

# Panel Meters and Controllers

## Modular Panel Meter

### Type EDM 35

CARLO GAVAZZI



- Modular digital panel meter, 3 1/2-digit
- Indicating or controlling current, voltage, resistance, temperature, tacho or frequency.
- Easy programming
- Programmable hysteresis and time delay (up to 2 setpoints)
- Data hold
- Peak/valley function
- Password protection of programming parameters
- Stock-saving - several ranges on each input module
- IP 65 (front)
- Optional hardware lock of programming
- Optional high-efficiency red or green display

## Product Description

The EDM 35 is a 3 1/2-digit, modular digital panel meter where input and output modules can be combined to suit many applications. Scaling and setpoints are fully programmable and the program-

ming itself is very user-friendly. Furthermore, the EDM 35 includes peak/valley function and password protection. The housing is easy to mount and ensures a protection degree of IP 65.

## Ordering Key

**EDM35V1D41XXXY**

- Model \_\_\_\_\_
- Range code \_\_\_\_\_
- Power supply \_\_\_\_\_
- Relay output \_\_\_\_\_
- Signal output \_\_\_\_\_
- Options \_\_\_\_\_

## Type Selection

### Range DC Voltmeters:

**V1D:** -199.9 to +199.9 mV  
**V2D:** -1.999 to +1.999 V  
**V3D:** -19.99 to +19.99 V  
**V4D:** -199.9 to +199.9 V  
**V5D:** -600 to +600 V \*

### Range AC Voltmeters:

**V1A:** 0 to 199.9 mV  
**V2A:** 0 to 1.999 V  
**V3A:** 0 to 19.99 V  
**V4A:** 0 to 199.9 V  
**V5A:** 0 to 600 V \*

### Range Ohmmeters:

**R1D:** 0 to 199.9  $\Omega$   
**R2D:** 0 to 1.999 k $\Omega$   
**R3D:** 0 to 19.99 k $\Omega$   
**R4D:** 0 to 199.9 k $\Omega$

### Range DC Ammeters:

**A1D:** -199.9 to +199.9  $\mu$ A  
**A2D:** -1.999 to +1.999 mA  
**A3D:** -19.99 to +19.99 mA  
**A4D:** -199.9 to +199.9 mA  
**A5D:** -1999 to +1999 mA  
**A6D:** -5.00 to +5.00 A  
**A7D:** -10.00 to +10.00 A

\* Nominal voltage according to EN 60664-1.  
 The measuring range includes 15% tolerance equal to 690 V.

### Range AC Ammeters:

**A1A:** 0 to 199.9  $\mu$ A  
**A2A:** 0 to 1.999 mA  
**A3A:** 0 to 19.99 mA  
**A4A:** 0 to 199.9 mA  
**A5A:** 0 to 1999 mA  
**A6A:** 0 to 5.00 A  
**A7A:** 0 to 10.00 A

### Range Thermometers:

**Pt 100:**  
**P1C:** -100.0 to 199.9°C  
**P2C:** -100 to 850°C  
**P1F:** -148.0 to 199.9°F  
**P2F:** -148 to 392°F  
**P3F:** -148 to 1562°F

### Thermocouple Type J:

**-JC:** -100 to 760°C  
**-JF:** -148 to 1400°F

### Thermocouple Type K:

**-KC:** -100 to 1250°C  
**-KF:** -148 to 1999°F

### Signal Output:

**X:** None  
**1:** 4 to 20 mA  
**2:** 0 to 20 mA  
**4:** 0 to 10 V  
**5:** 12VDC excitation output  
**6:** 24VDC excitation output

### Options:

**XXY:** None  
**CXY:** High eff. red display  
**DXY:** Green display  
**XPY:** Program lock  
**01Y-99Y:** Special options (assigned by factory)

### Relay Output:

**0:** None  
**1:** 1 Relay  
**2:** 2 Relays

### Power Supply:

**3:** 12 to 48 VDC  
**4:** 230 VAC  
**5:** 115 VAC  
**6:** 48 VAC  
**7:** 24 VAC

### Range Frequency Meters:

**F1X\*:** 5.0 to 199.9 Hz  
**F2X\*:** 10.0 to 1999 Hz

\* Replace X with:  
**A** for Namur input  
**B** for NPN, PNP & Contact input  
**C** 600 VAC input

## Type Selection (cont.)

### Range Tachometers:

|               |                             |
|---------------|-----------------------------|
| <b>T1X*</b> : | 8.0 to 199.9 rpm @30 ppr**  |
| <b>T2X*</b> : | 5.0 to 199.9 rpm @60 ppr**  |
| <b>T3X*</b> : | 2.0 to 199.9 rpm @100 ppr** |
| <b>T4X*</b> : | 20 to 1999 rpm @30 ppr**    |
| <b>T5X*</b> : | 10 to 1999 rpm @60 ppr**    |
| <b>T6X*</b> : | 10 to 1999 rpm @100 ppr**   |

- \* Replace X with:  
 A for Namur input  
 B for NPN, PNP & Contact input
- \*\* pulses per revolution

## Input Specifications - General

|                     |                                                                             |
|---------------------|-----------------------------------------------------------------------------|
| <b>Power supply</b> | Input modules supplied by main unit                                         |
| <b>EMC</b>          | Electromagnetic compatibility<br>Acc. to IEC 60801-4<br>Acc. to IEC 60801-5 |
| Immunity            |                                                                             |

## Supply Specifications

|                                 |                                                                                |
|---------------------------------|--------------------------------------------------------------------------------|
| <b>Power supply AC</b>          | Overvoltage cat. III (IEC 60664)                                               |
| Rated operational voltage       | 230 VAC $\pm$ 10%<br>115 VAC $\pm$ 10%<br>48 VAC $\pm$ 10%<br>24 VAC $\pm$ 10% |
| Frequency                       | 50/60 Hz $\pm$ 5Hz                                                             |
| Voltage interruption            | $\leq$ 20 ms                                                                   |
| Rated insulation voltage        | 250 VAC basic rms                                                              |
| Rated impulse withstand voltage | 6 kV (1.2/50 $\mu$ s) IEC 60664-1                                              |
| <b>Power supply DC</b>          |                                                                                |
| Rated operational voltage       | 12 to 48 VDC $\pm$ 15%                                                         |
| Voltage interruption            | $\leq$ 10 ms (voltage = 10 VDC)                                                |
| Rated insulation voltage        | 150 VDC basic                                                                  |
| Rated impulse withstand voltage | 4.0 kV (1.2/50 $\mu$ s) IEC 60664-1                                            |
| <b>Rated operational power</b>  | < 7 VA                                                                         |
| <b>EMC</b>                      | Electromagnetic compatibility<br>Acc. to IEC 60801-4<br>Acc. to IEC 60801-5    |
| Immunity                        |                                                                                |

## Separate Ordering Numbers

| Main unit<br>(mechanical parts included) | Ordering number |                          |
|------------------------------------------|-----------------|--------------------------|
| Red display (standard red)               | 5100711         |                          |
| Red display (high-bright red)            | 5100712         |                          |
| Green display                            | 5100710         |                          |
| <b>Input modules</b>                     |                 | <b>With Program Lock</b> |
| VDC                                      | 5100530         | 5100630                  |
| VAC                                      | 5100531         | 5100631                  |
| ADC                                      | 5100532         | 5100632                  |
| AAC                                      | 5100533         | 5100633                  |
| AAC/ADC 10 A                             | 5100534         | 5100634                  |
| Ohm                                      | 5100535         | 5100635                  |
| Pt 100                                   | 5100536         | 5100636                  |
| Pt 100 850°C                             | 5100539         | 5100639                  |
| Thermocouple Type J                      | 5100537         | 5100637                  |
| Thermocouple Type K                      | 5100538         | 5100638                  |
| Tachometer                               | 5100540         | 5100640                  |
| Frequency meter                          | 5100541         | 5100641                  |
| <b>Output modules</b>                    |                 |                          |
| 1 Relay                                  | 5100561         |                          |
| 2 Relays                                 | 5100562         |                          |
| Analog output                            | 5100560         |                          |
| 12/24 VDC excitation output              | 5100526         |                          |
| <b>Power supply modules</b>              |                 |                          |
| 12 to 48 VDC                             | 5100524         |                          |
| 24 VAC                                   | 5100523         |                          |
| 48 VAC                                   | 5100522         |                          |
| 115 VAC                                  | 5100521         |                          |
| 230 VAC                                  | 5100520         |                          |

## General Specifications

|                          |                                                                              |
|--------------------------|------------------------------------------------------------------------------|
| <b>Display</b>           | 7-segment LED,<br>height 14.2 mm<br>2 LEDs for indication of relay ON        |
| Min./Max. indication     | -1999/1999                                                                   |
| Overrange indication     | EE (underrange: -EE)                                                         |
| Accuracy                 | See module specifications                                                    |
| Temperature drift        | See module specifications                                                    |
| Scaling                  |                                                                              |
| Electrical input range   | Progr. within whole range                                                    |
| Display range            | Progr. within whole range                                                    |
| Decimal point position   | Programmable                                                                 |
| <b>Module connection</b> | Screw terminals                                                              |
| <b>Environment</b>       |                                                                              |
| Degree of protection     | IP 65 (front)<br>IP 20 (behind panel)                                        |
| Operating temperature    | 0° to +50°C. R.H. < 90%<br>non-condensing                                    |
| Storage temperature      | -10° to +60°C. R.H. < 90%<br>non-condensing                                  |
| <b>Weight</b>            | Approx. 350 g<br>depends on modules used                                     |
| <b>Housing</b>           |                                                                              |
| Dimensions               | 48 x 96 x 89 mm                                                              |
| Housing material         | ABS/Polycarbonate blend                                                      |
| Front material           | Polycarbonate                                                                |
| Colour                   | Black housing<br>Red front with red display<br>Grey front with green display |
| <b>Approvals</b>         | CE, CSA, UL                                                                  |

## Input Specifications - Modules

### Voltmeters - AC/DC (5100531/5100530, 5100631/5100630)

| Measuring ranges | Jumper position | Range code |    | Resolution | Input imped. |
|------------------|-----------------|------------|----|------------|--------------|
|                  |                 | AC         | DC |            |              |
| 199.9 mV         | 1 - 4           | 7          | 1  | 0.1 mV     | 100 kΩ       |
| 1.999 V          | 2 - 5           | 8          | 2  | 1 mV       | 100 kΩ       |
| 19.99 V          | 2 - 5           | 9          | 3  | 10 mV      | 1 MΩ         |
| 199.9 V          | 3 - 6           | 10         | 4  | 0.1 V      | 1 MΩ         |
| 600 V *          | 5 - 6           | 12         | 6  | 1 V        | 1 MΩ         |

\* Nominal voltage according to IEC 664-1. The measuring range includes 15% tolerance equal to 690 V.

#### Accuracy

AC voltmeter  
DC voltmeter

0.3% rdg ±3 dgt  
0.2% rdg ±2 dgt

#### Temperature drift

AC voltmeter  
DC voltmeter

±150 ppm/°C ±0.2 dgt/°C  
±100 ppm/°C ±0.05 dgt/°C

### Ammeters - AC/DC(5100533/5100532/ 5100534, 5100633/5100632/5100634)

| Measuring ranges | Jumper position | Range code |    | Resolution |
|------------------|-----------------|------------|----|------------|
|                  |                 | AC         | DC |            |
| 199.9 μA         | 1 - 2           | 7          | 1  | 0.1 μA     |
| 1.999 mA         | 2 - 3           | 8          | 2  | 1 μA       |
| 19.99 mA         | 4 - 5           | 9          | 3  | 10 μA      |
| 199.9 mA         | 5 - 6           | 10         | 4  | 0.1 mA     |
| 1999 mA          | 2 - 5           | 11         | 5  | 1 mA       |
| 5.00 A           | 2 - 5           | 12         | 6  | 10 mA      |
| 10 AAC           | 2 - 3           | 12         | -  | 10 mA      |
| 10 ADC           | 1 - 2           | -          | 6  | 10 mA      |

#### Accuracy

AC ammeter  
AC ammeter (10 A)  
DC ammeter  
DC ammeter (10 A)

0.3% rdg ±3 dgt  
0.5% rdg ±5 dgt  
0.2 % rdg ±2 dgt  
0.5% rdg ±5 dgt

#### Temperature drift

AC ammeter  
AC ammeter (2 A, 5 A)  
AC ammeter (10 A)  
DC ammeter  
DC ammeter (2 A, 5 A)  
DC ammeter (10 A)

±150 ppm/°C ±0.5 dgt/°C  
±200 ppm/°C ±0.1 dgt/°C  
±200 ppm/°C ±0.5 dgt/°C  
±100 ppm/°C ±0.05 dgt/°C  
±200 ppm/°C ±0.5 dgt/°C  
±200 ppm/°C ±0.5 dgt/°C

#### Voltage drop

< 200 mV (all ranges)

### Thermometers (5100536/5100537/5100538, 5100539/5100636/5100637/5100638/5100639)

| Range                       | Resolution | Accuracy                  | Temperature drift            |
|-----------------------------|------------|---------------------------|------------------------------|
| <b>Pt 100:</b>              |            |                           |                              |
| -100.0 to 199.9°C           | 0.1°C      | ± 0.2% rdg<br>± 2 dgt     | ±150 ppm/°C<br>± 0.05 dgt/°C |
| -148.0 to 199.9°F           | 0.2°F      | ± 0.2% rdg<br>± 4 dgt     | ±180 ppm/°F<br>-148 to 392°F |
| 1°F                         |            | ± 0.2% rdg<br>± 4 dgt     | ±180 ppm/°F                  |
| <b>Pt100, 850°C:</b>        |            |                           |                              |
| -100 to 850°C               | 1°C        | ± 0.2% rdg<br>± 3 dgt     | ±150 ppm/°C<br>± 0.05 dgt/°C |
| -148 to 1562°F              | 2°F        | ± 0.4% rdg<br>± 6 dgt     | ±180 ppm/°F<br>± 0.1 dgt/°F  |
| <b>Thermocouple type J:</b> |            |                           |                              |
| -100 to 760°C               | 1°C        | ± 0.1% rdg<br>± 4 dgt     | ±100 ppm/°C<br>± 0.05 dgt/°C |
| -148 to 1400°F              | 1°F        | ± 0.1% rdg<br>± 8 dgt     | ±180 ppm/°F<br>± 0.1 dgt/°F  |
| <b>Thermocouple type K:</b> |            |                           |                              |
| -100 to 1250°C              | 1°C        | ± 3% rdg<br>± 3 dgt       | ±100 ppm/°C<br>± 0.05 dgt/°C |
| -100 to -50°C               | 1°C        | ± 1% rdg<br>+ 5/-1 dgt    | ±100 ppm/°C<br>± 0.05 dgt/°C |
| -50 to 780°C                | 1°C        | ± 0.1% rdg<br>± 3 dgt     | ±100 ppm/°C<br>± 0.05 dgt/°C |
| 780 to 1250°C               | 1°C        | ± 0.25% rdg<br>+ 1/-3 dgt | ±100 ppm/°C<br>± 0.05 dgt/°C |
| -148 to 1999°F              | 2°F        | ± 3% rdg<br>± 6 dgt       | ±180 ppm/°F<br>-148 to -58°F |
| 2°F                         |            | ± 1% rdg<br>± 1 dgt       | + 10/-<br>-58 to 1436°F      |
| 2 dgt                       |            | ± 0.1 dgt/°F              | ±180 ppm/°F                  |
| 2°F                         |            | ± 0.1% rdg<br>± 6 dgt     | ±180 ppm/°F<br>1436 to       |
| 1999°F                      |            | ± 0.25% rdg<br>+2/-6 dgt  | ±180 ppm/°F                  |

### Ohmmeters (5100535, 5100635)

| Measuring ranges | Jumper position | Range-code | Resolution |
|------------------|-----------------|------------|------------|
| 199.9 Ω          | 1 - 4           | 7          | 0.1 Ω      |
| 1.999 kΩ         | 2 - 5           | 8          | 1 Ω        |
| 19.99 kΩ         | 3 - 6           | 9          | 0.01 kΩ    |
| 199.9 kΩ         | 1 - 2           | 10         | 0.1 kΩ     |

#### Accuracy

0.2% rdg ±2 dgt

#### Temperature drift

±150 ppm/°C ±0.1 dgt/°C

## Input Specifications - Modules (cont.)

### Tachometers (5100540, 5100640)

| Measuring ranges    | Jumper position | Range code | Resolution |
|---------------------|-----------------|------------|------------|
| 199.9 rpm @30 ppr*  | J4, 1-2         | 7          | 0.1 RPM    |
| 199.9 rpm @60 ppr*  | J5, 1-2         | 8          | 0.1 RPM    |
| 199.9 rpm @100 ppr* | J6, 1-2         | 9          | 0.1 RPM    |
| 1999 rpm @30 ppr*   | J4, 2-3         | 10         | 1 RPM      |
| 1999 rpm @60 ppr*   | J5, 2-3         | 11         | 1 RPM      |
| 1999 rpm @100 ppr*  | J6, 2-3         | 12         | 1 RPM      |

\* pulses per revolution

|                                                         |               |
|---------------------------------------------------------|---------------|
| <b>Input selection</b><br>Namur<br>NPN, PNP, Contact    | J1<br>J2      |
| <b>Accuracy</b>                                         | 1% rdg ±5 dgt |
| <b>Temperature drift</b>                                | ± 200 ppm/°C  |
| <b>Input impedance</b><br>Namur<br>NPN, PNP and Contact | 1 kΩ<br>5 kΩ  |
| <b>Time constant (tc)</b>                               | 1 sec.        |

### Frequency Meters (5100541, 5100641)

| Measuring ranges | Jumper position | Range code | Resolution |
|------------------|-----------------|------------|------------|
| 199.9 Hz         | J7              | 7          | 0.1 Hz     |
| 1999 Hz          | J8              | 8          | 1 Hz       |

|                                                                    |                                  |
|--------------------------------------------------------------------|----------------------------------|
| <b>Input selection</b><br>Namur<br>NPN, PNP, Contact<br>600 VAC    | J1, J4 and J6<br>J2 and J5<br>J3 |
| <b>Accuracy</b>                                                    | 1% rdg ±5 dgt                    |
| <b>Temperature drift</b>                                           | ± 200 ppm/°C                     |
| <b>Input impedance</b><br>Namur<br>NPN, PNP and Contact<br>600 VAC | 1 kΩ<br>5 kΩ<br>600 kΩ           |
| <b>Time constant (tc)</b>                                          | 1 sec.                           |

## Output Specifications

### Excitation output (5100526)

|                                                                             |                                                                             |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Power supply</b>                                                         | Supplied by main unit                                                       |
| <b>Output voltage</b><br>12 VDC: jumper position<br>24 VDC: jumper position | 3 - 6, tolerance ±20%<br>1 - 4, tolerance ±20%                              |
| <b>Output current</b><br>12 VDC<br>24 VDC                                   | ≤ 35 mA DC<br>≤ 20 mA DC                                                    |
| <b>EMC</b><br><br>Immunity                                                  | Electromagnetic compatibility<br>Acc. to IEC 60801-4<br>Acc. to IEC 60801-5 |

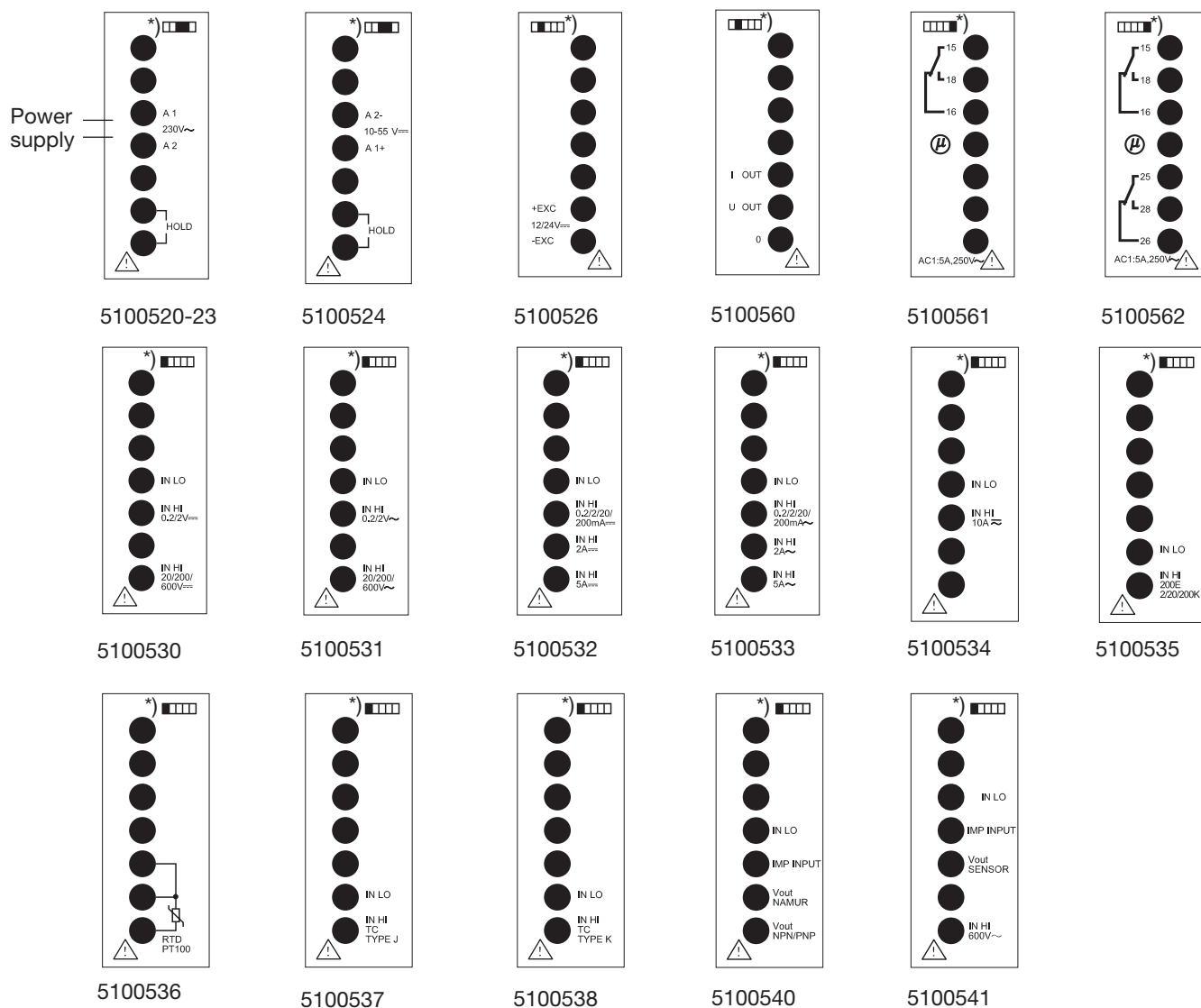
### Analogue output (5100560)

| Measuring ranges                                         | Load resistance                                       |
|----------------------------------------------------------|-------------------------------------------------------|
| 0 to 20 mA                                               | ≤ 500 Ω                                               |
| 4 to 20 mA                                               | ≤ 500 Ω                                               |
| 0 to 10 V                                                | ≥ 1,000 Ω                                             |
| <b>Accuracy</b><br>0 to 20 mA<br>4 to 20 mA<br>0 to 10 V | ±1% rdg ±0.1 mA<br>±1% rdg ±0.1 mA<br>±1% rdg ±0.05 V |
| <b>Temperature drift</b>                                 | ±200 ppm/°C                                           |
| <b>Short-circuit protection</b>                          | yes                                                   |

### Relay output 1 or 2 relays (5100561/5100562)

|                                                                                             |                                                            |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Power supply</b>                                                                         | Supplied by main unit                                      |
| <b>Output</b>                                                                               | 1 or 2 SPDT relays                                         |
| <b>Rated insulation voltage</b>                                                             | 250 V basic rms                                            |
| <b>Contact ratings (AgCdO)</b><br>Resistive<br>DC 1<br>Small inductive loads AC 15<br>DC 13 | 5 A, 250 VAC<br>5 A, 24 VDC<br>2 A, 250 VAC<br>3 A, 24 VDC |
| <b>Mechanical life</b>                                                                      | ≥ 40 x 10 <sup>6</sup> operations                          |
| <b>Electrical life</b>                                                                      | ≥ 10 <sup>5</sup> operations<br>(at max. load)             |
| <b>Operating frequency</b>                                                                  | max. 10 Hz (50% duty cycle)                                |
| <b>Dielectric strength</b><br>Dielectric voltage<br>Rated impulse withstand volt.           | 2 kVAC (rms)<br>4 kV (1.2/50 μs)                           |

## Wiring Diagrams



Modules with type nos. xxxx63x are equipped with Program Lock function.

\*) Module position (slot) in the base unit is indicated by a drawing on the plastic cover.

### Caution!

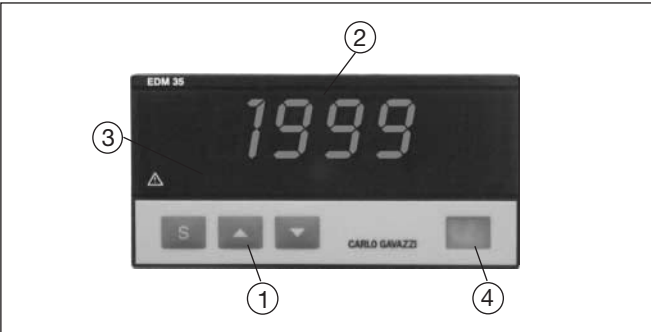
Since the input circuitry is not galvanically isolated, the potential of the measured variable will be present on all connections to the unit (i.e. "Hold" input). This is of special importance when measuring line voltage and current.

### Note.

By short-circuiting terminals marked "HOLD" (supply module), it is possible to hold the displayed value indefinitely (hold function). The comparison of the input variable with the alarm setpoint remains active. To reactivate the display, remove the short-circuit.



Front Panel Description



1. Keyboard

- « S » Set/enter
- « ▲ » Up
- « ▼ » Down

Set-up and programming procedures are easily controlled by the three pushbuttons.

- Set/Enter key:
- Entry of variables.
  - Selecting programming functions.

- Up and Down key for:
- Display control.
  - Increasing or decreasing programming value.
  - Selecting programming functions and instrument configuration together with the « S » key.

2. Display

3 1/2-digit (maximum read-out 1999).

Alphanumeric indication by means of 7-segment display for:

- Displaying of the measured value.
- Indication of programming parameters.

3. LED

- “1” and “2” LED indicators for alarm conditions.

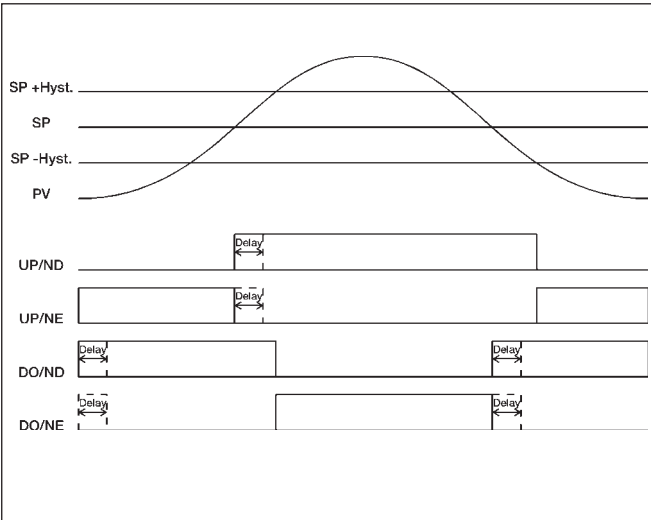
4. Engineering unit

Screen for interchangeable unit label. The symbols in the greyish areas are those available on the set of engineering unit labels supplied with the EDM. (Engineering unit label to be inserted by customer.)

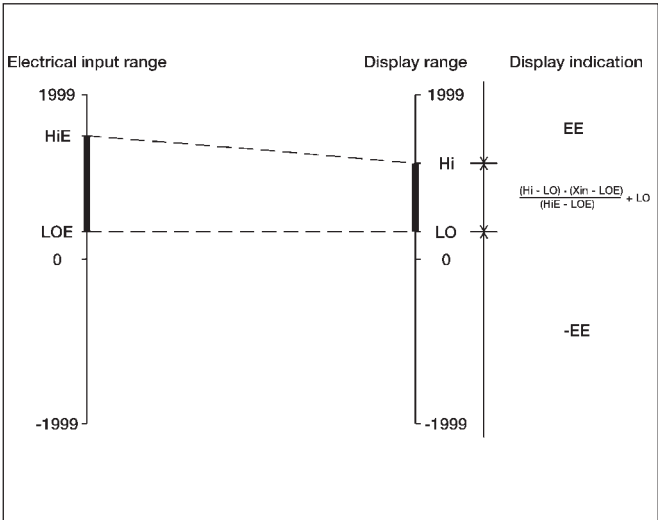
|         |           |            |             |             |            |
|---------|-----------|------------|-------------|-------------|------------|
|         | W = 08    | MΩ = 16    | % = 24      | mm HG = 32  | cm = 40    |
| mV = 01 | kW = 09   | Hz = 17    | mbar = 25   | l/min = 33  | m = 41     |
| V = 02  | MW = 10   | kHz = 18   | bar = 26    | l/h = 34    | kg = 42    |
| kV = 03 | var = 11  | RPM = 19   | psi = 27    | kg/min = 35 | ppm = 43   |
| μA = 04 | kvar = 12 | m/s = 20   | ata = 28    | ton/h = 36  | kA = 44    |
| mA = 05 | Mvar = 13 | m/min = 21 | ate = 29    | m²/min = 37 | cos φ = 45 |
| A = 06  | Ω = 14    | °C = 22    | kg/cm² = 30 | m²/h = 38   | m³ = 46    |
| mW = 07 | kΩ = 15   | °F = 23    | mm H₂O = 31 | mm = 39     | μs = 47    |

Operation Diagrams

Setpoint Operation



Scaling Operation



Mode of Operation

Depending upon the input modules used, it is possible to measure AC/DC (current or voltage), resistance (the range is selected with a jumper on the input module) or temperature (Pt 100 or Thermocouple J/K). Without an output module, the EDM is an indicator - by inserting an output module the EDM is a controller.

The input range and the display range are fully programmable, and so are the set-point(s) if a relay output module is inserted. A hold function is available for freezing a measured value. Passwords 0 to 99 are for overall programming while passwords 100 to 199 allow direct set-point programming outside the password protection. See user manual for further details.

Settings

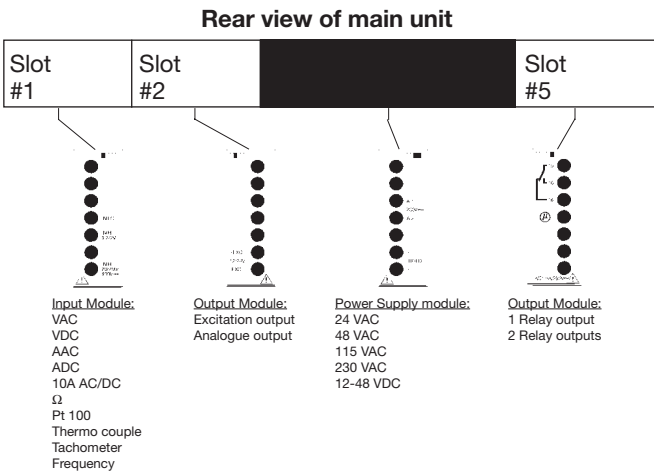
Programmable setting:

Jumper setting:

See user manual.

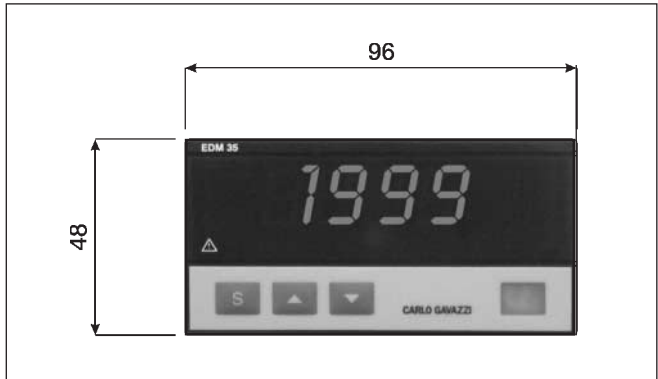
See user manual.

Modules and Slot Position

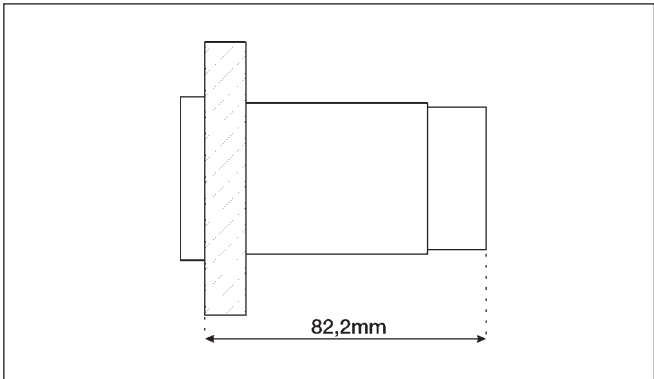


Overall Dimensions and Panel Cutout (mm)

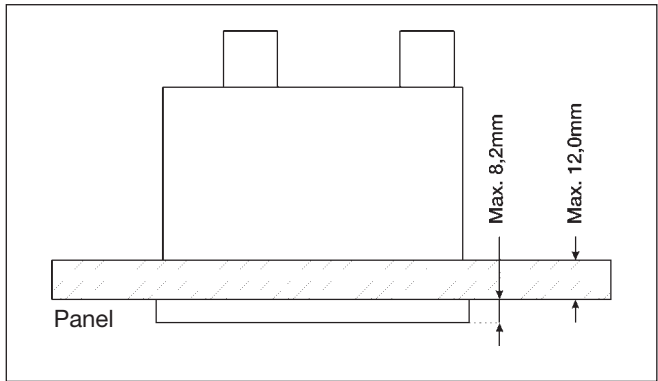
Front view



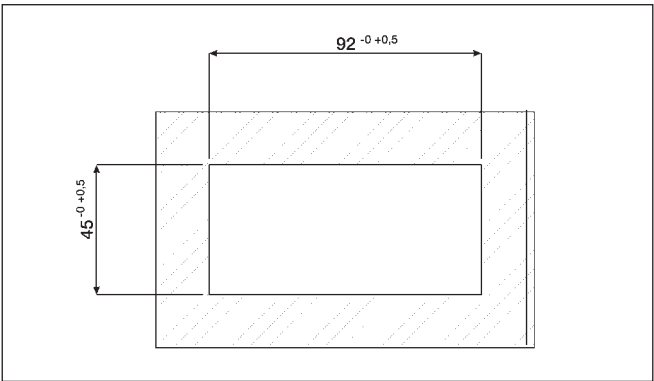
Side view



Top view



Panel cutout



All dimensions in mm.