

NUWIND CENTRIFUGE

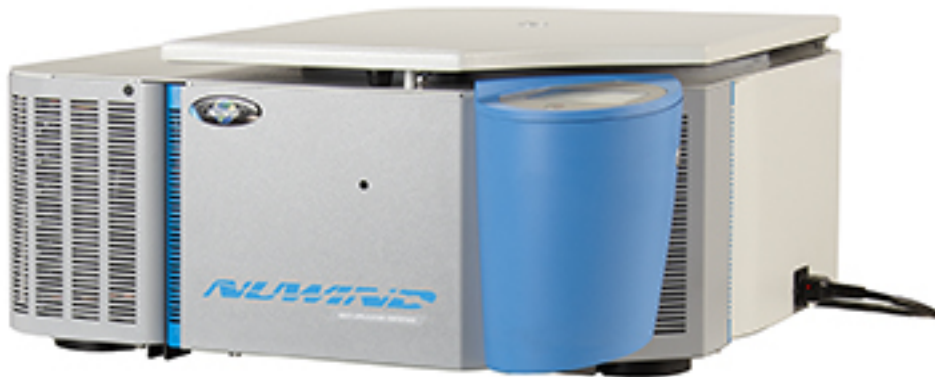
Models

NU-C200V	NU-C200V-E
NU-200R	NU-C200R-E
NU-C300V	NU-C300V-E
NU-C300R	NU-C300R-E
NU-C300RF	NU-C300RF-E

Service Manual

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Revision 6



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**NUWIND Centrifuge
Table of Contents**

1.0	Description of the Centrifuge
1.1	Electronic Control Center / Block
1.2	.....	Lock
1.3	.....	Engine
1.4	.....	Speed Sensor
1.5	.....	Tachometer Board
1.6	.....	Temperature Probe
1.7	.....	Imbalance Sensor
1.8	.....	Cylinder
1.9	.....	Absorption of Vibrations
1.10	.....	Ventilation System: Ventilated Model
1.11	.....	Refrigeration System: Refrigerated Model
1.12	.....	Frame
1.13	.....	Lid: Ventilated Model
1.14	.....	Lid: Refrigerated Model
2.0	.....	Troubleshooting
2.1	.....	Troubleshooting
2.2	.....	Error Messages
3.0	.....	Settings
3.1	.....	Access to the Technician Menu
3.2	.....	Setting the Temperature Probe
3.3	.....	Unbalancing Sensitivity Detection
3.4	.....	Setting the Lock
3.4.1	.....	Lock Operation
3.4.2	.....	Setting the Time Delay of the Lock
3.5	.....	Auto-Diagnostic
3.6	.....	Information Update
3.7	.....	Loading the Firmware
4.0	.....	Standard Exchange of Components
4.1	.....	Safety Rules
4.2	.....	Terminology:
4.3	.....	List of Spare Parts and Tools
4.4	.....	Replacement of the Control Center
4.5	.....	Replacement of Cylinders
4.5.1	.....	Ventilated Model
4.5.2	.....	Refrigerated Model
4.6	.....	Lock Replacement
5.0	.....	Functional Checks
5.1	.....	Safety
5.1.1	.....	Checking the Installation: Currently being drafted
5.1.2	.....	Required Equipment: Currently being drafted
5.1.3	.....	Lid Hinge
5.1.4	.....	Lock Check: Currently being drafted
5.1.5	.....	Overspeed Detection: Currently being drafted
5.1.6	.....	Unbalance Detection
5.1.7	.....	Emergency Opening Detection
5.2	.....	Speed Check
5.3	.....	Checking the Timer
5.4	.....	Checking the Temperature
6.0	.....	Electrical Diagrams
6.1	.....	2.0L Ventilated Model
6.2	.....	2.0L Refrigerated Model
6.3	.....	3.0L Ventilated Model
6.4	.....	3.0L Refrigerated Model

**NUWIND Centrifuge
Table of Contents**

7.0 Refrigerated Systems
7.1 2.0L 115V Model
7.2 2.0L 230V Model
7.3 3.0L Benchtop Model
7.4 3.0L Floor Standing Model

Note



It is mandatory to connect all centrifuges and electronic equipment to the grounding point. This is to protect both users and devices.
Only operate a centrifuge after taking all necessary safety measures.

Rotors and buckets should be removed from use in case of mechanical fault trace, or corrosion. These elements have a life cycle duration, engraved on their visible part: To maintain safe conditions, it is imperative to replace them when the recommended duration is reached.

The NuAire accepts no liability for damage caused by non-compliant use, unauthorized maintenance or modifications.



Compliant use includes compliance with instructions for use and the delivery of inspection and maintenance work.

The photos used in this document are not contractual.

Please read this manual before first use.

Symbols used in this manual and on the unit

 **Note:**

This symbol alerts the user of tips and additional information enabling optimal use of the centrifuge.



Caution: This warning symbol indicates that non-observance of the information provided may cause damage to the equipment in use. Precautions to be taken and possible consequences are described in the warning.



Danger! This symbol indicates safety measures which must be followed by the user or technician to ensure the physical integrity of persons close to the centrifuge. These measures must also be followed with utmost care.



Pinching: This warning symbol indicates the presence of a risk of pinching when handling the lid.

1.0 Description of the Centrifuge

The centrifuge is composed of:

- an electrical block, called Control Center.
- a lock
- a motor
- a ventilation or refrigeration system (depending on the model)
- a one-piece frame
- a lid

It is equipped with one or several rotors:

- Free or swing-out
- Angular

The free rotors are fitted with:

- Buckets
- Tube adapters or inserts
- Watertight lids

Some angular rotors are equipped with tight fitting lids.

1.1 Electronic Control Center / Block

The electrical block, or Control Center, includes a touch screen, a control button, the main switch, a lid opening button, as well as the microcontroller electronic board, and the electrical power supply electronic board.

There is no provision for changing the elements composing the Control Center. It is a complete separate part. In case of defective element, a standard exchange of the complete Control Center must be considered, which facilitates the restoration of the centrifuge.

Touch Screen

The display is based on a TFT type display its size is 4.3". It offers 480X272 pixels, and 16 Million colors.

It is also equipped with LED lighting for bright background.

The screen is also touch, and resistive type. It provides access to many features when using the interface.

The display and display card unit is located in the upper part of the Control Center.

Start/Stop Button

The control button placed under the screen allows for controlling the startup and interruption of a centrifugation cycle.

Main Switch

The main switch is located under the Control Center. It allows for completely shutting off power to the centrifuge.

Cover Opening Button

The lid opening is controlled by the button on the right side of the Control Center.

Electronic Tachometer Board

The electronic microcontroller board is located under the display card. The data for controlling the various parts are stored in this board, in the form of software, also marked "Display fw"

The connection for the update of this software is below the Control Center, via the connection kit part no. AFI-71122001.

The procedure is described in the Technical Bulletin CTB0311 Software Programming.

This board communicates with:

- The tachometer board
- The various lid position sensors for detecting the lid position,
- The touch display card
- The programming connector
- The temperature probe
- The Start / Stop control button on the membrane
- The lid opening button on the right side of the Control Center.

Electronic Tachometer Board

This board is powered by: The transformer

The electronic tachometer board controls:

- The microcontroller board
- The display card
- The centrifuge motor
- The refrigeration group
- The lock motor

It also transmits the power accumulated during rotor braking to the load shedding resistance.

Transformer

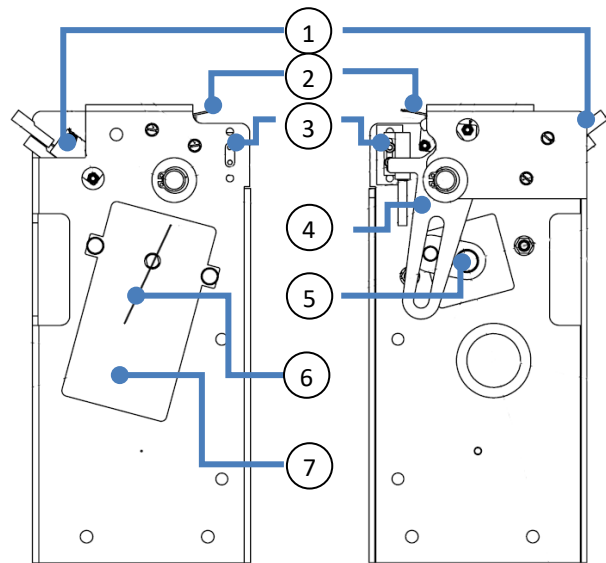
The transformer generates 3 voltages identified by the following colors:

Voltage	26V	16V	9.5V	18.5V
Color	Green	Yellow	Red	Black

1.2 Lock

The lock consists of a media on which the following are assembled:

- 1) Micro contact / Micro switch **No. 1**:
It detects the open position of the lock.
The deadbolt presses on the micro switch blade when the lid strike plate is completely released.
- 2) Micro contact / Micro switch **No. 2**:
It detects the closed position of the lid.
The guide finger comes in contact with the micro switch blade when the lid is closed.
This signal stops the gear motor command.
A "Lid lock tempo" timer allows for adjusting the stop for proper locking.
- 3) Magnetic sensor:
It detects the approach of the lid. The integrated magnet in the lid strike plate allows for starting the gear motor command.
- 4) Deadbolt:
It pivots to mechanically immobilize the lid.
- 5) Crankshaft:
It actuates the deadbolt through the motor reducer.
The locking position is obtained when the crankshaft and the deadbolt form a 90 degree angle.
This position is marked by the trace on the visible face.
- 6) Trace from the locked position
- 7) Motor reducer:
It rotates counter-clockwise to close and clockwise to open. It is supplied with a voltage of 24 V.



Visible face - when the front panel is removed

Internal Face - after extraction of the lock unit

1.3 Motor

It is a three phase induction motor powered in variable frequency.

It has an integrated over temperature sensor. It measures the heating of the internal motor winding, and sends a signal from 130 degrees Celsius. It then sends the message "ERROR 04".

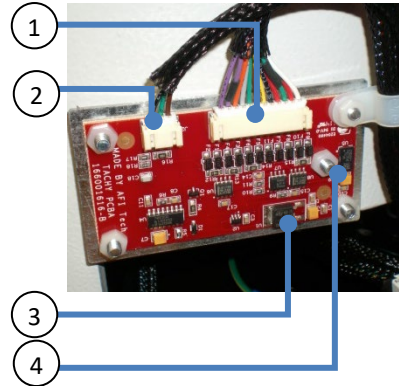
1.4 Speed Sensor

The speed sensor is a Hall Effect magnetic sensor, placed under the motor. Six (6) magnets with alternating poles are placed on a rotating disc. The sensor measures the frequency of passage of the magnets, to determine the speed.

1.5 Tachometer Board

The tachometer board is composed of:

- 1) The connection to the tachometer sensor
- 2) The connection to the Control Center
- 3) The accelerometer: It detects the vibrations emitted by the centrifuge. The triggering threshold is set by the menu for setting the sensitivity to the imbalance: see §. 0
- 4) The accelerometer is perfectly maintained by the 5 mounting points.



1.6 Temperature Probe

It is located under the lid, and therefore nearest to the samples when the lid is closed and the rotor is in rotation. The measurements are only taken when the rotor is rotating. It is a PT500 class A probe.

During a centrifugation cycle, the temperature displayed on screen is that of the sample. Before being centrifuged, the sample must be brought to the program setpoint temperature. Use either an oven, or a refrigerator to bring it to the desired temperature. The centrifuge is designed to maintain the temperature during a rotation cycle.

1.7 Imbalance Sensor

In the case of a load presenting an imbalance, the oscillations caused will be higher than the centrifuge's own vibration. The vibration sensor then intervenes to detect the movements of the centrifuge. This sensor is an electronic accelerometer. It is placed at the level of the tachometer board, located to the side of the shield, and sends the information to the microcontroller board.

The systematic minimum threshold detection is: 25 gr. The detection results in an immediate shutdown of the power supply to the motor, and a slowdown of the rotor free wheel.

This threshold is adjustable according to the media on which the centrifuge rests, in order for the imbalance sensor to always be triggered with a minimum imbalance of 25 gr see Section 3.3 for the procedure to adjust the imbalance detection threshold.

1.8 Gas Spring

A single cylinder allows the opening of the lid when it is released by the lock. It is a gas cylinder, fitted with a spring. This spring allows a better relaxation at the opening start. The cylinder should open the lid without causing rebound of the latter at the end of travel.

1.9 Absorption of Vibrations

Any system has its own resonance frequency, which will cause oscillations. The dissipative elements of these oscillations, which translate into vibrations, are anti-vibration mounts, numbering 4, coupled by an absorbent foam. This set will allow for absorbing parasitic movements whatever the rotor, its load, and its speed, providing that the load is balanced.

Three (3) of these mounts are placed vertically between the motor and the stabilizer bed.

The 4th mount acts horizontally. It is located under the machine frame.

1.10 Ventilation System: Ventilated Model

The ventilated model allows for heat exchange between the inside of the centrifugation bowl and the ambient air. The air inlets are installed in the lower part of the lid. This ambient air is sucked in and enters the bowl by the central part of the lid.

During rotation, the friction between the rotor and the air causes overheating. The hot air is expelled by the circular part under the lid. A circuit allows this air to descend through the centrifuge body, by the duct located on the right, near the hinge. A silencer allows you to evacuate the air from the rear, under the unit. The heat caused by motor rotation is also evacuated by this conduit.

1.11 Refrigeration System: Refrigerated Model

The refrigerated model allows the maintenance of a sample at its initial temperature, while undergoing a rotation. It is possible to maintain a temperature from -10°C to 40°C.

Maximum performance for an ambient temperature of 20+ /- 2°C, with the rotor RX500 and the buckets BX500:

- 2. 0 Liter: continuous maintenance of 4°C at 4200 rpm,
- 3. 0 Liter: continuous maintenance of 4°C at 3600 rpm,

1.12 Frame

It is a one-piece frame: The safety shield allowing for absorbing the energy deployed by the rotor in the event of an accident is directly visible from outside the machine. This allows you to limit the parts, and the sources of vibration.

1.13 Lid: Ventilated Model

The lid is fitted with an anti-vibration mount in anterior position, allowing for stabilizing it in the closed position. A single strike plate allows the lock to close the lid, immobilizing it with a motorized deadbolt. A guide finger provides additional safety when closing the lid.

The lid of the ventilated model has a fresh air inlet circuit, and a hot air outlet circuit.

1.14 Lid: Refrigerated Model

The lid is fitted with an anti-vibration mount in anterior position, allowing for stabilizing it in the closed position. A single strike plate allows the lock to close the lid, immobilizing it with a motorized hook. A guide finger provides additional safety when closing the lid.

The lid of the refrigerated model allows you to maintain the sealing of the bowl when the latter is closed. It is fitted with a removable temperature sensor. A porthole in the central part allows the tachometer control of the rotor using an optical tachometer.

2.0 Troubleshooting

2.1 Troubleshooting

Problem	Cause	Solution
No display: the screen remains black.	No voltage	Operate the switch under the Control Center. Connect the mains power cable. Check the electrical supply of the laboratory and restore it.
The lid does not close: the mechanism does not start.	The lid has been opened with the manual opening key	Press the control button to open the lid: The mechanism starts. The lid can then be closed.

2.2 Error Messages





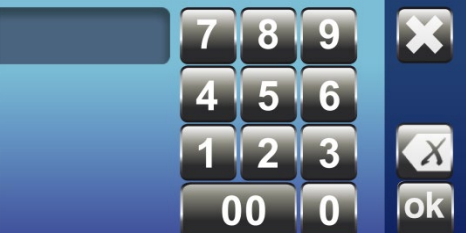









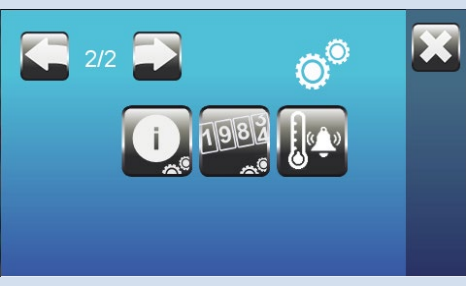




Error / Message No.	Cause	Solution
01 LOCK FAIL	The lid is open at startup	Press Start / Stop: The message disappears. Close the lid. Wait for the complete closure of the lid before starting a cycle.
	The locked position detector is faulty.	Check that the micro contact 2 blade is present and not folded. Check that this micro contact 2 is wired correctly. Check the operation of this micro contact, and change it if necessary.
02 IMBALANCE	The rotor is non-symmetrically loaded.	Wait until the end of automatic shutdown. Open the lid by pressing the button. Press Start/Stop: The message disappears. Balance the rotor loads Restart the spin cycle
	The centrifuge is installed on a wrong type of media.	Place the centrifuge on a compliant media.
	Despite a weight gap < 15 gr, the detection threshold is set incorrectly.	Carry out a calibration of the imbalance sensitivity threshold.
03 BOWL OVERTEMPERATURE	The temperature in the bowl has exceeded 43°C, the temperature of the room being too high.	Wait until the end of the automatic shutdown of the rotor. Activate the air conditioning system for an ambient temperature under the conditions described in the user's manual.
	The programmed temperature setpoint is inappropriate	Change speed / temperature pair of the program, which is not compatible with normal use.
	The initial loading temperature is too high.	Place the samples before centrifugation in an environment between 4 and 37°C, for 1h.
	The chiller no longer works.	Check the operation of the chiller with the menu "Auto-Diagnostic " (Startup and performance)
	The temperature probe is defective	In the probe calibration menu, the value displayed is different from the value measured by the probe, with a gap > 2°C.
	The difference between the air temperature and the over temperature alarm set point is greater than the set value.	Check the value of the temperature alarm threshold. Change program settings: speed and/or temperature.
04 MOTOR OVERTEMPERATURE	The motor temperature is too high.	A stop in "freewheel" mode occurs. Wait 30 minutes (software reset) before opening the lid. Activate the air conditioning system of the room to obtain a lower ambient temperature.
	The frequency of use of the centrifuge is too intensive (ventilated model)	Spacing the periods of use.
	The motor is damaged	Change the motor.
	Motor temperature sensor connection malfunction	Change the motor.

	Error / Message No.	Cause	Solution
05	Locking micro contact error	One of the micro contacts is damaged or defective The connections of one of the micro contacts is faulty	Check the operation of the micro contacts, the change if they are faulty. Check the hook-ups.
06	Contactor not open	The power contactor is closed when it should be open at the startup of the centrifuge.	The power contactor does not work anymore and it is stuck: Change the power contactor. The connections of the auxiliary contact are faulty: Check the contacts at the terminals of the auxiliary contact.
07	Contactor not closed	The power contactor is open when it should be closed. The micro contact 2 is released after the closure of the lid. The contactor is not controlled.	The power contactor does not work anymore: Change the power contactor. Check the state and operation of micro contact No. 2, and change it if necessary. Check the connections of the contactor coil.
08	Safety lid error	At the time of the safety self-test at the start of the cycle, the lid half-opened	The tachometer board is defective: Change the board. The connections of this board are faulty: Check the connections. The locked lid position detector is released just after the startup of the machine: Check the operation of the sensor.
09	No tachometer signal at startup	No speed measurement in the 5s after startup of the centrifuge	The speed sensor is defective: Change Speed sensor. The tachometer board is defective: Change the board. The connections of this board are faulty: Check the connections.
10	Loss of tachometer signal	Tachometer signal is lost in the course of rotation	The connections of these parts are faulty: Check the connection of the cables on the tachometer board, and to the entry of the Control Center. The speed sensor is defective: change the tachometer sensor The tachometer board/speedometer is defective: Change the tachometer board Unit will be locked for 30 minutes. Acknowledge error and after 30 minutes lid will be able to be opened and run normally again.
11	Bad tachometer signal	The speed signal is not correct	The speed sensor connections or of the tachometer board is defective: Check the hook-ups. The speed sensor is defective: change the tachometer sensor The tachometer board/speedometer is defective: Change the tachometer board One or more of the magnets of the tachometer disc have been lost: Check for the presence of 6 magnets. Change the tachometer disc if it is defective.
12	Overspeed	The measured speed exceeds the maximum allowable speed for the rotor used.	Major problem centrifuge shutdown. An expert appraisal is required by an authorized technician.
13	I ² C Bus accelerometer	Communication fault with the accelerometer board	The speed sensor connections or of the tachometer board is defective: Check the hook-ups. The speed sensor is defective: change the tachometer sensor. The tachometer board/speedometer is defective: Change the tachometer board
14	Temperature measurement I ² C-bus	Communication fault with the temperature measurement level	Check that the 2 connectors of the Control Center are properly connected to the machine. Microcontroller board faulty: Change the Control Center.





	Error / Message No.	Cause	Solution
15	Cover open in rotation	The lid was opened with the manual opening key	Wait for the rotor to stop without braking manually: Risk of injury. Press Start/Stop: The message disappears. Press the lid control button: The mechanism starts.
		The micro contact to closed position is released, during the rotation	Check that the micro contact 2 blade is present and not folded. Check that this micro contact 2 is wired correctly. Check the operation of this micro contact, and change it if necessary.
16	Temperature probe problem	Temperature probe out of service	Check that the temperature probe is in place in its housing under the lid and replace it if necessary.
			Remove the probe & measure the resistance at the probe terminal. The value must be 500 ± 100 Ohm (Probe PT500).
17	Overspeed safety fault	The overspeed safety good working order test carried out at each machine startup revealed a fault	Microcontroller board faulty: Change the Control Center.
18	SPEED SIGNAL IS LOST	<p><u>2 possible situations:</u> Signal permanently lost: Impossible to clear the Error and open the lid: 30 minute safety timer is running, Wait for 30mn before being allowed to open the lid</p> <p>Speed signal recovered during braking: Error can be erased after full stop: lid can be opened as soon as error is acknowledged</p>	After erasing the error, cycle the power supply and try to launch a new cycle. If Error 18 is detected again, call technical service
19	SPEED SENSOR ISSUE	<p><u>2 possible situations:</u> Signal permanently lost: Impossible to clear the Error and open the lid: 30 minute safety timer is running, Wait for 30mn before being allowed to open the lid</p> <p>Speed signal recovered during braking: Error can be erased after full stop: lid can be opened as soon as error is acknowledged</p>	After erasing the error, cycle the power supply and try to launch a new cycle. If Error 19 is detected again, call service

3.0 Settings

3.1 Access to the Technician Menu

	<p>Access the “Settings” menu using the following keys:</p>	
	<p>This menu is reserved for authorized technicians.</p>	
	<p>Enter the access code: (9876)</p>	
	<p>1st page of settings Next page</p>	
	<p>Setting the temperature probe</p>	
	<p>Setting the imbalance sensitivity</p>	
	<p>Setting the time delay of the lock</p>	
	<p>Auto-Diagnostic</p>	
	<p>Reset to factory settings</p>	
	<p>Clear the counters</p>	
	<p>2nd settings page Previous page</p>	
	<p>Changing the internal numbers</p>	
	<p>Changing the counters</p>	
	<p>Over Temperature Alarm</p>	


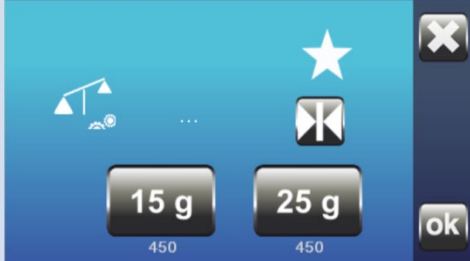


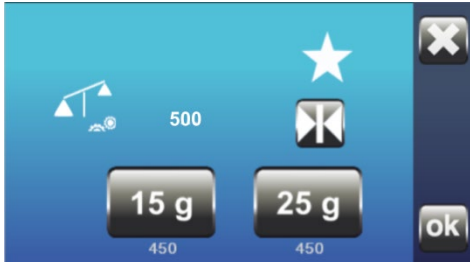

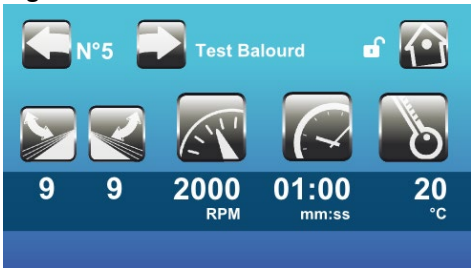
3.2 Setting the Temperature Probe

	Access the temperature probe calibration menu.	
	<p>The upper value "Probe Temp." corresponds to the physical value measured by the temperature sensor, located in the lid.</p> <p>The lower value "Displayed Temp." is the value displayed on the screen. This is the temperature value of the samples in the buckets, during a centrifugation cycle.</p> <p>A correction of + /- 2°C is possible in the case of deviation with the temperature of the sample in the buckets.</p>	
	Press the "-" or "+" keys to adjust the value.	
	Confirm by pressing ok.	

3.3 Unbalancing Sensitivity Detection

The centrifuge has a reaction to the load balancing faults which may be different depending on the media on which the centrifuge is placed. A calibration of the imbalance sensitivity is therefore necessary during installation.

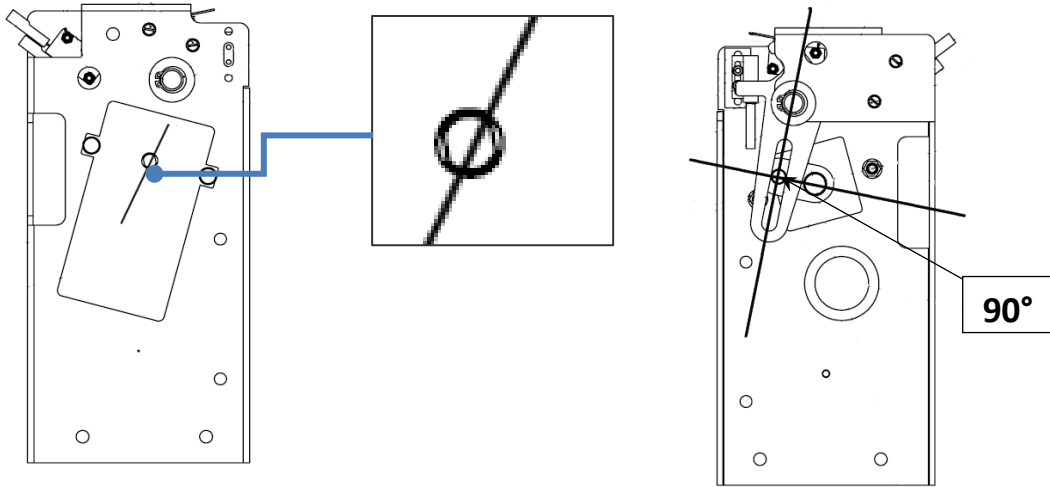
Required equipment: Use the reference balancing kit CTB0310 AFI-71122002.

	Access the unbalance sensitivity calibration menu.	
	Equip a rotor swing-out and its 4 buckets in the centrifuge. Remove the inserts of the buckets.	
<p>Low threshold</p>	<ol style="list-style-type: none"> Place the round 15 gram weight in one of the buckets and close the lid, Press the button "15gr" The rotor accelerates until it stabilizes. The centrifuge shakes, then the rotor slows down. The low threshold is then determined. It appears under the button "15 gr". (e.g. 480) Open the lid and remove the 15 gram weight. 	
<p>High threshold</p>	<ol style="list-style-type: none"> Place the 25 gram weight in the same bucket. Proceed in the same way as for the 15 gram weight. The low threshold is then determined. (e.g. "520") Open the lid and remove the 25 gram weight. 	
<p>Average</p> 	<ol style="list-style-type: none"> Press on the Next button to average the setting. (e.g. $[480+520]/2 = 500$) The average value is displayed. By default, the factory setting value is 500. 	
<p>Check</p>	<p>The following steps are compulsory.</p>	
<p>High threshold:</p>  <p>Do not adjust this threshold with a weight greater than 25 gr. This would cause a breach of warranty. The appliance has been dimensioned for a maximum threshold of 25gr.</p>	<ol style="list-style-type: none"> Place the 15 gr + 10 gr weights in a bucket. Start the cycle. 2000 rpm / 1 minute / 9 Acceleration / Braking 9 The centrifuge must stop during the acceleration, and display the message ERROR1: The 25 gr imbalance is not tolerated. <p>Repeat the High threshold check 3 times: ERROR1 must appear each time.</p>	
<p>Low threshold:</p>	<ol style="list-style-type: none"> Leave only a weight of 15 gr in a bucket. Start the cycle. 2000 rpm / 1 minute / 9 Acceleration / Braking 9 The centrifuge should achieve the desired speed and then slow down and stop without the following error message appearing: The 15 gr imbalance must be tolerated. Repeat the Low threshold check 3 times: Each cycle should take place normally. 	

3.4 Setting the Lock

3.4.1 Lock Operation


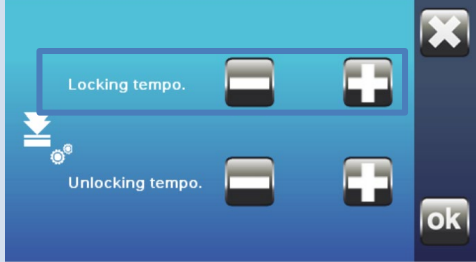

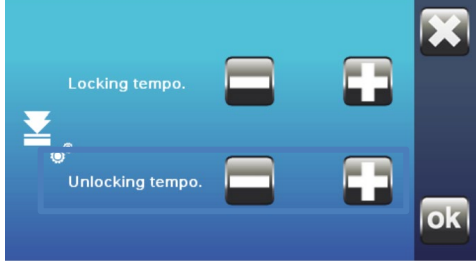

The lock is in the locked position when the axis of the crankshaft and the oblong hole of the bolt are perpendicular. A marking is carried out on the visible face, corresponding to this position.



Visible face - when the front panel is removed
Locked position identification marking

Internal face - after lock unit extraction.
Perpendicular position of the 2 axes

3.4.2 Setting the Time Delay of the Lock

	<p>Access the unbalance sensitivity calibration menu.</p>	
	<p>Locking the timer: The motor reducer timer when closing.</p> <p>Adjust with the “-” and “+” buttons up to the position described above, in Section 3.4</p>	
	<p>Unlocking the timer: Motor reducer time delay when closing.</p> <p>Adjust with the “-” and “+” buttons until the bolt is completely clear at the opening, in order to let the lid strike plate escape freely.</p>	

3.5 Auto-Diagnostic

“Contactor”

Close the lid.
 Access the Auto-Diagnostic menu
 Press “Contactor”: the button turns green.
 The return of information “contactor state” turns green.

“Compressor”:

It allows for manually starting the compressor, the chiller fan, as well as the additional fan.
 Performance: By closing the lid and activating the compressor (pressing on compressor), after 5 minutes, ice forms on the sides of the bowl. Coolant is always present in the circuit.

“Lid word. Dir1”: The motor reducer lock rotates anti-clockwise (opening). The mechanism runs without stopping.

“Lid word. Dir2”: The motor reducer lock rotates clockwise (closing)

“Speed”: Rotate the rotor (no matter what direction): The rotation value is displayed in RPM.

“Lid Locked sw”: Actuate micro contact 1: the button changes state (red-> tick green)

“Lid unlocked sw”: Operate the lock with the manual opening key: ¼ turn clockwise, then ¼ turn anti-clockwise”.
 When the micro contact engages, change of state.

“Lid approach”: Passes in green checkmark when the lid is lowered (magnet detection).

“Open button”: press the button to open lid: becomes green

“Start button”: press Start/Stop: Change of state.

Exit with the cross, and then return to new in the state reset menu.




3.6 Information Update

Caution: This information concerns the serial numbers of the electronic boards fitted on the centrifuge.

In case of changing an electronic board, these values should be changed:

Changing the Control Center: 2 numbers should be detected:


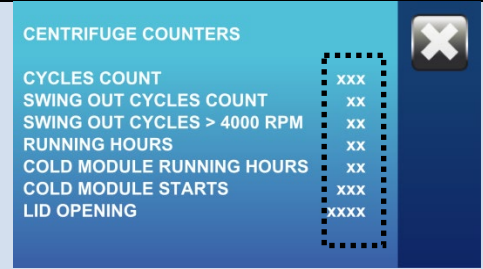

the number concerning the microcontroller board, and that of the display card
 Changing the tachometer board

<p>The information corresponds to technical information about the computer software and components constituting the device.</p>	<p>Access the menu using the following key:</p>	
	<p>SERIAL NUMBER: Unique serial number of the centrifuge</p> <p>SOFTWARE: The 2 following information items are updated automatically upon a software change.</p> <ul style="list-style-type: none"> Centrifuge fw: Microcontroller software version Display fw: Screen software version <p>Locker LT: Locking tempo of the lid Locker UT: Unlocking tempo of the lid Imbalance: Imbalance calibration setting</p>	
	<p>Exit</p>	

3.7


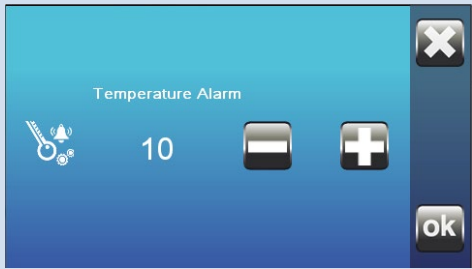


The values are used to determine the age of the device and the rotating accessories. Changing values should ONLY be done in the case of an exchange of the control center. The values to be set must be identical to those recorded in the faulty control center. It is therefore necessary to record the values before removing the faulty control center.

If the values are lost monitoring the life of the rotor will not be correct. A rotor may therefore be used beyond their maximum lifespan. This causes a DANGEROUS situation for users and machine. In case of inability to access data from the defective control center these values can be retrieved by the factory.

	Enter the counters modification menu	
	<p>Press the item to change. The input keyboard then appears.</p> <p>Fill in the value recorded from the old control center.</p> <p>Repeat this for all counts.</p>	
	Exit	

3.8

This alarm can protect the samples subjected to excessive heating of the air with respect to the set temperature. In case of triggering of the alarm, the cycle is aborted. ERROR 3 A message is displayed and a buzzer starts.

	Entering the overtemperature alarm menu	
	<p>Adjust the desired value. The default is + 10° C.</p> <p>The value is adjustable between + 5° C to + 20° C.</p> <p>Example: for a 10° C setpoint when the over temperature threshold is set at 5° C, the alarm will sound if the air temperature is > 15° C</p>	
	Exit	

Note: If the sample temperature exceeds 43 ° C, but also if the temperature of the air inside the bowl becomes higher than 50 ° C, then the cycle is aborted with the message ERROR 3.

3.9 Loading the Firmware

The centrifuge is controlled by 2 firmware applications:



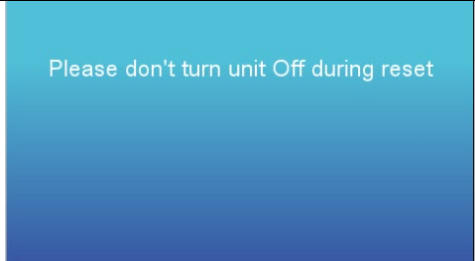
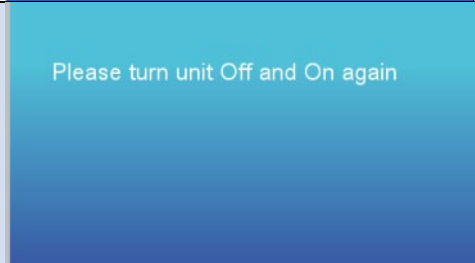
- A firmware application called “Display firmware”.
It is located in the screen board.
It manages a HMI (Human Machine Interface), and visual screens.
- A firmware application called “Centrifuge firmware”.
It is located in the microcontroller board.
The latter defines the behavior, and the interactions between the different parts of the centrifuge.

It is necessary to use the programming cable, supplied with reference CTB0311 “Software Programming”.

3.10 Factory Reset

After loading a new version of software microcontroller, it may be necessary to perform a factory reset, which returns the device to factory configuration. This deletes the following data:

- Lock setting (a default is recorded)
- The imbalance calibration
- User programs
- The error counters (reset to 0)
- The serial numbers of the unit and electronic cards


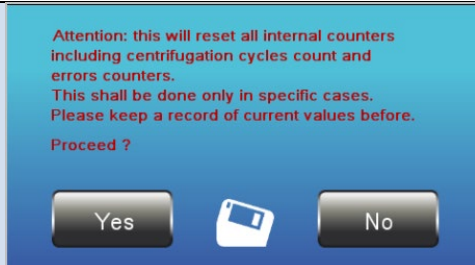
	Access the factory reset menu	
	<p>"Warning: Return to factory settings All settings of the user, and programs will be lost. Continue?"</p> <p>OK to continue</p>	<input type="button" value="Yes"/> <input type="button" value="No"/>
	<p>"Do not power off unit during reset." Wait until the following message.</p>	
	<p>Turn off & turn on the unit.</p>	



3.11 Clear Counters

The counters are used to determine the age of the device, and the rotating accessories. In case of resetting these counters, monitoring the life of the rotor will not be correct. A rotor may therefore be used beyond their maximum lifespan. This causes DANGER for users and machine.

This menu is primarily used in the factory.

	Access the factory reset menu	
	<p>"Warning: This will erase all internal counters, including centrifugation cycles counters, and error counters. This should be achieved in specific cases. Keep a record of the current settings before proceeding. Continue?"</p> <p>OK to continue</p>	<input type="button" value="Yes"/> <input type="button" value="No"/>

4.0 Standard Exchange of Components

4.1 Safety Rules

Before any repair intervention, observe the safety rules by turning off and unplugging the centrifuge.
In the event of non-compliance with these instructions, there is a risk of electrical shock.

4.2 Terminology:

The kits and spare parts are specific to specific appliance models.
The crosses in the right part of the table allow you to define the part corresponding to the device concerned.

Symbol	Description
V	Ventilated Models
R	Refrigerated Models
RF	Refrigerated Floor Standing Model
120V	Models 120V / 60 Hz
230V	Models 230V / 50 Hz
NU	Models for the International Market - Export
AFI	Models for the French Market
U	Wear Parts. The figure corresponds to an estimated life in years, before change, for preventive maintenance, in the case of use, maintenance and care consistent with the user manual. In the contrary case, or for intensive uses, these life cycle durations may be decreased.
Kit	The spare part is delivered with a set of parts required for its implementation, as well as the procedure or Technote.

4.3 C200 List of Spare Parts and Tools

Technical Bulletin	References	Name	V	R	V + R	230V	120V	U
CTB0314	AFI-71120000	Cylinder kit Ventilated Mod.	X					3
CTB0320	AFI-71120001	Bowl Seal kit - Ventilated Mod.	X					5
CTB0320	AFI-71120002	Bowl bottom Seal kit - Ventilated Mod.	X					3
CTB0326	AFI-71120003	Anti-vibration mount kit - Ventilated Mod.	X					5
CTB0312	AFI-71120301	230V / 50 Hz Control Center kit - Ventilated Mod.	X			X		
CTB0312	AFI-71120400	120V / 60 Hz Control Center kit - Ventilated Mod.	X				X	
CTB0313	AFI-71121000	Cylinder kit - Refrigerated Mod.		X				3
CTB0321	AFI-71121001	Bowl seal kit - Refrigerated Mod.		X				5
CTB0321	AFI-71121002	Bowl bottom Seal kit - Refrigerated Mod.		X				3
CTB0325	AFI-71121003	Anti-vibration mount kit - Refrigerated Mod.		X				5
CTB0315	AFI-71121004	Temperature probe kit		X				
CTB0324	AFI-71121007	Inner Lid & Temp. Sensor		X				
CTB0322	AFI-71121008	Temp Sensor v2.0		X				
CTB0312	AFI-71121300	230V / 50 Hz Control Center kit - Refrigerated		X		X		
CTB0312	AFI-71121400	120V / 60 Hz Control Center kit - Refrigerated		X			X	
CTB0311	AFI-71122001	NUWIND programming kit			X			
CTB0310	AFI-71122002	15-25 gr balancing kit			X			
CTB0330	AFI-71122003	Porthole kit			X			
CTB0319	AFI-71122004	Motor kit			X			10
CTB0328	AFI-71122005	Lock switch kit			X			
CTB0323	AFI-71122006	Tachometer board kit			X			
CTB0318	AFI-71122007	Tachometer sensor kit			X			
CTB0316	AFI-71122008	Lock kit			X			
CTB0327	AFI-71122010	24V motor reducer kit			X			
CTB0327	AFI-71122012	24V Power contactor kit			X			
CTB0329	AFI-71122100	Gray membrane kit			X			

4.4 Replacement of the Control Center

If the state of the control center allows record the values in the tables below.

Programs :						
	Name	Speed	Duration	Temperature	Acceleration	Braking
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						





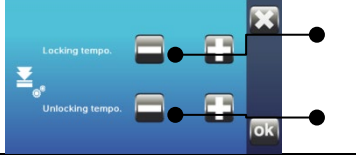

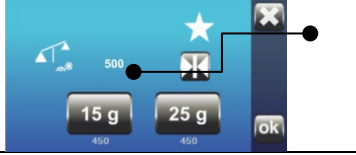
Parameters :

Access the following menus

Accessing menus

Access the parameters

Function	Description	Value	
1	Information menu :		
	SERIAL NUMBER (Also on the machine label)		
	CONTROL CENTER ID (Also on label attached to control center)		
	ACCELEROMETER ID (Visible on tach board)		
	MOTOR ID (Visible also on tab.)		
2	User Preferences menu:		
	Mode RPM/RCF		
	Frequency of grease		
	CYCLES COUNT		
	SWING OUT CYCLES COUNT ≤ 4000 RPM		
	SWING OUT CYCLES > 4000 RPM		
	RUNNING HOURS		
	COLD MODULE RUNNING HOURS		
	COLD MODULE STARTS		
	LID OPENING		
	Unit of temperature	°C <input type="checkbox"/>	°F <input type="checkbox"/>
	Timing mode	ON <input type="checkbox"/>	OFF <input type="checkbox"/>
	Error Counter	01 : / 02 : / 03 : / 04 : / 05 : / 06 : / 07 : / 08 : / 09 : / 10 : 11 : / 12 : / 13 : / 14 : / 15 : / 16 : / 17 : / 18 : / 19 : / 20 :	

	Postcool	ON <input type="checkbox"/>	OFF <input type="checkbox"/>
	Pre-cooling Mode	AIR <input type="checkbox"/>	ROTOR <input type="checkbox"/>
	Temperature display mode	AIR <input type="checkbox"/>	ROTOR <input type="checkbox"/>
3	Enter service menu and enter password : (9876)		
		LOCKING TEMPO	
		UNLOCKING TEMPO	
		IMBALANCE SETTING	

4.5 Replacement of Cylinders

4.5.1 Ventilated Model

- Open the lid.
- Switch the centrifuge off & disconnect it.
- Remove the c-clip & pin located at the top of the cylinder using c-clip pliers.
- Gently swivel the lid backward.
- Unscrew the 3 screws located under the bowl seal.
- Disassemble the bowl by pulling toward the top, and then remove it.
- Hold the lid in the open position
- Remove the screw located at the bottom of the cylinder
- Remove the defective cylinder holding the lid open.
- Install the new cylinder, with the spiral spring down.
- Insert the screw at the bottom of the cylinder.
- Reposition the bowl & its 3 screws.
- Place the pin & the snap rings on top of the cylinder, in the lid.
- Use the new bolts during the reassembly of the bowl.

4.5.2 Refrigerated Model

- Access the rear of the centrifuge and clear access to the cylinder, from the right side.
- Remove the c-clip & pin located at the top of the cylinder using c-clip pliers.
- Gently swivel the lid backward.
- Remove the screw located at the bottom of the cylinder.
- Remove the faulty cylinder.
- Install the new cylinder.
- Insert the screw at the bottom of the cylinder.
- Place the pin & the c-clip on top of the cylinder, in the lid.

4.6 Lock Replacement

Disassembly:

Remove the front panel.

Remove the 2 screws located at the bottom of the lock and the top screw

Disconnect the 2 micro contacts and the magnetic sensor, as well as the power supply of the motor reducer

Slide the lock unit to the left

(For the ventilated model, it is necessary to remove the mounting bolts from the power contactor on the plate in order to leave a space to remove the lock).

Mounting:

Connect the 2 micro contacts, the magnetic sensor, and the motor reducer.

Insert the lock unit in the location provided for this purpose.

Tighten the 3 mounting bolts with their washer.

Refit the power contactor if it was removed.

Proceed with adjusting the lock.

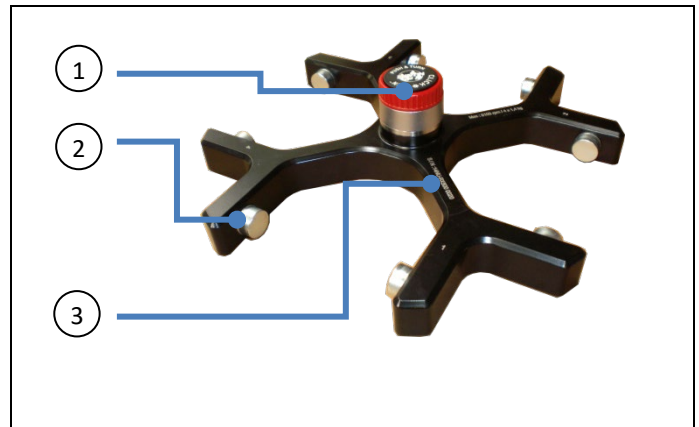
Replace the front panel, connecting the ground wire.

5.0 Functional Checks

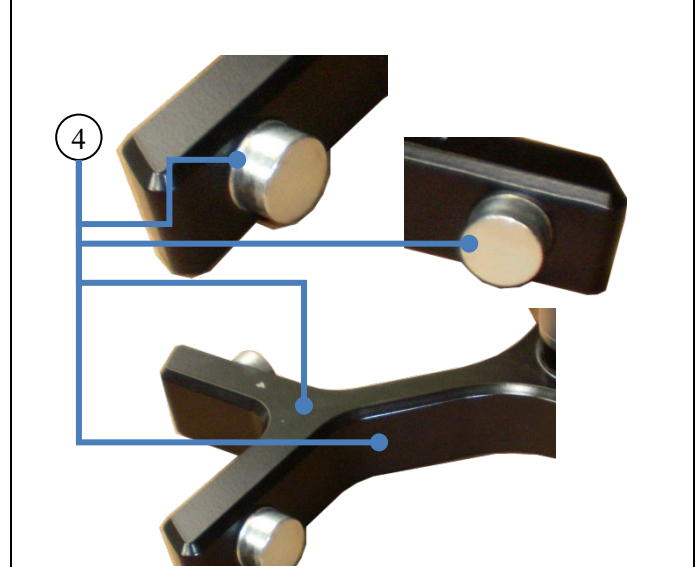
5.1 Safety

- Hinge:
Check the tightness of the screws, and the integrity of the hinge by moving side-to-side. There should be no movement other than that of the hinge rotation.
- Control Center:
The Control Center must be secured by a nut located near the switch and fixed to the body of the centrifuge.
- Accessories:
Check that the maximum cycle number marked on the free rotor is far superior to the value recorded on the counter "SWING OUT CYCLES COUNT"
- Conduct a visual inspection:

- 1) Clickspin:
Remove and replace the rotors, removing and placing them on the motor axle: once the rotor is in its place, the rotor should not be able to be removed without operating the clickspin. Otherwise, the rotor must no longer be used, and must be repaired and checked by an authorized technician.
 - 2) Trunions
 - 3) Arm of the rotor. The life cycle information of the rotor is marked there.
 - 4) The surface of the rotors should be:
 - Smooth
 - Regular
 - Circular in shape on the periphery of the trunions
- Check the absence of:
- Trace of impact
 - Corrosion
 - Cracking
 - Wear



For correct surface condition of the trunions



5.2 Speed Check

Required equipment: Calibrated and reflective adhesive optical tachometer.

Place a reflective strip on the central part of the rotor.

Remove the plug sealing the central porthole under the lid.

Close lid.

Start a cycle at the desired speed

When the setpoint speed is reached, place the speedometer on the central porthole.

The speed displayed in the measurement device must be equal to that displayed on the screen, within a tolerance of ± 10 rpm

If this is not the case, check that the reflective tape is well placed in the central part of the rotor, and firmly hold the optical tachometer, without movement during the measurement.

5.3 Checking the Timer

Required equipment: Calibrated stopwatch.

Define a centrifugation cycle of the desired duration (e.g.: 10 min, 4500 rpm, acceleration 9, braking 9).

Start the cycle by pressing start.

To start the centrifuge stopwatch, operate the stopwatch.

Stop the stopwatch at the end of the programmed time. Check that the centrifuge starts to brake well.

5.4 Checking the Temperature

Currently being drafted



DECLARATION OF CONFORMITY

Application Council Directive(s):

EMC Directive 2004/108/EC
European Standard EN 61326-1:2006
Low Voltage Directive 2006/95/EC
European Standard EN 61010-1 (2nd Edition)
European Standard EN 61010-2-020 (2nd Edition)
RoHS Directive 2011/65/EU
WEEE Directive 2002/19/EC

Manufacturer's Name: NuAire, Inc.
Manufacturer's Address: 2100 Fernbrook Lane
Plymouth, MN, 55447, USA
Importer's Name: See Shipping/Customs Documents
Importer's Address: See Shipping/Customer's Documents for your equipment
Name of Equipment: Laboratory Benchtop Centrifuge
Model Numbers: NU-C200V-E NU-C2500V-E
NU-C200R-E NU-C2500R-E
*NU-SCxxx+
+ With and Without Suffixes


Serial No.: Various – See Individual Declaration
Year of Manufacture: 2015 and Subsequent

* Denotes special product, product evaluation to be conducted on an individual basis.

I hereby declare that the equipment as specified conforms to the above requirements.

Date: July 24, 2015 Location: Plymouth, MN, USA

European Contact:
IBS Tecnomara GmbH
Ruhberg 4
D-35463, Fernwald, Germany

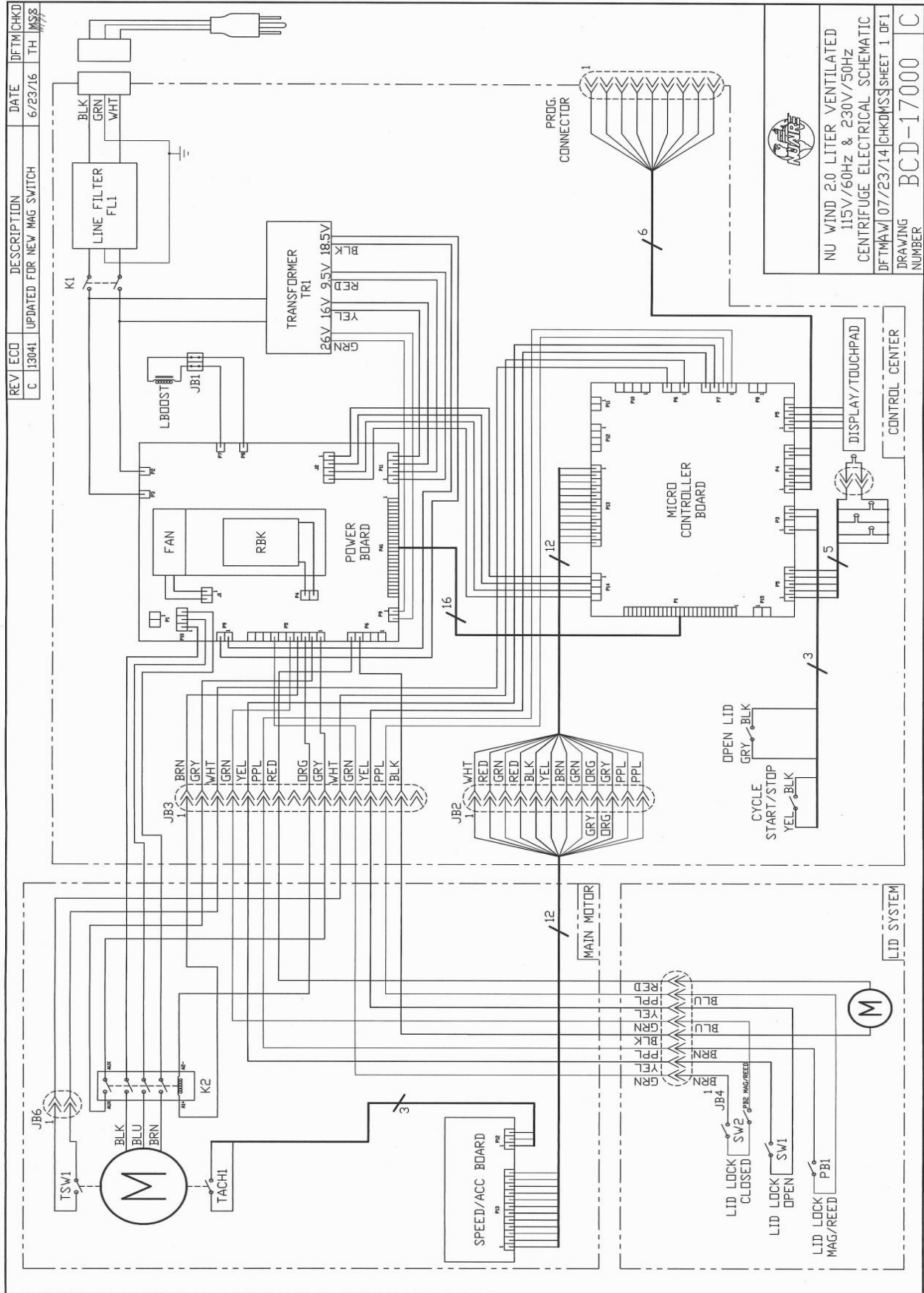

William F. Peters
V.P. Engineering

Best Products. | Best Performance. | Best Protection.

NuAire, Inc. | 2100 Fernbrook Lane | Plymouth, MN 55447 | U.S.A | ph: 763.553.1270 | fx: 763.553.0459 | tf: 800.328.3352 | www.nuaire.com

6.0 Electrical Diagrams

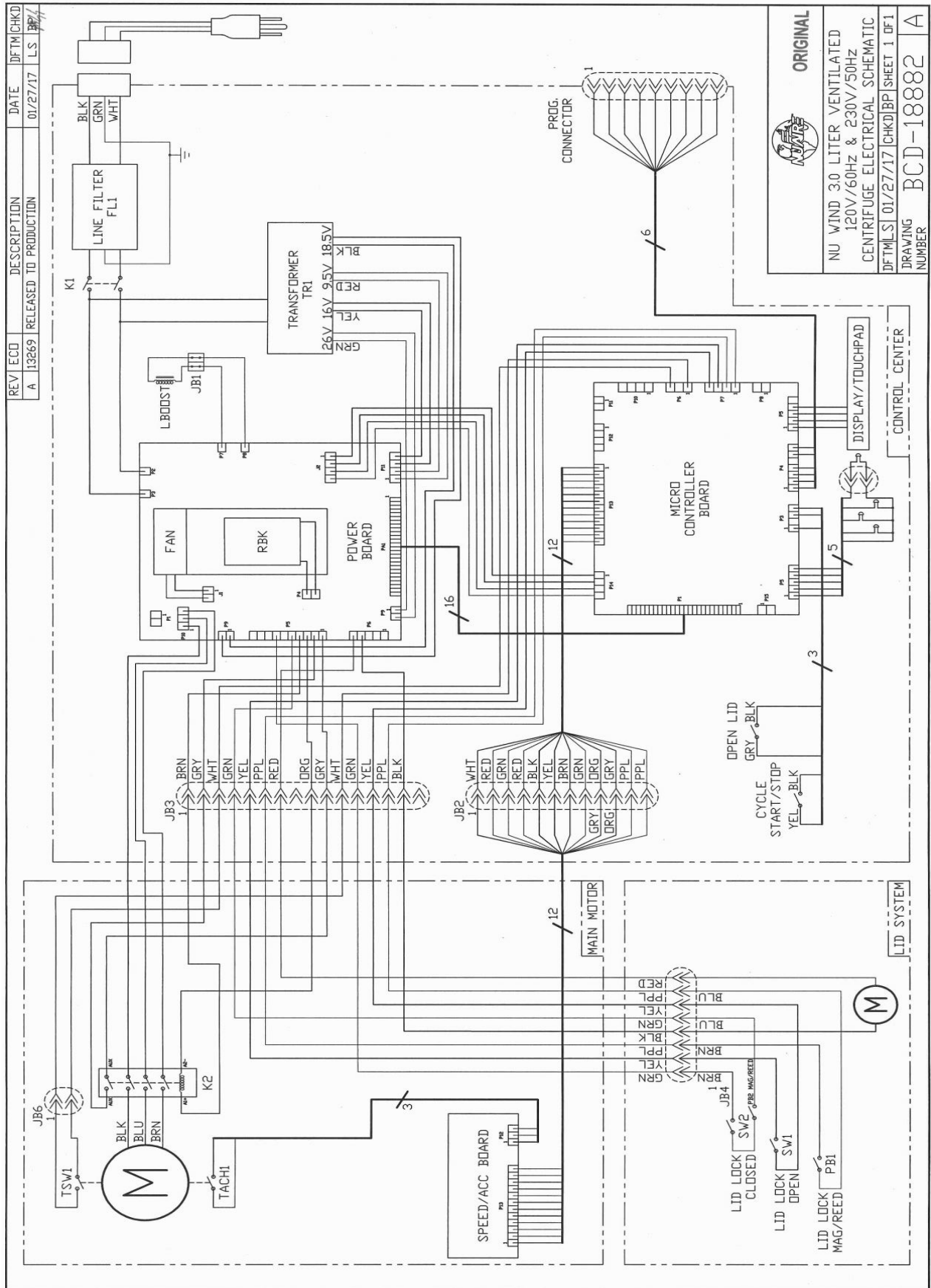
6.1 2.0 Liter Ventilated Model



NU WIND 2.0 LITER VENTILATED
115V/60Hz & 230V/50Hz
CENTRIFUGE ELECTRICAL SCHEMATIC
DFTMAW|07/23/14|CHKDMS|SHEET 1 OF 1

DRAWING NUMBER: BCD-17000 C

6.3 3.0 Liter Ventilated Model



ORIGINAL

NU WIND 3.0 LITER VENTILATED
 120V/60HZ & 230V/50HZ
 CENTRIFUGE ELECTRICAL SCHEMATIC

DFTM | S | 01/27/17 | CHKD | BP | SHEET 1 OF 1
 DRAWING NUMBER **BCD-18882** A

7.0 Refrigerated Systems

7.1 2.0 Liter 115V Model

REV	ECO	DESCRIPTION	DATE	DFTM	CHKD
A	12769	RELEASE TO PRODUCTION	7/31/2015	JK	MSS

Embarco NEK6213GK11

600159 Plate

601165 Bowl + Copper

ELCO NU 6 20 1

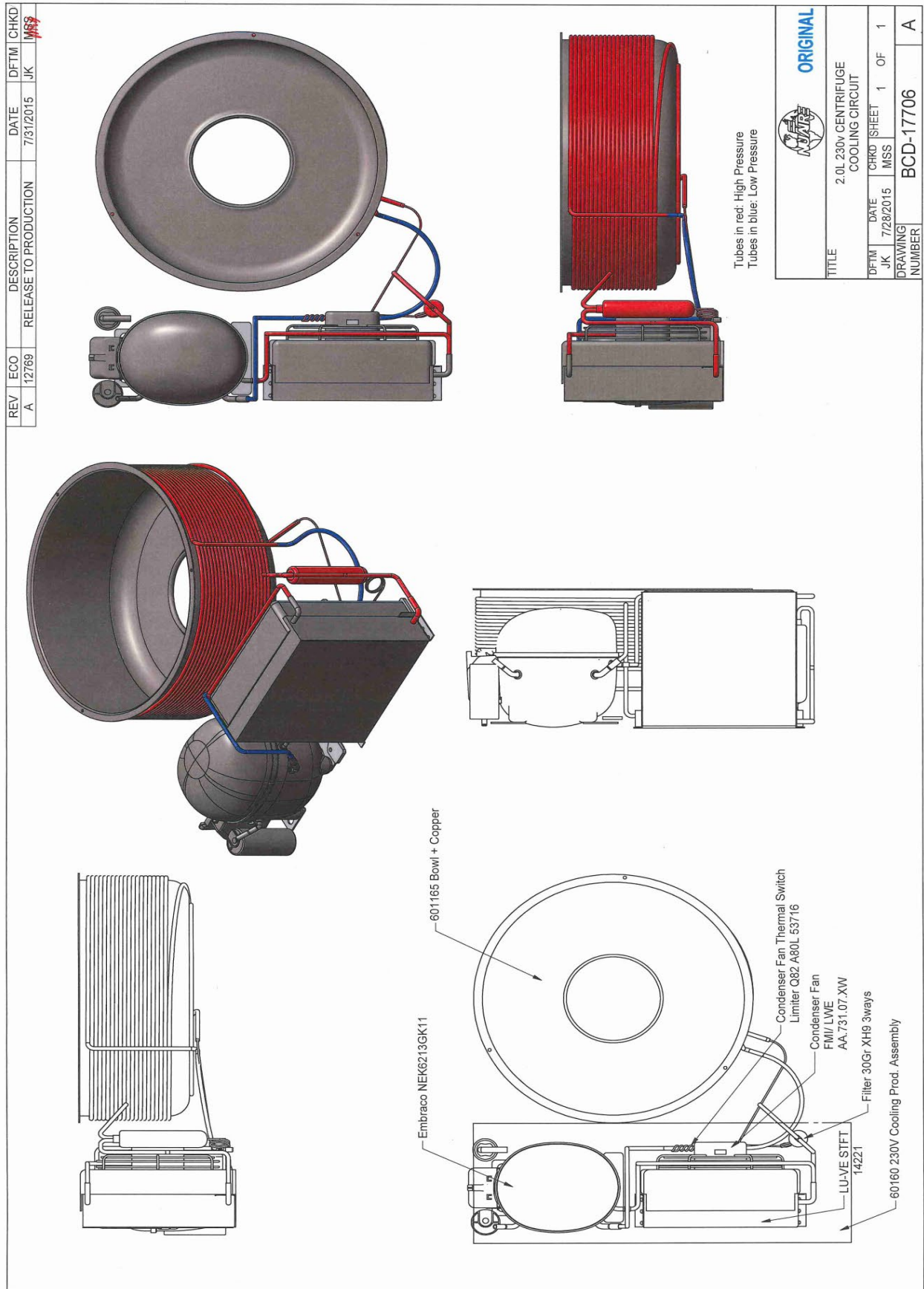
Filter 30Gr XH9 3ways

LU-VE STFT 14221

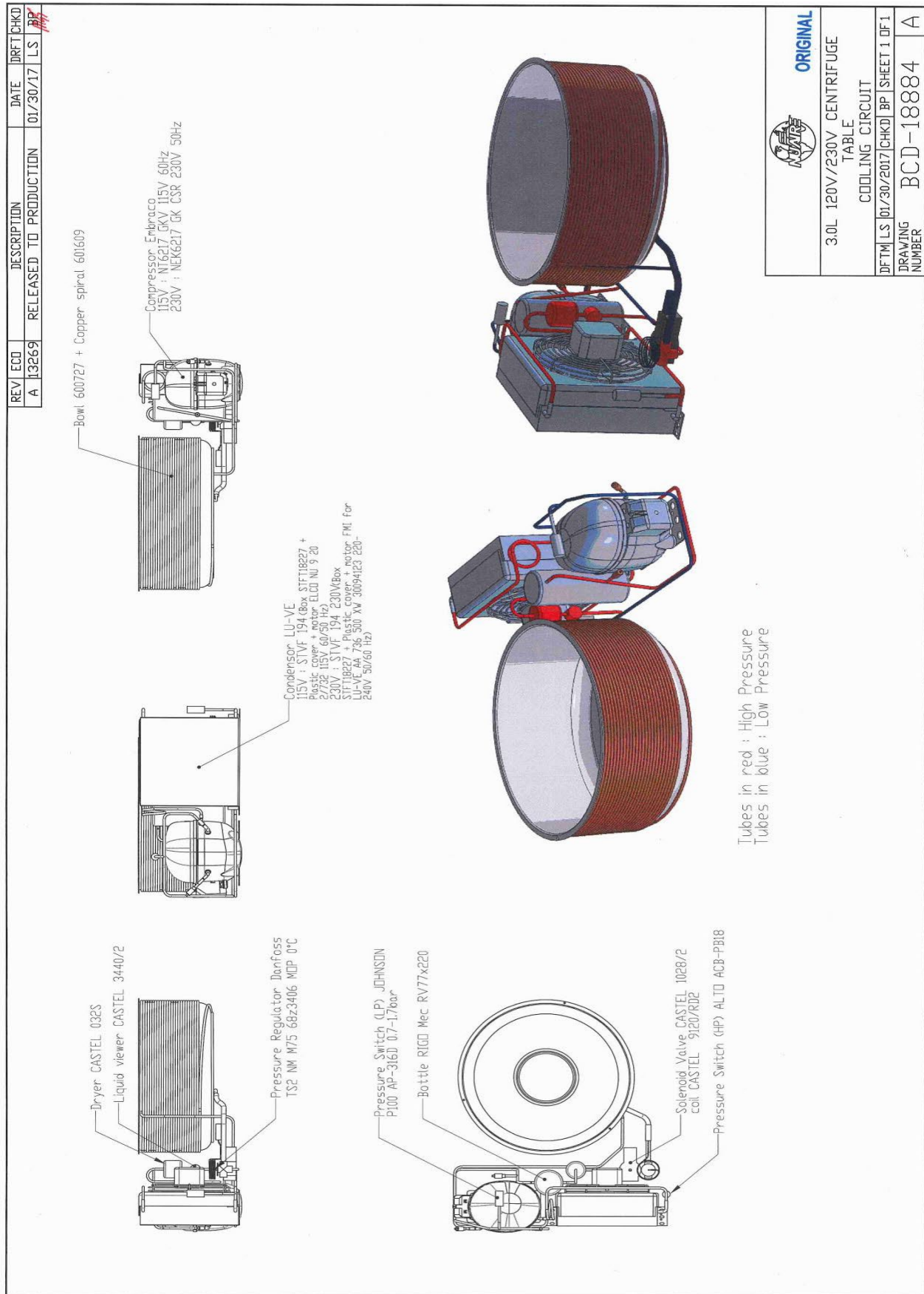
60160 115V Cooling Prod. Assembly

		ORIGINAL	
TITLE			
2.0L 115V CENTRIFUGE COOLING CIRCUIT			
DFTM	DATE	CHKD	SHEET
JK	7/28/2015	MSS	1 OF 1
DRAWING	NUMBER		
	BCD-17707		A

7.3 2.0 Liter 230V Model



7.3 3.0 Liter Benchtop Model



	ORIGINAL
3.0L 120V/230V CENTRIFUGE TABLE COOLING CIRCUIT	
DFTM LS 01/30/2017 (CHKD) BP	SHEET 1 OF 1
DRAWING NUMBER	BCD-18884 A

7.4 3.0 Liter Floor Standing Model

REV A	ECC 13269	DESCRIPTION RELEASED TO PRODUCTION	DATE 01/30/17	DRFT LS	CHKD BP
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Tubes in red : High Pressure
Tubes in blue : Low Pressure

ORIGINAL

3.0L 120V/230V CENTRIFUGE
FLOOR STANDING
COOLING CIRCUIT

DFTM LS 01/30/2017 [CHKD] BP | SHEET 1 DF 1
DRAWING NUMBER BCD-18885 A