Product Service

Technical Report No. 64.110.07.0792.01
Rev. 01
Dated November 26, 2007

Client:	G-Technologies Co., Ltd. Chaqiao Industrial District, Shiqi, Zhongshan City, 528404, Guangdong Province, P. R. China
Manufacturing place:	Same as client
Test subject:	Product: Control PCB for elevator Type: SRU
Test specification:	Annex F F.6 of EN 81:1998 + AC : 1999
Purpose of examination:	• Test according to the test specification
Test result:	The test subject was found to be in compliance with the test specification

1 Description of the test subject

1.1 Function

Manufacturer's specification for intended use:

Control PCB for elevator

Model:	SRU
Rated Voltage Input:	24 V d.c.
Main control output:	230V~ (terminal S1 and S2), 50Hz
Control output:	24 V d.c. (terminal FB)
Ambient temperature:	-25℃ ~ +65℃
Pollution degree:	3

2. Order

2.1 Date of Purchase Order

June 22, 2007

2.2 Receipt of Test Sample, Location

The test object was sent to Guangzhou on September 24, 2007.

2.3 Date of Testing

From September 27, 2007 to November 23, 2007

2.4 Location of Testing

The testing was done in Guangzhou, department ELS, per your order.

2.5 Points of Non-compliance or Exceptions of the Test Procedure

None

3. Test Results

The presented unit was found to be in compliance with the test specification.

3.1 Positive Test Results

Electrical safety *Annex F F.6 of EN 81:1998 + AC : 1999*

F6.3.1 Mechanical test
F.6.3.1.1 Vibration test
F.6.3.1.1 a

EN 60068-2-6:1995 Endurance by sweeping: Table C.2

Table C.2 — Endurance by sweeping — Examples with higher cross-over frequency

Frequency range Hz	Number of sweep cycles in each axis				Examples of application
	Amplitude[a]				
	0,15 mm or 20 m/s²	0,35 mm or 50 m/s²	0,75 mm or 100 m/s²	1,5 mm or 200 m/s²	
1 to 35[b]	—	100	100	—	Equipment mounted adjacent to heavy rotating machinery
10 to 55[b]	10	—	—	—	Equipment intended for large power plants and for general industrial use
	20	20	—	—	
	100	—	—	—	
10 to 150	10	—	—	—	Equipment intended for large power plants and for general industrial use, where it has been found that appreciable vibration components exist beyond 55 Hz
	20	20	—	—	
	100	—	—	—	
10 to 500	10	10	—	—	Equipment for general aircraft use, the higher values apply to equipment close to, but not within, the engine compartment
10 to 2 000	—	10	10	—	Equipment for high-speed aircraft, the higher values apply to equipment close to, but not within, the engine compartment
				10	Aircraft engine compartments

NOTE Where there is more than one amplitude for a stated frequency range, only one is to be used.

[a] Displacement amplitude below the cross-over frequency and acceleration amplitude above the cross-over frequency 58 Hz to 62 Hz (see 5.2 and Table 5).

[b] Constant displacement amplitude test.

20 sweeping cycles in 3 axis, at amplitude 50m/s^2, and in the frequency range 10-55Hz

Two working conditions are simulated.
Condition1: Low speed input on, door area input off;
Condition2: Low speed input off, door area input on;

F.6.3.1.1 b

EN 60068-2-27:1993 Accelebration and duration of pulse: Table 1

TABLE I

Acceleration and duration of the pulse

Peak acceleration (A)		Corresponding duration of the nominal pulse (D)	Corresponding velocity change (ΔV)		
			Half-sine	Final-peak saw-tooth	Trapezoidal
			$\Delta V = \frac{2}{\pi} AD \times 10^{-3}$	$\Delta V = 0.5\ AD \times 10^{-3}$	$\Delta V = 0.9\ AD \times 10^{-3}$
g_n	(Equivalent m/s²)	ms	m/s	m/s	m/s
5	(50)	30	1.0	—	—
15	(150)	11	1.0	0.8	1.5
30	**(300)**	**18**	**3.4**	**2.6**	**4.8**
30	(300)	11	2.1	1.6	2.9
30	(300)	6	1.1	0.9	1.6
50	**(500)**	**11**	**3.4**	**2.7**	**4.9**
50	(500)	3	0.9	0.7	1.3
100	(1 000)	11	6.9	5.4	9.7
100	**(1 000)**	**6**	**3.7**	**2.9**	**5.3**
200	(2 000)	6	7.5	5.9	10.6
200	(2 000)	3	3.7	2.9	5.3
500	**(5 000)**	**1**	**3.1**	—	—
1 000	(10 000)	1	6.2	—	—
1 500	**(15 000)**	**0.5**	**4.7**	—	—
3 000	(30 000)	0.2	3.7	—	—

Two working conditions are simulated.
Condition1: Low speed input on, door area input off;
Condition2: Low speed input off, door area input on;

-- 294 m/s^2,
-- corresponding duration of pulse 11 ms,
-- corresponding velocity change 2,1m/s, half sine.

Evaluation:

During the tests, the tested object (printed circuit) shall be kept under operation. During and after tests, no unsafe operation and condition shall appear within the safety circuit.

☒ Pass ☐ Fail

After tests, clearances and creepage distances shall not become smaller than the minimum accepted.

☒ Pass ☐ Fail

F.6.3.1.2 Bumping (EN60068-2-29)

The specimen shall be fastened to the fixture or the table of the bump test by its normal mounting means.

F.6.3.1.2.1 partial shockings

1) Shocking shapes: half-sinus;
2) amplitude of acceleration: 15 g;
3) duration of shock: 11 ms

F.6.3.1.2.2 continuous shockings

1) amplitude of acceleration: 10 g;
2) duration of shock: 16 ms
3) a number of shocks: 1000±10 ; shock frequency: 2/s

Two working conditions are simulated.
Condition1: Low speed input on, door area input off;
Condition2: Low speed input off, door area input on;

Evaluation:

During the tests, the tested object (printed circuit) shall be kept under operation. During and after tests, no unsafe operation and condition shall appear within the safety circuit.

☒ Pass ☐ Fail

F.6.3.2 Temperature tests (HD 323.2.14 S2)

Operating ambient limits: -25℃, +65℃

- the PCB must be in operational position
- the PCB must be supplied with normally rated voltage;
- the safety device must operate during and after the test. If the PCB includes components other than safety circuits, they also must operate during the test (their failure is not considered);
- the test lasts a minimum of four hours;

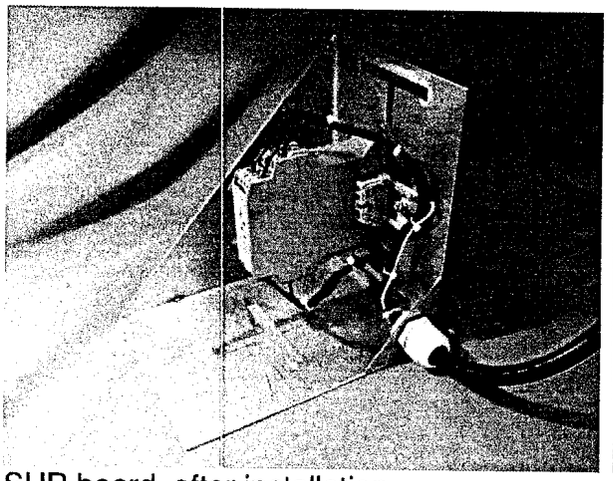
Two working conditions are simulated.
Condition1: Low speed input on, door area input off;
Condition2: Low speed input off, door area input on;

Evaluation:

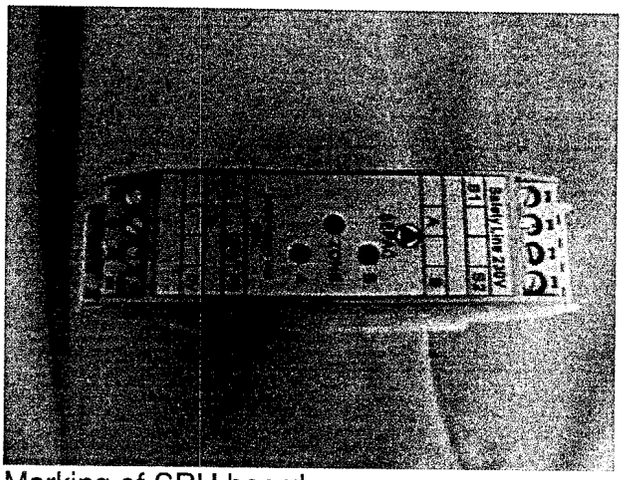
During the tests, the tested object (printed circuit) shall be kept under operation. During and after tests, no unsafe operation and condition shall appear within the safety circuit.

☒ Pass ☐ Fail

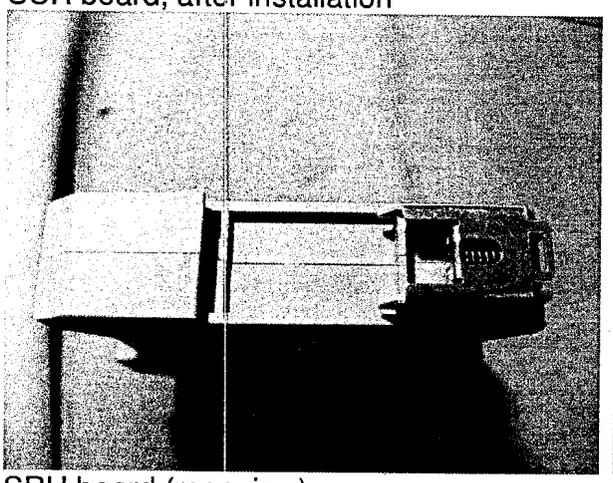
4 Photos of test sample



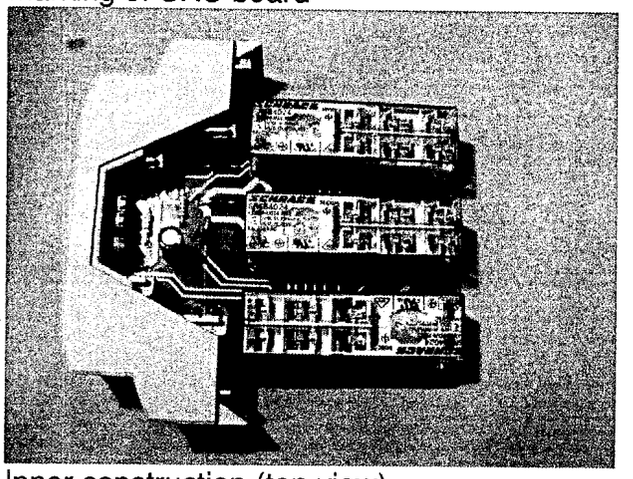
SUR board, after installation



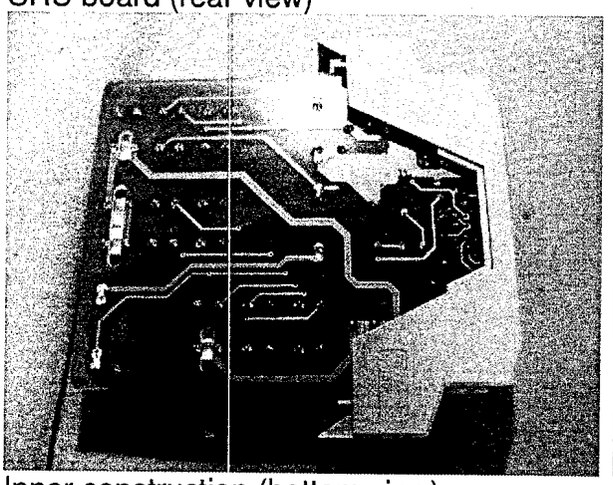
Marking of SRU board



SRU board (rear view)

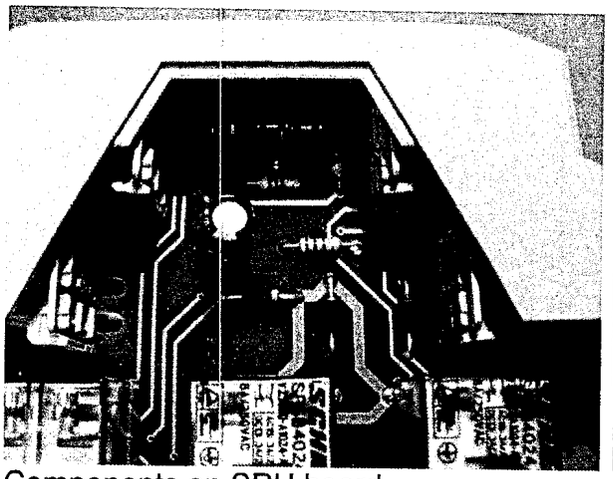


Inner construction (top view)

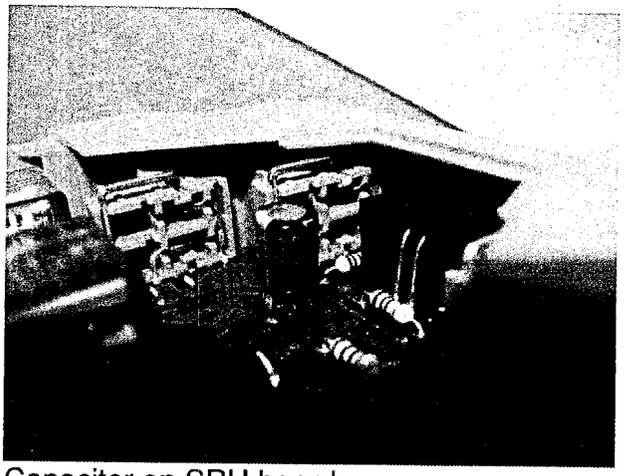


Inner construction (bottom view)

Relay on SRU board



Components on SRU board



Capacitor on SRU board

TÜV Product Service Ltd. Guangzhou Branch
TÜV SÜD Group

Engineer: Johnny

Johnny Guan

Technical Report checked:

Vinod Bhatnagar