

SURVEYING INSTRUMENTS

SET310

SET310S

SET510

SET510S

SET610

SET610S

Electronic Total Station

SET500/SET500S/SET600/SET600S

19. ₩

가

1.	.....	3
2.	.....	4
3.	ON/OFF.....	7
4.	.....	9
5.	.....	12
6.	.....	16
7.	.....	20
8.	(SETTING-OUT).....	23
9.	(OFFSET)	28
10.	.....	32
11.	.....	34
12.	.....	36
13.	.....	41
14.	.....	43
15.	.....	48
16.	.....	55
17.	.....	56
18.	.....	59
19.	.....	62
20.	Option	64
21.	.....	66
22.	.....	69

1.

1) SET가

2)

SET

가

3) SET

4) SET

5) SET

6)

7)

SET

Off

가

8)

9) SET가

2.

2.1

• SET 12 가 .

, , 4 , 5 .

•

{ON} : ON

{ON} + {☀} : OFF

•

{☀} : ON

•

가 가 .

{F1}~{F4} : , .

•

{FUNC} :

SET 3 .

{BS} :

{ESC} : , .

{SFT} : Shift ON/OFF

{☐} :

{ }/{ } : , .

{ }/{ } : , , .

Option .

2.2

SET510	SOKKIA
NO. XXXXXX	
Ver. XXX-XX-XX	
JOB1	
■■■■	■■■■

■■■■ : Unit

	PC	-30
	ppm	0
S		■
ZA		
HAR		P1
■■■■	■■■■	0

•
S :
H :
V :
[]

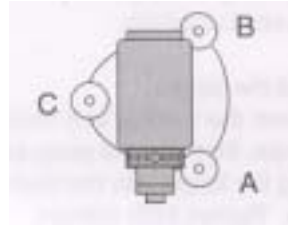
•
ZA :
HAR : ()

• PC :

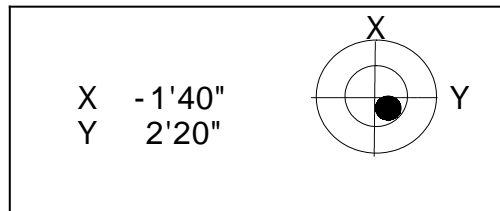
• ppm :

2.3

1) []
 X(),
 Y()



2) X A, B
 Y C 0°



±3',

±4'

3. ON/OFF

3.1. ON

• ON

Absolute Encoder 0SET가

		PC	-30
		ppm	0
S			█
ZA	100°16	20	
HAR	70°26	23	P1
		0	

“Out of range” 가 가

		PC	-30
		ppm	0
S			█
ZA	Out of range		
HAR			P1
		0	

3.2. OFF

• ON

OFF

3.3

• {FUNC}

		PC	-30
		ppm	0
S			█
ZA	100°16 23		
HAR	130°46 26		P1
█	█	0	█

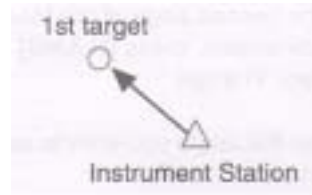
		PC	-30
		ppm	0
S			█
ZA	100°16 23		
HAR	130°46 26		P2
█	█	█	█

		PC	-30
		ppm	0
S			█
ZA	100°16 23		
HAR	130°46 26		P3
█	█	█	█

4. [REDACTED]

4.1 2 (0°)

1)



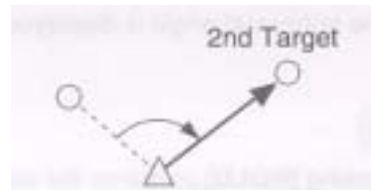
2) 1 [0]

[0]가 [0]
0°

	PC	-30
	ppm	0
S		█
ZA	89°40 24	
HAR	0°00 00	P1
[REDACTED]	[REDACTED] 0	[REDACTED]

3)

(HAR)
(A, B)



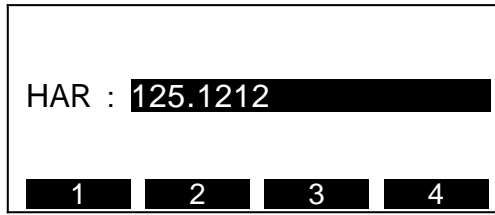
4.2 ()

1)

2) 2 []

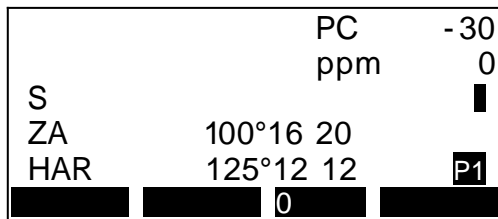


3) “ ” .



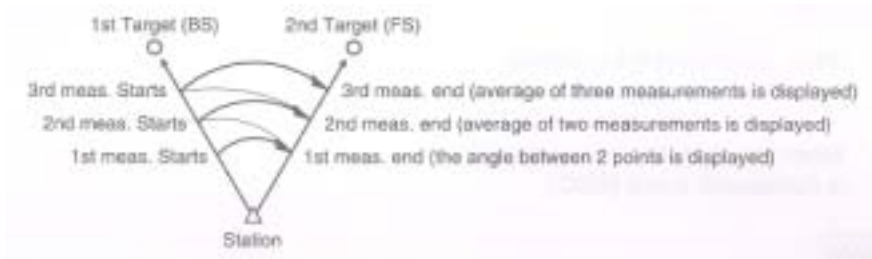
4) □

가




“18.” []

4.3



1) 2 [] “ ” .


0°가 .

HARp	0°00 00
	0
	0°00 00
	OK

2) [OK] .

3) , [OK] .

1 가 : []
 (“ ” 가)

HARp	100°16 20
	2
	50°08 10
	OK

4) 2 , [OK] .
 2

5) , [OK] .
 3

가 “HaRp” , 가
 “ ” .

6) 4)~5) .

7)  .

5. [Redacted]

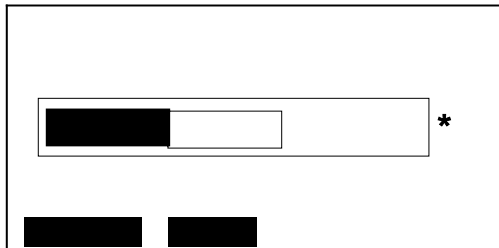
4가 .

-
- Type
-
-

5.1

1) "18. " [] .

2) [] .

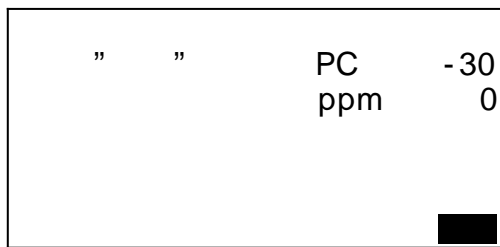


- [] .
 - [*] .
 - [] 가 [*] .
- [OFF] .

5.2

1)

2) 1 [] EDM (, ,)가



3) [] 3가

[SDIST] :

[HDIST] :

[VDIST] :

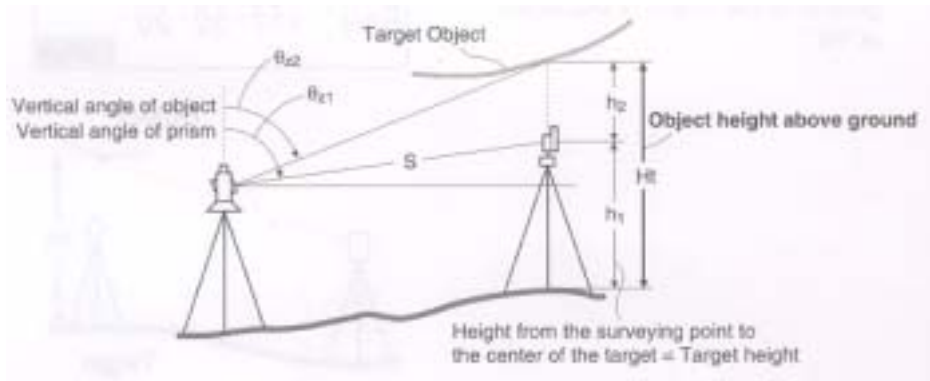
5.3

• "18. " [] 가

5.4

$$H_t = h_1 + h_2$$

$$h_2 = S \sin z_1 \times \cot z_2 - S \cos z_1$$



1)

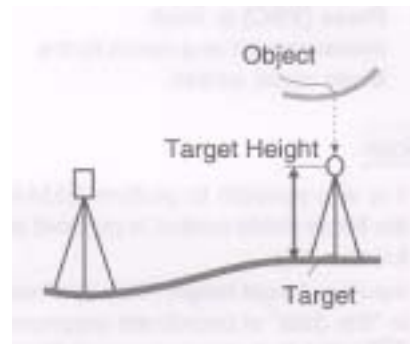
2) "18." []

1 []

" "

" "

[]

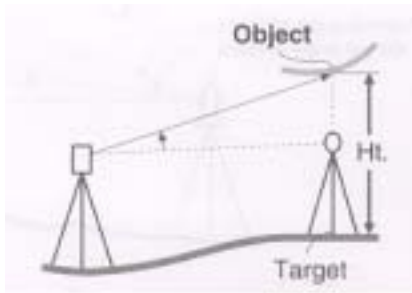


3) 1 []

S/H/V

Ht.	6.255m
S	13.120m
ZA	89°59 50
HAR	117°32 20

4) 2 [] “ ”



5) []

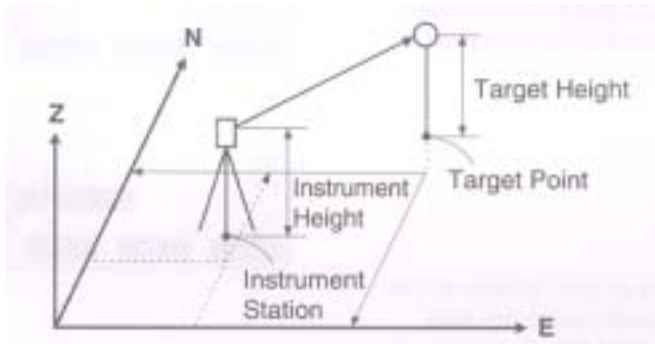
Ht.	6.255m
S	13.120m
ZA	89°59 50
HAR	117°32 20

6) []
[] :

6. [REDACTED]

3

가



6.1

1)

2)

3) “ ”

“ ”

N0:	370.000		
E0:	100.000		
Z0:	123.000		
	1.400m		
	1.200m		
1	2	3	4

6.2

• “ [] .

•

1) “ ” [] .

			37
			38
			40
			51
			45
P			

: “ ”
/ : JOB

2) { } { }

[] .

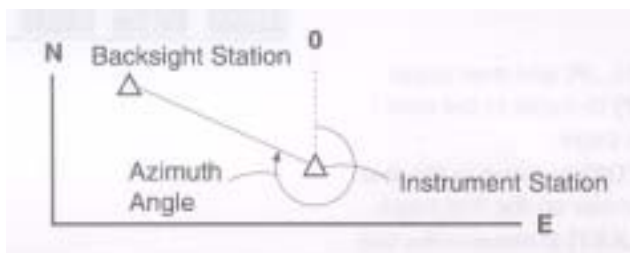
3) ☐ 가 .

4) [OK] .

6.3

•

•



1) “ ” .

2) “ ” .

3) [] []

/			
NBS:	170.000		
EBS:	470.000		
ZBS:	123.000		
1	2	3	4

4) [OK]

ZA	89°59 55
HAR	117°32 20

5) [] .

“ ”

HAR :	125.1212		
1	2	3	4

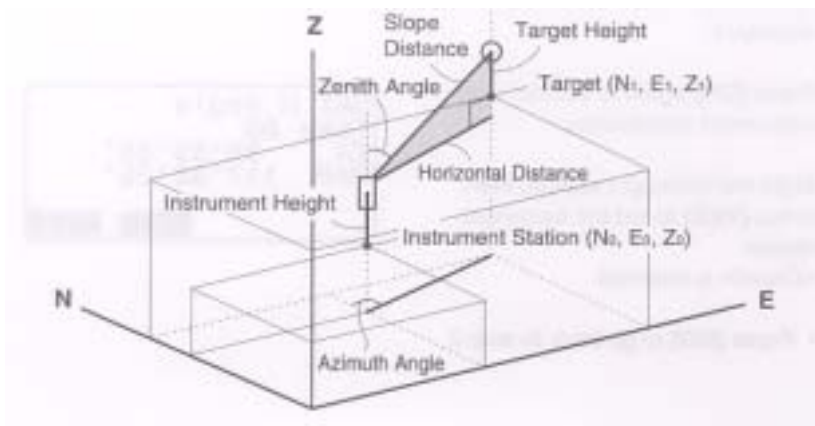
6.4 3

$$N_1 \text{Coordinate} = N_0 + S \times \sin z \cos h$$

$$E_1 \text{Coordinate} = E_0 + S \times \sin z \cos h$$

$$Z_1 \text{Coordinate} = Z_0 + Mh + S \times \cos z - Ph$$

N_0 : N S : ih :
 E_0 : E : fh :
 Z_0 : Z Az :



1)

2) “

N	240.490
E	340.550
Z	305.740
ZA	89°59 50
HAR	180°59 50
█	█

3)

[]

4)

[]

5)

[]

2)

3)

[]

	1st Pt.
N	170.000
E	470.000
Z	123.000
[] []	

4)

[]

가

..

5)

[]

3

[]

6)

가

[]

7) []

가

(N, E)가

N	240.490
E	340.550
Z	305.740
N	0.0010m
E	0.0020m
[] [] OK	

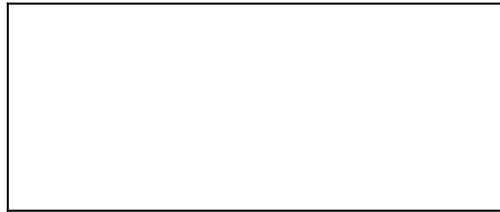
[] :

[] :

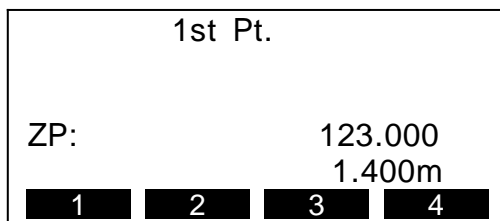
[]

	N	E
1st	-0.001	0.001
*2nd	0.005	0.010
3rd	-0.001	0.001
4th	0.003	-0.002
[] [] [] 가		

가 Esc .
 [가] : 가 .
 [] :



8) 2 [] “ ” .
 " " .
 .
 . 10 .



“NEZ” .

• SET
 N, E

Z

• () 3 가 가 .

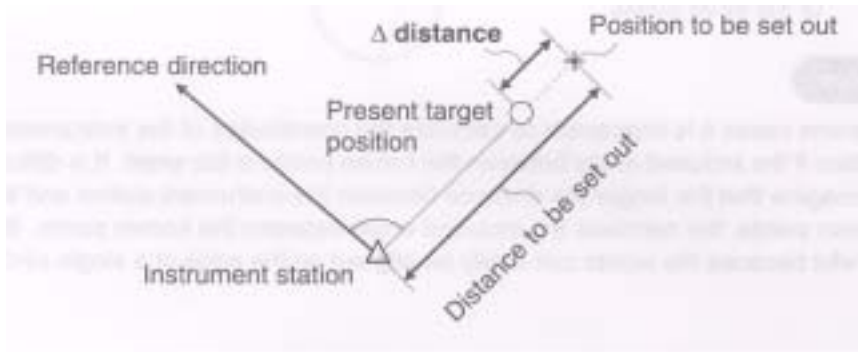
가 가

가 .

3 .

8.

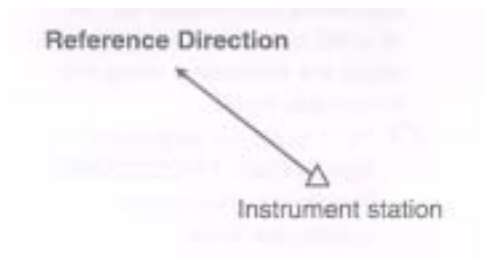
가 가
=



“ ”

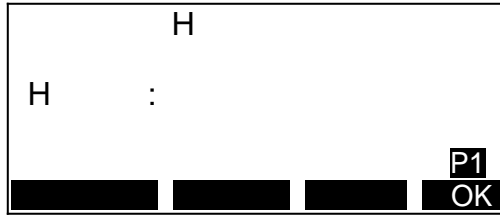
8.1

1) 0

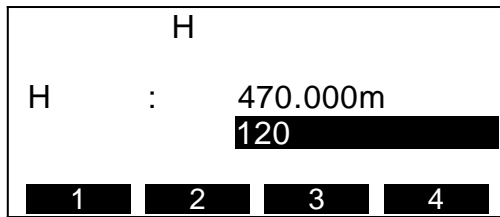


2) 3 []

3) “ ”



[] “ H”
[]

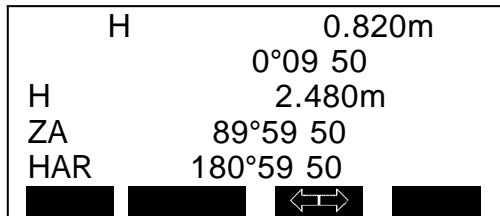


4) [OK]

“ ”

:

가



“ H S”

[+]

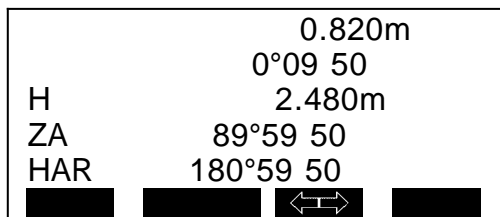
, [-]

5) [↔]

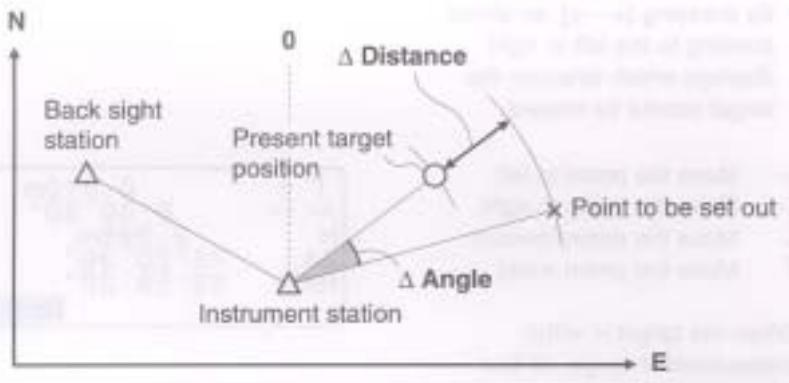
“ ”

가

가



8.2



가

1) 3 []

2) “6.” “ ”

3) “ ”

H			
H	:		
			P1
			OK

{FUNC}

H			
H	:		
			P2

[] .

H			
NP:	170.000		
EP:	100.000		
ZP:	123.000		
	1.400m		
1	2	3	4

4) . [OK]

H			
	38.067m		
	180°59 50		
			OK

[]
[OK]

5) 0°가
가 ±30" 가

7) []
가

H		0.820m
		0°09 50
H		2.480m
ZA		89°59 50
HAR		180°59 50
		↔

8) “ H” 가 0m가
[] ..
±1cm 가

9) 가 0m가

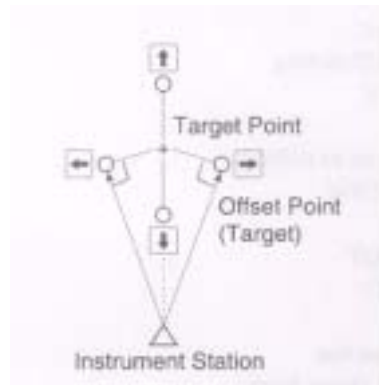
9.

-
- ()

9.1

-
- , 가

90°



가

1) [] ,
 “ ”

2) 3 [] .

3) “ ” .

4) .

-

-

S	34.770m
ZA	80°16 20
HAR	100°16 20
	2 m
1	2
3	4

: 가
 : 가
 : 가
 : 가

5) [OK]

“ ” , . , , .

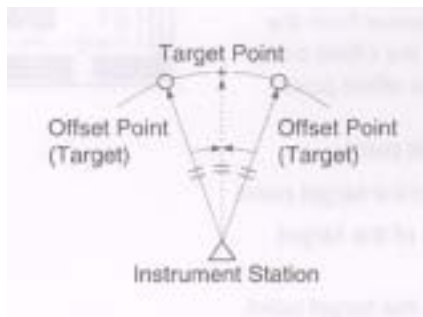
S	10.169m
ZA	90°24 24
HAR	100°16 20
	NEZ

6) [NEZ] 가 []

가 .

9.2

가
 가
 가



1) ,

[] .
 “ ” .

2) 3 [] .

3) “ ” .

S	34.770m
ZA	80°16 20
HAR	100°16 20
	?
<input type="checkbox"/>	<input type="checkbox"/> OK

4) [OK] .

“ ” ,
, , .

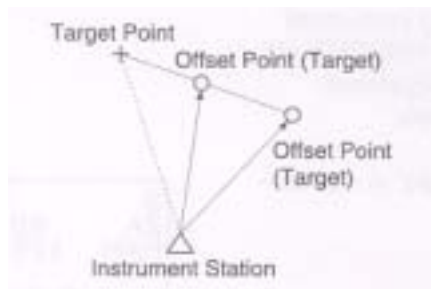
S	34.980m
ZA	100°16 20
HAR	143°26 30
<input type="checkbox"/>	<input type="checkbox"/> NEZ <input type="checkbox"/>

5) [NEZ] 가 [] 가

9.3 (2)

• 2

()



2 (2RT500)

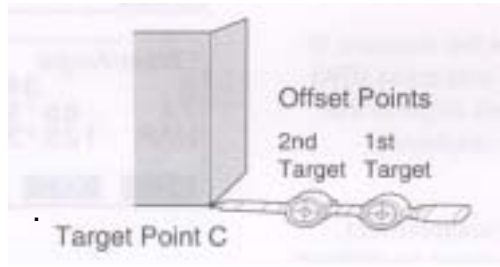
- 2

-

-

1) 3 []

2) “2”



3) [OK]
[]

	2
ZA	87°18 53
HAR	100°16 20
	OK

4) [OK]
가

5) []
“ ”

B-C :	1.2 m		
1	2	3	4

6)
“ ”

가

2			
N	10.480		
E	20.693		
Z	15.277		
1	2	3	4

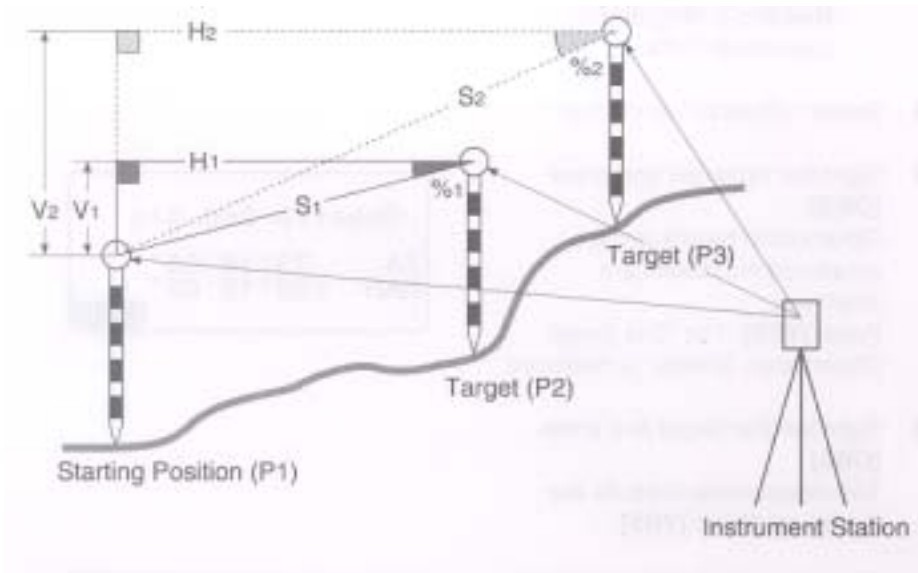
10.

• () , , ()

• 2 (V)

1) (P1) , []

2) (P2) 3 []



3) “ ”

S	20.757m
H	27.345m
Z	10.012m
/ %	

S :
H :
V :

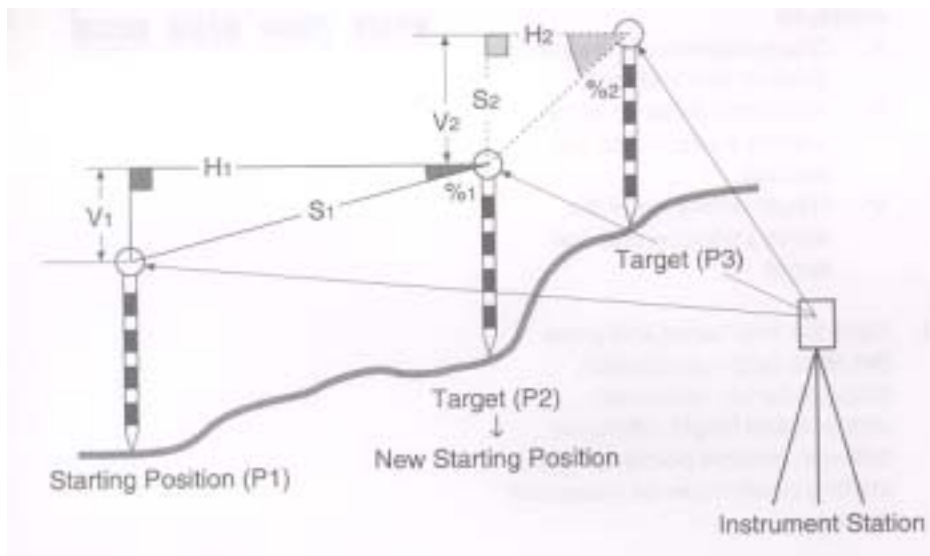
4) []

[] :

[/%] : 가 %

[] :

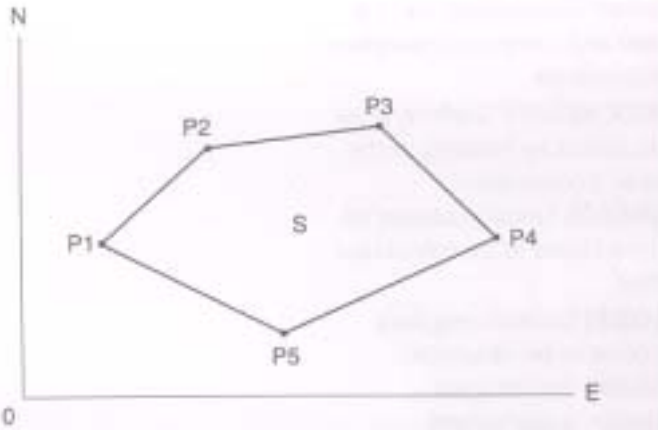
10.1



1) “ ” []

2) []

11.



INPUT

- : P1(N1,E1)
- : P2(N2,E2)
- : P3(N3,E3)

OUTPUT

: S

1) 2 [] .

2) “ ” “ ” .

01 :	
02 :	
03 :	
04 :	
05 :	

3) [] . [] . 가 .

N	12.480
E	120.693
Z	15.277
ZA	89°18 23
HAR	187°18 53
OK	

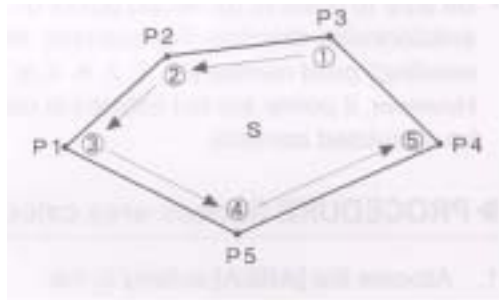
[OK] Pt_01 .

01 :	Pt_01
02 :	
03 :	
04 :	
05 :	
OK	

4) [] .

5) [] .

[]



가 1, 2, 3, 4, 5

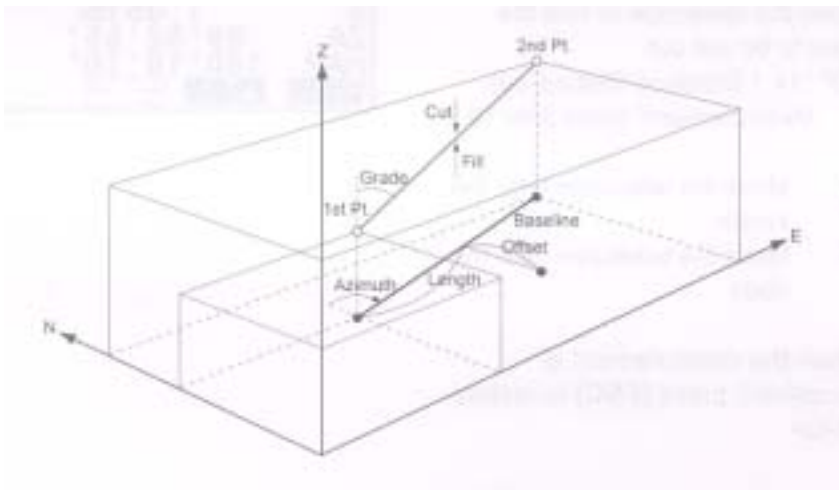
5, 4, 3, 2, 1

.3	468.064m ²
	0.00468ha
OK	

12.

12.1

$$\text{Scale}(X,Y) = H \begin{pmatrix} \cos(\theta) \\ \sin(\theta) \end{pmatrix}$$



가

“1”

- 1) “ ” [“ ”]
- 2)
- 3) “ ” [] []

NP:	██████████	100.238		
EP:		40.928		
ZP:		115.000		
	1	2	3	4

4)

[OK]

NP:	██████████	113.464	
EP:		91.088	
ZP:		123.000	
			P1
			OK

5) {FUNC}

[]가

[]

NP:	██████████	113.464	
EP:		91.088	
ZP:		123.000	
			P2
			██████████

6)

[]

NP:		100.238
EP:		40.928
ZP:		115.000
	██████████	

[]

7)

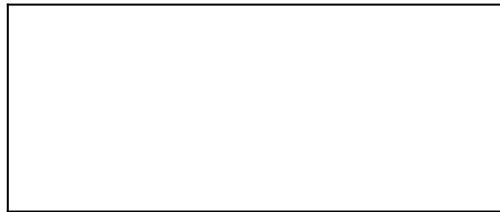
8)

" H" " H" 가

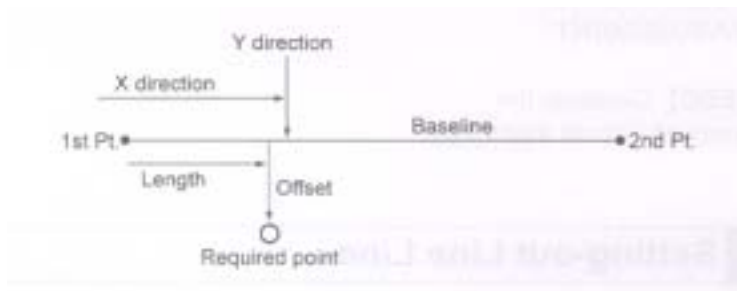
	100°16'20"
H	51.854m
H	51.855m
ScaleX	1.000091
ScaleY	1.000091
Sy=1	Sy=Sx
OK	

%15.422	
1.**	%
OK	

9) [OK]



12.2

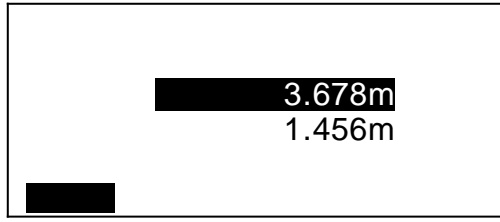


1) []

(X)

(Y)

[OK]

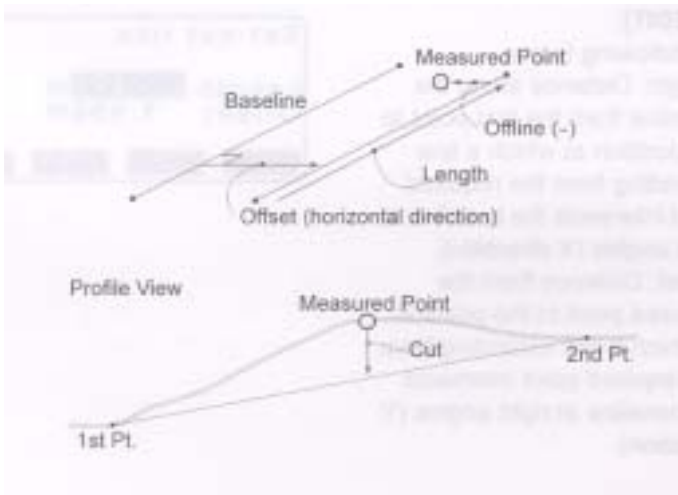


2) [] 가 가 .

N	111.798
E	94.675
Z	12.024

3) [] 8. .

12.3 - .
가
가 .



1) [] .

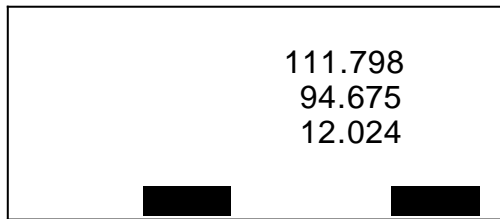
“0” (+), (-) .



2) [] [] .

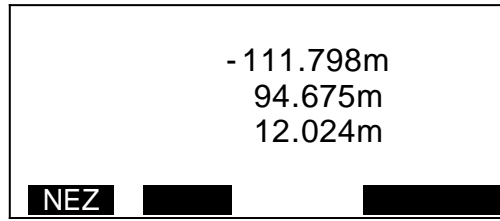
3)

(/)가 가



4) [] 가 .

가 .



5) [NEZ] 가 .

6) [] 가 .

7) [] .

8. .

14. [REDACTED]

• 가

가

14.1

1)

2) 3 [] . “ ”
“ ” [] .

/	rec 10000
S	134.980m
ZA	123°16 20
HAR	143°26 33
	1
[REDACTED]	[REDACTED]

3) [] , , [OK]

S	234.773m
ZA	80°16 20
HAR	100°16 20
	[REDACTED] 1
	1.234m
1	2
3	4

4) [] : , [] .
SET 가 , 가 가 .

/	rec 2923
S	134.980m
ZA	123°16 20
HAR	143°26 33
	1

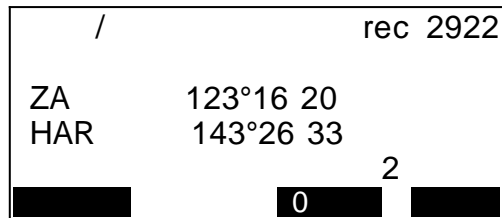
[] : “ ”, “ ” .

14.2

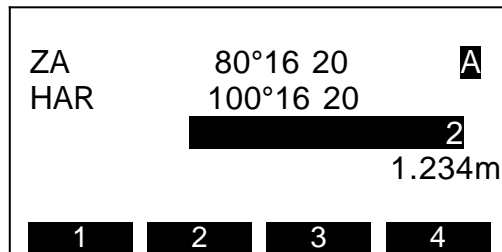
가

1) 3 [] .

2) “ ” .



3) [] .



4) , , [OK] .

14.3

1) “ ” .

2) 3 [] .

3) “ ” .

	/	rec 2921
N		344.284
E		125.891
Z		23.564
		3

4) , , [OK] .

N		344.284	
E		125.891	
Z		23.564	
		3	
		1.234m	
1	2	3	4

14.4

1) 3 [] .

2) “ ” .

3) [] .

N0:		274344.284	
E0:		178125.891	
Z0:		123.564	
		4	
		1.234m	
1	2	3	4

: CL
: SOKKIA
OK

: May/29/2000
: 11:45:15
:
:
:
:
OK

: 15
: 1013hPa
ppm : 0
OK 0ppm

4) [OK]

14.5

1) 3 []

2) “ ”

/ rec 2823
OK

3) []

14.6

1) 3 [] .

2) “ ” .
“ ” .

	37
	38
	40
	51
	45
P	

[,] :

[-P] :

(,)

[] :

[] :

[] :

3)  .

N	144.730
E	234.837
Z	21.345
	51
	1.345m

15. [REDACTED]

- 가 “ ” [] .
- .
-
-
-
-
-
-

15.1

- . , , .

- 10 가 , JOB01 .

- 1) “ ” .
- 2) “ ” .

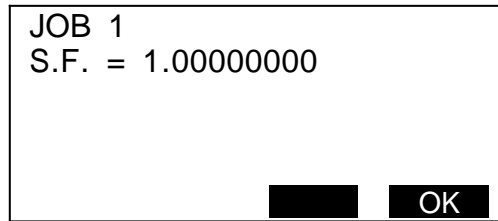
```
: JOB1 [REDACTED]  
S.F. = 1.00000000  
: JOB1  
[REDACTED] S.F.
```

- 3) [] .

SOKKIA	45
* TEST	246
3-1	5
JOB4	0

“ * ”

4) [S.F]



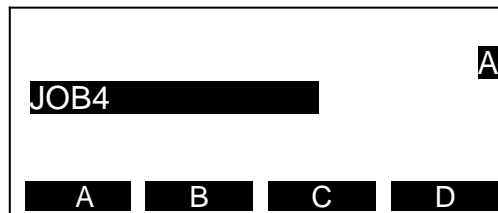
15.2

1)

“ ”

2) “

”



3)

15.3

1)

“ ”

2) “

”

3)

SOKKIA	45
* TEST	246
3-1	5
JOB4	0

TEST

?

[REDACTED] [REDACTED]

15.4

.

,

.

10,000

.

1) “ ” “ ”

2) “ ” “ ”

	rec 9641
N	274344.284
E	178125.891
Z	123.564
	4
1	2
3	4

3) , [REDACTED]

	rec 9640
N	274344.284
E	178125.891
Z	123.564
	4

•

1) “ ” “ ” .

2) “ ” .
“ ” .

SDR 12

3) “ ” .

4) “ ” .

15.5

•

1

1) “ ” “ ” .

2) “ ” .

				37
				38
				40
				51
				45
P				

3)



N	278435.345			
E	187456.340			
Z	132.4			
			37	

4) “ ”

15.7

1) “ ” “ ”

2) “ ”

					A
:	JOB4				
E	F	G	H		

15.8

1) “ ” “ ”

2) “ ”

가

16.

1) “ ” “ ” .

2) “ ” .

JOB01	OUT
SOKKIA	45
* TEST	246
3-1	5
JOB4	0
	OK

3) .

4) “OUT” [OK] .

SDR

5) “SDR” [OK] .
“ * ”

“17. ” “17.4 ”

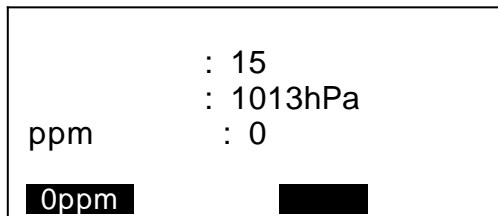
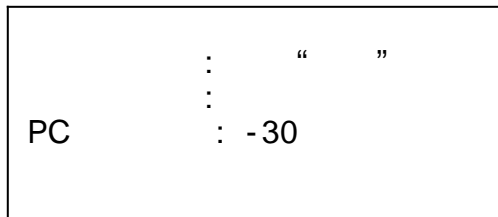
Communication Software (WCOMMS, COMMS PLUS)

17.

가

17.1 EDM

2 [] .



: [,]
" " "n="

"1 " 1 " "

"1 " 1

: [,]
() ()

PC :
:
:

ppm :

가 .



17.2

1) [] .

2) “ ” .

coll.	:	S
	:	(H, V)
	:	
	:	
	:	Zenith

	:	1"
	:	N-E-Z

coll. :

 : (S , H , V)

 :

 :

 : ,

 : (,)

 :

 : (1"/5")

 :

17.3

1) [] .

2) “ ” .

	OFF	:	30
		:	4
EDM		:	On
		:	5
		:	Off
EDM		:	off
EDM ALC		:	

OFF : Off
 :
 EDM : On/Off
 :
 : On/Off
 EDM : On/Off
 EDM ALC : /

17.4

Baut rate	: 1200bps
Data bits	: 8bit
Parity	: Not set
Stop bit	: 5
Check sum	:
Xon/Xoff	:

Baud rate :1200bps, 2400bps, 4800bps,
 9600bps, 19200bps, 38400bps
 Data bits : 8bit, 7bit
 Parity : Not set, Odd, Even
 Stop bit : 1bit, 2bit
 Check sum : ,
 Xon/Xoff : ,

17.5

:
: hPa
: degree
: meter

: ,
 : hPa, mmHg, inchHg
 : degree, gon, mil : meter, feet, inch

18.

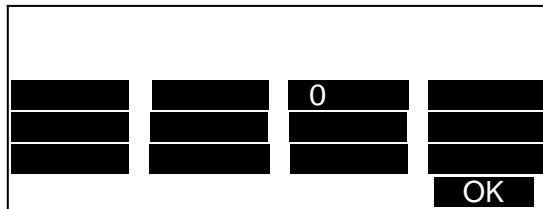
• SET

, 1 2 가

1) [] .

2) “ ” .

3) “ ”
 “ ” .



1 : [] [] [0] []

2 : [] [] [] []

3 : [] [] [] []

4) [,] [,]

5) [OK] .

6) “ ” 1,
 2 .

1
2
1

7)

“ ”

“ ”

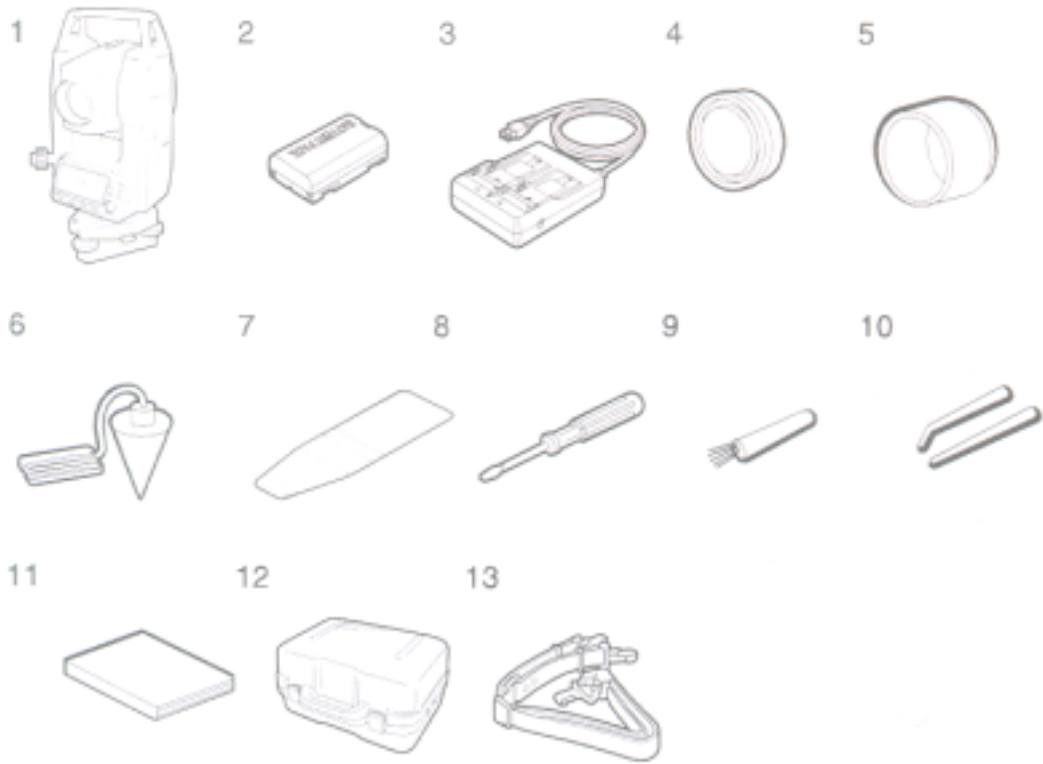
.

1
2

.

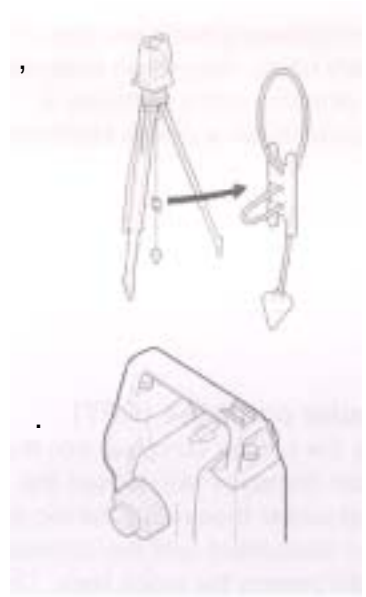
[]	
[]	(S= , H= , V=)
[0]	0°
[]	
[]	
[]	
[]	(Setting out)
[]	
[]	
[]	EDM (,)
[]	
[]	
[]	
[]	
[]	
[.]	/
[/%]	/ %
[]	/
[]	
[]	
[]	
[]	
[F/M]	Meter/Feet
[]	
[]	
[]	
[- - -]	

19.



1.	.....1	7.	.....1
2.	(BDC46) (SET310/510).....2 (SET610).....1	8.	.....1
3.	(CDC61/62).....1	9.	.....1
4.	.....1	10.	.....1
5.	.....1	11.	.....1
6.	.....1	12.	(SC196).....1
		13.	.....1

S 가



20. Option

(SF14)

SF14

3V DC
R03/AAA×2
0.5m~2.0m
37 keys
IP44
162(W)×63(D)×19(H)mm
0.12Kg ()



(CP7)

2

「正」

(磁北)



UNIT (SCRC2A)

SET 310/510 CF Unit

(EL6)

SET610

30x
3"

Diagonal eyepiece (DE25)



(OF3A)



Cable

PC

Cable

DOC25 Seiko/Epson

DOC27 IBM/Toshiba J3100

DOC1 Cable PC

가

PC

21.

• SET

가
가

가

가

Checksum error

SET

『 17.4

『 17.4

Flash write error!

Flash mount error!

가

2

, []

, []

2

, []

, []

Code

가

Out of range

가

. ±3'

%

(1000%)

±89°

가 9999.999

가

· (·) · ·

RAM

가 가 ·

Pt.1 Pt.2

170mm
 45mm(EDM:48mm)
 SET310/510 : 30×
 SET610 : 26×

SET310/510 : 3"
 SET610 : 3.5"
 1° 130"
 1.0m
 1 Speed
 5

Absolute Encorder

Degree/Gon/Mil (가)
 -3599°59'59" ~ 3599°59'59"
 1"/5" (가)
 SET310 : 3"(1mgon)
 SET510 : 5"(1.5mgon)
 SET610 : 6"(1.9mgon)
 0.5
 ON(V&H/V)/OFF (가)
 2

±3'

: / (가)
 : Zenith/Vertical/Vertical±90°
 (가)

SOKKIA ,
 (가 20Km,
 가)

SET310/510

RS90N-K : 3.0~70m
 RS50N-K : 3.0~50m
 RS10N-K : 3.0~20m

Compact prism CP01 : 1.0~700m
 Standard prism AP×1 : 1.0~2,000m
 Standard prism AP×3 : 1.0~2,200m

SET610

RS90N-K : 3.0~60m
 RS50N-K : 3.0~50m
 RS10N-K : 3.0~20m

Compact prism CP01 : 1.0~600m
 Standard prism AP×1 : 1.0~1,600m
 Standard prism AP×3 : 1.0~1,800m

, : 0.001m

: 0.01m

4200m

: $\pm(3+2\text{ppm} \times D)\text{mm}$

: $\pm(5+5\text{ppm} \times D)\text{mm}$

: $\pm(4+3\text{ppm} \times D)\text{mm}$

: $\pm(5+5\text{ppm} \times D)\text{mm}$

(D: , :mm)

(single/repeat/average)

(single/repeat)

(가)

:

2.8sec+ 1.6sec (2.4sec)

:

2.3sec+ 0.8sec (1.9sec)

:

1.8sec+ 0.3sec (1.4sec)

(): EDM standby On

Infrared LED

: -30~60 (1)
 : 500~1,400hPa(1hPa)
 375~1,050mmHg(1mmHg)
 ppm : -499~499(1ppm)
 -99 ~ 99mm(1mm)
 On(K=0.142/K=0.20)/Off

Ni-ion BDC46
 4
 5 (25)
 2 (CDC61/62)

LCD
 192 dots×80dots : SET310/510
 SET610

15
 Off 30 Off
 10,000

Serial, RS232C
 SET310 : 30"/2mm
 SET510 : 40"/2mm
 SET610 : 60"/2mm
 : 10"/2mm

:
 : 3x
 : 0.3 m

1 Level
 -20~50
 -30~70
 IP66
 165(W)×170(D)×341(H)mm ()
 SET310/510/610S : 5.2Kg
 SET610 : 5.1Kg
 SET310S/510S : 5.3Kg