

# DIGITAL PANEL METERS

programmable  $\pm 10\,000$  points

and  $-10\,000/+100\,000$  points

## DIP 400/502

The series DIP 40- offers a complete **range of high accuracy digital panel meters**, with **IP 65** front face protection. Each instrument is equipped with a 14mm high 5 red digit display, whose brightness fits applications in industrial control rooms perfectly. It enables display, control and and transmission of data of all measurable magnitudes.

► This range is declined in 3 input versions :

- **DIP 400** (for process inputs)  
Bidirectionnal input for DC current or voltage :  $\pm 100\text{mV}$ ,  $\pm 1\text{V}$ ,  $\pm 10\text{V}$ ,  $\pm 300\text{V}$ ,  $\pm 20\text{mA}$ .
- **DIP 401** (for Temperature inputs)  
-Either thermocouple :  
(J, K, N, S, B, W5, T, R, E, W, W3, L)  
-Or sensor :  
Pt 100  $\Omega$  3 wires,  $\Delta$ Pt 100  $\Omega$  2 wires, Ni 100  $\Omega$  3 wires
- **DIP 402 / 502** (Process, temperature, potentiometer + resistance inputs)  
Potentiometer : from 100  $\Omega$  to 10 K $\Omega$   
Resistance : caliber 0-400  $\Omega$ , 0-2 K $\Omega$  (0-8 K $\Omega$ , as option)



► **Combinable with various option types :**  
(to be specified on the order)

### Insulated analogue output :

Output active or passive current, or voltage.  
Programmable scale ratios, with enlarging effect.  
Return value in case of sensor rupture and/or error self-diagnosis.

**Relay output :** 2 or 4 relays :  
mode setpoint or window.  
Memorising of alarms.  
Delaying and hysteresis adjustable on each setpoint.  
Alarm messages

### Insulated digital output :

RS 485 2 wires, protocole MODBUS-JBUS.

**LOGIC input :** 2 insulated LOGIC inputs, with programmable functions

Display blocking, coma moving, tare function, min. and max. zero reset.


**Bargraph display :** (display 16 leds)

Enables fast evaluation of the measured value variations.

Programmable scale factor.

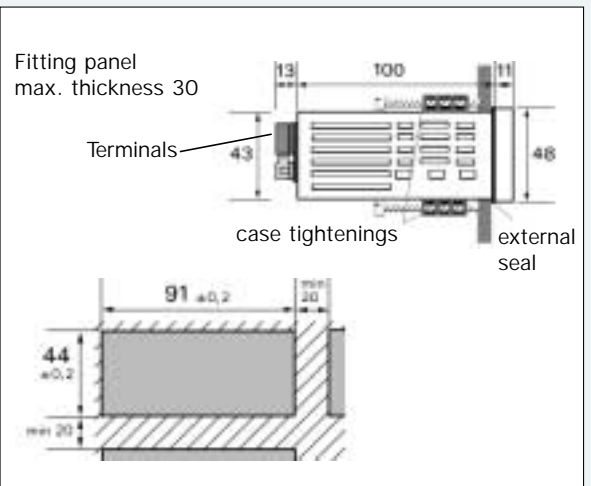
## External view

Easy programming from the front face via a 4-key keyboard.

- **Display :** Electroluminescent red, 4 alarm messages  
DIP 400 :  $\pm 10\,000$  points (14 mm)  
DIP 502 :  $-10\,000 / +100\,000$  points (14 mm)  
 $-2\,000 / +10\,000$  points (20 mm) (consult with Ardetem)
- **Casing :** Self-extinguishing case in black UL 94 V0 ABS.
- **Connectings** plug-off connectors on the rear for screwed connections (2,5mm<sup>2</sup>, flexible or rigid)
- **Protection :** Front face : IP 65 Case/terminals : IP20
- **Standards :** Complies with standards EN 50081-2 on emission and EN 50082-2; immunity (in industrial environment)  
EN 61000-4-2 level 3, EN 61000-4-3 level 3,  
EN 61000-4-4 level 4, EN 61000-4-6 level 3  
Marking  according to directive CEM 89-336

## Dimensions

Case : 96 x 48 x 124 mm (including terminals)



**Mounting :** on panel, cut out 44 x 91 mm

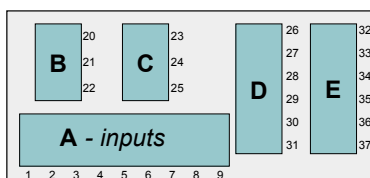
# Technical features

	Input types																																										
DIP 400	<b>DIP 400</b>	<b>DC current or voltage</b>																																									
	<b>Bidirectionnal</b> $\pm 100\text{mV}$ , $\pm 1\text{V}$ , $\pm 10\text{V}$ , $\pm 300\text{V}$ , $\pm 20\text{mA}$ . <ul style="list-style-type: none"> <li>• Accuracy 0,05 % of full scale at +25 °C</li> <li>• Thermic drift &lt; 150 ppm/°C</li> <li>• Measurable scale overlapping from -5% to +5%</li> <li>• Programmable scale factor</li> <li>• Enlarging effect - Square root extraction</li> <li>• Special linearisation on 20 points</li> <li>• Supply for 2 or 3-wire sensor 26 Vdc (<math>\pm 15\%</math>) -25 mA protected from short circuits</li> </ul>																																										
DIP 401	<b>DIP 401</b>	<b>Temperature</b>																																									
	<b>Thermocouples :</b> <table border="0"> <tr> <td><b>Type J</b></td> <td>min. -160 °C</td> <td>max. +1200 °C</td> </tr> <tr> <td><b>Type K</b></td> <td>min. -270 °C</td> <td>max. +1370 °C</td> </tr> <tr> <td><b>Type N</b></td> <td>min. +0 °C</td> <td>max. +1300 °C</td> </tr> <tr> <td><b>Type S</b></td> <td>min. -50 °C</td> <td>max. +1770 °C</td> </tr> <tr> <td><b>Type B</b></td> <td>min. +200 °C</td> <td>max. +1820 °C</td> </tr> <tr> <td><b>Type W5</b></td> <td>min. +0 °C</td> <td>max. +2300 °C</td> </tr> <tr> <td><b>Type T</b></td> <td>min. -270 °C</td> <td>max. +410 °C</td> </tr> <tr> <td><b>Type R</b></td> <td>min. -50 °C</td> <td>max. +1770 °C</td> </tr> <tr> <td><b>Type E</b></td> <td>min. -120 °C</td> <td>max. +1000 °C</td> </tr> <tr> <td><b>Type W</b></td> <td>min. 1000 °C</td> <td>max. +2300 °C</td> </tr> <tr> <td><b>Type W3</b></td> <td>min. 0 °C</td> <td>max. +2480 °C</td> </tr> <tr> <td><b>Type L</b></td> <td>min. -150 °C</td> <td>max. +910 °C</td> </tr> </table> <ul style="list-style-type: none"> <li>• Accuracy : 0,1% of full scale at +25°C, or 25<math>\mu\text{V}</math> typical (50<math>\mu\text{V}</math> max.)</li> <li>• Thermic drift &lt; 150ppm/°C (except CJC) CJC efficiency : &lt; 0,03°C/°C <math>\pm</math> 0,5°C from 0 -5°C to +55°C</li> </ul> <b>Sensors :</b> <table border="0"> <tr> <td><b>Pt 100 <math>\Omega</math></b></td> <td>min -200 °C</td> <td>max. +850 °C</td> </tr> <tr> <td><b>Ni 100 <math>\Omega</math></b></td> <td>min -60 °C</td> <td>max. +260 °C</td> </tr> </table> <ul style="list-style-type: none"> <li>• Line resistance influence in 3-wire measure included in the class for <math>0 &lt; R_t &lt; 25\Omega</math></li> <li>• 2-wire <math>\Delta</math> Pt100 2 measure from -200°C to +270°C (<math>0 &lt; R_t &lt; 10\Omega</math>) (Resistance max. 400<math>\Omega</math>)</li> <li>• Max. measure current : 250 <math>\mu\text{A}</math></li> <li>• Accuracy : 0,1% of full scale at +25°C</li> <li>• Thermic drift &lt; 150ppm/°C</li> </ul>		<b>Type J</b>	min. -160 °C	max. +1200 °C	<b>Type K</b>	min. -270 °C	max. +1370 °C	<b>Type N</b>	min. +0 °C	max. +1300 °C	<b>Type S</b>	min. -50 °C	max. +1770 °C	<b>Type B</b>	min. +200 °C	max. +1820 °C	<b>Type W5</b>	min. +0 °C	max. +2300 °C	<b>Type T</b>	min. -270 °C	max. +410 °C	<b>Type R</b>	min. -50 °C	max. +1770 °C	<b>Type E</b>	min. -120 °C	max. +1000 °C	<b>Type W</b>	min. 1000 °C	max. +2300 °C	<b>Type W3</b>	min. 0 °C	max. +2480 °C	<b>Type L</b>	min. -150 °C	max. +910 °C	<b>Pt 100 <math>\Omega</math></b>	min -200 °C	max. +850 °C	<b>Ni 100 <math>\Omega</math></b>	min -60 °C
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DIP 402 / 502	<b>DIP 402 / 502</b>	<b>DC current or voltage, temperature, potentiometer, resistance</b>																																									
	(See DIP 400 and DIP 401 features above) <b>Resistive sensor :</b> calibers 0-400 $\Omega$ and 0-2 k $\Omega$ (option 0-8 k $\Omega$ ) <ul style="list-style-type: none"> <li>• Accuracy : 0,1% for calibers 0-400 <math>\Omega</math> and 0-8 k<math>\Omega</math> and 0,5% for caliber 0-2 k<math>\Omega</math> (of full scale at +25°C)</li> <li>• Thermic drift &lt; 150ppm/°C</li> </ul> <b>Potentiometers :</b> from 100 $\Omega$ to 10 k $\Omega$ <ul style="list-style-type: none"> <li>• Accuracy : 0,1% of full scale at +25°C</li> <li>• Thermic drift &lt; 150ppm/°C</li> </ul>																																										

	Types of options
A1 or A2 or A3	<b>Analogue output : choice among 3 types</b> <b>A1 : Active current output</b> 0/4-20mA <b>A2 : Passive current output</b> 0/4-20mA ( $V_{\text{max.}}=30\text{Vdc}$ ) <b>A3 : Voltage output</b> 0-10V <ul style="list-style-type: none"> <li>• Accuracy 0,1 % in relation to display (at +25°C)</li> <li>• Residual drift <math>\leq 0,2\%</math></li> <li>• Admissible load <math>0\Omega &lt; R_c &lt; 500\Omega</math> (current) <math>R_c &gt; 2\text{k}\Omega</math> (voltage)</li> <li>• Programmable scale ratio with enlarging effect</li> <li>• Response time : 40 ms</li> </ul>
	<b>Relay output : choice among 2 types</b> <b>R : 2 separately programmable setpoint relays</b> <b>R4 : 4 separately programmable setpoint relays</b> <ul style="list-style-type: none"> <li>• Hysteresis programmable independently from 0 to 100% of setpoint in the display unit</li> <li>• Delaying programmable independently from 0 to 25 s in 0,1s increases</li> <li>• NO-NC contact 8 A - 250 V on resistive load</li> </ul>
option N	<b>Digital output</b> <b>N : RS485 data link</b> (2 wires) <ul style="list-style-type: none"> <li>• Protocoles MODBUS-JBUS , data formats : integer / double integer</li> <li>• Slave number programmable from 1 to 255 with a 1200 to 19200 Baud rate</li> </ul>
option LOGIC	<b>LOGIC inputs</b> <b>LOGIC : 2 insulated LOGIC inputs</b> <ul style="list-style-type: none"> <li>• Display blocking,</li> <li>• Coma moving,</li> <li>• Function tare,</li> <li>• Min. max. zero reset</li> </ul>
option B	<b>Bargraph display</b> <b>B : display 16 leds</b> <ul style="list-style-type: none"> <li>• Enables fast evaluation of measured value variations</li> </ul>

## ◆ Locations and combinations of options

All options can be combined, except in one case :  
options : logic input, 4 relays, with the analogue output.



Location of terminals  
(view from case rear side)

### Locations

- B :** option N (digital output)
- C :** option A1, A2, A3 (analogue output) or logic option
- D :** option R (2 relays only)
- E :** option logic input or **E+D** : option R4 (2+2 relays)

*Note :* location E is used in priority for option logic input

## ◆ Power supply

**2 Versions : High or Low Voltage**  
(to be specified on order)

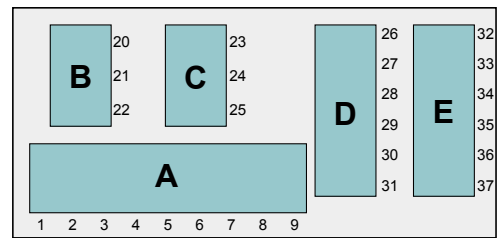
High Voltage :	90...270 V <sub>AC</sub>	50/60/400 Hz
	and 88 ...350 V <sub>DC</sub>	
Low Voltage :	20...53 V <sub>AC</sub>	50/60/400 Hz
	and 20...75 V <sub>DC</sub>	

**Power draw :** 5 W max. 8 VA max.

<p>◆ <b>Features</b></p> <ul style="list-style-type: none"> <li>• Sampling time : 100ms</li> <li>• Input impedance <math>\geq 1\text{ M}\Omega</math> for voltage inputs Drop 0,9 V max. for current input</li> <li>• Rejection rate : Common mode : 130 dB      Mode series : 70 dB 50/60 Hz</li> <li>• Zero drift compensation and self-calibration</li> <li>• Insulation : Input / Power supply : 2,5 kV eff. 50Hz-1min Input / Output : 2,5 kV eff. 50Hz-1min</li> </ul> <p>◆ <b>Programmable integration indice</b></p> <p>Enables display stabilising in case of unsteady input.</p> <p>◆ <b>Sensor rupture or line detection</b></p> <ul style="list-style-type: none"> <li>• Can be detected on inputs mV, TC, Pt 100, Ni 100 , <math>\Delta</math>Pt100, resistance (0-400 <math>\Omega</math>) and current (4-20 mA).</li> <li>• Return value programmable on the analogue output in case of sensor rupture.</li> <li>• Sensor rupture detection programmable on the 4 relays.</li> <li>• Possibility to disconnect sensor rupture.</li> </ul> <p>◆ <b>Self diagnosis :</b></p> <ul style="list-style-type: none"> <li>• Permanently watches any component drift that may surge. Serves to warn the user before they provoke false measures.</li> <li>• Self-diagnosis error detection programmable on the 4 relays.</li> <li>• Return value programmable on the analogue output in case of error self-diagnosis.</li> </ul> <p>◆ <b>Input scale overstepping</b></p> <p>Visualised on the display by flashing measure.</p> <p>◆ <b>Linearisations</b></p> <ul style="list-style-type: none"> <li>• Linear input</li> <li>• Square root extraction (current or voltage inputs)</li> <li>• Special linearisation on 20 points (in X and in Y) (voltage, current, potentiometer or resistance inputs)</li> </ul> <p>◆ <b>Scale shifting</b> (inclination or offset)</p> <p>Programmable on all inputs.</p> <p>◆ <b>Brightness setting</b></p> <p>Sets brightness of digits and bargraph leds independently Programmable : 4 levels According to instrument location (exterior, control room...)</p> <p>◆ <b>Fast reading on the display</b></p> <ul style="list-style-type: none"> <li>• Of setpoint values.</li> <li>• Of input signal electrical value.</li> <li>• Of min. and max. values.</li> </ul> <p>◆ <b>Simulation function</b></p> <ul style="list-style-type: none"> <li>• Simulation possible via the analogue output (mode generator).</li> <li>• Simulation of measure possible : enables validating the configuration of analogue output and relay outputs in the system.</li> </ul>	<p>◆ <b>Access code</b></p> <p>Access code adjustable from 0000 to 9999 serves to prevent unauthorised programming of indicator, of setpoints and lock access to some functions. Factory code is 0000.</p> <table border="1"> <tr> <td>x</td><td>x</td><td>x</td><td>x</td> <td>0 to 5</td><td>Access to scale shifting</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>6 to 9</td><td>No access</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>0 to 5</td><td>Access to measure and output simulations</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>6 to 9</td><td>No access</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>0 to 5</td><td>Access to function "tare" (except t° inputs)</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>6 to 9</td><td>No access</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>0 to 5</td><td>Access to fast entering of alarm setpoints</td> </tr> <tr> <td>↓</td><td>↓</td><td>↓</td><td>↓</td> <td>6 to 9</td><td>No access</td> </tr> </table> <p>◆ <b>Environment</b></p> <ul style="list-style-type: none"> <li>• Front face protection IP 65.</li> <li>• Operating temperature : -5 to 55°C.</li> <li>• Storage temperature : -30°C to +80°C.</li> <li>• Relative dampness : 80% annual average</li> <li>• Connection by plug-off screwed connectors (for 2,5 mm<sup>2</sup> cable, flexible or rigid).</li> <li>• Black ABS self-extinguishing case UL 94 VO.</li> <li>• Weight with / without output board : 250g / 150g.</li> </ul> <p style="text-align: center;"><b>coding</b></p> <p>◆ <b>Types : DIP 40- / DIP 502</b></p> <table border="1"> <tr> <td> <b>Display type</b> </td> <td> <input type="checkbox"/> </td> <td> <input type="checkbox"/> </td> <td> <b>Input type</b> </td> </tr> <tr> <td> <math>\pm 10\ 000</math> points (14 mm) : <b>4</b>  <math>-2\ 000 / +10\ 000</math> points (20 mm) : <b>4</b>  <i>(add H at the end of type name : eg. DIP 402 H)</i>  <math>-10\ 000 / +100\ 000</math> points (14 mm) : <b>5</b> </td> <td> <input type="checkbox"/> </td> <td> <input checked="" type="checkbox"/> </td> <td> <b>0</b> : Process input  <b>1</b> : Temperature input  <b>2</b> : Process input temperature, resistance, potentiometer </td> </tr> </table> <p>◆ <b>Output options :</b></p> <p><b>A</b> : Analogue (A1, A2 or A3 : to specify)  <b>R</b> : 2 relays  <b>R4</b> : 4 relays  <b>N</b> : Digital link (RS 485 2 wires)  <b>tor</b> : 2 TOR inputs  <b>B</b> : Bargraph display</p> <p><i>Simultaneously combinable options :</i>  A / R / N / B / tor  A / R4 / N / B  R4 / N / B / tor</p> <p>◆ <b>Power supply type</b></p> <p><b>2</b> : High Voltage  <b>3</b> : Low Voltage</p> <p><b>Ordering example :</b></p> <p>For a 10000 point meter with temperature input (DIP 401) to display temperature from an engine rotor with an analogue output and 2 relays with a 230 V<sub>AC</sub> power supply, request reference : <b>DIP 401 A2R 2</b> (passive current output)</p> <p>For a 100000 point meter with potentiometer input (DIP 502) with an analogue output and 2 relays with a 230 V<sub>AC</sub> power supply, request reference : <b>DIP 502 A2R 2</b> (passive current output)</p>	x	x	x	x	0 to 5	Access to scale shifting	↓	↓	↓	↓	6 to 9	No access	↓	↓	↓	↓	0 to 5	Access to measure and output simulations	↓	↓	↓	↓	6 to 9	No access	↓	↓	↓	↓	0 to 5	Access to function "tare" (except t° inputs)	↓	↓	↓	↓	6 to 9	No access	↓	↓	↓	↓	0 to 5	Access to fast entering of alarm setpoints	↓	↓	↓	↓	6 to 9	No access	<b>Display type</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Input type</b>	$\pm 10\ 000$ points (14 mm) : <b>4</b> $-2\ 000 / +10\ 000$ points (20 mm) : <b>4</b> <i>(add H at the end of type name : eg. 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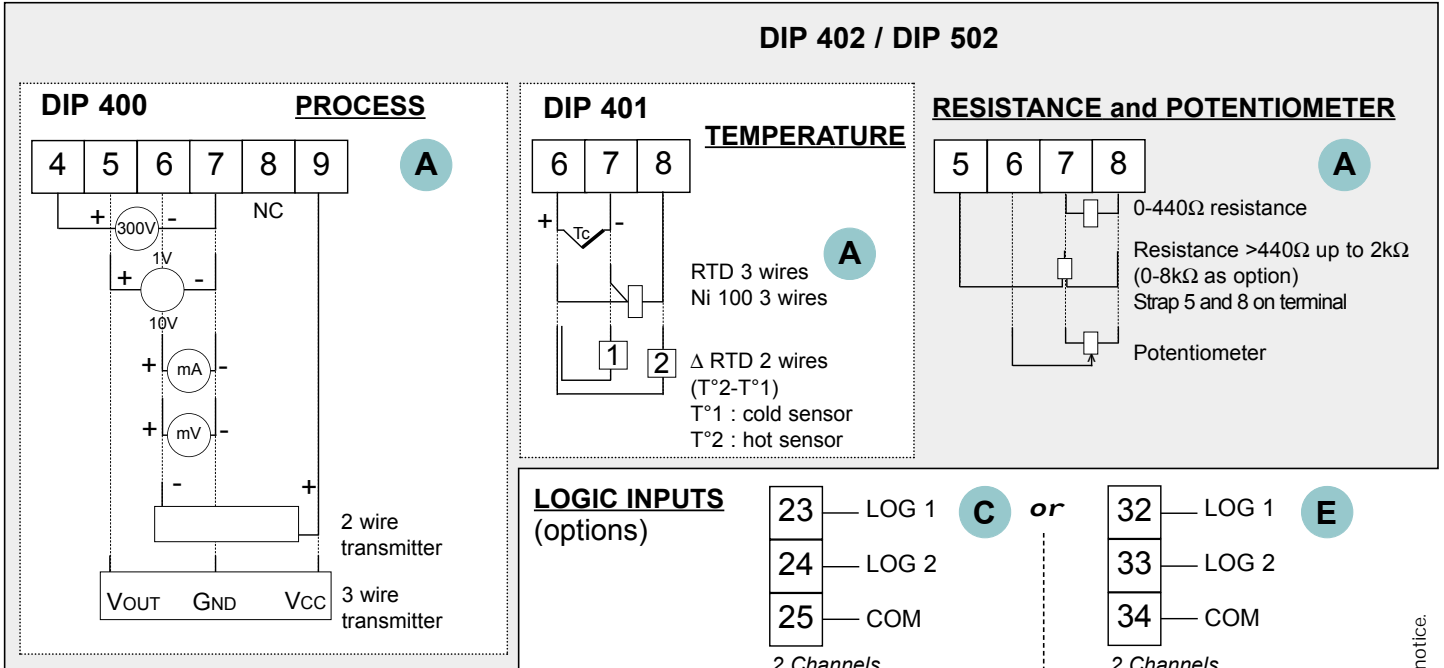
*This instrument is designed for industrial applications. It has to be mounted in an electrical switchbox, or similar.*

# Connections

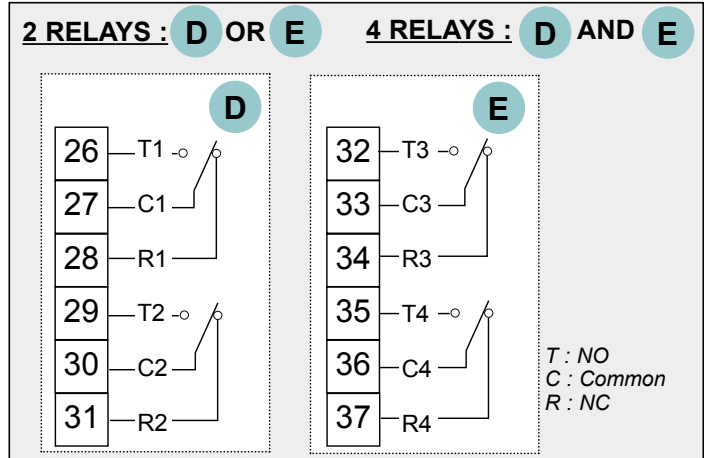
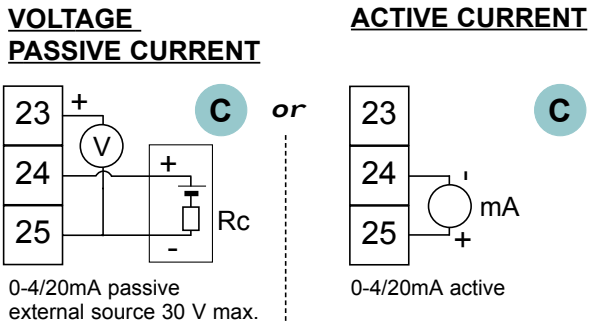


**Location of terminals**  
(view of case rear face)

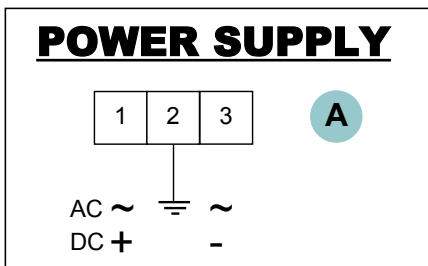
## INPUTS



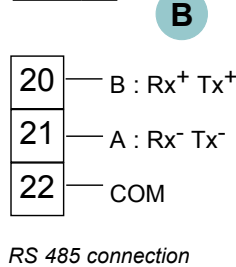
## OUTPUTS (options)



## POWER SUPPLY



## DIGITAL



your representative



e-mail : [info@ardetem.com](mailto:info@ardetem.com)  
http : [//www.ardetem.com](http://www.ardetem.com)

Route de Brindas  
Parc d'activité d'Arbora N°2  
69510 SOUCIEU EN JARREST  
FRANCE

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Fax. : 33 (0)4 72 31 31 31