≡ ר ع ₭ ص ﮋ ﮊ

≡ ר ﺝ ر ۱ ω ḟ ص „ • ﮋ ﮊ

≡ ר ع ٠ ص ﮋ ﮊ

≡ ר ή ’ ė| ص ﮋ ﮊ ϑ

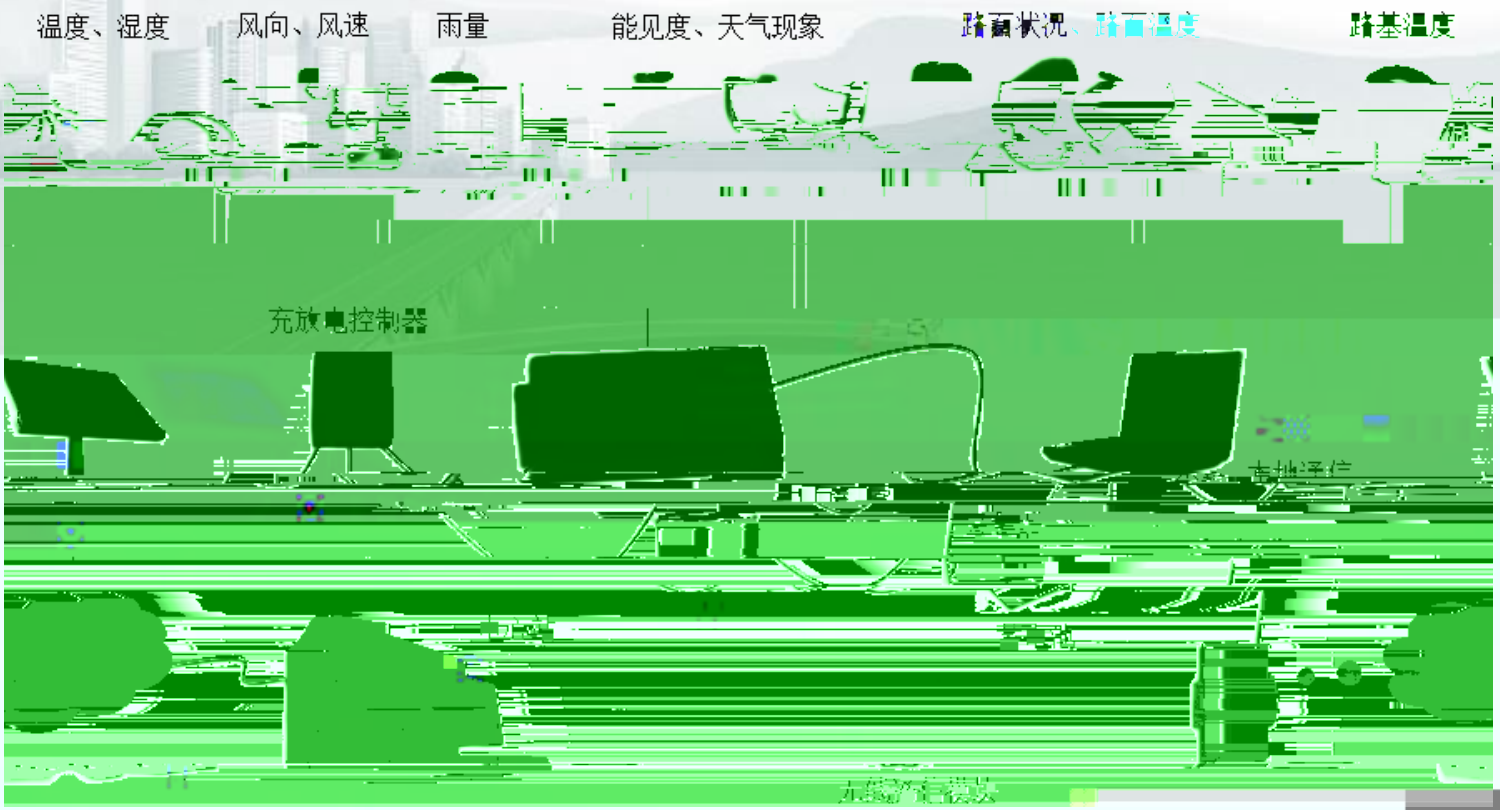
. ḟ ۸ ~ ص ﮋ ﮊ

ū ı ɾ ạ ۸ ~ ص ﮋ ﮊ

2

- ♪ ╏ ╗ ╨ Ẇ ɾ ≡
- ⁵ ʖ ʖ ڍ ʖ æ ٣ ɾ ≡
- ڤ Ⅾ℘ گ ٣ ɾ ≡
- ∧ ժ Ẇ ٣ ɾ ≡
- ص ک ╗ Ẇ ص ک ◦˜ ɾ ≡
- ص ǂ ╗ Ẇ ٣ ɾ ≡

3



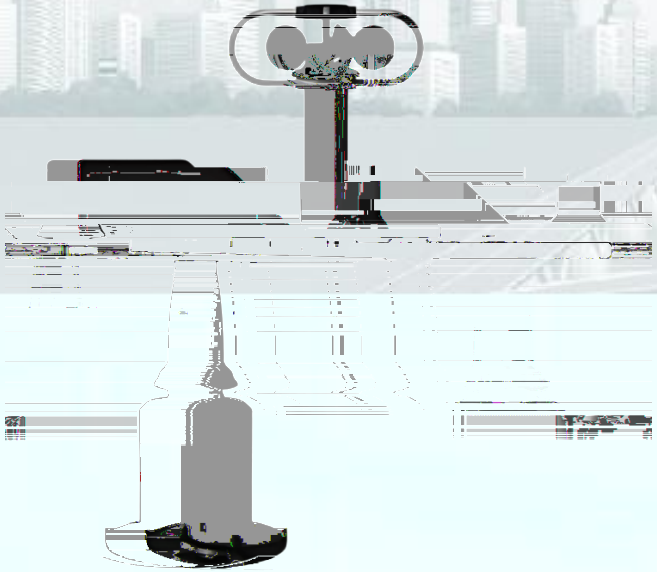
3.1

ő ŭ Ǝ Ặ	╗ ẘ	╩ ẘ
≡ ᔕ ỉ ʁ	-40 ~ 60	0% RH 100% RH
˜ ʐ Ր q ţ	±0.2	

•ë `# a@ Î)&Fb †5)Í

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3.2



ã ŭ ĩ	ڜ ڕ	ڜ æ
≡ گ ỉ ʁ	0~60m/s	0~360°
≡ گ ۷ ẘ	±(0.3+0.03V)m/s V— ´ ڜ ڕ	±5°
ˬ ˚ Ψ	0.1m/s	3°
ө ∩ ڜ ڕ	≤0.5m/s	
̈A ڜ ã ẘ	70m/s	

3.3

Ɛ ǎ ŭ ∃ Ậ

1 ǎ Ⅾ ᴬ è ł

3.4



Ꮯ ก ㇒ z ◕

1 ≡ ᜒ ᛏ ᵚ ᴴ ˬ ˍ ㅏ Ḧ 10 16 20 30 50 ᵎ ᛘ

2 ㇒ ㅁ ᵴ ᴴ ŋ ⅜ — ʃ ᴡ ᵚ

3 ≡ ᜒ ᛏ ᵚ 6m 50000m ᴴ ㅏ

4 ≡ ᜒ ᛁ ẘ ±10% (≤60m ɋ ţ ±6m)

5 ṣ ╗ ẘ -35 60

6 Ä ᵴ ã̃ ẘ ≤60m/s

1

„ • ⫷ / ِ ص ۪ ڸ ۔ ڹ ڷ ۴ ″Ḥ ۱ ѽ ۄ ḟ

z ۶ ڧ ِ ص ḟ ۄ ڸ ۔ ڹ ۏ ۪ ڷ ۵ ڷ „ • ⫷ / Ḫ ″Ḥ

ŋ ۷ ר ≡ ڷ „ • ⫷ / ۄ ۱ ѽ ḟ ’ ڵ Ⴔ ۷₄ ۤ ف ۪ ″Y

„ • ⫷ / ◦ „ • ⫷ / ۄ ۋ ẁ ۤ ⫞ ≡ ۶ ۤ ۱ ƫ

z ۶ ″Y ″O ۔ ِ ص „ • ⫷ / ۄ ḡ ḃ ḟ ۔ ڷ

2

ɻ õ ẓ ƛ / ẓ ᴘ

„ • ẘ

ɲ / Ω ᷉

ᷬ ẙ `

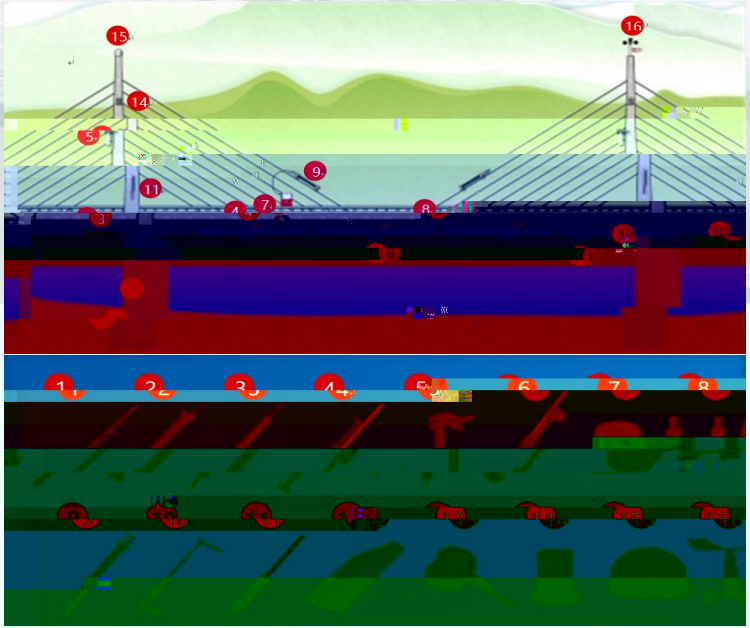
ᑭ ↓

„ ᵻ / ɲ ᷒

ᵬ ᑎ ѧ ẃ ᷓ ɪ ᷓ ẘ᷍

˝E ɻ ɻ ƛ

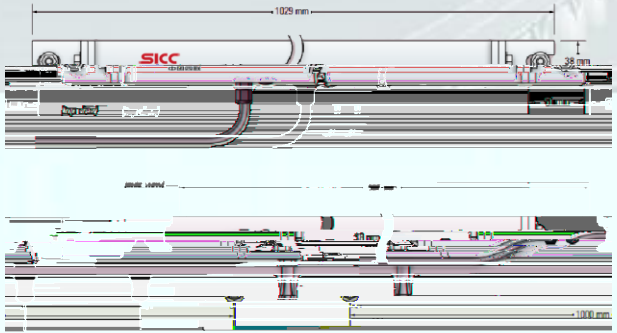
„ • Ỉ ɥ ᴘ ᄀ ≡ GNSS/₩ ɻ ↓ ᵬ ɪ /



序号	监测内容	监测设备
1	钢筋应力	
2	埋入式应变计	混凝土应变
3	梁端位移计	梁位移
4	埋入式应变计	混凝土应变
5	桥塔/墩柱倾斜	倾角计
6		
7	锚索测力计	锚索应力
8	电磁式静力水准系统	桥梁挠度监测
9		
10	裂缝计	桥梁裂缝
11	温度计	桥梁温度
12	自动化数据采集仪	数据采集
13	加速度计	振动监测
14	云终端	数据采集
15		
16	风速风向监测	风速风向仪



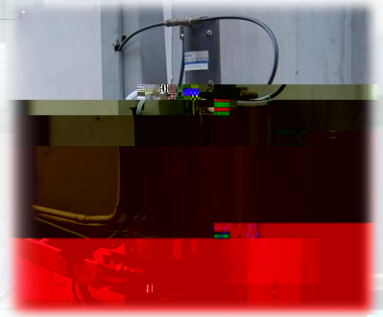
2 „ • ẘ



´ ℊ	±10°
Ạ ẘ	10 ǎ ˜
ɬ ẘ	±0.1%FS
╕ ẘ ỉ ʊ	-20 80
≠ ≠ P	12V

3 ɲ / Ω ậ

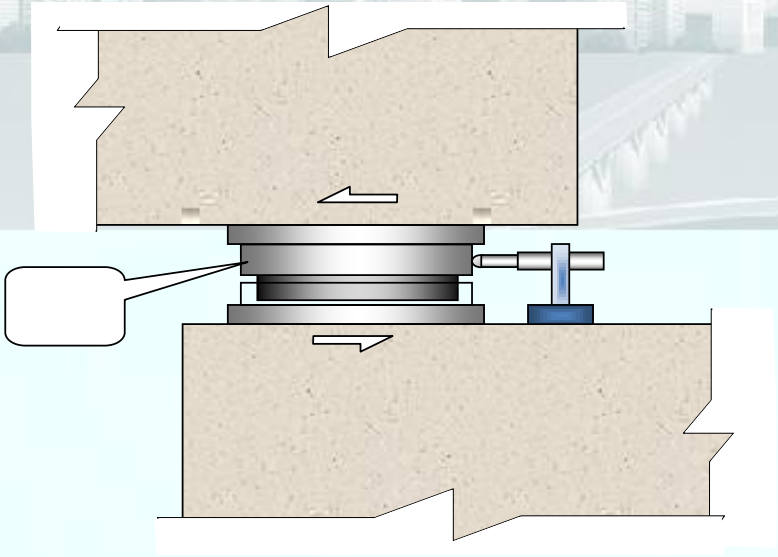




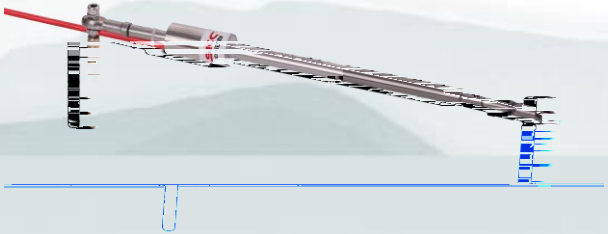


≡ Ꮆ ỉ ʁ	100 200 300 500 1000 mm
≡ Ꮆ Ɩ ẘ	±0.1 FS Õ ɓ
ˬ ˚ ƛ	≤0.01 FS
˜ ˜ ʻḤ ẩ	RS485 MODBUS
ᵘ Ẻ Ồ Ḷ	ɔ ề 112mm ˚ =(Ꮆ)+250mm

4 ḍ ẏ `



5 Ƥ ɻ ך ≡



ˊ ☙	12.5 25 50 100 150 200 250mm
ک ɻ ẘ	ב ɻ ≤0.5%FS ᵘ ☙ ẚ ≤0.1%FS
Ạ ẘ	0.025%FS
╗ ẘ ỉ ʁ	-20 +80
ɻ Ⅾ₀ ᴘ	ᴴ ˈ ˌ ̰ Ủ Ꞇ ₱ Ḧ ɻ 0.5 2MPa ở ệ Ⅾ₀ ᴘ
ز	☙ ɻ Ḧ

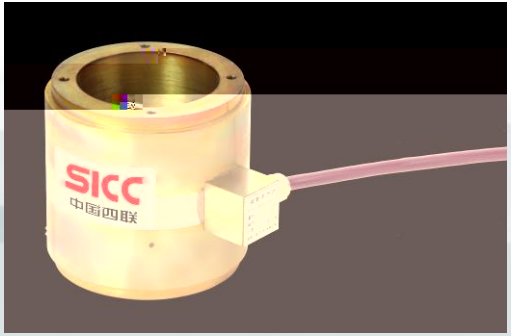


6 „ ł / ɲ ŋ̈



	± 10 °
	10
	± 0.1%FS
	-20 80
	12V
	± 3V@ ± 10 °
×	φ32×187mm

8 ˝E ٧ ٧ ג



9 GNSS



GNSS Ł ḿ ắ ĸ Ậ ϒ ϟ ά ₂ ɬ Ł ĸ Ậ ḿ ắ ϒ ϟ ῦ ὄ
ϒ ẘ O ƶ ` ≡ ॐ ϒ ϟ Ը ה ﻉ ά ڋ ȯ ¦ GNSS Ặ ″O ῦ ک
Ձ ϒ Ḯ ♪ „ • ă ჯ ⊦ ″Ḯ ′ somebody æ ` P ƶ ॐ ῦ ך ≡

Ը ∃ Ặ
ک Ձ ϒ ϒ ẘ
ẇ ƶ ±2.5mm+1×10-6D
ὄ ±5.0mm+1×10-6D
ĸ Ậ ὄ ↓ GPS L1 L2
GLONASS L1 L2 BD B1 B2
ī ϒ ڋ U RJ45
ᾠ ϒ ڋ U 4G ϟ ڋ WIFI
ɨ ἐ ̈ ϒ:IP68

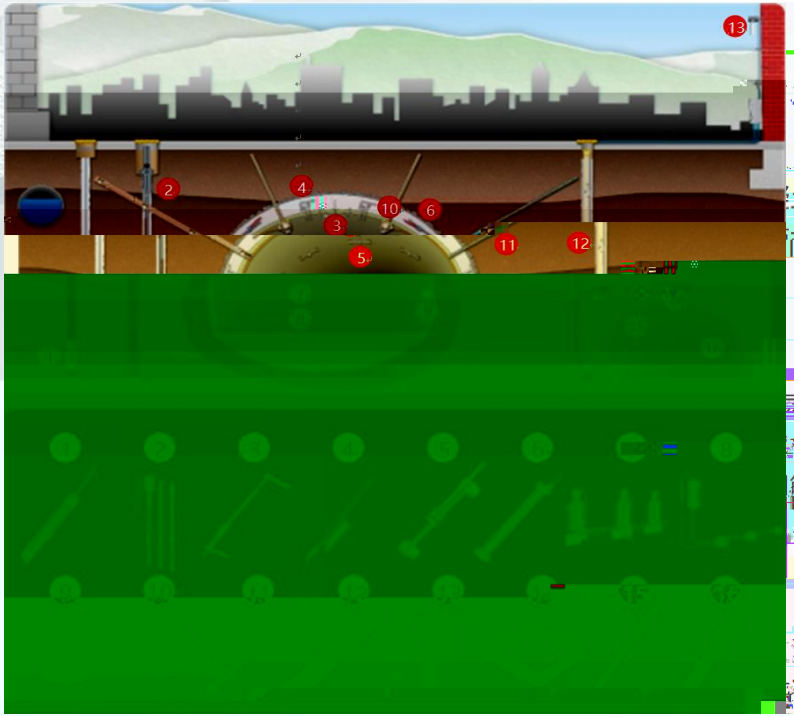
11 ᵛ ﻯ ẃ Ⴆ Ч ≡ ᏻ ヿ ㄱ

ᵬ ο ᵛ ﻯ ẃ Ⴆ Ч ̈Ω ᾶ ŭ ᴴ ỉ ᵂ ⸗ ⸗ ̀Y ㄱ ᴿ ㄱ
≡ Ã ̈O ᴴ ỉ „ • z ^ ʊ · ə ̃ ş Ạ Ấ ̇ ˜ ᵕ ტ Ɜ ⁴ ц Ꮋ ♪
ỉ ■ ŋ ᵕ ᶎ ̋Y | ტ Ɜ ́H Ƶ ᵕ ỉ ⊦ ̋Ḥ ᵕ ˜ Ḧ ′ ㄋ Ⴓ
ᵉ ヿ ᵕ ヿ ė ᵘ ტ ¡ ̋Y Ã ̈O ạ

Ⴑ ∃ Ã
ṣ ̋Ḥ ẩ ᶻ ტ ヿ ㄱ ≡
` ᵛ ᵠ 0.001mm
ヿ ᵛ Ồ Ḷ 1.12um
ᵡ ﻯ ẃ 1um+1um/m, 0.2mm/200m
̋Y ﻯ ẃ 1/75 ヿ
̀E Ꭴ ﻱ 10us-1s
ה ᵠ 8w
¡ Ⅾ ρ IP66
ṣ ♪ ⸗ ╗ ẃ - ȧ

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3



序号	监测内容	监测仪器
2	围岩变形	多点位移计
4	土压力盒	衬砌压力
6	埋入式应变计	混凝土应变
7	电磁式静力水准系统	隧道沉降
10	钢筋应力	钢筋计
12	固定式测斜仪	土体水平位移
13	倾角计	倾斜变形

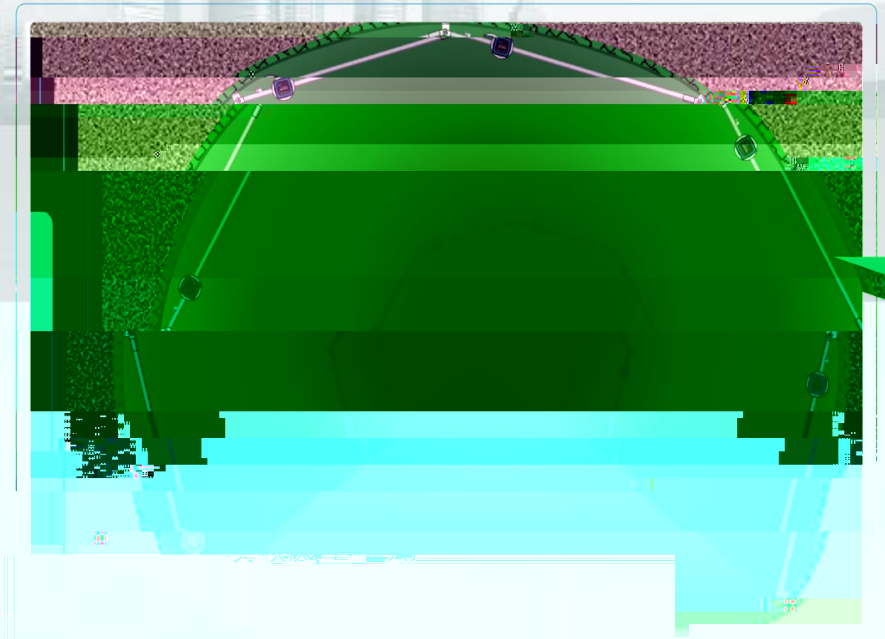
1 ˜H ˇ Ω ˛





≡ گ ˆ ʁ :	700 1700 3500 mm
≡ گ ˥ ẘ :	±0.1 FS
˚ ɹ :	≤0.01 FS
˚ ˜H ẩ	RS485 MODBUS
˚	12V ≤25mA
ᵘ Ė Ồ	Φ34×185 mm

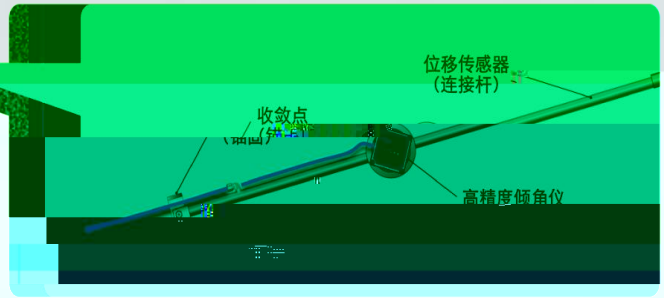
2 ۋ / ۈ ٰۋ



ۋ ۋ ۈ ۋ ۋ

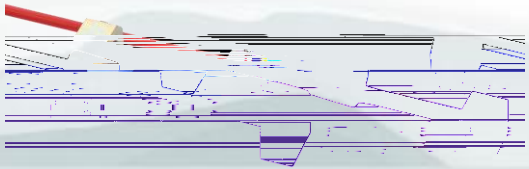
ۋ 50mm(`) ±10° ۋ

ۋ ۋ ۈ ۋ ±0.3mm 6m / ۋ ۈ



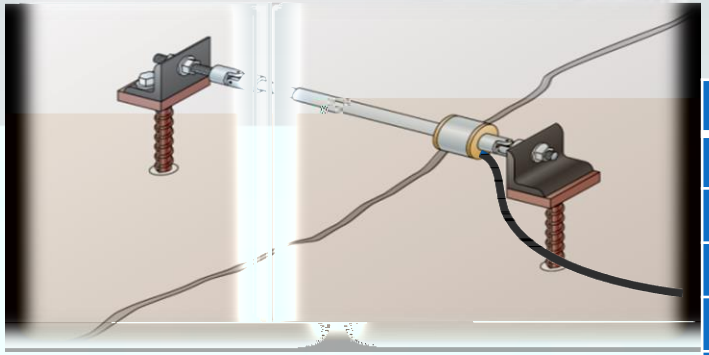
3 ὰ ὲ 1 ῶ ẓ ɤ / ẓ ᴘ





´ ℊ	3000με
ک ۷ ₩	ב ۷ ≤1%FS ᵘ ℊ ẩ ≤0.1%FS
Ậ ₩	1με
╗ ₩ ỉ ʁ	-20 +80
ز	150mm
ḟ ϥ ̈Ḥ ẩ	O ɾ ḟ ϥ

4 Ɒ ↓ õ · ↑ ↓



	≤0.5%FS ≤0.1%FS
	0.025%FS
	-20 +80
	0.5 2MPa

5 GNSS

GNSS Ł ḿ ắ κ Ꮆ ヿ ㄱ ʷ – ɕ ∀ ᷓ ᷔ Ỉ ɥ ᴘ ㄱ ≡ Ꮋ

♪ ᷓ ᷔ ’ ㄴ ᵉ ` ᴘ ɀ ᵹ ᵕ ㄱ ≡

Ꮯ ∃ Ꮓ Ạ

ᔑ Ꭿ ヿ ㄐ ẘ

ẇ Ƹ ±2.5mm+1×10-6D

ᵒ ±5.0mm+1×10-6D

κ Ꮆ ᵒ ↓ GPS L1 L2

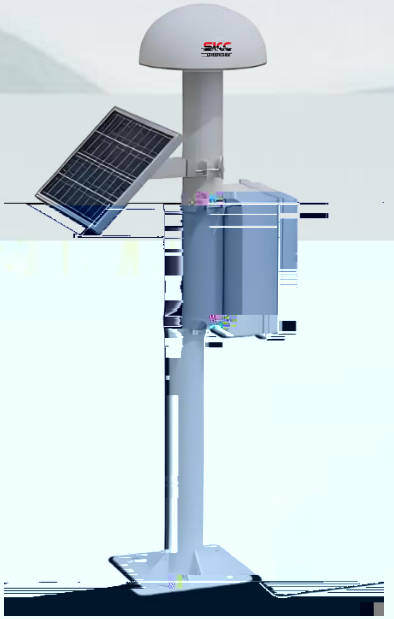
GLONASS L1 L2 BD B1 B2

ī ㄐ ẓ U RJ45

ᷠ ㄐ ẓ U 4G ㄔ ẓ WIFI

ɨ ɛ ᷉ ヿ:IP68





6 Ė ᴘ ㄱ ≡ ₩ ㄐ ↓ ᵑ ㅣ

ᵑ ȯ ᵑ ㅣ ƕ ㄐ ᴿ ㄱ ≡ Ḩ ♪ Ḧ Ḧ ᵹ Ḱ ̤ Ḥ ī

ᵑ ₦ ᵑ ˜ Ḧ ک ü ᒉ å ᵑ ㄐ ẘ Ḩ Ợ ≡ ᵹ ᶎ

Ợ ᶎ ᴨ ᵾ ᵑ Ẽ ᵟ ف ㄔ Ợ ㄔ ɛ ᒉ c ᴴ ک

ᵑ ̈ ◕ ᴴ ỉ ᶄ ᵣ ᾽ ㄣ ₩ ㄐ ㄐ ẘ ᵕ ᵡ ᘯ ᵴ ㄱ ≡ ᶄ

ᵣ ᵕ ᶄ ᾽ ㄣ ᵑ ₦ ᵕ ㄱ ≡ ᶄ

Ꮯ ∃ Ã

ㄱ ≡ ɾ ` ≥500M ≥1K M ≥2.5KM ≥5KM ᴴ ᶄ ف

Ė ᴘ ≡ ᵹ ㄐ ẘ ≤0.1mm

Ã ̈ O ́ H ̈ Ḥ ᵠ 10S/ ⁸

ᵀ ᶻ ̈ Ḥ ɣ ̈ Y 120°

ƕ ᕽ ỉ ʁ 40°

ū ᵏ ᵹ ≤5KG ≤10KG

ᴨ ᒉ ≤10w ≤15w ≤20w ≤35w

7 ᵛ ㄐ ẘ ㄏ ㄐ ≡ ☭ ㄚ ㄔ

ᵬ ο ᵛ ㄐ ẘ ㄏ ㄐ ″Ω ᾶ ŭ ᴴ ḭ ᵂ ⌋ ⌉ `Y ㄔ ᴿ

ㄱ ≡ Ặ ″O ᴴ ḭ ◚ ⸗ z ^ ʁ · ə ̃ ş Ạ Ấ ˝ ~ ᵕ ъ Ɜ ⁴ ц

Ḫ ♪ ḭ ▄ ŋ ᵕ ◚ ″Y | ъ Ɜ ΄H ƪ ᵕ ḭ ⊦ ″Ḥ ᵕ ~ Ḧ ′ ㄣ

Ⓑ ᵋ ㄟ ᵕ ㄔ ἐ ᵘ ъ ɨ ″Y Ặ ″O ᾳ

Ⴎ ∃ Ặ

ṣ ″Ḥ ẩ ᶻ ↺ ㄟ ㄱ ≡

` ᵛ ᵻ 0.001mm

ㄟ ᵛ Ồ Ḻ 1.12um

ᵡ ㄐ ẘ 1um+1um/m, 0.2mm/200m

″Y ㄐ ẘ 1/75 ㄔ

`E Ợ ي 10us-1s

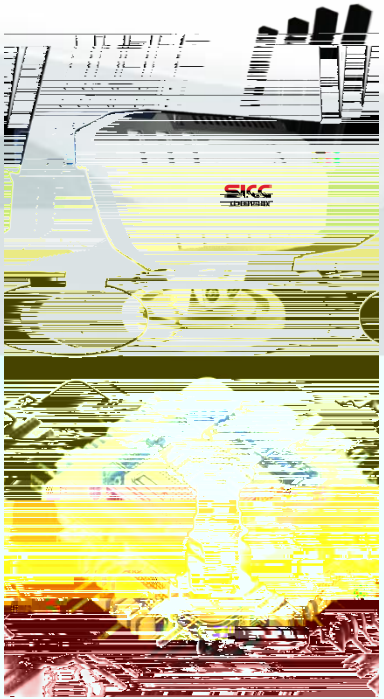
ת ᵻ 8w

ɨ Ⅾ ρ IP66

ṣ ♪ ⌋ ╗ ẘ -30 ——+80

≡ ☭ ز ` 300 ㄐ o ת ᵡ ỏ /800 ㄐ ת r ỏ

ᾶ æ ㄐ ẘ 0.5°





2

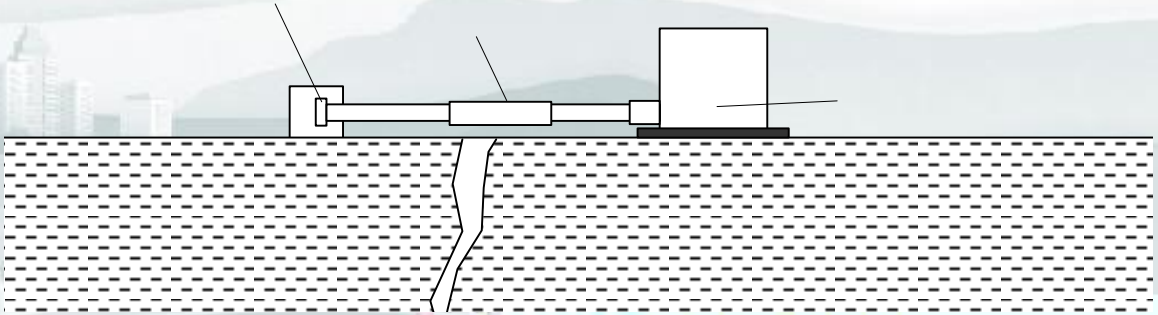
ר ≡ ֯ ֲ	׀ ר ≡ ׀ ׳	ר ≡ ֲ ִ
ص ɬ Ω ﻩ	· ą ą ֯ ص ɬ	☋ · ą P Ė Ư ڎ ở ִ ֯ ف ص P Ė Ω ﻩ
O ɀ `	· ą O ɀ	ר ≡ · ą O ɀ t̄ ˷ ♪ ִ Ƥ ɻ õ ʜ ׀ W ִ Ƥ ɻ P ɀ ˜
ف┼ `	· ą ف	ר ≡ · ą ف P ɀ ɾ W ִ Ɗ ṗ ˵ `
ɾ Ɗ	· ą ف	ר ≡ · ą ف ɾ O ɾ Ɗ ִ P ɀ ˜
ȷ ³ Ɗ ɬ	· ą ف	ר ≡ · ą ف ȷ ⅄ ẘ ˜
O ɀ Ƥ ɻ	ɛ̇ ą O ɀ	ר ≡ ɛ̇ ą Ƥ ɻ P ɀ ˜

城市公路
深部位移-固定式测斜仪



2 O ` - ` ს

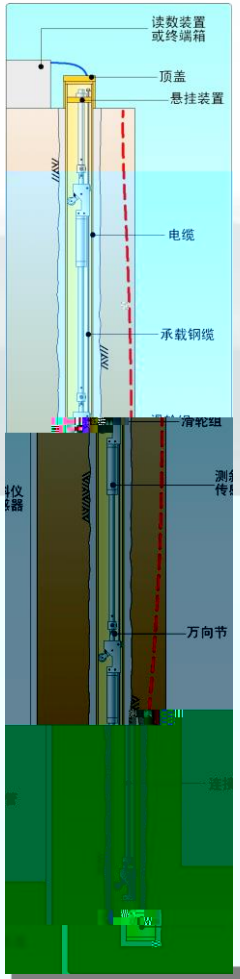




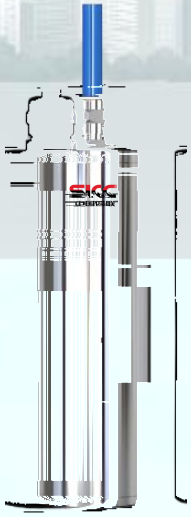
≡	Ǝ Ạ	
´	500 1000 2000mm	4000mm
ᔑ	≤0.5%FS	≤0.1%FS
Ạ	0.02%FS	
╗	-30 +60	
ᑌ Ė Ò Ļ	(L)110×(W)88×(H)76mm	(L)200×(W)130×(H)190mm

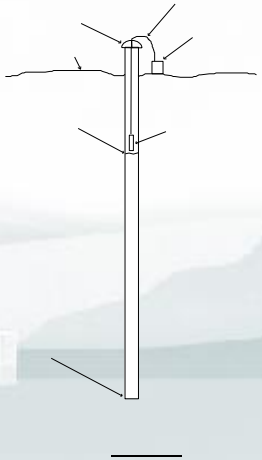
3 ┼ف ` - ɓ Ḧ ẩ ≡ ŋ̈

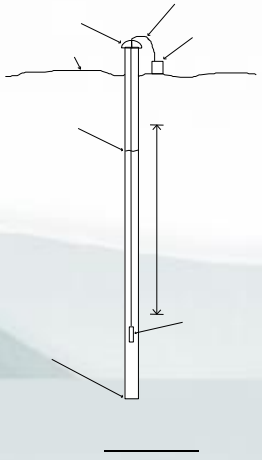
٦ ≡ ڳ ᾰ	∃ Ậ
´ ڳ	±10°(ڕ ב)
Ậ ẘ	10 ả˜ ±0.05mm/m
١ ẘ	±0.1%FS
╗ ẘ ỉ ʊ	-20 80
≠ ≠ P	12V
ʷ ˷ ≠ P	±3V@±10°
ב ề × ¸ ẘ	φ32×187mm
۱ ˬ	2000g



4 ʃ Ɗρ- ╓ P Ɔ







ㄱ ≡ ᾏ ᾗ	∃ ᾎ Ạ		
ᾗ ᾘ	0.35 0.7 1 2 3MPa	70 170KPa	0.35 0.7MPa
ᾖ ᾗ ẘ	ㄷ ᾖ ≤0.5%FS	ᾗ ᾘ ẳ ≤0.1%FS	
Ạ ẘ	0.025%FS		
ο ᾏ ㅅ ㄱ	50%		
ϐ ᾐ ẘ	133mm		
ᾗ ề	19.05mm	25.4mm	19.05mm

5 ȷ ³ Ɗρ ᵠ - ȷ ⅄ ẘ Ɩ



ㄱ ≡ ᵹ ᾰ	∃ ᷇Ạ
≡ ᵹ ∃ ᷇Ạ	ȷ Ḳ´ ³ Ɗρᵹ θV
ᵹ ᾽	0 100% m3/m3
∖ ẘ	0 50% m3/m3 ᷇ ᵾ ±2% m3/m3
~ Ḧ Ꝋ ᷇	ᵬ ≠ ᵾ ㄴ 10~
ᵟ ẓ Ꝋ ᷇	ᵟ ẓ ŋ 1~ ’ ~ 0᾽
¦ ṁ ṗ ᷈	ABS ṡ᾽ ᷈
᷅ ᷇ ᵹ ṗ ᷈	Ɉ

SICC
中国四联

6 ○ㄡㄆㄐ-○ㄡ≡ㄐㄣ

ㄱ≡ㄱᴥ	ㅋㅊ
ˊ ㄱ	12.5 25 50 100 150 200 250mm
ㄷㄐ ㅱ	ㅂㄐ ≤0.5%FS ᵘㄱ ㅀ ≤0.1%FS
ㅊ ㅱ	0.025%FS
ㄲ ㅱ ㅣ ㅎ	-20 +80
ㅓ ᄃᵨ ᴘ	ᴴ ˈㅣ ㅣ ᵾ ㄷ ₱ Ḧ ˙ ㅓ0.5 2MPaᴏ̃ ę ᄃᵨ ᴘ
ㅈ	ㄱ ㅓ Ḧ
ㅂ ề	12mm(ف)/25mm(ㅐ ķ)

7 ≡ ⁇

ᵕ ㄱ ẘ ᴘ Ė ≡ ☭ ㄱ ㄱ Ꮯ ɕ ᵛ ȷ Ⅾ ᵨ ẇ ` z ˙ ᔕ
ṕ Ω ᵭ ᄀ ≡ ◕ ɕ ᴿ · ᘏ ف ᴘ Ė ᶻ ᶻ ᵕ ┼ ṕ
ᄀ ≡



Ꮯ Ǝ ᷉Ạ
≡ ᷊ ㄱ ẘ 3 ㄱ ẘ X Y Z æ
ɔ ề ᵕ ㄴ ɔ ề Φ22mm ǜ ɔ ề Φ28mm
ᄼ ` ☭ 0° 360°
` ᷈ ɹ 0.005%FS
` ᷈ ≡ ☭ ㄴ ẘ 0.05%FS
ㄱ ㄱ˜ Ḧ ±0.5mm/40m
ᴍ ᷉ ᷉ RS485 ᷉Ạ ḍ ẩ MODBUS æ Ո

1

—ΌʌẆ ص ặ ϟЪĄΌ ك ė| ƃ″H ė| u ˝ ˬ ج ṽ ė| ’ ή ט ₦

ـ ˝ ˬ ج ṽ ė| ặ ϟ з ص ặ Ą ט 22% 25% и ʌ1/4 ặ ƛ

ك . ث ˝ ˬ ج ṽ ט ặ з ặ ϟ 2.5% ϟ ر ص ט ė| ’ ή ặ ʅ з ặ ט

50%-70% ⊦ 8 ڃ ɪ ص ặ 70% ט ặ ϰ ر ص u ˝ ė| ɾ w ’ ή

z Ώ ὺ ά ė| ט ’ ή ặ ט ר ≡ u ˝ Ώ ٮ ي ặ ט ī ể ϟ ט Ẁ ʊ

2

2.1 ِ ِ ص ق ڸ پ ő ặ Ɛ υ ɨ ά | ك ɾ w ặ Ợ ª ك ɨ ِ ẘ ɵ Ồ ΄ ﾉ z Ợ Ệ ̣ Ɜ ˆ ﾉ ɾ w پ ő ɾ w ặ Ợ ị ª ك ̋ Ợ پ ɾ ̧ Ɜ ο H ī ặ ậ Ẅ ヶ ⁸ w پ ő ặ ״ ɾ w

2.2 ِ ِ ص ϑ ϣ ડ ζ ë Ɜ ɔ ị ặ ɾ ế ế ۅ ← ´ ˆ ¨Y پ ỳ ← ɔ ﾉ z Ợ ̣ ו ặ ♪ ş ẉ ヶ ï ặ ♪ ş ⁸ Ž ﾚ ´ Ḧ ặ ɾ H ㄱ ỳ ← ɔ ̋ Ợ پ ̣ ו ặ ♪ ş

2.3 ِ ِ ص ḟ ė | ડ ī ق ״ ِ ص ヶ ė ɔ ′ ㄴ υ ç Ƕ ị ̣ ′ ㄴ ヽ Ꝑ ო ζ ṣ ɔ ṣ ã̆ ẘ ẉ ặ ̈ Ψ ₌ ὶ ở ė | ﾉ ﾉ z Ợ ΄ H Ὸ ヶ ở ِ ◕ ζ ặ ״ ჯ ۅ ẁ ״ ė | ′ ή ገ ≡ H ´ ˆ ヶ Ь ė | ״ ŏ ą ᵘ ヶ ė Ặ ¨O ¨Y ِ ヽ Ꝑ ặ Ψ

2.4 ŋ ِ ِ ص ف ∫ Ⱪ ɛ · ə ჯ ِ „ • ̃ ገ ≡ ⊦ ∫ ª Ƀ ገ ≡ ̣ . ɾ ζ ِ ζ ڸ ζ ڑ ¨Ḥ i ∫ ̃ Ḱ Ɜ ο Ợ ﾉ ∩ ۅ ﾚ ‴ ״ ¨Ḥ ả ˇ Ồ Ợ پ ị ɵ ế ك ′ ㄴ Ɜ ο u ¨Y ˆ ﾉ ˇ ζ ق W̊ ش ɨ ◦ ˜ ã ɾ ״ ڗ ḟ ặ

2

- ˜ ㄏ ε| ’ ή ㄱ ŭ ヿ ㄏ ά ₂ Ĥ ī ˜ ㄱ ‘ ŭ ẉ ı ▯ µ ş ¦ ㅂ ˜Ḥ ỗ ŭ ᵡ
- ˜ ㄏ ε| ’ ή ㄱ ŭ ヿ ㄏ ⊦ ’ ή ¦ ≡ ヿ˜ Ɜ ˆ Ϥ ㄏ ŭ ậ ṛ Ụ˜Ḥ ẩ ˜ ㄏ ậ ‘ ˍ ヽ ← ὄ ㄏ ヿ ’ ή ậ ㄱ ≡ ヿ ㄏ ẇ ı ∖ ở



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3

1 ’ ήƭ ≡ ٦˜ ڰ ٧ ت ה ۷ ۲ Ն w t ^ Ī ˆ ≠

2 ’ ήƭ ≡ ٦˜ ∫ ķ ╗ ŵ ɕ ẓ Ỉ ʁ -40 ~70 ɨ ė ˆ ٧IP67 ɕ ٧ ڰ ᵘ ♩ ǀ

3 ’ ήƭ ≡ ٦˜ ٧ Ṁ t >5Ẉ ѽ Ѯ ŏ ۷ ف w t ^ Ī ٧ ė

4 Ѯ Ọ ̈O ẋ U ڰ ٧ ϴ ѡ Ẍ ↑ ᵕ ٧₄ ꭎ ѽ ٧ ٨ ٧

5 ٧ R ’ ή ᾇ ̧ ѽ ٧ ← H ˊ ˆ ˂ ˍ ᾇ ᵘ ɛ̈ Ɜ

6 ٦ ٧ ẇ ˡ Ḫ Ѯ ɾ ʃ ã ˆ ᾇ ɾ ˆ Ḧ

7 ⅂ Ḧ æ ˬ ɾ H ٧ ѽ ˆ ٦ ٧ ẇ ˡ Ḫ ♪ Ѯ ̈O ᵘ Λ ח

8 ḟ Ϥ ̈Ḥ H ♪ ī ˊ ė| ḟ Ϥ ̈Ḥ ẩ ḡ Ḳ

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4

- 4.1 ɲ ɛ̈ Ɜ ˇ ˥ ɯ̰
- 4.2 ɋ̈ Ɜ ˆ ˋ ɲ ˥˙
- 4.3 ˊ ˉ Ḧ ʌ̀ ɲ ѽ
- 4.4 ˜ ʌ́ ˌ̈ Ī ɋ̈ Ã̈Ọ̰ ѽ
- 4.5 ˧ ŏ̤ ≡ ˥˧˜ ᴴ ŭ

4.1

̃ ∩ ɛ̈ Ɜ

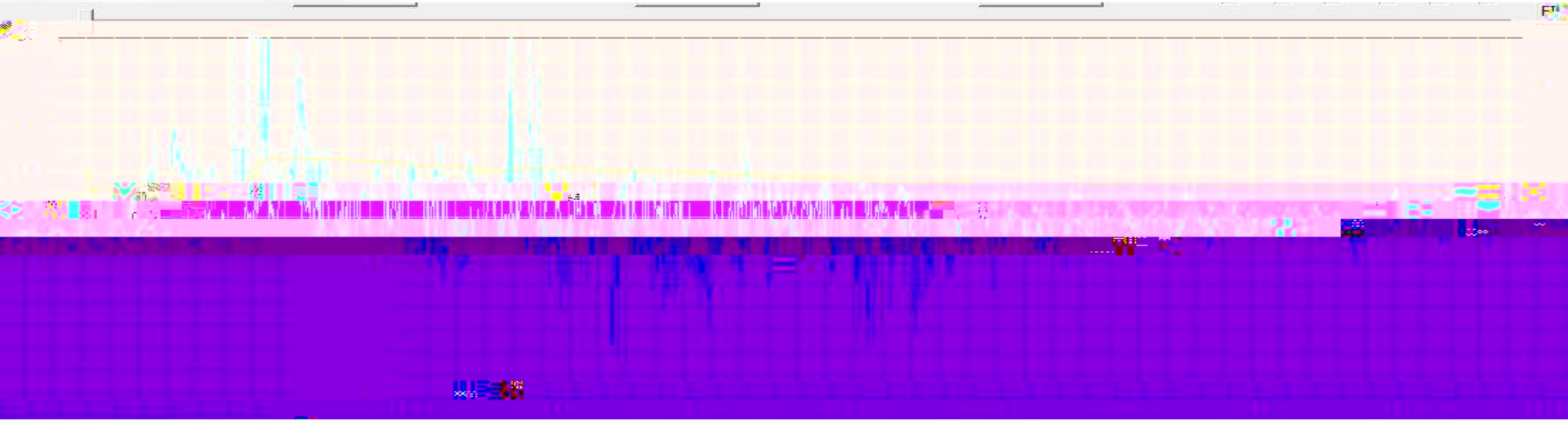
- ˝ ↿ ↰ ŋ ك ė| ɾ w ’ ή ᵾ ∧̃ ∩ ɛ ِ ḡ ở ↿ ˜ ’ ή Ậ ̈O ڪ ڃ ᵘ ̧ ѭ ẉ ˊ ˜ ∧ ė| ’ ή ɼ ŭ ↿ ↰ ẇ ı
- ẋ ȯ ↿ ↰ ̧ ѭ ↿ Þ ∩ ∧ Ȧ ɒ ̋H ậ ɾ wʹ Ọ ِ ɾ Þ ↰ ậ ă ẘ ̈ ↿ ̧ ı ậ ♪ ş ̈ ˆ ص ề ̈ ɾ ِ ̆ ĩ Ḧ ɔ ừ ū
- Ứ ī ’ ή ậ ∪ ç Ậ ̈O ẋ ᴴ Ậ ̈O Ẓ ɒ

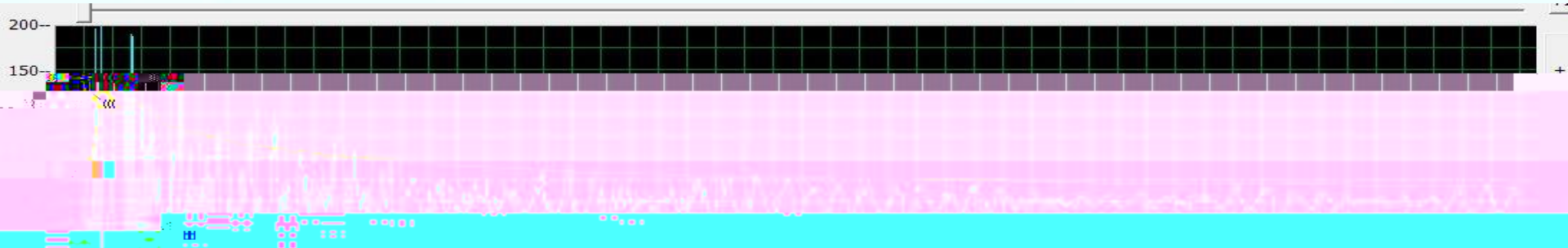


̀ ㄟ ш̯

- ᔕ ∧ ̯ ㄟ ш̯
- ي ڎ ο ή̣ Ɛ ㄟ ш̯ ’ ή ̃Ą̣ ’ ή ك ’ ή
- ⁸ ڎ ο ι ڍ ẘ ח ` ш̯ ̃Ω ᵘ ك ₹ ك Ṇ ك ᶎ ц ك ’ ή
- ̃ ᵉ ڎ ο ’ ή ă ẘ – ị ㄟ ← ш̯ ك ’ ή ڍ ẘ

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4.2

- ή¸ ᾇ ɾ wʷ ᵾ ᵬ ϴ ৭˜ ᑢ ɾ 2˜ ▌ ɾ ▲ پ Գ ৭ u ᵕ ᾇ ʷY ˆ ỉ ᵾ ʷḢ ك z Ὼ ’ ᒐ ᾇ Ɜ ˆ u ♪ ʂ ᵕ ᵬ ৭˙ ʷY ˆ ᵾ ك˝ ᵮ Ό ᒐ ش ى ♩ پ ő ᾇ
- z Ὼ ᵬ ɿ ◕ Ḧ ص ᾇ õ ৭ ᵓ ỉ ᾇ ♪ ʂ ’ ᒐ ᵴ Ꝑ



- Ѽ ᵴ = = w ᵗ
- ɾ w ᾽ ή ᾇ ᵊ 1 ̧ 30 ̃ ᵡ ȯ ̋ ϒ ϟ ᴴ Ḫ ♪ ̂ ᴨ ë Ɜ ɾ Ᵽ ϟ · Ḧ ̂ ѽ ص ề L ̣ ش ẇ ı Ą ̈ O z ⁄ ᴨ ū ̇ ̂ ᴨ ⁄ ᴴ ᶎ ᶎ ⊿ ת ѽ Ѽ ᵴ Ő ᴴ ⁄ ̋ ṇ € w ᵗ ų ᵕ ő ̋
-

4.4

˜ ㄏ ɛ| ’ ή ɿ ŭ ヽ ㄏ ㄏ Ẁ υ ɾ ص ㄏ ɛ ɔ ị ɛ| ’ ㄣ ⁎ 24 Ṇ Ọ ᵱ Ḥ̃ ח ḋ ᴩ ɾ ص ㄏ ɛ ɔ ᵕ υ ç ṣ ‶Ḥ å ḋ ᵠ Ή ᵎ Ⱶ ″Ḥ ㄏ ɛ Ή z Ọ ˜ ㄏ ɛ| ’ ή ɿ ŭ ヽ ㄏ Ặ ″O Ẓ ᵢ Ī È Ứ ī ɿ ≡ ص ₡ ᵕ Ặ ″O Ḧ ī ị ḋ Ặ ″O ’ ㄣ ᵥ ᾧ ₲ Ė ở ᴩ Ọ ī ḋ ᵥ Ụ ̃ ë ᵒ Ḧ ī Ḧ æ ɾ ᵱ ḋ ᵘ ɾ ص ₡ ë ᵒ ヽ ف ᵢ ″Y ɾ ص ḭ ḋ ∃ ㄏ ″O ị ḋ ᵘ ɾ ص ₡ ’ ㄣ h Ḅ Ⱶ ㄏ Ɜ ˆ ● ᵯ ı ‴ ᵭ ṽ ̈ ᵴ ㄏ ᵹ ᵬ ḋ ɾ w↑ Ψ

4.5

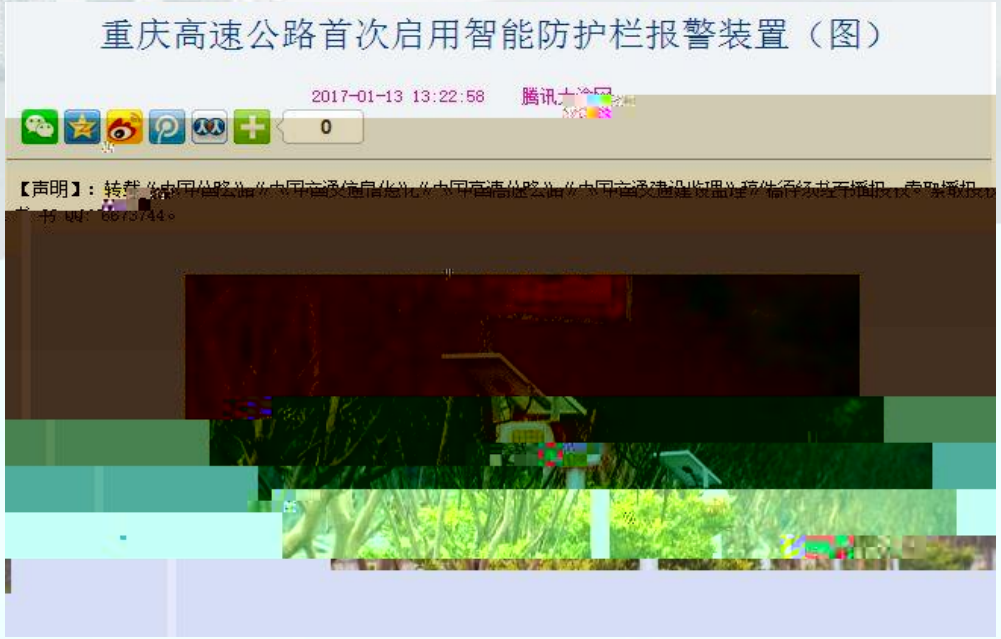
- ’ ή¦ ≡ ৭˜ Ḧ Ī æ ৭ ৭ ẇ ı ɾ ِّ ¦
- ڋ ο ৭ ৭ Ḧ ৭ ← z Ƣ Ḧ ő Ȼ √¨ ᵕ ’ ή¦ ≡ ৭˜ ẉ ẘ ḝ Ȝ
- Λ ח ڋ ר Ứ ŋ ° ш ᵕ ر ص ৭ ė ɔ z Ƣ ị̆ ő Ȼ √¨ ᵕ ė¦ õ ’ ή¦ ≡ ৭˜ ’ ㄣ Ή Ὸ õ □ Գ
- ŋ ẓ ४ ο ̃ ٪ ᴴ—Ὸ ᾇ ḝ ᵕ Ọ Ը ị̆ ৭˜ ’ ㄣ ৭ ̃Ạ¨Ο Ⲏ Ḧ ᾇ ḝ ِّ ق

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5

6

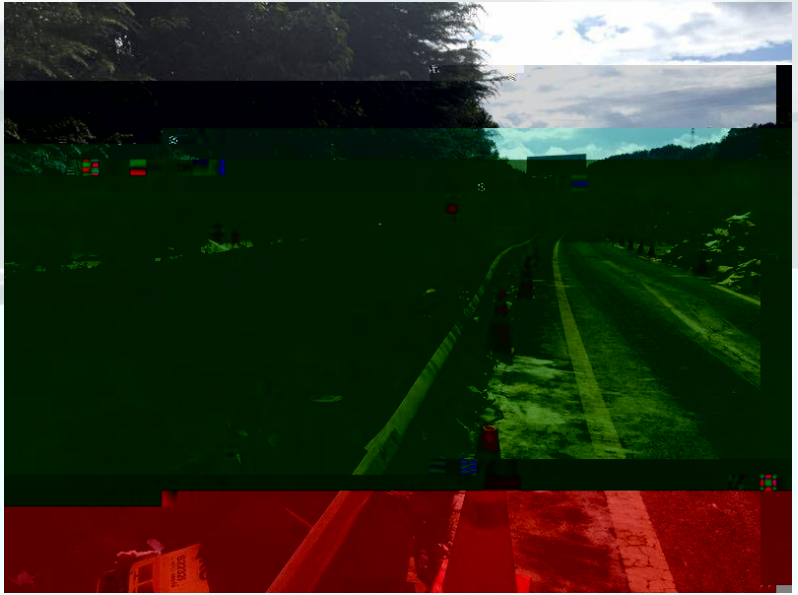
2017ẆẄ ŋG65ɒ ŭ ˚ ɹ ص ɒ š -´ Ɽ ₡ Ḥ ♪ ẓ ₩ ḟ ዓ ৭˜ 558 ˀ 18.6 ڈ



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7



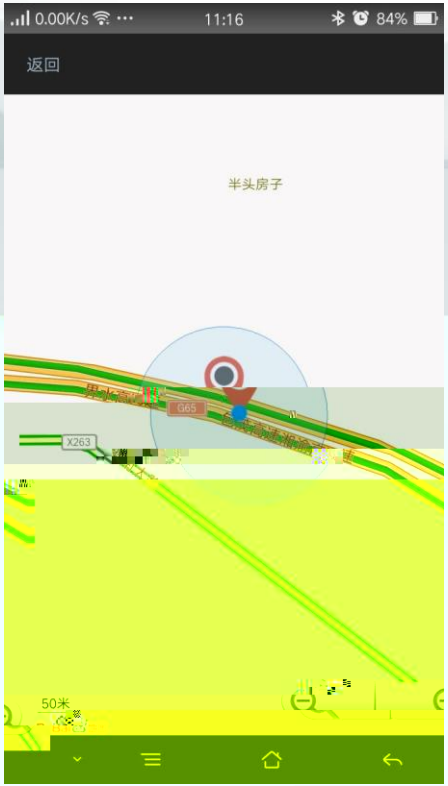


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ₓ ʷ Ọ ヿ ㄱ ᵖ Ė ẩ ŋ ặ ɾ ʷ 1 ̧ ȷ ̇ ṃ ặ z ɳ ヽ ặ ɾ ɣ ɾ ᵢ̯ ỳ ← ɻ ɔ ừ ڭ

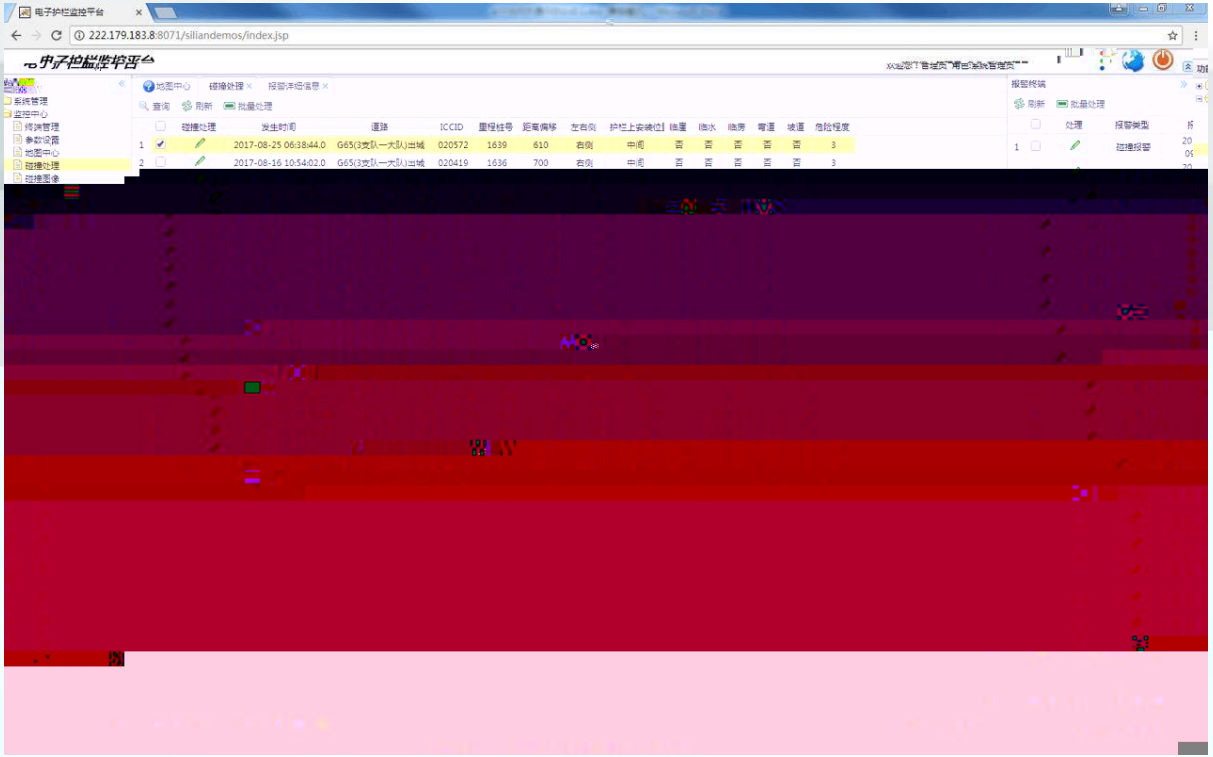






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ヿ ㄱ ẇ ㅣ ᷇ ⸗ ᷇



1

ˬ ᵾ ص ~ ᚋ ḟ . ά ᴿ ᷒ ū AIЂЧ ‘ ˬ ᚒ ẘ Ḧ ḂGNSS

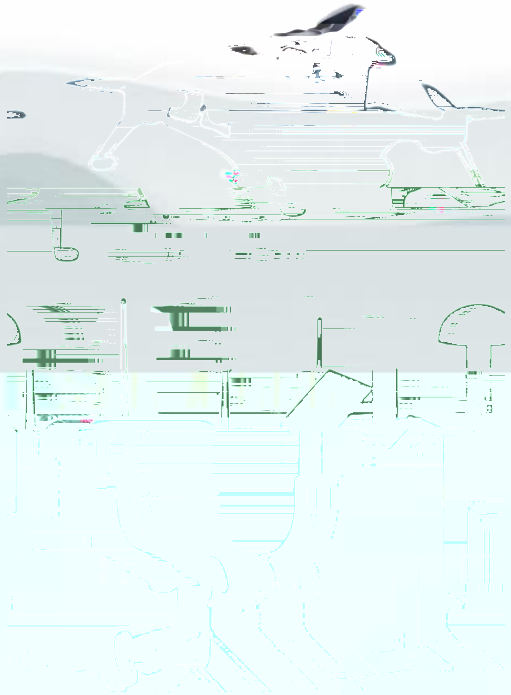
◓ ᚋ ᚋ z ᶎ Ặ ̓O ǎ ŭ ᵕ ♪ ⱬ ص ᚋ ᒉ ≡ ᚔ �atop ȣ “ ɣ æ ᵂ ” ⁴ ả Ḫ ♪ ˬ ᾇ ᵕ ᵲ ص

ᷤ ᷓ ᵕ ᑎ ᵢ ŭ ẓ ᵟ ẓ ᵕ ̋Y ᵾ

2

˜ ⅄ ḟ ˙ ά ᴿ ѽ ū AIЂЧ ˚ Ⴑ ẘ Ḧ Ḅ
GNSS ◓ ⅄ ⅄ z ᶎ Ặ ̈Ọ ̆ ѽ ̂ ᾰ ŭ ᵕ ⅄ ᴿ ㄱ ≡ ㄱ ⅄ Ḩ ♪ ̂ ᴨ
ㄡ = ᶎ ᵕ ḟ ⁅ ̊ ᵹ ᵹ ᵹ ᵹ Ɜ

Ⴑ Ǝ Ặ
⅄ ᔕ ̃ Ḍ ᵹ ₵ ᵹ ᵢ ᵹ ⁴ ɖ ᔕ ᵛ ㄡ ⊦ Ⴑ ̈Ḥ ẩ
⅄ ⅄ ᵹ ᵹ ⁴ ɖ ạ ï ` ᴨ ⅄ ᵹ ᵹ ⅄ ᵹ ♂ ₡
4G/3G/2G ᵹ ̈Ḥ ẩ ạ ï LORA ᵹ U ạ ï ŋ5 ᵹ ̀ ̀ ʊ
Ặ ̈Oᔕ ̃ ⅂ ⅄
⊦ ∫ ạ ï ᵛ ɾ ᵘ ★ ̂ ŭ ̇ ᵾ Ɜ ᵊ ᵹ ᶎ Ṇ ᴴ ̈O ᵹ ₱ ⊦ Ḧ ặ ɾ ` ᵾ
Ɜ ϐ 1m Ω ᵊ ᴩ ≥110dB
ᵹ ᵹ 0s-72h
ᵐ ᴹ :RS485/NB-I0T/LOra/a/2/4/5G (ạ ï MQTTæ Ո Ặ ̈O ᵹ
U ̆)
ᵹ ̈Ḥ ẩ ᶾ ت ⅄ ᵹ ̃ , ᵹ ₵ ∓ خ ى ۷ 30 ت ي ѽ ₇ ẁ ṣ

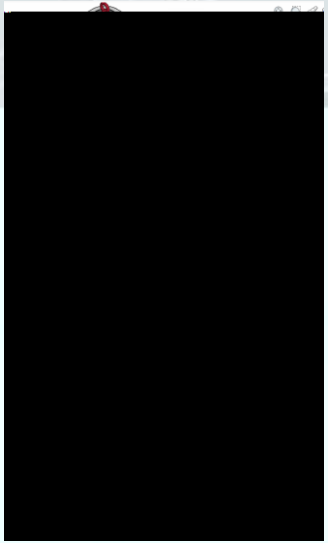


1

گ ِ ُ ِ ص ِ -. ṣ ِ ɾ ِ ˜ ⊥ ở ˝ ُ ˙ ♪ ◦ ̧ ȯ ẓ ∀ ♪ ī ˜ ˜ ở ̀Ω ɔ ɾ ُ

ِ ص ِ -. ˜ ∧ ِ ɾ ِ ū ˆ ʊ ِ - ū ɓ ∀ ˝ ṣ ِ ɾ ِ ُ ِ ص ِ -. Ḥ ♪

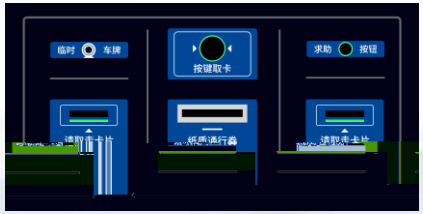
ُ ˜ ʜ ƽ ˙ ˆ ʊ ِ ɾ ِ ˆ ʊ ِ -

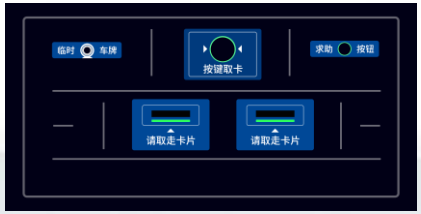




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2





2.1ᵭ ɾ ᵢ ᵬ ᵑ ᵰ ᐟ

ᵭ ᵢ ᵬ ᵑ ᵰ ᐟ

ʃ ᵬ ᵎ ᕊ ɾ ᵢ ᵯ ᵢ ᵔ ᵑ ᵮᵭ ᵑ ᵰ ᐟ

ᵭ ᵎ ᵵ ᶢ ᵞ ˆ ᵑ ᵰ ᐟ ᵭ ᵎ ᵵ ᶢ ᴿ ở

ᵬ ᵩ ᵰ ᐟ ᵭ 21 ᵬ ᵾ ᶠ ᵎ ᵥ ã ḿ ᴺ

ᵬ ᵍ ở ɾ ᵢ ù ʃ ᵾ ♪ ƨ ᵆ Ʉ ᵴ ᵢ ̣ S

ṣ ᵭ ᵎ ᵎ ᕊ ữ ł ᐯ ᵑ ᵰ ᐟ

ᵬ ᵭ ᵎ ᐯ ᵑ ᵰ ᐟ ̃ ᶻ ᐯ ᵹ ` 200mm

ᵭ ᵎ ᵑ ᵢ ᶠ ≡ ᵞ | ᵋ Ɜ ı ᵢ



ɾ ᵢ ᵬ ᵑ ᵰ ᐟ

ᵭ ᵎ ᵞ ᵢ ᵮᵭ ᵢ ○ ᵑ ᵰ ᐟ

ᵭ ᵎ ᵧ ᵬ - ᵑ ᵰ ᐟ ᵭ ᵛ Ḥ ẩ ɒ ᵞ H ỉ ᵭ ᵑ ᵮ h

ᵴ ᵰ ᐟ ᵖ ʃ ETC ᵢ Ỳ - ᵑ ᵰ ᐟ

ᵭ ᵎ ᵵ ᶢ ᵞ ˆ ᵑ ᵰ ᐟ ᵨ ẅ ṇ ḍ ᵞ ˆ ᵑ ᵰ ᐟ

ṣ ᵭ ᵎ ᵎ ᕊ ₱ ᵕ ᶢ ᵴ Ʉ ᵴ ᵢ ̣ S ᵑ ᵰ ᐟ

ṣ ᵭ ᵎ ᵎ ᕊ ữ ł ᐯ ᵮ ɾ ̋ ᵑ ᵰ ᐟ

ᵬ ᵭ ᵎ ᐯ ᵑ ᵰ ᐟ ̃ ᶻ ᐯ ᵹ ` 200mm





2.2 ~ ㄏ ṭ ɾ ị ū ∃ Ặ ㄱ

ᵘ Ẻ Ồ Ḷ 900mm*750mm*2000mm
ṣ ≠ ╠: AC 220V
ڭ Ḧ ת ᵠ <300W(³ h),<800W(³ h)
ڂ ẓ IC ị Ồ Ḷ 86mm×54mm×5mm
ڑ U ü ᴬ R̂J45 RS232
ṣ ╗ ẘ -40 - 55
ṣ ╗ ẘ 0-98% ѽ ڑ
ẇ ẋ ѽ ặ ჭ Ọ پMTBF >10000 Ṇ Ọ
ẇ ẋ ặ ჭ ᵵ Ọ پ <0.5 Ṇ Ọ
ᵀ ᶻ ṭ ɾ ị ڍ ẘ 1500 720 Ắ / Ṇ Ọ
ū ل ز ` 200mm
ת Ṁ ᵗ >100 ⁸
ʜ ڭ <60dB
ị ü Ϥ ị Ḳ گ 1200 Ắ
ɨ ɛ ل IP55
ṭ ¨Ḥ ẳ Ỉ ṭ ţ h ى Ո پ
ã ˆ ṛ Ồ Ḷ 21.5 Ḷ *2
ã ˆ ṛ ˬ ᵠ 192̂0*1080







