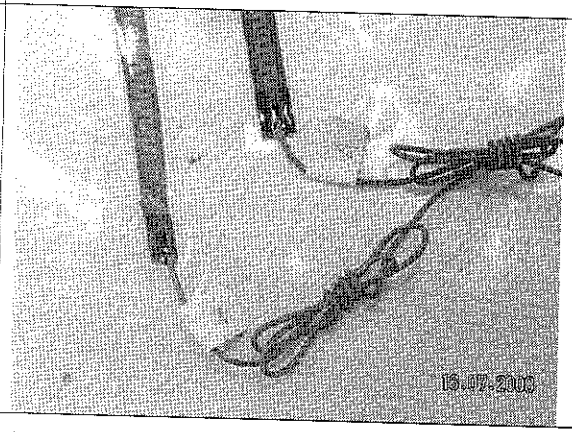
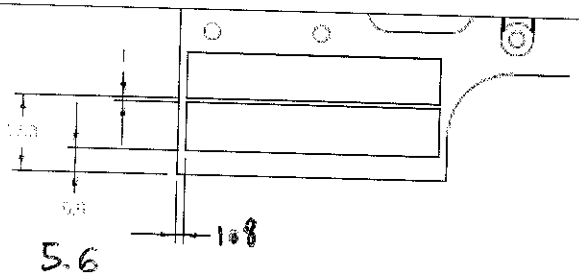
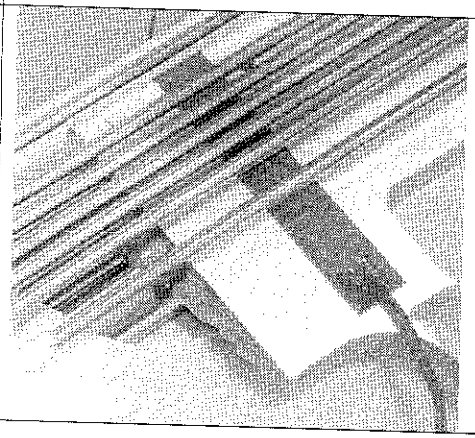
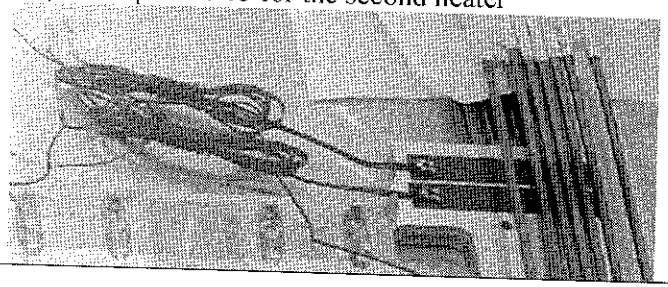
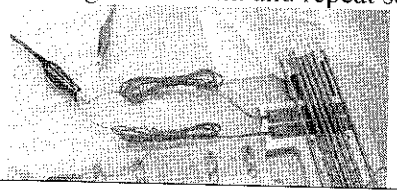
7.2 Liquid line Inlet/outlet foil heater installation procedure sheet

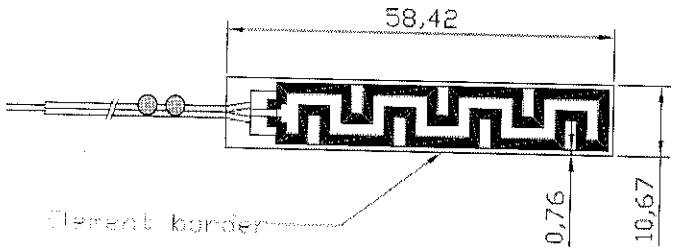
	Inlet/outlet foil heater installation procedure		company: AIDC		date: ~~19~~ 14 January 2009	
	Fill in by hand.		engineer: Shrek		location: AIDC	
Step	Action	Monitoring	Value	**Result**	Comment	√
1.	Record condenser model (P-ram, P-wake, S-ram, S-wake)	T.I. description	-	FM 3 PR		
2.	Record model (EM / QM / FM)	model	-	FM		
	Visual and electical inspection					
3.	Record test equipment used	manufacturer, type				
4.	Visual inspection on the heaters to be installed		-			
5.	Label the lead wire near the heater that it can be clearly identified when for check. Report in the table (Appendix A) the part number correspondent.	Part number TTCS heater ID	A or B	ok		

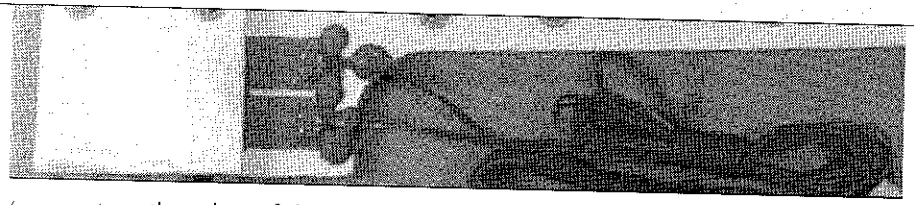
	Inlet/outlet foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
				ok		
6.	label the lead wire near the heater that it can be clearly identified when for check. Report in the table (appendix A) the part number correspondent	Part number TTCS heater ID	A or B	ok	SEE TABLE	
7.	Check the resistance and record	resistance	7.3 Ohm +/- 10%	ok		
	Surface preparation					
8.	Wipe the bonding surface area with K-Dry tissues or equivalent dampened with isopropyl alcohol.			ok		
9.	Determine the required position of the heater and mark reference points with Aluminum tape. Close out all gaps around the edge of heaters			ok		

	Inlet/outlet foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
17.3						
10.	Prepare the location and dimension of MINCO heater according to. Drawing ET5998-09-DR-001-A-KW-CONDENSOR ASSEMBLY or ET5998-10-DR-001-0-KW-CONDENSOR ASSEMBLY (and figure in Appendix A)			ok		
11.	Strip the adhesive backing from the heater and lay the heater on the top plate per the reference drawing and gently press it into place per figure in appendix A			ok		

	Inlet/outlet foil heater installation procedure					
	Fill in by hand.		company:		date:	
Step	Action		engineer:		location:	
		Monitoring	Value	**Result**	Comment	√
						
12.	Use a rubber roller (or equivalent tool) to press the heater onto the top plate. Roll from the centre toward the edges.			ok		
13.	Repeats step 12, make sure no trapped air under the heaters.			ok		
14.	Repeat step 11 to 13 for the second heater 			ok		

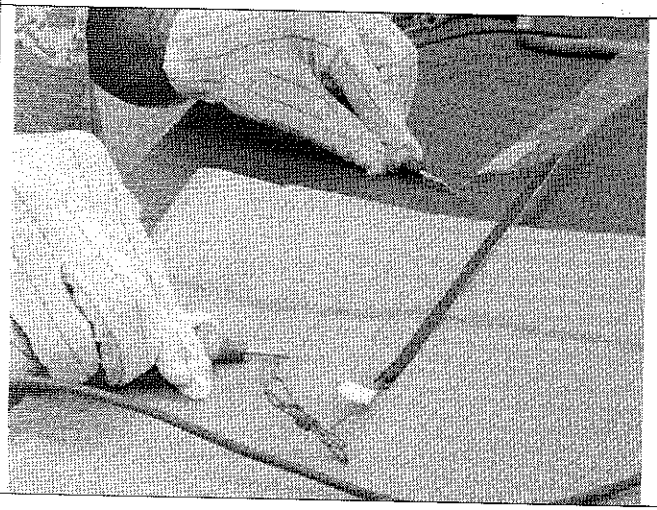
	Inlet/outlet foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
15.	For QM check resistance after gluing per heater individually For FM check resistance after gluing per heater individually		7.3 Ohm +/- 10%	A= B=		
16.	For QM/FM: Power on A & B heater parallel to a **4.2 V** power supply. Rolling while warm and repeat several times 			ok		
	Electric Checkouts and Record					
17.	Record Multimeter used	Type; S/N; cal. Valid date				
18.	Record power supply used	Type; S/N; cal. Valid date				
19.	Check the heaters are electrically isolated with the panel by using Multi-meter.					
20.	For QM/FM: Power on heater A to a **4.2 V** power supply.. Record the voltage and current values of the heater For QM/FM: Power on heater B to a **4.2 V** power supply..	Voltage current	4.2 V 0.57 A	V_A= 4.207 V I_A= 0.53A Vb= 4.2V		

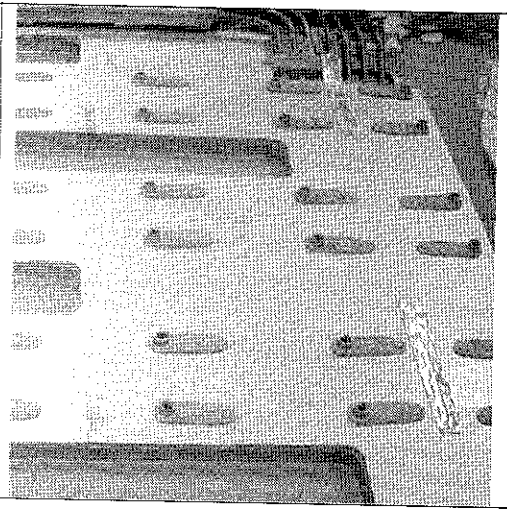
	Inlet/outlet foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
	Record the voltage and current values of the heater			Ib= 0.55		
21.	Recored the derived resistance	Resistance	V/I	RA_{dev}= RB_{dev}=		
22.	Check the derived resistance with the measured one (step 7)	Resistance	From step 7	RA_{mes}= RB_{mes}=		
	Heater tape installation					
23.	Record glue 3M 2216 data and mixing ratio	Expiring date Mixing ratio				
24.	Put glue on the wire leads (3 mm diameter or more, as needed)  NOTE: this wire fixing has to be performed during the final gluing step (together with the installation of all the remaining top plate foil heaters)					

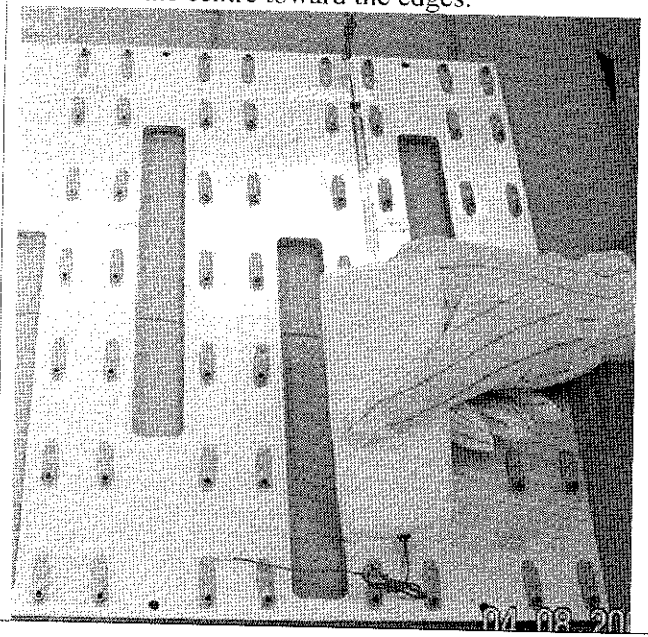
	Inlet/outlet foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
	 (no spot on the edge of the heaters!)					
25.	7 days for fully curing					
26.	End					

7.3 Condenser 120 V foil heater installation procedure sheet

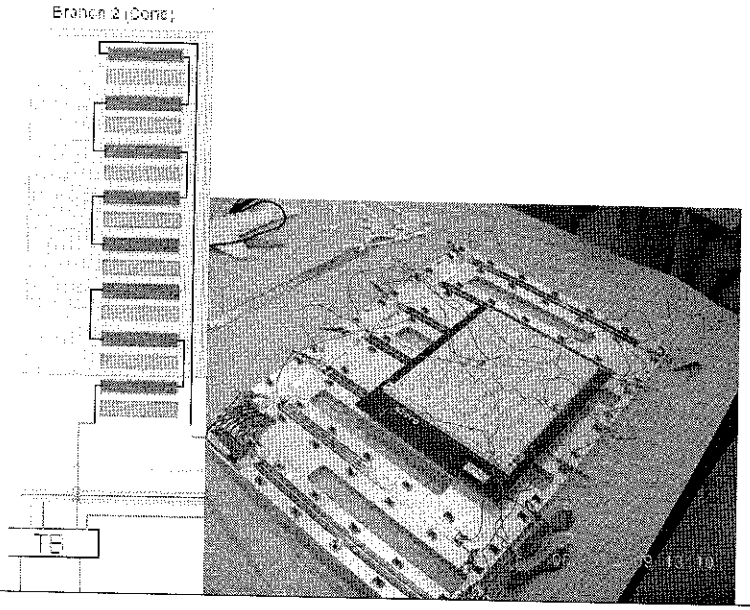
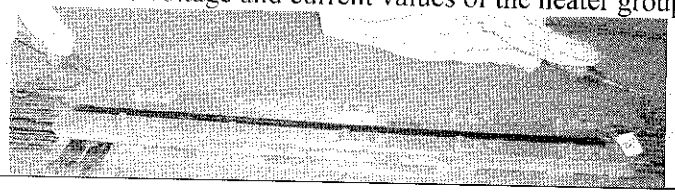
	Condenser 120 V foil heater installation procedure		company: AIPC		date: 19 January 2009	
	Fill in by hand.		engineer: Shrek		location: AIPC	
Step	Action	Monitoring	Value	**Result**	Comment	√
1.	Record condenser model (P-ram, P-wake, S-ram, S-wake)	T.I. description	-	FM3 PR		
2.	Record model (EM / QM / FM)	model	-	FM		
	Visual and electical inspection					
3.	Record test equipment used	manufacturer, type				
4.	Visual inspection on the heaters to be installed		-			
5.	Label the lead wire near the heater that it can be clearly identified when for check. Report in the table on appendix A the part number correspondent.	Part number TTCS heater ID	A or B	ok	see Table	
6.	label the lead wire near the heater that it can be clearly identified when for check. Report in the table on appendix A the part number correspondent	Part number TTCS heater ID	A or B	ok	see Table.	
7.	Repeat step 5 and 6for the remaining pairs of heaters			ok		
8.	Check the resistance and record (in table in Appendix A)	resistance	48.4 Ohm +/- 10%	ok		

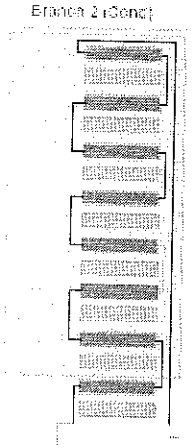
	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
	Surface preparation					
9.	Wipe the bonding surface area with K-Dry tissues or equivalent dampened with isopropyl alcohol.			ok		
10.	Determine the required position of the heater and mark reference points with Aluminum tape. Close out all gaps around the edge of heaters			ok		

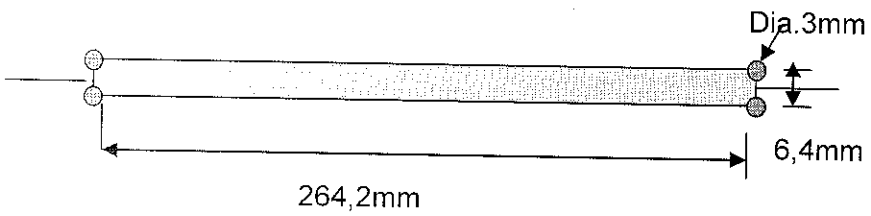
	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
						
11.	Prepare the location and dimension of MINCO heater according to Appendix B and drawing ET5998-09-DR-001-A-KW-CONDENSOR ASSEMBLY or ET5998-10-DR-001-0-KW-CONDENSOR ASSEMBLY (figure in Appendix A)			ok		
12.	Strip the adhesive backing from the heater and lay the heater on the top plate per the reference drawing and gently press it into place per figure in appendix A			ok		

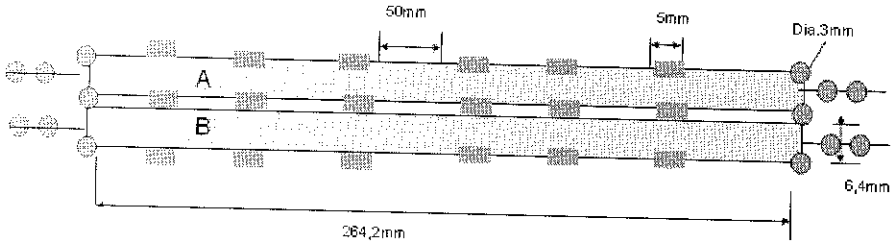
	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
13.	Use a rubber roller (or equivalent tool) to press the heater onto the top plate. Roll from the centre toward the edges. 			ok		
14.	Repeats step 13, make sure no trapped air under the heaters.			ok		
15.	For QM/FM: Power on A heater parallel to a ~~50 V~~ 15 V power supply. Rolling while warm and repeat several times			ok		

	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
16.	Repeat step15 for heaters B			ok		
	Electric Checkouts and Record					
17.	Record Multimeter used	Type; S/N; cal. Valid date				
18.	Record power supply used	Type; S/N; cal. Valid date				
19.	Check the heaters are electrically isolated by using Multi-meter.					
20.	Connect all heaters A in series(red), using a bread-board					

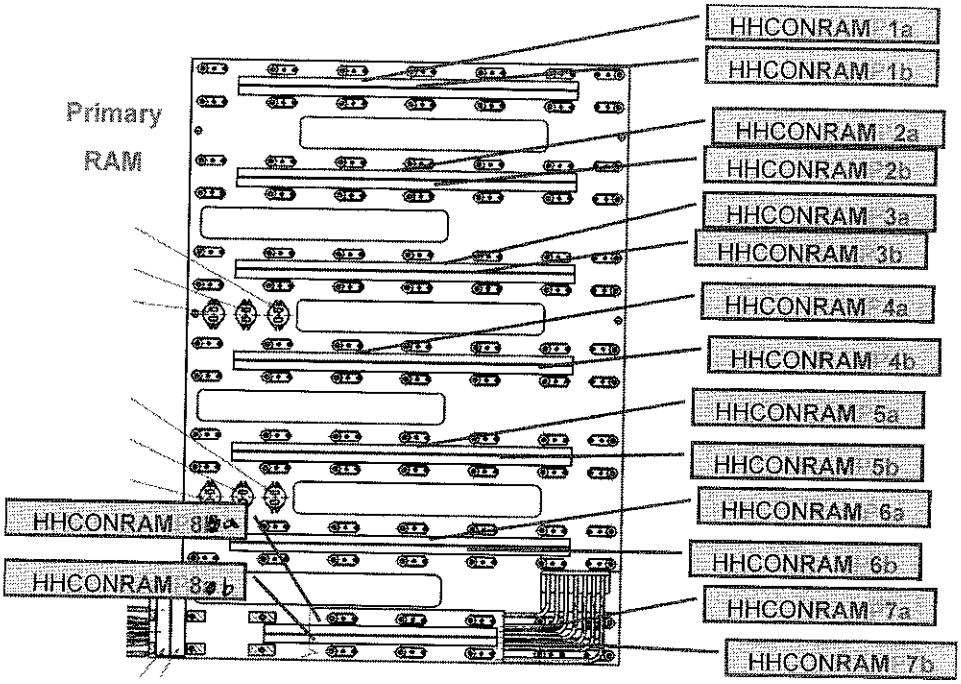
	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
					R_A = 400.89 (No. power)	
21.	For QM/FM: Power on heaters A to a **50 V** power supply.. Record the voltage and current values of the heater group 	Voltage current		Va = 50 V Ia = 124.2 mA = 0.1242 A		

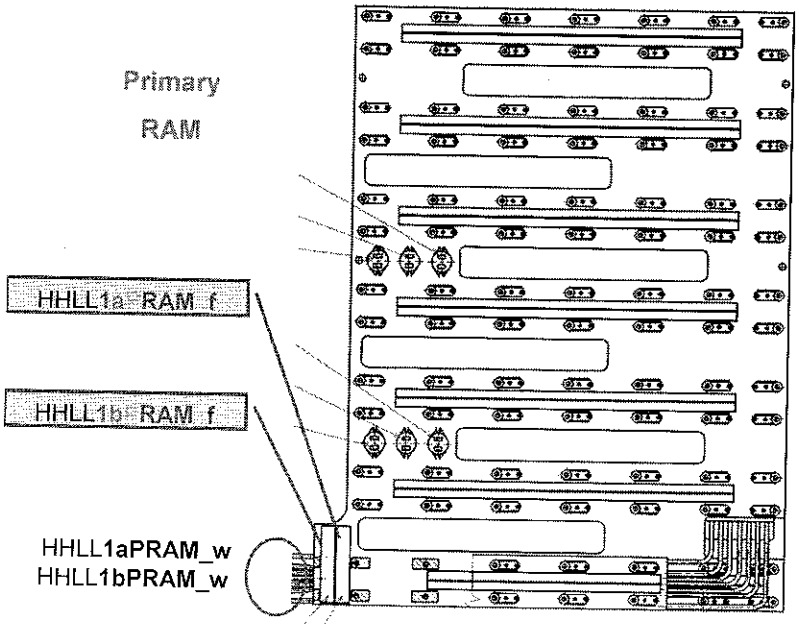
	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
22.	Check the derived resistance with the measured one for heaters A(step8)	Resistance	Design: 8*48,4=387,2Ohm From step 8(measured): 8*R_{step8}= Ohm	**Derived Resistance (V/A)(Ω) Ra=**		
23.	Connect all heater B in series (orange) 				R_B = 397,13 (No power)	
24.	For QM/FM: Power on heaters B to a **50 V** power supply. Record the voltage and current values of the heaters	Voltage current		Vb= 50 V Ib= 0,125 A		

	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
25.	Check the derived resistance with the measured one for heaters B(step8)	Resistance	Design: 8*48,4=387,2Ohm From step 8: $8*R_{step8}$= Ohm	**Derived Resistance (V/A)(Ω) Rb=**		
	Heater Tape Installation					
26.	Record glue 3M 2216 data and mixing ratio	Expiring date Mixing ratio		as the same of FM1.		
27.	Put 4 spots of glue on the heater patch corners (3 mm diameter) (**DON'T SPOT GLUE THE HEATERS UNDER STRAIN RELIEF SIDE)**  			ok		

	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
28.	Put glue on the wire leads (3 mm diameter or more, as needed)			OK	Put Tape 3M 5490 to fix the cable of heater	
29.	Put glue on the edges : every 50 mm put a spot of glue of this size: 2 to 3 mm wide (i.e.: across the edge), enough to bridge the heater and the surface underneath 5 mm long (i.e.: along the edge) (**DON'T SPOT GLUE THE HEATERS UNDER STRAIN RELIEF SIDE**) 			ok.	"	
30.	Repeat step 26 to 29 for all the remaining heaters.			ok		

	Condenser 120 V foil heater installation procedure		company:		date:	
	Fill in by hand.		engineer:		location:	
Step	Action	Monitoring	Value	**Result**	Comment	√
31.	7 days for fully curing					
32.	End					


Primary
RAM
HHCONRAM 1a
HHCONRAM 1b
HHCONRAM 2a
HHCONRAM 2b
HHCONRAM 3a
HHCONRAM 3b
HHCONRAM 4a
HHCONRAM 4b
HHCONRAM 5a
HHCONRAM 5b
HHCONRAM 6a
HHCONRAM 6b
HHCONRAM 7a
HHCONRAM 7b
HHCONRAM 8a
HHCONRAM 8b


Primary
RAM
HHLL1a RAM f
HHLL1b RAM f
HHLL1aPRAM_w
HHLL1bPRAM_w

8 Appendix A

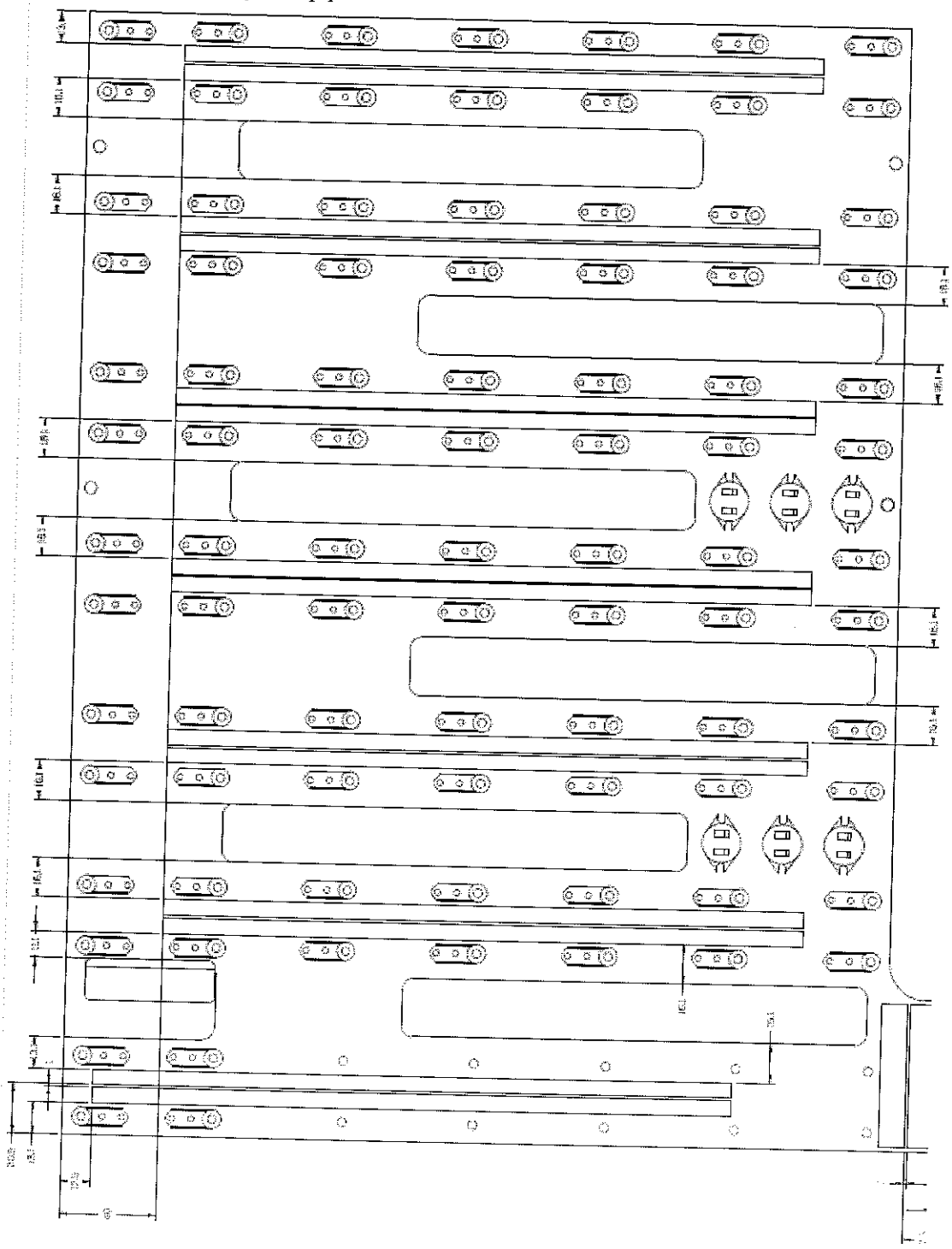
In the following tables are described the correspondence between the ID heater on TTCS loop are related to the heater P/N provided by the supplier:

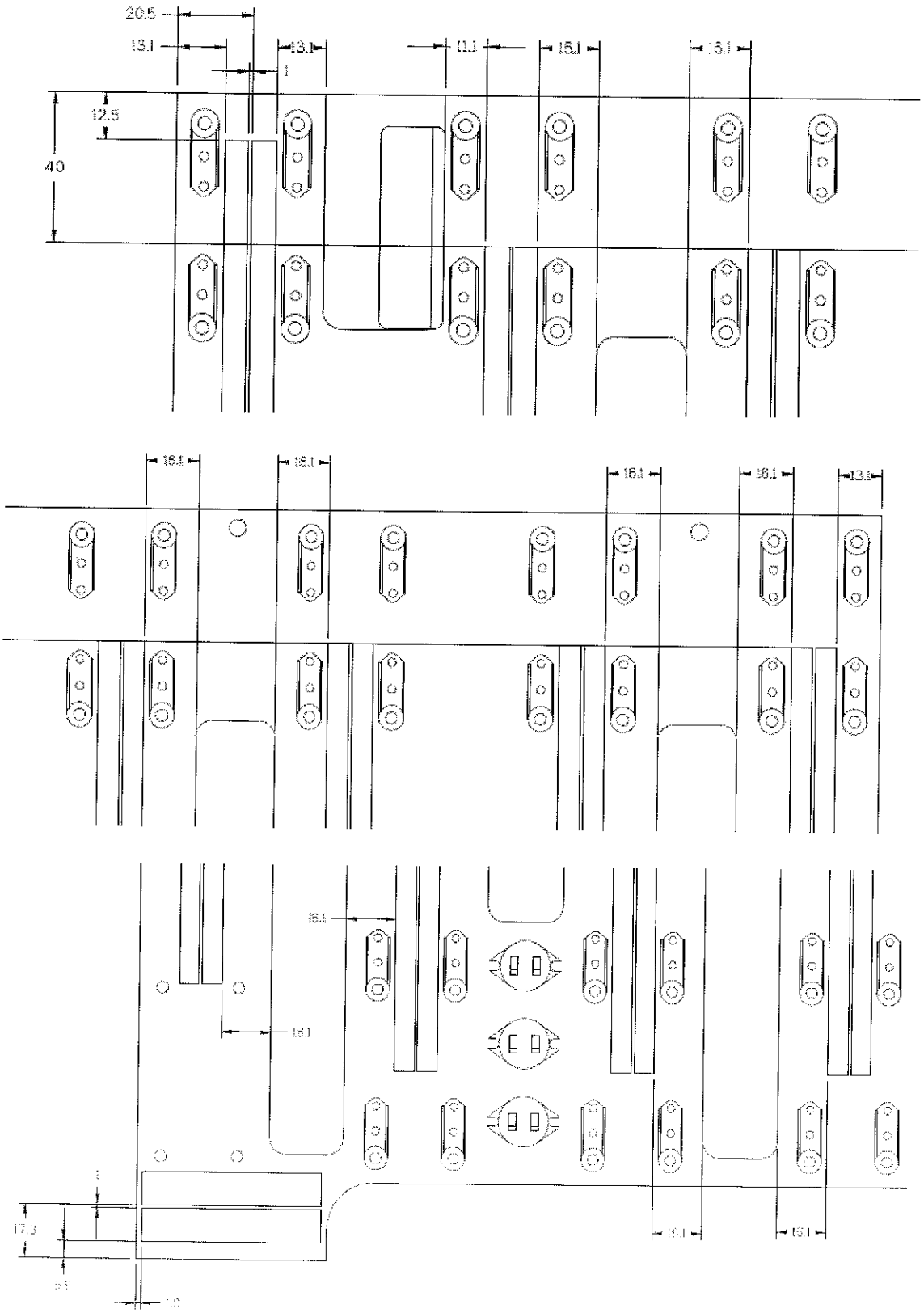
Location/	Condenser	ID heater	P/N	Ω Before gluing	After gluing
Inlet/outlet foil heater	QM	HHLL1aPW_f			
		HHLL1bPW_f			
	PW	HHLL1aPWAK_f			
		HHLL1bPWAK_f			
	SR	HHLL1aSRAM_f			
		HHLL1bSRAM_f			
	PR F13	HHLL1aPRAM_f	No. 7	7.81	7.8
		HHLL1bPRAM_f	No. 8	[illegible]	[illegible]
	SW	HHLL1aSWAK_f		7.62	7.61
		HHLL1bSWAK_f			
Condenser foil heater	QM	HHCONWP7a			
		HHCONWP7b			
	PW	HHCONWAKEP1a			
		HHCONWAKEP1b			
		HHCONWAKEP2a			
		HHCONWAKEP2b			
		HHCONWAKEP3a			
		HHCONWAKEP3b			
		HHCONWAKEP4a			
		HHCONWAKEP5a			
		HHCONWAKEP5b			
		HHCONWAKEP6a			
		HHCONWAKEP6b			
		HHCONWAKEP7a			
		HHCONWAKEP7b			
		HHCONWAKEP8b			
		HHCONWAKEP8a			

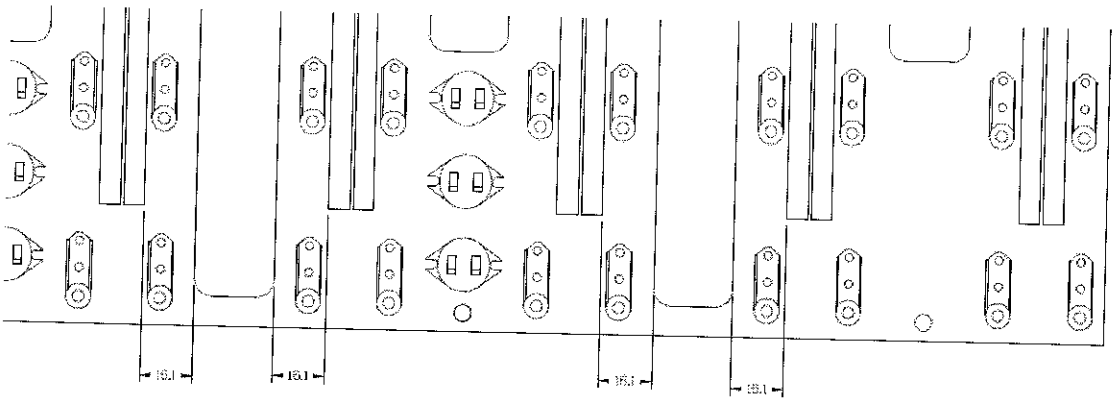
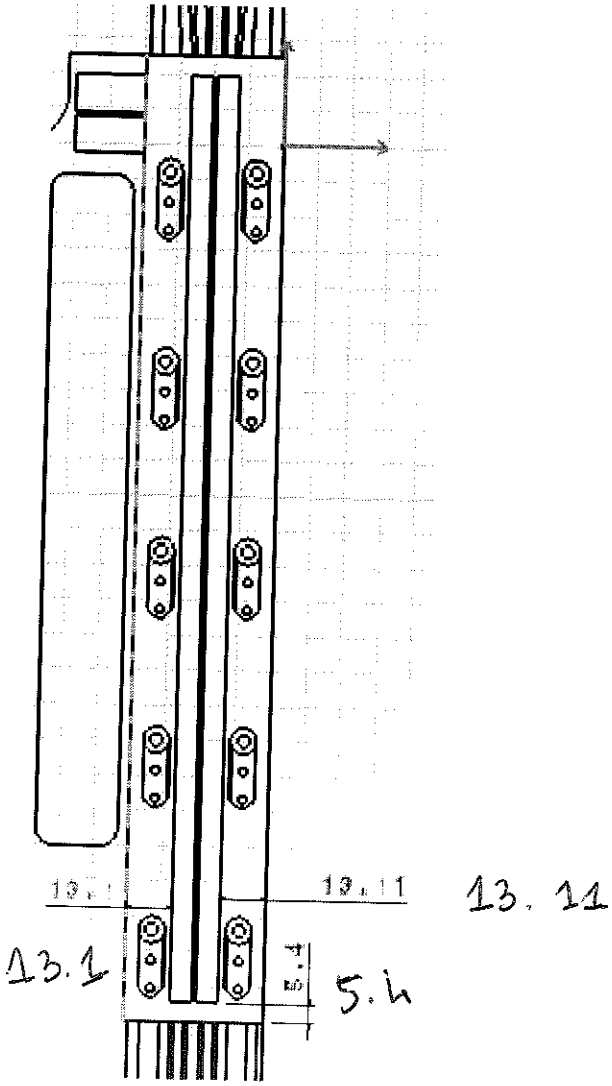
		Ω before gluing	after gluing
SR	HHCONRAMS1a		
	HHCONRAMS1b		
	HHCONRAMS2a		
	HHCONRAMS2b		
	HHCONRAMS3a		
	HHCONRAMS3b		
	HHCONRAMS4a		
	HHCONRAMS5a		
	HHCONRAMS5b		
	HHCONRAMS6a		
	HHCONRAMS6b		
	HHCONRAMS7a		
	HHCONRAMS7b		
	HHCONRAMS8b		
	HHCONRAMS8a		
PR Fig 3	HHCONRAMP1a No. 35	50.50	
	HHCONRAMP1b No. 36	49.19	
	HHCONRAMP2a No. 37	50.91	
	HHCONRAMP2b No. 38	49.28	
	HHCONRAMP3a No. 39	49.61	
	HHCONRAMP3b No. 40	49.52	
HH CONRAMP 4b: No. 42	49.87	HHCONRAMP4a No. 41	49.55
	HHCONRAMP5a No. 43	50.68	
	HHCONRAMP5b No. 44	50.27	
	HHCONRAMP6a No. 45	50.59	
	HHCONRAMP6b No. 46	49.79	
under strain relief	HHCONRAMP7a No. 33	49.77	49.77
	HHCONRAMP7b No. 34	49.92	49.93
	HHCONRAMP8b No. 47	50.31	
	HHCONRAMP8a No. 48	50.31	
SW	HHCONWAKES1a		
	HHCONWAKES1b		
	HHCONWAKES2a		
	HHCONWAKES2b		
	HHCONWAKES3a		

9 Appendix B

Foil heater positioning on top plate




20.5
13.1
13.1
1
11.1
15.1
15.1
12.5
40
15.1
15.1
15.1
15.1
13.1
15.1
15.1
15.1
15.1



Foil heater positioning on top strain relief