

# Digital display

Technical features - MODELS



## CAO digital display

CAO is a range of display units including small display units (96x48 mm format) which receive different type of signals (mA, V, Ohm, thermocouple, Termoresistance). Some models are equipped with n.2 relay outputs in order to activate external devices using programmable thresholds. All models are equipped with optical led, it can be activate when the measurement is out from a programmable range.

Order numb.	CAO622	CAO623	CAO633	CAO632
Input	mA, V, Ohm, Termocouple, Termoresistance		Impuls, TTL	
Analogue input (Tension)	Tension: $\pm 10$ Vdc Resolution: 1 mV Impedence: 1 M Ohm Excitation: 24 Vdc /30 mA Accuracy: 0,1% Reading $\pm 1$ digit			
Analogue input (Current)	Current: $\pm 20$ mA dc Resolution: 2 $\mu$ A Impedence: 20 Ohm Excitation: 24 Vdc /30 mA Accuracy: 0,1% Reading $\pm 1$ digit			
Frequency input			Reed relay: PNP, NPN, NAMUR Excitation: 8 V and 22 V, 22 mA Min.frequency: 0,01 Hz Max.frequency: 7,5 Hz (count), 25KHz (Tac)	
N°relay output			N.2	
Relay output			N.2 threshold Delay: 0÷99 sec Hysteresis: 0÷10 ms-1	

### Common features

<i>Power supply</i>	11÷265 Vac/dc
<i>Format</i>	1/8 DIN (96x48x60 mm)
<i>Digits</i>	N.4 red digits H 14 mm
<i>Panel orifice dimension</i>	92x45 mm
<i>Depth</i>	72 mm
<i>Power consumption</i>	3 W
<i>Reading rate</i>	0,1 s
<i>Alarm information</i>	N.2 led on frontal panel

# Wind alarm unit

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## Wind alarm unit

It is used whenever the wind speed can damage the working of some systems like builder's rotating crane and quay crane, construction sites, road networks, cable cars and chair-lifts protective covering for sport fields, etc.

It shows the speed and the direction of the wind, and has two programmable set-points to activate alert and alarm systems; these systems are composed of a local optical indicator, a local acoustic buzzer and relays to activate remote systems.

Order numb.	DGA400	DGA420
Display	Wind speed	Wind speed and direction
Sensors inputs	DNA801, DNA802	DNA821

### Common features

Wind direction range	0÷359°
Wind speed range	Same as sensor output
Resolution	Wind speed: 0,1 m/s, Wind direction: 1°
Reading rate	0,5 sec.
Power supply	24 Vac
Input	4÷20 mA
Acoustic buzzer	YES
Alarm light	N.2: alarm and alert
Output	Total N.3 relay N.1 Together with alert light N.1 Together with alarm light N.1 together with acoustic buzzer
Relay	1 A, 250 Vac
Dimension	200x200x170 mm
Protection	IP65
Weight	2 Kg

## Wind polar unit

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### Wind polar unit

It shows on digital display the instant and maximum wind speed value in knots, MPH, Km/H, m/s; it shows instant wind direction (alternately to max wind speed) and shows the wind direction on a polar display made by 36 led with the last 10 acquisitions information.

Information regarding instant wind speed and direction measurements can be replaced by the average values over a programmable time base.

Polar wind display unit informs about alarm situation over wind speed and direction using led and relay contacts.

It has 0-5 Vdc (and RS485, ASCII file) output for wind speed and direction. More units (up to 16 units) can be mounted together over a RS485 line.

Order numb.

**DGA311**

<i>Input</i>	4-20 mA (wind speed: 0-50 m/s o 0-100 m/s; wind direction: 0-360° o 0-540°)
<i>Power supply</i>	12-30 Vdc
<i>Power consumption</i>	3,5 W
<i>Dimension</i>	144x144x36 mm
<i>Panel orifice dimension</i>	138x138 mm
<i>Uncertainty</i>	±0,6% full scale
<i>Serial output</i>	RS485 half-duplex, 9600 baud for line connection or ASCII file
<i>Analogue output</i>	0÷5 Vdc (0÷100 m/s; 0÷360/540°)
<i>Alarm</i>	Alarm relay connections (Normally open) for wind speed and direction. Alarm contact rating 24 VAC/30 VDC, 5 A resistive, 2 A inductive
<i>Weight</i>	0,45 Kg

# ▶ First rain display and controller

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## First rain display&regulator

First rain condition is the first 5 mm. of water rained in a given period of time. More than 5mm of rain it is treated as "further rain" condition. DGP020 display, connected to a rain gauge, informs through its relay about the rain condition status. Also, It shows on the display the total rain, the rain intensity and the duration of the rain event.

$T_1$ ,  $T_2$  and  $Q_p$ , parameters shown below, are programmable.

- No rain condition: is any period of at least  $T_1$  minutes of no precipitation. The beginning of precipitation during the no rain period determines the transition to the status of "first rain".
  - First rain condition: rainy condition, following a continuous period of no rain, or interrupted by any rain event intervals lower than  $T_2$  minutes, until rain volume reaches  $Q_p$  mm. When reached  $Q_p$  mm of precipitation the system moves to Further rain condition. If during First rain condition rain stops for a period longer than  $T_2$  minutes, the system goes back to the "no rain condition".
  - Further rain condition: is the period following the first rain condition, during which there are not rain breaks longer than  $T_1$  minutes. Break longer than  $T_1$  minutes determines the transition to the "no rain condition".
- $T_1$ ,  $T_2$  and  $Q_p$  parameters are programmable.

### Order numb.

### DGP020

Input	<i>Input</i>	<Tipping bucket rain gauge (1 imp. = 0,2 mm)
Output	<i>Relay</i>	OFF during "further rain" condition ON during other conditions: No rain, First rain
	<i>Exchange contact</i>	1 Amp 250 Vca
Commands	<i>Switch</i>	On/Off
	<i>Led</i>	Condition status information when relay is ON
	<i>Buttons</i>	N.4 buttons for $T_1$ , $T_2$ , $Q_p$ parameters set-up and language
Power supply	<i>Power supply</i>	24Vac±10% (opz.220Vac)
	<i>Power consumption</i>	2VA
	<i>Battery</i>	Rechargeable Ni-Mh 9Vcc 150mAH
	<i>Battery life</i>	48 hrs if relay is ON, 30 hrs when ON
General information	<i>CE</i>	Industrial environments
	<i>Operative limits</i>	0 + 50°C; RH 0-90%.
	<i>Language</i>	Italian, English, France and German
	<i>Display</i>	LCD 20 chars, n.4 rows
	<i>Dimensions</i>	144x72 mm
	<i>Enclosure</i>	DIN box

### Accessories



### ELF020

#### Containing box

IP65 box for DGP020 First rain display and regulator. It includes the power supply system (220 -> 24 Vac) and the main switcher.

<i>Dimensions</i>	300x400x200 mm
<i>Material</i>	Polyester
<i>Power supply</i>	220->24 Vac
<i>Mounting</i>	Mast or wall

# ► Sensors conditioning. RS485 Modbus RTU, 4÷20 mA outputs | Technical features - MODELS



## MSB - Modbus sensor box

Sensor conditioning unit to convert (Volt, Pt100 e Hz) signals into RS485 over RTU Modbus protocol. It can receive signals from different sensors on the market as: solar irradiance sensor, also pyranometers (configurable sensitivity value), temperature sensors (Pt100) and wind speed sensor (Hz).

- N.1 high-resolution input (18 bit) for Pyranometer/reference cell ( $\mu\text{V}$ , mV) or 4÷20mA. Configurable sensitivity value
- N.2 Pt100 inputs (3-wire) with 0.5°C accuracy
- N.1 Pt100 internal temperature sensor as alternative to external sensor
- N.1 pulse/frequency input (wind speed sensor)
- Terminal board on input
- Output as running statistical values for every parameter (min, ave, max, stdev) over programmable time base
- 9÷30 Vdc Power Supply
- N.1 RS232 port on board for configuration
- IP65 case
- RS485 (2-wire) Modbus RTU® interface with Galvanic insulation
- CISS/TTY Protocols over RS232 port
- Configuration by Terminal Emulation program (HyperTerminal, Miniterm,...)

### Order numb.

### DEA485

Input 1	Type	Volt
	Ranges	0÷30 mV; 0÷1000 mV
	Resolution	< 0,5 $\mu\text{V}$ (range 0÷30 mV) < 20 $\mu\text{V}$ (range 0÷1000 mV)
	Accuracy	< $\pm$ 5 $\mu\text{V}$ (range 0÷30 mV) < 130 $\mu\text{V}$ (range 0÷1000 mV)
Input 2 & 3	Type	Pt100
	Range	-20÷100°C
	Resolution	$\approx$ 0,04°C
	Accuracy	0.1°C
	Thermal drift	0,1°C/10°C
	Line resistance error	0,06°C/ $\Omega$
Input 4	Type	Frequency
	Range	0÷10 kHz
	Input signal	0÷3 V (supported 0÷5 V)
	Photodiode power	3,3 V (6 mA)
	Phototransistor power	3,3 V (0,7 mA)
	Resolution	1 Hz
	Accuracy	$\pm$ 0,5% reading
	User's adjustment	Using polynomial function (3th°)





Output	<i>Type</i>	2-fili RS485
	<i>Protocols</i>	Modbus RTU®, TTY
	<i>Programmable output</i>	Instant, max., min., ave. (1 ÷ 3600 sec)
	<i>Protection</i>	Galvanic insulation (3 kV, according to UL1577)
	<i>Connection</i>	Screw terminals
Configuration	<i>Program</i>	Using Hyper Terminal emulation program
	<i>Input</i>	9-pin RS232 on board (DTE/DCE cable)
Power supply	<i>Input voltage</i>	9÷30 Vcc
	<i>Consumption</i>	250 mW
EMC Protections	<i>Type</i>	Tranzorb, EMI filters
Data acquisition	<i>Sampling rate</i>	1 s
Environmental limit	<i>Operative temp.</i>	-30÷70°C
	<i>Protection</i>	IP65



### STB-Sensor Transducer Box

Signal conditioning unit to converter (Volt, Pt100, Thermocouples and Hz) signals into 4÷20 mA. It can receive signals from different sensors on the market as: solar irradiance sensor, also pyranometers (configurable sensitivity value), temperature sensors (Pt100 and thermocouples) and wind speed sensor (Hz).

- N.1 high resolution input for Pyranometer/reference cell ( $\mu\text{V}$ , mV) or 4÷20mA. Configurable sensitivity value
- DEA420.1: N.2 Pt100 inputs (3-wire)
- DEA402.2: N.1 Pt100 inputs (3-wire) N.1 Thermocouple T type input
- N.1 pulse/frequency input
- N.1 Pt100 internal temperature sensor as alternative to external sensor
- Terminal board on input
- Output as running statistical values for every parameter (min, ave, max, stdev) over programmable time base
- 9÷30 Vdc Power Supply
- IP65 protection
- N.1 RS232 port for setup
- Alternative protocols on RS232: TTY and CISS (LSI LASTEM protocol)
- Configuration by Terminal Emulation program (HyperTerminal, Minterm,...)

#### Order numb.

#### DEA420.1

#### DEA420.2

Order numb.	DEA420.1	DEA420.2	
Input 1	Type	Voltage	
	Ranges	0÷30 mV	
	Resolution	8 $\mu\text{V}$	
	Accuracy	< $\pm 20 \mu\text{V}$	
	Thermal drift	1 W/m <sup>2</sup> (radiation) / 10°C	
Input 2	Range	Pt100 thermo resistances	
	Resolution	12 bit	
	Accuracy	0.3°C	
	Thermal drift	0,05°C/10°C	
	Line resistance error	0,06°C/ $\Omega$	
Input 3	Type	Pt100	T type thermocouple
	Range	-20÷100°C	
	Resolution	≈ 0,04°C	
	Accuracy	< $\pm 0,2^\circ\text{C}$	< $\pm 0,3^\circ\text{C}$ (+ cold joint: $\pm 0,3^\circ\text{C}$ )
	Thermal drift	0,05°C/10°C	0,1°C/10°C
	Line resistance error	0,06°C/ $\Omega$	-



Input 4	Type	Frequency
	Range	0÷10 kHz
	Input signal	0÷3 V (supported 0÷5 V)
	Photodiode power	3,3 V (6 mA)
	Phototransistor power	3,3 V (0,7 mA)
	Resolution	1 Hz
	Accuracy	±0,5% reading
	User's adjustment	Using polynomial function (3th°)
Output	Type	N.4 x 0/4÷20 mA (Max load 500 Ω 24 V; 300 Ω 12 V)
	Resolution	< 6 μV
	Accuracy	±15 μA
	Programmable output	Instant, max., min., ave. (1÷3600 sec)
	Connection	Screw terminals
Configuration	Program	Using Hyper Terminal emulation program
	Input	9-pin RS232 on board (DTE/DCE cable)
Power supply	Input voltage	9÷30 Vcc
	Consumption	< 0,4 W
EMC Protections	Type	Tranzorb, EMI filters
Data acquisition	Sampling rate	1 s
Environmental limit	Operative temp.	-30÷70°C
	Protection	IP65





### Signal transducer for pyranometers

It converts  $\mu\text{V}$  signal output into 4÷20 mA. It is made mainly for pyranometers. Two versions are available: with connector (DEA852) compatible with DWAxxx cables to connect the unit to its utility, and with free wiring terminal (DEA854).

Individual sensitivity ( $\mu\text{V}$ ) setup of the pyranometer required by the signal transducer is made by LSI LASTEM.

#### Order numb.

#### DEA852

#### DEA854

Connection

7 pin IP65 watertight connector  
Compatible with DWAxxx cables

Terminals

#### Common features

Output	Type	0/4÷20 mA (Max load 500 $\Omega$ 24 V; 300 $\Omega$ 12 V)
	Resolution	< 6 $\mu\text{V}$
	Uncertainty	$\pm 15 \mu\text{A}$
Power supply	Power supply	9÷30 Vcc
	Power consumption	< 0,4 W
Informazioni generali	Input	V
	Operative limits	- 30÷70°C
	Protection	IP65
	Dimensions	80x125x58 mm

#### Accessories

#### Order numb.

<b>DWA510</b>	Cable for DEA852 L = 10 m
<b>DWA525</b>	Cable for DEA852 L = 25 m
<b>DWA526</b>	Cable for DEA852 L = 50 m
<b>DWA527</b>	Cable for DEA852 L = 100 m
<b>MG2251</b>	7 pin free male connector