Energy Management
Energy Meter with plug-in Output Modules
Type EM3-DIN

- **Class 2 (active energy)**
- **Class 3 (reactive energy)**
- **Active reactive energy meter**
- **Direct connection up to 90A**
- **Electromechanical display 6+1DGT**
- **LED for the indication of the consumed energy**
- **Selection of the displayed energy by means of dip-switch**
- **Optional pulse output (as a module)**
- **Self power supply or auxiliary power supply 115VAC, 230VAC 50-60Hz**
- **Full compliance with EN61036 (active energy, class 2)**
- **Full compliance with EN61268 (reactive energy, class 3)**
- **Dimensions: 9 DIN-modules**
- **Sealable housing**

Product description

EM3-DIN is a three-phase energy meter for the measure of active or reactive energy; the 208V_{L-L}, 220V_{L-L} and 400V_{L-L} meters are self-supplied, while the 660V_{L-L} meters are provided with auxiliary power supply. EM3-DIN is provided with: 6+1DGT electromechanical indicator for the indication of kWh or kvarh; one green LED for the indication of power ON; one red LED blinking proportionally to the consumed energy.

How to order

EM3-DIN AV9 3 X X

Model
Range code
System
Power supply
Slot A

Important note: the AV2 model is suitable only for three-phase unbalanced system without neutral.

Type selection

Range code

Auxiliary Power Supply (C or D):
AV3: 660V_{L-L} / 20(90)AAC
Self Power Supply (X):
AV2: 220V_{L-L} / 20(90)AAC
AV8: 208V_{L-L} / 20(90)AAC
AV9: 400V_{L-L} / 20(90)AAC

System

3 : Three-phase, unbalanced load

Power supply

C: 115VAC - 15+10% 50-60Hz (only range AV3)
D: 230VAC -15+10% 50-60Hz (only range AV3)
X: Self power-supply

Slot A (retransmission)

X: None
O: Module AO2900 Dual open collector pulse output
R: Module AO2910 One relay output + one open collector output.

Input specifications

Accuracy	
Active energy	Class 2, according to EN61036
Reactive energy	Class 3, according to EN61268
Start-up current	80mA
Additional errors	Acc. to EN61036, EN61268
Voltage variation	< 0.5%
Frequency variation	< 0.5%
Wave form	<1% (3rd harmonic: 10%)
Voltage disymmetry	< 0.5% (referred to the rated input voltage)
External continuous magnetic induction	0
Magnetic induction	0 (up to 0.5 mT)
HF electromagnetic field	< 1%
Accessories influence	0
Temperature drift	≤ 250 ppm/°C
Measurements	Active or reactive energy
Wave form	sinusoidal and distorted
Crest factor (I ≤ 20A)	≤ 6 (127A peak max)
Basic current (Ib)	20A (according to EN61036 /EN61268)
Maximum current (Imax)	90A (according to EN61036/ EN61268)
Overload	
Continuous: current	4.5 x Ib
For 10ms: current	30 Imax @ 50Hz

Rated input voltage	
AV2 (AE2004)	Un: 220V_{L-L}, -10%≤Un≤+15%, 50-60Hz
AV3 (AE2002, AE2003)	Un: 660V_{L-L}, -20%≤Un≤+15%, 50-60Hz
AV8 (AE2001)	Un: 208V_{L-L}, -20%≤Un≤+15%, 50-60Hz
AV9 (AE2000)	Un: 400V_{L-L} -20%≤Un≤+15%, 50-60Hz
Input impedance	
AV2	> 720kΩ (220V_{L-L}), ≤ 4VA
AV3	> 1.97MΩ (660V_{L-L}), ≤ 4VA
AV8	> 720KΩ (208V_{L-L}), ≤ 4VA
AV9	> 720KΩ (400V_{L-L}), ≤ 4VA
Frequency	50-60 Hz
Electrical system	3-phase, unbalanced with or without neutral. Note: in the self-supplied version, the neutral must be connected to the measuring inputs.
Display	Electromechanical type 6+1 DGT
Power supply	Green LED, ON if supplied
Energy consumption	Red LED, 640 imp./kWh/ kvarh (min. period: 0.5s)
Selection of displayed energy	By means of DIP-switch
Dip-switch 1	ON: active energy OFF: reactive energy

Output specifications

Pulse outputs (on request)	AO2900, slot A
Number of outputs	2
	Pulse outputs to be used as retransmission of the energies:
Channel 1	active energy
Channel 2	reactive energy
Number of pulses	10 / kWh, 10 / kvarh
Type	Open collector (NPN transistor) V_{ON} 1.2VDC / max 100mA V_{OFF} 30VDC max
Pulse duration	220ms (ON), ≥200ms (OFF) according to DIN43864
Leakage current	≤10µA, @ 30V, 60°C
Insulation	By means of optocouplers, 2000Vrms for 1 minute between measuring inputs and pulse outputs.
	Insulation between the two outputs: functional
AO2910 module	Relay + open collector output. Working mode like AO2900.
Pulse output	One static output+one relay output, other characteristics like AO2900.
Output type	Static type like module AO2900; Relay type: SPDT, AC1, AC15: 1AAC @250VAC
Insulation	2000 V_{RMS} outputs to measuring inputs, 2000 V_{RMS} output to supply input. Insulation between the two outputs: 2000 V_{RMS}

Power supply specifications

Self power supply	400VAC V_{L-L} -20% +15% 50-60Hz 208VAC V_{L-L} -20% +15% 50-60Hz 220VAC V_{L-L} -10+15%, 50-60Hz
Auxiliary power supply	230VAC -15+10% 50-60Hz 115VAC -15+10% 50-60Hz

General specifications

Operating temperature	-20 to +55°C (14°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN61036 and EN61268
Storage temperature	-20 to +70°C (14°F to 140°F)
Dielectric strength	4000Vrms for 1 minute
Installation category	Cat. III (IEC 664)
EMC	
Burst	4kV / level 4 (EN61000-4-4)
Immunity to irradiated electromagnetic fields	10V/m from 26 to 1000MHz (EN61000-4-3)
Electrostatic discharges	15kV (EN61000-4-2)
Radio frequency emissions	according to CISPR 14 and CISPR 22
Pulse voltage (1.2/50µs)	8kV (EN61000-4-5)
Standards	
Metrology	EN61036, EN61268
Safety	IEC-664
Pulse output	DIN 43864
Connections	Screw-type,
Cable cross-section area	Max. 35 mm^2 (measuring inputs) Min. 6 mm^2 (measuring inputs) Other inputs: 4 mm^2
Min./Max. screws tightening torque	2 Nm / 6 Nm (90A inputs)
Housing	
Dimensions	162.5 x 90 x 63 mm
Material	ABS, NORYL, PC self-extinguishing
Mounting	DIN-rail or wall
Degree of protection	Front: IP40 Screw terminals: IP20
Weight	Approx. 800 g (packing included)

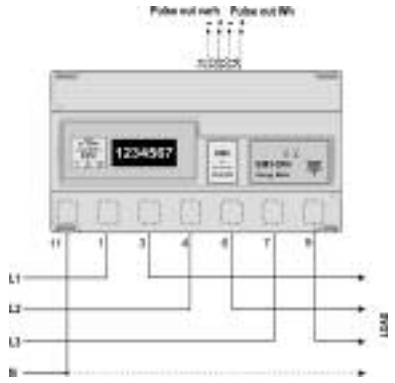
Available models and modules

Type	Inputs	Power Supply	Number of channels	Ordering code
EM3-DIN AV9.3.X	400V_{L-L} / 20(90)AAC	Self power supply		AE2000
EM3-DIN AV8.3.X	208V_{L-L} / 20(90)AAC	Self power supply		AE2001
EM3-DIN AV2.3.X	220V_{L-L} / 20(90)AAC	Self power supply		AE2004
EM3-DIN AV3.3.C	660V_{L-L} / 20(90)AAC	115VAC - 15+10%		AE2002
EM3-DIN AV3.3.D	660V_{L-L} / 20(90)AAC	230VAC - 15+10%		AE2003
Open collector output			2	AO2900
Relay + open coll. output			2	AO2910

Wiring diagrams

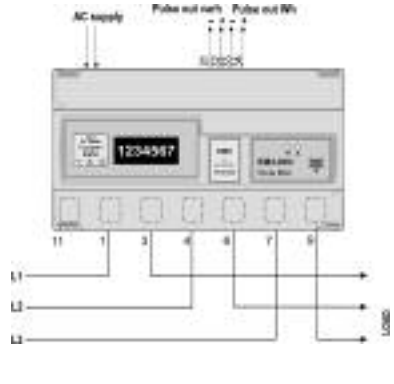
EM3-DIN 20(90)A

Self power-supplied Fig. 1



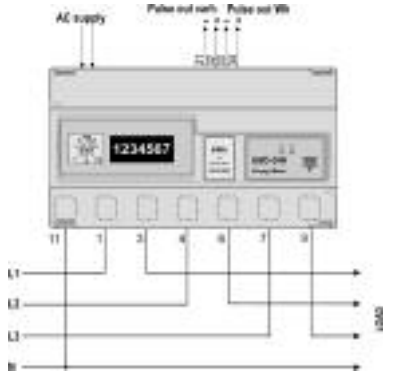
Direct connection (3-phase system + N)

Auxiliary power-supply Fig. 2



Direct connection (3-phase system)

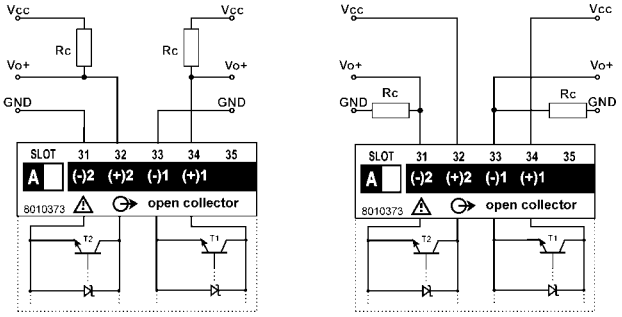
Auxiliary power-supply Fig. 3



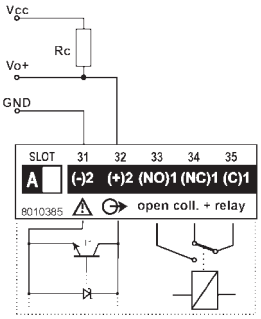
Direct connection (3-phase system + N)

Wiring diagrams (optional module)

Open collector output Fig. 1



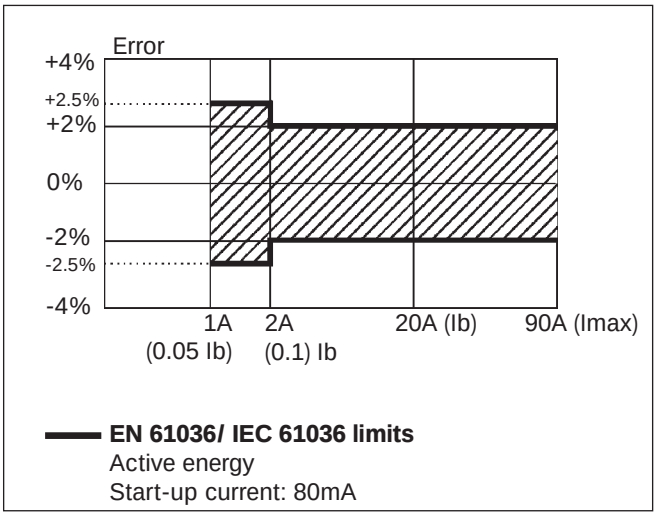
Relay + open collecttor output Fig. 2



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.

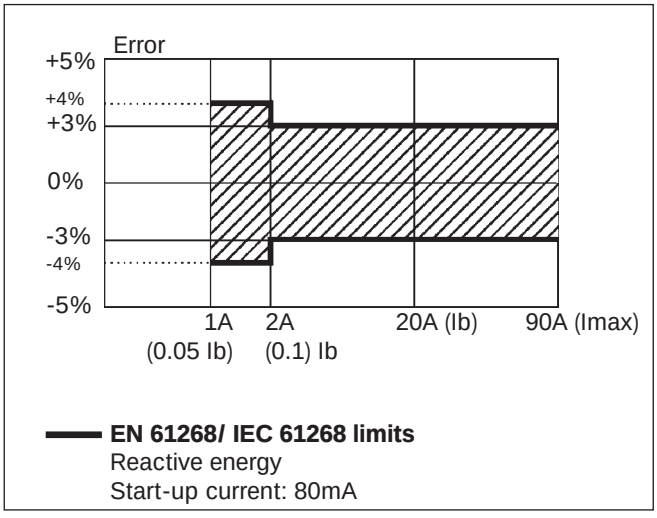
Accuracy

Accuracy (RDG) depending on the current



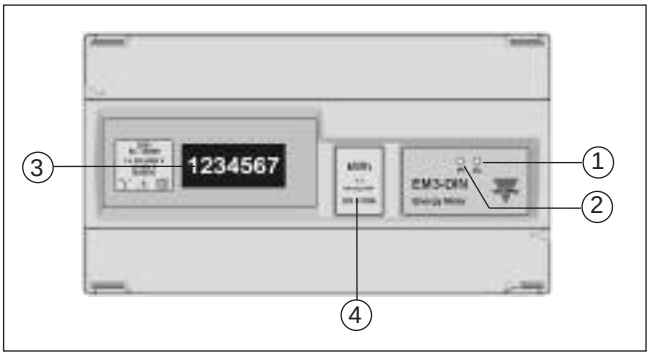
EN 61036/ IEC 61036 limits
Active energy
Start-up current: 80mA

Accuracy (RDG) depending on the current



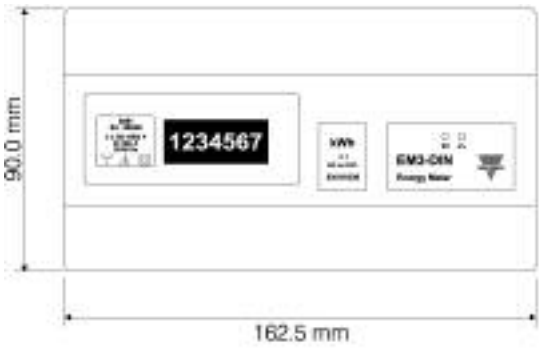
EN 61268/ IEC 61268 limits
Reactive energy
Start-up current: 80mA

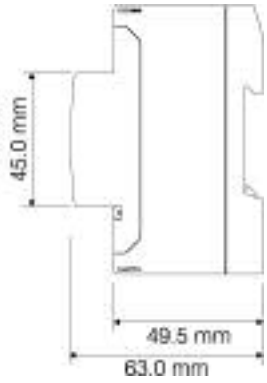
Front panel description



1. **Red LED**
   Indicates the consumed energy (640 pulses / kWh, minimum period 0.5ms) blinking proportionally.
2. **Green LED**
   Indicates power ON.
3. **Display**
   Electromechanical type, 6+1 DGT, displays kWh or kvarh according to the selection made by means of an internal dip-switch.
4. **Engineering unit**
   Removable double sided [front (kWh) / back (kvarh)] label

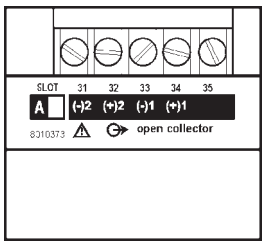
Dimensions





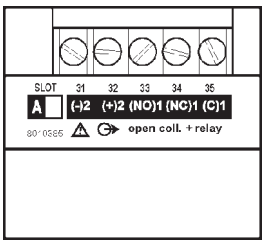
Terminal board

Dual open collector output module



AO 2900

Realy + open collect-tor output



AO 2910