

USER-MANUAL

Tamson Cool Cube Bath (TCC-B)



1	SAFETY AND WARNINGS	3
2	WARRANTY	3
3	DISCLAIMER	3
4	PRECAUTIONS AND HAZARDS	4
5	INSTALLATION	4
5.1	IMPORTANT	4
5.2	UNPACKING	4
5.3	MOUNT SPACERS	4
6	AIR CIRCULATION	5
6.1	REGULAR MAINTENANCE	5
7	OPERATION	6
7.1	SWITCHING ON	6
7.2	CAUTION WITH POWERING ON/OFF	6
7.3	WHAT IS WHAT?	6
7.4	START	7
7.5	SELECTING PARAMETERS	8
7.6	QUICK START	9
7.7	FLUID LEVEL	10
7.8	MAXIMUM FLUID LEVEL	11
8	CONNECTING	12
8.1	CLEANING	12
9	INTRODUCTION TO THE TCC-B SERIES	13
9.1	GENERAL	13
9.2	PUMP	13
10	SPARE PARTS LIST AND PRODUCT CODE	15
11	WIRING	15
12	TECHNICAL DETAILS	16
13	TROUBLE SHOOTING	17
14	CE DECLARATION OF CONFORMITY	18

1 SAFETY AND WARNINGS

Make sure before installing or operating the equipment to read and understand all instructions and safety precautions listed in this manual. If there are any questions concerning the operation of the equipment or about the information given in this manual, please contact your local dealer or our sales department first.

Performance of installation, operation, or maintenance other than those described in this manual may result in a hazardous situation and may void the manufacturer's warranty.

Never operate equipment that is not correctly installed. Unqualified personnel must not operate the equipment. Avoid damage to the equipment, or its accessories, caused by incorrect operation.

Important:

- When performing service, maintenance or moving the apparatus, always disconnect the apparatus at the main's socket,
- Proper skilled and trained personnel are only allowed to operate this equipment,
- Take notice of warning labels and never remove them,
- Refer service and repairs to qualified technician,
- If a problem persists, call your supplier or Tamson Instruments b.v.

2 WARRANTY

Tamson Instruments b.v. warrants that all their manufactured equipment is free from defects in material and workmanship, preventing the device from normal operation. Tamson Instruments b.v. does not warranty that the equipment is fit for any other use than stated in this manual. The manufacturer can only be held responsible for the security, reliability and performance of the equipment, when operated in accordance with the operating instructions, extensions, adjustments, changes and/or if repair is performed by Tamson Instruments b.v. or authorized persons only. This warranty is limited to one year from the date of invoicing. All equipment and materials are subject to standard production tolerances and variations.

3 DISCLAIMER

For relevant measurements always an independent reference measurement is needed. Tamson can't be held responsible for misinterpretation or consequences of an erroneous reading.



ISO 9001 : 2015
NL/PRO 238239125

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tcc-b-man.docx Rev 1.03 UK 2023

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Page 3/19

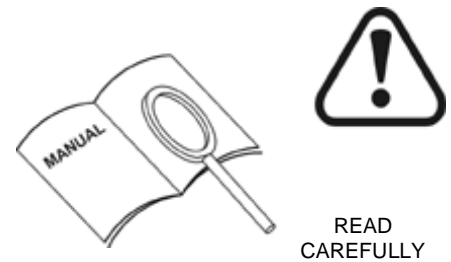
4 PRECAUTIONS AND HAZARDS

Before attempting to operate the TCC – B, read all parts of this manual carefully to insure smooth operation and avoid damage to the equipment or its accessories.

If a malfunction occurs, consult section "TROUBLE SHOOTING", page 17. If the problem persists email us via the website www.tamson.com and the "Contact Us" form.

Never operate the equipment if not correctly installed. The equipment must be operated only by qualified personnel. Avoid damage to the equipment or its accessories through incorrect operation.

Environment	
Panel sealing	Conform to EN60529: IP65
Environment Temperature	0 tot 35°C. Supply enough ventilation
Humidity	5 tot 95 %, non condensating
Atmosphere	Not suited for altitudes heights above 2000m or explosive/corrosive environment
Pollution cat. 2	Conducting pollution must be prevented



5 INSTALLATION

5.1 Important

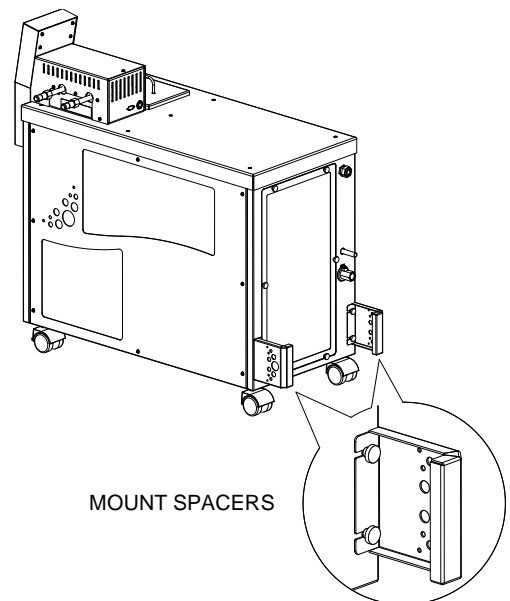
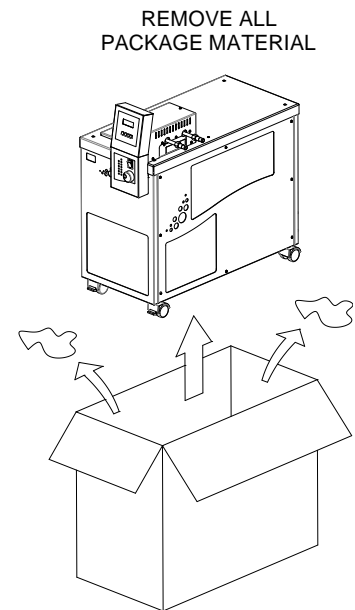
Tamson Instruments bv is not responsible for any consequential damage or harm caused by using this TCC - B. Repairs on the electrical system of the TCC – B may only be carried out by well trained and authorized persons.

5.2 Unpacking

Before leaving the factory Tamson products are adequately packed to prevent damage during normal transportation. Check the packing for external damage and make a note on the shipping documents if any damage is found. Always retain the cartons and packing material until the product has been tested and found in good condition. (Transport companies generally will not honor a claim for damage if the respective packing material is not available for examination).

5.3 Mount spacers

Mount the two spacers at the backside of the TCC-IC apparatus.



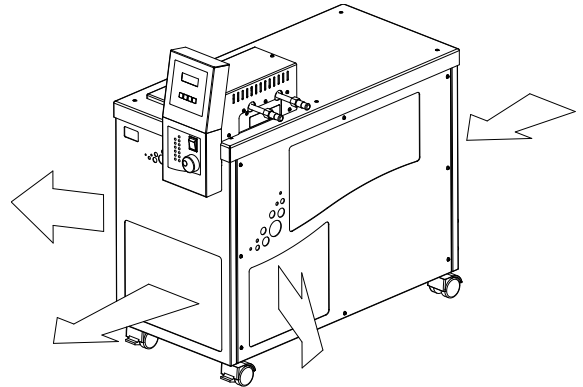
6 Air circulation

Put the unit in its proper place. Leave enough room around the cryostat for sufficient air circulation. Place the unit in a clean working environment and keep away from dust. When air can not circulate well, the cryostat will overheat itself resulting in irreversible and severe mechanical damage. Dust will block the condenser and might also cause overheating of the system. Overheating will cause severe damage to the compressor.

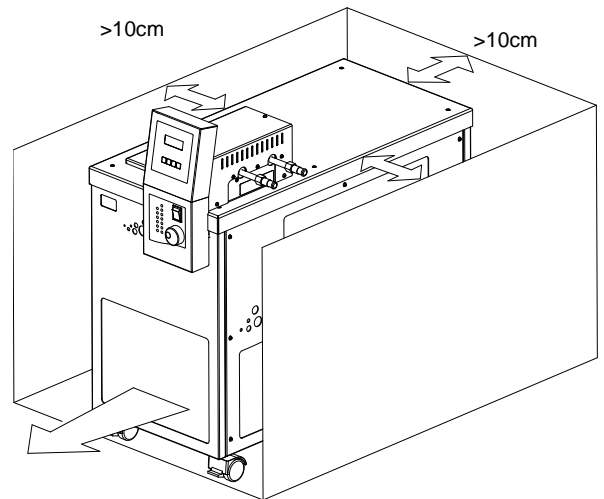
6.1 Regular maintenance

Please check the apparatus to see if airflow is not blocked around apparatus and both apparatus and condenser are free from dust.

KEEP AIR FLOW FREE





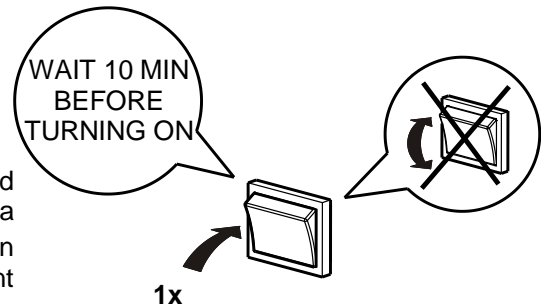
ROOM FOR AIR CIRCULATION



7 OPERATION

7.1 Switching on

If the bath has been properly filled with fluid, it can be switched with the mains switch located on the front panel. Choose a working temperature (set point) with  and  keys. For an optimal performance the bath is best tuned at the set point temperature.



7.2 Caution with powering on/off

Be careful and do not toggle with the on/off switch. To start the cooling compressor high currents are needed which will heat the compressor motor internally. Switching off and on the compressor several times within a short period will lead to mechanical damage.

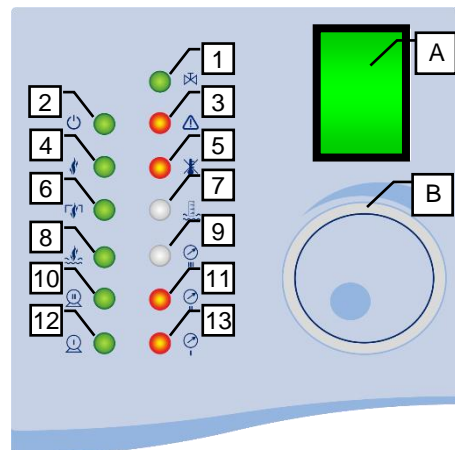
When switching off the apparatus, wait for 10 minutes before switching the system back on again.

7.3 What is what?

- A On / off switch
- B Pump Speed

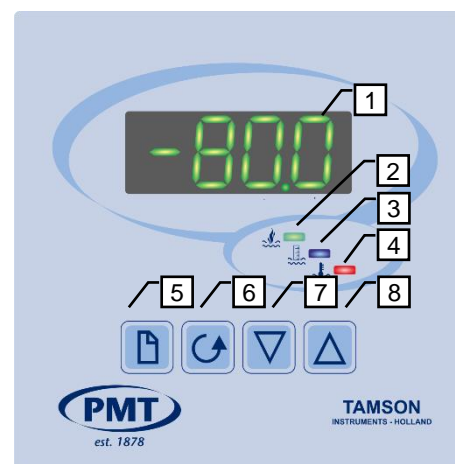
Indicators:

- 1 Pressure valve open
- 2 On - indicator
- 3 Overtemperature bath fluid
- 4 Heater pump outlet
- 5 Temperature Alarm
- 6 Heater Top Lid
- 7 Bath Fluid Low
- 8 Heater Temperature Control
- 9 Overpressure Stage II
- 10 Compressor 2 running
- 11 Overpressure Compressor II
- 12 Compressor 1 running
- 13 Overpressure Compressor I



Items

- 1 LED Display
- 2 Heater
- 3 Level indicator
- 4 Error overtemperature
- 5 Page key
- 6 List
- 7 Down key
- 8 Up key



7.4 Start

The bath must be filled with a liquid suitable for the minimum operating temperature.

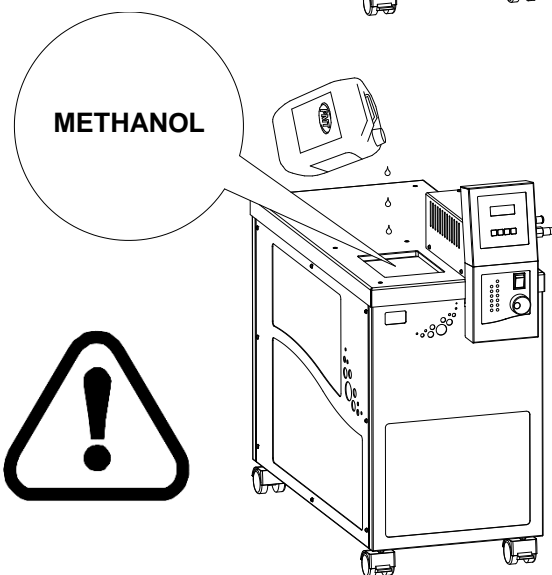
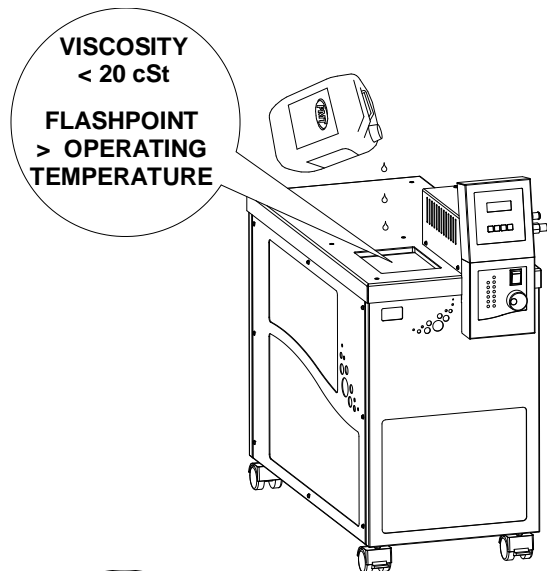
It is very important to select a liquid with a viscosity of less than 20 cSt at the operating temperature and a flash point which is well above the operating temperature.

The best bath liquid to be used is methanol, enabling circulation at very low temperatures.

Methanol is extremely flammable and can cause fire hazard. Please take all necessary precautions to reduce fire hazard. When using methanol all vapors must be removed by using appropriate air ventilation.

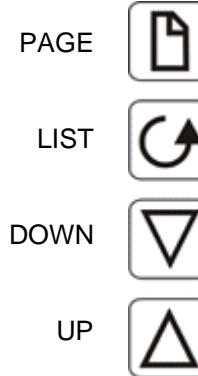
Methanol is toxic and can cause health risks. Use appropriate ventilation and other precautions to prevent inhaling toxic vapors. If ventilation is insufficient the risk of explosion hazards can occur!


The supplier of the bath liquid (methanol) will be able to hand over all chemical details and safety precautions related to the use of methanol. These precautions must be followed when operating the bath.



7.5 Selecting parameters


The front panel layout shows the following 4 operating keys:



Press shortly  and following is displayed

SP.1	- Temperature set point in °C,
tU.n	- Tuning the bath ("Atune"),
Pb	- Changing the tuning (PID) parameters "P" value
ti	- Changing the tuning (PID) parameters "I" value
td	- Changing the tuning (PID) parameters "D" value
OFSt	- Change temperature readout offset (± 5°C)

Sequence

Each time  is pressed another option is displayed.

Up and Down keys allow changing the listed value. All changed values, like set point and PID parameters, will be kept in memory when pressing the page key to leave the menu. After switching off the power supply, changed values are kept in memory.

- SP.1 - Set point adjust. Press page key to confirm setting when altered.
- tU.n - Auto tuning PID parameters, set on or off. Off is default value here. On, when selecting parameter 2nd time, On.A is played. This indicates adaptive tune. Bath is adapting PID setting in background operation. When in On.A mode PID values can not be set manually anymore.
- pb^d - Changing the tuning (PID) parameters. 'Proportional band value. Default value is 2, range 1 .. 100. (Proportional band equals 1/proportional value). Press page key to confirm setting when altered.
- ti^d - Changing the tuning (PID) parameters 'Integrator' value. Default value is 200. Range 1 .. 1200. Default value is 200. Press page key to confirm setting when altered.
- td^d - Changing the tuning (PID) parameters 'Differentiator' value. Default value is 10. Range 1 .. 600. Default value is 40. Press page key to confirm setting when altered.
- OFST - Set offset. The offset value is added to the displayed bath temperature. I.e. when the



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Page 8/19




displayed bath temperature is 20.0°C, an offset of 0.2 displays a value of 20.2°C. An offset of -0.2°C will display 19.8°C. Range is -5°C .. +5°C. Press page key to confirm setting when altered.

note: ☞ When tune is set to on, PID values can not be set. Change tune to off en alter PID values.
☞ Press page key to confirm setting when altered.

7.6 Quick start

To quickly start operating the bath:

- Fill the bath with sufficient fluid to submerge the cooling coil. However do not overfill the bath fully as the fluid will exit through the overflow outlet,
- Place the power plug,
- Switch the bath on using the mains switch,
- Choose a working temperature (set point):

Press  once. Display will indicate "SP.1". Alter set point temperature by using up  and down  key to select the desired bath temperature.

Press  to display bath temperature again (or wait 10 seconds).

7.7 Fluid level

Do not operate the bath with low fluid level.

When the fluid level is too low, bath fluid will vaporize leading to toxic and flammable fumes.

Flammable fumes can lead to fire

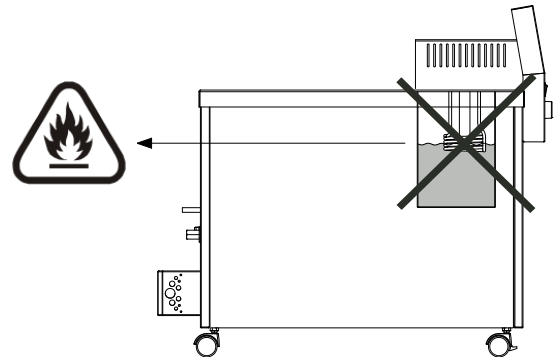
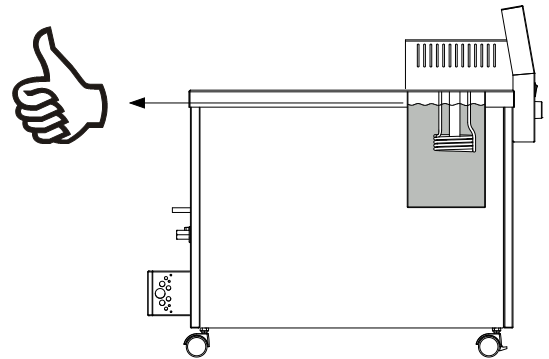
Flammable fumes can be ignited by the not submerged part of the heating element.

The level indicator will start to blink (blue light) when the fluid level is too low.

When the bath has been installed it must be filled with an appropriate liquid. Depending on the operating temperature the liquid level in the bath should be observed.

The liquid level should be maintained between 1 and 3 cm below the lid during normal operation.

The heating element will be damaged when not fully submerged in the bath fluid. A lower level than 5 cm below the lid may damage the heaters. A high bath level can cause overflow and will might also damage the bath insulation.



Low fluid level:

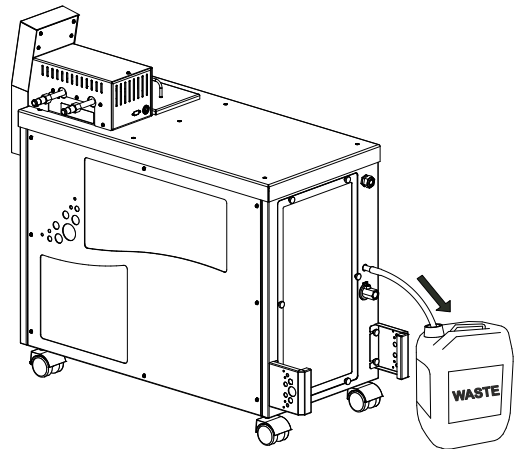
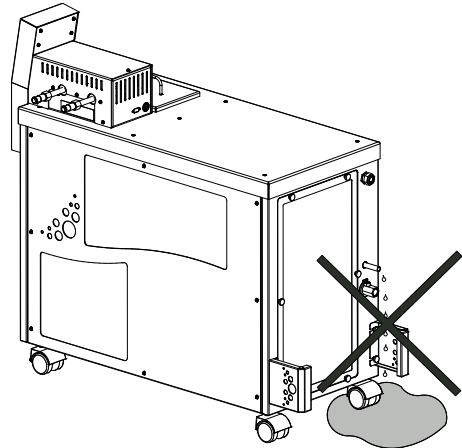
- Can cause fire when heater gets partially submerged
- Will damage the heater



7.8 Maximum fluid level

If the fluid level is too high, it will leave the bath via the overflow outlet (10 mm outside diameter pipe). Prevent fluid from the overflow outlet entering the backside of the apparatus. For this reason the overflow outlet must be connected to a waste container.

When the bath is working at low temperatures, tubing and waste container must be chemical resistant and able to withstand high temperatures (<-85°C / -121°F).



8 CONNECTING

Before plugging TCC-B bath into mains socket, make sure the voltage of the bath corresponds to the local voltage and frequency.

Use a mains supply that is well earthed, clean of interference and suitable for the acquired electrical load of the bath.

8.1 Cleaning

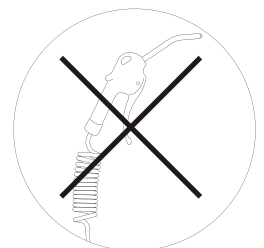
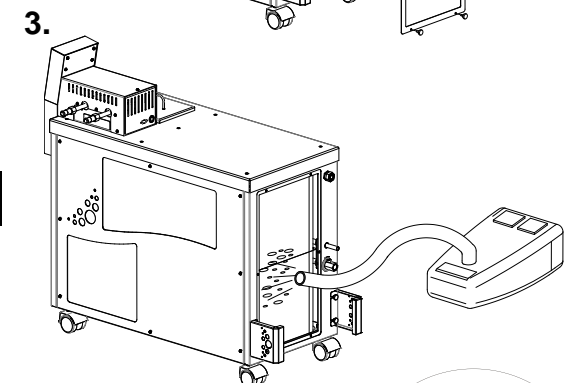
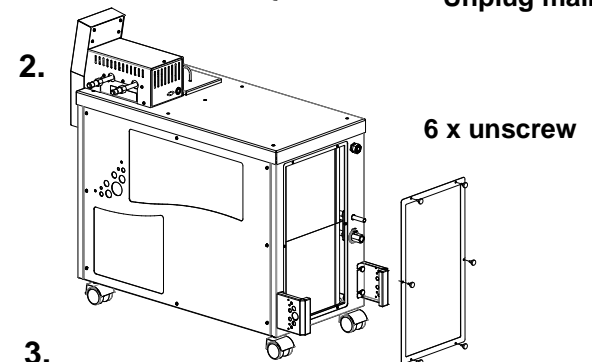
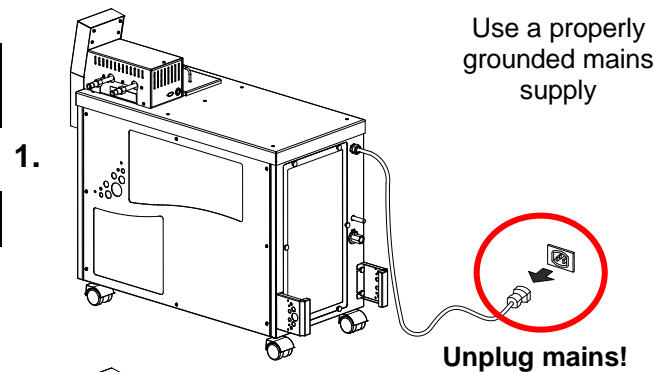
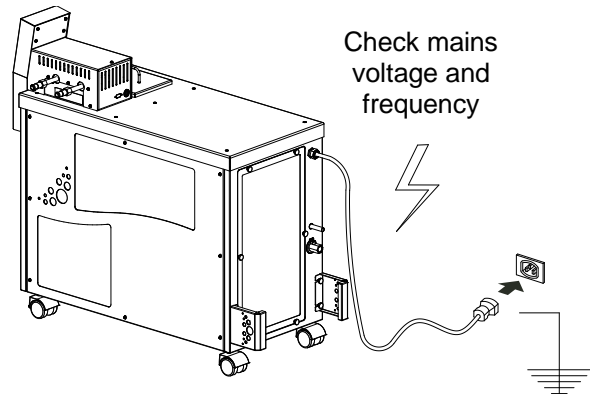
Regularly check the apparatus and condenser unit for dust. Follow steps 1 to 3 to remove the dust.

Unplug from mains supply

Remove dust with a vacuum cleaner

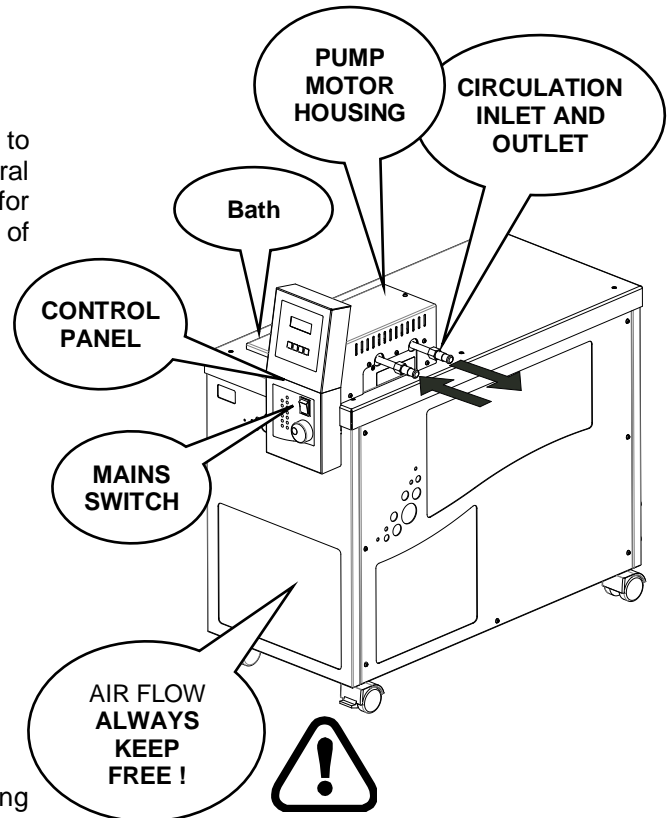
Do not use compressed air to clean the system!

- This is not allowed for safety reasons.
- Dust can be blown in moving parts and cause friction.
- Dust can be toxic



9 INTRODUCTION TO THE TCC-B SERIES

The TAMSON model TCC-B circulators are designed to perform accurate temperature control required for general laboratory. The Tamson circulator is optimized for temperature control of applications requiring a high degree of stability over a broad temperature range.



9.1 General

The TCC-B apparatus consists of a combination of a cooling system and a microprocessor controlled heating element. This design ensures a high degree of accuracy and reproducibility of temperature controls.

The TAMSON baths are constructed throughout from corrosion-resistant – stainless steel and Teflon – materials. The bath is effectively insulated against heat loss by a layer of Armaflex® rubber between the inner tank and outer casing.

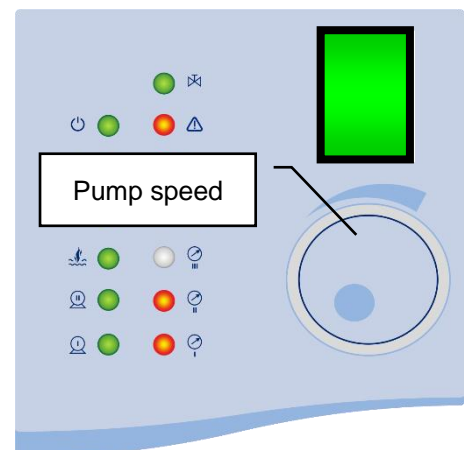
9.2 Pump

A circulation pump is built-in to guarantee an uniform temperature distribution within the bath and providing the possibility to circulate through a closed external system.

A circulation pump is provided with a circulation pump with a capacity of 10 liters / min and a max pressure of 10 m head of water [10mtr H₂O].

The pump speed can be set to a minimum and maximum. To enable stirring of the bath fluid the pump/stirrer can never be set to off ("zero speed").

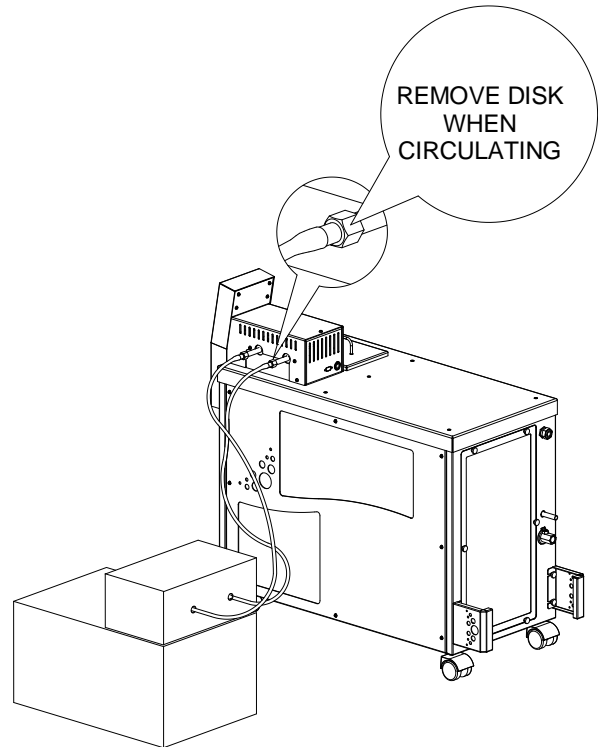
The standard pump offers a motor protection (small thermal fuse) which is placed on the back panel of the motor compartment. This protects the motor from excessive loads.



When pumping viscous liquids the thermal fuse can be activated. The motor fuse can be reset by pressing the knob.

The inlet and outlet of the pump are fitted with 10 mm hose connections and 3/8" threaded fittings for metal tubing. The outlet (most near to the backside of the apparatus) is provided with a small disc, stopping the circulation action.

Before the fluid can begin circulating through external systems this disc must be removed by unscrewing the fitting and hose connection removing the disc.

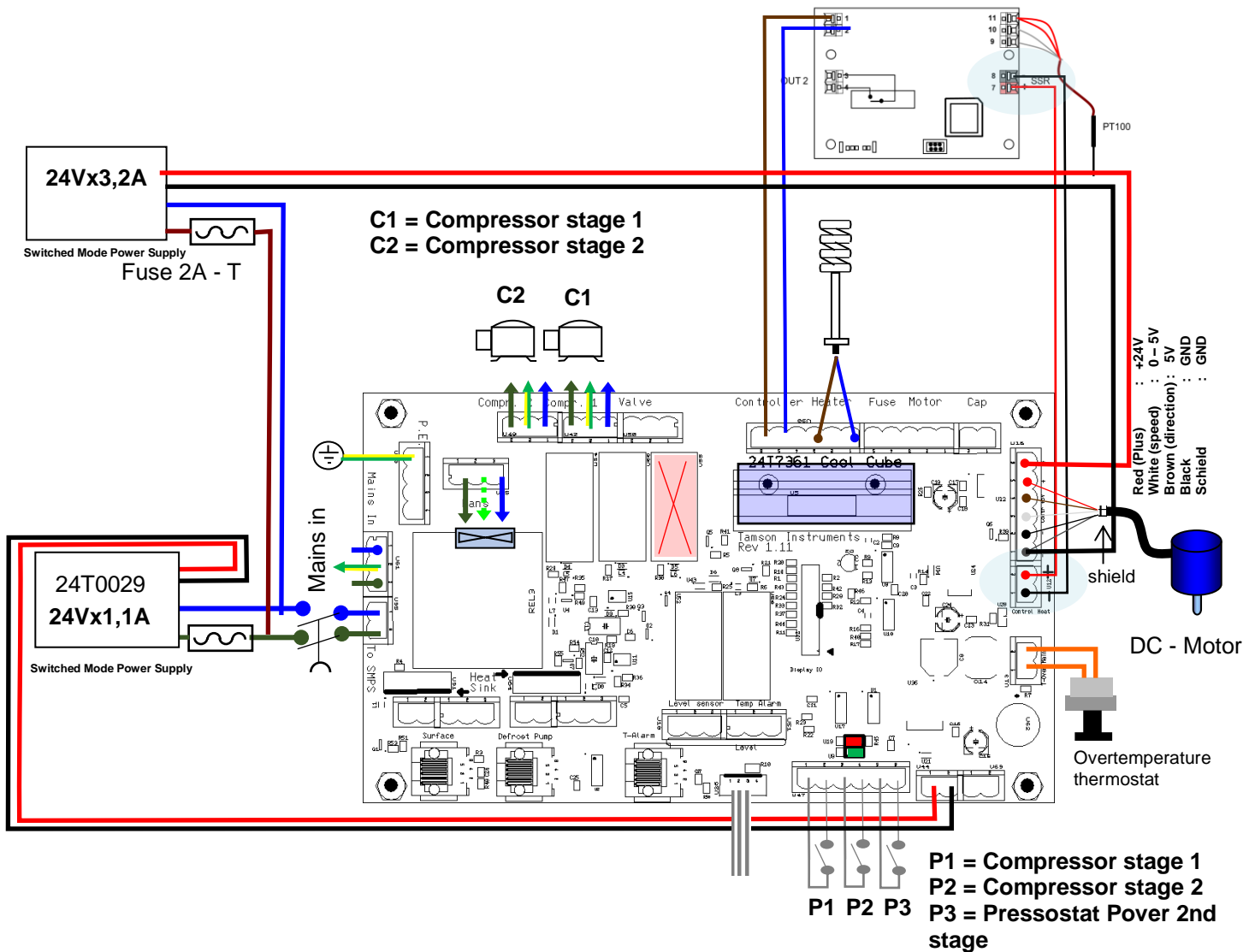


10 SPARE PARTS LIST AND PRODUCT CODE

Product code	
Ordering code	Description
00T0310	Tamson Cool Cube – Bath 230V / 50Hz
00T0311	Tamson Cool Cube – Bath 230V / 60Hz
00T0302	Tamson Cool Cube – Bath 115V / 60Hz

Sparepart - list	
Ordering code	Description
06T0462	PCB, Mains Circuit Board
06T0464	Display Board
24T0029	Power Supply 24V/1,1A Wide Range Input
28T8006	Fan Motor
28T1209	Adjustment Key - Pressostat P20EA Johnson Control

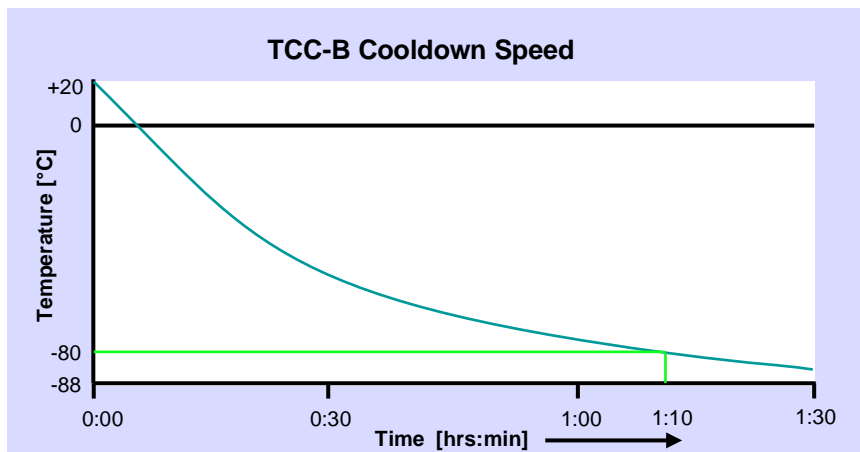
11 WIRING



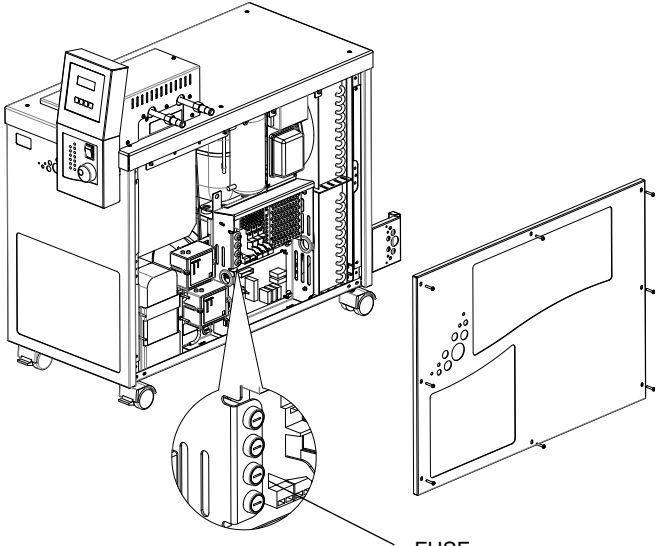
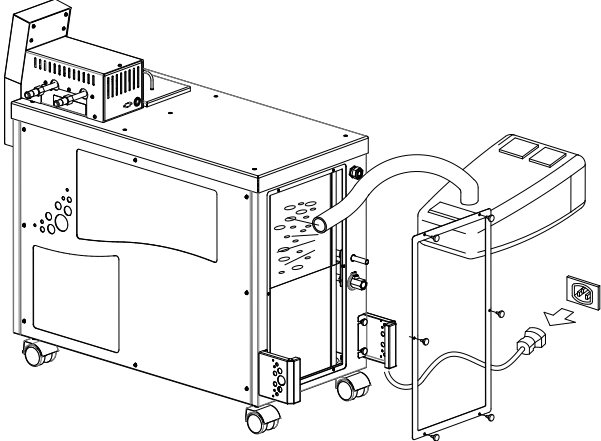
12 TECHNICAL DETAILS

Dimensions Casing			
Height + display	780	[mm]	
Width	380	[mm]	
Depth (casing)	830	[mm]	Do not operate backside directly to the wall
Weight	73	[kg]	
Power consumption			
Initial start (first 15 min. max)	2600W	During first starting minutes Cooling down	
Working load	1500W max		During normal operation and no heating
Heater	1400W max		
Full operation	2900W max		Heating up mode
Working conditions			
Temperature	15..26		[°C]
Humidity	10..90	[%]	relative humidity
Bath			
Opening	175x130	[mm]	
Depth	260	[mm]	
Contents	11	[ltrs]	
Heat removal capacity			
@ -84°C / -119 F	250	[Watt]	
@ -82°C / -116 F	300	[Watt]	
@ -73°C / -99 F	350	[Watt]	
@ -64°C / -83 F	400	[Watt]	
@ -58°C / -72 F	450	[Watt]	
Minimum working temperature	-85 / -121	°C / °F	

Cooling down curve



13 TROUBLE SHOOTING

 <p>FUSE</p>	<p>⊗: Electronics seem to be "dead"</p> <p>☹: Check fuse</p> <p>☺: Replace fuse. Fuse can be accessed by removing right side panel.</p>
	<p>⊗: Compressor (C1 or C2) do not run</p> <p>☹: Check apparatus for dust.</p> <p>☺: Remove all dust using a vacuum cleaner. Do not use pressurised air.</p>
	<p>⊗: Fan makes noise</p> <p>☹: Check fans inside for blocking</p> <p>☺: Remove dust or litter sucked in.</p>
	<p>⊗: System does not cool down</p> <p>☹: Ice forming (crystals) in the bath.</p> <p>☺: Use new methanol Do not use ethanol</p>

14 CE DECLARATION OF CONFORMITY



Following equipment is in compliance with EMC Directive 2014/30/EU:

Product: Thermostatic bath and circulator
Model: TCC - IC
 TCC - B
Serial code: Effective from serial number 19Txxx
Manufacturer: Tamson Instruments bv
 van 't Hoffstraat 12
 2665 JL Bleiswijk
 The Netherlands

The products are in conformity with the following specifications:

Item	Reference	Description	Test result
a	RoHS Directive	2011/65EU	p
b	EN61010-2-010	Safety requirements for electrical equipment for measurement, control, and laboratory use. Particular requirements for laboratory equipment for the heating of material	
c	Machine Directive 2006/42/EC	Machinery Directive, of the European Parliament and of the Council of 17 May 2006/42/EC 2nd Edition June 2010	p
d	EN 60204	Machinery Directive and Safety requirements	p, p ⁱ
e	EN60950-1	Low Voltage Directive	p
f	EN61000-3-2:2014	Harmonics	p
g	EN61000-3-3	Flicker	p
h	EN61000-4-2 +A1+A2	ESD	p
j	EN61000-4-3 +A1+A2	Radiated immunity	p (anechoic room)
k	EN61000-4-4	Electrical Fast Transients	Minimum requirements pass
l	EN61000-4-5+A1	Surges	Minimum requirements pass
m	EN61000-4-6+A1	Conducted immunity	p
n	EN61000-4-11 +A1	Voltage dips and Voltage variations	p
o	EN55016-2-1	Conducted emission	p
p	EN55016-2-3	Radiated emission	p (anechoic room)
q	Pr EN 378	Refrigerating systems and heat pumps - Safety and environmental requirements	
r	EN 13445-5	PED Inspection and Testing	Maximum working pressure level of 30 Bar is confirmed. On each apparatus following pressure and leak tests have been carried out with positive result - Low pressure side 20 Bar - High pressure side 30 Bar

p = Pass
 pi = Individually tested



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 Page 18/19

not applicable were:

Conducted discontinuous emissions (Clicks)

Radiated emission (OATS)

Magnetic field immunity

The equipment conforms with all the specifications and norms in this regard.

The equipment conforms without any further notice.

Entity responsible for marking this declaration :

Manufacturer, Tamson Instruments bv, van 't Hoffstraat 12, Bleiswijk The Netherlands,

Name	:		R.C. van Hall
Function	:		Director
Date	:		January, 2019
Version	:		1.04



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Page 19/19