

# Potentiometer measurement

Measuring a potentiometer for checking correct functioning.

## Tools:

- Flathead screwdriver 0.50 x 3.5
- Multi-meter

## Preconditions:

Knowledge of concerning systems aboard.

## Note:

The pictures used for this instruction are of control lever type BUK-B. But this instruction is also applicable for control lever types such as:

- BUK-A
- BUK-C
- BUK-G

Before applying the instructions in this guide, the correct electrical drawing of the control lever is needed. If this is not available, please contact us via [service@kwantcontrols.nl](mailto:service@kwantcontrols.nl)

To send you the correct drawing we need the original factory number of the control lever. This 6-digit number is handwritten on a green sticker which is placed at one of the mounting plates of the control lever.



Example:

1. Before starting with measurements make sure it is safe to do so. (Main engine turned off and no possibility to accidentally actuate the propulsion system)
2. Determine which potentiometer you want to measure.

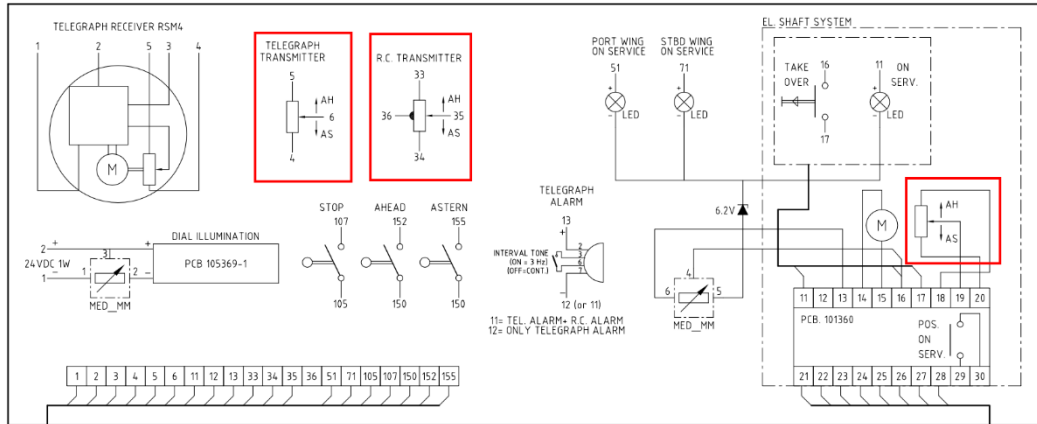
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# Potentiometer measurement

Note:

Depicted configuration is only an example. The configuration can vary between different control levels.



1. In this example the telegraph potentiometer is used. The sequence is applicable for other potentiometers mounted on the control lever, only terminal numbers may vary.

Make sure you use the correct electrical drawing of the concerning control lever.



2. The most accurate way to measure is with the power still supplied to the potentiometer.

To do so you need a multimeter set to the VDC range.



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# Potentiometer measurement

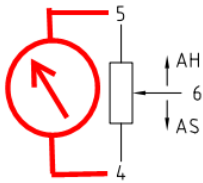
3. The most convenient way to measure is to place the probes at the terminal strip of the control lever.



4. First measure the voltage supplied to the potentiometer and note this value. (terminal 4(-) and 5(+)).

Note:

The ahead direction is always the positive terminal.



5. Put the lever in the zero position.



6. If there is no zero detent or the zero detent is not in the middle of the dial, make sure the lever is perpendicular to the frame.



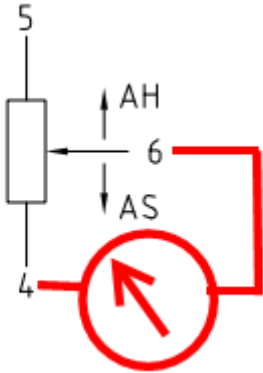
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# Potentiometer measurement

7. Measure the voltage between terminal 4(-) and 6 (+ (wiper))

The measured value should be exact half of the value measured in step 6.  
(half the power supply)



8. Set the control lever to full Astern (mechanical end stop).

Measure the voltage between terminal 4(-) and 6 (+ (wiper))

The measured value should be 10% of the value measured in step 6



9. Set the control lever to full Ahead (mechanical end stop).

Measure the voltage between terminal 4(-) and 6 (+ (wiper))

The measured value should be 90% of the value measured in step 6.



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# Potentiometer measurement

10. If above measurements are correct, set the lever to full astern, still measuring between terminals 4 and 6.  
Slowly increase the lever position to full ahead, meanwhile keeping an eye on the value measured. This value should increase linearly to the lever position without any "bumps" or "glitches".



11. It is not always possible to perform the measurement with the power supply still available. An alternative way to check the potentiometer is with resistance measurement. In this case the multimeter is to be set in resistance range.



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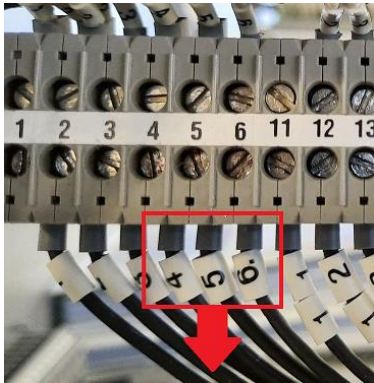


# Potentiometer measurement

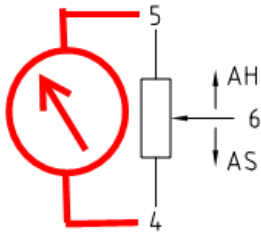
12. For the best results, it is advised to disconnect the external wiring from the terminals. By doing so, it is possible to only measure the potentiometer. When external wiring is not removed, external connected equipment can influence the measurement.

Note:

Make sure the loosened wires cannot make some kind of short circuit.



13. Measure the total resistance of the potentiometer.  
Most potentiometers used are 2K ohm with a tolerance of 10%.  
Therefore, they can vary from 1800 ohm till 2200 ohm.



14. Set the control lever to the zero position.

See also step 7 and 8.

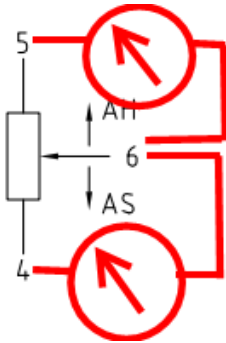
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# Potentiometer measurement

15. Measure the resistance between the wiper and terminal (4) connected to one end of the resistance element and between the wiper and the opposite terminal (5) connected the resistance element.

Both measured values should be more or less equal.



16. Set the control lever to the full astern position (mechanical end stop).



17. Measure between the wiper and the terminal (4) connected to the end of the resistance element which gives the lowest resistance.

18. Slowly increase the lever position to full ahead, meanwhile keeping an eye on the resistance value measured. This value should increase linear to the lever position without any "bumps" or "glitches".



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# Potentiometer measurement

Potentiometer supply:		VDC	Potentiometer resistance:		Ohm
Lever position.	Voltage VDC		Lever position.	Resistance Ohm	
Ahead			Ahead		
10			10		
9			9		
8			8		
7			7		
6			6		
5			5		
4			4		
3			3		
2			2		
1			1		
0			0		
-1			-1		
-2			-2		
-3			-3		
-4			-4		
-5			-5		
-6			-6		
-7			-7		
-8			-8		
-9			-9		
-10			-10		
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