T H Y R ⌀ C O N T

Vacuum Instruments

VD84M / VD84MIR

Kompakt-Vakuummeter
Compact-Vacuummeter

Betriebsanleitung
Operating Instructions

Content

1 Safety Instructions

➢ Read and follow the instructions of this manual
➢ Inform yourself regarding hazards, which can be caused by the product or arise in your system
➢ Comly with all safety instructions and regulations for accident prevention
➢ Check regularly that all safety requirements are being complied with
➢ Take account of the ambient conditions when installing your VD84. The protection class is IP 40, which means the unit is protected against penetration of foreign bodies.
➢ Adhere to the applicable regulations and take the neccessary precautions for the process media used
➢ Consider possible reactions between materials and process media
➢ Consider possible reactions of the process media due to the heat generated by the product
➢ Do not carry out any unauthorized conversions or modifications on the unit
➢ Before you start working, find out whether any of the vacuum components are contaminated
➢ Adhere to the relevant regulations and take the neccessary precautions when handling contaminated parts
➢ When returning the unit to us, please enclose a declaration of contamination
➢ Communicate the safety instructions to other users

Piktogram-Definition

Danger of an electric shock when touching

Danger of personal injury

Danger of damage to the unit or system

Important information about the product, it's handling or about a particular part of the documentation, which requires special attention

2 The VD84M

2.1 For Orientation

This operating instructions describe installation and operation of products with article numbers
A VD84M
A VD84MIR (with infrared interface)

The article number can be found on the product's type label. Technical modifications are reserved without prior notification.

2.2 Delivery Content
Included in the delivery consignment are:
- VD84M / VD84MIR
- Pirani sensor VSP521 (A VD84M/1 and A VD84MIR/1) or VSP522 (A VD84M/2 and A VD84MIR/2)
- Protective cover
- Operating instructions

Available Accessories:
- Protective case, AVD8CASE
- External plug-in power supply 12V, AVD8N2
- AlMn block battery 9V, AVD8ALK

Special accessories f. VD84MIR:
- IR-adapter f. PC-interface RS232, AVD8IRA
- Windows-Software VacuGraph, AVGR

2.3 Product Description

The VD84 compact vacuummeter is measuring total pressure in the range 100 - 0.001 mbar.
The unit is operated with an external Pirani sensor and temperature compensated. It can be mounted to suitable flanges, threads or hose connections. When using a suitable battery, the instrument can also be operated completely under vacuum.

With the integrated memory-function it is possible to store and display minimum- and maximum pressure.

Further model VD84MIR with infrared data-interface can
- transmit measurement data directly to a PC (online-transmission) or
- store measurement data in the instrument (datalogging) and via push of a button transmit them to a PC afterwards

Measurement Principle
The VD84 compact-vacuummeter is connected to an external Pirani sensor, which uses the heat conduction of gases for measuring vacuum. In a bridge curcuit the filament is heated to constant temperature, the neccessary bridge voltage is a measure for total gas pressure.

Warm-up-time
Pressure is displayed immediately after the unit is switched on. To take advantage of the maximum accuracy of the unit it can be appropriate to allow for stabilization time of 2 minutes, especially when extreme pressure changes have occured.

Accuracy
The unit is factory adjusted. Through contamination, ageing or extreme climatic conditions the need for readjustment may arise. Accuracy is reduced in the range above 20mbar and below 10^{-2}mbar.
After a new sensor head is connected we recommend to readjust the unit in order to have maximum accuracy.

Dependency on gas type
The Pirani measurement is depending on composition and type of the gas being measured. The unit is adjusted for N_2 and dry air. With He and CO deviations will be almost negligible below 0,5mbar.

Proper Use
The VD84 serves exclusively to provide total pressure measurements in the range 100 – 0.001 mbar. It may only be connected to components specifically provided for such purpose.

Improper Use
The use for purposes not covered above is regarded as improper, in particular:
- the connection to components not allowed for in their operating instructions
- the connection to components containing touchable, voltage carrying parts.

No liability or warranty will be accepted for claims arising from improper use.

The user bears the responsibility with respect to the used process media.

3 Installation

3.1 Notes for Installation

| WARNING |
| ⚠ |

Unauthorized modifications or conversions of the instrument are not allowed!

Installation location: Indoor

For not fully air conditioned open buildings and operation rooms:

Temperature: +5°C ... +50°C
Rel. Humidity: 5 - 85%, not condensing
Air pressure: 860 - 1060 hPa

3.2 Vacuum Connection

| CAUTION |
| ⚠ |

Dirt and damage, especially at the vacuum flange, have an adverse effect on the function of this vacuum component. Please take account of the neccessary instructions with regard to cleanliness and damage prevention when using vacuum components.

- Remove the protective cover (is required again during maintenance work!)
- Make vacuum connection via small flange DN16 ISO KF or 1/8NPT thread
- For flange connection use clamps, that can be opened and closed with appropriate tools only (e.g. strap retainer-tension-ring)
- Use sealing rings with a centering ring.

| WARNING |
| ⚠ |

Overpressure in the vecuum system > 1 bar

Accidental or unintended opening of clamp elements under stress can lead to injuries due to parts flying around!

| WARNING |
| ⚠ |

Overpressure in the vecuum system 1,5 to 4 bar

KF flange connections with elastomer sealings cannot withstand such pressures. Process media thus can leak and possibly damage your health.

3.3 Electrical Connection

The unit must be switched-off. Connect the spiral cable of your VD84 to the socket of the sensor head VSP521 or VSP522.

Battery operation

Before operating the VD84M a suitable battery or rechargable accu must be inserted.
Therefore, pull the battery cover on the back of the unit downwards, connect the battery to the cable plug and close the cover again by pushing it upwards until it snaps into position.

Battery types:
-    9V AlMn block battery type 6LR 61; lifetime max. 40h
-    9V Lithium block battery; lifetime max. 100h
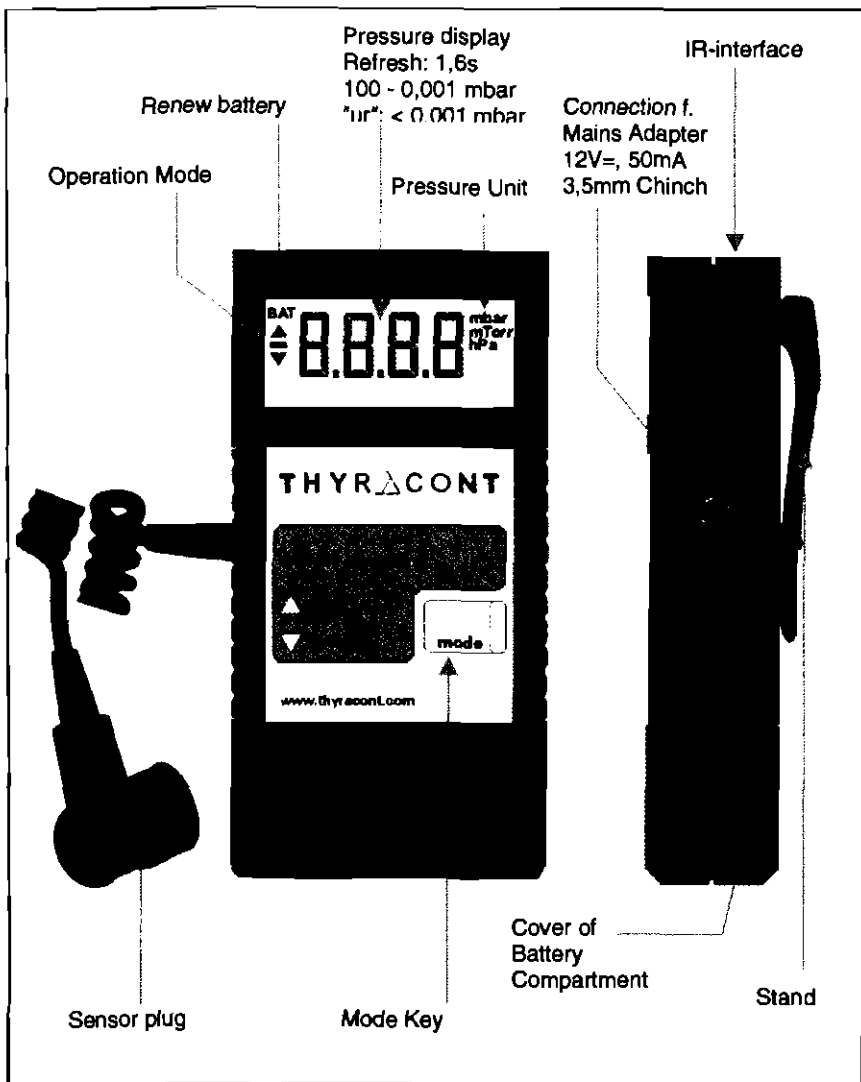
Operation with external mains adapter

Alternatively to battery operation the VD84 can be supplied by an external plug-in mains adapter (12V).

WARNING	
⚠	When using an external mains adapter, there must not be a battery connected inside the instrument. The arising charging current may lead to destruction of the battery and damage your health by leaking battery acid.

4 Operation

4.1 General

Pressure display
Refresh: 1,6s
100 - 0,001 mbar
"ur": < 0.001 mbar

IR-interface

Renew battery

Connection f.
Mains Adapter
12V=, 50mA
3,5mm Chinch

Operation Mode

Pressure Unit

BAT

mbar
mTorr
hPa

THYR△CONT

mode

www.thyracont.com

Cover of
Battery
Compartment

Stand

Sensor plug

Mode Key

4.2 Pressure Display

1) Short-Term Operation (Auto-Off Mode)

Press Mode-Key:

[MODE] → | ▾ B.5 - 3 mbar | The actual pressure is displayed.

After 20 seconds the display is automatically switched off.

2) Continuous Operation (Cont Mode)

Press Mode-Key again within 20 seconds:

[MODE] → | ▴ B.5 - 3 mbar | The actual pressure is displayed.

Model VD84MIR is equipped with a serial infrared-interface. If this data interface is activated -as discribed in chapter configuration -, the instrument transmits one measurement every 1,6 seconds when operating in Cont-Mode.

In Cont-Mode the instrument keeps operating continuously, until It is switched-off manually or, after the maximum operation time has elapsed, automatically. (For adjustment of the maximum operation time see chapter configuration.)

[MODE] →   On further keystroke in Cont Mode the unit returns to
1) Auto Off Mode.
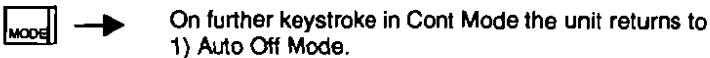
4.3 Pressure Display with Memoryfunction

To operate the VD84 as pressure display with additional storage of extremal values please activate the memory function as described in chapter configuration.
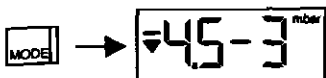
1) Short-Term Operation (Auto-Off Mode)

Press Mode-Key:

[MODE] → | ▾ B.5 - 3 mbar | The actual pressure is displayed.

After 20 seconds the display is automatically switched off.

2) Stored Maximum:

```
[MODE] → ▲69-1 mbar
```
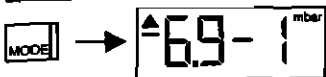
Without further keystroke, return to 1) after 4s.

3) Stored Minimum:

```
[MODE] → ▼45-3 mbar
```

Without further keystroke, return to 1) after 4s.

4) Delete Memory:

```
[MODE] →   cLr
```

On further keystroke the stored Min-/Max-values are deleted (when datalogging is activated simultaneously, the data memory is also deleted).
Without further keystroke, return to 1) after 4s.

5) Memory-Mode:

```
[MODE] → ▲▼85-3 mbar     Actual pressure is displayed.
```

Stored Min-/Max-values are deleted. The instrument is in the Memory-Mode, i.e. new extremal values are detected and stored from now on. (Further, when datalogging is activated simultaneously, measurements are saved according to the chosen logging rate.)

Model VD84MIR is equipped with a serial infrared-interface. If this data interface is activated -as discribed in chapter configuration -, the instrument transmits one measurement every 1,6 seconds when operating in Memory-Mode.

In Memory-Mode the VD84 keeps operating continuously, until it is switched-off manually or, after the maximum operation time has elapsed, aufomatically. (For adjustment of the maximum operation time see chapter configuration.)

To switch-off the VD84:

```
[MODE] →     Press Mode-Key twice: return to 1) Auto Off.
```

4.4 Pressure Display with Datalogging

To operate your VD84MIR as datalogger with internal storage of almost 1000 measurements please activate the logging function as discribed in chapter configuration under "Logging Rate".

1) Short-Term Operation (Auto-Off Mode)

Press Mode-Key:

MODE → ▼8.5-3 mbar

The actual pressure is displayed. After 20 seconds the display is automatically switched off.

2) Delete Memory:

MODE → cLr

On further keystroke the data memory is deleted.
Without further keystroke, return to 1) after 4s.

3) Continuous Mode with Datalogging (Cont Mode)

MODE → ▲8.5-3 mbar   Actual pressure is displayed.

Data memory is deleted and new measurements are stored according to the chosen logging rate. As data memory a battery-independent memory-IC is used.

Model VD84MIR is equipped with a serial infrared-interface. If this data interface is activated -as discribed in chapter configuration -, the instrument transmits one measurement every 1,6 seconds when operating in Cont-Mode.

In Cont-Mode the VD84 keeps operating continuously, until it is switched-off manually or, after the maximum operation time has elapsed, automatically. (For adjustment of the maximum operation time see chapter configuration.) Logging is stopped when no further memory is available or when the unit is switched-off.
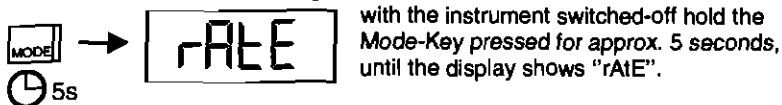
To stop datalogging and switch-off the VD84:

MODE → Press Mode-Key twice: return to 1) Auto Off.

5 Configuration

To switch the VD84 into Configuration-Mode:

[MODE] → | **rAtE** | with the instrument switched-off hold the Mode-Key pressed for approx. 5 seconds, until the display shows "rAtE".
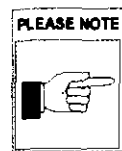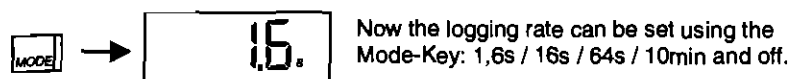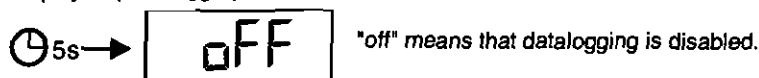
⏱5s

5.1 Logging Rate

To set the logging rate of your VD84MIR, switch the unit into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE":

[MODE] → | **rAtE** |
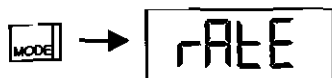
After additional 5s the current rate setting for internal storing of measurements is displayed (Datalogging):

⏱5s → | **oFF** | "off" means that datalogging is disabled.

[MODE] → | **1.6s** | Now the logging rate can be set using the Mode-Key: 1,6s / 16s / 64s / 10min and off.

| PLEASE NOTE |

☞ Attention: a change of the logging rate setting inevitably results in deletion of the data memory. Stored data, which have not been read-out yet, are lost.

Without further keystroke, the unit switches to Auto-Off-Mode after approx. 5 seconds. The last settings are saved.

5.2 Read Out Data-Memory

To read-out measurement data stored in the internal memory of the VD84MIR, switch the unit into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".

Then press Mode-Key several times, until the display shows "PC":

[MODE] → | PC |

After 5 more seconds the display shows

⏲5s → | $PCon$ |
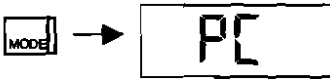
The infrared interface now works in bidirectional transmission mode, i.e. when the unit is connected to a serial PC port you can right now read-out stored data with a suitable PC software.
For this purpose our accessories like the IR-PC-adapter AVD8IRA and our VacuGraph-Software AVGR are available.

[MODE] → By pressing the Mode-Key the transmission mode is canceled. The unit switches into Auto-Off-Mode.

[PLEASE NOTE]

Operation with active IR-interface requires additional power and thus shortens battery lifetime. Therefore please switch off the transmission-mode when it is no longer needed!

5.3 Infrared Interface

The infrared-interface of your VD84MIR can be activated for continuous data transmission to a PC (online-transmission).
For this purpose accessories like our IR-PC-adapter AVD8IRA for connection to a serial PC-Port and our VacuGraph-Software AVGR for saving and plotting measurements are available.
Communication via IR-interface is performed according to Thyracont-interface-protocoll (see separate description).

Interface-Parameters:
9600 Baud, 8 databits / 1 stopbit, no parity
ASCII-Code
Transmission rate: 1/1,6s.

To activate the IR-interface of your VD84MIR for continuous data transmission, switch the unit into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".

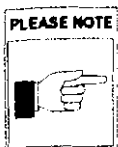Then press Mode-Key several times, until the display shows "Ir":

[MODE] ➜ | **] r** |

After 5 more seconds the display shows the current status of the IR-interface:

🕒5s ➜ | **] oFF** |
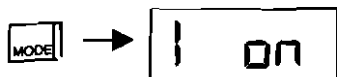
[MODE] ➜ | **] on** | Using the Mode-Key the IR-interface can now be switched on and off.

Without further keystroke, the unit switches to Auto-Off-Mode after approx. 5 seconds. The last settings are saved.

PLEASE NOTE Operation with active IR-interface requires additional power and thus shortens battery lifetime. Therefore please switch off the transmission-mode when it is no longer needed!. For longer operation with active IR-interface we recommend use of an external mains adapter (accessory AVD8N2) instead of a battery.
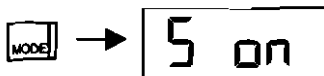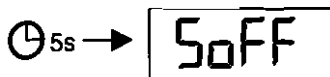
5.4 Memory Function

To activate the memory function of your VD84 for saving minimum and maximum pressure values, switch the unit into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".
Then press Mode-Key several times, until the display shows "Stor":

[MODE] ➜ | **Stor** |
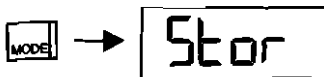
After 5 more seconds the current status of the memory function is displayed:

🕒5s ➜ | **SoFF** |

[MODE] ➜ | **5 on** | With the Mode-Key the memory function can now be enabled or disabled.

Without further keystroke, the unit switches to Auto-Off-Mode after approx. 5 seconds. The last settings are saved.

5.5 Adjustment

The instrument is factory adjusted. Through use under different climatic conditions, through extreme temperature changes, ageing or contamination readjustment can become neccessary.

To adjust your VD84, switch the unit into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".

Then press Mode-Key several times, until the display shows "CAL":

| MODE | → | [R L |

Adjustment on Atmosphere Pressure

After 5 more seconds the display shows:

🕒 5s → | [R L H |

Press Mode-Key for adjustment:

| MODE | → | [R L I | The adjustment procedure takes some seconds: during this time the display shows "CALI".

When the adjustment procedure is finished, the unit switches to Auto-Off-Mode.

PLEASE NOTE

Adjustment on atmosphere pressure is possible only if the actual pressure is above 40 mbar. Otherwise adjustment is denied and the error message "Err" displayed.

Adjustment on Zero Pressure

Switch the unit to Configuration-Mode like discribed above and press Mode-Key several times, until "CAL" is displayed.
After 5 more seconds the display shows:

🕘 5s → | ⌐ᴿᴸ.ᴴ |

After 5 more seconds the display shows:

🕘 5s → | ⌐ᴿᴸᴸ |

[MODE] → | ⌐ᴿᴸⅠ | Press Mode-Key for adjustment. During the adjustment procedure the display shows "CAL!".

When the adjustment procedure is finished, the unit switches to Auto-Off-Mode.

PLEASE NOTE

Adjustment on zero pressure is possible only if the displayed actual pressure is below 4×10^{-2} mbar. Otherwise adjustment is denied and the error message "Err" displayed.
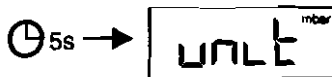
5.6 Pressure Units

To set the displayed pressure unit, switch the VD84 into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".

Then press Mode-Key several times, until the display shows "unit":

[MODE] → | unᴸᵗ |
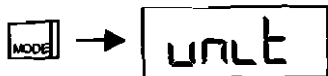
After 5 more seconds the current unit setting is displayed:

🕘 5s → | unᴸᵗ ᵐᵇᵃʳ |
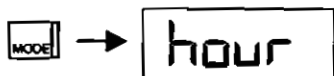
[MODE] → | unᴸᵗ ᵀᵒʳʳ | Using the Mode-Key you can now select "mbar", "Torr" or "hPa".

Without further keystroke, the unit switches to Auto-Off-Mode after approx. 5 seconds. The last settings are saved.

5.7 Maximum Operation Time

When operating continuously in Cont- or Memory-Mode the unit stays switched-on, until a key is pressed or until a selected maximum operation time has elapsed. To set maximum operation time, after which the unit is turned-off automatically in any way, switch the VD84 into Configuration-Mode. For this the instrument must be switched-off. Hold the Mode-Key pressed then, until the display shows "rAtE".

Then press Mode-Key several times, until the display shows "hour":

MODE → | hour |

After 5 more seconds the current setting of maximum operation time is displayed:

⏱ 5s → | cont |
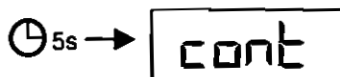
MODE → | 1h | Using the Mode-Key you can now select a timespan from 1h to 24h or cont (no switch-off).

Without further keystroke, the unit switches to Auto-Off-Mode after approx. 5 seconds. The last settings are saved.

6 Maintenance and Service

WARNING

Danger of possibly contaminated parts!
Contaminated parts can cause personal injuries. Inform yourself regarding possible contamination before you start working. Be sure to follow the relevant instructions and take care of neccessary protective measures.

The unit requires no maintainance. External dirt and soiling can be removed by a damp cloth.

Should a defect or damage occur on the VD84, please send the instrument to us for repair.

CAUTION

The unit is not planned for customer repair!

PLEASE NOTE

Malfunction of the unit, which are caused by contamination or break of filament are not covered by warranty.

Battery-Operation
Low battery power is signalized by the "batt"-symbol in the upper left corner of the display. Operation of the unit is still possible.
When the battery is empty the instrument is switched-off. In this case please insert a new battery as discribed in chapter Installation.
Rechargeable accus have to be removed from the unit for charging. For the charging procedure a suitable commercial charger can be used.

Operation with external mains adapter
If an external plug-in mains adapter is used there must not be a battery inside the instrument. A rechargeable accu is supplied with charge conservation (charging current 10mA).

Error messages and malfunction

Problem	Possible Cause	Correction
high measurement error	contamination, ageing, extreme temperature, maladjustment	readjustment
display shows "ur"	pressure under range	(pressure < 10^{-3}mbar)
error message "Err"	adjustment done at wrong pressure	displayed pressure must be >40mbar f. atmosphere adjustment, <4×10^{-2}mbar f. zero adjustment
	measurement error out of adjustment range	exchange sensor head
error message "Err1"	defective sensor	exchange sensor head
	no sensor connected	check sensor connection

7 Technical Data
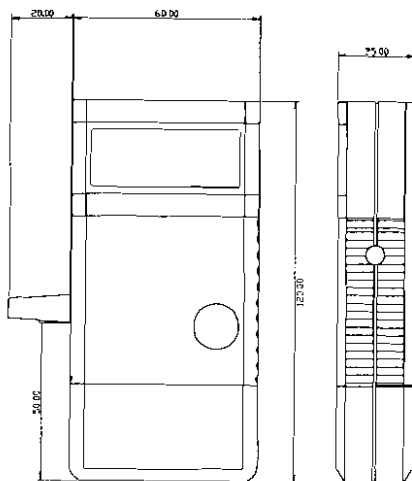
Measurement Principle	heat conductivity, Pirani (gas-type depending)
Measuring Range	100 - 1,0x10^{-3} mbar (75 - 1,0x10^{-3} Torr)
Max. Overload	4 bar abs.
Accuracy	10 - 0,01mbar: < 15 % f.r. (f. reading)
Materials with vacuum contact	stainless steel, tungsten, nickel, glass
Measuring Rate	1,6 s
Setting Time	400ms
Operating Temperature	0...50 °C
Storage Temperature	-20...+60 °C
Power Supply	9V battery (accu) or 12V plug-in-supply (mini-jack, plus pole on top)
Power Consumption	ca. 110mW (clocked) +25mW for active IR-interface
Operation Time	Li-battery: <100h 6LR61Alkaline:<40h
Display	LCD 12mm
Connection	DN16KF with VSP521, 1/8NPT male with VSP522
Dimensions	60 x 120 x 25 mm (without gauge head)
Protection Class	IP 40
Weight	ca. 200g (incl. battery, without gauge head)

Declaration of Conformity

$$C \in$$

Erklärung über die Konformität

Diese Erklärung gilt für folgend bezeichnete Erzeugnisse:

Geräteart: Kompakt - Vakuummeter

Typenbezeichnung: VD84M, VD84M/1, VD84M/2,
                            VD84MIR, VD84MIR/1, VD84MIR/2

Hiermit wird bestätigt, dass die Produkte den wesentlichen Schutzanforderungen
entsprechen, die in den Richtlinien des Rates zur Angleichung der Rechtsvorschriften
der Mitgliedstaaten über die elektromagnetische Verträglichkeit (89/336/EWG) geändert
durch 91/263/EWG, 92/31/EWG, 93/68/EWG sowie 93/97/EWG und der
Niederspannungsrichtlinie 73/23/EWG geändert durch 93/68/EWG festgelegt sind.

Diese Erklärung wird abgegeben durch

Thyracont Elektronic GmbH
Max-Emanuel-Str. 10
94036 Passau
Germany

Zur Beurteilung der Erzeugnisse hinsichtlich elektromagnetischer Verträglichkeit sowie
der Niederspannungsrichtlinie wurden folgende Normen herangezogen:

EN 55 022: 1994 + Änderung: 1997 / A1: 1995 + A2: 1997 Klasse B
EN 50 082-2: 1995
(EN 61 000-4-2: 1995 + A1: 1998, EN 61 000-4-3: 1996 + A1: 1998,
ENV 50 204: 1995, EN 61 000-4-4: 1995, EN 61 000-4-6: 1996)

EN 61 010-1: 1993 + A2: 1995

Passau, 20.09.01

Datum / Ort   rechtsgültige Unterschrift des Inverkehrbringers