14.1 The Rebuilt RTC LA-306

This supplement describes the differences between LCI rebuilt versions of RTC's original LA-306 and the new LCI model described in the core chapters of this manual. Manufactured between 1984 and 2005 by Radiant Technology Corporation, RTC's LA-306 is a compact, near-infrared, conveyor belt furnace for laboratory and general purpose thermal processing in the range of 100-980 °C. Furnaces rebuilt by LCI have the entire control system replaced with modern digital controllers and logic described in this manual.



Figure 14-1 RTC LA-306 Furnace Front Elevation

The RTC LA-306 is a slightly smaller furnace with a chamber length of 700 mm (27.5 inches), 63 mm (2.5 inches) shorter than the LCI model. Entrance and transition baffles are 160 mm (6.25 inches) long, each 220 mm (8.75 inches) shorter than the LCI model. The cooling section is 1015 mm (40 inches) long, 254 mm (10 inches) longer than the LCI model thereby making the combined cooling of the transition baffle and cooling roughly equivalent for both models (1174 mm on the RTC vs. 1143 mm on the LCI)

Similar to the LCI model, it transports product on a 150 mm (6-inch) wide belt with a chamber clearance above the belt of 50 mm (2 inches). RTC LA-306 furnaces feature a hermetically sealed heating chamber permitting control of the furnace chamber process environment. Baffle sections before and after the heating section contain curtains that hang down to just above the belt to further isolate the furnace chamber from the room atmosphere and from the cooling section.

RTC LA-306's can process substrates, wafers, PCBs, metal, ceramic, glass or polycarbonate parts for electronic package sealing, thermo-setting polymer curing, reflow soldering, hybrid/thick film firing, brazing, annealing, tempering and metal sintering applications, or almost any kind of general thermal processing requiring precision temperature control in a controlled atmosphere environment.



Figure 14-2 Entrance Elevation

14.2 Console Controls & Indicators

14.2.1 Control Console

Control of the furnace is via a control console (Figure 14-3) with completely new front panel, control instruments and electrics installed in the original enclosure mounted over the heating section of the furnace. Original flowmeters have been re-plumbed to support either single or optional dual gas operation as described in Paragraph 2.4.2.



Figure 14-3 RTC LA-306 Control Console

14.2.1 Transport Drive

A. Major Components

The major transport drive components are listed in Table 14-1.

Table 14-1 Transport Drive Components							
ltem	Brand	Model	Drive Speed	HP	Torque, (in-LB)	Motor Voltage	Gear Ratio
Controller	Minarik	PCM21010A	-	1/40-1/8	-	90 Vdc	-
Alt Controller*	Iron Horse	GSD4-240-1C	-	1/50-1/8	-	90 Vdc	-
Motor	Bison	011-190-0702	2.6 rpm	1/40	100	90 Vdc	702:1
Encoder	Automation Direct	TRD-NH30-RZWD	30 ppr	4.75-30 Vdc	-	-	-

*2014 models only. Uses GSDA-AI-V4 Isolated Analog Voltage Signal Input Card

B. Motor Controller

The RTC LA-306 includes one of the motor controllers shown below. These motor controllers are set for 90 Vdc motor operation. The motor controller is mounted in the furnace Control Enclosure.



When operated in the Manual Mode the motor controller uses the control panel-mounted potentiometer to scale output voltage to the motor. In the Normal (or automatic) Mode the PLC averages the pulse counts from the encoder and modifies the signal to the motor controller to maintain motor speed using a PID loop.



2014 models used the IronHorse controller which requires the use of an added card to accommodate the incoming dc analog signal from the PLC. Models after 2014 incorporate the Minarik controller which has the ability to receive dc analog signals without an additional board. Either board can be installed to run the furnace.

C. Transport Drive Motor

The transport drive motor is a 1/40 HP TENV Brushless parallel shaft DC gearmotor and encoder assembly. The transport motor assembly is mounted in an enclosure at the exit end of the furnace. Drive chain and motor sprocket sized to provide the desired belt speed range shown in Table 1-4. The motor is shown in Figure 1-27 and Figure 1-28.



Figure 14-8 Drive Motor



Figure 14-9 Transport Drive DC Motor

D. Speed Encoder

The motor is equipped with a 30 pulse per revolution dual channel 5-30 Vdc push-pull encoder (Figure 1-29). One channel is connected to the rate meter to report the belt speed, the other to the PLC to lock in the belt speed.





Figure 14-10 Encoder

14.3 Installation

Once located, ¹/₄-inch diameter concrete fasteners, or equivalent, should be used to assure the RTC LA-306 model is safely secured to the facility floor. To complete proper installation follow the guidelines in Chapter 2 of this manual except as noted on drawing 803-100267 INSTALLATION DRAWING in this Chapter.

14.4 Initial Setup

Except as noted below, follow the instructions in Chapter 3 of this manual.

14.5 Operation

Except as noted below, follow the instructions in Chapter 4 of this manual.

14.6 Modifying Control Strategies

Follow the instructions in Chapter 5 of this manual.

14.7 Service & Maintenance

The guidelines Chapter 7 of this manual apply to refurbished RTC LA-306 furnaces except as noted for various installed motor equipment.

14.7.1 Motor and Motor Controller

The RTC LA-306 furnace is equipped with a 1/50 HP Bodine N1D shunt-wound 1728:5.76 rpm DC gearmotor. Alternately, a 1/40 HP Bison 100 series PMDC permanent magnet TENV 1790:6.6 rpm gearmotor may be installed. See Frame Wiring Diagram 802-101781-02 in this chapter and detail corresponding to your motor.

14.8 **MSDS**

The MSDS in Chapter 12 of this manual apply to refurbished RTC LA-306 furnaces.

Chapter 14

						DOC NBR: STD - 802-101401-02 R2				
 LCI Furnaces				EQUIPMENT SPECIFICATIONS		MODEL: RTC A-306		STD POWER		
			SERIAL NBR:				SHT 1 OF 1			
CONTINUOUS BELT IR FURNACE										
Equipment M	odel								-	
Model	Base Equipment			Cont	Control Zones		ated Length	Nominal Furna	ice Belt Width	
RTC LA-306	Atmosphere Furnace				3		699 mm	6.0 in 152 mm		
Equipment Arrangement										
Phase	Process				Max	Ler	ngth	Process Gas	Temperature (typ)	
Phase 1	IR Furnace,	3 Zones		1000 °C		28 in	699 mm	CDA, N2, FG	450-950 C	
Phase 2	Gas Convective Cooling, Exterior Fan			Heat Removal		6 in	159 mm	CDA or N2	350-40 C	
	(includes transition tunnel)									
Process Sect	tions									
Function	Name			Location		Length		Process Gas	Temperature (typ)	
Product Load	Load Station			Entrance load area		9.5 in	241 mm	none	ambient	
	Entr Baffle/Entrance Stack with Educt		ck with Educt	Entrance barrier		6.25 in	159 mm	CDA or N2	80-250 C	
IR Furnace	Zone 1 Zone 2			Furnace ch	amper 1	0.0 IN 14 3 in	168 mm 363 mm	N2 or FG	80-975 C	
	Zone 3		Furnace chamber 1		6.6 in	168 mm	N2 or FG	80-975 C		
		ما					150 mm	none	360 %	
Cooling Section			Heat/cool barrier		0 IN 40 in	1016 mm	NO	55_360 C		
Product Upload	Unload Stat			Evit unload	aroa	40 in	241 mm	nopo	ambiont	
	Frame Adiu	stment			area	9.0 m 2.5 in	64 mm	none	amplent	
	Total	Simeni				101.5 in	2578 mm			
Process Gas	(If Single Ga	s combine G	AS1 & GAS2 F	Quel Gas: GAS 2 - CDA N2 a		r EG to furnace besting asso		CASI-N2 or CDA to all except zenes)		
1100035 045	(ii oliigie da	Actual Condito	ns	Typical 425	C CDA operation	Typical 950 C low O2 operation		Max (all flowr	neters open)	
Furnace Repleni	shment Rate			2.	0 rep/min	3.7	rep/min	3.9	rep/min	
	Temp	Press		Typic	al Min Flow	Typical	Typical		Max Compressor	
On of Osmahi	0°C	psi		sc	fh sL/m	scfh	sL/m	scfh	sL/m	
	21	70		130		238	113	838	390	
	Supply 21 70			32	2 15		33	3/5		
101AL PROCESS GAS 170 80 308 146 1,213							572			
Exhaust Gas	Tomp	Draca		Tunia	ol Min Flow	Turning	Turning		Maximum Exhaust	
	°C	in H ₂ O		scfh sL/m		scfh sL/m		scfh s		
GAS 1 & 2, MIX 200 6			170) 80	202	95	348	164		
Cabinet Vent	ilation			1						
Cabinet Ventilation	on Fans		Flowrate			550 cfm	930 m3/h	550 cfm	930 m3/h	
(vent to room or	exhaust syst	em)	Temperature			<86°F	<30°C	<122°F	<50°C	
Control Cabinet Ventilation Fans Flowrate		Flowrate			212 cfm	360 m3/h	212 cfm	360 m3/h		
(vents to room)			Temperature			<86°F	<30°C	<104°F	<40°C	
Transport Sy	stem					1				
Belt width 6.0 in			6.0 in	152.4 mr	n	Belt Edge He	ater(s):	none		
Beit type			Balanced spi	rai weave	tloval	Baffle plate clearance: 0.5" above belt				
Product height 2 in (50.8 mi			2 III (50.6 IIII	10 above bei $2.40 inm$	t level.	25-500 mm/m or 50-500 mm/min				
Convover height 36.0 in		36.0 in	+/-15 in adjustable		914.4 mm		+/-38.1 mm	adiustable		
Electrical Su	tom		Single	Dheee	adjustable		514.4 mm	2 Dhese	adjustable	
Voltage (ac conf	aured)	208 1/20		230 Vac	240 \/oo	208 \/20	220 \/20	380 1/20	415 \/22	
Frequency H7	gurea)	206 vac	220 Vac	230 Vac	240 Vac 50/60	206 vac 50/60	50/60	50/60	415 Vac	
Power. maximun	n. kW	14.0	14.3	14 6	15.0	14.0	14.3	14.3	15.0	
Current, maximu	m, A	67.3	65.2	63.7	62.3	38.9	37.7	37.7	36.0	
Power, kW @ 42	25 C	6.3	6.5	6.6	6.7	6.3	6.5	6.5	6.7	
Current, A @ 42	5 C	30.4	29.5	28.7	28.1	17.6	17.0	17.0	16.2	
Power, kW @ 95	50 C	8.3	8.6	8.7	8.9	8.3	8.6	8.6	8.9	
Current, A @ 950 C 40.1 38.9			37.9	37.1	23.2	22.4	22.4	21.4		
Materials of Construction										
Heating Chamber 304 Stainless steel Cooling			Aluminum,	aircraft	Belt		Nichrome V, 80%Ni,20%Cr, <1% Fe			
Baffle & Eductor 304 Stainless steel Belt support			Quartz rod,	Quartz tube	Frame Steel, epoxy or pov			der coated		
Heating element Quartz, near infrared Belt Return UHMW-PE Cover Panels 18GA steel, epoxy coated							oated			
Furnace Dimensions										
Length Wid			Width	Height (floor to stack)		stack)	Furnace Sect	Coolg Sectn	Total Net Wt	
U.S.	U.S. 102 in		18 in		80 in	+/- 1.5 in	800 LB	none	800 LB	
Metric 2.6 m		46 cm		203 cm	+/- 3.8 cm	370 kg	none	370 kg		
Standard Conditions			Pressure	14./ psia	101.3 kPa		remperature	70 °F	21 °C	





Expected three phase current draw when stabilized at various temperatures.

14.11 RTC LA-306 DRAWINGS

Refer to the following drawings in lieu of the corresponding drawings in Chapter 10. RTC's furnace chamber drawing is included to illustrate its smaller size. Two versions of the Frame Wiring drawing are included depending upon the model of Belt Speed tachometer supplied. Table 14-2 lists the drawings that are specific to an LCI rebuilt LA-306.

Table 14-2 Applicable Drawings for LCI Rebuilt RTC LA-306					
Master		Drawing Nbr.	Title		
	STD	803-100267	FURNACE ARRANGEMENT, RTC LA-306		
	STD	803-091734-02	RTC LA-306FURNACE CHAMBER		
	STD	802-101781-02	FRAME WIRING SCH		





