

## Instruction Manual Dräger MSI VARIOx-2 NO



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# Instruction Manual Dräger MSI VARIOx-2 NO

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# Instruction Manual Dräger MSI VARIOx-2 NO

## 1. Warning

Any use of the MSI VARIOx-2 NO requires a full understanding and strict adherence to these instructions and to the national and international regulations and standards. The instrument is only to be used for the purposes specified here. For maintaining accurate function and measurement accuracy, inspection and calibration once a year by authorized service people is recommended.

As from 2005 EC specifications for disposal of electric and electronic equipment are valid. These are regulated in the 2002/96/EC directive and respective national law. Essential content is the establishment of special collection and recycling facilities for private users. Since this device is not registered for private users, it is not allowed to dispose it in this way. For disposal you can send it back to your local Dräger Safety organisation and if requested, get further information concerning this matter from Dräger MSI GmbH.

## 2. The Instrument

The MSI VARIOx-2 NO is an electronic, handheld device to measure the NO concentration in the stack of combustions, auxiliary heaters, industrial processes etc..

### 2.1 Front

Gas inlet  
Display  
Function keys



### 2.2 Top

Socket for charger and  
for Connection cable to PC  
Infrared transmitter  
Gas inlet



## 3. Function of the MSI VARIOx-2 NO

The internal pump of the MSI VARIOx-2 NO pumps a part of the stack gas to the electrochemical NO sensor. The gas is leaving the NO sensor and escapes from the MSI VARIOx-2 housing by a small hole in the bottom of the housing.

The NO concentration is displayed in ppm or mg/m<sup>3</sup>, it is also possible, to start a printout via the internal IR-transmitter or to send data online to a PC via special RS 232 cable. The MSI software "DERAS" allows it, to show the actual NO concentration on the PCs monitor and to store it in a data base.

## 4. Measuring Step By Step

### 4.1 Preparing the Instrument

First connect the hose of the probe with the gas conditioner. Then connect the gas conditioner with the gas inlet of the MSI VARIOx-2.

Make sure that the filter fleece is in good condition. The filter fleece should not be visibly dirty. Never forget to use the gas conditioner, because particles and liquids will harm pump and Sensor of the MSI VARIOx-2.

Verify that fresh air will be sucked through the probe before switching on.

Switch on the instrument, by pushing the buttons "F" and "S" together for a short while. Now the "Start Mode" (see 4.2) is called.

### 4.2 Start Mode

The Instrument starts with a display check. After about 0.5 seconds the display shows "NO" and then the used measuring unit "PPn" (ppm) or "nG" (mg/m<sup>3</sup>), which has been selected the last time.

With a short push of the "S" key, the next measuring unit may be selected.

The measuring units you may select are:

PPn = concentrations are shown in ppm  
nG = concentrations are shown in mg/m<sup>3</sup>

With pushing the "F" key, the shown measuring unit is accepted and the instrument will skip to "System check" (see 4.3).

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## 4.3 System check

The display shows a count down, which represents the progress of the system check. The system check (including zero point adjustment) lasts 30 seconds.

After the calibration is completed, the instrument will skip to "Measuring Mode" (see 4.4).

## 4.4 Measuring Mode

The display shows the NO concentration (in ppm or mg/m<sup>3</sup>). Put the probe in the stack and fix it by the cone. Change the position of the probe until the tip of the probe is in the middle of the stack.

With a push of the "S" key the actual measured value together with time and date may be send to an IR-printer via IR-data transfer and printed. Make sure that between the IR-transmitter of the MSI VARIOx-2 and the IR-receiver of the printer is intervisibility. During the printing the display reads "Prn".

After the printout is finished the actual NO concentration is displayed again.

With pushing the "F" key you may skip to the "Time and Date Display Mode" (See 4.6).

## 4.5 Stop Measuring

Take the probe out of the stack and let the MSI VARIOx-2 NO suck fresh air for 1 to 2 minutes.

Push the "F" key for more than 3 seconds, the display will read "OFF" and the instrument will become switched off.

Check filter fleece and filter disk and change filters when they are visibly dirty (see 6.1).

To save energy, the MSI VARIOx-2 switches off after 5 minutes of measuring fresh air.

## 4.6 Time and Date Display Mode

If "Time and Date Display Mode" has been called, the actual time is shown like 16:21, the blinking colon shows that the clock is running.

With pushing the "F" key you may skip back to the "Measuring Mode" (see 4.4).

With pushing the "S" key you may adjust date and time.

The display now shows the hour e.g.:

H 16
------

With "S" you may alter the hour adjustment.

With pushing "F" the displayed hour is accepted and the display now shows the minutes:

n :21
-------

With pushing "S" you may alter the minutes adjustment.

With pushing "F" the displayed minutes are accepted and the display shows the year e.g.:

J 07
------

With pushing "S" you may alter the year adjustment.

With pushing "F" the displayed year is accepted and the display shows the month e.g.:

n 03
------

With pushing "S" you may alter the month adjustment.

With pushing "F" the displayed month is accepted and the display now shows the day e.g.:

d 27
------

With pushing "S" you may alter the day adjustment.

With "F" the displayed day is accepted and you skip to "Calibration" (see 4.4).

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## 4.7 Calibration

Has Calibration been called, the display reads "CAL".

After pushing "F" the function "Measuring Mode" (see 4.4) is called.

With pushing "S" the zero point calibration of the sensor is started. Verify that fresh air will be sucked through the probe, before you push "S".

Has the calibration been finished function "Measuring Mode" (see 4.4) is called again.

## 5. Technical Data

Display:	LCD; 4-characters
Ambient temperature:	+5 °C ... +40 °C
Storing temperature:	-20 °C ... +50 °C
Battery:	NI-MH rechargeable battery, 1.2 V, 2000 mAh; ca. 8 h operation time
Charger:	sec. 7.5 V; 0.5 A
Gas sampling:	Membrane pump, Flow about 0.3 l/min
Gas conditioner:	filter fleece and filter disks
Dimensions (HxWxD):	160 mm x 80 mm x 40 mm, without gas conditioner
Weight:	300 g incl. battery

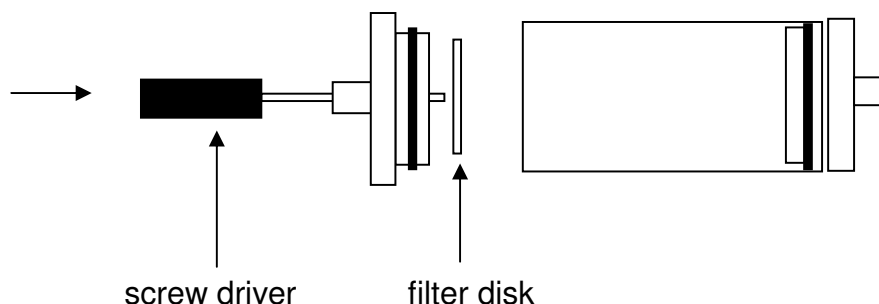
Function	Sensor type	Range	Resolution
NO	Electro chemical sensor	0 ... 2000 ppm	1 ppm

## 6. Maintenance and Service

### 6.1 Maintenance

The gas conditioner has to be checked after each measurement.

The filter disks and filter fleece must be changed if dirty. For changing the filter disks, use a small screw driver or a paper clip etc.



### 6.2 Error messages

If there have been errors detected, they are displayed after the system check.

The MSI VARIOx-2 detects following errors:

Error Code	Fault	Remedy
E1	NO-sensor low	New calibration with fresh air / Service
E2	Electronic failure	Service
OFL	Overflow	Put probe into fresh air
LO BAT	Low battery	Charge battery

### 6.3 Charge Battery

Is LO BAT shown in the upper left corner of the display the Ni-MH battery of the MSI VARIOx-2 has to be charged with a recommended charger (5600747 or 5600753).

Has the charging been missed the MSI VARIOx-2 is switched off automatically.

Is it impossible to switch on the MSI VARIOx-2, caused by undervoltage, the charger must be connected and the switch-on must be repeated!!



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## 6.4 Service

Dräger MSI GmbH recommends service once a year by authorised service people for check and calibration of the instrument.

The electro-chemical NO sensor needs replacement after approximately 4 years. The MSI VARIOx-2 NO checks the sensor during zero calibration.

## 6.5 Accessories

Plug-in charger 230 V	5600747
Universal plug-in charger 100V - 240 V with different plug adapters	5600753
MSI IR3 Printer with IR data transfer	5600401

## 6.6 Probes

probe, aluminium, incl. cone (up to 200 °C)	5600291
probe for auxiliary heaters, PTFE, incl. clip (up to 200 °C)	5600518
probe for auxiliary heaters, copper, incl. clip (up to 250 °C)	5600613
probe, stainless steel (up to 600 °C)	5600608
cone, steel (up to 600 °C) for 5600608	5630131

## 6.7 Consumables

10 x particle filter disks	5600093
10 x filter fleece	5630250
Paper for IR-Printer, 6 pcs.	5690151