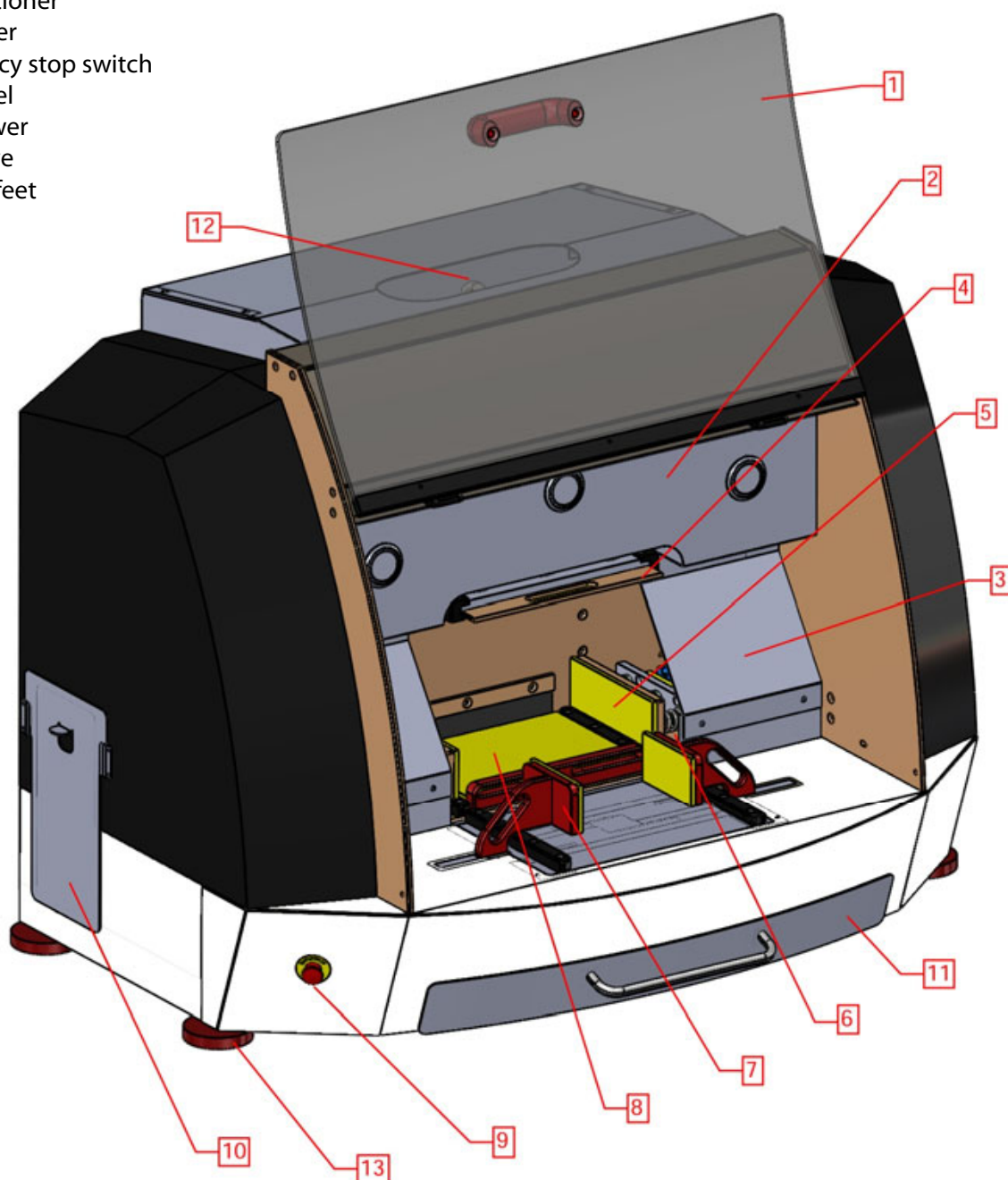
Weight	125 kg / 276 lbs
Dimensions (w x h x d)	1050 x 790 x 760 mm / 3.44 x 2.6 x 2.5 ft
Stroke length	0.5 to 2 inch
Frequency	0 to 2.5 Hz
Ramp up/down time	0.25 Hz per cycle
Test duration	0 to 24 hours
Pressure top cylinder	0 to 6 bar / 0 to 87 psi
Pressure side cylinders	0 to 6 bar / 0 to 87 psi
Can size	150 to 1000 ml / 5.07 to 33.8 fl. oz. (US) / 5.28 to 35.2 fl. oz. (UK)
Min / max can height	88 to 205 mm / 3.5 to 8.1 inch
Min / max can diameter	53 to 84 mm / 2.1 to 3.3 inch
Operating temperature	0 to 50 °C / 32 to 122 °F
Operating humidity	0 to 90% rH (non-condensing)
Power Supply	100 to 240 VAC, 50 to 60 Hz
Max. power consumption	265 Watt
Air supply	8 bar ± 20%
Noise Level	< 70 dB

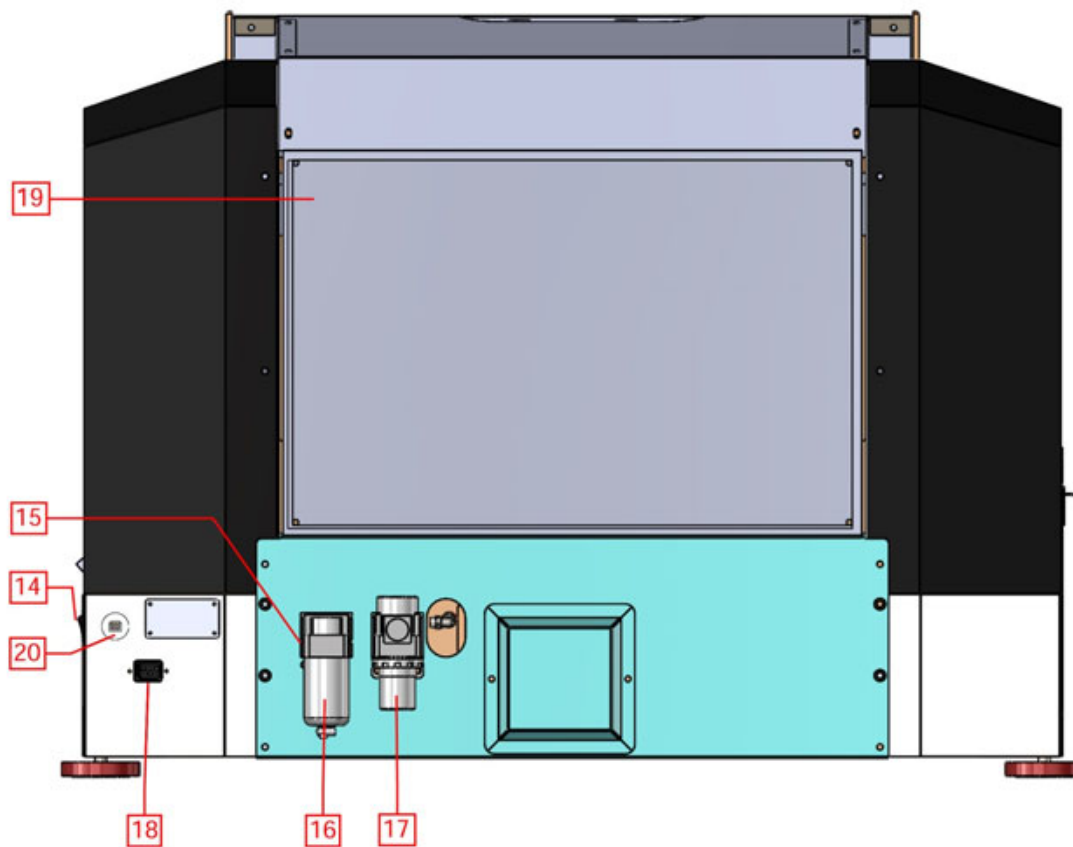
4.3 Standards

- IEC 61326-1, EMC
- IEC 61340-5-1, ESC
- IEC 61010-1, Safety requirements for electrical equipment
- Directive 2011/65/EU, RoHS2

4.4 Instrument controls and functions

1. Front door
2. Front cover
3. Side cover
4. Top pressure plate
5. Side pressure plate
6. Shake table
7. Can positioner
8. Can carrier
9. Emergency stop switch
10. Side panel
11. Spill drawer
12. Lifting eye
13. Support feet





- 14. Power on/off switch
- 15. Air supply connector
- 16. Air filter
- 17. Air regulator
- 18. Power socket
- 19. Junction box
- 20. USB Port

5 INSTALLATION

1	Placement Place the TQC CAT on a sturdy, vibration-free table or work area, capable of holding a minimum of 250 kg / 550 lbs. Place, if necessary, a spirit level on the work surface and adjust the height of the feet.
2	Check all parts Carefully unpack the machine and the accessories, and check complete supply.
3	Connect the power cord Connect one end of the power cord to the power socket on the back of the CAT and the other end to a power outlet.
4	Connect the air hose Connect one end of the air hose to the air supply connector on the back of the CAT and the other end to the air supply.
5	Turn on the TQC CAT
6	Turn on the laptop
7	Connect the laptop to the TQC CAT Connect the USB-B end of the USB cable to the USB port on the back of the CAT and the USB-A end to the USB port on the laptop.



Make sure the machine and its supporting table remain in position during testing of various can sizes at various conditions.

If machine or supporting table rock and / or move during testing abort test and investigate its cause or contact the manufacturer.

6 RUNNING A TEST

6.1 Preparing the machine

- 1 Confirm if the stroke length is set as required. (see Annex A)
- 2 Place Can carrier and manually check if it slides in and out the machine smoothly.
- 3 Place Top pressure plate as described in Annex B.
- 4 Place the correct set of side pressure plates.

**Warning**

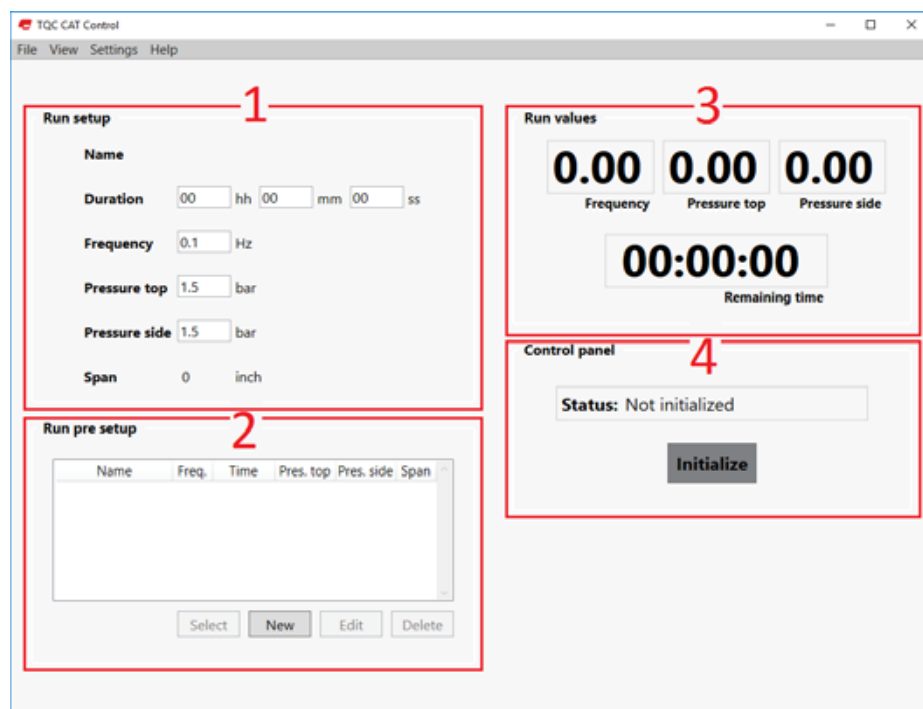
Make sure the side plates match the can size. Side plates should always be lower than the can height

6.2 Loading the machine

- 1 Slide Can carrier to the forward position.
- 2 Place Can positioning bar in the correct position.
- 3 Place 6 cans against the Can positioning bar.
- 4 Push Can Positioners to each other to center the cans.
- 5 Pull Can Positioners back when cans are centered.
- 6 Carefully remove the Can positioning bar.
- 7 Slowly slide Can carrier onto the shake table.
- 8 Close Front door.

6.3 Preparing the CAT Control application

Open the TQC CAT Control application on the laptop.



The TQC CAT Control application consists of 4 sections

1	Run setup This section shows the setup for the current setup. <i>The last used setup is shown when opening the application.</i>
2	Run pre setup This section shows the saved setups. More information about setups in chapter 6.7
3	Run values This section shows the real-time Frequency, Top and Side Pressure, and the Remaining Time of the test.
4	Control panel This section shows the system status and contains the buttons to control the CAT.

6.4 Starting a manual test

1	Initializing Press Initialize to connect to the TQC CAT. <i>The system status should be 'Ready' after initializing, if not: see chapter 7</i>
2	Run Setup Enter the Duration, Frequency, Top Pressure, and Side Pressure.
3	Loading the setup into the TQC CAT Press Start to start a test with the current setup.
4	Test is running The test will stop when the duration time has been reached. To pause the test, press Pause . To abort the test, press Stop .
5	Test is finished When the duration time has been reached, you can choose to extend the test or to stop the test.
6	Stop test When the duration time has been reached and you have chosen to stop the test, the system will stop the motor and release the top and side cylinders. <i>Important: Do not open the front door until the system status is Ready.</i>

6.5 Starting a pre setup test

1	Initializing Press Initialize to connect to the TQC CAT. <i>The system status should be 'Ready' after initializing, if not: see chapter 7</i>
2	Selecting a saved setup Select a saved setup from the list and press Select to load the setup into the TQC CAT.
3	Loading the setup into the TQC CAT Check if the run setup is correct and press Start to start a test with the current setup.
4	Test is running The test will stop when the duration time has been reached. To pause the test, press Pause . To abort the test, press Stop .
5	Test is finished When the duration time has been reached, you can choose to extend the test or to stop the test.
6	Stop test When the duration time has been reached and you have chosen to stop the test, the system will stop the motor and release the top and side cylinders. <i>Important: Do not open the front door until the system status is Ready.</i>

6.6 Test finished

When the test is finished and the system status is Ready, you can open the Front door.



Clean any spill immediately to keep the machine in proper condition.



Always remove any debris from previous tests before starting a new test as this may affect the results.

6.7 Run pre setup

Add new setup:

1	Add a new pre setup Press New to open the pre setup form.
2	Enter the values Set the Name, Duration, Frequency, Top Pressure, Side Pressure, and Span.
3	Press OK to save

Edit a setup:

1	Select the setup and press Edit
2	Edit the values you want
3	Press OK to save

Delete a setup:

1	Select the setup
2	Press Delete

6.8 CAT Settings

To open the CAT Settings, go to Settings > CAT Settings. Changing these values will increase or decrease the time it takes to start/finish the test.

Motor acceleration / deceleration	The ramp up/down speed of the motor. (Default value: 0,3 Hz)
Pneumatic actuation time	The time to build up the pressure in the top and side cylinders. (Default value: 5 seconds)

7 SYSTEM STATUS AND TROUBLESHOOTING

Status	Description	What to do
Not Initialized	The system is not initialized	Press Initialize
Ready	The system is ready to start	Press Start to start a test. See chapter 7.4 and 7.5
Running	The test is running	Wait until the test is finished, or Press Pause to pause the test, or Press Stop to abort the test
Run Paused	The test is paused	Press Resume to continue test, or Press Stop to abort the test
Emergency stop	The emergency stop button is active	Release the emergency power button and restart the TQC CAT
Front door open	The front door is open	Close the front door
Side panel open	The side panel is open	Close the side panel

Problem	Cause	Solution	Note
Machine does not start	Front door is not closed entirely.	Close front door	Front door equipped with safety switch
Machine does not start	Side panel is not positioned correctly	Position side panel correctly	Side panel equipped with safety switch
Machine does not start	Emergency switch is active	Turn emergency switch clockwise to release	
Machine does not start or switch on	Power cord not plugged in	Plug in the power cord	
Machine does not start or switch on	Mains switch is turned off	Turn on main switch	
Shake table starts but stops spontaneously , machine makes loud humming sounds	Load on can carrier too high.	Check type and positioning of cans	Only use cans that match the side pressure plates in use.
Shake table stops instantly and a loud humming sound is heard	Can carrier not in correct position	Slide can carrier fully in the machine until it clicks into position	

8 CLEANING THE MACHINE



When tests are performed with original beverages inside the cans leakage and spill may occur. This is no problem as the TQC CAT is designed to be cleaned with lukewarm water and is required a mild soap.

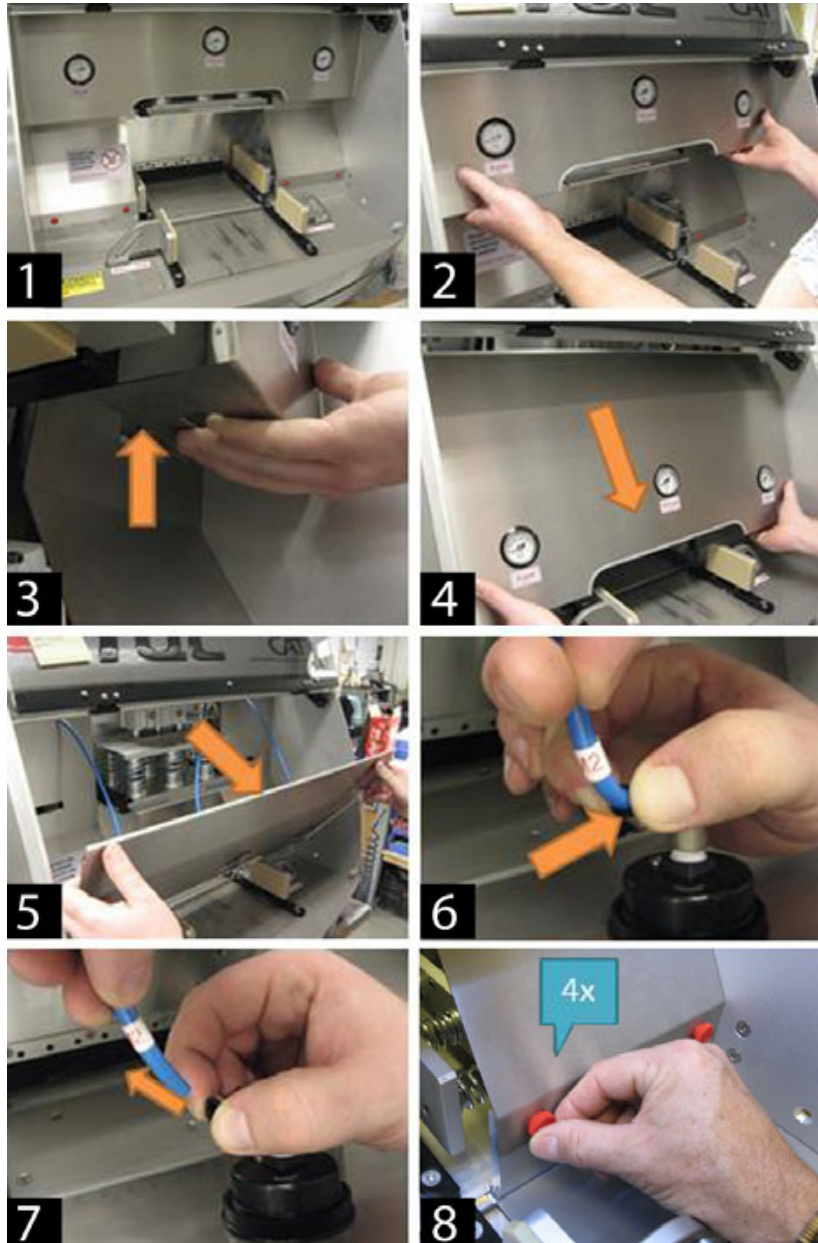
DO NOT use solvents or any chemicals to clean the machine. Do not use high pressure wash.



Make sure to clean the machine immediately after a spill has taken place. Sugar and other ingredients of the beverages may form a sticky or hard layer on the inner components of the machine which eventually may lead to malfunctioning.

Use the pictured guidelines for cleaning the TQC CAT.

8.1 Removing panel work for cleaning and maintenance purposes



Always unplug the power supply from machine before cleaning!

1 Open

Open the front door

2-3-4 Unlock front cover

Place hands under the front cover and push upwards to unlock the cover. Then pull forwards.

5 Tilt panel

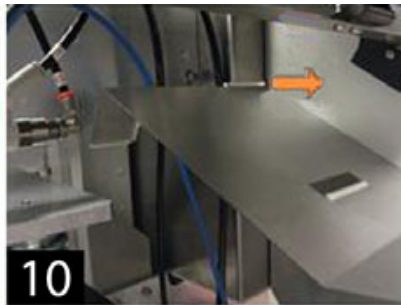
Carefully tilt the panel as on picture.

6-7 Remove airlines

Release quick disconnect fittings to remove air lines.

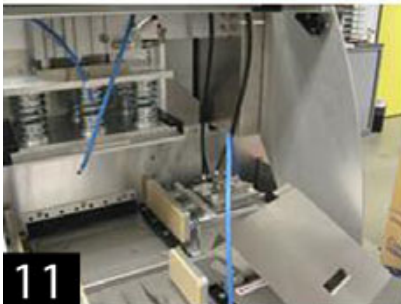
8 Unfasten bolts

Unfasten the bolts at the bottom of the side covers.



9-10 Remove side covers

Remove side covers as shown in the pictures.



11 Easy to reach

All mechanical parts are now easy to reach.

8.2 Cleaning and rinsing TQC CAT



lukewarm
water



Always unplug the power supply from machine before cleaning!



1 Remove Can Carrier

Open the front door and remove can carrier.

2-3-4 Rinse with water

Rinse polluted components with lukewarm water (no high pressure wash!). Water will be retained in the spill drawer.



5 Use cleaning cloth...

If necessary use a cleaning cloth, sponge or soft brush.

6 Use dry cloth

Dry parts with a soft dry cloth.



7 Open drawer

Open the spill drawer



8 Unfold tube

Unfold drain tube.



9-10-11-12-13-14 Unplug drain

Lower into a container as shown and unplug drain.



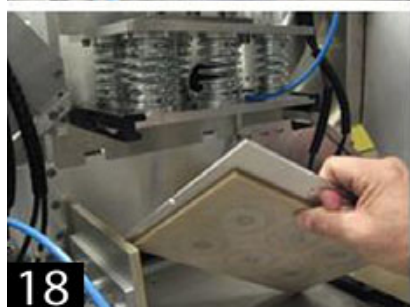
15 Reposition drain tube

When spill drawer is fully drained plug drain tube and reposition. If required slide out spill drawer fully and clean.



**16-17-18 Remove top pressure plate**

Remove top pressure plate (as described in §9.1)

**19-20 Rinse and clean**

Rinse top pressure plate and can carrier under lukewarm water and clean.

**21 Place parts**

Dry parts and place back into the machine.

9 CARE AND MAINTENANCE

9.1 Inspection and Maintenance

- Though robust in design, this instrument is precision-machined. Never drop it or knock it over.
- Always clean the instrument after use.
- Clean the instrument using a soft dry cloth or hand warm water.
- Never clean the instrument by any mechanical means such as a wire brush or abrasive paper. This may cause, just like the use of aggressive cleaning agents, permanent damage.
 - Generally the TQC CAT does not require any maintenance.



Make sure that no shattered glass, paint or other liquids are spilled on the electronics or left in the test compartment

9.2 Disposal of Materials

Disposal of materials used in the operation of the instrument or for auxiliary functions and exchanged items should be dealt with safety and in a manner that will not harm the environment. Follow the local regulations.

9.3 Customer Service

Customer service is provided on request by
TQC - Molenbaan 19, 2908 LL Capelle aan den IJssel - The Netherlands,
T +31(0)10 7900100, F +31 (0)10 7900129 or by local representatives.

The right of technical modifications is reserved.

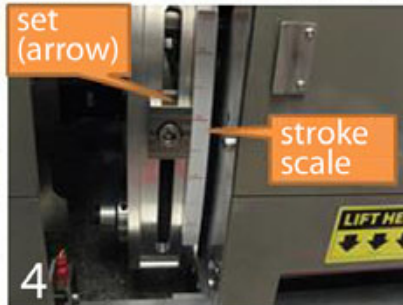
10 DISCLAIMER

The information given in this manual is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this manual without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Whilst we endeavor to ensure that all advice we give about the product (whether in this manual or otherwise) is correct we have no control over either the quality or condition of the product or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability whatsoever or howsoever arising for the performance of the product or for any loss or damage (other than death or personal injury resulting from our negligence) arising out of the use of the product. The information contained in this manual is liable to modification from time to time in the light of experience and our policy of continuous product development.

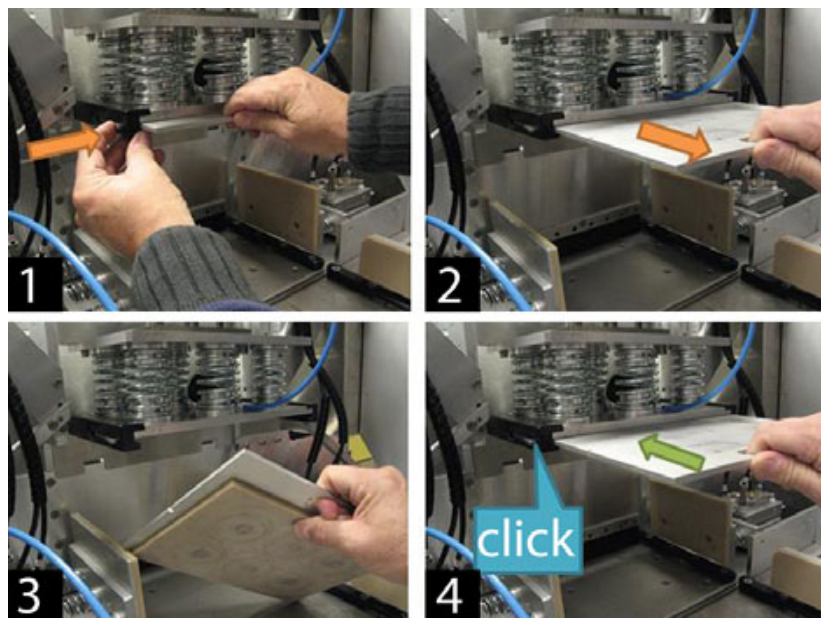
ANNEX A - TQC CAT COMPREHENSIVE ABRASION TEST STROKE ADJUSTMENT



Always unplug mains power from machine before starting!



- 1 Stroke adjustment device is positioned at left side of the machine.
- 2 Move metal cover in an upwards direction to unlock.
- 3 Adjustment tool is place at the inside of the cover.
- 4 Now the stroke scale and set device (see arrow) are visible.
- 5 Untighten set device.
- 6 Align arrow with the desired stroke length on the stroke scale and tighten again.
- 7 Close Metal cover of stroke adjustment device.

ANNEX B - POSITIONING TOP PRESSURE PLATE

- 1 Press black pawl at the left side to release top pressure plate and pull outwards simultaneously.
- 2 Pull top pressure plate outwards.
- 3 Remove top pressure plate for maintenance or control.
- 4 Replace top pressure plate by sliding inwards until a "click" is heard.



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