

Panel Meters and Controllers

Panel Meter Modular

Series 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

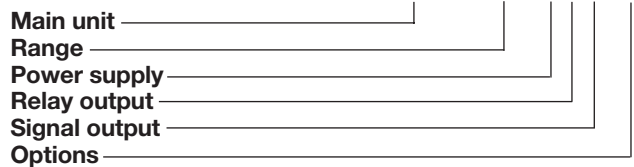
Product Description

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

EDM35V1D41XXX



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 Ω
R2D: 0 to 1.999 kΩ
R3D: 0 to 19.99 kΩ
R4D: 0 to 199.9 kΩ

Range DC Ammeters:

A1D: -199.9 to +199.9 μA
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 IEC 60664-1.
 The measuring range includes 15% tolerance equal to 690 V.

Range AC Ammeters:

A1A: 0 to 199.9 μA
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: Transducer power supply 12 VDC
6: Transducer power supply 24 VDC
 Contact factory for other output signals

Options:

XX: None
CX: High eff. red display
DX: Green display
XP: Program lock
01-99: 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:

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

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

Supply Specifications

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

Separate Ordering Numbers

| Main unit (mechanical parts included) | Ordering number | |
|--|-----------------|--------------------------|
| Red display (standard red) | 5100511 | |
| Red display (high-bright red) | 5100512 | |
| Green display | 5100510 | |
| | | With Program Lock |
| Input modules | | |
| 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 |
| Output modules | | |
| 1 Relay | 5100561 | |
| 2 Relays | 5100562 | |
| Analog output | 5100560 | |
| 12/24 VDC excitation output | 5100526 | |
| Power supply modules | | |
| 12 to 48 VDC | 5100524 | |
| 24 VAC | 5100523 | |
| 48 VAC | 5100522 | |
| 115 VAC | 5100521 | |
| 230 VAC | 5100520 | |

General Specifications

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

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 | 0.3% of reading ± 3 dgt |
| DC voltmeter | 0.2 % of reading ± 2 dgt |

Temperature drift

| | |
|--------------|--|
| AC voltmeter | ± 150 ppm/ $^{\circ}$ C ± 0.2 dgt/ $^{\circ}$ C |
| DC voltmeter | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |

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

| Measuring ranges | Jumper position | Range code | | Resolution |
|------------------|-----------------|------------|----|-------------|
| | | AC | DC | |
| 199.9 μ A | 1 - 2 | 7 | 1 | 0.1 μ A |
| 1.999 mA | 2 - 3 | 8 | 2 | 1 μ A |
| 19.99 mA | 4 - 5 | 9 | 3 | 10 μ A |
| 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 | 0.3% of reading ± 3 dgt |
| AC ammeter (10 A) | 0.5% of reading ± 5 dgt |
| DC ammeter | 0.2 % of reading ± 2 dgt |
| DC ammeter (10 A) | 0.5% of reading ± 5 dgt |

Temperature drift

| | |
|-----------------------|--|
| AC ammeter | ± 150 ppm/ $^{\circ}$ C ± 0.5 dgt/ $^{\circ}$ C |
| AC ammeter (2 A, 5 A) | ± 200 ppm/ $^{\circ}$ C ± 0.1 dgt/ $^{\circ}$ C |
| AC ammeter (10 A) | ± 200 ppm/ $^{\circ}$ C ± 0.5 dgt/ $^{\circ}$ C |
| DC ammeter | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| DC ammeter (2 A, 5 A) | ± 200 ppm/ $^{\circ}$ C ± 0.5 dgt/ $^{\circ}$ C |
| DC ammeter (10 A) | ± 200 ppm/ $^{\circ}$ C ± 0.5 dgt/ $^{\circ}$ C |

Voltage drop

< 200 mV (all ranges)

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

| Range | Reso- lution | Accuracy | Temperature drift |
|--|------------------|---|--|
| Pt 100: | | | |
| -100.0 to 199.9 $^{\circ}$ C | 0.1 $^{\circ}$ C | $\pm 0.2\%$ of reading ± 2 dgt | ± 150 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -148.0 to 199.9 $^{\circ}$ F | 0.2 $^{\circ}$ F | $\pm 0.2\%$ of reading ± 4 dgt ± 0.10 dgt/ $^{\circ}$ F | ± 180 ppm/ $^{\circ}$ F -148 to 392° F |
| 1 $^{\circ}$ F | | $\pm 0.2\%$ of reading ± 4 dgt ± 0.10 dgt/ $^{\circ}$ F | ± 180 ppm/ $^{\circ}$ F |
| Pt100, 850$^{\circ}$C: | | | |
| -100 to 850 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 0.2\%$ of reading ± 3 dgt | ± 150 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -148 to 1562 $^{\circ}$ F | 2 $^{\circ}$ F | $\pm 0.4\%$ of reading ± 6 dgt | ± 180 ppm/ $^{\circ}$ F ± 0.1 dgt/ $^{\circ}$ F |
| Thermocouple type J: | | | |
| -100 to 760 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 0.1\%$ of reading ± 4 dgt | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -148 to 1400 $^{\circ}$ F | 1 $^{\circ}$ F | $\pm 0.1\%$ of reading ± 8 dgt ± 0.1 dgt/ $^{\circ}$ F | ± 180 ppm/ $^{\circ}$ F |
| Thermocouple type K: | | | |
| -100 to 1250 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 3\%$ of reading ± 3 dgt | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -100 to -50 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 1\%$ of reading $+ 5/-1$ dgt | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -50 to 780 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 0.1\%$ of reading ± 3 dgt | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| 780 to 1250 $^{\circ}$ C | 1 $^{\circ}$ C | $\pm 0.25\%$ of reading $+ 1/-3$ dgt | ± 100 ppm/ $^{\circ}$ C ± 0.05 dgt/ $^{\circ}$ C |
| -148 to 1999 $^{\circ}$ F | 2 $^{\circ}$ F | $\pm 3\%$ of reading ± 6 dgt ± 0.1 dgt/ $^{\circ}$ F | ± 180 ppm/ $^{\circ}$ F -148 to -58° F |
| 2 $^{\circ}$ F | | $\pm 1\%$ of reading $+ 10/-2$ dgt | ± 180 ppm/ $^{\circ}$ F ± 0.1 dgt/ $^{\circ}$ F |
| -58 to 1436 $^{\circ}$ F | 2 $^{\circ}$ F | $\pm 0.1\%$ of reading ± 6 dgt ± 0.1 dgt/ $^{\circ}$ F | ± 180 ppm/ $^{\circ}$ F 1436 to |
| 1999 $^{\circ}$ F | 2 $^{\circ}$ F | $\pm 0.25\%$ of reading $+2/-6$ dgt | ± 180 ppm/ $^{\circ}$ F ± 0.1 dgt/ $^{\circ}$ F |

Ohmmeters (5100535, 5100635)

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

Accuracy

0.2% of reading ± 2 dgt

Temperature drift

± 150 ppm/ $^{\circ}$ C ± 0.1 dgt/ $^{\circ}$ 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

| | |
|---|------------------------------|
| Input selection Namur NPN, PNP, Contact | J1 J2 |
| Accuracy | 1% of reading ± 5 dgt |
| Temperature drift | ± 200 ppm/ $^{\circ}$ C |
| Input impedance Namur NPN, PNP and Contact | 1 k Ω 5 k Ω |
| Time constant (tc) | 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 |

| | |
|--|--|
| Input selection Namur NPN, PNP, Contact 600 VAC | J1, J4 and J6 J2 and J5 J3 |
| Accuracy | 1% of reading ± 5 dgt |
| Temperature drift | ± 200 ppm/ $^{\circ}$ C |
| Input impedance Namur NPN, PNP and Contact 600 VAC | 1 k Ω 5 k Ω 600 k Ω |
| Time constant (tc) | 1 sec. |

Output Specifications

Excitation output (5100526)

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

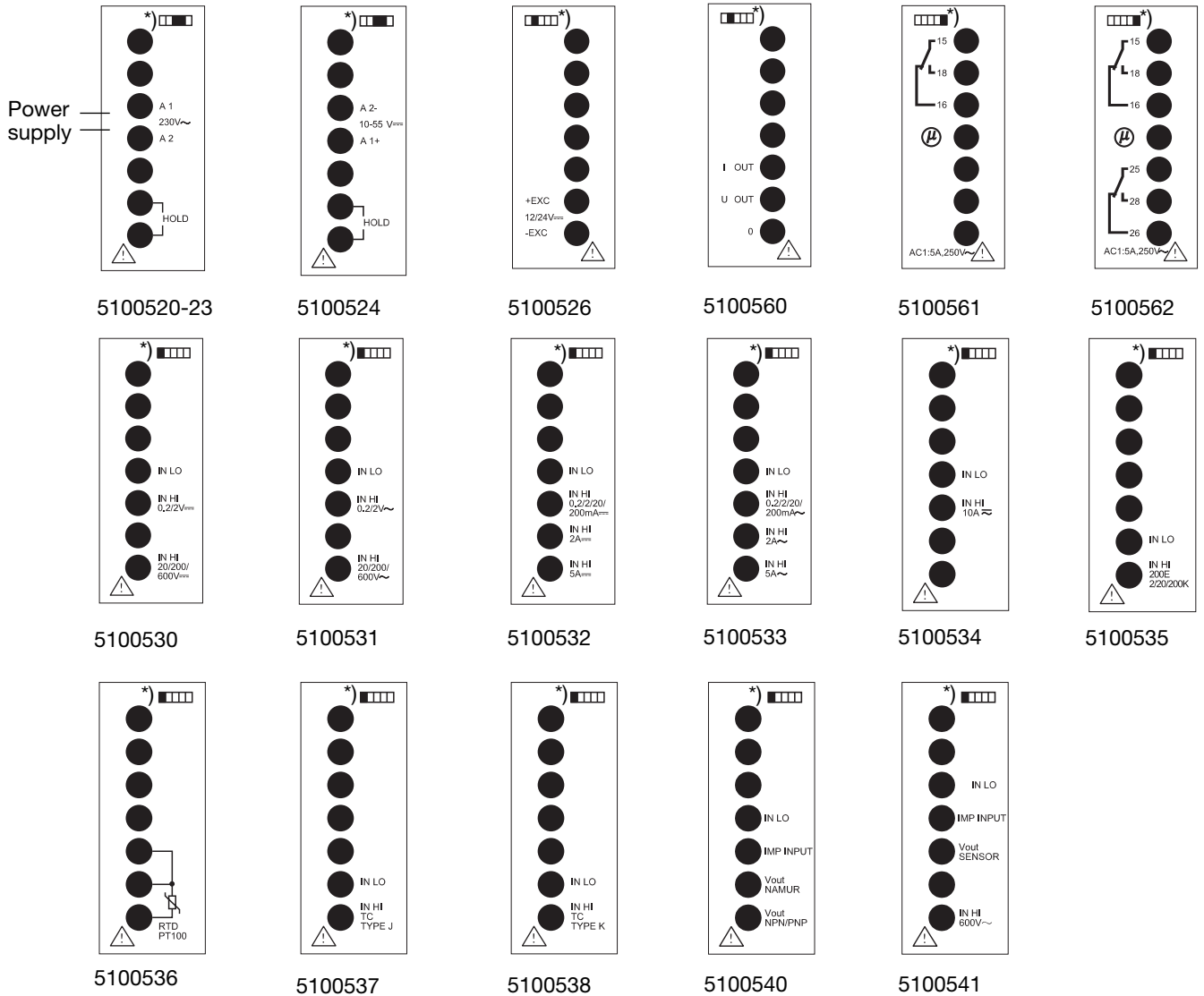
Analogue output (5100560)

| Measuring ranges | Load resistance |
|--|---|
| 0 to 20 mA | $\leq 500 \Omega$ |
| 4 to 20 mA | $\leq 500 \Omega$ |
| 0 to 10 V | $\geq 1,000 \Omega$ |
| Accuracy 0 to 20 mA 4 to 20 mA 0 to 10 V | $\pm 1\%$ of reading ± 0.1 mA $\pm 1\%$ of reading ± 0.1 mA $\pm 1\%$ of reading ± 0.05 V |
| Temperature drift | ± 200 ppm/ $^{\circ}$ C |
| Short-circuit protection | yes |

Relay output 1 or 2 relays (5100561/5100562)

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

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.

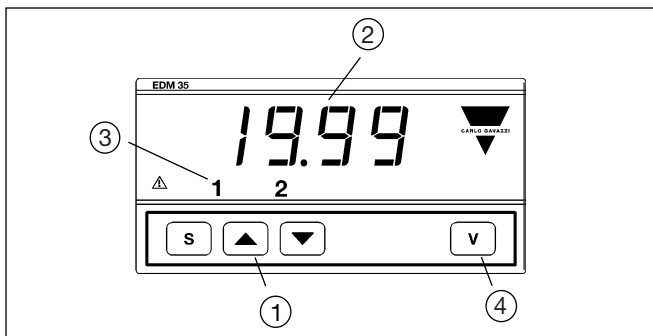
Caution!

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.

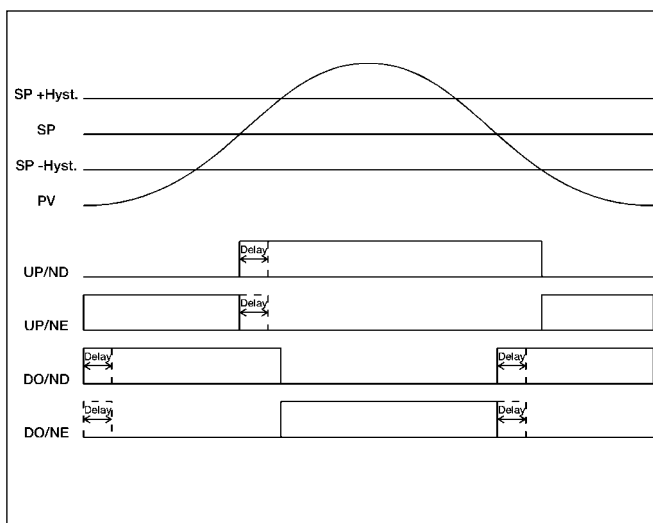
4. Engineering unit

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.)

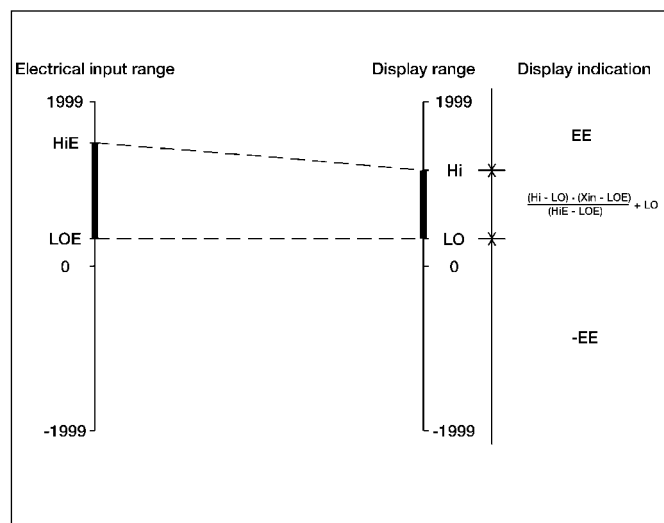
| | | | | | |
|---------|-----------|------------|--------------------------|--------------------------|---------------------|
| | W = 08 | MΩ = 16 | % = 24 | mm HG = 32 | cm = 40 |
| mV = 01 | kW = 09 | Hz = 17 | mbar = 25 | l/min = 33 | m = 41 |
| V = 02 | MW = 10 | kHz = 18 | bar = 26 | l/h = 34 | 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 | m ² /min = 37 | cos φ = 45 |
| A = 06 | Ω = 14 | °C = 22 | kg/cm ² = 30 | m ² /h = 38 | m ³ = 46 |
| mW = 07 | kΩ = 15 | °F = 23 | mm H ₂ O = 31 | mm = 39 | μs = 47 |

Operation Diagrams

Setpoint Operation



Scaling Operation



Mode of Operation

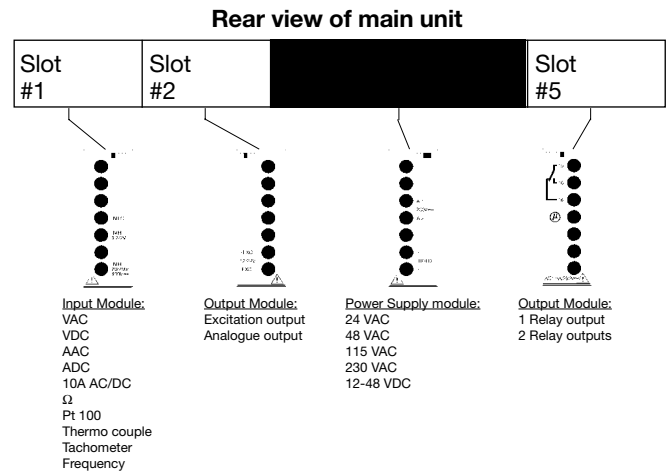
Depending upon the input modules used, it is possible to measure AC/DC (current or voltage), resistance (the range is selected with a jumper on the input module) or temperature (Pt 100 or Thermocouple J/K). Without an output module, the EDM is an indicator - by inserting an output module the EDM is a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

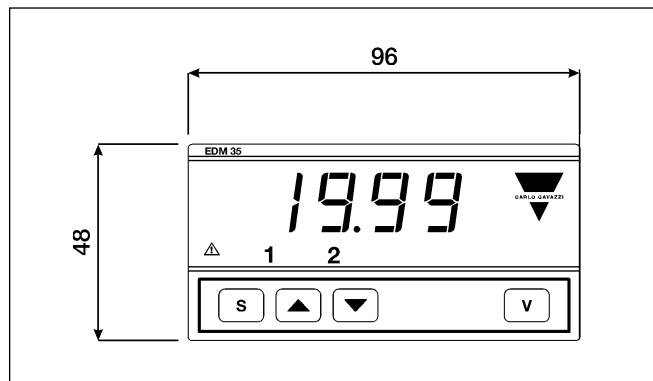
Programmable setting: See user manual.
 Jumper setting: See user manual.

Modules and Slot Position

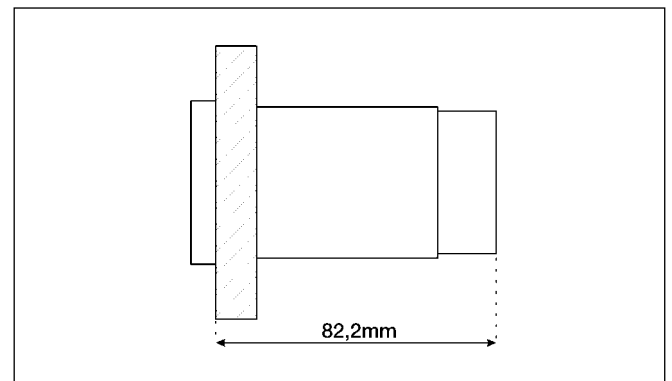


Overall Dimensions and Panel Cutout

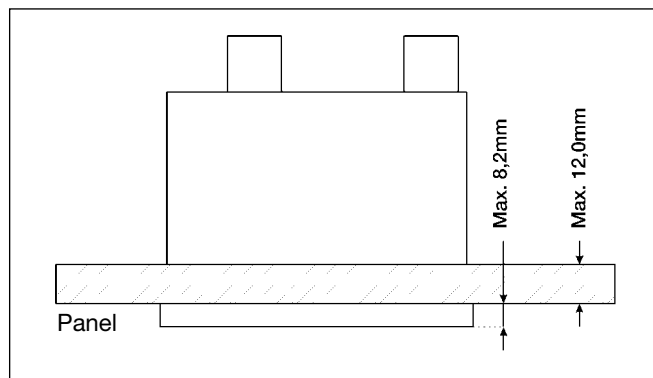
Front view



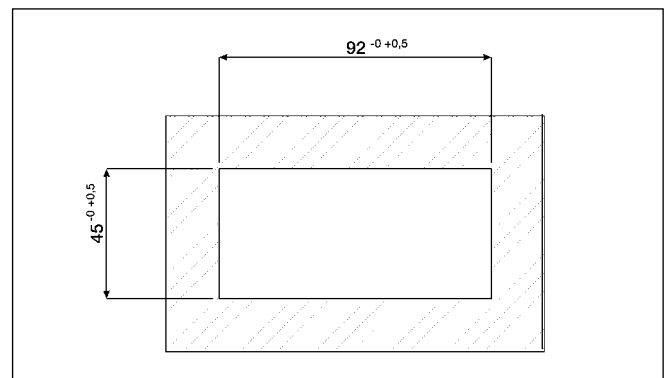
Side view



Top view



Panel cutout



All dimensions in mm.