20:1 Coffee/Tea Brewer Operation and Service Manual

Model 20:1-AP
Airpot not Included

Model	Height	Width	Depth	US 120 V	Canada 120 V	240 V
20:1-LD	17.8	8.5	19.8	1750W 14.6A	1400W 11.7A	3500W 14.6A
20:1-AP	19.3	8.5	19.8	1750W 14.6A	1400W 11.7A	3500W 14.6A
20:1-TD	24.2	8.5	19.8	1750W 14.6A	1400W 11.7A	3500W 14.6A
20:1-LP3	17.3	15.5	18.4	1700W 14.2A	1400W 11.7A	3800W 17.1

20:1 INSTALLATION / SETUP INSTRUCTIONS

WARNING: - Read and follow installation / setup instructions before plugging or wiring in machine to electrical circuit. Warranty will be void if machine is connected to any voltage other than that specified on the name plate.

Plumber's Installation Instructions

1) Plumb brewer in to water supply using 1/4 inch copper tubing. Flush water line before installing brewer to remove sediment. Brewer should be connected to COLD WATER LINE for best operation.
2) Water pressure should be at least 20 PSI. For less than a 25 ft run, use 1/4" tubing and connect to 1/2" or larger water line. The inlet water fitting on the back of the brewer is a 1/4" flare fitting.
3) If installed with saddle valve, the valve should have a minimum of 1/8" port hole for up to 25 ft run, and 5/16" port hole for over 25 ft runs.
4) Manufacturer strongly recommends use of a water filter to reduce scale and sediment as well as to provide for a better tasting beverage. Connect water line from filter to the flow control attached to the flared fitting extending from the back of the brewer. Manufacturer recommends connecting to copper tubing.
5) Check for leaks.

Initial Setup Instructions

Ensure power switch on right rear of unit is in the off position. Plug or wire brewer to the appropriate voltage circuit as indicated on the serial tag. Turn power switch to the on position. Brewer tank will begin to fill. Once the tank is full the brewer will begin to heat. Ready light will come on to indicate tank has finished heating.

CAUTION: The water faucet will dispense hot water anytime the handle is pulled.

Programming - 121753 firmware

The 20:1 Brewer may be ordered as a standard coffee brewer or as a “combo” brewer capable of brewing both coffee and iced tea beverages. The combo brewer incorporates a 2nd water valve to deliver the cold water dilution to mix with the brewed tea concentrate. Brewers with r2 and higher firmware are also now available with an alternate mechanical heater relay as an option to the solid state relay. The new main control board (part no 121753) includes a couple of additional programming steps compared to previous control versions (part no 100729) to accommodate these options. The tables on the next couple of pages have the new programming steps highlighted as an aid to those familiar with the previous programming procedures.

The brewer has two program modes, service mode and user mode. The service mode is used to establish basic operating parameters of the unit while the user mode allows the three buttons to be programmed for brewing into various containers or for varying beverage volumes. Programming mode is initiated as outlined below. The following pages will outline the various steps as displayed by the programming “screens”. The screens will loop continuously until exiting the mode.

Service Mode is entered by holding any two of the buttons on the face of the machine while powering up the brewer. The brewer firmware revision number is displayed for a couple of seconds when entering this mode. The table below list the items that may be programmed along with available values or settings. Use the center brew button to advance through the items and the left and right button to decrement or increment the values/selection respectively. These items are programmed at the factory and will typically not need adjustment. For coffee only brewers (no 2nd valve) ignore the dilution calibration and cold calibration volume. Use the center button to advance through those items.

Item Selected	Screen Example	Values Available	Comment
Water Temperature	200	170-205	Degrees F
Pulse Heating New in version 2 of 121753 control board	Off	On, OFF	Must be OFF for mechanical relay. May be on or off for solid state relay, on is preferred. If brewer has a heat sink on the back, this indicates it has a solid state relay for tank heater.
End of Cycle Beeper	On	On, OFF	Used to audibly indicate brew cycle has completed with a series of beeps.
Brew Pump Speed	b:05	1-10	Pump speed used for brewing
Not Used	F:05	2-10	No effect. Unused feature.
Pump Calibration	CAL	N/A	See instructions below. **Must be done if pump speed modified.**
Hot Calibration Vol	39.0	25.0-99.9	Ounces. Only displays if calibration cycle was run.
Dilution Calibration	CLd	N/A	Press left or right button to run dilution valve calibration.
Cold Calibration Vol	24	20-150	Ounces delivered during cold water dilution.
Water Fill Flow Rate	0.30	Off, 0.05-1.40	Adjustable in increments of .05 GPM. Should match flow rate through valve.
Water Filter Capacity	100	Off, 500-2500	In tens of gallons. 50=500 gallons. Increments are 500 gallons.
Power Mode	nor	nor, SAV, dn	Normal, Power Down, or Power Save.
Power Down/Save Time	4:00	OFF, 0:30-4:00	Hours:Minutes from last brew until brewer enters the selected power mode. No effect if mode is “Off”.
Brew Counter	0-999	N/A	Shows number of brew cycles since last reset (up to 999).
Service Data	Srv	N/A	Used to view temperature & probe data. See **Service Data** below.
Exit	End	N/A	Use left or right button when displayed to exit this mode.

Pump Calibration:

Pump calibration is necessary when the pump speed is changed or if the brewer is delivering substantially more or less beverage than what it has been programmed for in the user mode. Pump speed may be adjusted up or down if required to deliver water at a faster or slower rate to meet a specific beverage taste profile. Calibration tells the brewer control how much hot water is delivered within a specific time frame so it can adjust the time required to run to deliver the desired brew volumes.

Ensure the brew basket is in place. Place a suitably graduated container in place below the brew basket to capture and measure the water delivered. To calibrate, enter the service mode as noted above and advance to the “CAL” screen. Press either the left or right brew button and water delivery will begin. If the brewer has not reached operating temperature, it will finish heating before automatically starting. The pump will cycle on and off for approximately 2 minutes at which time the currently programmed volume is displayed. Use the left and right button to decrement or increment the value to the measured value. For better accuracy, you may want to measure a couple of cycles and average the measured values. At the least, the system should be primed before calibration by allowing a partial brew cycle to run (10-15 secs).

Note: User mode will be entered automatically when exiting the service mode if calibration values have been changed.

Service Data consist of the tank temperature as measured at two points in the tank and an indication as to which probe(s) are making contact with the water. To view data, enter the service mode as noted above and advance to the "Srv" screen. Use the left or right button to enter service data mode. Use the center button to advance through the data. The table below list the data that is displayed.

Data displayed	Screen Example	Values Available	Comment
Lower Temperature	198	N/A	Degrees F, OPn, SHr, - - -*
Upper Temperature	20·0	N/A	Degrees F, OPn, SHr, - - -*
Probes	1:L	L	Displays L for liquid level if probes are in contact with the water.
Exit	End	N/A	Use left or right button when displayed to exit this mode.

* The 3 dashes indicate that the temperature value reported by the thermistor is outside the display range, 100-215F. This could be because the tank is cold or because the thermistor is out of calibration. If the tank temperature is within the noted range, the thermistor is defective and should be replaced.

User Mode is entered by holding any one of the buttons on the face of the machine while powering up the brewer. Note that the user mode is also automatically entered whenever the calibration volume setting is changed. The beverage volumes, brew time, and visa-brew time can be programmed for each of the three buttons on the face of the brewer. The brew volume may all be run through the basket or a portion of the total volume may be added to the brewed concentrate as cold water dilution. The brewer will determine the minimum brew time possible based on pump speed and calibration values as outlined previously. This time is set as the default whenever calibration values are changed. The brew time can be extended to lengthen the water delivery time to meet a specific beverage taste profile. For coffee only machines, brew total and brew concentrate should match. The table below list the data displayed and values available.

Data displayed	Screen Example	Values Available	Comment
Brew 1 Settings	b1	N/A	Displays briefly to indicate that the parameters are for brew button 1 (left)
Brew 1 Total Brew Volume	64	Off, 30-128	Ounces. Button can be turned off and will serve as cancel only.
Brew 1 Concentrate Volume	64	30-Total Brew Volume	Program the volume of the total volume that should be delivered as hot water through basket. Total - Conc = Cold Dilution.
Brew 1 Time	3:30	Min-9:59	Calculated minimum to 9 minutes and 59 seconds.
Brew 1 delay	0:05	0-2:00	Delay between end of hot water delivery and start of cold water. Only displays if Conc Volume < Total Volume and is > 0
Visa-brew 1 Time	0:30	0:00-4:00	Set to allow for beverage to finish dripping from basket after water delivery time has been completed.
Brew 2 Settings	b2	N/A	Displays briefly to indicate that the parameters are for brew button 2 (center)
Brew 2 Total Brew Volume	64	Off, 30-128	Ounces. Button can be turned off and will serve as cancel only.
Brew 2 Concentrate Volume	64	30-Total Brew Volume	Program the volume of the total volume that should be delivered as hot water through basket. Total - Conc = Cold Dilution.
Brew 2 Time	3:30	Min-9:59	Calculated minimum to 9 minutes and 59 seconds.
Brew 2 delay	0:05	0-2:00	Delay between end of hot water delivery and start of cold water. Only displays if Conc Volume < Total Volume and is > 0
Visa-brew 2 Time	0:30	0:00-4:00	Set to allow for beverage to finish dripping from basket after water delivery time has been completed.
Brew 3 Settings	B3	N/A	Displays briefly to indicate that the parameters are for brew button 3 (right)
Brew 3 Total Brew Volume	84	Off, 30-128	Ounces. Button can be turned off and will serve as cancel only.
Brew 3 Concentrate Volume	42	30-Total Brew Volume	Program the volume of the total volume that should be delivered as hot water through basket. Total - Conc = Cold Dilution.
Brew 3 Time	3:30	Min-9:59	Calculated minimum to 9 minutes and 59 seconds.
Brew 3 delay	0:05	0-2:00	Delay between end of hot water delivery and start of cold water. Only displays if Conc Volume < Total Volume and is > 0
Visa-brew 3 Time	0:30	0:00-4:00	Set to allow for beverage to finish dripping from basket after water delivery time has been completed.
Exit	End	N/A	Use left or right button when displayed to exit this mode.

OPERATION INSTRUCTIONS

Coffee/Tea Preparation Procedures

1) Place filter into brew basket.
2) Put the proper amount of coffee or tea into the filter. Filter not required for filter pack coffee/tea.
3) Slide the brew basket into holder.
4) Place the appropriate empty decanter into position below the brew basket. For airpots first open lid and remove pump stem unless of a brew through design. For other dispensers remove the lid unless it is a brew through design.
5) Press the appropriate brew start switch. Note: a brew cycle may be initiated even if the heating light is on. The brewer features an autoarm circuit which will flash the heating light indicating that the brewer is heating and will begin to brew immediately after the heating cycle is complete. To over ride autoarm, hold in brew button until cycle starts (5 seconds).
6) Do not remove decanter. Brew cycle may be canceled by depressing any brew button or the cancel switch on the front control panel.
7) Hot water will be delivered through the sprayhead. This distributes the hot water evenly over the coffee bed within the brew basket. The coffee brew will drain from the brew basket into the decanter below.
8) The Brewing light should continue to flash until all the liquid has finished flowing from the brew basket. Do not remove decanter until the brewing process has stopped and all liquid has stopped flowing from the brewbasket.
9) The resultant coffee brew should be crystal clear and have the desired properties attainable through excellent extraction.
10) To clean brew basket simply remove from brew rails and dump filter into waste basket. The brewing process, as described above, can now be started again.

Error Messages

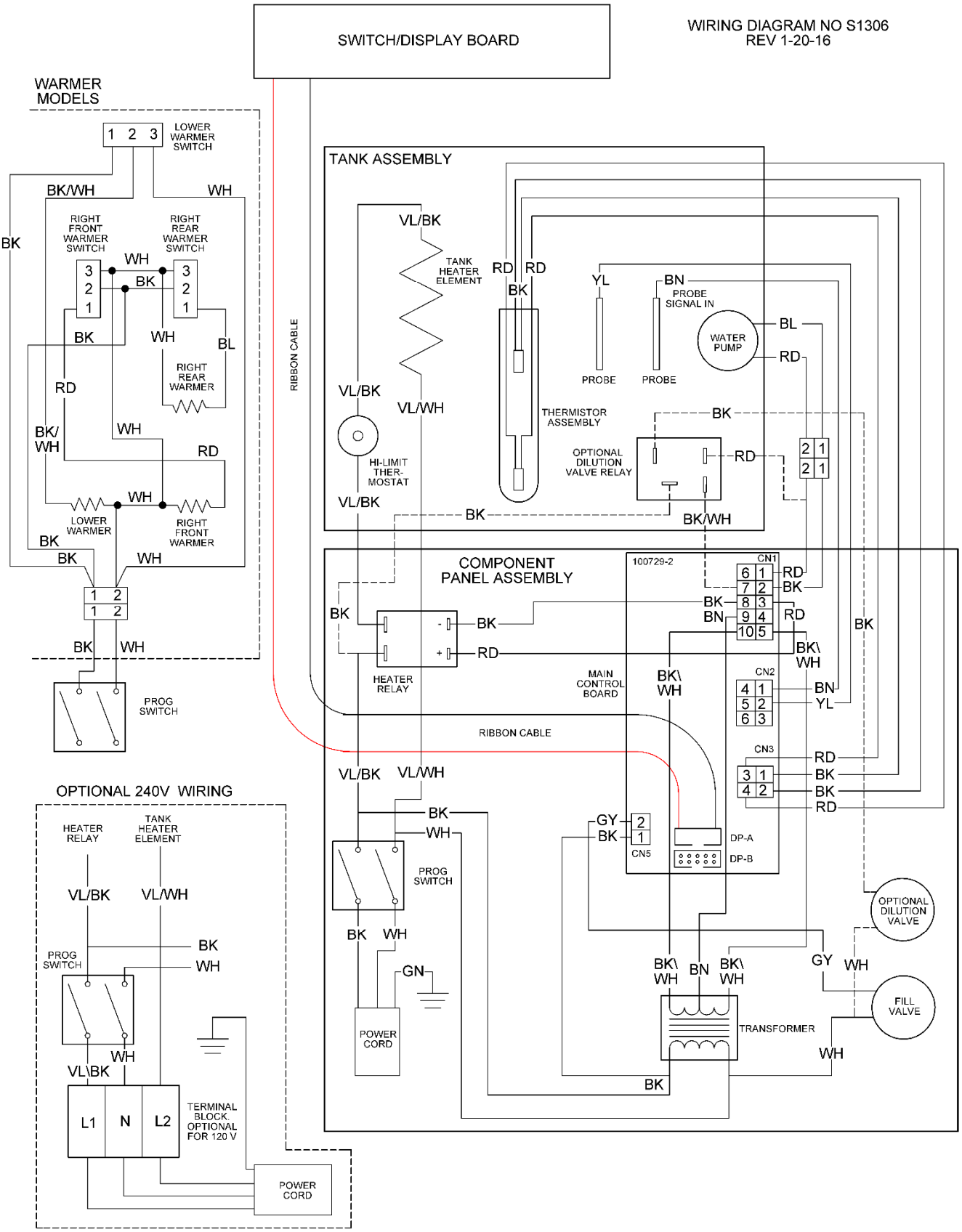
This brewer incorporates a number of self diagnostic test that are routinely run. If a fault condition should occur the unit will display an error number as outlined below. All errors may be reset by powering unit off and then back on. Errors E1 and E2 are auto-resetable and will clear themselves if the condition that caused them goes away. E3 will disable the heater but will allow a brew cycle to complete. The brewer will try to heat again when a brew cycle is started. E4 and E-A must have power to unit cycled to clear them. E5 will force brewer to use its default settings for brewing. E7 and E8 will clear when a brew cycle is started. E9 will disable input from display board. If error repeats, correct the cause of the error.

Error Number	Description	Cause	What to Check
E1	Open Thermistor	Resistance extremely high from lower thermistor. Upper thermistor is also bad.	Check/replace thermistor.
E2	Shorted Thermistor	Resistance extremely low from lower thermistor. Upper thermistor is also bad.	Check/replace thermistor.
E3	Heater Run Error	Water did not heat within timeout period	Check element for short and for proper resistance. Check relay, hi-limit thermostat, and harness. Replace if bad.
E4	Tank Fill Error	Water did not reach probe in timeout period. 4 minutes for initial fill, 1-1/2 minutes during normal operation.	Check valve function and flow rate. Replace valve or increase flow rate. Check probe(s) for excess scale.
E5	Comm Error	Serial communication error to/from non-volatile memory (EEPROM).	Replace main board.
E7	Open Motor Circuit	Open motor circuit. Pump 0 or pump 1.	Check harness/motor continuity. Replace if defective.
E8	Bad (Open) Motor Driver	Bad/open motor driver. Pump 0 or pump 1.	Replace main board.
E9	SPI Comm Error	Serial communication error to/from display board.	Verify good connection in proper port. Try new display board. Try new main board.
E-A	Possible Leak Detected	Water system may have a leak.	Check all plumbing system components for possible leak. Look for water on counter.
Full	Filter Full	Water filter has reached capacity.	Replace filter.

Replacement Parts:

Electrical Components	
121753	Board, main control
100731	Display board, red LED
121478	Display board, blue LED
105115	Transformer,120V primary, 24 VCT 40VA
119804	Pump assembly, gear water
109937	Pump only, gear water
121756	Valve assy, double solenoid
100255	Valve assy, solenoid
110626	Switch, DPST, black rocker
100085	Switch, SPST, lighted rocker
110367-10	Relay, Solid state, 50 amp
110958	Relay, Mechanical, 12VDC, SPST, 30A
202025	Element, tank 120V 1750W
701170	Element, tank 120V 1400W
202057	Element, tank 120V 1100W
202027	Element, tank 240V 3500W
111593	Thermostat, hi-limit, 221F, 25A
100269	Bracket, hi-limit thermostat
100010	Warmer plate assy, 120V 100W, black
100187	Warmer element, 120V 100W
151677	Thermistor probe, dual temp 7.312
500404	Probe assy, liquid level, 90 deg, 1.45"
Labels	
119978	Label, faceplate, red window
121479	Label, faceplate, blue window
401361	Label, combo faceplate "Regular Bold Tea"
119996	Label set, round icons
100254	Decal, Hot Surfaces warning
Flow controls	
110305	Flow regulator, PDS adjustable, low
101350	Flow regulator, diaphragm type, .35
100298	Flow washer, .35 GPM
Baskets/servers	
110985	Brewbasket, black coffee
110856	Brewbasket, clear tea
121752	Pitcher, ice tube, 3.3 liter tea
Tubing/seals	
110885	Faucet assy, lift up handle
803131	Hose, reinforced silicone, 1/4 ID X .52 OD
111240	Hose, grey silicone, 1/4 ID X 1/2 OD
119843	Sprayhead tube assy, internal
201173	Nut, sprayhead, 7/16-20 S/S
201208	Sprayhead, RD dump, .086 drill
152207	Plug, tank silicone
500038	Grommet, silicone, thermistor, .06 hole
500350	Grommet, silicone, probe, .31 hole
Miscellaneous	
100665	Foot, rubber push-in, plastic base
100078	Foot, screw in, metal base

Wiring Diagram



WARRANTY

Applies to all equipment manufactured after 2/1/2017. This warranty supersedes all other previous warranties that are currently in manuals.

Newco warrants equipment manufactured by it for 1 year parts and labor.
Accessories and Dispensers 1 Year parts only.
Electronic Circuit and Control Boards- 3 years parts, 1 year labor.
Equipment manufactured by others and distributed by Newco- please see original equipment manufacturers warranty, Newco will follow.

These warranty periods run from the date of sale Newco warrants that the equipment manufactured by it will be commercially free of defects in material and workmanship existing at the time of manufacture and appearing within the applicable warranty period. This warranty does not apply to any equipment, component or part that was not manufactured by Newco or that, in Newco's judgment, has been affected by misuse, neglect, alteration, improper installation or operation, relocation or reinstallation, improper maintenance or repair, incorrect voltage applied to the unit at any time, damage or casualty. This warranty does not apply to any equipment failures related to poor water quality, excessive lime and chlorine and non periodic cleaning and descaling. Warranty is null and void if muriatic or any other form of hydrochloric acid is used for cleaning or deliming. In addition, this warranty does not apply to replacement of items subject to normal use including but not limited to user replaceable parts such as faucet seat cups, sight gauge tubes, washers, o-rings, tubing, seals and gaskets.

This warranty is conditioned on the Buyer 1) giving Newco prompt notice of any claim to be made under this warranty by telephone at (800) 556-3926 or by writing to 3650 New Town Blvd, Saint Charles, MO 63301; 2) if requested by Newco, shipping the defective equipment prepaid to an authorized Newco service location; and 3) receiving prior authorization from Newco that the defective equipment is under warranty.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY OTHER WARRANTY, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The agents, dealers or employees of Newco are not authorized to make modifications to this warranty or to make additional warranties that are binding on Newco. Accordingly, statements by such individuals, whether oral or written, do not constitute warranties and should not be relied upon.

If Newco determines in its sole discretion that the equipment does not conform to the warranty, Newco, at its exclusive option while the equipment is under warranty, shall either 1) provide at no charge replacement parts and/or labor (during the applicable parts and labor warranty periods specified above) to repair the defective components, provided that this repair is done by a Newco Authorized Service Representative; or 2) shall replace the equipment or refund the purchase price for the equipment.

THE BUYER'S REMEDY AGAINST NEWCO FOR THE BREACH OF ANY OBLIGATION ARISING OUT OF THE SALE OF THIS EQUIPMENT, WHETHER DERIVED FROM WARRANTY OR OTHERWISE, SHALL BE LIMITED, AT NEWCO'S SOLE OPTION AS SPECIFIED HEREIN, TO REPAIR, REPLACEMENT OR REFUND.

In no event shall Newco be liable for any other damage or loss, including, but not limited to, lost profits, lost sales, loss of use of equipment, claims of Buyer's customers, cost of capital, cost of down time, cost of substitute equipment, facilities or services, or any other special, incidental or consequential damages.