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# MIMUX4

**4 channels multiplexer for measuring instruments**

## OPERATING INSTRUCTIONS



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**READ THE SAFETY NOTICES IN APPENDIX C BEFORE USING.**

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## **WARNING**

The information you will find in this document can be modified without notice.

The manufacturer allows no warranty of any kind including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

The manufacturer is responsible neither for mistakes which can appear in this handbook nor for direct or indirect damages arising from the equipment, the performances and the use of this material.

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## PRESENTATION

The MIMUX4 multiplexer for instruments enables the communication between 1 to 4 instruments with a computer or a similar device equipped with an RS232 type interface. So the computer can make the data acquisition from different instruments.

Mitutoyo instruments and Sylvac, Tesa Brown & Sharpe, ... instruments with an "Opto RS duplex" circuit can be connected too.

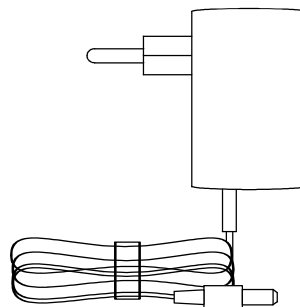
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## WHAT HAS BEEN SUPPLIED

MIMUX4



ELECTRICAL ALIMENTATION MODULE



OPERATING INSTRUCTIONS



|                 |
|-----------------|
| <b>CONTENTS</b> |
|-----------------|

|   |           |
|---|-----------|
| <i>WARNING</i> .....                                | <i>I</i>  |
| <i>PRESENTATION</i> .....                           | <i>II</i> |
| <i>WHAT HAS BEEN SUPPLIED</i> .....                 | <i>II</i> |
| <b>I. <u>STARTING PROCEDURE</u></b>                 |           |
| 1. OPERATION.....                                   | 1         |
| 2. FRONT PANEL .....                                | 2         |
| 3. REAR PANEL .....                                 | 2         |
| <b>II. <u>RS 232 PORT</u></b>                       |           |
| 1. SIGNALS DESCRIPTION AND PINS ALLOCATION .....    | 3         |
| 2. DATA .....                                       | 3         |
| 3. CHECKING MESSAGES ON THE RS 232 PORT .....       | 3         |
| 4. STATUS MESSAGE.....                              | 3         |
| <b>III. <u>COMMANDS THROUGH THE RS 232 PORT</u></b> |           |
| 1. MULTIPLEXED MODE.....                            | 4         |
| A) DIRECT TRANSMISSION OF INSTRUMENTS .....         | 4         |
| B) ACQUISITION REQUEST FROM AN INSTRUMENT .....     | 4         |
| 2. MIMUX ADRESSED MODE .....                        | 5         |
| A) INSTRUMENT SELECTION COMMAND .....               | 5         |
| B) INSTRUMENT READING COMMAND.....                  | 5         |
| C) TRANSMITTED VALUES.....                          | 5         |
| D) ERROR MESSAGES .....                             | 5         |
| E) RETURN TO THE MULTIPLEXED MODE .....             | 6         |
| 3. MULTIMUX ADRESSED MODE .....                     | 6         |
| A) INSTRUMENT SELECTION COMMAND .....               | 7         |
| B) INSTRUMENT READING COMMAND.....                  | 7         |
| C) TRANSMITTED VALUES.....                          | 7         |
| D) ERROR MESSAGES .....                             | 7         |
| <b>IV. <u>TECHNICAL SPECIFICATIONS</u></b>          | 8         |
| <b>V. <u>OPTIONS</u></b>                            | 9         |
| <i>APPENDIX A - CLEANING</i> .....                  | <i>10</i> |
| <i>APPENDIX B - WARRANTY</i> .....                  | <i>11</i> |
| <i>APPENDIX C - SAFETY NOTICES</i> .....            | <i>12</i> |
| <i>APPENDIX A - CLEANING</i> .....                  | <i>11</i> |
| <i>APPENDIX B - WARRANTY</i> .....                  | <i>12</i> |
| <i>APPENDIX C - SAFETY NOTICES</i> .....            | <i>13</i> |

## I. STARTING PROCEDURE

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### *1. OPERATION*

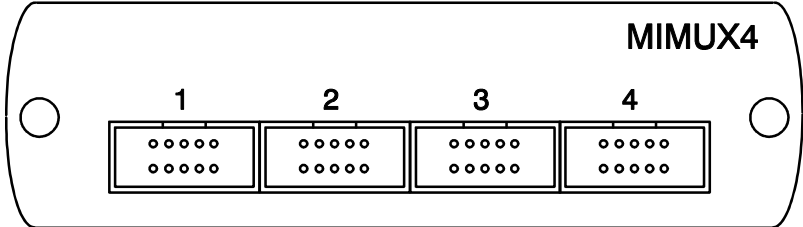
Connect the mains socket adapter, the instruments and the RS 232 linkage cable.

Connect the mains socket adapter on the electric network.

**IMPORTANT:**      **The mains socket adapter connection must be linked to a single-phase electric network shielded with a fuse on all conductors.**

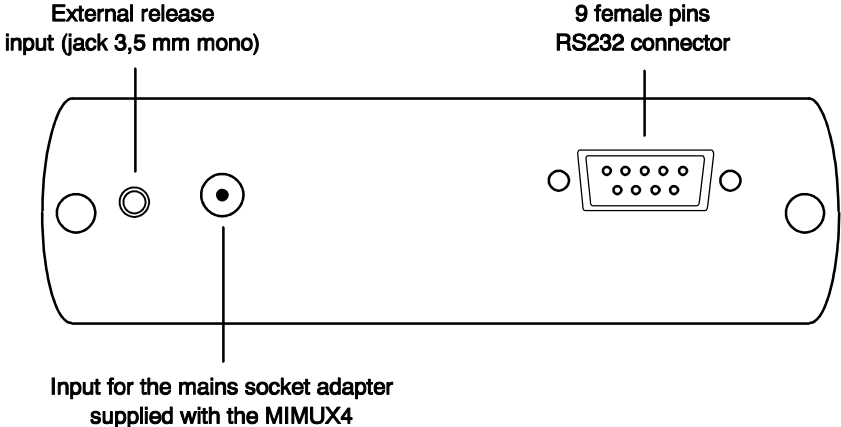
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**2. FRONT PANEL**



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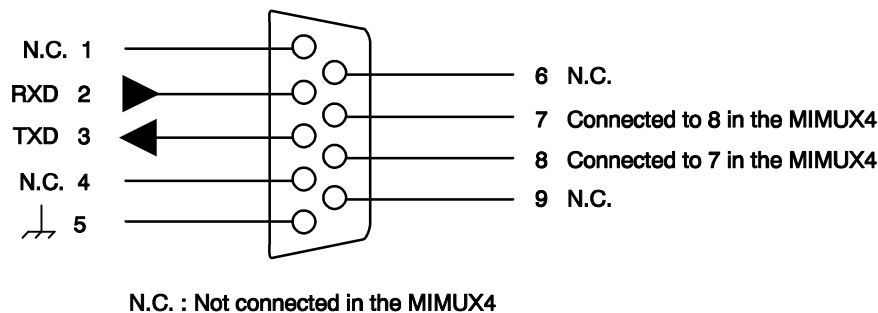
**3. REAR PANEL**



## II. RS 232 PORT

The RS 232 port is fitted with a Sub D 9 female pin connector.

### 1. SIGNALS DESCRIPTION AND PINS ALLOCATION



### 2. DATA

Data are transmitted according to the following format :  
9600 bauds, 8 data bits, no parity, 1 stop bit

### 3. CHECKING MESSAGES ON THE RS 232 PORT

Messages received on the RS232 port are filtered :

- Only the following characters are allowed : @ Esc \* L D N 0 1 2 3 4 ? R T S  $C_R^{L_F}$
- Only the characters 1, 2, 3, 4, @ and Esc are allowed as 1<sup>st</sup> character of a message.
- A message must end with a  $L_F$  character (except interrogations 1,2,3,4 in multiplexed mode).
- Each received character releases a delay time (of 0,07 seconds) ; the next character must arrive before the end of this delay time (so, messages cannot be entered manually) ; a  $L_F$  character cancels this delay time.

If these criteria are not respected, the message being received is cancelled and the reception buffer is dumped.

### 4. STATUS MESSAGE

A special message enables the detection of the multiplexer presence (switched off, wrongly connected or disconnected) and to get its serial number.

Commands : @\*? $C_R^{L_F}$  ou Esc\*? $C_R^{L_F}$

The multiplexer answers with « M4nnnnnnn $\square$ v1.00 $C_R^{L_F}$  » : M4nnnnnnn = serial number on 9 characters,  $\square$  = space, v1.0x = programm version on 5 characters.

### III. COMMANDS THROUGH THE RS 232 PORT

The MIMUX4 multiplexer can operate according to three different modes:

- the multiplexed mode
- the "MIMUX" addressed mode (used on MIMUX8 also)
- the "MULTIMUX" addressed mode.

These 2 modes ("MIMUX" and "MULTIMUX" addressed modes) have the same operation procedure. Only the structure of the received and sent messages is different. These 2 modes ensure a total compatibility with our other multiplexers : MIMUX8, MUX8 and MULTIMUX.

#### 1. MULTIPLEXED MODE

This mode is automatically selected when switching on.

##### A) DIRECT TRANSMISSION OF INSTRUMENTS

The MIMUX4 scans continuously channels 1 to 4 and transmits the value of an instrument (MIMUX8 format) as soon as the operator uses the "transfer" key of this instrument. Values are transmitted according to the following format :

$$N_{xy} : \pm 0000.00uu^{C_R L_F}$$

- $N_{xy}$  gives the instrument number from N01 to N04
- $:$  is a tolerance indicator and can have the following values (depending on the instrument) :
  - $:$  it is the general case, no tolerance indication
  - $=$  shows a dimension within the tolerances
  - $>$  shows a dimension out of the maximum tolerance
  - $<$  shows a dimension out of the minimum tolerance
- $\pm$  + ou - sign
- **0000.00** shows the read value (decimal point position depending on the number of decimales transmitted by the instrument)
- **uu** corresponds to the unit (when transmitted by the instrument)
- $C_R L_F$   $C_R$  (ASCII 0D) +  $L_F$  (ASCII 0A) end the transmission

*For example :* value -1.25 on channel 2 can be transmitted as follows :  
N02:-001.250  $C_R L_F$

##### B) ACQUISITION REQUEST FROM AN INSTRUMENT (Type MUX50 MITUTOYO MODE)

Commands '1' to '4' (ASCII characters 31h to 34h, without  $C_R L_F$ ) received on the MIMUX4 RS 232 port release reading and then values transmission (MIMUX8 format) of instruments 1 to 4.

---

## 2. MIMUX ADRESSED MODE

As soon as a correct addressing instruction is received on the RS232 port, the multiplexer selects the corresponding instrument input. Then it is working in *MIMUX addressed mode*.

### A) INSTRUMENT SELECTION COMMAND

This command is setting up the connection to an instrument. This connection will remain valid until reception of a new configuration. The MIMUX4 does not answer this command.

#### Command format:

| Character   | @ or Esc | N  | x        | y        | CR | LF |
|-------------|----------|----|----------|----------|----|----|
| Decimal     | 64 or 27 | 78 | 48 or 49 | 49 to 52 | 13 | 10 |
| Hexadecimal | 40 or 1B | 4E | 30       | 31 to 34 | 0D | 0A |

x and y characters represent the selected input number, that is to say 01 to 04.

---

### B) INSTRUMENT READING COMMAND

It causes the selected instrument reading, then the value transmission on the RS232 port.

#### Command format:

| Character   | @ or Esc | L  | CR | LF |
|-------------|----------|----|----|----|
| Decimal     | 64 or 27 | 76 | 13 | 10 |
| Hexadecimal | 40 or 1B | 4C | 0D | 0A |

When an instrument has been selected, its value transmission can be released also through the external release input (foot switch) or through the instrument "transfer" key.

---

### C) TRANSMITTED VALUES

Values are transmitted according to the following format :

$$Nxy: \pm 0000.00uu^{C_R L_F}$$

- **Nxy** gives the instrument number from N01 to N04
- **:** is a tolerance indicator and can have the following values (depending on the instrument) :
  - :** it is the general case, no tolerance indication
  - =** shows a dimension within the tolerances
  - >** shows a dimension out of the maximum tolerance
  - <** shows a dimension out of the minimum tolerance
- **±** + ou - sign
- **0000.00** shows the read value (decimal point position depending on the number of decimales transmitted by the instrument)
- **uu** corresponds to the unit (when transmitted by the instrument)
- **<sup>C<sub>R</sub></sup><sub>R</sub><sup>L<sub>F</sub></sup>** <sup>C<sub>R</sub></sup> (ASCII 0D) + <sup>L<sub>F</sub></sup> (ASCII 0A) end the transmission

*For example :* value -1.25 on channel 2 can be transmitted as follows :  
N02:-001.250<sup>C<sub>R</sub></sup><sup>L<sub>F</sub></sup>

---

#### D) MESSAGES D'ERREUR

When a reading is requested on an input which is not connected to an instrument or when this instrument is not switched on, an error message is transmitted according to the following format :

**Vx:Ex**  $C_{R^L}^L F$

"Ex" represents the error code :

- "E1" = communication with instrument error.
- "E3" = instrument reading error.

---

#### E) RETURN TO THE MULTIPLEXED MODE

This command sets the multiplexer MIMUX4 in multiplexed mode again (as it was when switching on).

The MIMUX4 does not answer this command.

Commands :  $@R_{R^L}^L F$  ou  $EscR_{R^L}^L F$  ou  $@*R_{R^L}^L F$  ou  $Esc*R_{R^L}^L F$

---

### 3. MULTIMUX ADRESSED MODE

As soon as a correct addressing instruction is received on the RS232 port, the multiplexer selects the corresponding instrument input. Then it is working in *MULTIMUX addressed mode*.

#### A) INSTRUMENT SELECTION COMMAND

This command is setting up the connection to an instrument. This connection will remain valid until reception of a new configuration. The MIMUX4 does not answer this command.

**Command format :**

| Character   | @ or Esc | *  | N  | x        | CR | LF |
|-------------|----------|----|----|----------|----|----|
| Decimal     | 64 or 27 | 42 | 78 | 49 to 52 | 13 | 10 |
| Hexadecimal | 40 or 1B | 2A | 4E | 31 to 34 | 0D | 0A |

x and y characters represent the selected input number, that is to say 01 to 04.

#### B) INSTRUMENT READING COMMAND

It causes the selected instrument reading, then the value transmission on the RS232 port.

**Command format :**

| Character   | @ or Esc | *  | L  | D  | CR | LF |
|-------------|----------|----|----|----|----|----|
| Decimal     | 64 or 27 | 42 | 76 | 68 | 13 | 10 |
| Hexadecimal | 40 or 1B | 2A | 4C | 44 | 0D | 0A |

When an instrument has been selected, its value transmission can be released also through the external release input (foot switch) or through the instrument "transfer" key.

#### C) TRANSMITTED VALUES

Values are transmitted according to the following format :

**Vx:□uuuu□ttt□seeeee.dddddd<sup>C<sub>R</sub></sup><sup>L<sub>F</sub></sup>**

- x gives the instrument number.
- □ space
- uuuu unit : mm, inch, IN, rps, m/s, ... (□□□□ when unit not transmitted)
- ttt tolerance : GO□, +NG, -NG, ABS, REL, MIN, MAX, ... or □□□
- s read value sign
- eeeee 5 digits : whole part preceded by 0s when necessary
- . décimal point
- dddddd 6 digits : decimal part followed by 0s when necessary
- <sup>C<sub>R</sub></sup><sup>L<sub>F</sub></sup> <sup>C<sub>R</sub></sup> (ASCII 0D) + <sup>L<sub>F</sub></sup> (ASCII 0A) end the transmission

*For example :* value -1.25 mm on channel 2 will be transmitted as follows  
 V2:□mm□□□□□□-00001.250000<sup>C<sub>R</sub></sup><sup>L<sub>F</sub></sup>

---

**D) ERROR MESSAGES**


When a reading is requested on an input which is not connected to an instrument or when this instrument is not switched on, an error message is transmitted according to the following format :



$$\mathbf{Vx:Ex}^{\mathbf{C_R^L F}}$$

"Ex" represents the error code :

- "E1" = communication with instrument error.
  - "E3" = instrument reading error.
-

#### IV. TECHNICAL SPECIFICATIONS

| <b>MIMUX4</b>                     |   |
|-----------------------------------|---|
| Dimensions L x D x H              | 106 x 65 x 35 mm  |
| Weight                            | 0,150 kg  |
| Material                          | Aluminium   |
| Operating temperature             | 0° C to + 45° C   |
| Storage temperature               | - 40° C to + 70° C  |
| Permissible relative humidity     | 80%   |
| Not permissible relative humidity | 80%   |
| Protection                        | IP 42   |
| Inputs - Outputs                  | <ul style="list-style-type: none"> <li>• 4 inputs for MITUTOYO format or Opto RS instruments (1200 or 4800 bauds SYLVAC, TESA, ... type)</li> <li>• 1 external release input (Jack 3,5 mono)</li> </ul> |
| Low voltage supply                | 7,5V  through external mains adapter   |
| Power consumption                 | 50 mA maxi (all inputs connected)   |

| <b>AL.0030.075.1S COMATEC AC/DC SECTOR ADAPTER</b> |  |
|--|--|
| Mains voltage                                      | 230V ± 10%   |
| Frequency  |  50 Hz      |
| Output   | 7,5V  300Ma |

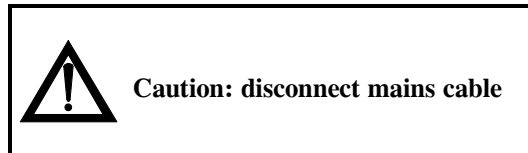
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## V. OPTIONS

- **SERIAL LINKAGE CABLE - P/N CA09RS09**  
For RS 232 linkage with a P.C. - 9 pin socket.
  - **SERIAL LINKAGE CABLE - P/N CA09RS25**  
For RS 232 linkage with a P.C. - 25 pin socket.
  - **CABLE BETWEEN OPTO RS 232 INSTRUMENT AND MIMUX4 - P/N : M4-OPTO**
  - **FOOT SWITCH FOR VALUES TRANSFER - P/N: PEMX4OOE**
-

## APPENDIX A

### CLEANING



Use a soft cotton cloth slightly soaked with an ethyl alcohol based product.

**DO NOT USE** the following products: acetone, benzene, toluene and halogens hydrocarbons.

## **APPENDIX B**

### **ONE YEAR LIMITED WARRANTY ON MIMUX4 PARTS**

#### **MANUFACTURERS RESPONSABILITY**

**MIMUX4 - PRODUCTS HARDWARE AND LABOUR PARTS.** For a period of one year from the effective warranty date, the manufacturer will pay for service labour and replacement parts. Replacement parts may be new or remanufactured at the option of the manufacturer and are warranted for the remaining portion of the original warranty period.

**FIRST END-USER COVERAGE.** This warranty applies only to the first end-user of the product and is not assignable to any other subsequent purchaser or user.

**NOT COVERED.** Any accessory or expansion item not included in the original factory packaging for the product is not covered.

Costs of installation or adjustment or damage resulting from causes beyond the control of the manufacturer, including acts of God, misuse, neglect, accident damage occurring in shipment or from improper installation, operation or application; or damage resulting from use of products, components, accessories or expansion items not supplied by the manufacturer are not covered. It also does not cover products which have been altered in any way without the written approval of the manufacturer including electrical or mechanical alteration, removal of serial numbers or the manufacturer trademarks or other identification.

**THE SOLE REMEDY UNDER THIS WARRANTY SHALL BE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS AS PROVIDED ABOVE. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE IN ANY WAY TO THE USER FOR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO, ANY LOSS OF DATA, BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY.**

**THE PRESENT WRITTEN WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ALL WARRANTIES ARE EXPRESSLY EXCLUDED AND NEGATED.**



#### **OWNERS RESPONSIBILITY**

**OPERATING MANUAL AND OTHER DOCUMENTATION.** Read your operating manual and other documentation carefully so that you will understand the operation of your products. It may be possible to avoid unnecessary service work which may not be covered by this warranty.

**AFTER SALES SERVICE.** If the product is defective, take it to an authorized dealer.

## APPENDIX C

### SAFETY NOTICES

|   |   |  |
|---|---|--|
|  |  | <p><b>Caution:</b> To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.</p> |
|---|---|--|

The mains adapter (electric power supply module) cannot be repaired.  
When defective, it should be thrown or sent back to the distributor.

**CE:** This device meets the EN 61010-1 safety standards and the electromagnetic compatibility EN55011 class A, ENV 50140 Criterium A, ENV 50141 Criterium A, ENV 50204 Criterium A, EN 61000-4-2 Criterium B, EN 61000-4-4 Criterium B.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.