

Model 9439-950
Dissolved Oxygen and
Hydrazine Cell
Current Simulator

Instruction Manual

For use with Models
9435, 9437 and 7835

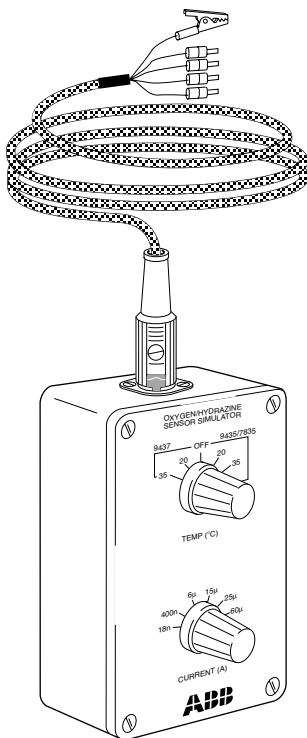


ABB Automation

The Company

ABB Automation is an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The NAMAS Calibration Laboratory (No. 0255) is just one of ten flow calibration plants operated by the Company, and is indicative of ABB Automation's dedication to quality and accuracy.

BS EN ISO 9001



St Neots, U.K. – Cert. No. Q5907
Stonehouse, U.K. – Cert. No. FM 21106

EN 29001 (ISO 9001)



Lenno, Italy – Cert. No. 9/90A



Stonehouse, U.K.

Use of Instructions



Warning.

An instruction that draws attention to the risk of injury or death.



Note.

Clarification of an instruction or additional information.



Caution.

An instruction that draws attention to the risk of damage to the product, process or surroundings.



Information.

Further reference for more detailed information or technical details.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of Marketing Communications Department, ABB Automation.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

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1 INTRODUCTION

The 9439-950 current simulator can be used as a convenient device for checking the correct operation of the transmitter units of Dissolved Oxygen Models 9435, 9437 and the Hydrazine Monitor Model 7835.



Note. The simulator is purely a checking device and calibration of the above instruments is not possible.

The 9439-950 is a portable hand-held instrument provided with a 1 metre cable (5-pin DIN plug to flying leads), for connection to monitors.

The simulator is powered by a 6LR61 (PP3) 9 volt alkaline replaceable battery, and has two rotary switches for independent current and temperature selection as follows:

Current range:

18 nA, 400 nA, 6 μ A, 15 μ A, 25 μ A, 60 μ A

Temperature range:

9435/7835: 20°C, 35°C, 50°C

9437: 20°C, 35°C

The tolerance of the readings displayed on the instrument are < $\pm 5\%$. Temperature tolerances are < $\pm 2\%$ of reading.

Located on the back of the simulator is a chart displaying the test values of current and temperature, and the expected readings obtained for each particular Model.

2 ELECTRICAL CONNECTIONS

The cell and temperature sensor connections should be disconnected from the terminals in the transmitter. The simulator fly leads can then be connected in accordance with the following information for each particular instrument Model.

The red (+ve) and blue (-ve) leads correspond to the cell current output. The white and violet leads provide temperature simulation by means of appropriate resistance.

2.1 Models 9435 and 7835

	TB3/4
White	Th1
Violet	Th2
Red	S1
Blue	S2
Green	Earth (case)

2.2 Model 9437

	Wall Mounted	Panel Mounted
Red	Chan 1-1	TBB12
Blue	Chan 1-3	TBB10
White	Chan 2-5	TBB 8
Violet	Chan 2-6	TBB 7
Green	Earth (Ground) stud	

3 OPERATION

3.1 Model 9435

Instrument calibration is derived from the software and therefore cannot be manually adjusted.

To calibrate the 9435 transmitter to the simulator, 20°C should be selected on the top rotary switch of the simulator and 25 μ A selected on the bottom switch. A calibration sequence of the transmitter should now be initiated by depressing the CAL button on the front panel of the transmitter unit. During the calibration sequence the display will read CAL and the CAL button will be illuminated. After three minutes the display should revert to a reading of 9.8 mg l⁻¹, and the simulator can now be used to check the transmitter – see Section 3.4

Summary:

Current	Temp.	Reading
25 μ A	20°C	9.8 mg l ⁻¹

3.2 Model 9437

Instrument calibration is derived from the software and therefore cannot be manually adjusted.

To calibrate the 9437 transmitter to the simulator, 20°C should be selected on the top rotary switch of the simulator and 25 μ A selected on the bottom switch.

A calibration sequence should now be initiated by selecting the transmitter calibration programming page and by performing the calibration sequence. During the sequence, 'Calibrating Air' is displayed and the oxygen value as displayed is calculated using the data from the previous calibration.

After three minutes the display reads 'Calibration Pass' and a reading of 9.8 mg l⁻¹ is obtained on return to the operating Page. The simulator can now be used to check the transmitter – see Section 3.4.

Summary:

Current	Temp.	Reading
25 μ A	20°C	9.8 mg l ⁻¹

3.3 Model 7835

Instrument calibration is derived from the software and therefore cannot be manually adjusted.

For calibration of the transmitter with the simulator, the exact figure for the calibration value should be entered into the microprocessor. This figure is chosen as $80 \mu\text{g kg}^{-1}$ and may be entered by pressing the CAL CONC button together with the SET VALUE buttons on the transmitter unit until the display reads this figure. 20°C should then be selected on the top rotary switch of the simulator and $25 \mu\text{A}$ selected on the bottom dial – see Table 2.

To initiate a calibration sequence depress the CAL button on the front panel of the transmitter unit and hold it until the display reads CAL. The calibration sequence will last for 15 minutes during which time the display will continue to read CAL. After this time $80 \mu\text{g kg}^{-1}$ is displayed and the simulator can be used to check the instrument – see Section 3.4.

Summary:

Current	Temp.	Reading
$25 \mu\text{A}$	20°C	$80 \mu\text{g kg}^{-1}$

3.4 Checking Procedure

Referring to the tables below or the summary provided on the back face of the simulator, the appropriate current and temperature inputs should be dialled up using the rotary switches on the simulator.

The instrument being checked should display the values as tabulated when specific input combinations of current and temperature are selected.

Table 1 Model 9435 and 9437

Input Current	20°C	35°C	50°C 9435 only
Values in mg l^{-1}			
$60 \mu\text{A}$	19.9*	13.5	7.7
$25 \mu\text{A}$	9.8	5.6	3.2
$15 \mu\text{A}$	5.9	3.4	1.93
$6 \mu\text{A}$	2.4	1.35	0.77
Values in $\mu\text{g l}^{-1}$			
400nA	157	90	51
18nA	7.1	4.1	2.3

* Reading on 9437 will be 23.5 (flashing)

Table 2 Model 7835

Input Current	20°C	35°C	50°C
Values in $\mu\text{g kg}^{-1}$			
$60 \mu\text{A}$	192	132	100
$25 \mu\text{A}$	80	54	40.5
$15 \mu\text{A}$	48	31.3	23.3
$6 \mu\text{A}$	19.2	12.6	9.1

4 FAULT FINDING

Should the specified values not be attained by the instrument under test, then certain checks should be made on the simulator.

- 1) Ensure that the tag terminations are connected correctly and firmly in the instrument junction box and all other connections to the instrument are adequate.
2. Check the condition of the battery and replace as necessary by referring to the General Maintenance section of this manual.
3. The outputs from the simulator can be checked by connecting it to a standard digital multimeter using the fly leads and observing the values obtained.
The current value should be very close to that selected on the lower rotary switch of the simulator.
Temperature is simulated by providing the appropriate resistances to the transmitter.

Temperature (°C)	Resistance (ohms)	
	9435/7835	9437
20	12500	1078
35	6490	1136
50	3600	-

4. Should the instrument still fail to respond correctly after the above checks, then the fault finding section of the relevant instrument manual should be referred to before the Company is consulted.

5 GENERAL MAINTENANCE

5.1 Replacing the Battery

A 6LR61 (PP3) 9 volt alkaline battery is used to power the 9435-950 simulator.

To gain access to the battery, remove the four screws on the top face of the body, and remove the lid section.

5.2 Socket connections

Pin 1	White	}	Temperature
Pin 4	Violet		
Pin 2	Green	-	Earth
Pin 3	Red	}	Current
Pin 5	Blue		

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- *Zirconia oxygen analyzers, katharometers, hydrogen purity and purge-gas monitors, thermal conductivity.*

Customer Support

ABB Automation provides a comprehensive after sales service via our Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

United Kingdom

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Fax: +44 (0)1480 470787

United States of America

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Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification. Periodic checks must be made on the equipment's condition.

In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of operating and maintenance records relating to the alleged faulty unit.



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