GOSSEN METRAWATT **ENGLISH**

3-447-132-15

IST324-01 - 1/9.22

METRALINE I ENERGY

Three-phase Digital Energy Meter

Direct connection 80 A

Operating Instructions

The Energy Meter provides all relevant measures for the evaluation of an electrical network: I, U, PF, F, THD%, Powers (displayed for each phase and 3 phase) and Imported/Exported Active/Reactive Energies.

• All models have the 0.25-5(80) A current range, with 2 tariffs and with IR lateral communication available.

The built-in communication depends of the model:

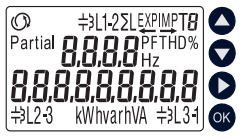
Model	Communication
U289D	2 S0 Impulsausgänge **MID-zertifiziert**
U289E	Built in RS-485 Modbus RTU **MID certified**
U289F	Built in M-Bus (1 unit Load) **MID certified**

(•) For swiss market only active energy on display

⚠ RISK OF ELECTRIC SHOCK, BURNS OR EXPLOSION

This device must be installed and maintained ONLY by qualified and duly authorized personnel.
During its installation, be sure there is no voltage applied.

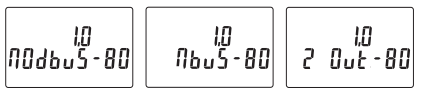
Frontal of the Energy Meters



- **UP button:** to scroll pages and change parameters
- **DOWN button:** to scroll pages and change parameters
- **MENU/ESC button:** to change menu and stop modification procedure of a parameter
- **OK button:** to confirm the modification of a parameter

Device Switch-on

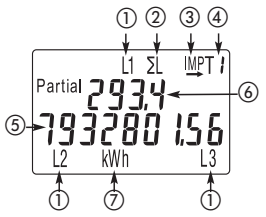
• When the device is switched on, the firmware version and the model appear on the display for one second. **(Preliminary Page)**



Display Back light

• If no button is pushed for 40 seconds, the display goes back to the **Main Page** and the backlight is switched off.
• The first button pushing does not change the page but is used to switch the backlight on.

Main Energy Page



1: Appears if V (L-N) >=92 VAC
2: Three-phase energy
3: "IMPorted" / "EXPorted" flowing power direction
4: working tariff
5: Three-phase Active Energy register
6: Corresponding Partial Energy register
7: Energy Unit

Selection Menu

By Pushing from Any page of Main Menu

- ΣL EnErGIES (*) OK → **Three Phase Energies List**
- L1 EnErGIES (*) OK → **Phase 1 Energies List**
- EnErGIES L2 (*) OK → **Phase 2 Energies List**
- EnErGIES L3 (*) OK → **Phase 3 Energies List**
- ΣL InSt nEASUrES (*) OK → **Three Phase Instantaneous measures** active power, reactive power, apparent power, frequency, neutral current
- L1 InSt nEASUrES L2 L3 (*) OK → **Phase L1, L2 & L3 Instantaneous measures** active power L1, active power L2, active power L3, reactive power L1, reactive power L2, reactive power L3, apparent powers, line voltages, system voltages, phase current, power factors, voltage THDs, currents THDs
- CONFIGUrE (*) OK → **Parameters List (Read and/or Modify)**
- Partial EnrG rESEt ,? (*) OK → **Partial Energies Reset Procedure**
- CHS 626CH → **Firmware checksum**
- UEr. 1.04 → **Firmware version**
- Partial PF THD% Hz kWh varh VA → **Display test**

(*) access can be protected by Password (see Password chapter)

Partial Energies Reset Procedure

Partial EnrG rESEt ,? → OK
Partial SurE to rESEt? → OK
Partial dOnE rESEt

• When this page is on the display, it is possible to reset the Partial Energies **(Main Energies are not resettable)**.
• By pushing the **OK button** again, the Partial Energies are reset.
• By Pushing push **MENU/ESC button** or no button is pressed for 40 seconds, the procedure is stopped, and the display goes back to **"Enrg Reset?"** page.

Password

In **Configure Menu** it is possible to protect the access to sub-menues of Selection Menu by a password.

OFF PASSWOrd — Password can be enabled **(ON password)** or disabled **(OFF password)**, the default value is OFF

Entr PASSWOrd — Once requested, to enter the password user must push both **UP button** and **DOWN button** at the same time for 4 seconds

Phase Sequence Error

PhASE Err

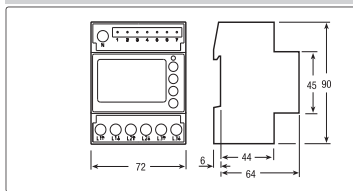
• In case the cabling sequence is wrong, this message appears. In this condition, the Energy Meter continues to measure and to increase the Energy Registers, but its calculation is not correct.
• By pushing **OK button** for 5 seconds, this message disappears until next restart

Unrecoverable Internal Errors

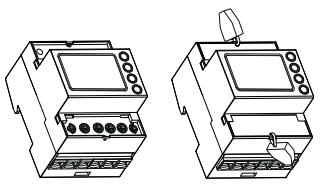
FAIL ErrOr n.02
FAIL ErrOr n.03

• In case the display shows these messages, the device has got a malfunction and must be replaced

Dimension



Sealable terminal covers

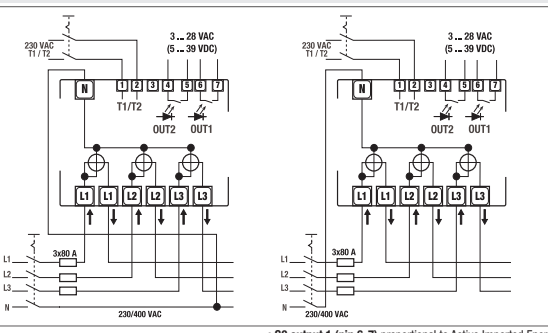


Wiring diagram

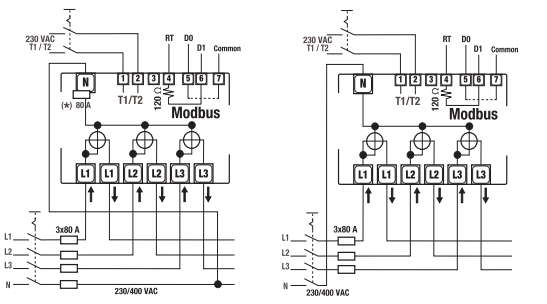
• The Energy Meter has **OVERVOLTAGE CATEGORY III** (according to IEC 62052-31 that refers to IEC-60664-1 Ed. 2.0:2007), hence its direct connection to the Public Electricity Grid is not allowed. The Energy Meter is intended for INDOOR installation only (according to EN 50470-1 and IEC 62052-31).
The Energy Meter must be installed on a DIN-rail and inside a cabinet with a protection degree (IP rating) equal to (or better than) IP51

(N) Neutral wire must be connected to the meter

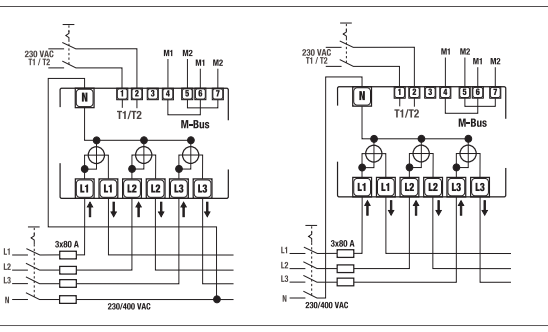
U289D



U289E



U289F



*** Note**
S0 outputs options
S0 outputs, by default, are proportional to **Imported (pin 6-7)** and **Exported (pin 4-5)** Active Energy.
The following other options are selectable by means of HMI interface.

- **S0 output 1 (pin 6-7)** proportional to Active Imported Energy
- **S0 output 2 (pin 4-5)** proportional to Reactive Imported Energy

or

- **S0 output 1 (pin 6-7)** proportional to Active Imported Energy under Tariff T1
- **S0 output 2 (pin 4-5)** proportional to Active Imported Energy under Tariff T2

Terminal Description

1-2: Tariff input, internally opto-isolated (4kV). Applying 230 VAC (±20%), the running tariff toggles to T2, and T2 Energy Counter Registers are incremented
L1 ↑: Input connection for phase 1.
L1 ↓: Output connection for phase 1.
L2 ↑: Input connection for phase 2.
L2 ↓: Output connection for phase 2.
L3 ↑: Input connection for phase 3.
L3 ↓: Output connection for phase 3.
N: Neutral connection.

S0
6-7: Opto-isolated S01 pulses output
4-5: Opto-isolated S02 pulses output

Modbus
4: Modbus Network. Short this pin with pin 5 to apply 120 Ohm termination.
5: Modbus network. D0
6: Modbus network. D1
7: Modbus network. Common

M-Bus
4-6: M-Bus network terminals.
5-7: M-Bus network repeated terminals. These terminals are internally connected to terminals 4-6.

Main Menu

Three Phase Energies List

Main Page → Active Imported Energy tariff T1 with partial register
Partial 293.4 793200 1.56 kWh → Active Exported Energy tariff T1 with partial register
Partial 6.47 610.65 kWh → Active Imported Energy tariff T2 with partial register
Partial 3528 3208 1.46 kWh → Active Exported Energy tariff T2 with partial register
Partial 1986 532608.74 kWh → Reactive Imported Energy tariff T1
3367 1.24 k varh → Reactive Exported Energy tariff T1
276009.83 k varh → Reactive Imported Energy tariff T2
3245 105.76 k varh → Reactive Exported Energy tariff T2
925 0.16 k varh

■ **Note: Main Page** and consequently page sequence could be different, according to the flowing power and working tariff

Parameters in S0 model

PLS 250 kWh — **Pulses per kWh**
• In direct connected models, the following values are available: 1, 2, 5, 10, 20, 50, 100 or 200.
• The default value is 200

PLS 80 tLEn — **Pulse time length**
• Duration of ON pulse for S0 outputs: 30 to 100 ms.
• The default is 100 ms

PLS In - Out kWh — **S0 ouputs configuration mode**
■ **In - Out**
• **S01** proportional to Imported Active Power
• **S02** proportional to Exported Active Power
■ **Act-React**
• **S01** proportional to Imported Active Power
• **S02** proportional to Imported Reactive Power
■ **TAR1-TAR2**
• **S01** proportional to Imported Active Power under T1
• **S02** proportional to Imported Active Power under T2

OFF PASSWOrd — • Password Enabled/Disabled

Parameters in models with Modbus on-board

Addr 138 — • **Modbus Address**. Selectable in the range 1 ... 247.
• The default address is 1.

bAud rAtE 9600 — • **Modbus Baud Rate.** Available Baud Rates are: 1200, 2400, 4800, 9600, 19200 and 38400.
• The default baud rate is 19200.

nOnE PAr ItY — • **Modbus Parity.** Available Parity are None, Even and Odd.
• The default Parity is None.

2 StOP bItS — • **Modbus Number** of Stop Bits (1 or 2).
• The default number of Stop Bits is 1

OFF PASSWOrd — • Password Enabled/Disabled

Parameters in models with M-Bus on-board

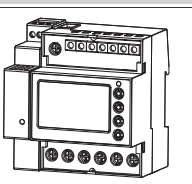
Addr 138 — • **M-Bus Primary Address.** Selectable in the range 1... 250.
• The default value is 0, but, once modified to a value 1... 250, it is no longer possible to go back to 0.

bAud rAtE 9600 — • **M-Bus Baud Rate.** Available Baud Rates are: 300, 600, 1200, 2400, 4800 and 9600.
• The default baud rate is 2400.

Id. 04517629 — • **Unique M-Bus Secondary Address**, not modifiable

OFF PASSWOrd — • Password Enabled/Disabled

Connectable IR Communication Modules

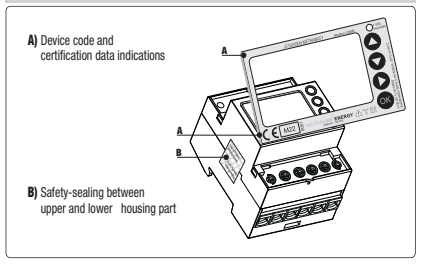


Cable stripping length and max terminal screw torque

Main terminals - Screw driver PZ2 — 15.5 mm — 2 Nm

Tariff and communication terminals Screw driver blade 0.8x3.5 mm — 9 mm — 0.5 Nm

MID certified



A) Device code and certification data indications
B) Safety-sealing between upper and lower housing part

Applications

Please read this important information!
Intended Use / Use for Intended Purpose
The instrument is a digital multifunctional energy meter certified in accordance with MID. Integrated 4-quadrant measurement permits measurement of energy import and export.
Thanks to MID certification, acquired data (display) can also be used for the purpose of billing energy costs to third parties.
Via integrated communication interfaces, the values are also forwarded to superordinate management systems. Protection against tampering is provided through adequate measures (tamper-proof cover).
Safety of the operator, as well as that of the instrument, is only assured when it's used for its intended purpose

Use for Other than Intended Purpose
Using the instrument for any purposes other than those described in the product documentation is contrary to use for intended purpose.

Liability and Guarantee
Gossen Metrawatt GmbH assumes no liability for property damage, personal injury or consequential damage resulting from improper or incorrect use of the product, in particular due to failure to observe the product documentation. Furthermore, all guarantee claims are rendered null and void in such cases.
Nor does Gossen Metrawatt GmbH accept any liability for data loss.

Scope of Delivery

3 instrument **(U289D) - (U289E) - (U289F)**
1 operating instructions

Safety Instructions

Read and follow these instructions carefully and completely in order to ensure safe and proper use. Keep for future reference.

DANGER

Electric shock due to live components!
Life endangering due to electric arcs!

Touching voltage conducting components is life endangering!

– The installation and any work performed on the instrument may only be carried out by a qualified electrician.
– Observe and comply with all safety regulations which are applicable for your work environment.
– Wear suitable and appropriate personal protective equipment (PPE) whenever working with the instrument.
– During installation, the installation environment must be voltage-free. For that, observe the five safety rules in accordance with DIN VDE 0105-100.

ATTENTION
Faulty installation & incorrect operation
Faulty installation/incorrect operation can damage your instrument/system.
Risk of malfunctions and disruptions

– Comply with the specified technical data and conditions
– Do not install the instrument in potentially explosive atmospheres.
– Do not install the instrument in locations where it may be exposed to direct sunlight.
– Install and operate the instrument only if it and all connection cables and leads are in good working order and damage-free. Inspect the instrument at regular intervals.
– If the instrument doesn't function flawlessly, permanently remove it from operation and secure it against inadvertent use.

Symbols on the Instrument

European conformity marking

CE

Double insulation (protection category II)

CE and metrology mark with indication of year (M22) and registration number of the notified body for module D, country-specific calibration validity period

CE M 22 0051 398 / MID

Standards, Regulations and Directives

– DIN 43880
– EN 50470-1
– EN 50470-3
– EN 60715
– EN 62053-31
– IEC 62053-23

Transport & Storage

Transport and store the instrument only within the limits of permissible ambient conditions. Also use suitable packaging in order to ensure adequate protection against environmental influences and mechanical stress.

Maintenance

The instrument is maintenance-free. Keep outside surfaces clean.
Clean the instrument only with a dry cloth.

Recalibration

Comply with national recalibration regulations and laws. The calibration period in Germany is 8 years.
A broken manufacturer's seal means equals invalidated calibration. The instrument must not be used for billing purposes.

Repairs & Manufacturer's Guarantee

If your instrument requires repair, please contact our service department; see Support & Contact.
Unauthorized modification of the instrument is prohibited. This also includes opening the meter.
If it can be ascertained that the instrument has been opened by unauthorized personnel, no guarantee claims can be honored by the manufacturer with regard to personal safety, measuring accuracy, compliance with applicable safety measures or any consequential damages. If the manufacturer's seal is damaged or removed, all guarantee claims are rendered null and void.
The instruments are guaranteed for a period of 2 years after shipment. The manufacturer's guarantee covers materials and workmanship. Damage resulting from use for any other than the intended purpose or operating errors, as well as any and all consequential damage, are excluded.

Disposal & Environmental Protection

- The following comments refer specifically to the legal situation in the Federal Republic of Germany. Owners or end users who are subject to other national requirements are required to comply with the respectively applicable national requirements and to implement them correctly on site
- The symbol on the left depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end user (German electrical and electronic equipment act ElektroG and German battery act BattG) not to dispose of used electrical equipment and batteries with unsorted municipal waste ("household trash").
- Old devices, electrical or electronic accessories and waste batteries (including rechargeable batteries) used in Germany can be returned free of charge to Gossen Metrawatt GmbH or the service provider responsible for their disposal. Further information can be found on our website.

Support and Contact

Please contact us at
+49 911 8602-0
Monday – Thursday: 08:00 Uhr – 16:00 Uhr
Friday: 08:00 Uhr – 14:00 Uhr
support.industrie@gossenmetrawatt.com

Please contact GMC-I Service GmbH for repairs, replacement parts and calibration:
+49 911 817718-0
service@gossenmetrawatt.com
www.gmci-service.com

CE Declaration

The device fulfills all requirements of applicable EU directives and national regulations.
We confirm this with the CE mark.
The CE declaration is available on our website:
https://www.gmc-instruments.de/en/services/download-center/download-center/

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Technical Data

ENGLISH

Data in compliance with CLC/TR 50579 , EN 62059-32-1, EN 50470-1, EN 50470-3			Direct connection Pulse output S0	Direct connection built-in communication Modbus / M-Bus
General characteristics				
• Housing	DIN 43880	**DIN**	4 modules	4 modules
• Mounting	EN 60715	**35 mm**	DIN rail	DIN rail
• Depth		**mm**	70	70
• Weight		**g**	412	412
Operating features				
• Connectivity	to three-phase network	**n° wires**	4	4
• Storage of energy values and configuration	internal FLASH memory	**-**	yes	yes
• Display tariffs identifier	for active energy	**n° 2**	T1 and T2	T1 and T2
Approval (according to EN 50470-1, EN 50470-3)				
• Reference Voltage **Un**	Line to Neutral	**VAC**	230	230
• Reference Voltage **Un**	Line to Line	**VAC**	400	400
• Reference Current **(Iref)**		**A**	5	5
• Minimum Current **(Imin)**		**A**	0.25	0.25
• Maximum Current **(Imax)**		**A**	80	80
• Starting Current **(Ist)**		**A**	0.015	0.015
• Reference Frequency **(fn)**		**A**	50	50
• Number of phases (number of wires)		**-**	3 (4)	3 (4)
• Certified Measures		**kWh**	→ kWh, ← kWh	→ kWh, ← kWh
• Accuracy Active Energies (accor. to EN 50470-3) and Active Powers		**class**	B	B
Supply Voltage and Power Consumption				
• Operating Supply Voltage range		**VAC**	92 ... 276 / 160 ... 480	92 ... 276 / 160 ... 480
• Maximum Power Dissipation (Voltage circuit)		**VA (W)**	<2 (0.6)	< (0.6)
• Maximum VA burden (Current circuit) @ **Imax**		**VA**	<0.7	<0.7
• Voltage Input Waveform		**-**	AC	AC
Overload capability				
• Voltage	continuous; phase/phase	**VAC**	480	480
	1 second: phase/phase	**VAC**	800	800
	continuous; phase/N	**VAC**	276	276
	1 second: phase/N	**VAC**	300	300
• Current	continuous	**A**	80	80
	Temporary (10 ms)	**A**	2400	2400
Measuring Features				
• Voltage range	phase/phase	**VAC**	160 ... 480	160 ... 480
	phase/N	**VAC**	92 ... 276	92 ... 276
• Current range (secondary winding)		**A**	0.015 ... 80	0.015 ... 80
• Frequency range		**Hz**	45 ... 65	45 ... 65
• Measured Quantities		**-**	kWh	kWh
Display features				
• Display type	LCD	**-**	9 (2 Decimal)	9 (2 Decimal)
	Energy digits dimension	**mm**	6 x 3	6 x 3
• Active Energy	7 digits + 2 decimal digits	**min. ... max. kWh**	0.01 ... 9999999.99	0.01 ... 9999999.99
• Running Tariff	1 digit	**-**	T1 or T2	T1 or T2
• Display refresh period		**s**	1	1
Safety				
• Protective class		**class**	II	II
• AC voltage test (EN 50470-3, 7.2)		**kV**	4	4
• Degree of pollution		**-**	2	2
• Operational voltage		**VAC**	300	300
• Impulse voltage test		**1.2/50 µs-kV**	6	6
• Housing material flame resistance	UL 94	**class**	V0	V0
• Safety-sealing between upper and lower housing part	-		yes	yes
Pulse Outputs (S0 signals)	acc. to IEC 62053-3			
• Pulse Output 1	adjustable	**-**	kWh (T1) →, kWh → , kWh →	kWh (T1) →, kWh → , kWh →
• Pulse Output 2	adjustable	**-**	kWh (T2) →, kWh ← , kvarh →	kWh (T2) →, kWh ← , kvarh →
• Pulse Rate	adjustable	**p/kWh**	1 ... N **(•)** **(•) N - dep. on CT-ratio and Pulse on Time)**	-
• Pulse ON-time	adjustable	**ms**	30 ... 100	-
• Operating Voltage	Min - Max	**VAC (VDC)**	3 ... 28 VAC (5 ... 39 VDC)	-
• Pulse ON maximum current		**mA**	90	-
• Pulse OFF leakage current		**µA**	1	-
• Isolation class		**-**	SELV circuit	-
Embedded communication Modbus				
• Physical interface	RS485 - 3 Wire	**-**	-	D1, D0, Common (GND)
• Internal termination resistor		**-**	-	120 Ω
• Baud rate	adjustable	**-** 19200-38400	-	1200-2400-4800-9600
• Parity	adjustable	**-**	-	Odd, Even, None
• Stop Bit	adjustable	**-**	-	1. 2
• Address	adjustable	**-**	-	1-247
• Isolation class		**-**	-	SELV circuit
Embedded communication M-Bus				
• Baud rate	adjustable	**-** 4800-9600	-	300-600-1200-2400
• Unit load		**-**	-	1
• Isolation class		**-**	-	SELV circuit
Optical metrological LED				
• Front mounted red LED (meter constant)	proportional to active imp/exp Energy	**p/kWh**	1000	1000
IR Connectable Communication Modules				
• For communication moduls connection **(LAN-TCP/IP / M-Bus / Modbus RTU / KNX)**	-	yes	yes	
Connection terminals				
• Screwdriver for mains terminals	head with Z +/-	**POZIDRIV**	PZ2	PZ2
• Screwdriver for tariff and comm. terminals	slotted head	**mm**	0.8 x 3.5	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max)	**mm²**	0 (33)	0 (33)
	stranded wire with sleeve min. (max)	**mm²**	0 (33)	0 (33)
• Terminal capacity for tariff and comm.	solid wire min. (max)	**mm²**	0 (4)	0 (4)
	stranded wire with sleeve min. (max)	**mm²**	0 (2.5)	0 (2.5)
Environmental conditions (storage)				
• Temperature range		**°C**	-25 ... +70	-25 ... +70
Environmental conditions (operating)				
• Temperature range		**°C**	-25 ... +55	-25 ... +55
• Mechanical environment		**-**	M1	M1
• Electromegnetic environment		**-**	E2	E2
• Installation	Indoor	**-**	yes	yes
• Altitude (max.)		**meters**	<2000	<2000
• Humidity	yearly average, not condensing	**-**	<5%	<75%
	on 30 days per year (not condensing)	**-**	<95%	<95%
• IP rating		**-**	IP51(*)/IP40	IP51(*)/IP40

(*) The metering equipment must be installed inside a cabinet with IP rating IP51 or better.

Notes