Multi-function Acceleration Simple Display Device

Electronic U-Tube

Program & Operation Manual

027-2 version for braking

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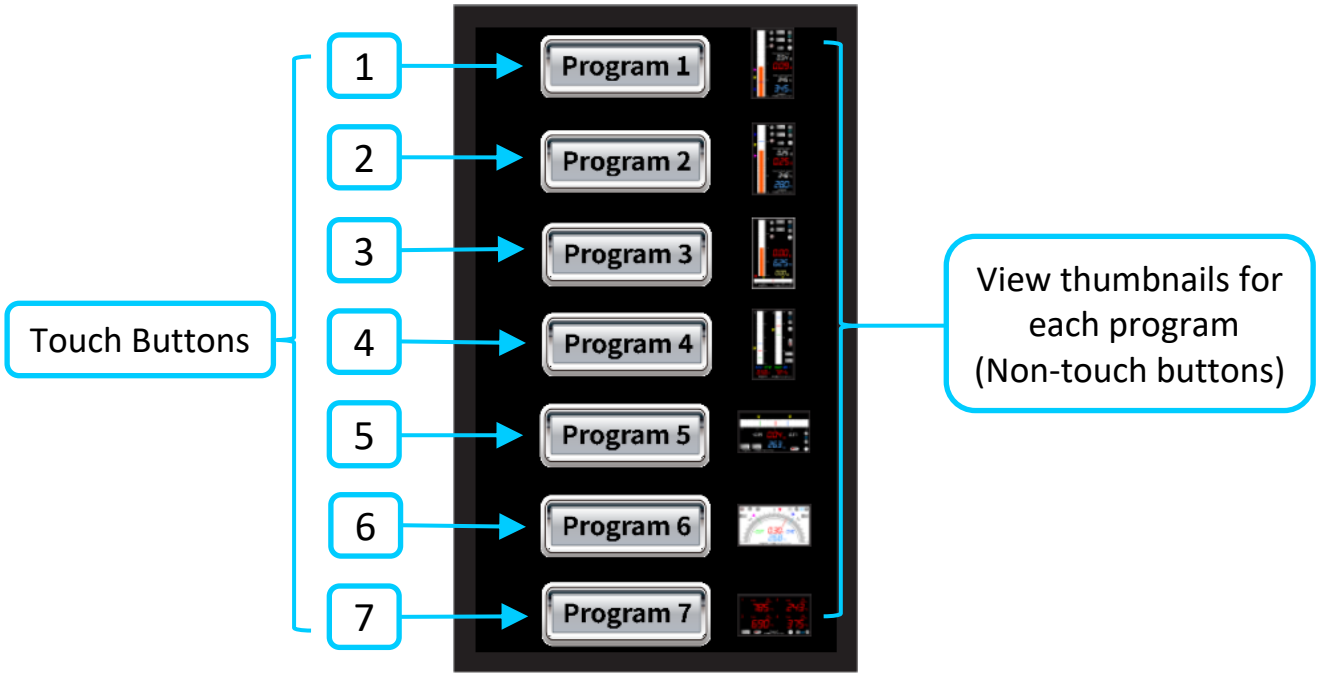
HOME Operation Instructions



1. Go to "Program 1" (Default Screen)
Measurement of acceleration and temperature during deceleration
※ Can be moved to special program8.

2. Go to "Program 2"
Measurement of acceleration and temperature during acceleration

3. Go to "Program 3"
Measurement of acceleration and temperature during deceleration
and turning Left/Right

4. Go to "Program 4"
Measurement of acceleration during acceleration/deceleration and external input 1ch

5. Go to "Program 5"
Simple measurement of acceleration and temperature when turning Left/Right

6. Go to "Program 6"
Simple measurement of acceleration during acceleration/deceleration,
Left/Right turning acceleration, and temperature
※ Can be moved to special program9.

7. Go to "Program 7"
Supports 4ch temperature measurement with K-type thermocouple

"Program 1" is set to start, and "Program 1" starts when the power is turned on.
If you touch the "HOME" button on the "Program1" screen, the HOME screen will appear.

※ When switching programs, it will freeze a little for loading.

Program 1 Each part setting explanation

1. Target indication marker sub (Blue)
2. Peak Needle (Automatic erased)
3. Target indication marker sub (Yellow)
4. Target onetouch marker main (Red)
5. Acceleration bar meter
6. Peak needle display ON/OFF
7. Onetouch move of target marker main (Red)
8. Target marker Main (Red) Down move
9. Target marker Main (Red) Up move
10. Go to "Calibration"
11. Go to "HOME"
12. Increase screen brightness [+]
13. Screen illuminance degree %
14. Decreased screen brightness [-]
15. Onetouch switching day&night illumination
16. Acceleration peak (Automatic erased)
17. Acceleration (Real time)
18. Temperature peak (Touch erase)
19. Temperature (Real time)**(Touch Delete)**
20. Switching [Mpa] screen
21. Three Temperature screen switching
22. Changeover switch position instruction
23. Go to "Program8" (Touch near yellow frame)
24. Change bar movespeed (Touch yellow frame)

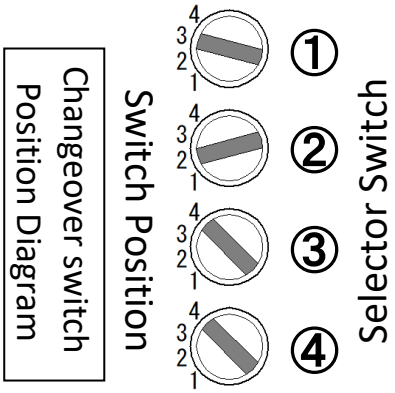
■ **Supports simple measurement of acceleration and temperature**

★ First, switch the switch according to "Switch Position" instruction.

①-3 : Set selector switch ① to switch position [3]
②-2 : Set selector switch ② to switch position [2]
③-4 : Set selector switch ③ to switch position [4]
④-4 : Set selector switch ④ to switch position [4]

Switch Position
Selector Switch

※ If the switching is not correct, program will behave erratically.
★Insert "K-type thermocouple" into panel №2 on back of main unit.
※ It cannot be measured if it is inserted in another position.
※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "19". (See supplement 2)



1 About peak display

Peak needle and digital "Peak g" are held for about 3 seconds and automatically cleared. Ppeak needle can be deleted with "Peak needle display ON/OFF" button in Figure "6".

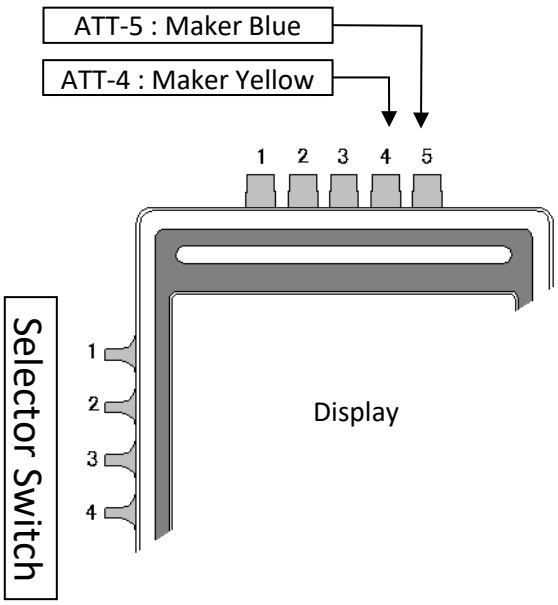
※ Needle and digital do not necessarily disappear at same time.
※ Peaks do not show accurate values when acceleration is applied.
★Maximum temperature "Peak ℃" display remains recorded and is touched to erase it, and then current temperature.
※ Touch once if the startup peak is fixed at 0℃ and does not work.

2 About target indicator markers

Main target marker red can be moved up&down with [▼] [▲] buttons shown in Fig. "8"&"9", and set it to a position that serves as guideline. You can instantly move to target position with one-touch movement button shown in Fig. "7", and alternately move between two positions each time you touch it. Sub target markers (Yellow/Blue) can be moved freely turning the ATT knobs.

3 About brightness of screen to

Change brightness of the screen, press screen brightness "+" & "-"



buttons in Figures "12" & "14".You can change brightness from 1 to 100% by 10% with. (minimum illumination 1%)
"Illuminance onetouch change button" in Figure "15" below "+" & "-" buttons You can change brightness alternately every time you touch 1% and 100% brightness.

4 About program changes

Touch "HOME" button to move to another program.
To calibrate, touch "CAL" button.
※ For "CAL", refer to "Calibration1 Explanation of each part setting"
※ Set "Selector Switch" to position appropriate for each program.

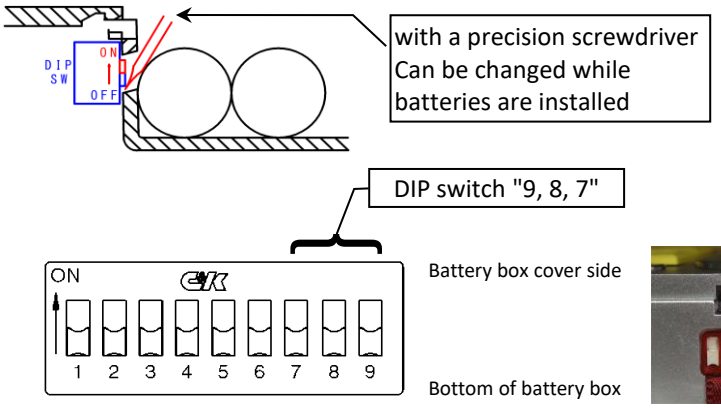
Other settings

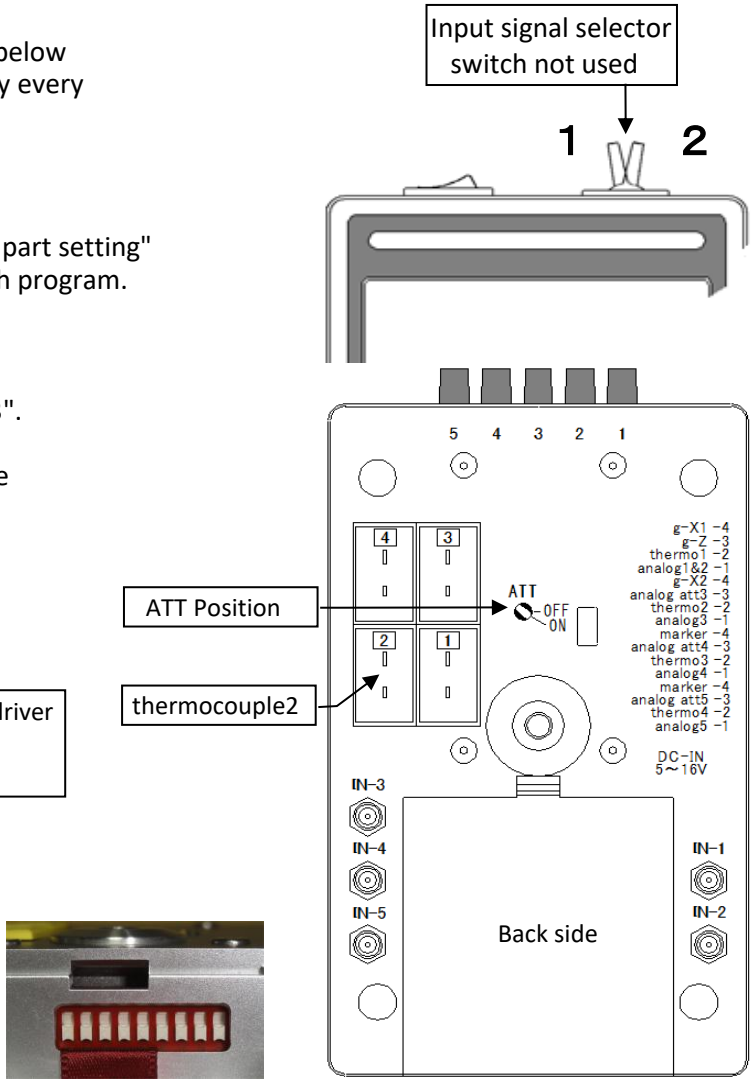
1 About switch on back

ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting the DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.
Default: OFF





speed of speed	quick	←					→	Slow
Weak DIP switch 9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

4 About touch buttons "20", "21", "23", "24" (※ For "20" & "21", DIP switch in Other settings 2. should be OFF.)

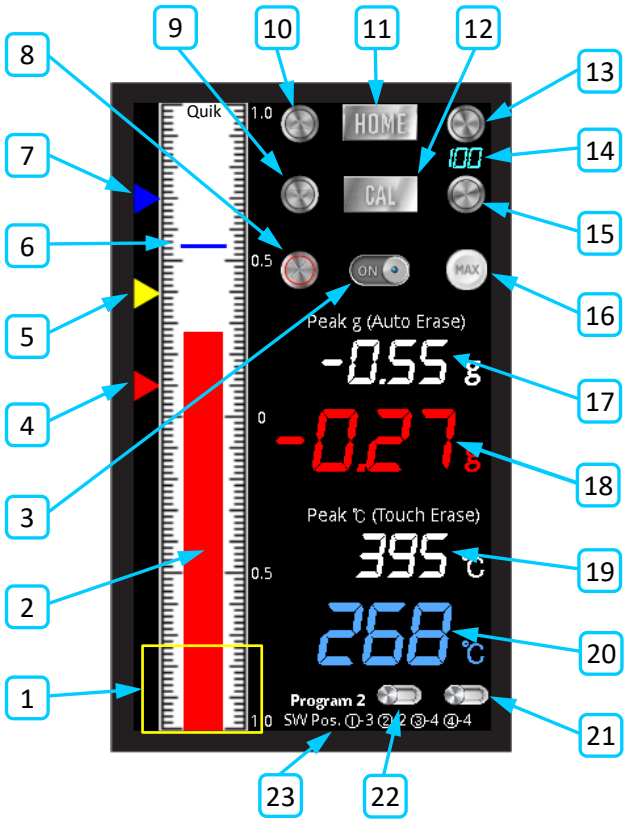
・Touch button "20": screen changes to a screen where pressure can be measured, and yellow marker moves up and down.
Refer to Supplement 3 "Electronic U-tube application and connection setting" for use.
(Display change of Figure "22" "Switch Position indication")

・Touch button "21": Change to a screen where you can measure 3 temperatures. Connect to thermocouple connectors ②③④.
Switch "Switch Position" of ②③④ to [2] and use it. (Display change of Figure "22" "Switch Position indication")

・Touch button "23": Touch area near yellow frame to move to special program vertical 360-degree analog meter "Program8".
(For details, refer to "Explanation of each part of Program 8")

・Touch button "24": If you touch area around yellow frame in image, word "Quick" at top of scale will change to "Dull" and movement speed of Acceleration bar meter and peak needle will slow down.
※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.
※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.

Program 2 Each part setting explanation



1. Change bar movespeed (Touch yellow frame)
2. Acceleration bar meter
3. Peak needle display ON/OFF
4. Target onetouch marker main (Red)
5. Target indication marker sub (Yellow)
6. Peak Needle (Automatic erased)
7. Target indication marker sub (Blue)
8. Onetouch move of target marker main (Red)
9. Target marker Main (Red) Down move
10. Target marker Main (Red) Up move
11. Go to "HOME"
12. Go to "Calibration"
13. Increase screen brightness [+]
14. Screen illuminance degree %
15. Decreased screen brightness [-]
16. Onetouch switching day&night illumination
17. Acceleration peak (Automatic erased)
18. Acceleration (Real time)
19. Temperature peak (Touch erase)
20. Temperature (Real time)**(Touch Delete)**
21. Switching [Mpa] screen
22. Three Temperature screen switching
23. Changeover switch position instruction

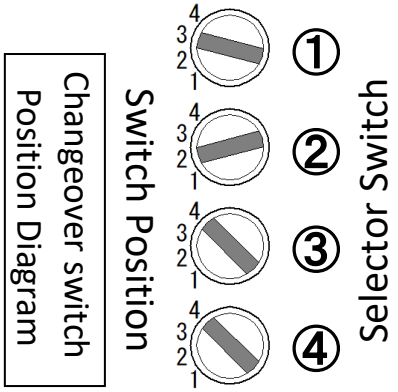
■ **Supports simple measurement of acceleration and temperature**

★ First, switch the switch according to "Switch Position" instruction.

①-3 : Set selector switch ① to switch position [3]
②-2 : Set selector switch ② to switch position [2]
③-4 : Set selector switch ③ to switch position [4]
④-4 : Set selector switch ④ to switch position [4]

Switch Position
Selector Switch

※ If the switching is not correct, program will behave erratically.
★Insert "K-type thermocouple" into panel №2 on back of main unit.
※ It cannot be measured if it is inserted in another position.
※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "20". (See supplement 2)



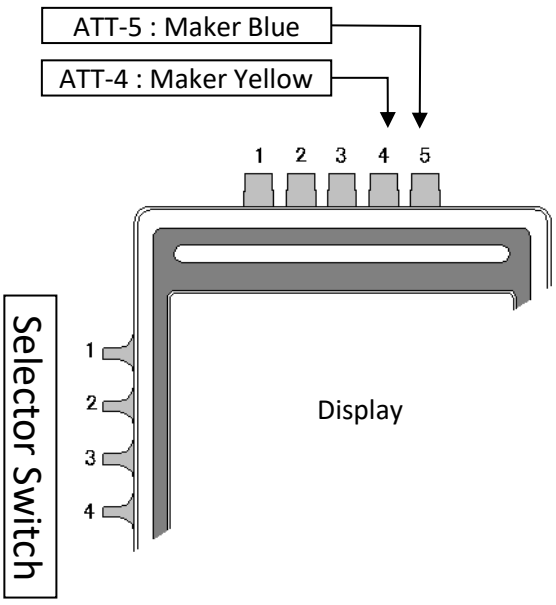
1 About peak display

Peak needle and digital "Peak g" are held for about 3 seconds and automatically cleared. Peak needle can be deleted with "Peak needle display ON/OFF" button in Figure "3".

※ Needle and digital do not necessarily disappear at same time.
※ Peaks do not show accurate values when acceleration is applied.
★Maximum temperature "Peak ℃" display remains recorded and is touched to erase it, and then current temperature.
※ Touch once if startup peak is fixed at 0℃ and does not work.

2 About target indicator markers

Main target marker red can be moved up&down with [▼] [▲] buttons shown in Fig. "9"&"10", and set it to a position that serves as guideline. You can instantly move to target position with one-touch movement button shown in Fig. "8", and alternately move between two positions each time you touch it. Sub target markers (Yellow/Blue) can be moved freely turning ATT knobs.



3 About brightness of screen to

Change brightness of screen, press screen brightness "+"&"-" buttons in Figures "13"&"15".You can change brightness from 1～100% by 10% with. (minimum illumination 1%)

"Illuminance onetouch change button" in Figure "16" below "+"&"-" buttons You can change brightness alternately every time you touch 1% & 100% brightness.

4 About program changes

Touch "HOME" button to move to another program.

To calibrate, touch the "CAL" button.

※ For "CAL", refer to "Calibration1 Explanation of each part setting"

※ Set"Selector Switch" to position appropriate for each program.

Other settings

1 About switch on back

ATT position on back is normally ON.

When switching to OFF, it depends on "Other settings 3".

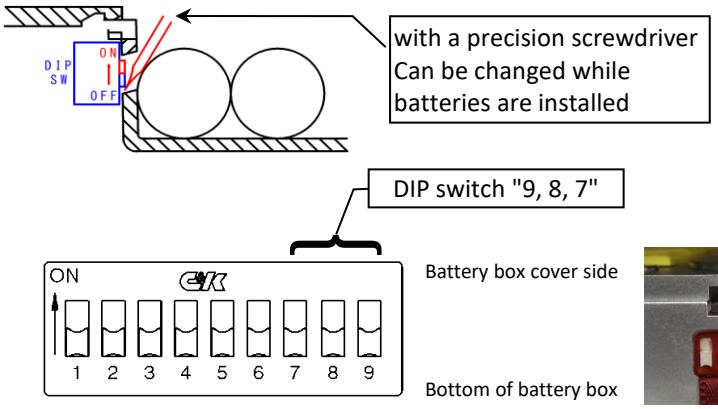
2 About DIP switches

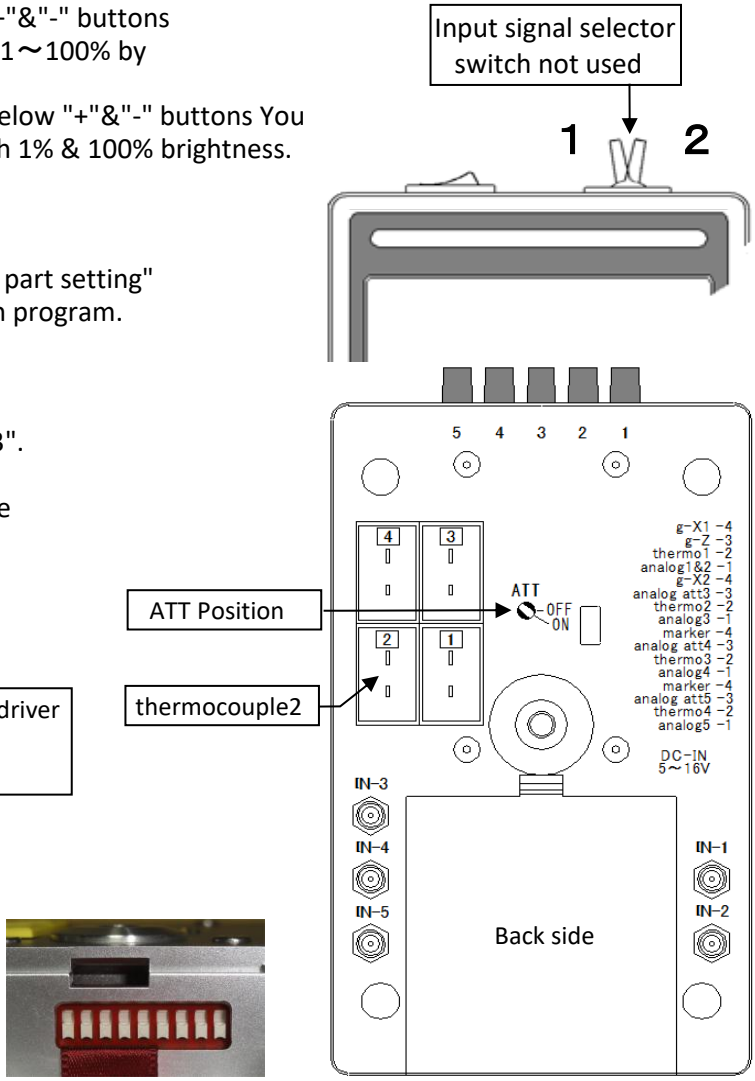
By setting the DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).

Leave OFF unless otherwise instructed.

※ In principle, turn off power before changing.

Default: OFF





speed of speed	quick	←						Slow
Weak DIP switch 9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch onback to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

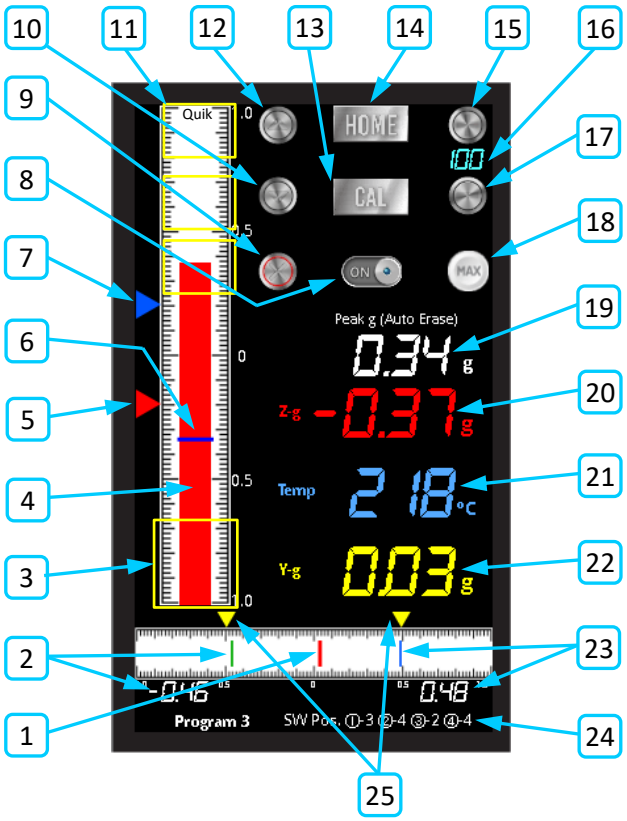
4 About touch buttons "1", "21", "22" (※ For "21" & "22", the DIP switch in Other settings 2. should be OFF.)

・Touch button "1": If you touch area around yellow frame in image, word "Quick" at top of scale will change to "Dull" and movement speed of Acceleration bar meter and peak needle will slow down.
※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.
※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.

・Touch button "21": screen changes to a screen where pressure can be measured, and yellow marker moves up and down.
Refer to Supplement 3 "Electronic U-tube application and connection setting" for use.
(Display change of Figure "23" "Switch Position indication")

・Touch button "22": Change to a screen where you can measure 3 temperatures. Connect to thermocouple connectors ②③④.
Switch "Switch Position" of ②③④ to [2] and use it. (Display change of Figure "23" "Switch Position indication")

Program 3 Each part setting explanation



1. Left/right acceleration main needle
2. Left acceleration peak & needle
3. Change bar movespeed (Touch yellow frame)
4. longitudinal acceleration bar meter
5. Target onetouch marker main (Red)
6. Longitudinal acceleration peak needle(Auto erased)
7. Target indication one-touch marker sub (Blue)
8. Peak needle display ON/OFF
9. Onetouch move of target marker main (Red)
10. Target marker Main (Red) Down move
11. Target indication marker sub(Blue)(Touch yellow frame)
12. Target marker Main (Red) Up move
13. Go to "Calibration"
14. Go to "HOME"
15. Increase screen brightness [+]
16. Screen illuminance degree %
17. Decreased screen brightness [-]
18. Onetouch switching day&night illumination
19. Longitudinal acceleration peak (Automatic erased)
20. Longitudinal acceleration (Real time)
21. Temperature (Real time)**(Touch Delete)**
22. Left/right acceleration (Real time)
23. Right acceleration peak&needle(Auto erased)
24. Changeover switch position instruction
25. Left and right target indicator (Yellow)

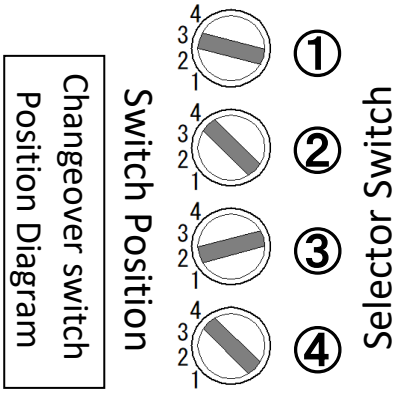
■ **Supports simple measurement of deceleration, Left/Right acceleration, and temperature**

★ First, switch the switch according to "Switch Position" instruction.

①-3 : Set selector switch ① to switch position [3]
②-4 : Set selector switch ② to switch position [4]
③-2 : Set selector switch ③ to switch position [2]
④-4 : Set selector switch ④ to switch position [4]

Switch Position
Selector Switch

※ If switching is not correct, program will behave erratically.
★Insert "K-type thermocouple" into panel №3 on back of main unit.
※ It cannot be measured if it is inserted in another position.
※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "21".



1 About peak display

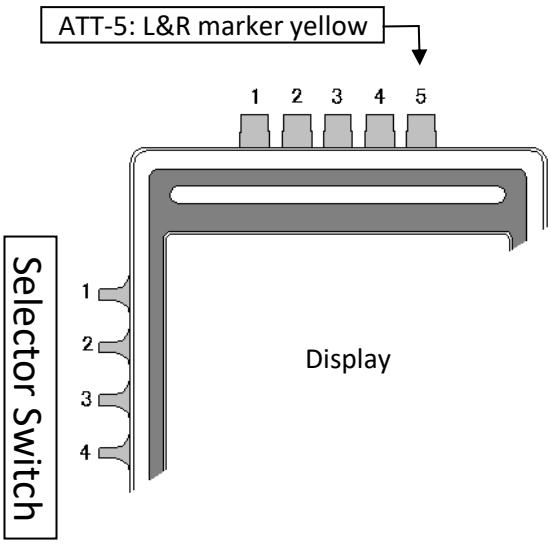
Peak needle and digital "Peak g" are held for about 3 seconds and automatically cleared. Peak needle can be deleted with "Peak needle display ON/OFF" button in Figure "8".
※ Needle and digital do not necessarily disappear at same time.
※ Peaks do not show accurate values when acceleration is applied.

2 About front and rear target indication markers

Main target indicator marker red can be moved up/down with [▼] [▲] buttons in Fig. "10"& "12", and set it to a position that will serve as a guideline for measurement. You can instantly move to target position with one-touch movement button shown in Fig. "9", and alternately move between two positions each time you touch it.
※ To move target indication marker (Blue), touch the area around 3 yellow frames in Fig. 11.

3 About left and right target indication markers

Left/Right target indication marker yellow Figure "25", attached to horizontal bar meter can be freely moved symmetrically around "0" by turning attenuator knob ATT-5.



4 About brightness of screen to

Brightness of screen can be changed from 1～100% by 10% with screen brightness "+" & "-" buttons in Figures "15"&"17". (minimum illumination 1%)
Brightness can be changed alternately each time you touch brightness of 1%&100% with "onetouch change button for illuminance" in Figure "18" below "+"&"-" buttons.

5 About program changes

Touch "HOME" button to move another program.To calibrate, touch "CAL" button.
※ For "CAL", refer to "Calibration1 Explanation of each part setting"
※ Set "Selector Switch" to position appropriate for each program.

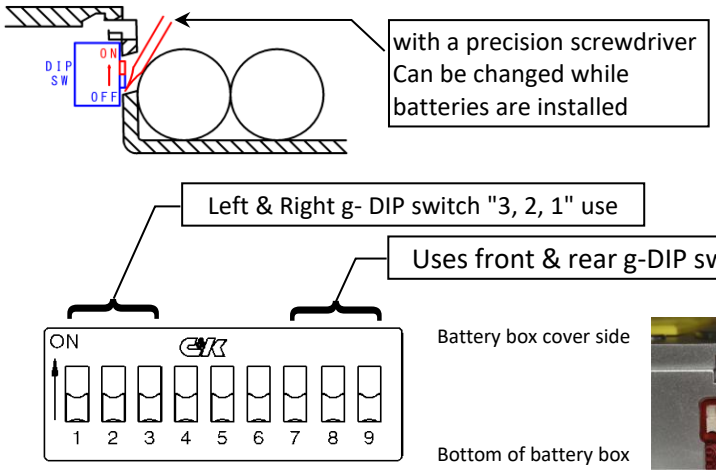
Other settings

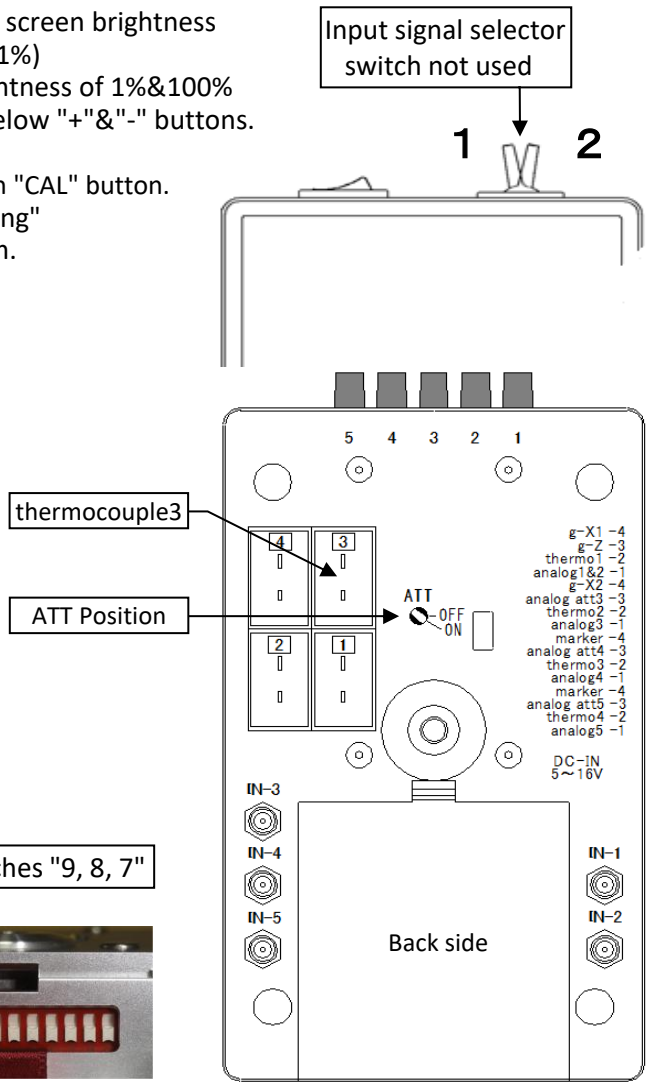
1 About switch on back

ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting the DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.
Default: OFF





speed of speed	quick	←						Slow
Weak DIP switch 9,3	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8,2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7,1	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use front and rear internal G-sensors, switch "Switch Position" of "Selector Switch ①" to [1]. Connect external signals to IN-1 and IN-2 connectors. (※Analog input DC0-5V). Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2). Turn attenuator ATT-1 and ATT-2 knobs on the top to adjust meter deflection. It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal. In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

・If you do not use L&R internal G sensors, switch "Switch Position" of "Selector Switch ②" to [1] or [3]. Connect an external signal to the IN-3 connector. (※Analog input DC0-5V). In case of "Switch Position" [3], turn knob of attenuator ATT-3 on top to adjust meter deflection. It will not work when input signal current is weak, switch to switch position [1] to switch to direct signal input. Adjust the level on input signal equipment side.

4 Regarding target indication marker sub (Blue) Figure "6"

・If 2 target indicator markers are required when measuring longitudinal acceleration, target indicator sub marker(Blue) shown in Figure "6" can be used. By touching area near 3 yellow frames in Figure "11", you can move target in same way as one-touch marker main(Red).

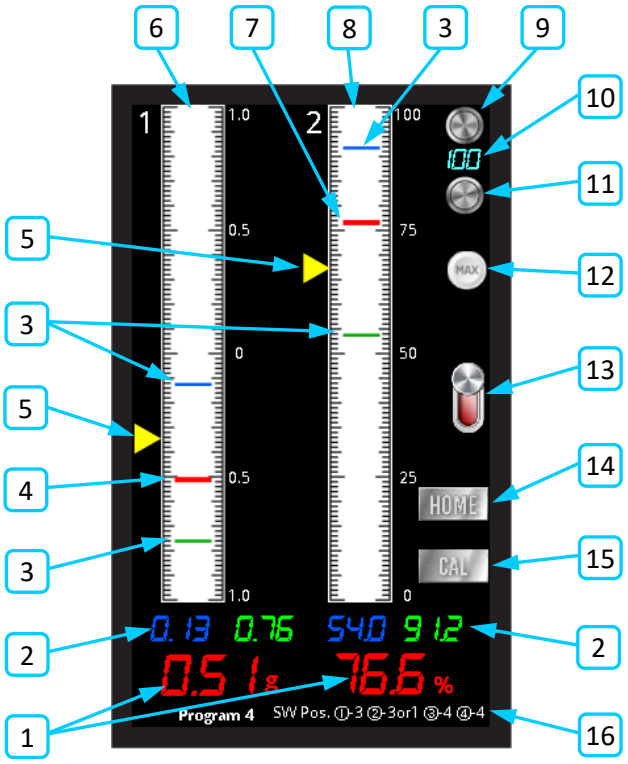
5 Regarding the numerical display when turning left and right

・If pointer swings to left (acceleration when turning right), a minus sign (-) is displayed.
※ Only left/right digital peaks will display a "-", and digital main shown in fig. "22" will not display a minus.

6 About touch button "3"

・Touch button "3": If you touch area around yellow frame in image, word "Quick" at top of scale will change to "Dull" and movement speed of Acceleration bar meter and peak needle will slow down.
※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.
※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.

Program 4 Each part setting explanation



1. ch1 & ch2 main (Real time)
2. ch1 & ch2 peak Max&Min (Automatic erased)
3. ch1&ch2 peak needle Max&Min
4. ch1 main needle
5. ch1 & ch2 target indication marker (Yellow)
6. ch1 longitudinal acceleration scale (-1 to +1g)
7. ch2 main needle
8. ch2 scale for external input (0 to 100%)
9. Increase screen brightness [+]
10. Screen illuminance degree %
11. Decreased screen brightness [-]
12. Onetouch switching day & night illumination
13. ch1 & ch2 peak needle display ON/OFF
14. Go to "HOME"
15. Go to "Calibration"
16. Changeover switch position instruction

■ Supports measurement of acceleration during acceleration/ deceleration and external input 1ch

★ First, switch the switch according to "Switch Position" instruction.

①-3 : Set selector switch ① to switch position [3]
②-3or1 : Set selector switch ② to switch position [3]or [1]
③-4 : Set selector switch ③ to switch position [4]
④-4 : Set selector switch ④ to switch position [4]

Switch Position
Selector Switch

※ If switching is not correct, program will behave erratically.

1 About peak display

Peak needle and digital "Peak g" are held for about 3 seconds and automatically cleared. Peak needle can be deleted with "Peak needle display ON/OFF" button in Figure "13".

※ Needle and digital do not necessarily disappear at same time.
※ Peaks do not show accurate values when acceleration is applied.

2 About ch2 side

External signal input to ch2 bar meter is connected to SMA terminal "IN-3". Turn knob of attenuator ATT-3 to adjust meter deflection.
If input signal current is weak and it does not work with ATT through, switching position of "Selector Switch ②" should be set to "Setting 1 No ATT" for direct input without ATT.

※ Adjust level on input signal equipment side.
※ Input voltage is in range of 0 to 5V DC

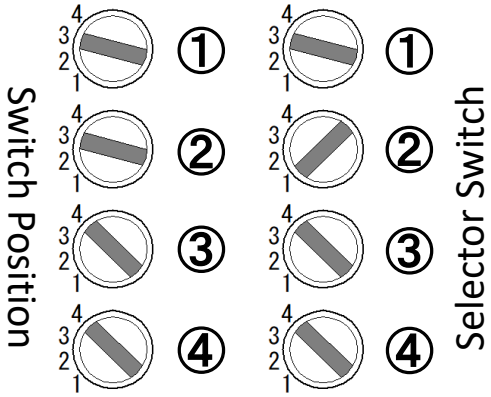
3 About target indicator markers

Target indication markers yellow attached to ch1 & ch2 bar meters can be moved freely by turning knobs of attenuators ATT-4 and 5.

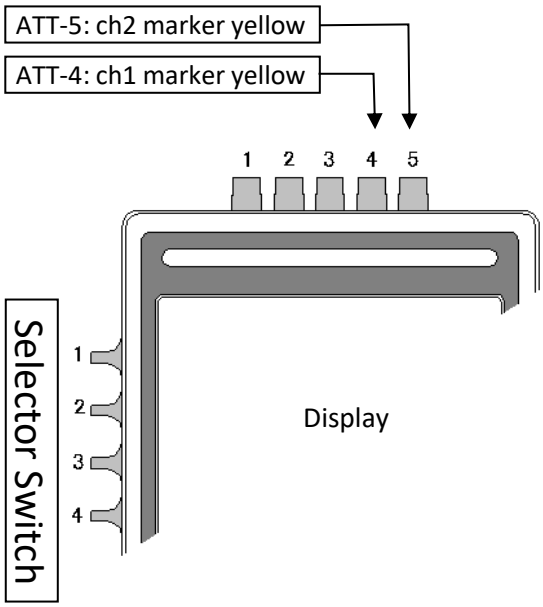
4 About brightness of screen to

Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+" & "-" buttons in Figures "9" & "11". (minimum illumination 1%)
Brightness can be changed alternately each time you touch

Changeover switch Position Diagram



Setting 2 With ATT or Setting 1 No ATT



brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "12" below "+" & "-" buttons.

5 About program changes

Touch "HOME" button to move to another program.
To calibrate, touch the "CAL" button.
※ For "CAL", refer to "Calibration1 Explanation of each part setting"
※ Set "Selector Switch" to position appropriate for each program.

Other settings

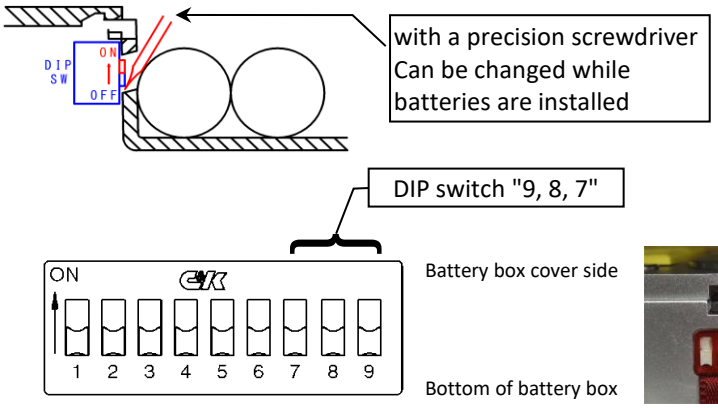
1 About switch on back

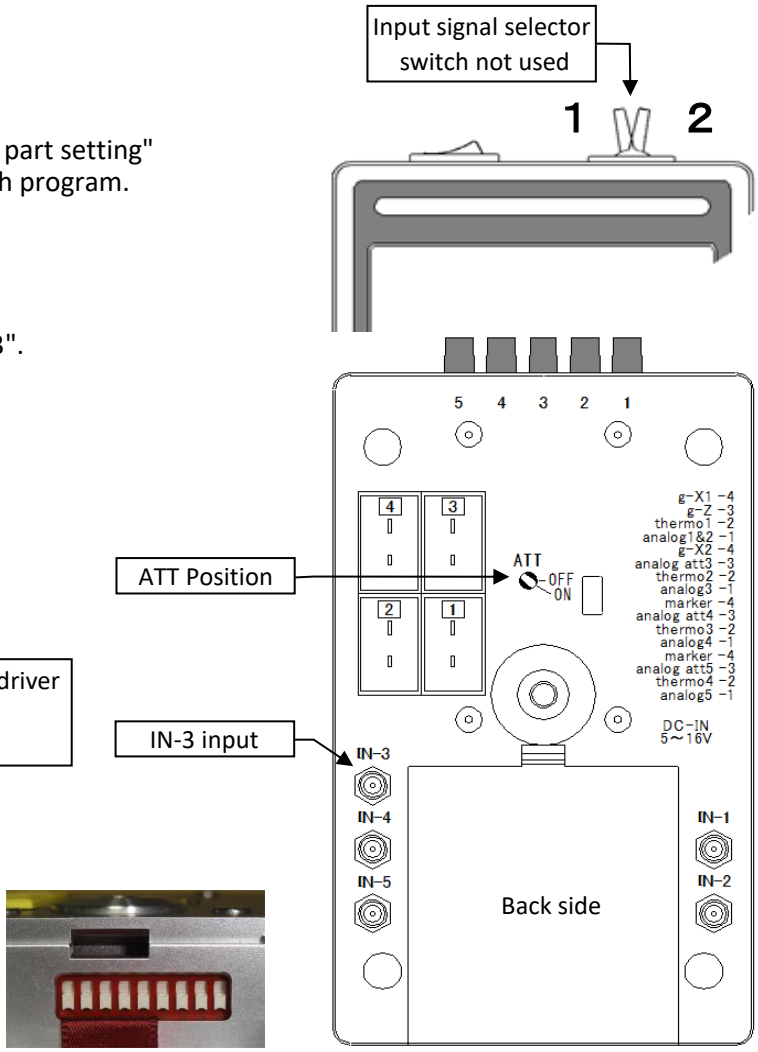
ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.

Default: OFF





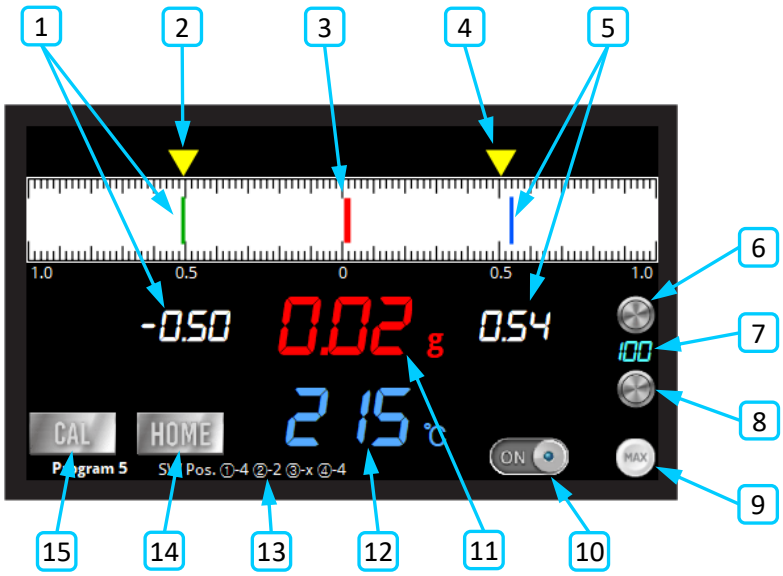
speed of speed	quick	←						Slow
Weak DIP switch 9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use the internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1]
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

Program 5 Each part setting explanation



1. Left acceleration peak & needle
2. Left target indicator marker
3. Acceleration main needle
4. Right target indicator marker
5. Right acceleration peak & needle
6. Increase screen brightness [+]
7. Screen illuminance degree %
8. Decreased screen brightness [-]
9. Onetouch switching day & night illum.
10. Peak needle display ON/OFF
11. Acceleration (Real time)
12. Temperature (Real time)**(Touch Delete)**
13. Changeover switch position instruction
14. Go to "HOME"
15. Go to "Calibration"

■ **Supports simple measurement of lateral acceleration and temperature**

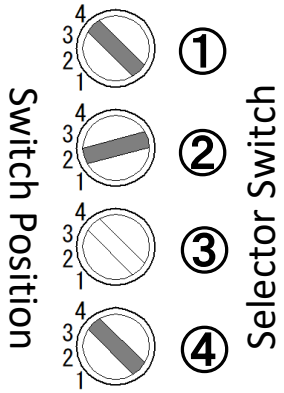
★ First, switch the switch according to "Switch Position" instruction.

①-4 : Set selector switch ① to switch position [4]
②-2 : Set selector switch ② to switch position [2]
③-x : Set selector switch ③ to Any switch position possible
④-4 : Set selector switch ④ to switch position [4]

Switch Position
Selector Switch

※ If switching is not correct, program will behave erratically.
★Insert "K-type thermocouple" into panel №2 on back of main unit.
※ It cannot be measured if it is inserted in another position.
※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "12".

Changeover switch Position Diagram



1 About peak display

Peak needle and digital "Peak g" are held for about 3 seconds and automatically cleared. Peak needle can be deleted with "Peak needle display ON/OFF" button in Figure "10".

※ Needle and digital do not necessarily disappear at same time.
※ Peaks do not show accurate values when acceleration is applied.

2 About left and right target indication markers

L/R target indication marker yellow attached to horizontal bar meter can be freely moved symmetrically around "0" by turning attenuator knob ATT-5.

3 About brightness of screen to

Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+" & "-" buttons in Figures "6" & "8". (minimum illumination 1%)

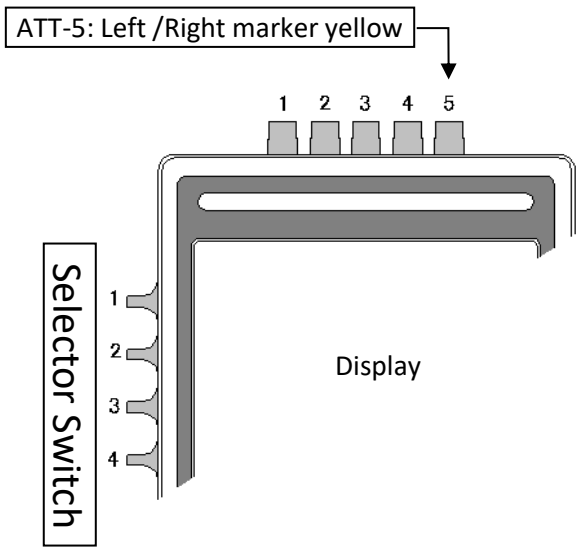
Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "9" below "+" & "-" buttons.

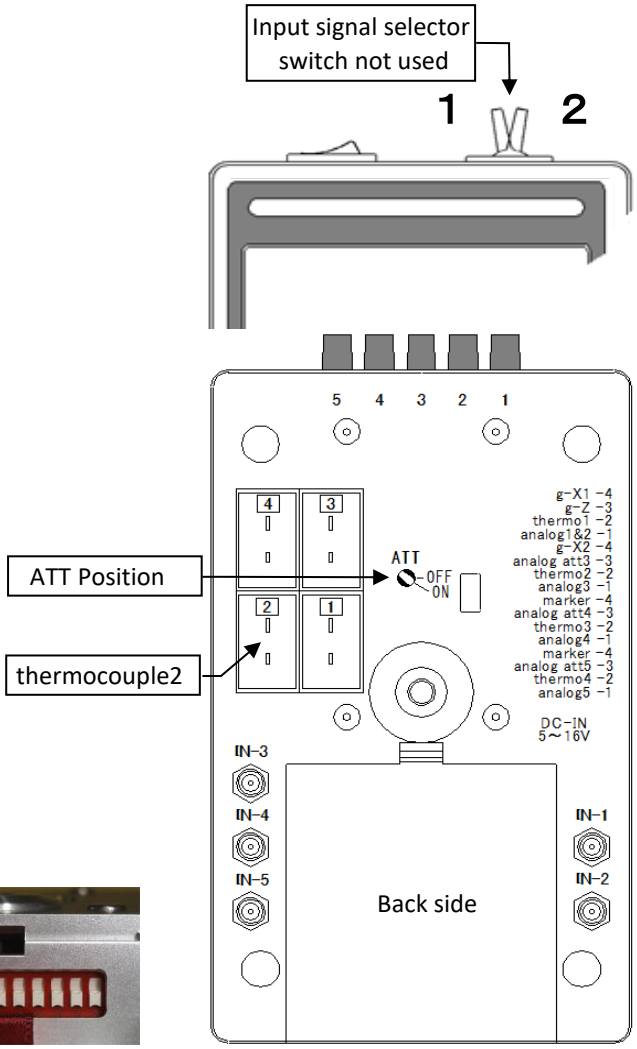
4 About program changes

Touch "HOME" button to move to another program.

To calibrate, touch the "CAL" button.

※ For "CAL", refer to "Calibration2 Explanation of each part setting"
※ Set "Selector Switch" to position appropriate for each program.





Other settings

1 About switch on back

ATT position on back is normally ON.

When switching to OFF, it depends on "Other settings 3".

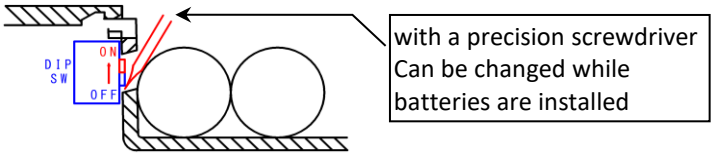
2 About DIP switches

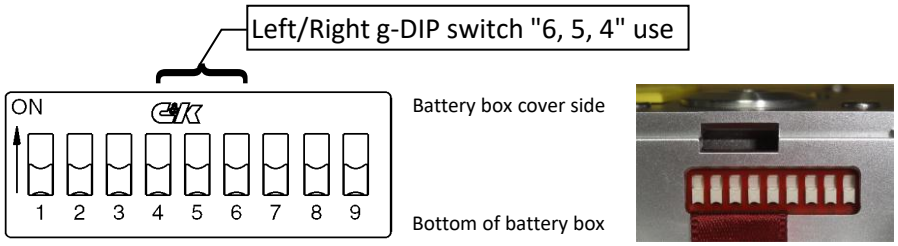
By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).

Leave OFF unless otherwise instructed.

※ In principle, turn off power before changing.

Default: OFF





speed of speed	quick	←						Slow
Weak DIP switch 6	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 5	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 4	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].

Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)

Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)

Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.

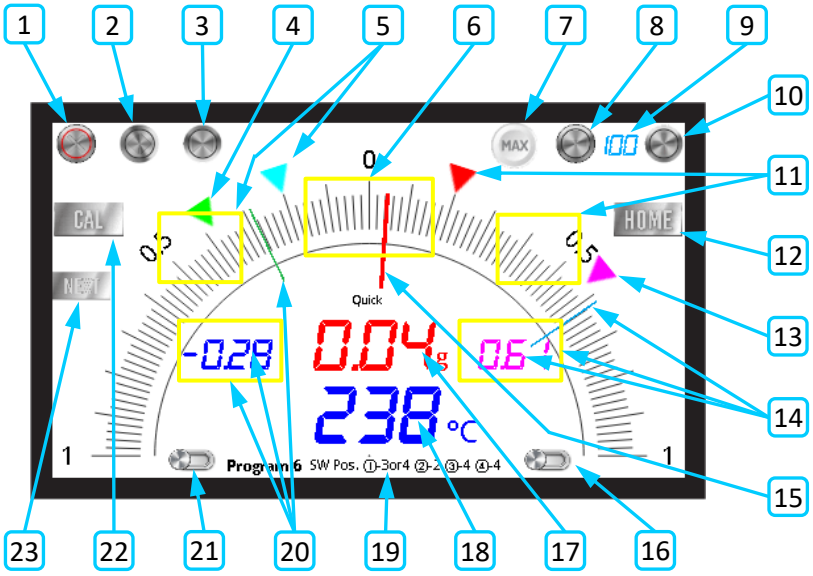
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal. In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

4 Regarding numerical display when turning left and right

・If pointer swings to left (acceleration when turning right), a minus sign (-) is displayed.

※ Only left/right digital peaks will display a "-", and digital main shown in fig. "11" will not display a minus.

Program 6 Each part setting explanation



1. Onetouch move of target marker (Blue&Red)
2. Target indication marker (Blue&Red) Out rotate
3. Target indication marker (Blue&Red) In rotate
4. Target indication marker sub (Green)
5. Speed increase side onetouch marker (Blue) (ON/OFF touch yellow frame)
6. Change needle move speed (Touch yellow frame)
7. Onetouch switching day & night illumination
8. Decreased screen brightness [-]
9. Screen illuminance degree %
10. Increase screen brightness [+]
11. Deceleration side onetouch marker (Red) (ON/OFF touch yellow frame)
12. Go to "HOME"
13. Target indication marker sub (Pink)
14. Deceleration side Peakneedle & Digtal (ON/OFF touch yellow frame)
15. F/R, (L&R) acceleration analog needle indicator
16. Three Temperature screen switching
17. F/R, (L&R) Acceleration Digtal (Real time)
18. Temperature (Real time)**(Touch Delete)**
19. Changeover switch position instruction
20. Speed increase side Peakneedle&Digtal (ON/OFF touch yellow frame)
21. Switching [Mpa] screen
22. Go to "Calibration"
23. Go to "Program9"

■ **Supports simple measurement of acceleration/deceleration,**
L&R acceleration, and temperature

★ First, switch the switch according to "Switch Position" instruction.

①-4or3：Set selector switch ① is L&R-g: switch position to [4]
In the case of F&R-g: Switch position [3]

②-2：Set selector switch ② to switch position [2]

③-4：Set selector switch ③ to switch position [4]

④-4：Set selector switch ④ to switch position [4]

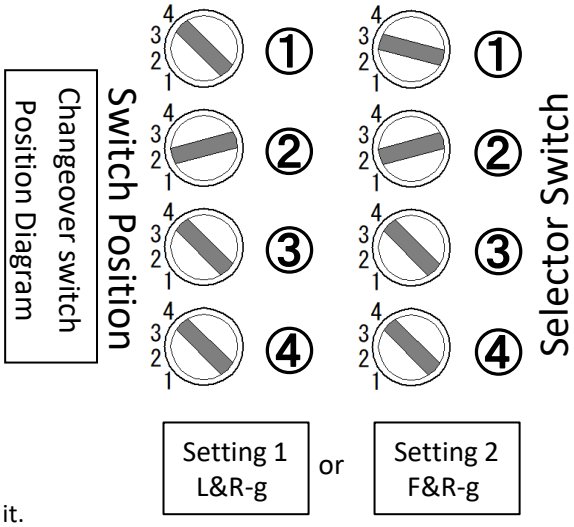
Switch Position
Selector Switch

※ If switching is not correct, program will behave erratically.

★Insert "K-type thermocouple" into panel №2 on back of main unit.

※ It cannot be measured if it is inserted in another position.

※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "18". (See supplement 2)



1 About peak display

Peak needle and digital "Peak g" are held for about 3seconds and automatically cleared. If you touch the area near L&R yellow frames in Fig. 13, you can erase peak needle and digital independently on L&R.

※ Peak needle is set to "hidden" by default, and can be displayed by touching it.

※ Needle and digital do not necessarily disappear at the same time.

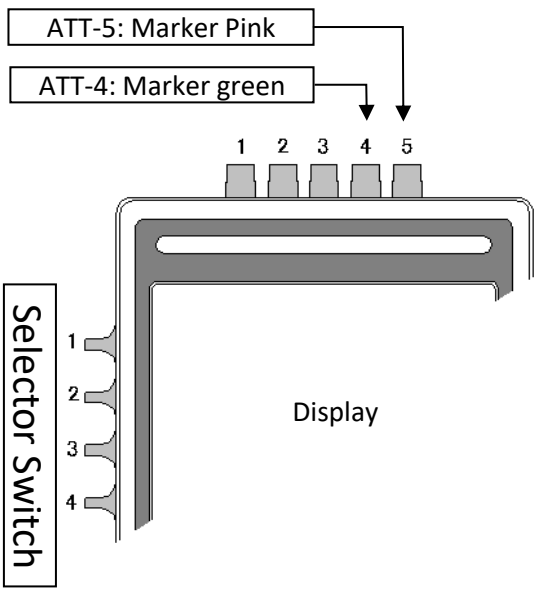
※ Peaks do not show accurate values when acceleration is applied.

2 About target indicator markers

Target indicator marker (Blue&Red) can be moved to numerically increasing side using [◂▸] button in figure "2" and to numerically decreasing side using [▸◂] button in "3", and set to a position that will serve as a guide for measurement. You can instantly move to target position using one-touch movement button shown in fig. "1", and each time you touch it, it will alternate between two positions. Target indicator markers on both sides can be erased independently by touching area near yellow frame in figures "5" and "11".

※ If you erase acceleration side when evaluating deceleration, or erase unnecessary side when using values other than specified values, it will not be an eyesore.

Sub target indicator markers (Green/Pink) can be moved freely by turning knobs of attenuators ATT-4 and ATT-5.



3 About brightness of screen To

Brightness of screen can be changed from 1～100% by 10% with screen

brightness "+"&"-" buttons in Figures "8"&"10".(minimum illumination 1%)
Brightness can be changed alternately each time you touch brightness of
1% and 100% with "one-touch change button for illuminance"
in Figure "7" beside "+" & "-" botton.

4 About program changes

Touch "HOME" button to move to another program. If you touch "NEXT" button in Figure "23", you will move to special program horizontal 360-degree analog meter "Program9".(For details, refer to "Explanation of each part of Program 9")
To calibrate, touch the "CAL" button.
※ For "CAL", refer to "Calibration2 Explanation of each part setting"
※ Set "Selector Switch" to position appropriate for each program.

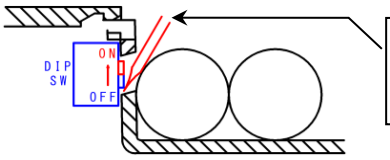
Other settings

1 About switch on back

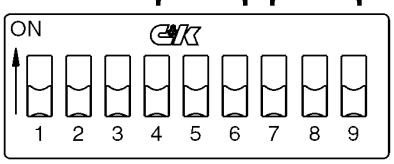
ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass). Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.
Default: OFF



with a precision screwdriver
Can be changed while batteries are installed

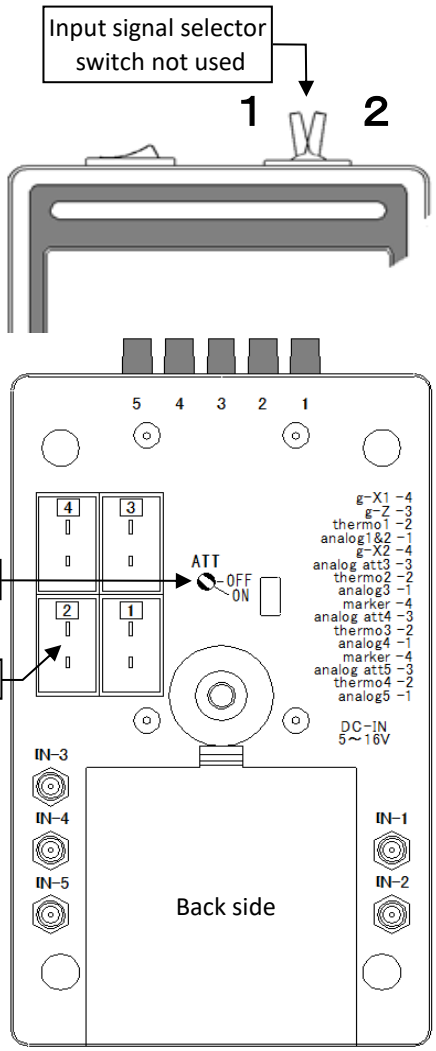


Left/Right g-DIP switch "6, 5, 4" use

Uses front & rear g-DIP switches "9, 8, 7"

Battery box cover side

Bottom of battery box



speed of speed	quick	←					→	Slow
Weak DIP switch 6,9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 5,8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 4,7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set the input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

4 About touch buttons "6", "16" and "21" (※ For "16" and "21", DIP switch in 2. Other settings must be OFF.)

・Touch button "6": When you touch area around yellow frame in image, word "Dull" at bottom center of scale changes to "Quick," and analog pointer and peak needle move more quickly.
※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.
※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.

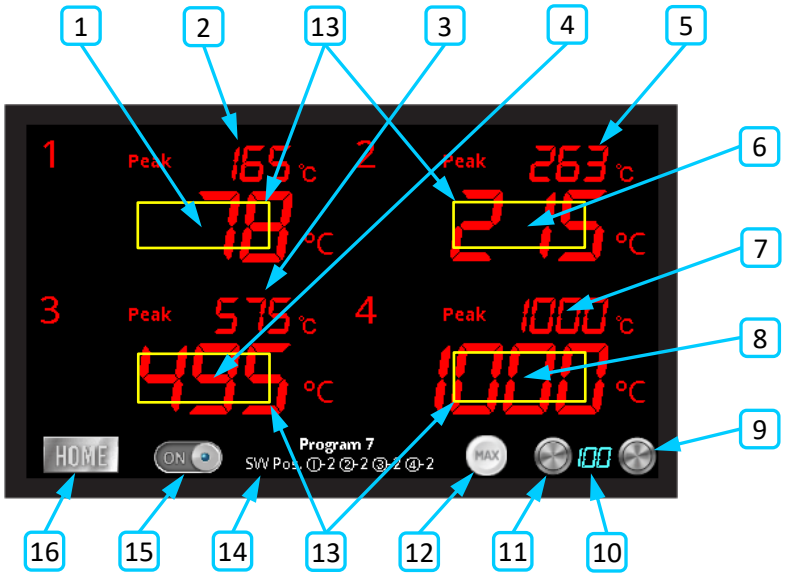
・Touch button "16": Change to screen where you can measure 3 temperatures.
Switch "Switch Position" of ②③④ to [2] and use it. (Display change of Figure "19" "Switch Position indication")

・Touch button "21": Screen changes to a screen where pressure can be measured, and yellow marker moves up and down.
Refer to Supplement 3 "Electronic U-tube application and connection setting" for use.
(Display change of Figure "19" "Switch Position indication")

5 Regarding numerical display during acceleration/deceleration and left/right turning

・If pointer swings to left (acceleration when turning right), a minus sign (-) is displayed.
※ Digital main and left and right digital peaks both display negative values.

Program 7 Each part setting explanation



1. ch1 thermometer (Real time)
2. ch1 thermometer peak (Reset by touch)
3. ch3 thermometer peak (Reset by touch)
4. ch3 thermometer (Real time)
5. ch2 thermometer peak (Reset by touch)
6. ch2 thermometer (Real time)
7. ch4 thermometer peak (Reset by touch)
8. ch4 thermometer (Real time)
9. Increase screen brightness [+]
10. Screen illuminance degree %
11. Decreased screen brightness [-]
12. Onetouch switching day&night illumination
13. Temp display erased by touch yellow frame
14. Changeover switch position instruction
15. Thermometer peak display ON/OFF
16. Go to "HOME"

■ **Supports 4ch temperature measurement**

★ First, switch the switch according to "Switch Position" instruction.

①-2 : Set selector switch ① to switch position [2]
②-2 : Set selector switch ② to switch position [2]
③-2 : Set selector switch ③ to switch position [2]
④-2 : Set selector switch ④ to switch position [2]

Switch Position
Selector Switch

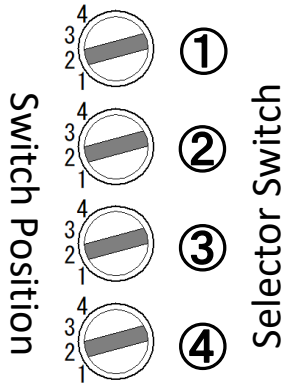
※ If the switching is not correct, the program will behave erratically.

★ Insertion position of temperature sensor "K-type thermocouple"

ch1: thermocouple panel №1 on back of main unit
ch2: thermocouple panel №2 on back of main unit
ch3: thermocouple panel №3 on back of main unit
ch4: thermocouple panel №4 on back of main unit

※ If you insert it in wrong position, it will not be possible to measure accurately.

Changeover switch Position Diagram



1 About peak display

Maximum temperature "Peak" display remains recorded and can be deleted by touching peak temperature figures "2", "3", "5",&"7" for each [ch].
Peak display can be turned off by touching button shown in Fig. 15, and display will switch to a large digital display.
※ Touch once if startup peak is fixed at 0℃ and does not work.

2 About the brightness of the screen To

Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+"&"-" buttons in Figures "9"&"11".(minimum illumination 1%)
Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "12" beside "+" & "-" botton.

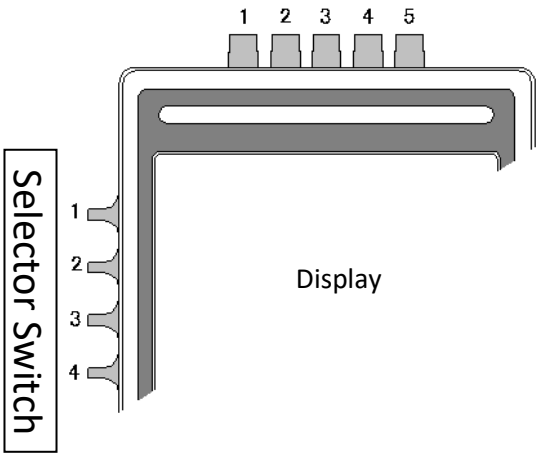
3 About program changes

Touch "HOME" button to move to another program.
※ Set "Selector Switch" to position appropriate for each program.

4 About temperature display

For channels where temperature has not been measured, touch area near each yellow frame in fig. "13" to clear temperature display and make it less annoying.

ATT Attenuator knob unused



Other settings

1 About the switch on the back

ATT position on back is normally ON.

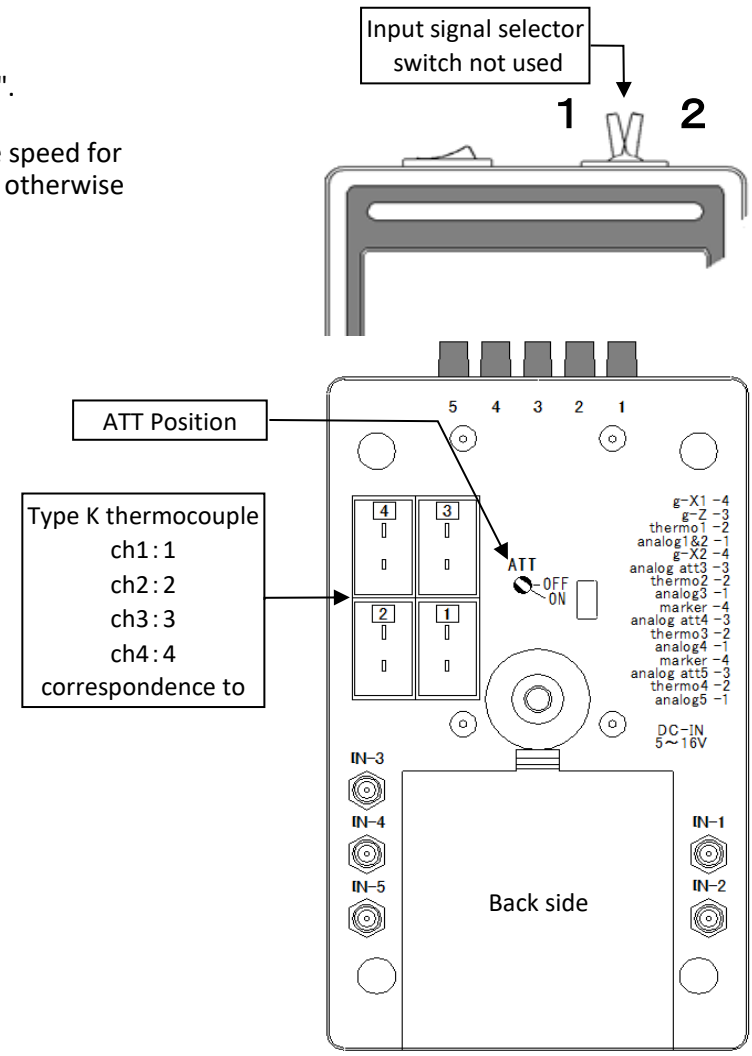
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting the DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass). Leave OFF unless otherwise instructed.

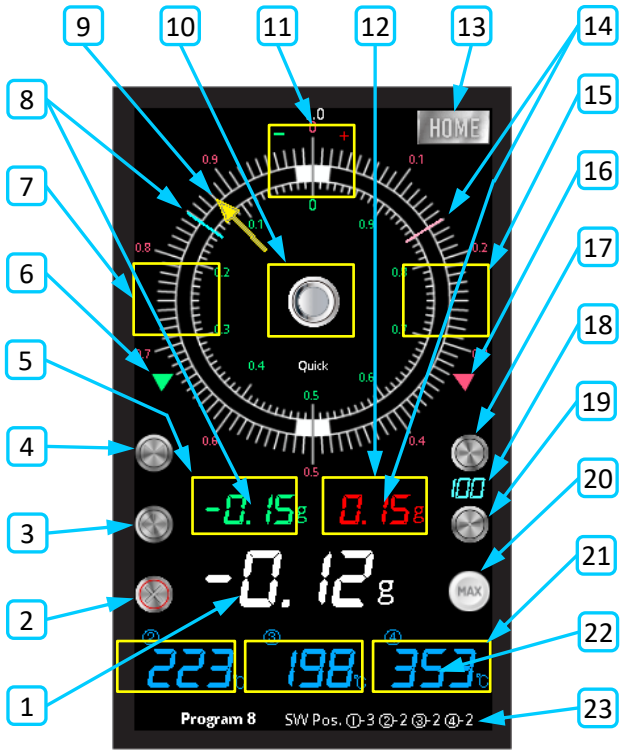
※ In principle, turn off power before changing.

Default: OFF



Program 8 Each part setting explanation

(Other Program**)**



1. Acceleration (real time)
2. Onetouch move of target marker (Green&Red)
3. Marker(Green&Red) move to increasing value side
4. Marker(Green&Red) move to numerical value decrease side
5. Acceleration peak needle & digital ON/OFF (Touch yellow frame)
6. Acceleration side target marker(Green)
7. Acceleration onetouch marker green ON/OFF (Touch yellow frame)
8. Acceleration side peak needle & digital
9. Acceleration analog pointer
10. Needle move speed change (Touch yellow frame)
11. Increasing/decelerating scale IN/OUT swap (Touch yellow frame)
12. Deacceleration peak needle&digital ON/OFF (Touch yellow frame)
13. Go to "HOME"
14. Deacceleration side peak needle & digital
15. Deacceleration onetouch marker red ON/OFF (Touch yellow frame)
16. Deacceleration side target marker(Red)
17. Increase screen brightness [+]
18. Screen illuminance degree %
19. Decreased screen brightness [-]
20. Onetouch switching day & night illumination
21. Temperature display ON/OFF (Touch yellow frame in 3 places)
22. ②③④ Temperature (Real time)
23. Changeover switch position instruction

■ Supports simple measurement of acceleration/deceleration and temperature

★ First, switch the switch according to "Switch Position" instruction.

①-3 : Set selector switch ① to switch position [3]
②-2 : Set selector switch ② to switch position [2]
③-2 : Set selector switch ③ to switch position [2]
④-2 : Set selector switch ④ to switch position [2]

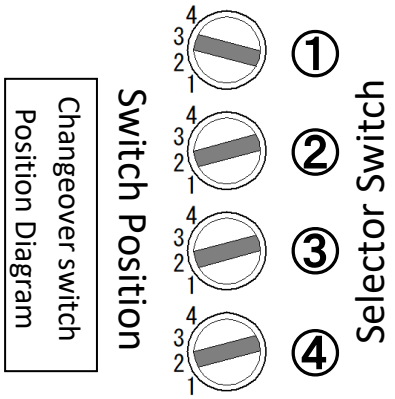
Switch Position
Selector Switch

※ If switching is not correct, program will behave erratically.

★ Temperature sensor "K-type thermocouple" is insert thermocouple panel №2, 3, and 4 on the back of main unit.

※ If you insert it in wrong position, it will not be possible to measure accurately.

※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "21".



1 About peak display

Peak needle and digital "Peak g" are held for about 3 seconds and automatically will be deleted. If you touch near left and right yellow frames of figures "8" and "14", the left and right Peak needle and digital can be erased independently.

※ Peak needle is set to "hidden" by default, and can be displayed by touching it.

※ Needle and digital do not necessarily disappear at same time.

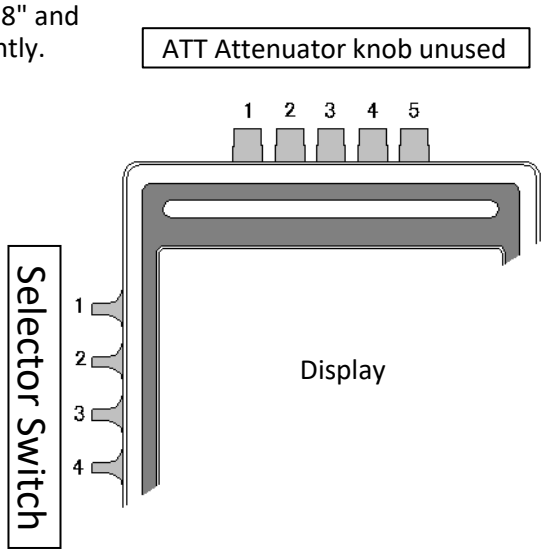
※ Peaks do not show accurate values when acceleration is applied.

2 About target indicator markers

Move target indication marker (Yellow) to side where numerical value increases using [◂▸] buttons in figure "3". Use [▸◂] button in figure "4" to move to side where numerical value decreases, and set it to position that will serve as a guideline for measurement.

You can instantly move to target position using one-touch movement button shown in figure 2, and each time you touch it, it will alternate between two positions. Target indication markers on both sides can be erased independently by touching the area near yellow frame in figures "7" and "15".

※ If you erase acceleration side or unnecessary side when evaluating deceleration, it will not be an eyesore.



3 About calibration

If you want to calibrate, touch the "CAL" button in "Program 1" in advance to make settings.

※ Set "Selector Switch" to appropriate position for each program.

4 About brightness of screen to

Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+" & "-" buttons in Figures "17" & "19". (minimum illumination 1%)

Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "20" below "+" & "-" buttons.

5 About program changes

Touch "HOME" button to move to another program.

※ Set "Selector Switch" to appropriate position for each program.

Other settings

1 About switch on back

ATT position on back is normally ON.

When switching to OFF, it depends on "Other settings 3".

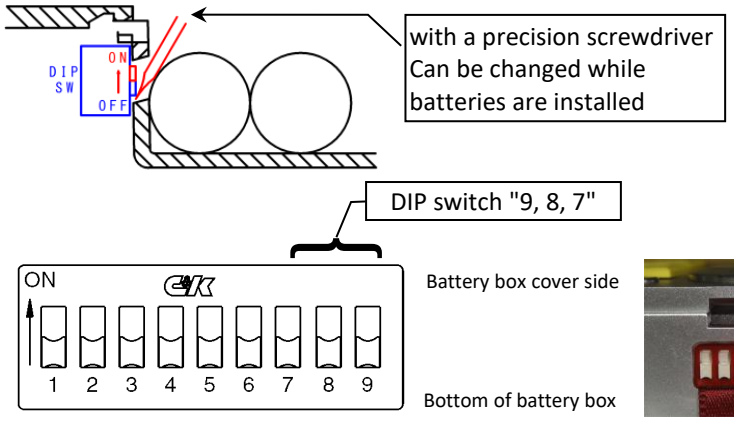
2 About DIP switches

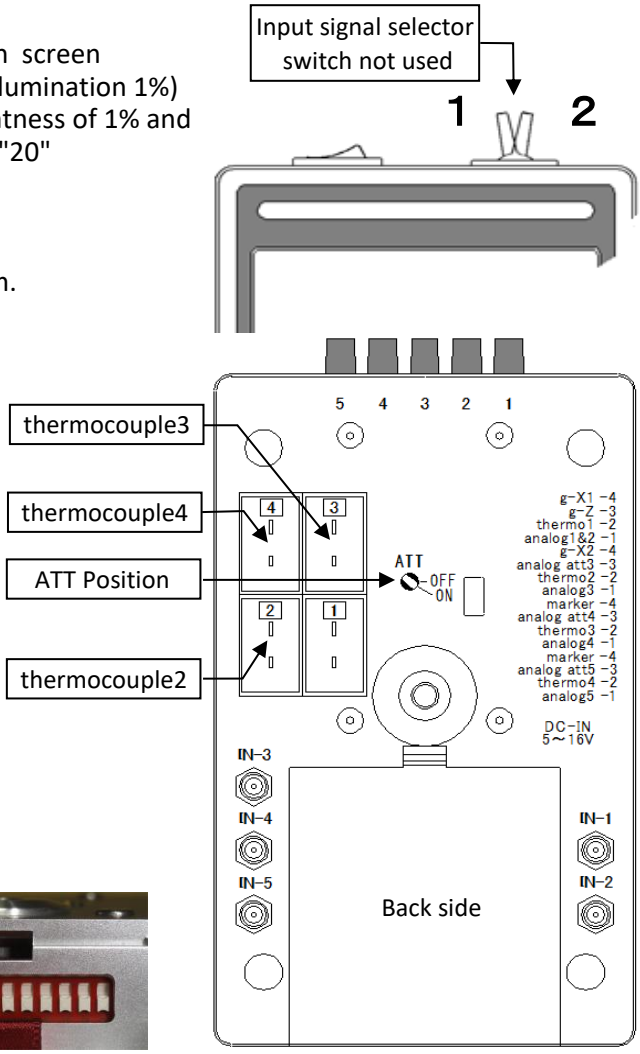
By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).

Leave OFF unless otherwise instructed.

※ In principle, turn off power before changing.

Default: OFF





speed of speed	quick	←					→	Slow
Weak DIP switch 9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].

Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)

Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)

Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.

It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.

In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

4 About the touch buttons "10","11" and "21"

・Touch button "10": When you touch area around yellow frame in image, word "Dull" at bottom center of scale changes to "Quick," and analog pointer and peak needle move more quickly.

※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.

※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.

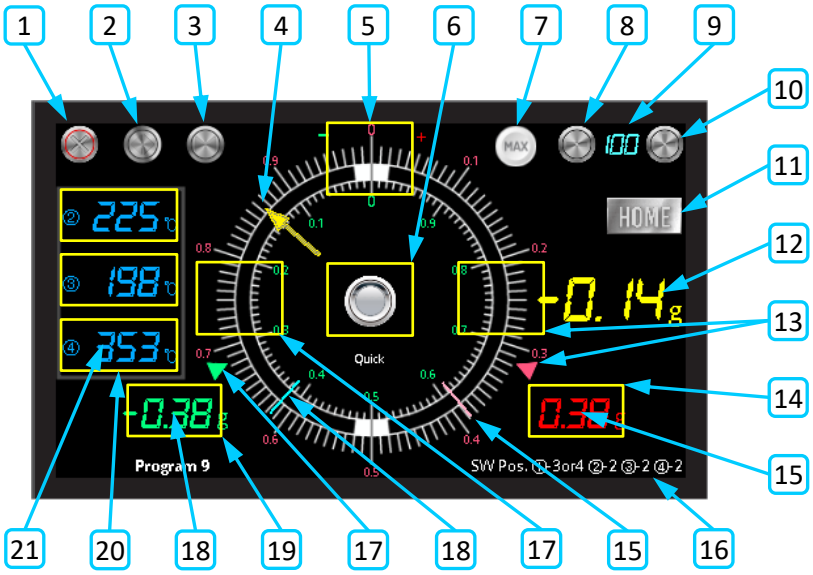
・Touch button "11": Touching the area near yellow frame in diagram will swap red and green numbers on scale, and inside and outside. Scale for speed increase and deceleration evaluation tests can be moved to outer periphery for easier viewing.

・Touch button "21": Temperature display can be deleted by touching area around three yellow frames in figure.

※ When not measuring temperature, you can turn it off to make screen easier to see.

Program 9 Each part setting explanation

(Other Program)



1. Onetouch move of target marker (Green&Red)
2. Marker(Green&Red) move to increasing value side
3. Marker(Green&Red) move to numerical value decrease side
4. Acceleration needle (Real time)
5. Increasing/decelerating scale IN/OUT swap (Yellow frame touch)
6. Needle move speed change (Touch yellow frame)
7. Onetouch switching day and night illumination
8. Decreased screen brightness [-]
9. Screen illuminance degree %
10. Increase screen brightness [+]
11. Go to "HOME"
12. Acceleration digital (Real time)
13. Deacceleration onetouch marker red ON/OFF (Yellow frame touch)
14. Deacceleration peak needle&digital ON/OFF (Touch yellow frame)
15. Deacceleration side peak needle & digital
16. Changeover switch position instruction
17. Acceleration onetouch marker green ON/OFF (Yellow frame touch)
18. Acceleration side peak needle & digital
19. Acceleration peak needle&digital ON/OFF (Touch yellow frame)
20. Temperature display ON/OFF (Touch yellow frame in 3 places)
21. ②③④ Temperature (Real time)

■ **Supports simple measurement of acceleration/deceleration, L&R acceleration, and temperature**

★ First, switch the switch according to "Switch Position" instruction.

①-4or3 : Set selector switch ① is L&R-g: switch position to [4]
In the case of F&R-g: Switch position [3]

②-2 : Set selector switch ② to switch position [2]

③-2 : Set selector switch ③ to switch position [2]

④-2 : Set selector switch ④ to switch position [2]

Switch Position
Selector Switch

★Insert "K-type thermocouple" in panel №2,3,4 on back of main unit.

※ It cannot be measured if it is inserted in another position.

※ If temperature has not been measured, it can be deleted by touching temperature value shown in figure "20".

1 About peak display

Peakneedle and digital "Peak g" are held for about 3seconds and automatically will be deleted. If you touch near the left and right yellow frames of figures "14" and "19", left and right peakneedle and digital of figures "15" and "18" can be erased independently.

※ Peak needle is set to "hidden" by default, and can be displayed by touching it.

※ Needle and digital do not necessarily disappear at same time.

※ Peaks do not show accurate values when acceleration is applied.

2 About target indicator markers

Move target indication marker (yellow) to side where numerical value increases using [◀▶] buttons in figure "2". Use [▶◀] button in figure "3" to move to side where numerical value decreases, and set it to position that will serve as a guideline for measurement. You can instantly move to target position using one-touch movement button shown in figure "1", and each time you touch it, it will alternate between two positions.

Target indicator markers on both sides can be erased independently by touching area near yellow frame in figures "13" and "17".

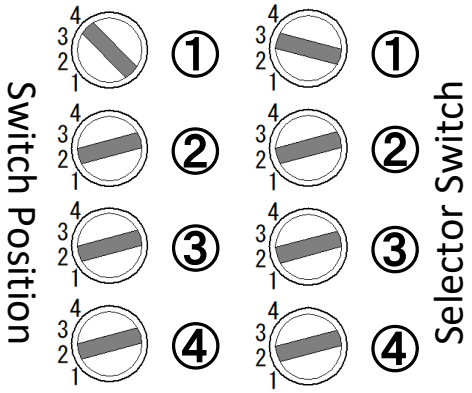
※ If you erase the acceleration side or unnecessary side when evaluating deceleration, it will not be an eyesore.

3 About calibration

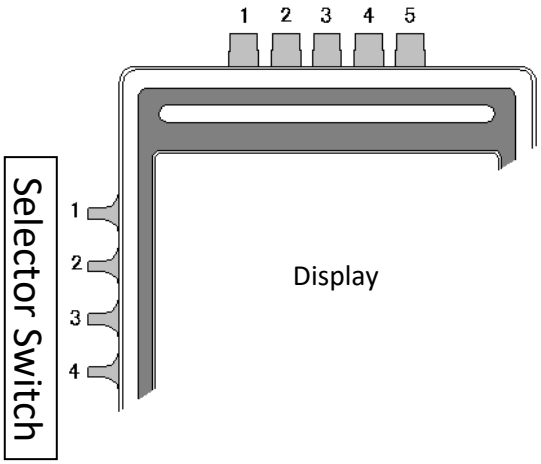
If you want to calibrate, touch the "CAL" button in "Program 6" in advance to make settings.

※ Set "Selector Switch" to appropriate position for each program.

Changeover SW Position Diagram



ATT Attenuator knob unused



4 About brightness of screen to

Brightness of screen can be changed from 1～100% by 10% with screen brightness "+" & "-" buttons in Figures "8","10". (min illumination 1%)
Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "7" beside "+" & "-" botton.

5 About program changes

Touch "HOME" button to move to another program.
※ Set "Selector Switch" to appropriate position for each program.

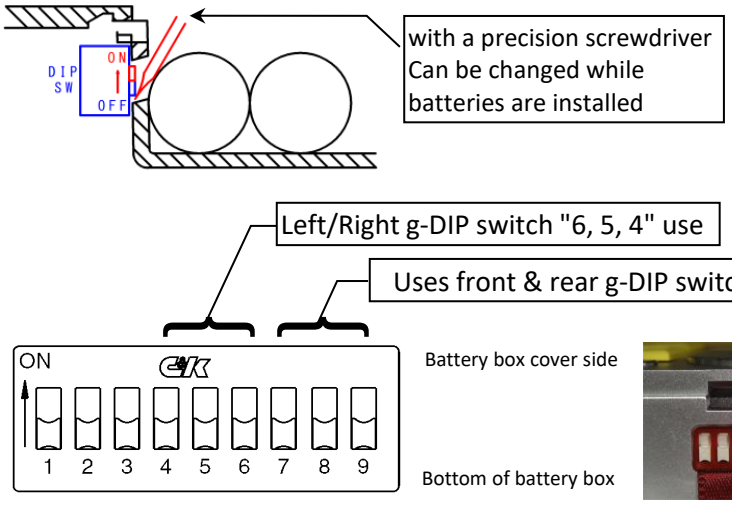
Other settings

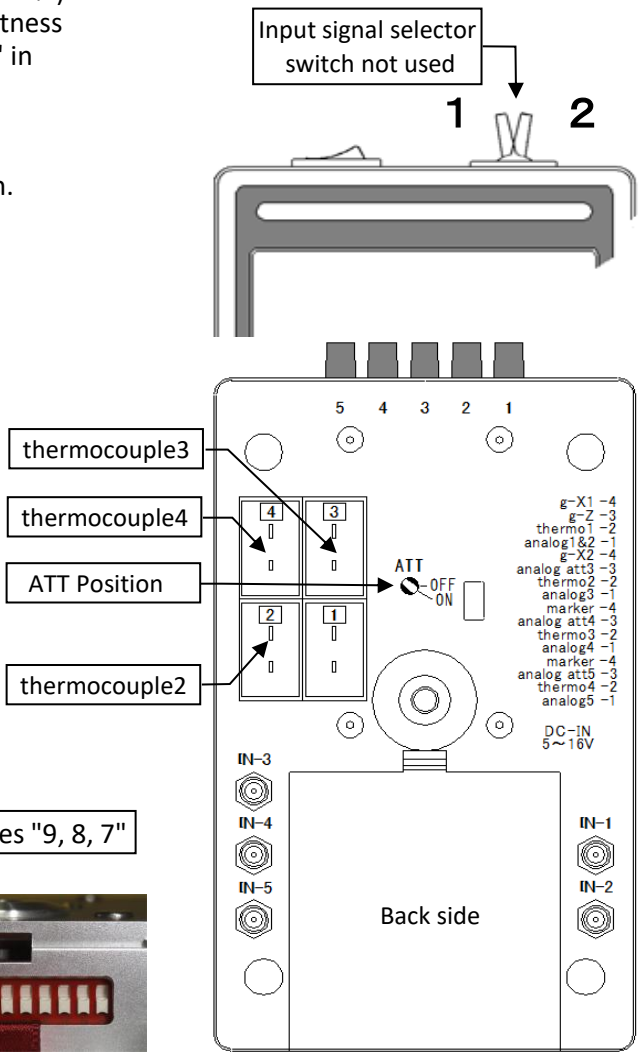
1 About switch on back

ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.
Default: OFF





speed of speed	quick	←					→	Slow
Weak DIP switch 6,9	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 5,8	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 4,7	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

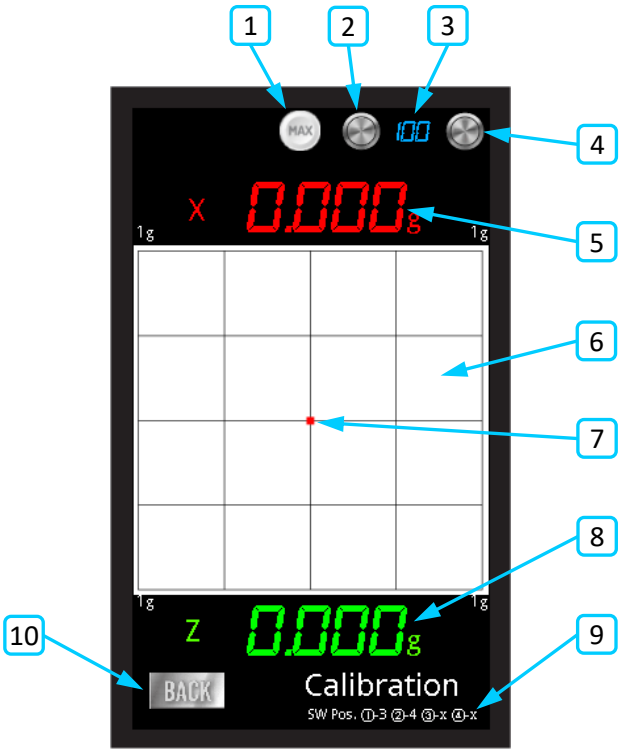
3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

4 About touch buttons "5","6" and "20"

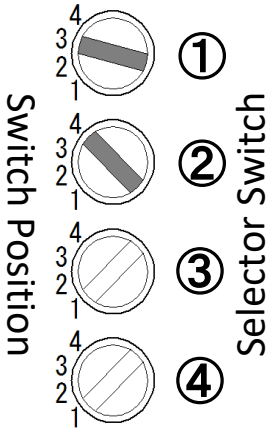
・Touch button "5": Touching area near yellow frame in diagram will swap red and green numbers on scale, and inside and outside. Scale for speed increase and deceleration evaluation tests can be moved to outer periphery for easier viewing.
・Touch button "6": When you touch area around yellow frame in image, word "Dull" at bottom center of scale changes to "Quick," and analog pointer and peak needle move more quickly.
※ Dull: Movement speed is reduced, but it cannot follow momentary changes in acceleration.
※ Quik: Pointer moves in a jumpy manner, which is difficult to see, but it can follow momentary changes.
・Touch button "20": Temperature display can be deleted by touching area around three yellow frames in figure.
※ When not measuring temperature, you can turn it off to make screen easier to see.

Calibration 1 Each part setting explanation



1. Onetouch switching day and night illumination
2. Decreased screen brightness [-]
3. Screen illuminance degree %
4. Increase screen brightness [+]
5. Y-direction acceleration (Horizontal degree) display
6. Scale frame
7. Pointer
8. Z-direction acceleration (Vertical) display
9. Changeover switch position instruction
10. Return to program

Changeover switch Position Diagram

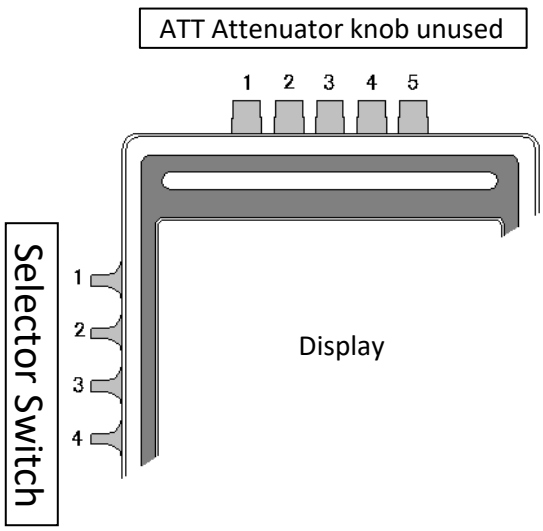


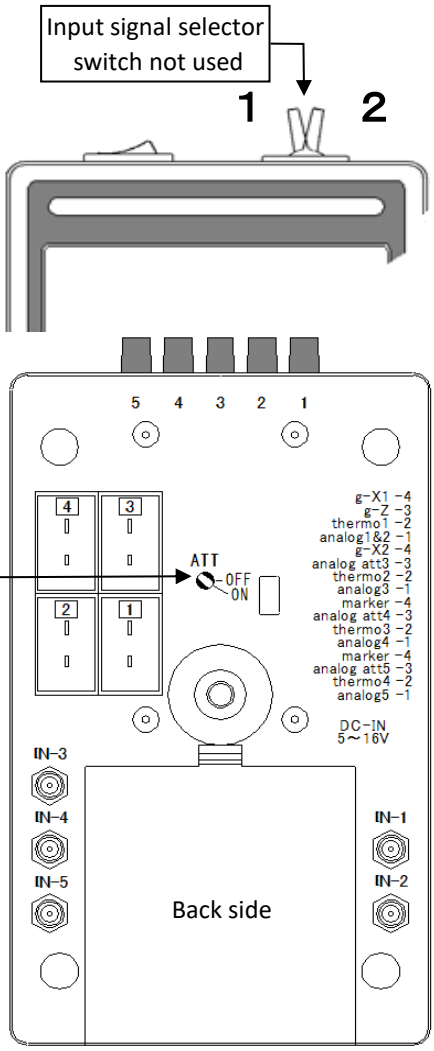
■ **For horizontal and vertical tilt setting when G-meter body is mounted vertically**
(It can also be used for other purposes such as evaluation.)
★ First, switch the switch according to "Switch Position" instruction.
①-3 : Set selector switch ① to switch position [3]
②-2 : Set selector switch ② to switch position [2]
③-x : Set selector switch ③ to Any switch position possible
④-x : Set selector switch ④ to Any switch position possible
Switch Position
Selector Switch
※ If switching is not correct, program will behave erratically.

1 About setting
Set so that pointer is in center.
※ Car is in a horizontal position

2 About program changes
Touch "BACK" button to move to previous program.
※ Set "Selector Switch" to appropriate position for each program.

3 About brightness of screen To
Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+" & "-" buttons in Figures "2" & "4".
(minimum illumination 1%)
Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "1" beside "+" & "-" botton.





Other settings

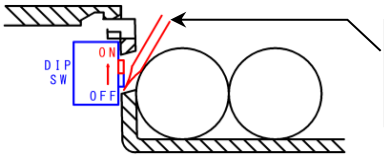
1 About switch on back

ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

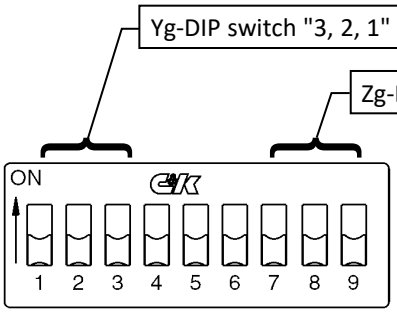
2 About DIP switches

By setting DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.

Default: OFF



with a precision screwdriver
Can be changed while
batteries are installed



speed of speed	quick	←					→	Slow
Weak DIP switch 9,3	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8,2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7,1	OFF	OFF	OFF	OFF	ON	ON	ON	ON

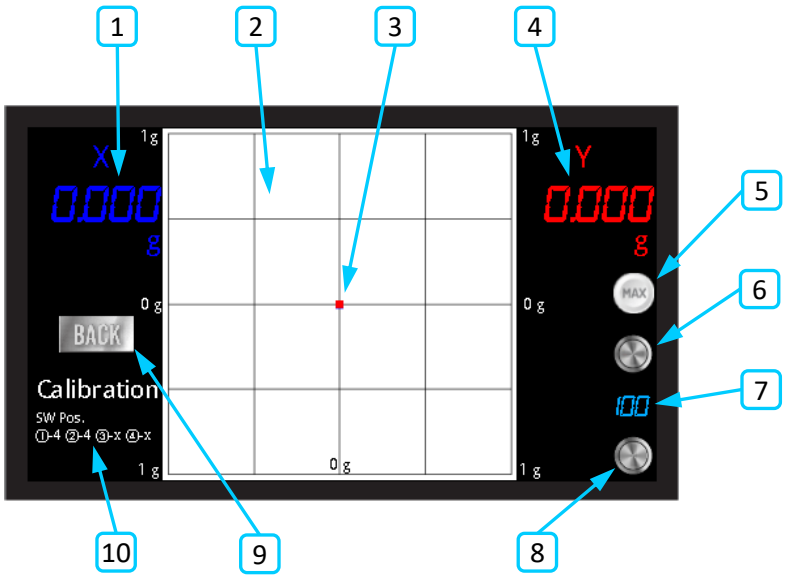
※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

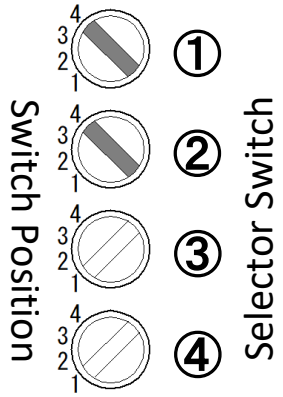
・If you do not use L/R internal G sensors, switch switchposition of "Selector Switch ②" to [1] or [3].
Connect an external signal to IN-3 connector. (※ Analog input DC0-5V)
In case of switchposition [3], turn knob of attenuator ATT-3 on top to adjust meter deflection.
It does not operate when input signal current is weak. Switch to "Switch Position" [1] to switch to direct signal input and adjust level on input signal device side.

Calibration 2 Each part setting explanation



※ Red/blue 2-pointer type
1. X-direction acceleration (Horizontal)(Blue)
2. Scale frame
3. Pointer (Red&Blue)
4. Y-direction acceleration (Vertical tilt)(Red)
5. Onetouch switching day&night illumination
6. Increase screen brightness [+]
7. Screen illuminance degree %
8. Decreased screen brightness [-]
9. Return to program
10. Changeover switch position instruction

Changeover switch Position Diagram

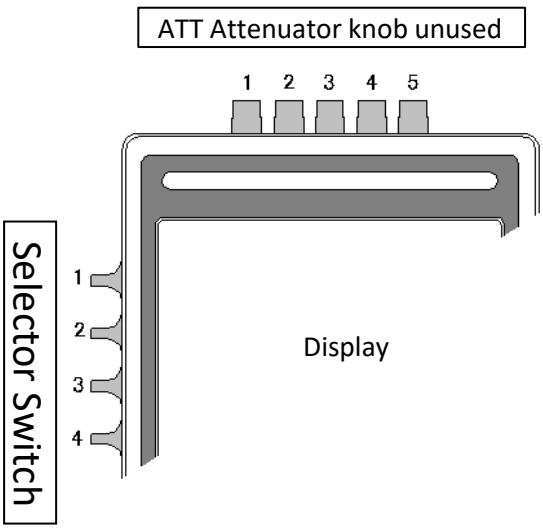


■ **For horizontal/vertical tilt setting when G-meter body is mounted horizontally**
(It can also be used for other purposes such as evaluation.)
★ First, switch the switch according to "Switch Position" instruction.
①-4 : Set selector switch ① to switch position [4]
②-4 : Set selector switch ② to switch position [4]
③-x : Set selector switch ③ to Any switch position possible
④-x : Set selector switch ④ to Any switch position possible
Switch Position
Selector Switch
※ If switching is not correct, program will behave erratically.

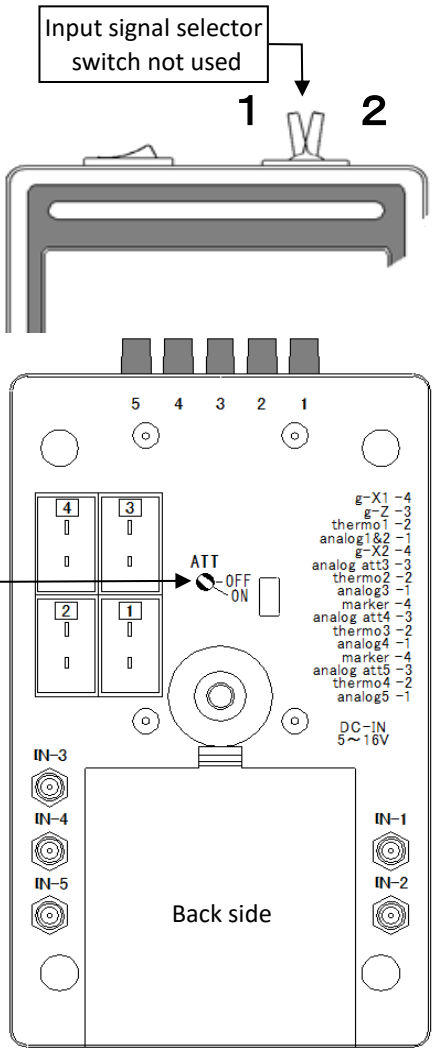
1 About setting
Blue pointer moves left and right, but red pointer moves up and down only from center to top, so set both pointers so that they overlap in the center.
※ Car is in a horizontal position
※ Red needle does not move down from the center when the setting is stationary, but it moves down from the center when it passes over a step while driving. (±1g can be measured vertically.)
※ When used for evaluation, etc.
※ In setting of calibration 2, switchposition [4] of "Selector switch ①" displays left & right tilt (turning acceleration) and does not display front and rear-g.
・After setting, if "Selector Switch ①" is switched to switch position [3], it becomes front-rear g, and it for horizontal movement to left & right will be pointer.
Pointer is hard to see, but you can check front and rear g on digital display.

2 About program changes
Touch "BACK" button to move to previous program.
※ Set "Selector Switch" to appropriate position for each program.

3 About the brightness of screen to
Brightness of screen can be changed from 1 to 100% by 10% with screen brightness "+" & "-" buttons in Figures "6" & "8".
(minimum illumination 1%)



Brightness can be changed alternately each time you touch brightness of 1% and 100% with "one-touch change button for illuminance" in Figure "5" upside "+" & "-" botton.



Other settings

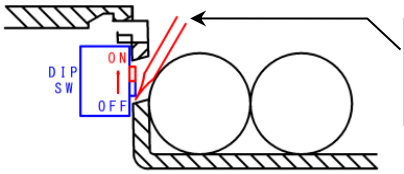
1 About switch on back

ATT position on back is normally ON.
When switching to OFF, it depends on "Other settings 3".

2 About DIP switches

By setting the DIP switch on inside of battery box, Move speed for Bar meter can be changed (low pass).
Leave OFF unless otherwise instructed.
※ In principle, turn off power before changing.

Default: OFF

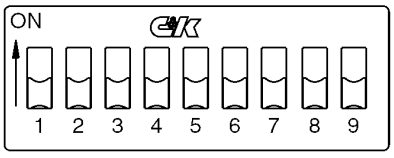


with a precision screwdriver
Can be changed while batteries are installed

ATT Position

Yg-DIP switch "3, 2, 1" use

Zg-DIP switch "9, 8, 7" use



Battery box cover side

Bottom of battery bo

speed of speed	quick	←					→	Slow
Weak DIP switch 9,3	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Medium DIP switch 8,2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Strong DIP switch 7,1	OFF	OFF	OFF	OFF	ON	ON	ON	ON

※ The slower setting, less accurate acceleration will be.

3 About external input (Other settings 2. DIP switch should be OFF)

・If you do not use internal G-sensor, switch "Switch Position" of "Selector Switch ①" to [1].
Connect external signals to IN-1 and IN-2 connectors. (※ Analog input DC0-5V)
Set input signal switch to 1 or 2. (Compatible with IN-1:1 and IN-2:2)
Turn attenuator ATT-1 and ATT-2 knobs on top to adjust meter deflection.
It does not work when input signal current is weak. Set ATT switch on back to OFF side to directly input signal.
In that case, attenuators ATT-1 & ATT-2 on top are disabled, and level adjustment should be done on input signal device side.

・If you do not use L/R internal G sensors, switch "Switch Position" of "Selector Switch ②" to [1] or [3].
Connect an external signal to IN-3 connector. (※ Analog input DC0-5V)
In case of "Switch Position" [3], turn knob of attenuator ATT-3 on top to adjust meter deflection.
It does not operate when input signal current is weak. Switch to "Switch Position" [1] to switch to direct signal input and adjust level on input signal device side.

Input Circuit System Diagram

analog input
DC 0V～5V
※There are exceptions

Attenuator knob (ATT)

IN−1
Compatible with Sw1

IN−2
Compatible with Sw1

IN−3
Compatible with Sw2

IN−4
Compatible with Sw3

IN−5
Compatible with Sw4

Attenuator ON/OFFSW

Input switch

Thermocouple input1

Thermocouple input2

Thermocouple input3

Thermocouple input4

4ch thermocouple amplifier

Selector switch No.

G sensor X (L & R when placed horizontally) -> g-X1
G sensor Z (front and rear) ----------> gZ
Thermocouple 1 ----------> thermoe 1
Analog input 1 & 2 ----------> analog 1 & 2
G sensor X (L & R when vertically installed) -> g-X2
Analog input 3-Att through ----------> analog Att 3
Thermocouple 2 ----------> thermo 2
Analog input 3-direct input ----------> analog 3
Move marker position GY ----------> marker or gY
Analog input 4-Att through ----------> analog Att 4
Thermocouple 3 ----------> thermoe 3
Analog input 4-direct input ----------> analog 4
Move marker position ----------> marker
Analog input 5-Att through ----------> analog Att 5
Thermocouple 4 ----------> thermoe 4
Analog input 5-direct input ----------> analog 5

Switch Position No.

X Z Y
Built-in 3-axis G-sensor

When placed horizontally

When placed vertically

Mpa switching & setting for programs 1&2,6

◆ Make Mpa pressure meter using marker

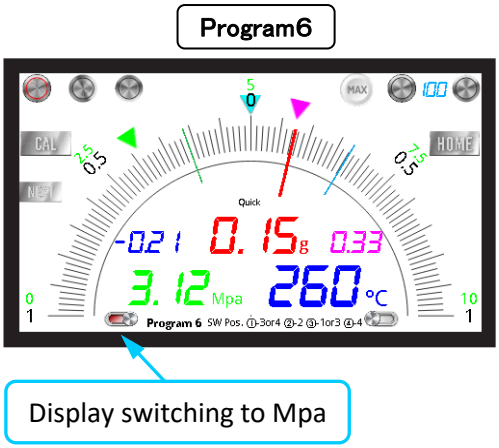
Program 1 & 2

Input pressure sensor signal to analog input IN-4 on back of "Electronic U-tube". (Use an SMA → BNC conversion cable, etc.) "Selector Switch" ③ position number is usually [4] for moving marker, but by switching to [1] or [3] external input, yellow marker will work as a 0-5V meter. When signal input voltage is 0 to 5V, yellow marker swings at maximum vertical amplitude of dial and becomes a meter of 0 to 10Mpa.

If output is set to ±10V by setting dynamic strainmeter, etc., "Electronic U-tube" is a meter for 0 to 5V, so 5V or more is not displayed and maximum amplitude is 10Mpa, and numerical value can be seen in detail.
At this time, if you touch "Mpa display changeover switch" to switch screen, Mpa digital value will be displayed.
If yellow marker exceeds 5V, it will remain stopped at upper limit, but digital value will be displayed up to 20Mpa.
※ Display of "Switch Position" will change, so follow instructions to change position of "Selector Switch ③".
※ If position number switching is not correct, program will behave abnormally.

Program 6

Input pressure sensor signal to analog input IN-4 on back of electronic U-tube.
(Use an SMA → BNC conversion cable, etc.)
Position number of "Selector Switch" ③ is usually [4] for moving marker, but by switching to [1] or [3] external input, green marker will work as a 0-5V meter.
When signal input voltage is 0-5V, green marker is maximum amplitude of dial and marker swings 0-20Mpa.
If you set output to ±10V by setting dynamic strainmeter, etc., "Electronic U-tube" is a meter for 0 to 5V, so 5V or more will not be displayed and maximum amplitude will be 10Mpa, and you will be able to see detailed values.
At this time, if you touch "Mpa display changeover switch" to switch screen, Mpa digital value will be displayed.
If green marker exceeds 5V, it will remain stopped at upper limit, but digital value will be displayed up to 20Mpa.
※ Display of "Switch position" will change, so follow the instructions to change position of "Selector Switch ③".
※ If position number switching is not correct, program will behave abnormally.



Temp switching & setting of programs 1&2,6

◆ **Add temperature measurement and display 3 items**

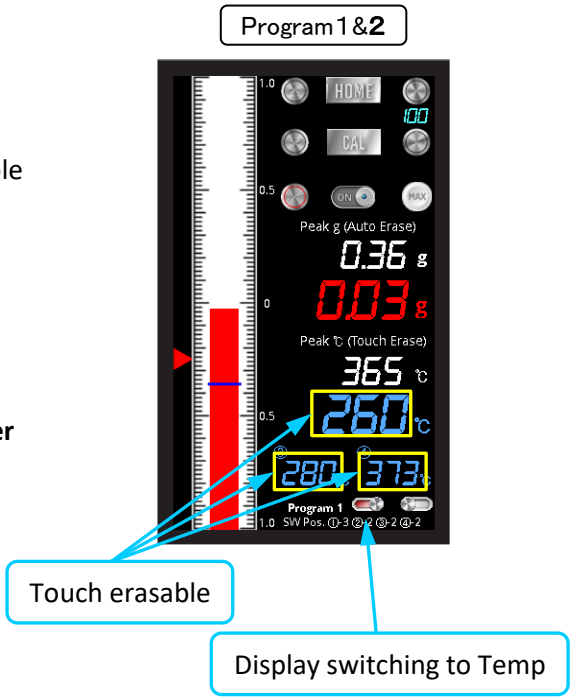
Program 1 & 2

If you touch "Temp display switch" to switch screen, it will switch to three temperature display screens.
Display of "Switch Position" will also change, so follow instructions to "Switch Position" No. of "Selector Switch" ②, ③, and ④ to [2] and insert thermocouple sensor into thermocouple connectors No.2, 3, and 4 on back.

※ Marker will switch to "target indication one-touch marker main (Red)" only.

※ If position number switching is not correct, program will behave abnormally.

※ Each temperature display can be erased by touching it. An abnormal signal may be displayed when not in use or when "Switch Position" is not correct, but it becomes easier to see by turning it off.



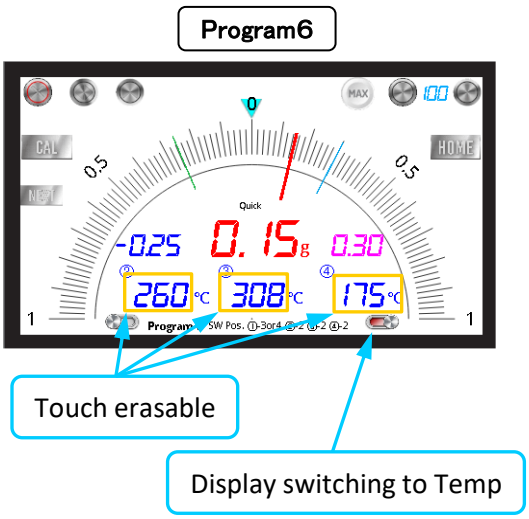
Program 6

If you touch "Temp display switch" to switch screen, it will switch to three temperature display screens.
Display of "Switch Position" will also change, so follow instructions to "Switch Position" No. of "Selector Switch" ②, ③, and ④ to [2] and insert thermocouple sensor into the thermocouple connectors No.2, 3, and 4 on back.

※ Marker will switch to "target indication one-touch marker main (Red)" only.

※ If position number switching is not correct, program will behave abnormally.

※ Each temperature display can be erased by touching it. An abnormal signal may be displayed when not in use or when "Switch Position" is not correct, but it becomes easier to see by turning it off.



Electronic U-Tube application & Connection setting

◆ Application (using a moving marker as a meter)
Some programs have markers that can be moved manually, and corresponding selector switch position number is usually 4, but by switching to 1 or 3, external input terminal can be used, and marker will work as a 0-5V meter. Programs 1, 2, and 6 have two manual markers each, and if both of them are switched to external input, they can be used as indicators for external signals x2 at the same time as the built-in acceleration sensor.
※ Manual markers of programs3 and 5 are not suitable for external input display due to operation specifications, and Program7 is also not suitable because display of 0 to 5V is 0 to 1250 for temperature.

●Example of external signal connection

Measuring instruments used by our company
Dynamic strain gauge:KYOWA DPM-911
Pressure sensor: KYOWA PGM-200KD
Acceleration sensor:KYOWA AS-2GB

1. Example of using a pressure sensor
For program 1, change the position of selector switch ③ to No.1 position.
Connect 20Mpa strain gauge type pressure sensor to dynamic strain gauge, set output voltage to 5V, and marker will be a meter from 0 to 20Mpa. If you set voltage to 10V, electronic U-tube is a meter for 0 to 5V, so 5V or more will not be displayed, and full scale will be 10Mpa, so you can see numerical value in detail.
※ When screen is switched to Mpa display, a numerical value from 0 to 10 appears on left side of dial. digital value is displayed from 0 to 20Mpa, but marker remains at upper limit position. In case of a 0 to 5V output amplifier built-in pressure sensor, direct input is possible, but full scale is fixed at 20Mpa. If screen is switched to Mpa display, it will not match dial value, so use normal screen.

2. Example of using accelerometer
・When using an accelerometer, sensor is usually placed upright and zero point (0V) is taken.
Next, if output voltage of dynamic strainmeter is set to 10V, output will be +-5V centered on 0g.
Display of Electronic U-tube is -1g for 0V, 2.5V for 0g, and +1g for 5V.
In above setting, 0g is 0V, so bottom of meter needle is 0g. Since -g cannot be displayed, fix direction of acceleration sensor to direction you want to measure and use it for measurement from 0g to +1g.
(In this case, ignore g value on dial and set it to 0 to +1g.)
※ Acceleration sensor must be attached in same direction as pointer movement.

・This is an unconventional setting method, but if you fix acceleration sensor with negative side facing down to get 0 point, set output voltage to 5V, and fix it in normal position, it will output 2.5V at 0g and 5V at +1g.
※ Acceleration sensor must be attached in same direction as pointer movement.
※ If output of +1g is deviated to 5.05V, etc., even if the 0 point is obtained, output of 5.00V can be obtained by finely adjusting output setting of dynamic strainmeter from 5.00V to 4.99V to improve accuracy.

・When using an external acceleration sensor without using internal acceleration sensor, perform above setting method, connect output of dynamic strain gauge to analog input terminal IN-1 or IN-2 of Electronic U-Tube tube, and switch position number of selector switch ① to 1 for external input.
Furthermore, if signal connection is IN-1, you can use it by switching "input signal selector switch" to 1 side.
※ ATT position (attenuator SW) on back of Electronic U-tube is basically OFF.
Also, if sensor output is 2.5V or 3.3V, use an external amplifier to increase it to 5V.