USER-MANUAL
Tamson TV12LT-80

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 bv.

2 WARRANTY

Tamson Instruments bv 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.

4 PRECAUTIONS AND HAZARDS

READ CAREFULLY

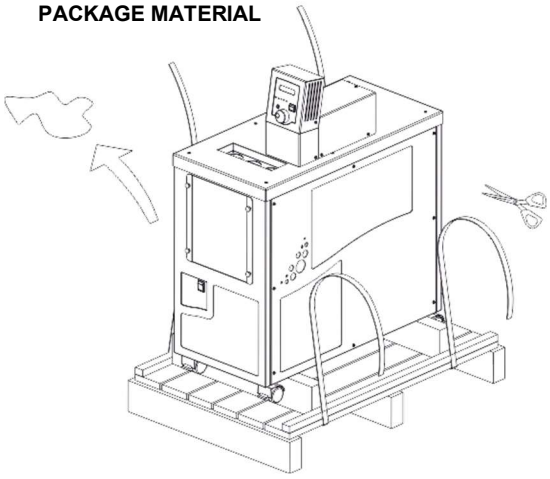
Before attempting to operate the TV12LT-80, read all parts of this manual carefully to insure smooth operation and avoid damage to the equipment or its accessories.

If a malfunction occurs, consult section "TROUBLE SHOOTING", page 18. 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	
Front panel sealing	Conform to EN60529: IP54
Environment Temperature	0 tot 35°C. Supply enough ventilation
Humidity	5 tot 95 %, non condensing
Atmosphere	Not suited for altitudes heights above 2000 mtrs or explosive/corrosive environment
Pollution cat. 2	Conducting pollution must be prevented
Ambient	18 - 26°C / 64 - 79°F

REMOVE ALL PACKAGE MATERIAL



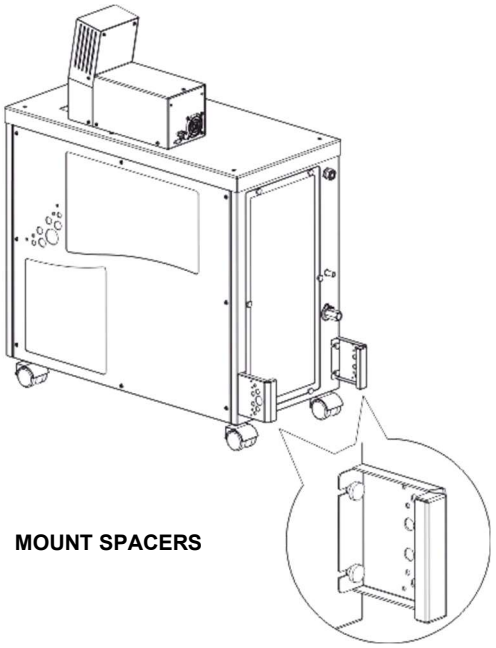
5 INSTALLATION

5.1 Important

Tamson Instruments bv is not responsible for any consequential damage or harm caused by using this TV12LT-80. Repairs on the electrical system of the TV12LT-80 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).



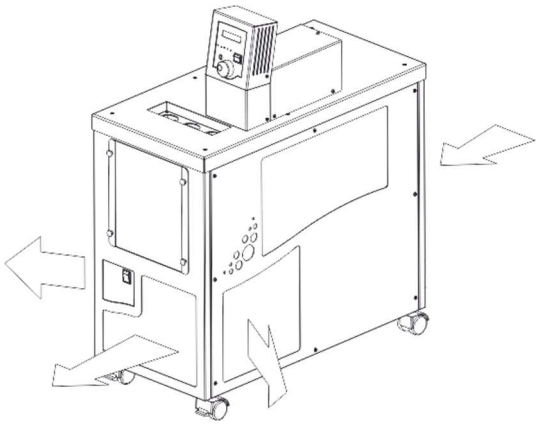
MOUNT SPACERS

5.3 Mount spacers

Mount the two spacers at the backside of the TV12LT-80 apparatus.

5.4 Air circulation

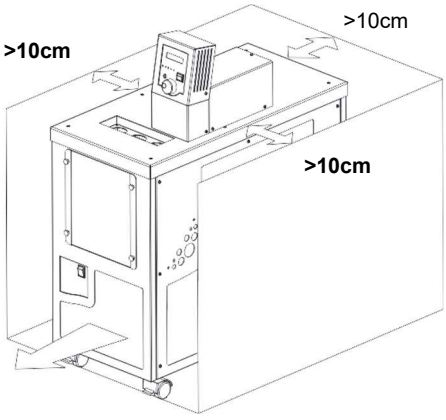
Put the unit in its proper place. Leave enough room around the cryostat for sufficient air circulation. Place the unit in a clean working environment and keep away from dust. When air can not circulate well, the cryostat will overheat itself resulting in irreversible and severe mechanical damage. Dust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



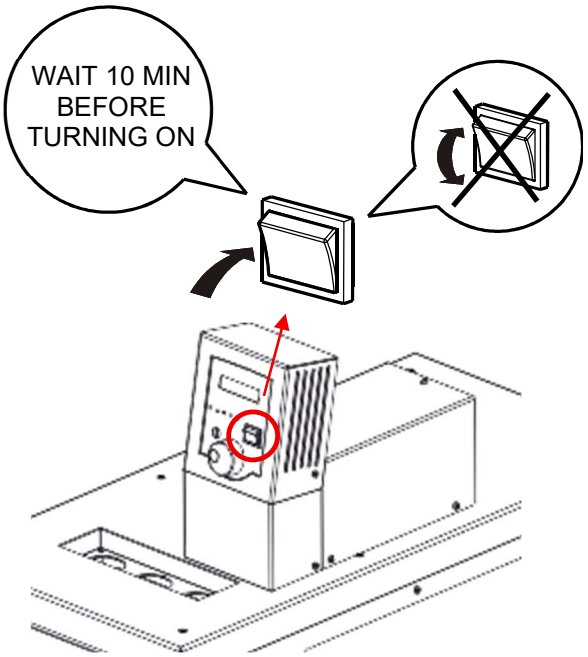
KEEP AIR FLOW FREE

5.5 Regular maintenance

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



6 OPERATION



6.1 Switching on

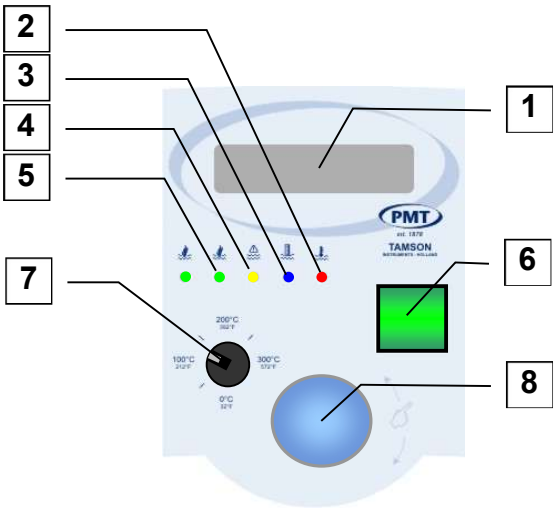
If the bath has been properly filled with fluid, it can be switched on with the mains switch located on the front panel. Choose a working temperature .

6.2 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.

6.3 What is what?



1 LC Display
2 Over temperature indicator (Red)
3 Level indicator, optional (Blue)
4 Error (Yellow)
5 Heater indicators (Green)
6 Mains switch
7 Safety thermostat
8 Turn-push button

Use a well grounded mains. Before plugging the TV12LT-80 into the mains socket, make sure the voltage and frequency of the bath corresponds to the local voltage.

The front panel layout shows the turn-push button:

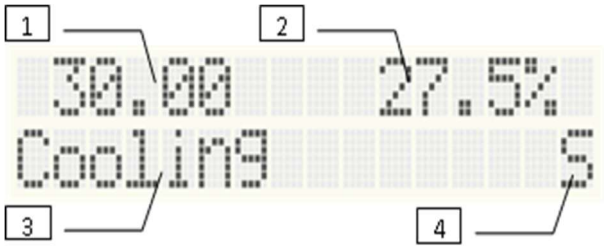
Previous / decrease: **Turn left**

Select: **Press**

Overview menu items

- Set point
- Offset (press: <-5.00 .. +5.00°C resolution 0.01°C)
- Max Power (press: low 25, med, hi, max)
- Boost heater (press on / off)
- Time const (press: fast, medium slow, precise)
- PID parameter :
  PID set 1,
  PID set 2,
  PID set 3,
  PID set 4.
  Each PID set offers settings for
  - Proportional band value
  (Pb=1/P where P is proportional value)
  - Integral value
  - Differential value
- Backlight
- Temp units
- Baud rate
- SP Offset
- Restart

Display



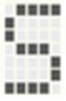
[1] Temperature readout
[2] Applied percentage of power
[3] Operating mode
[4] Indicator, alarm high, alarm low, control stable

Ad 1: When the controller starts or is restarted, the displayed value increases to a stable readout appears after a short period.

Ad 2: The controller calculates every second the amount of power which should be applied for stable control. The value is displayed with a resolution of 0.1% and ranges from 0% to 99.9%.

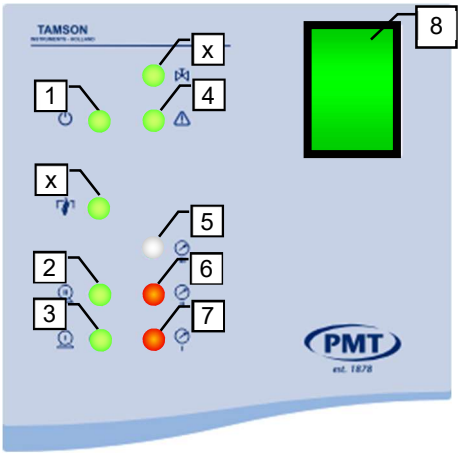
Ad 3:	Boost	Bath is heating to set point using boost heater
	Heating	Bath is heating to set point, B boost heater is off
	Cooling	Bath is cooling down to set point
	Tuning Ratio	Bath is tuning for power needed at set point, first step
	Tuning SA	Bath is tuning, second step
	PID SP=25.00	Bath is controlling, set point is 25.00°C (example)

Ad 4:

- Bath control is stable 

Indicators:

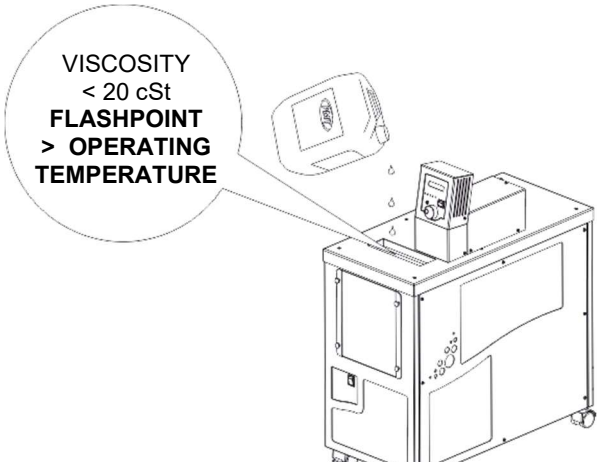
1	Pressure valve open
2	Compressor running stage 1
3	Compressor running stage 2
4	System error
5	Pressure alarm
6	Overpressure stage 1
7	Overpressure stage 2
8	Window heating



6.4 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.

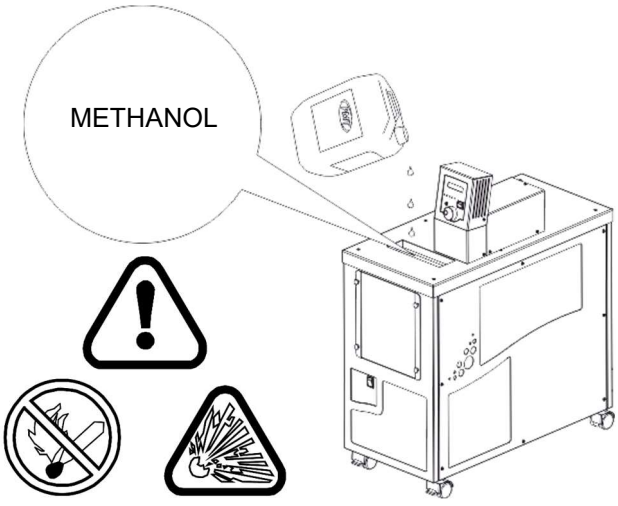


The best bath liquid to be used is methanol, enabling circulation at very low temperatures.

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.



6.5 Quick start

To quickly start operating the bath do the following:

Fill the bath with fluid as indicated in "Fluid level", page 10. Place the power plug, connect to mains socket,
Switch the bath on using the mains switch,
Select an appropriate set point,

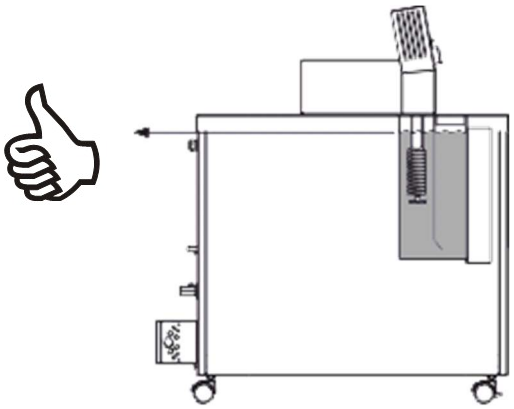
PID settings
All measuring results have been acquired using following PID settings:

Pb	**:=**	**25**
I	**:=**	**16**
D	**:=**	**0**

Under different settings its possible to achieve even better values by trimming the PID settings.

Place the bath spirit level and use the special jig with the levelling feet to trim. See section Levelling14.

6.6 Fluid level



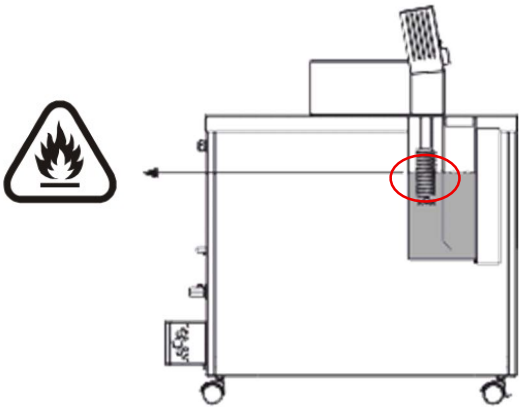
Do not operate the bath with low fluid level.

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

Flammable fumes can lead to fire

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

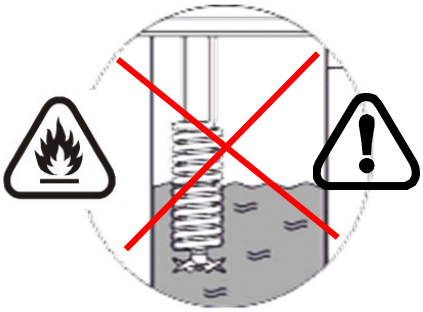
The level indicator will start to blink (blue light) when the fluid level is too low.



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.

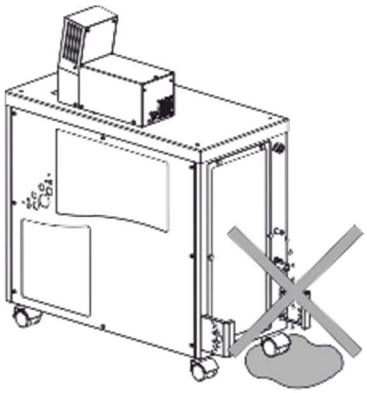
The liquid level should be maintained between 1 and 3 cm below the lid during normal operation.

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.



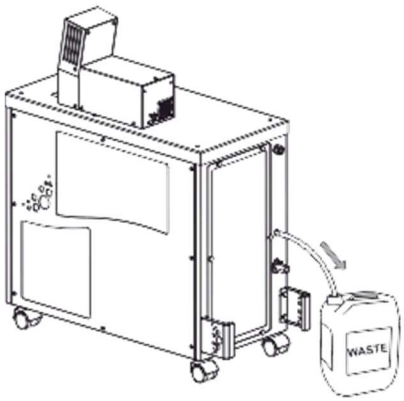
Low fluid level:
- Can cause fire when heater gets partially submersed
- Will damage the heater

6.7 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 the low bath temperatures (< -85°C / -121°F).



7 Front window

7.1 Window heating

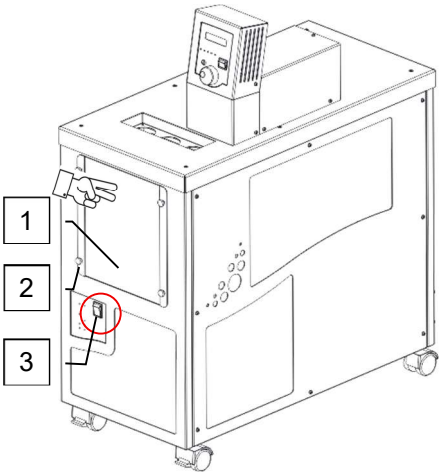
The double insulated window is heated to prevent condensate. There is a thermostat attached onto this window which regulates the temperature.

The window heating operates independent from the mains switch.

This is to enable the window heating to be on when the bath is switched off.

Cold bath fluid can cause ice forming on the window whilst the system is switched off

Ice forming must be prevented as it will trouble a clear view when switching back on again. Further built up condensate can eventually cause corrosion and damage the window heating.



Switch on - the switch will light up- during operation,
Switch on - when the bath is operated,
Switch off - when the bath fluid is at ambient temperature.

7.2 Cleaning the window pane

The front window pane can be detached to clean.

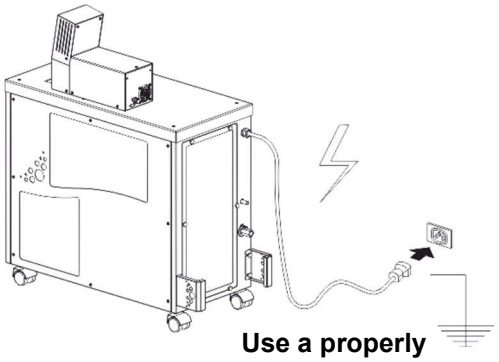
Unscrew the four bolts [2] and retrieve the slide brackets whilst preventing the pane to fall out.

You can gently pop out the window to clean.

8 CONNECTING

Before plugging TV12LT-80 bath into mains socket, make sure the voltage of the bath corresponds to the local voltage and frequency.

Check mains voltage and frequency



Use a properly grounded mains supply

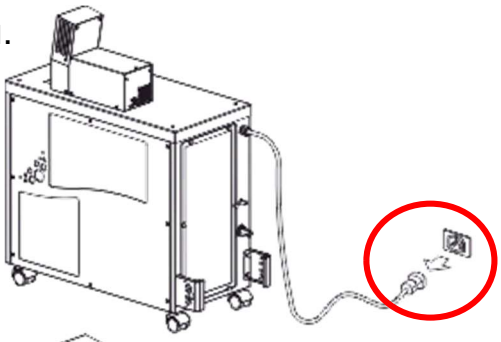
Use a mains supply that is well earthed, clean of interference and suitable for the acquired electrical load of the bath.

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 first

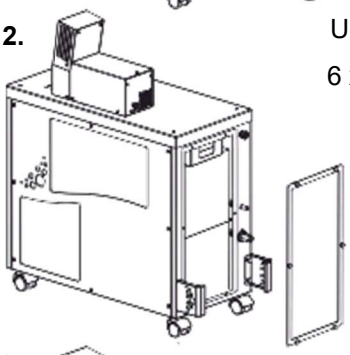
1.



Unplug mains!

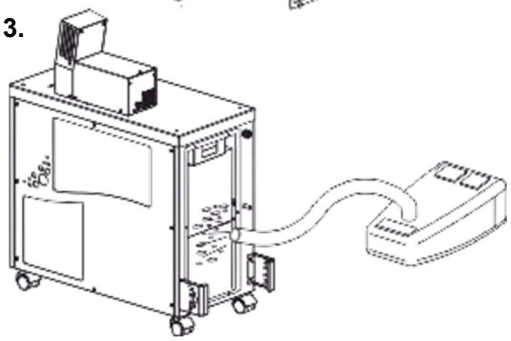
Unscrew the back panel

2.



6 x unscrew

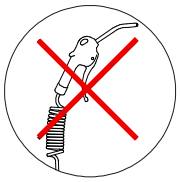
3.



Remove dust with a vacuum cleaner

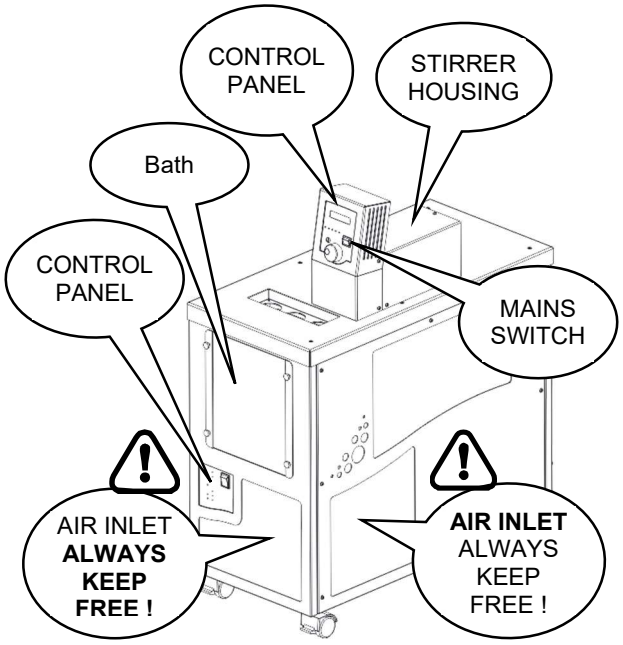
Do not use compressed air to clean the system!

- 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 TV12LT-80 SERIES

The TAMSON model TV12LT-80 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

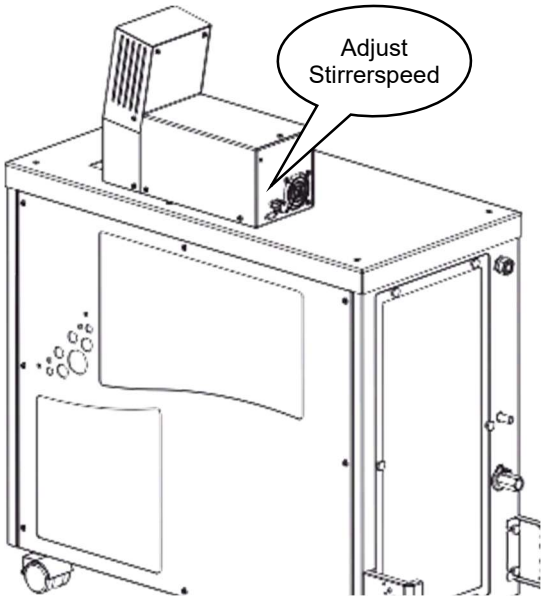
The TV12LT-80 apparatus consists of a combination of a cooling system and a microprocessor controlled heating element. This design ensures a high degree of accuracy and reproducibility of temperature controls.

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

9.2 Stirrer

A circulation stirrer is built-in to guarantee an uniform temperature distribution within the bath. At lower temperatures the bath liquid may become more viscous and to gurantee an homogeneous and stable temperature, circulation speed can be adapted by adjusting the stirrer speed.

The knob to adjust the stirrer speed is located at the back of the motor housing.



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").

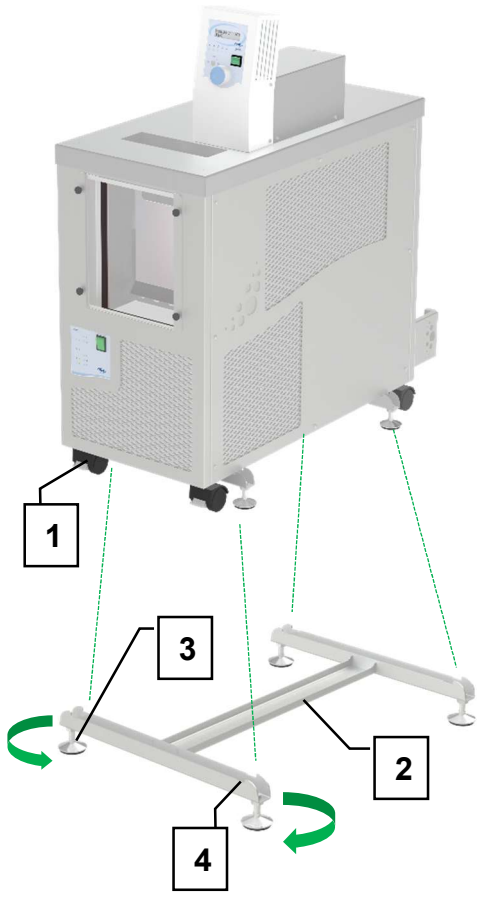
The standard pump offers a motor protection (small thermal fuse) which is placed on the back panel of the motor compartment. This protects the motor from excessive loads.

9.3 Levelling

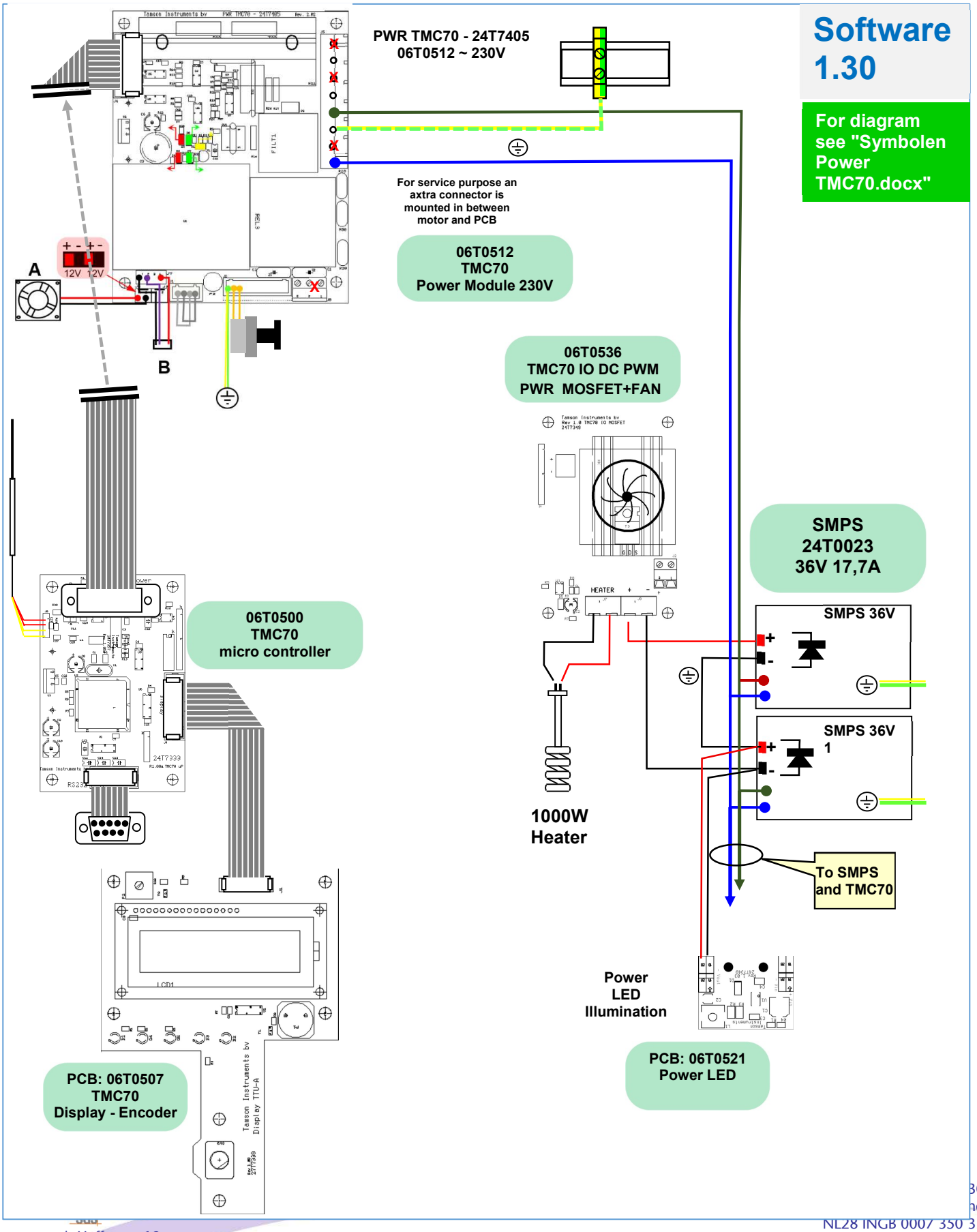
The appliance stands on four wheels [1]. Two of the wheels have brakes.

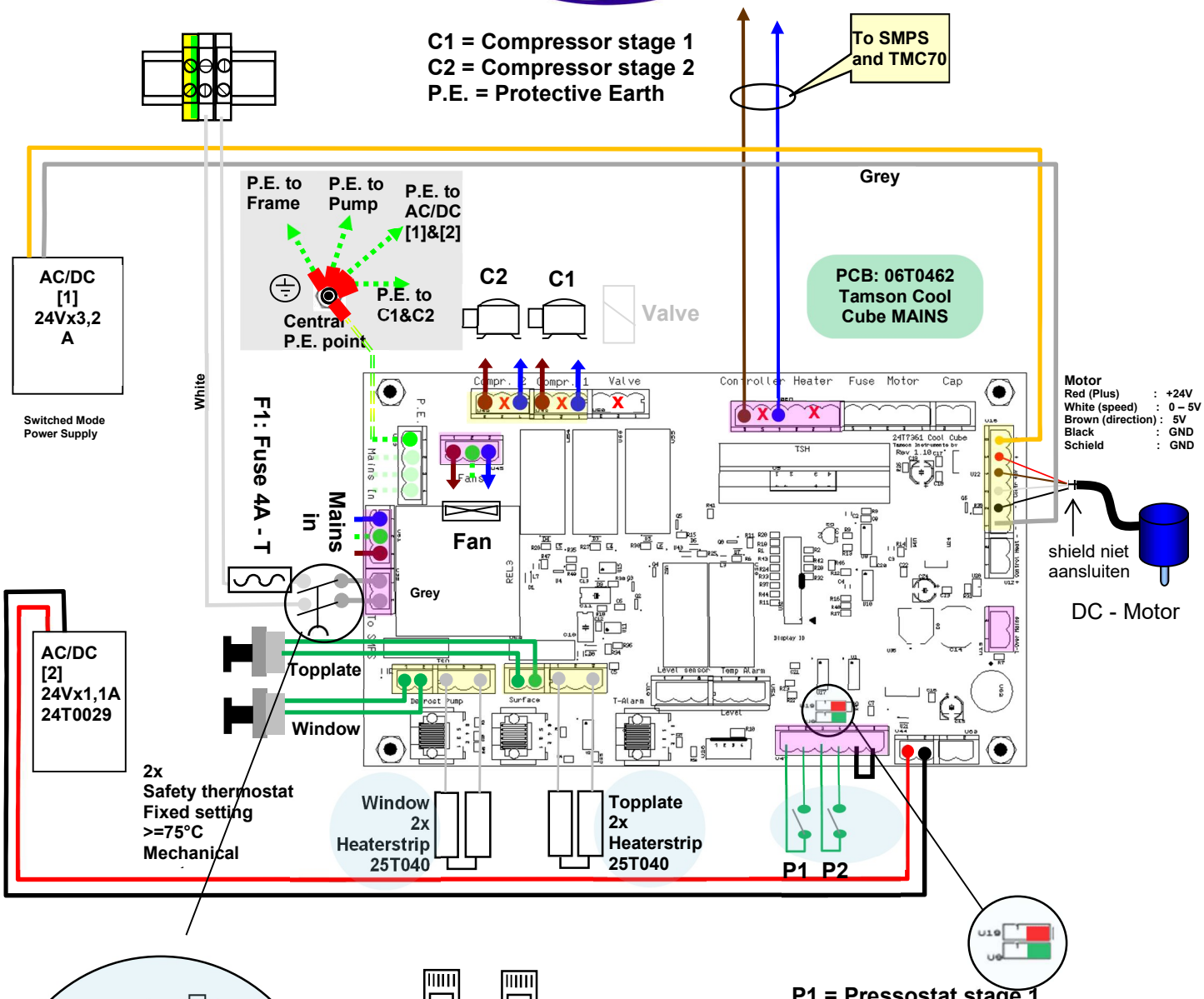
To perform viscosity measurements, the system must be leveled. A subframe [2] is available for this purpose. Underneath the frame are four adjustable feet [3] that can be screwed in or out to level the system.

The frame has notches [4] into which the subframe fits. After positioning the frame, the adjustable feet can be screwed in or out to level the system.



10 WIRING


Software 1.30
For diagram see "Symbolen Power TMC70.docx"
PWR TMC70 - 24T7405
06T0512 ~ 230V
For service purpose an axtra connector is mounted in between motor and PCB
06T0512
TMC70
Power Module 230V
A
B
12V 12V
06T0536
TMC70 IO DC PWM
PWR MOSFET+FAN
SMPS
24T0023
36V 17,7A
SMPS 36V
SMPS 36V
1
HEATER
1000W
Heater
06T0500
TMC70
micro controller
To SMPS and TMC70
Power
LED
Illumination
PCB: 06T0521
Power LED
PCB: 06T0507
TMC70
Display - Encoder



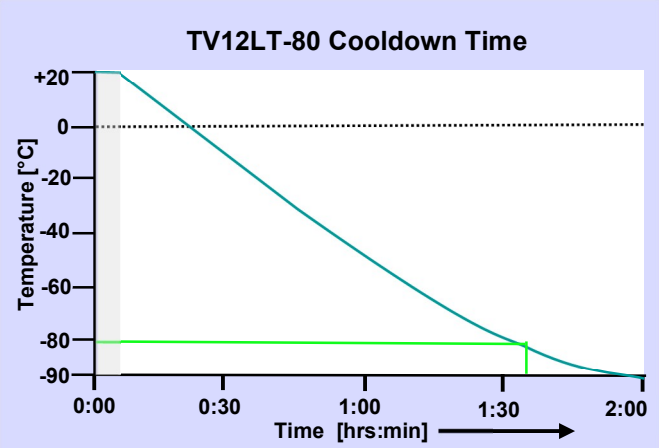
Green - cable upwards
28T0222 - 2 pole
28T0223 - 3 pole
28T0225 - 5 pole
28T0226 - 5 pole

Green - cable sideways
28T0302 - 2 pole
28T0303 - 3 pole
28T0305- 5 pole
28T0306 - 6 pole

12 Technical details

Full operation	**2000W - maximum - full cooling**		
	1500W - minimum		
Working conditions			
Temperature ambient	**18..26**		**[°C]**
Humidity	**10..90**	**[%]**	**relative humidity**
Bath			
Opening	**208x54**	**[mm]**	**3 positions 51mm dia.**
Depth	**330**	**[mm]**	
Contents	**12**	**[ltrs]**	
Cooling down time			
@-20°C/-4°F	**0hr35**		
@-40°C/-40°F	**1hr15**		
@-80°C/-112°F	**1hr40**		
@-85°C/-121°F	**1hr50**		
Minimum working temperature	**-90 / -130**	**°C /°F**	**+/- 2°C**

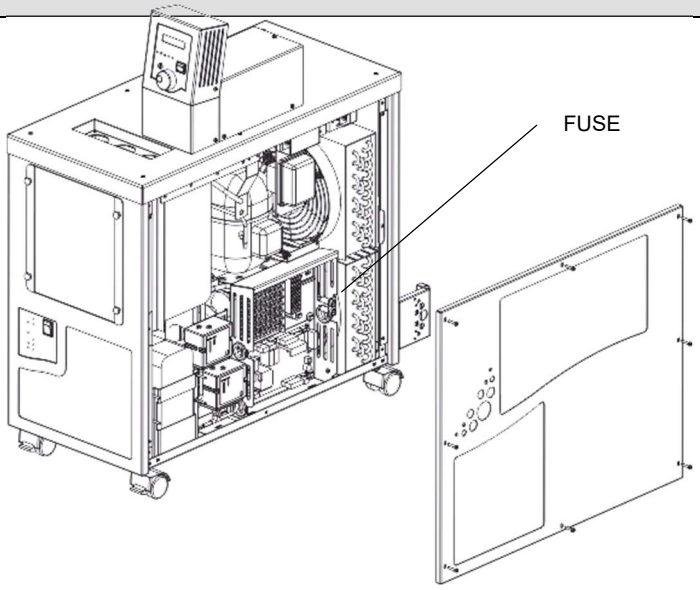
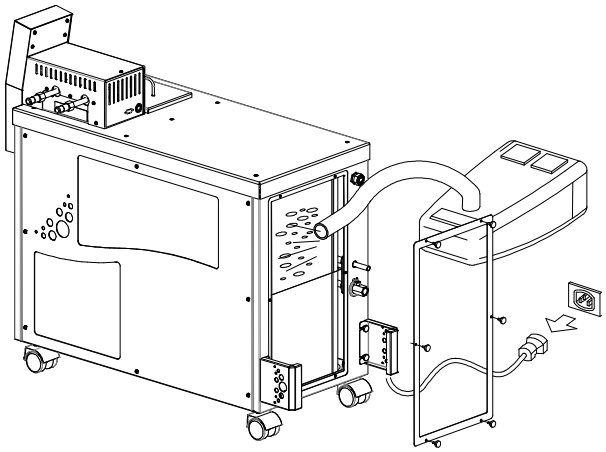
Cooling down curve



13 SPARE PARTS LIST AND PRODUCT CODE

Product code	
Ordering code	Description
00T0510	Tamson TV12LT-80 – Bath 230V / 50Hz
00T0515	Tamson TV12LT-80 – Bath 230V / 60Hz
06T0462	Main board
24T0231	Stirrer
25T0361	Heating element 1000W DC
06T0547	Thermostat
06T0512	Powerboard TMC70
06T0500	Microcontroller board
06T0507	Display PCB
24T0023	Power supply 36V
06T0536	TMC70 DC IO
06T0521	Power LED board

14 TROUBLE SHOOTING

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

15 CE DECLARATION OF CONFORMITY

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

Product: **Thermostatic bath and circulator**
Model: **TV12LT-80**
Serial code: **Effective from serial number 25T380**
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

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, 2026**
Version	**:**	**1.0**