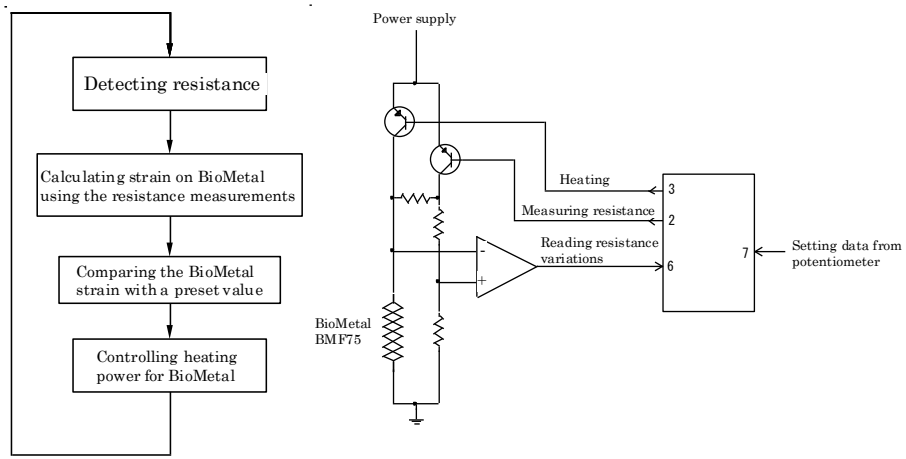
BM Smart Servo TK-B10　　Operation Manual

[Outline]

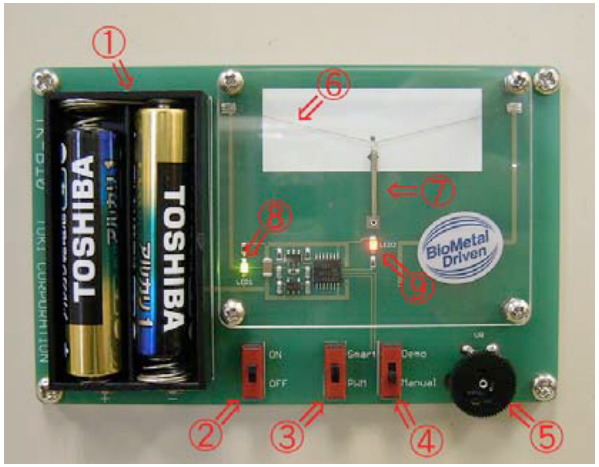
BM Smart Servo is a new servo technology that uses electrical resistance as a displacement sensor that changes in line with the movement of a metallic artificial muscle, “BioMetal.” This is TOKI’s unique technology put to practical use for the first time through integration of the optimized physical characteristics of BioMetal with advanced electronic technology.

BM Smart Servo is an advanced servo actuator composed of just a few electronic parts and BioMetal, which functions as a precision displacement sensor as well as an actuator. Feedback from BioMetal is conveyed via the same conductor as used for driving the servo.

TK-B10 is a demonstration apparatus fabricated to allow you to understand the workings of BM Smart Servo as compared with those of a conventional PWM system.



[Part name]



(1)	Battery box (two AAA batteries)
(2)	Main switch
(3)	Mode switch 1 (Smart/PWM)
(4)	Mode switch 2 (Demo/Manual)
(5)	Potentiometer
(6)	BioMetal (BMF75)
(7)	Load spring
(8)	Power LED indicator
(9)	Power LED indicator

[Operating the BM Smart Servo]

1. Put two AAA batteries in the battery box (1).
2. With Mode switch 1 (3), select the “Smart” or “PWM” mode.
   * The “Smart” mode conveys feedback from BioMetal.　The “PWM” is without a feedback function.
3. With Mode switch 2 (4), select the “Demo” or “Manual” mode.
4. Turn on the main switch (2) ON.　(The power LED indicator (8) lights up.)
5. Then, BioMetal (6) activates in selected modes.　At the same time, the output (current) LED indicator (9) displays the current flowing inside BioMetal.
6. To change modes, use the Mode switches.　You do not need to turn off the main switch.
7. To drive BioMetal in the “Manual” mode, you can adjust the BioMetal strain level with the potentiometer (5).
8. To terminate the operation, turn off the main switch (2).　(The power LED indicator (8) goes off.)

To understand how differently the “Smart” mode and “PWM” mode work, try the following operations.

- In the “PWM” and “Manual” modes (at a moderate value on the potentiometer), apply a slight breeze to BioMetal. You can observe a change in strain on BioMetal as it is cooled down by the breeze.
- In the “Smart” and “Manual” modes (at a moderate value on the potentiometer), apply a slight breeze to BioMetal. You can observe a change in brightness of the output (current) LED indicator with no change in strain on BioMetal.

[Specifications]

Type of BMF used/Length	BMF75 (75 µm dia.)/55 mm
Power voltage range for circuits	2.8 to 4.5 V
Average current consumption	About 45 mA (at power voltage of 3 V in Smart/Demo modes)
Outside dimensions/Weight	63 × 98 × 16 mm (L × W × H) 67 g (including batteries)

[Patent]

- Patent application No. 2004-378003
- Patent application No. 2005-100926

[Brand name]

Trademark application No. 2005-04922: “Smart Servo”

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