Energy Management
Power Analyzer with plug-in Output Modules
Type WM22-DIN

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- Front dimensions: 9 DIN modules
- Analogue output by means of optional module (20mA or 10VDC)
- RS 422/485 Serial port by means of optional module
- Alarm output by means of optional module
- Dual pulse output by means of optional module
- Control of phase asymmetry

- Class 0.5 (current/voltage)
- Three-phase power analyzer
- Back-lighted LCD
- 4 x 3$^{1}/_{2}$ DGT instantaneous variables read out
- 7$^{1}/_{2}$ DGT energy read-out
- Measurements of system and phase variables:
  W, Wdmd, var, VA, VAdmd, PF (cosφ), V, A, Hz, THD-A, THD-V
- Measurements of total energies: kWh, kvarh
- Measurements of partial energies: kWh, kvarh
- Energy measurements according to EN61036 and EN61268
- TRMS measurements of distorted wave forms (voltages/currents)
- Two basic models: direct connection 20(90)AAC, CT 5(10)AAC and VT connection
- Maximum value indication of W dmd and VA dmd (only 5A version); maximum value indication of A (only 90A version)
- Self power supply (available for some models only) or auxiliary power supply: 24V, 48V, 115V, 230V, 50-60Hz; 18 to 60VDC, 77 to 143VDC
- Degree of protection (front): IP 40

Product description

Three-phase power analyzer with built-in configuration key-pad;
Particularly indicated for the analysis of main, secondary and energy metering electrical variables.
Housing for DIN-rail or wall-mounting, IP40 (front) protection degree.
Completely sealable housing. In case of direct connection up to 90A, the measuring input terminals are suitable for cables with a cross-section area from 6 to 35 mm². The special design of the instrument's housing allows to add at any time the interface modules, even when the instrument is already installed.
The following modules are available:
- for all versions: pulses output;
- only for the versions with auxiliary power supply: analogue output, RS485 port or alarm output.

How to order   WM22-DIN AV5 3 X X XX

Model ———————————
Range code ——————
System ————————
Power supply ——————
Slot A ——————————
Slot B ——————————

Important note:
- The models from AV0 to AV7 can be equipped with any type of available modules (slot A and B).
- The models AV8 and AV9 can be equipped only with the "O" and "R" type modules.
- The AV8 and AV9 models can measure all the parameters even if the three phase system being connected is missing one phase.
- The Av2 model is suitable only for three-phase unbalanced system without neutral.

Type selection

Range Code	Power supply	Slot A (retransmission)	Slot B (retransmission)
Auxiliary Power Supply:	**For all versions**	**X:** None	**Only with A-B-C-D-4 power supply**
AV0: 208V$_{L-L}$/20(90)AAC [3]	**A:** 24VAC -15+10%, 50-60Hz	**O:** AO2900 module Dual open collector output	**XX:** None
AV1: 400V$_{L-L}$/20(90)AAC [1]	**B:** 48VAC -15+10%, 50-60Hz	Three operating modes:	**A1:** AO2920 module 0-20mADC analogue output
AV3: 660V$_{L-L}$/20(90)AAC [2]	**C:** 115VAC -15+10%, 50-60Hz	• two pulse outputs (kWh and kvarh);	**V1:** AO2921 module 0-10VDC analogue output
AV4: 208V$_{L-L}$/5(10)AAC [3]	**D:** 230VAC -15+10%, 50-60Hz	• one alarm output and one pulse output (kWh or kvarh)	**S0:** AR2950 module RS422/485 serial port
AV5: 400V$_{L-L}$/5(10)AAC [1]	**4:** 18 to 60VDC	• one output which is remotely controlled by a serial port and one pulse output (kWh or kvarh)	
AV6: 100V$_{L-L}$/5(10)AAC [3]	**5:** 77 to 143VDC		
AV7: 660V$_{L-L}$/5(10)AAC [2]	**AV2, AV8 and AV9 only**		
Self Power Supply:	**X:** Self Power Supply 400V$_{L-L}$ (-20+15%, 50-60Hz)	**R:** AO2910 module. One relay output + one open collector output. Operation modes like module AO2900.	
AV2: 220V$_{L-L}$/20(90)AAC [4]	208V$_{L-L}$ (-20+15%, 50-60Hz)		
AV8: 208V$_{L-L}$/20(90)AAC [1]	220V$_{L-L}$ (-10+15%, 50-60Hz)		
AV9: 400V$_{L-L}$/20(90)AAC [1]			

System

3 : Three-phase, unbalanced load with or without neutral

[1] Un: -20+15%   [2] Un: -30+15%   [3] Un: -20+20%   [4] Un: -10 +15%

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Input specifications

Number of inputs	
Current	3
Voltage	4
Accuracy (display, RS485)	Ib: 5A, Imax: 10A
	Ib: 20A, Imax:90A
	Un: see previous page
	"Range code"
Current	from 0.003Ib to 0.2Ib:
	±(0.5%RDG +3DGT)
	from 0.2Ib to Imax:
	±(0.5%RDG +1DGT)
Voltage	in the range Un:
	±(0,5% RDG + 1DGT)
Frequency	±0.1% RDG (50 to 60 Hz)
Active power	
(@ 25°C ± 5°C, R.H. ≤ 90%)	±(1% RDG +1DGT). PF 1,
	0.1Ib to Imax, in the Un range;
	PF 0.5L, PF 0.8C, 0.2Ib to
	Imax, in the Un range
Reactive power	
(@ 25°C ± 5°C, R.H. ≤ 90%)	±(2% RDG +1DGT). sinφ 1,
	0.05Ib to Imax, in the Un range;
	sinφ 0.5L, sinφ 0.5C,
	0.1Ib to Imax, in the Un range
Apparent power	
(@ 25°C ± 5°C, R.H. ≤ 90%)	±(1% RDG +1DGT). PF 1,
	0.1Ib to Imax, in the Un range
Energies	
(@ 25°C ± 5°C, R.H. ≤ 90%)	Class 1 acc. to EN61036
	Class 2 acc. to EN61268
	Ib: 5A, Imax: 10A
	0.1Ib: 500mA,
	Start up corrent: 20mA
	Un: see table "range code"
	Ib: 20A, Imax: 90A
	0.1Ib: 2A,
	Start up current: 80mA
	Un: see table "range code"
Harmonic distortion	±3% f.s. (f.s.: 100%)
(@ 25°C ± 5°C, R.H. ≤ 90%)	up to the 7th harmonic;
	Un: see table "range code"
Ib 5A	Imin: 500mA;
	Imax: 15Ap;
Ib 20A	Imin: 2A;
	Imax: 127Ap;

Additional errors	Acc. to EN61036, EN61268
Wave form	<1% (3rd harmonic: 10%)
Voltage asymmetry	< 0.5% (referred to Un)
Magnetic induction	0 (up to 0.5 mT)
HF Electromagnetic fields	< 1%
Operation of accessories	0
Temperature drift	≤ 200ppm/°C
Sampling rate	1000 samplings/s @ 50Hz
Display	
Type	Back-lighted LCD
Instantan. variables read-out	4x3$^1/_2$ DGT
Energies	Total:1x7$^1/_2$ DGT
	Partial: 1x7$^1/_2$ DGT
Max. and Min. indication	Max. 1999 (19999999), Min. 0
Measurements	Current, voltage, power,
	energy, power factor, frequen-
	cy, harmonic distortion (see
	display specs). TRMS
	measurements of distorted
	wave forms.
Coupling type	Direct
Crest factor	
Ib 5A	≤3 (15A max. peak)
Ib 20A	≤6 (127A max. peak)
Current overload	
5(10) A, for 10ms	300 A max, @ 50Hz
5(10) A, for 500ms	200 A max, @ 50Hz
5(10) A, permanent	10A, @ 50Hz
20(90) A, for 10ms	2700A max, @ 50Hz
20(90) A, permanent	90A, @ 50Hz
Voltage overload	
Permanent	1.2 Un
For 1s	2 Un
Input impedance	
400V$_{L-L}$ (AV1-AV5-AV9)	> 720KΩ
208V$_{L-L}$ (AV0-AV4-AV8-AV2)	> 720KΩ
660V$_{L-L}$ (AV3-AV7)	> 1.97MΩ
100V$_{L-L}$ (AV6)	> 400KΩ
5(10) A (AV4-AV5-AV6-AV7)	< 0.3VA
20(90) A (AV0-AV1-AV3-AV8-AV9)	< 4VA
20(90) A (AV2)	< 4VA
Frequency	50 to 60 Hz

Interface module specifications

Analogue outputs (on request)			the following ranges:
Number of outputs	1		0 and 20mADC, 0 and 10VDC
Range	0 to 20 mADC		
	(AO2920 module slot B,	Response time	
	only for versions with	System variables	V, W, VA, var, PF (cosφ)
	auxiliary power supply)	FFT off, filter off	900ms
	0 to 10VDC	FFT on, filter on	1.4s
	(AO2921 module slot B,	variables	THD-V, THD-A
	only for versions with	Filter off	3s
	auxiliary power supply)	Ripple	≤1% according to IEC 60688-1,
Accuracy	±0.5% F.S.		EN 60688-1
Temperature drift	≤ 300 ppm/ °C	Load	
Scaling factor	Programmable within the	20 mADC	≤ 500 Ω
	whole range of	10 VDC	≥ 10 kΩ
	retransmission;	Insulation	By means of optocouplers,
	it allows the retransmission		2000 V$_{RMS}$ between output
	of all the values included in		and measuring input

Specifications are subject to change without notice   WM22-DINDS1003

Interface module specifications (cont.)

	2000 V$_{RMS}$ between output and power supply input	Insulation	According to DIN43864 By means of optocouplers, 2000 V$_{RMS}$ outputs to measuring inputs, 2000 V$_{RMS}$ output to supply input. Insulation between the two outputs: functional
RS422/RS485 (on request) Type	AR2950 module Multidrop bidirectional (static and and dynamic variables)		
Connections	2 or 4 wires, max. distance 1200m, termination directly on the module	Alarm output Number of outputs Alarm type	1 Up alarm, down alarm phase asymmetry, phase loss.
Addresses	255, selectable by key-pad		
Protocol	MODBUS/JBUS		
Data (bidirectional)		Setpoint adjustment	0 to 100% of the electrical scale
Dynamic (reading only)	Phase and system variables: see table "Display pages"	Hysteresis	0 to 100% of the electrical scale
Static (writing only)	All the programming data, reset of energy, activation of static output. Stored energy (EEPROM) max. 19.999.999 kWh/kvarh	On-time delay Response time system variables FFT off, filter off FFT on, filter on	0 to 255 seconds V, W, VA, var, PF (cosφ) 700ms 1.2s
Data format	1 start bit, 8 data bit, no parity, 1 stop bit	variables Filter off	THD-V, THD-A 3s
Baud-rate	9600 bit/s	Output type	Open collector (transistor NPN) V$_{ON}$ 1.2 VDC / max. 100 mA V$_{OFF}$ 30 VDC max.
Insulation	By means of optocouplers, 2000 V$_{RMS}$ output to measuring inputs 2000 V$_{RMS}$ output to supply input	Insulation	By means of optocouplers, 2000 V$_{RMS}$ output to measuring input, 2000 V$_{RMS}$ output to supply input. Insulation between the two outputs: functional
Digital outputs (on request)			
AO2900 module	To be used as alarm, energy retransmission, or remote static outputs.	AO2910 module	Relay + open collector output. Working mode like AO2900.
	Three working modes are selectable: • two pulse outputs (kWh and kvarh); • one alarm output and one pulse output (kWh or kvarh) • one output remotely controlled by means of the serial port and one pulse output (kWh or kvarh)	Pulse output Alarm output Output type	One static output+one relay output, other characteristics like AO2900. Only relay output, other characteristics like AO2900. Static type like module AO2900; Relay type: SPDT, AC1, AC15: 1AAC @250VAC
Pulse outputs Number of outputs	2		
Number of pulses	From 0.01 to 100 pulses programmable according to the selected CT and VT ratios	Insulation	By means of optocouplers, 2000 V$_{RMS}$ output to measuring inputs, 2000 V$_{RMS}$ output to supply input. Insulation between the two outputs: 2000 V$_{RMS}$
Output type	Open collector (transistor NPN) V$_{ON}$ 1.2 VDC / max. 100 mA V$_{OFF}$ 30 VDC max.		
Pulse duration	220 ms (ON), ≥ 220 ms (OFF)		

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Software functions

Password	Numeric code of max. 3 digits 2 protection levels of the programming data	Electrical range	Programmable within the whole measuring range.
1st level 2nd level	Password "0", no protection Password from 1 to 1000, all data are protected	**Filter** Filter operating range	0 to 99.9% of the input electrical scale.
System selection	Three-phase with neutral Three-phase without neutral	Filter coefficient Filter action	1 to 16 Alarm, analogue and serial output (fundamental variables: V, A, W and their derived ones).
Transformer ratio CT	1 to 5000		
VT	1.0 to 199.9 and 200 to 1999 Note: The CT ratio* VT ratio must never exceed the value 5000. The current measuring inputs can manage CT's with a secondary of 1A and 5A (the accuracy always refer to 5A)	**Display** System variables Single phase variables System variables Single phase variables 20(90) A 5(10) A	Up to 4 variables per page Page 1: W-var-PF (cosφ) Page 2: W dmd - VA dmd - Hz Page 3: THD-V Page 4: THD-A Page 5: kWh total Page 6: kvarh total Page 7: kWh partial Page 8: kvarh partial Page 9: V_{L-N} Page 10: A Page 11a: A $_{MAX}$ Page 11b: W dmd $_{MAX}$ VA dmd $_{MAX}$ Page 12: W Page 13: VA Page 14: var Page 15: PF (cosφ)
Scaling factor Operating mode	Compression/expansion of the measuring range to be connected to the analogue output.		

Supply specifications

Self supplied version	$400V_{L-L}$ -20% +15%, 50-60Hz $208V_{L-L}$ -20% +15% , 50-60Hz $220V_{L-L}$ -10% +15% , 50-60Hz		115VAC -15 +10%, 50-60Hz 48VAC -15 +10%, 50-60Hz 24VAC -15 +10%, 50-60Hz 18 to 60VDC 77 to 143VDC
Auxiliary power supply	230VAC -15 +10%, 50-60Hz	**Energy consumption**	≤ 7VA

General Specifications

Operating temperature	0 to +55°C (R.H. < 90% non-condensing 40°C)	Pulse voltage (1.2/50µs)	8kV (EN61000-4-5)
Storage temperature	-20 to +60°C (R.H. < 90% non-condensing 40°C)	**Standards** Safety Metrology Pulse output	IEC664-1 Energy measurements: EN61036, EN61268. DIN43864
Installation category	Cat. III (IEC 664)	**Approvals**	CE
Insulation	2000 V$_{RMS}$ between all inputs / outputs to earth	**Connections 5(10) A** Cable cross-section area	Screw-type, 4 mm^2
Dielectric strength	4000 V$_{RMS}$ for 1 minute	**Connections 20(90) A** Min./Max. cable cross-section area Min./Max. screws tightening torque	Screw-type, 6 mm^2 / 35 mm^2 2 Nm / 6 Nm
Noise rejection CMRR	100 dB, 48 to 62 Hz	**Housing** Dimensions Material	162.5 x 90 x 63 mm ABS, NORYL, PC self-extinguishing: UL 94 V-0
EMC Burst Immunity to irradiated electromagnetic fields Electrostatic discharges Radio frequency emissions	4kV/level 4 (EN61000-4-4) 10V/m 26-1000MHz (EN61000-4-3) 15kV (EN61000-4-2) according to CISPR 14 and CISPR 22	**Mounting**	DIN-rail and wall
		Degree of protection	Front: IP40 Connections: IP20
		Weight	800 g approx. (packing included)

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Function description

Input and output scaling capability
Working examples of the analogue output (Y) versus the input variable (x) - (input/output scaling possibilities).

Figure A
The sign of measured quantity and output quantity remains the same. The output quantity is proportional to the measured quantity.
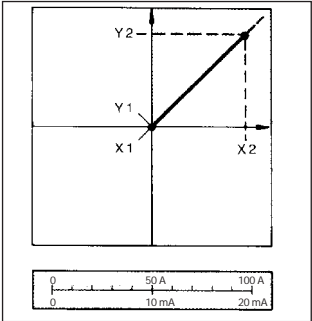
Figure B
The sign of measured quantity and output quantity remains the same. With the measured quantity being zero, the output quantity already has the value Y1 = 0.2 Y2.
Live zero output.
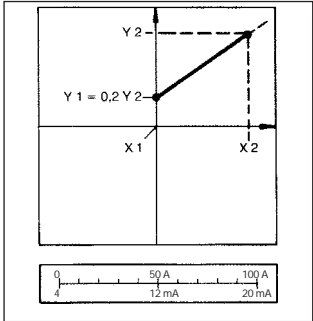
Figure C
The sign of measured quantity and output quantity remains the same. On the range X0...X1, the output quantity is zero. The range X1...X2 is delineated on the entire output range Y0=Y1...Y2 and thus presented in strongly expanded form.
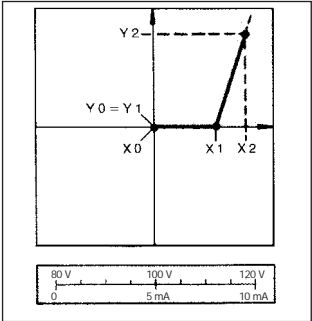
Mode of Operation

Waveform of the signals that can be measured
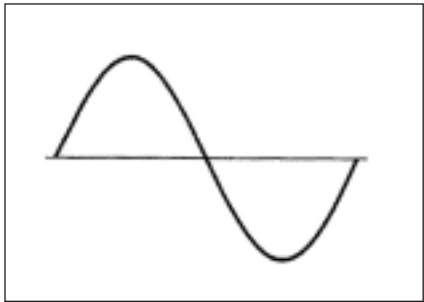
Figure D
Sine wave, undistorted

Fundamental content	100%
Harmonic content	0%
$A_{rms} =$	$1.1107 \mid \overline{A} \mid$
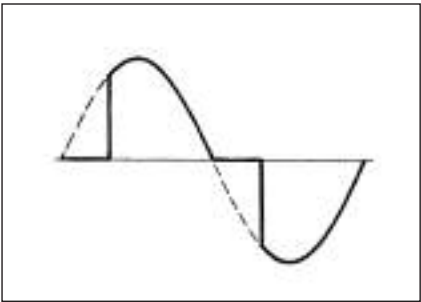
Figure E
Sine wave, indented

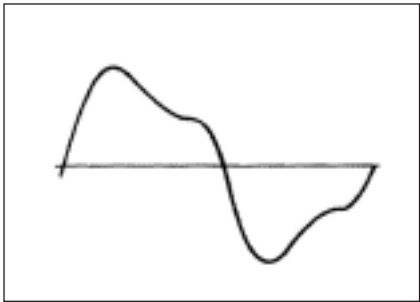|	
Fundamental content	10...100%
Harmonic contents	0...90%
Frequency spectrum: 3rd to the 16th harmonic	
Additional error: <1% rdg	

Figure F
Sine wave, distorted

Fundamental content	70...90%
Harmonic content	10...30%
Frequency spectrum: 3rd to the 16th harmonic	
Additional error: <0.5% rdg	

Harmonic distortion analysis

Anaysis principle	FFT		THD (A$_L$2), THD (A$_L$3)
Harmonic measurement		**Read-out**	THD %
Current	Up to the 7th harmonic	**System**	The harmonic distortion can be measured in 3-wire or 4-wire systems.
Voltage	Up to the 7th harmonic		
Type of harmonics	THD (V$_L$1), THD (V$_L$2), THD (V$_L$3), THD (A$_L$1)		

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Display pages

Variables that can be displayed

No	1st variable	2nd variable	3rd variable	4th variable	Notes
1	W sys	PF sys	Var sys		sys = system
2	W dmd	Hz	VA dmd		dmd = demand (integration time from 1 to 30 minutes)
3	V_{L1} THD	V_{L2} THD	V_{L3} THD		THD = tot. harmonic distortion
4	A_{L1} THD	A_{L2} THD	A_{L3} THD		THD = tot. harmonic distortion
5	kWh				total energy
6	kvarh				total energy
7	kWh				partial energy
8	kvarh				partial energy
9	V_{L1}	V_{L2}	V_{L-3}	V_{L-L} sys	sys = system
10	A_{L1}	A_{L2}	A_{L3}	Err	Err = in case of negative power
11a	W dmd MAX	VA dmd MAX			Only version 1-5A, dmd = demand
11b	A_{L1} MAX	A_{L2} MAX	A_{L3} MAX		Only version 90A
12	W_{L1}	W_{L2}	W_{L3}	W sys	sys = system
13	VA_{L1}	VA_{L2}	VA_{L3}	VA sys	The system value remains always 0
14	Var_{L1}	Var_{L2}	Var_{L3}	Var sys	if the neutral is not connected
15	PF_{L1}	PF_{L2}	PF_{L3}	PF sys	

Used calculation formulas

Phase variables

Instantaneous effective voltage

$$V_{1N} = \sqrt{\frac{1}{n} \cdot \sum_{1}^{n}(V_{1N})_i^2}$$

Instantaneous active power

$$W_1 = \frac{1}{n} \cdot \sum_{1}^{n}(V_{1N})_i \cdot (A_1)_i$$

Instantaneous power factor

$$\cos\phi_1 = \frac{W_1}{VA_1} \qquad \text{(TPF)}$$

Instantaneous effective current

$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_{1}^{n}(A_1)_i^2}$$

Instantaneous apparent power

$$VA_1 = V_{1N} \cdot A_1$$

Instantaneous reactive power

$$VAr_1 = \sqrt{(VA_1)^2 - (W_1)^2}$$

System variables

Equivalent system voltage

$$V_\Sigma = \frac{V_1 + V_2 + V_3}{3} * \sqrt{3}$$

System reactive power

$$VAr_\Sigma = (VAr_1 + VAr_2 + VAr_3)$$

System active power

$$W_\Sigma = W_1 + W_2 + W_3$$

System apparent power

$$VA_\Sigma = \sqrt{W_\Sigma^2 + VAr_\Sigma^2}$$

System power factor

$$\cos\phi_\Sigma = \frac{W_\Sigma}{VA_\Sigma} \qquad \text{(TPF)}$$

Total harmonic distortion

$$THD_i = \frac{\sqrt{\sum_{n,n\neq1}T_{n,i}^2}}{T_{1\,i}}$$

Note:
i = phase (L1, L2 or L3)
T = variable (V or I)
n = harmonic order

Consumption recording

$$kWh_i = \int_{t_1}^{t_2}P_i(t)\,dt \cong \Delta t \sum_{n_1}^{n_2}P_{n,i} \qquad kVarh_i = \int_{t_1}^{t_2}Q_i(t)\,dt \cong \Delta t \sum_{n_1}^{n_2}Q_{n,i}$$

Note:
i = phase (L1, L2 or L3)
P = active power
Q = reactive power
t_1, t_2 = starting and ending time points of consumption recording
n = time unit
Δt = time interval of consumption recording
n_1, n_2 = starting and ending discrete time points of consumption recording

List of the of the variables that can be connected to the analogue and alarm output

N°	Variable	Notes	N°	Variable	Notes
1	V sys	sys = system	6	THD-V	Max. THD value among the three phases
2	W sys	sys = system	7	THD-A	Max. THD value among the three phases
3	var sys	sys = system	8	VA dmd	Power demand in the selected integration time
4	VA sys	sys = system	9	W dmd	
5	PF sys	sys = system	10	ASY	Phase asymmetry

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Available models

Type	Inputs	Power supply	Ordering code
WM22-DIN AV9.3.X.	400V$_{L-L}$, 20(90)A	Self power supply	AF2100
WM22-DIN AV8.3.X.	208V$_{L-L}$, 20(90)A	Self power-supply	AF2101
WM22-DIN AV2.3.D.	220V$_{L-L}$, 20(90)A	Self power-supply	AF2144
WM22-DIN AV1.3.D.	400V$_{L-L}$, 20(90)A	230VAC, 50-60Hz	AF2102
WM22-DIN AV0.3.D.	208V$_{L-L}$, 20(90)A	230VAC, 50-60Hz	AF2103
WM22-DIN AV3.3.D.	660V$_{L-L}$, 20(90)A	230VAC, 50-60Hz	AF2104
WM22-DIN AV1.3.C.	400V$_{L-L}$, 20(90)A	115VAC, 50-60Hz	AF2105
WM22-DIN AV0.3.C.	208V$_{L-L}$, 20(90)A	115VAC, 50-60Hz	AF2106
WM22-DIN AV3.3.C.	660V$_{L-L}$, 20(90)A	115VAC, 50-60Hz	AF2107
WM22-DIN AV1.3.B.	400V$_{L-L}$, 20(90)A	48VAC, 50-60Hz	AF2108
WM22-DIN AV0.3.B.	208V$_{L-L}$, 20(90)A	48VAC, 50-60Hz	AF2109
WM22-DIN AV3.3.B.	660V$_{L-L}$, 20(90)A	48VAC, 50-60Hz	AF2110
WM22-DIN AV1.3.A.	400V$_{L-L}$, 20(90)A	24VAC, 50-60Hz	AF2111
WM22-DIN AV0.3.A.	208V$_{L-L}$, 20(90)A	24VAC, 50-60Hz	AF2112
WM22-DIN AV3.3.A.	660V$_{L-L}$, 20(90)A	24VAC, 50-60Hz	AF2113
WM22-DIN AV5.3.D.	400V$_{L-L}$, 5(10)A	230VAC, 50-60Hz	AF2114
WM22-DIN AV4.3.D.	208V$_{L-L}$, 5(10)A	230VAC, 50-60Hz	AF2115
WM22-DIN AV7.3.D.	660V$_{L-L}$, 5(10)A	230VAC, 50-60Hz	AF2116
WM22-DIN AV5.3.C.	400V$_{L-L}$, 5(10)A	115VAC, 50-60Hz	AF2117
WM22-DIN AV4.3.C.	208V$_{L-L}$, 5(10)A	115VAC, 50-60Hz	AF2118
WM22-DIN AV7.3.C.	660V$_{L-L}$, 5(10)A	115VAC, 50-60Hz	AF2119
WM22-DIN AV5.3.B.	400V$_{L-L}$, 5(10)A	48VAC, 50-60Hz	AF2120
WM22-DIN AV4.3.B.	208V$_{L-L}$, 5(10)A	48VAC, 50-60Hz	AF2121
WM22-DIN AV7.3.B.	660V$_{L-L}$, 5(10)A	48VAC, 50-60Hz	AF2122
WM22-DIN AV5.3.A.	400V$_{L-L}$, 5(10)A	24VAC, 50-60Hz	AF2123
WM22-DIN AV4.3.A.	208V$_{L-L}$, 5(10)A	24VAC, 50-60Hz	AF2124
WM22-DIN AV7.3.A.	660V$_{L-L}$, 5(10)A	24VAC, 50-60Hz	AF2125
WM22-DIN AV6.3.D.	100V$_{L-L}$, 5(10)A	230VAC, 50-60Hz	AF2126
WM22-DIN AV6.3.C.	100V$_{L-L}$, 5(10)A	115VAC, 50-60Hz	AF2127
WM22-DIN AV6.3.B.	100V$_{L-L}$, 5(10)A	48VAC, 50-60Hz	AF2128
WM22-DIN AV6.3.A.	100V$_{L-L}$, 5(10)A	24VAC, 50-60Hz	AF2129
WM22-DIN AV1.3.4 / [5]	400V$_{L-L}$, 20(90)A	18-60VDC [77-143VDC]	AF2130 [AF2137]
WM22-DIN AV0.3.4 / [5]	208V$_{L-L}$, 20(90)A	18-60VDC [77-143VDC]	AF2131 [AF2138]
WM22-DIN AV3.3.4 / [5]	660V$_{L-L}$, 20(90)A	18-60VDC [77-143VDC]	AF2132 [AF2139]
WM22-DIN AV5.3.4 / [5]	400V$_{L-L}$, 5(10)A	18-60VDC [77-143VDC]	AF2133 [AF2140]
WM22-DIN AV4.3.4 / [5]	208V$_{L-L}$, 5(10)A	18-60VDC [77-143VDC]	AF2134 [AF2141]
WM22-DIN AV7.3.4 / [5]	660V$_{L-L}$, 5(10)A	18-60VDC [77-143VDC]	AF2135 [AF2142]
WM22-DIN AV6.3.4 / [5]	100V$_{L-L}$, 5(10)A	18-60VDC [77-143VDC]	AF2136 [AF2143]

Available modules

Type	Channels	Code	Type	Channels	Code
Open collector output	2	AO2900	0-10VDC Analogue Output	1	AO2921
0-20mADC analogue output	1	AO2920	RS485 Serial Output	1	AR2950
Relay + open c. output	2	AO2910			

Possible module combinations

Power supply	Self p.s.		Auxiliary p.s.	
Basic unit	Slot A	Slot B	Slot A	Slot B
Open collector output	●		●	
Relay + open c. output	●		●	

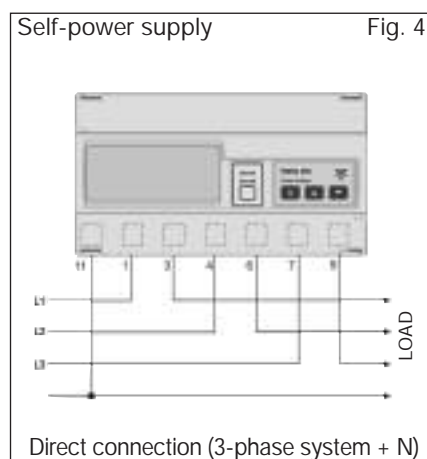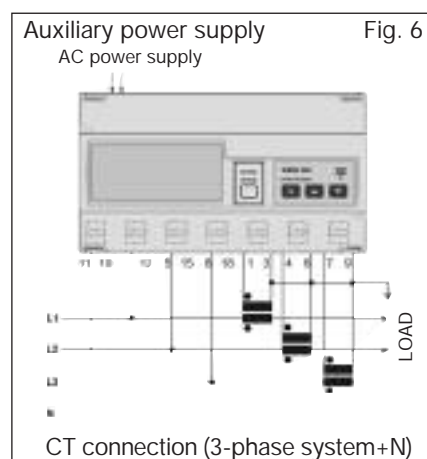| Power supply	Self p.s.		Auxiliary p.s.	
Basic unit	Slot A	Slot B	Slot A	Slot B
Analogue output		●(*)		●
RS485 Serial Output		●(*)		●

(*) AV2 only

Wiring diagrams

20(90)A model: three-phase unbalanced load
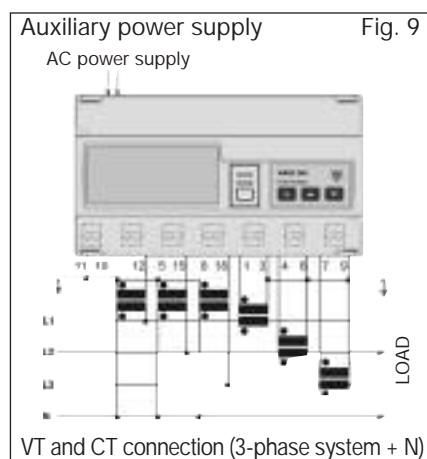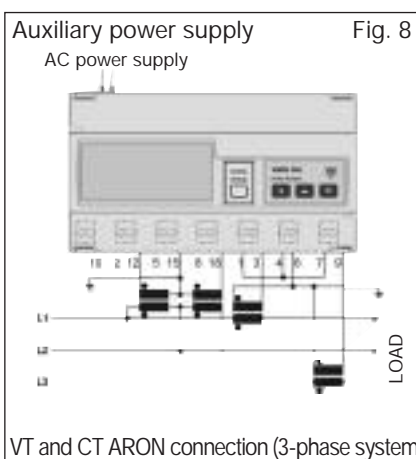
Auxiliary power supply   Fig. 1

AC power supply

Direct connection (3-phase system+N)

Auxiliary power supply   Fig. 2

AC power supply

Direct connection (3-phase system)

Self-power supply   Fig. 3

Direct connection (3-phase system)

**20(90)A model:
three-phase unbalanced load**

Self-power supply   Fig. 4

Direct connection (3-phase system + N)

**5(10)A model:
three-phase unbalanced load**

Auxiliary power supply   Fig. 5

AC power supply

Direct connection (3-phase system
with or without neutral)

Auxiliary power supply   Fig. 6

AC power supply

CT connection (3-phase system+N)

5(10)A model: three-phase unbalanced load

Auxiliary power supply   Fig. 7

AC power supply

CT ARON connection (3-phase system)

Auxiliary power supply   Fig. 8

AC power supply

VT and CT ARON connection (3-phase system)

Auxiliary power supply   Fig. 9

AC power supply

VT and CT connection (3-phase system + N)

Wiring diagrams (optional modules)
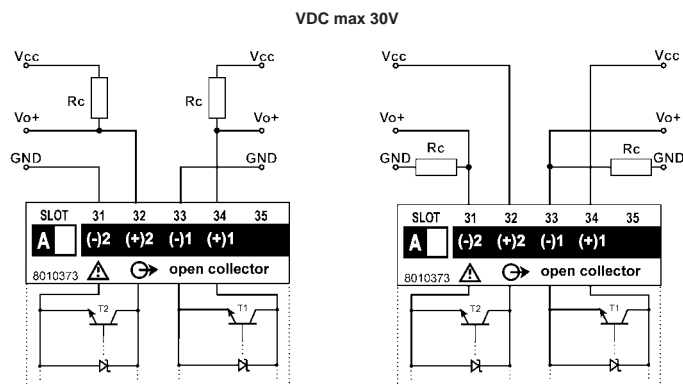
Open collector output   Fig.10

Relay + open collector output Fig. 11
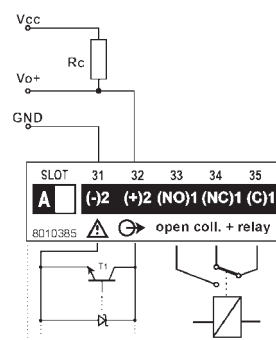
Only open collector outputs: the grounds of the outputs are separated, and therefore it's possible to carry out, for the same module, two different connections. The load resistance (Rc) must be designed so that the closed contact current is lower than 100mA; the VDC voltage must be lower than or equal to 30V. VDC: power supply voltage output. Vo+: positive output contact (open collector transistor). GND: ground output contact (open collector transistor).

Analogue output   Fig. 12
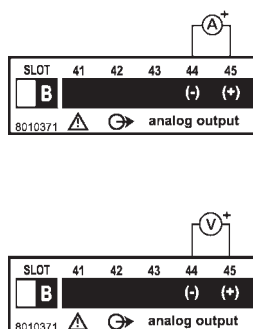
Current and voltage

RS485 Serial output   Fig. 13
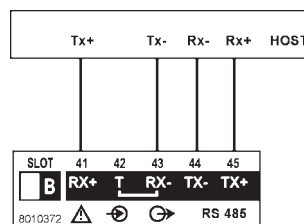
4-wire connection

RS485 Serial output   Fig. 14
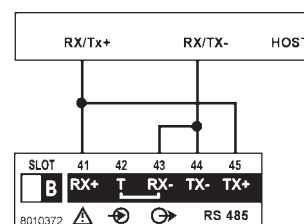
2-wire connection

Front panel description

Keys for:
- value programming;
- function selection;
- displaying the measuring pages.

2. Display
LCD with alphanumeric indications to:
- display configuration parameters;
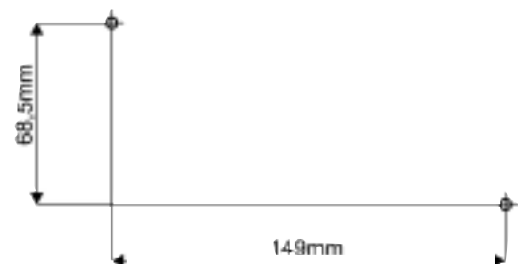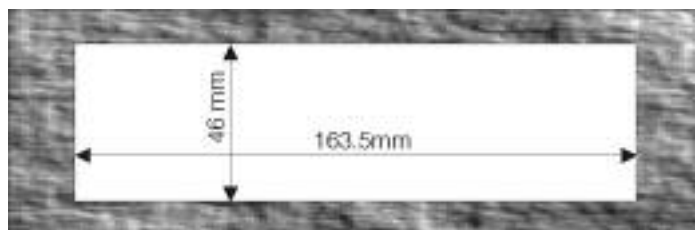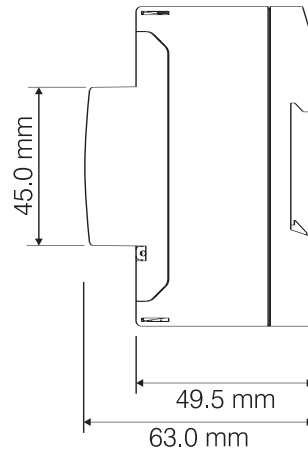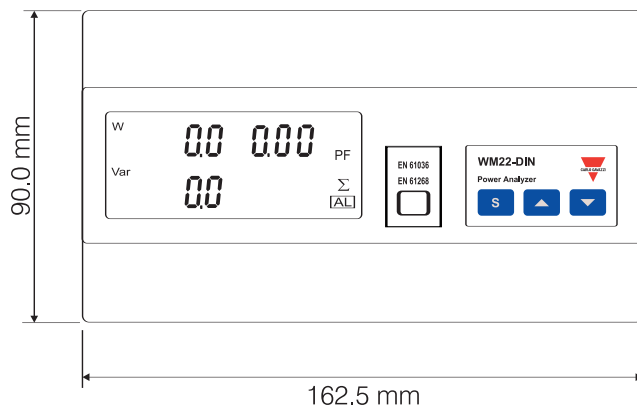- display all the measured variables.

3. Removable label
Label to write the instrument ID number.

4. Hidden dip-switch
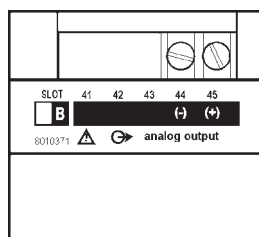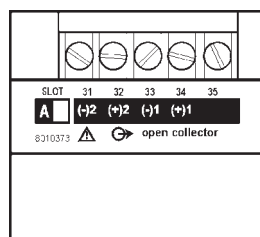Enable/ disable the access to the programming procedure.
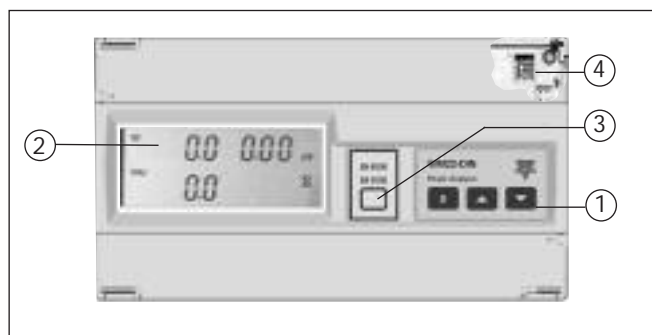
1. Key-pad
To program configuration parameters and to display variables.

| S |

S-key to enter programming and confirm selections;

CARLO GAVAZZI

Dimensions and panel cut-out

90.0 mm

W
0.0 0.00 PF
Var
0.0 Σ
AL

EN 61036
EN 61268

WM22-DIN
Power Analyzer

S ▲ ▼

162.5 mm

45.0 mm

49.5 mm
63.0 mm

46 mm
163.5mm

68.5mm

149mm

Terminal boards

Analogue output module	**Dual output open collector module**	**Relay output module + open collector output**	**RS485 serial output module**
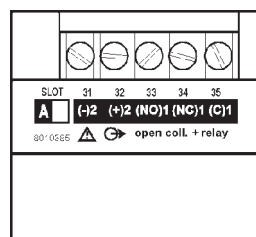
SLOT 41 42 43 44 45
B (-) (+)
8010371 ⚠ ⟶ analog output

SLOT 31 32 33 34 35
A (-)2 (+)2 (-)1 (+)1
8010373 ⚠ ⟶ open collector

SLOT 31 32 33 34 35
A (-)2 (+)2 (NO)1 (NC)1 (C)1
8010365 ⚠ ⟶ open coll. + relay

SLOT 41 42 43 44 45
B RX+ T RX- TX- TX+
8010372 ⚠ ⊕ ⟶ RS 485

AO 2920: 0-20 mA
AO 2921: 0-10 V

AO 2900

AO 2910

AR 2950