1. PRODUCT OVERVIEW

This specification defines the mechanical, electrical and functional specification of the NB0238B1-US membrane switch notebook PC keyboard, the keyboard outputs the particular signal when the particular keytop is pressed that available for input device of the notebook computer.

2. CONFIGURATION

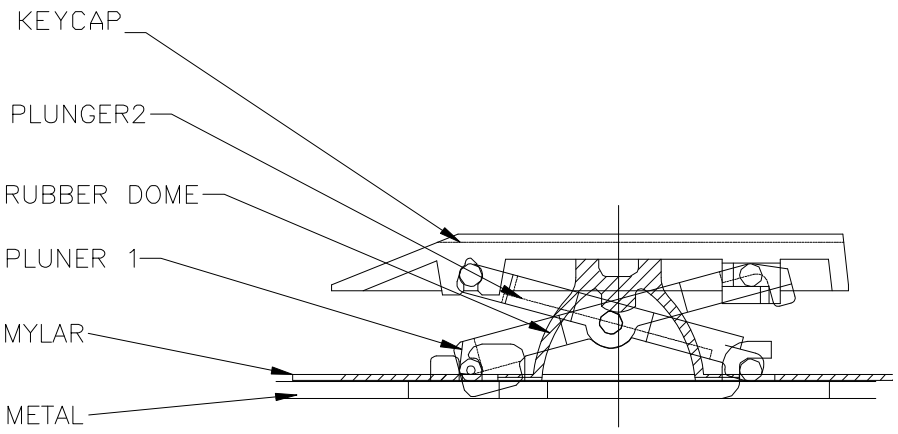
2.1 APPEARANCE DRAWING

According to attached drawing

2.2 KEY TOP PRINTING LAYOUT

According to attached drawing and shall confirm to the sample of colors.

2.3 KEY SWITCH STRUCTURE



2.3.1 The Everhero Design Engineer will design keycap external shape, the detailed design of the underside of the keycaps will be left to Everhero and Everhero will generate the tooling design of keycaps.

2.4 MATERIAL SPECIFICATION

Parts name	Material	UL grade	UL file NO.
Keycap	ABS	94HB	E56070
Membrane	PET	94VTM-2	E86511
Rubber	Silicone	94HB	E41813
Plunger	POM	94HB	E45034

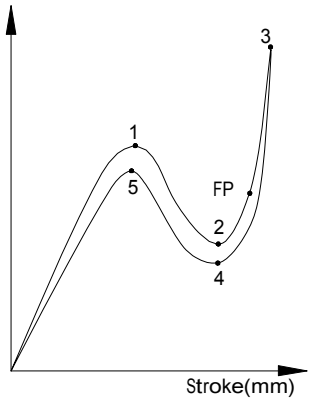
Rubber dome Mylar	PET t0.1mm	94VTM-2	E86511
Metal Plate	AL/SECC t0.5mm		

3. MECHANICAL SPECIFICATIONS

3.1 COLOR OF KEYCAPS AND TEXTURE (ALSO NAMES AS KEYCAP)

3.1.1 The keyboard shall have an MT-11010 texture

3.2 TACTILE CURVE GRAPH



Point	Position (mm) Initial	Position (mm) After 10 millions (normal) After 3 millions (fn)	Force (Mark)	Force (g) Initial	Force (g) After 10 millions (normal) After 3 millions (fn)
P1	**S1** =0.9 ± 0.40	**S1** =0.9 ± 0.60	**PF**	62 ± 20 g	(PF) 62 +20/-30 g
P2	**S2** =1.7 ± 0.40	**S2** =1.7 ± 0.60	**CL**	**P1**(F)-**P2**(F)≧20 g	N/A
P3	**S6** =2.25± 0.30	**S6** =2.25 ± 0.60	**TM**	Max 150 g	N/A
P4	**S3** =**P2** ± 0.40	**S3** =**P2** ± 0.60	**RF**	Min 15 g	(RF) Min 10 g (normal key)
P5	**S4** = (N/A)	**S4**-- (N/A)	**RP**	RP/PF≧0.75	N/A
Fire point	**S5**=P2+0.35/0.0	**S5**-- (N/A)	**FP**	F2~F2+15g	N/A

Mark statement:

PF=Peak force, **CL**=Click feeling, **TM**=Travel to make

RF=Return force, **RP**= Return point (hysteresis), **FP**= Fire point

3.3 TRAVEL

Operating travel 2.25 ± 0.30 mm

Full travel 2.5 ± 0.30 mm (force at 120g)

3.4 KEYCAP PULL OFF FORCE

500gf minimums with equal load applied to all 4 corners of the keycap

150gf minimums at any one corner or side of a given keycap

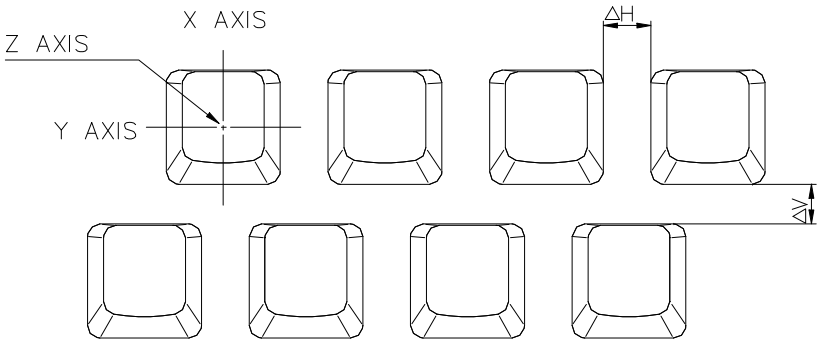
3.5 KEYBOARD HEIGHT

According to attached drawing

3.6 MAX. KEYCAP DEPRESSING FORCE (STOP STRENGTH)

Apply a force of 3Kg vertically to the upper face of the keycap for 1 minute.

3.7 KEYCAP SPACING AND ALIGNMENT



Clearance between keycaps(standard keycaps):ΔH (ΔV) -- ± 0.30 mm

Alignment (keycap to keycap): Neighbor 0.4 mm max

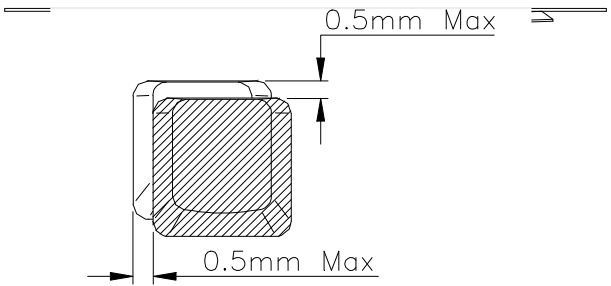
In a row 0.8 mm max

Height alignment (keycap to keycap): Neighbor 0.4 mm max

In a row 0.8 mm max

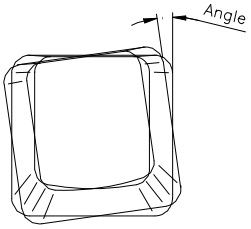
Key slant (keycap to keycap): 0.6 mm max

Key X,Y M on both X and y directions.



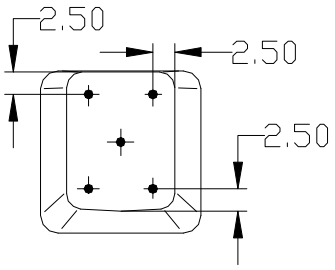
Key twisting: Normal key ±2.0°

Fn Key ±1.5°

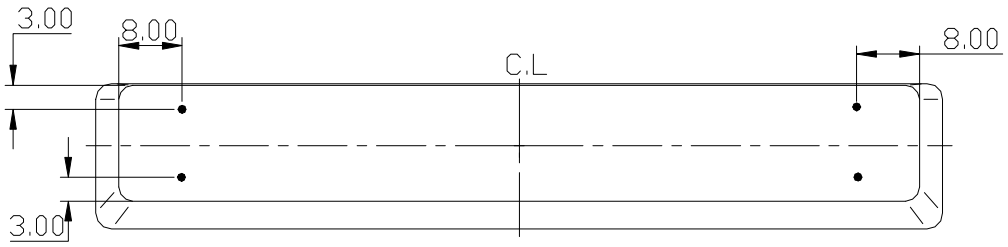


3.8 KEY_IN TEST SPEC ON THE 4 CORNERS OF THE KEYCA

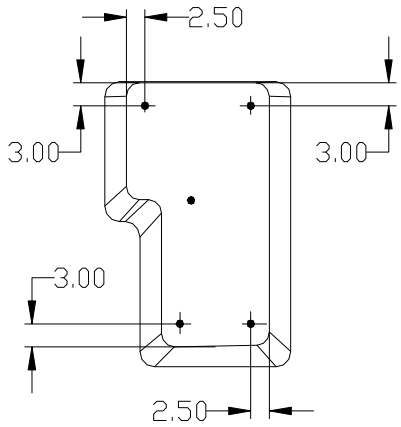
UNIT: mm (ALL TYPES)



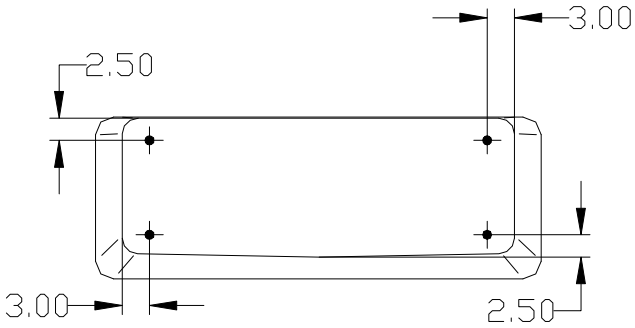
A.NORMAL KEY



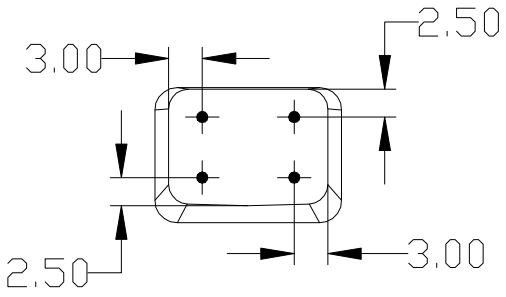
B.SPACE KEY



C. ENTER KEY



D. LONG TYPE KEY



E. SMALL KEY

NOTE:

It is not permissible under any circumstances for adjacent keys to touch during normal operation.

3.9 FLATNESS (keyboard assembly)

The Flatness of keyboard module to be within +3.0 –1.0mm while face up on the flat surface, checked by feeler gauge, the test apparatus should effective escaped from stand-offs that under the spreader.

4. ELECTRICAL SPECIFICATION

4.1 KEY MATRIX

According to attached drawing.

4.2 POWER REQUIREMENT

The key switch shall required DC 5V at 0.3mA maximum.

4.3 CONTACT RESISTANCE

The contact resistance is 1000 OHM maximum.

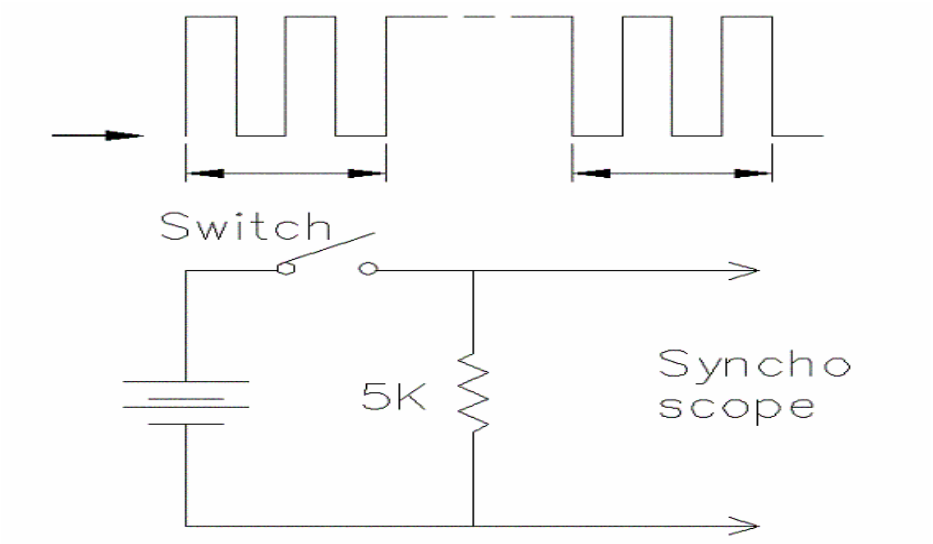
4.4 MEMBRANE SWITCH DIMENSION

According to attached drawing.

4.5 KEY SWITCH BOUNCE

Shall be 20 ms or less at " ON " and " OFF " when measured at a rate encountered in

normal use. (3 to 4 operations per sec)



5. ENVIRONMENTAL (Non-operating)

5.1 Non-operating low Temperature Test

Test Condition : -25℃@low humidity

1) Begin with sample(s) at 25℃@low humidity(approx.25%)
2) Ramp down the temperature to -25℃, Time =3 hours
3) Dwell at -25℃,Time =10 hours
4) Ramp up the temperature to 25℃, Time=3 hours
5) Test sample(s)

5.2 Non-operating high Temperature and humidity Test

Test condition: 40℃ 95% humidity (non - condensing) humidity ramp rates are approximately 20% per hours.

1) Begin with sample(s) at 25℃@low humidity(approx.25%)

2) Ramp up the temperature to 40, Time=2hours
3) Ramp up the humidity to 95%, Time =3.5 hours
4) Dwell at 40℃&95% humidity, Time =24 hours
5) Ramp down the humidity to low (approx.25%), Time =3.5 hours
6) Ramp dome the temperature to 25℃,Time=2 hours
7) Test sample(s)

5.3 Non-operating high-low Temperature humidity cycle Test

The purpose of the test is to realize that temperature and humidity whether might affect plastic components dimension such variations of ink's color on key-top, taking measurements to improve problem if any.

Test condition:

Using a two zone chamber, shuttle sample between -25℃- 60℃@low humidity dwelling at each extreme for 2 hours. Total test time is 48 hours.

1) Set sample(s) in carriage in one chamber
2) Set second chamber to -25℃
3) Once second chamber has stabilized to -25℃,transfer the sample(s) to the cold chamber and allow to dwell for two hours.
4) Set first chamber to 60℃
5) Once sample has completed its two hours dwell in the cold chamber, transfer the sample(s) to the hot chamber and also to dwell for two hours.

The samples should be placed for 24 hours under normal temperature, the function as below should passed after all above temperature test:

1. On position all strokes measurement—use computer tester
2. Operation touch, hanging check—press the keys in center and edge with fingers to check
3. Keyboard warp
4. Contact resistance—under 500 Ω
5. Check Printed characters, texture, and color glitter—more than 2/3 of the character's surface remained after the test.

6. DROP TEST

This test is executed for one corner and three edges and all six sides from the height specification after the drop test with standard packing there shall be no physical or functional damage.

WEIGH (KG) **DROP HEIGHT (CM)**

0 – 4.5	106
4.6 – 11.0	91
11.1 – 20.5	76
20.6 – 34.0	61

7. VIBRATION

The purpose of the test is to simulate the keyboard are transported, and realize whether mechanical or electrical functions might be damaged by vibration.
(K/B Weight: <160g, each single carton contains 24 pcs of K/B, carton G.W 6.1 kg)

Non-Operating Vibration:

Frequency: 10-55-10 HZ
Cycle time: 5 minutes
Amplitude: 1.5 mm
Sweep: Logarithmic Frequency
Vibration Direction: XYZ Directions, spectrum for duration of 30 minutes per side.
1.5 hours in total

8. ELECTRICAL SWITCH LIFE

The operation life cycle is 10 million cycles at DC 5V 0.1 mA load on normal key (including long shape keys)and 3 million cycles on FN key (small key),4 to 6 operations per sec,20 keys minimum, time between interval 24 hours.

9.KEYCAP PRINT WEAR PROOF

The purpose of the test is to assure that how durable the keytops are on there character's printing.

Testing equipment: ABRASION TESTER.(Everhero)
Remark: **1.Ink supplier:** YU YUAN FU
2.Ink material: UV ink — SP-100cm
3.Printing method: silkscreen print
Testing quantity: 5pcs
Testing condition:

1. Sand eraser: Fabercastell (75215) No.74 eraser 6.60 mm diameter.
2. Keys: Random

3. Load: 1000g
4. Test speed: 120 times/min.
5. Scrubbing travel: 10 mm
6. Stress cycles: 100 cycles

10. FLEXURE RESISTANCE

To perform on the flat cable or other portion need winding shall withstand winding test on a mandrel 1 m/m diameter of 180 angle ending 5 cycles with tension to get adhesion between the surfaces, after the test the resistance shall be within 150% of initial value.

11. PRECAUTION FOR HANDLING

11.1 CONNECTION TO THE CONNECTOR.

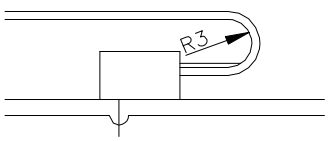
11.1.1 RECOMMENDED CONNECTOR IS " ZERO FORCE TYPE "

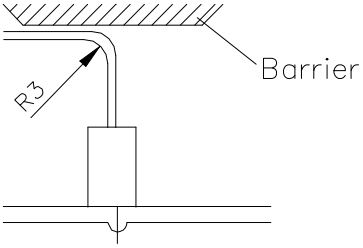
Please be sure to avoid the connectors that scratch on the surface of flexible pattern.

11.1.2 EXCESS FORCE TO THE FLEXIBLE PATTERN SHALL BE PROHIBITED AT THE TIME OF INSERTION.

11.1.3 ALLOCATION OF CONNECTOR IS RECOMMENDED TO BE AS CLOSE TO THE EDGE AS POSSIBLE. IF IMPOSSIBLE, LEASE BE SURE TO KEEP IT APART FROM HOT COMPONENTS.

11.1.4 PLEASE CONSIDER THE ALLOCATION OF CONNECTOR NOT TO BE AS BELOW IF UNAVOIDABLE, PLEASE BE SURE TO KEEP R3 Min.



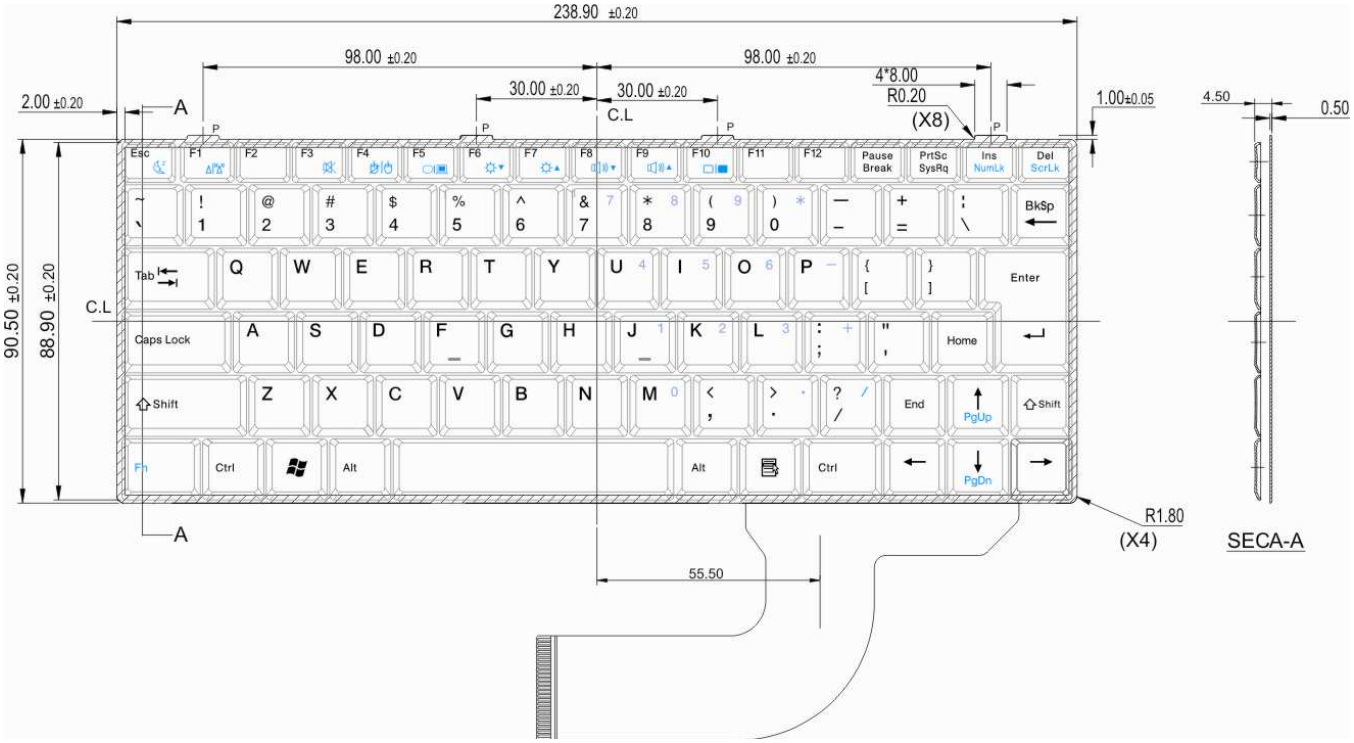


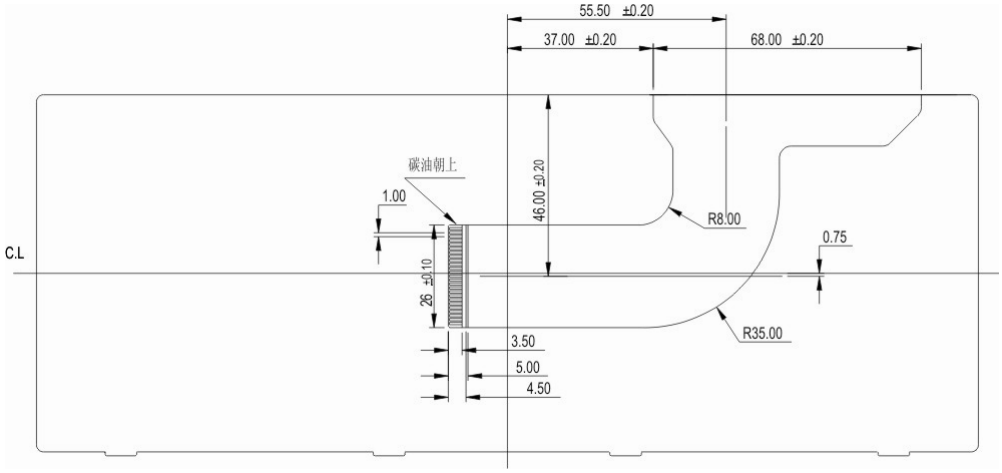
12. SPILL RESISTANCE

12.1.1 The keyboard is membrane water resisted only

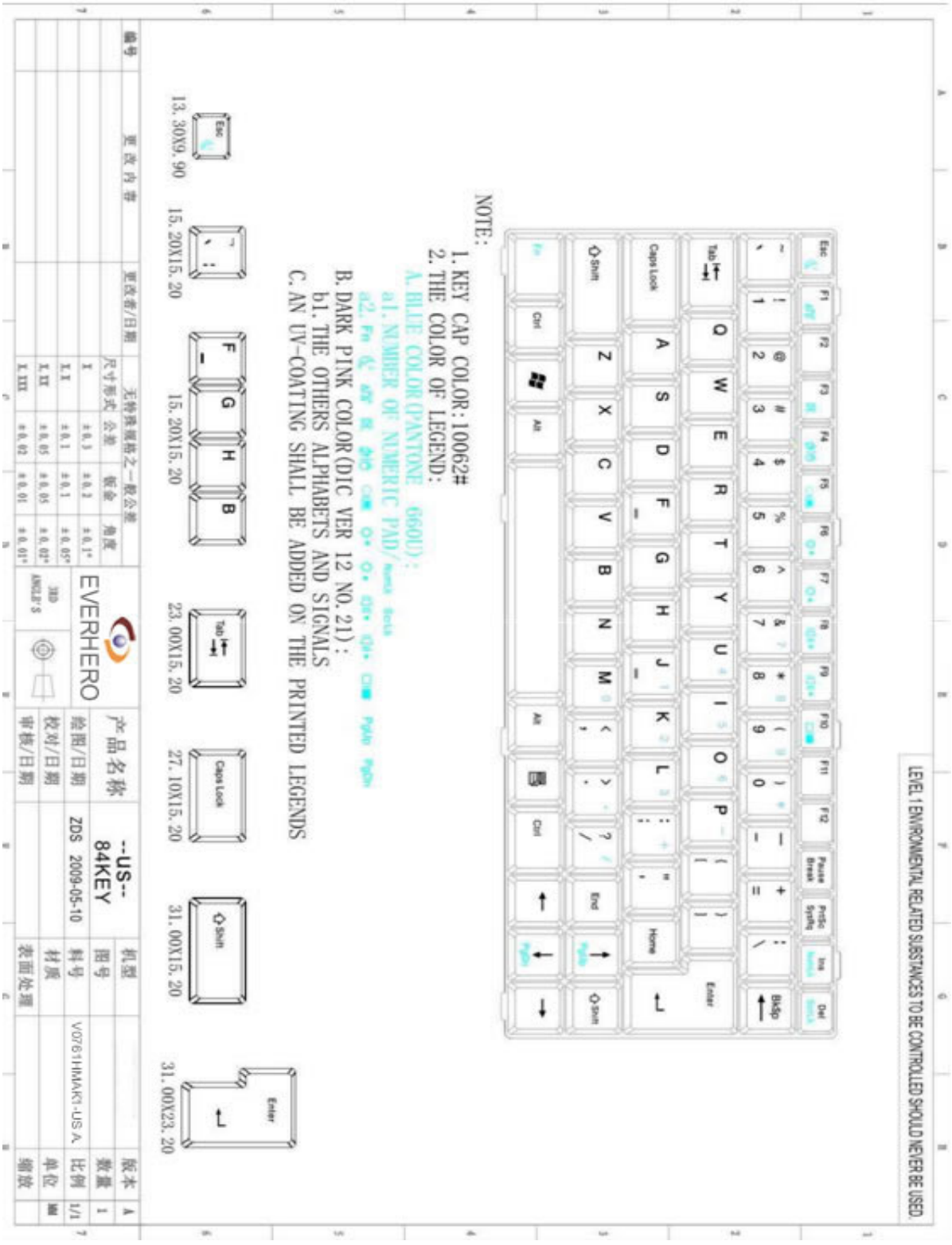
12.1.2 Follow Dell's spec, the keyboard placed on a level surface,1 oz of liquid spilled in the vicinity of the "H" key could not penetrate the keyboard structure in a time of 20 second, l couldn't prevent the water flow into the computer system from the edges of the keyboard.

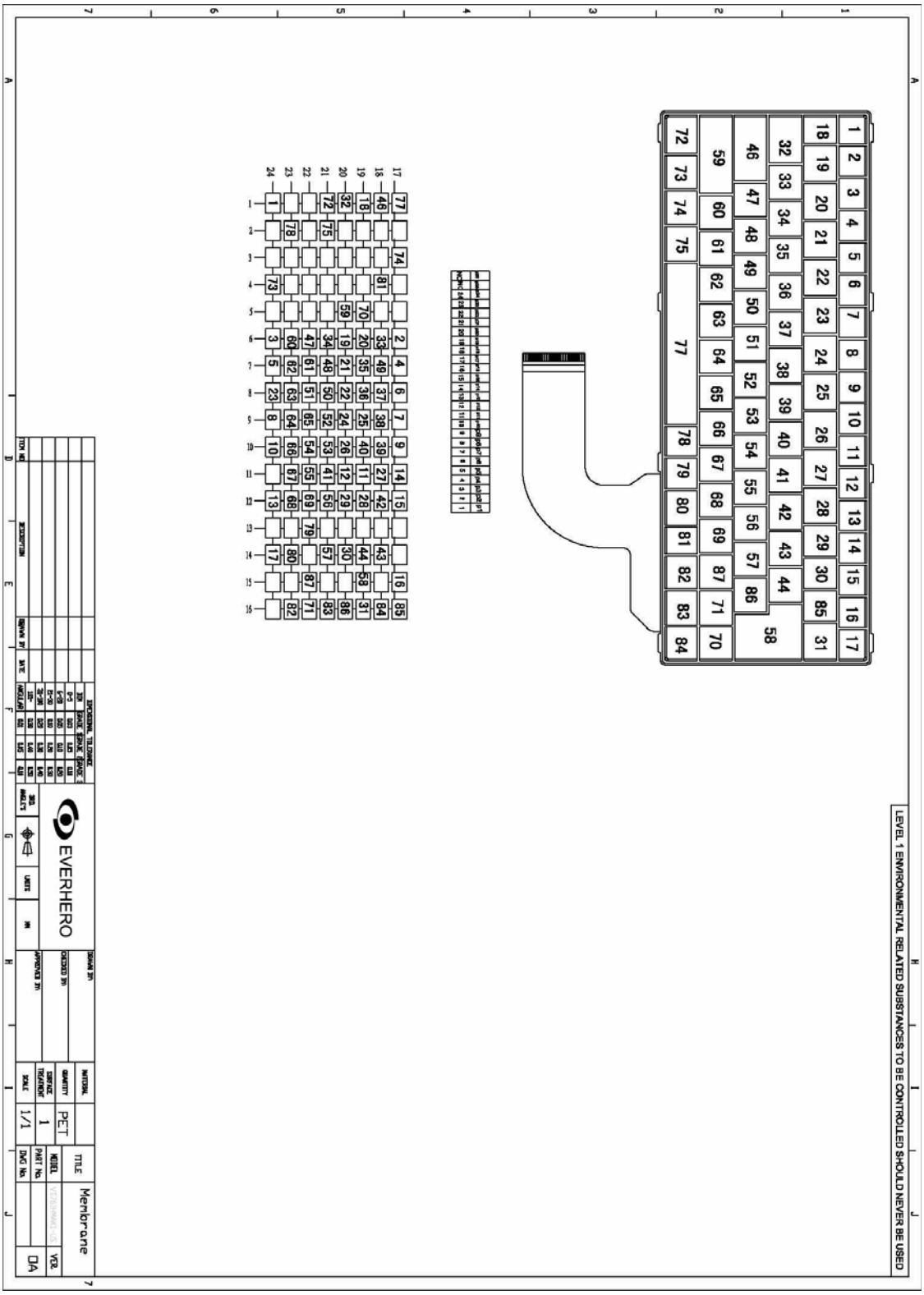
OUTLOOK:


238.90 ±0.20
98.00 ±0.20
98.00 ±0.20
30.00 ±0.20
30.00 ±0.20
C.L
4*8.00
R0.20
(X8)
2.00 ±0.20
A
1.00±0.05
4.50
0.50
90.50 ±0.20
88.90 ±0.20
C.L
R1.80
(X4)
SECA-A
55.50


55.50 ±0.20
37.00 ±0.20
68.00 ±0.20
碳油朝上
1.00
46.00 ±0.20
R8.00
0.75
C.L
26 ±0.10
R35.00
3.50
5.00
4.50

LAYOUT


LEVEL 1 ENVIRONMENTAL RELATED SUBSTANCES TO BE CONTROLLED SHOULD NEVER BE USED.
NOTE:
1. KEY CAP COLOR: 10062#
2. THE COLOR OF LEGEND:
A. BLUE COLOR (PANTONE 660U):
a1. NUMBER OF NUMERIC PAD
a2.
B. DARK PINK COLOR (DIC VER 12 NO. 21):
b1. THE OTHERS ALPHABETS AND SIGNALS
C. AN UV-COATING SHALL BE ADDED ON THE PRINTED LEGENDS
13.30X9.90
15.20X15.20
15.20X15.20
23.00X15.20
27.10X15.20
31.00X15.20
31.00X23.20
EVERHERO
--US--
84KEY
ZDS 2009-05-10
V076 1HMAK1-US A


LEVEL 1 ENVIRONMENTAL RELATED SUBSTANCES TO BE CONTROLLED SHOULD NEVER BE USED
EVERHERO
Membrane
PET