



CewePrometer

- Rack or wall mounted
- Two communication ports
- Up to one year logging memory
- Power quality
- Easy to configure
- Open protocol

General description of the CewePrometer

The Energy meter that apart from measure Energy also can measure power quality. The meter is developed and produced in Sweden.

What can the CewePrometer do?

Measure energy

CewePrometer can measure

- active energy (kWh)
- reactive energy (kVArh)
- apparent energy (kVAh)

The measured energy is accumulated in energy registers for import, export and the four quadrants.

Built in terminal

The CewePrometer can receive and accumulate energy pulses from other meters into registers. This enables one CewePrometer to act as a four-input data concentrator and record energy from other (simple) meters.

Power quality

The CewePrometer has a module to calculate the power quality according to selected parts of EN50160.

- Logging of power outages duration and number
- Supervision of short voltage fluctuations < 1 sec.
- Supervision of long voltage fluctuations > 1 sec.
- Measurement of THD and individual harmonics.
- Graphical display of harmonics and vector diagrams.
- Level monitoring for harmonics. 31 harmonics can be shown
- Level monitoring for Power, P.F., current and voltage imbalance.

Calculate maximum demand

The CewePrometer can be set up to calculate up to eight different maximum demand values and store in eight different MD registers. The MD's to be calculated

can be selected from active, reactive or apparent registers for both energy directions and the four quadrants or from one or more of the four pulse input registers.

Configurable

The CewePrometer has many functions and settings. The meter is configured according to the customer requirements. The user can easily change the configuration with the software CeweConfig.

Store and provide periodical invoicing data

The CewePrometer can store periodical readings. This means that the meter takes a "snapshot" of all accumulating and MD registers. To activate the end of period and reset the MDs, simply push a button on the meter, use a pulse input, use a calendar or use CeweConfig. 14 previous periods can be stored. The data for the oldest billing period will be overwritten when data for a newer period is saved at the end of the billing period.

Security

The security system in the CewePrometer and CeweConfig software consists of five password levels. The highest level (level 5) is used for calibration the meter and the lowest level (level 1) only allows reading from the meter.

The meter is provided with sealing screws.

Graphical display

A graphical display on the front and three buttons to navigate, makes it easy for the user to find useful information on the



meter. The information is displayed as text and as graphic. The user can configure up to five different display sequences from which one is selected.

Communication

The CewePrometer is equipped with an optical port, complying with IEC 1107 and one or two serial ports.

The two serial ports can be either RS232 or RS485 or a combination. These ports can be used to communicate with the meter via a modem, an Ethernet adapter or via a serial lead. The RS485 port can be used to connect several meters together in a network.

Transmit and receive pulse information, alarms etc

Some of the different versions of the CewePrometer are equipped with solid state relay outputs for pulsing or stationary control signals, and opto-isolated pulse or level sensing inputs.

These output functions can be freely configured to provide energy pulses, alarm signals, energy direction and a user selectable remote control function.

The input functions can be configured for counting external pulse signals into accumulating registers, ending demand period or ending a billing period.

Front panel LED indicators

The CAL Active and CAL Reactive is used when performing a calibration or checking the meter accuracy. It emits a light pulse frequency proportional to the power level, and consequently every pulse corresponds to a certain amount of energy. The constant (pulses per kWh or pulses per kVArh) can be set.

The Alarm-LED is flashing when it indicates that an alarm condition is present. The Power LED simply indicates that the CewePrometer Power supply is working and the meter is alive.

Display instantaneous values

In addition to the conventional data from the energy registers, instantaneous values can be read for the following electrical quantities:

- Current in each phase
- All phase - phase voltages
- All phase - neutral voltages
- Power factor
- Phase angle
- Frequency
- Active power in each phase
- Total active power
- Total reactive power
- Total apparent power
- THD (Total Harmonic Distortion)
- Display of individual harmonics
- Vector diagram

These values are calculated 12 to 15 times each second, based on data from four periods. The display is updated every second with a instantaneous value.

Diagnose installation/connection errors

Voltage phase sequence and correct connection of the currents can be checked on the display.

Store event and error messages

Events and error conditions can be stored in an events and error register. Some of the events to be recorded are configurable with the CeweConfig software. All entries in the register do have a number and a description specifying the event or error that has occurred and when. Some conditions can be set to switch on the front panel Alarm LED. Reading and resetting the register can be done on the display or with the CeweConfig program. Resetting also switches the Alarm LED to off.

Store average periodical consumption (MD's) for longer periods.

CewePrometer is equipped with a large capacity flash memory for data-logging purposes. Up to 20 logging channels in two loggers may be used to record power averages. The two loggers can have separately demand period.

Approximate storage capacity:

Number of logging channels per logger										
Demand period in min	1	2	3	4	5	6	7	8	9	10
1	19	13	10	8	7	6	5	4	4	3
5	96	67	51	41	34	30	26	23	21	19
15	290	201	153	124	104	90	79	70	63	58
30	580	401	307	248	209	180	158	141	127	116
60	1611	803	614	497	418	360	316	282	254	232

Correct for measuring and power transformer errors and losses

Measuring (instrument) transformers have errors that add to the system inaccuracy. If these errors are known it would be worthwhile to correct for these errors in order to maintain a better system measuring accuracy, or simply avoid replacing the measuring transformers when upgrading the system accuracy.

Sometimes the system energy selling point and the most convenient or economical position in the system for measuring the energy are not the same. For example, the commercial interface for a generator station selling the energy may be on the HV side of the line transformer. The most economical place to measure the energy is on the LV side of the power transformer, because of the cost for measuring transformers. To measure and sell the energy in different places in the system requires some means of accounting for the losses between these two positions, i.e. the power transformer losses.

CewePrometer can perform these corrections and compensations for measuring transformer errors and power transformer losses.

Correction for measuring transformer errors, CT's and VT's can be done for phase angle error and magnitude error. Compensation for power transformer losses can be done for iron losses (magnetisation losses) that are more or less constant, and copper losses (resistive losses) that varies as the square of the current.

Characteristics that makes the CewePrometer a better meter!

The CewePrometer is built up from function modules.

Each module has one micro controller. The measurement module has one DSP (Digital Signal Processor) and an AD(Analogue/Digital)-converter. This module makes all calculations.

All modules have its own firmware and can be updated individually. This can be done via optical port on the front, serial cable or via modem.

The rack and the wall mounted version are in fact the same meter but in different shape.

The CewePrometer has many useful functions and alarm levels which the user can configure easily with CeweConfig.

Specification

Accuracy

Class 0.2S or class 0.5S (IEC687)

Voltage circuit (U_N)

Measuring voltage	3-wire system: 3x48 - 138 V or 3x96 - 276 V 4-wire system: 3x48/83 - 3x138/239 V or 3x96/166 - 3x276/478 V
Frequency	50 Hz or 60 Hz $\pm 5\%$
Burden	$< 0,1$ VA/Phase
Max overload voltage	$1,3 \times U_N$ continuously, $2 \times U_N$ 0.5 s

Current curcuit (I_N)

Measuring current	1 or 5 A
Measuring range	0,1 - 200% of I_N
Frequency	50 Hz or 60 Hz $\pm 5\%$
Burden	$< 0,4$ VA/Phase
Max overload current	$2 \times I_N$ continuously, $10 \times I_N$ during 10 s, $40 \times I_N$ during 1 s
Starting current	$< 0,1\%$ (IEC687) of I_N , $0,2\%$ (IEC1036) of I_N

Auxiliary supply

Voltage range	30 - 100 VAC/40 - 130 VDC or 85 - 265 VAC/100 - 300 VDC
Max burden	10 VA

Outputs

Number of outputs	CewePrometer-R 6 outputs CewePrometer-W 8 outputs
Type rating	Solid state MosFET relay , bi-directional 0,2 A, 110 VAC/DC

Pulse outputs

Pulse length	40 ms - 1 s
Max pulse frequency	depending on pulse width, max duty cycle 50%

Inputs

Number of inputs	4 inputs
Type	Opto coupler
Voltage	(AC or DC) 48 - 230 V
Burden	Input resistance 20 k Ω

IEC 1107 communication port

Hardware	IEC 1107 (9603 2 nd edition) optical communication port
Communication protocol	IEC 1107 (9603 2 nd edition)
Baud rate	300 - 9600 baud

Serial communication port

Hardware	RS-232 or RS-485 serial communication port
Connector	RS-232 9-pin D-SUB RS-485 screw connector
Communication protocol	IEC 1107 (9603 2 nd edition)
Hand shaking	Not supported
Baud rate Port 1	300 - 19200 baud
Baud rate Port 2	1200 - 19200 baud

Instantaneous values

V, A, W, var, VA, phase angle, frequency, power factor, THD voltage, THD current, 30 harmonics, vector diagram

Temperature range

Working temperature	-20 °C - +55 °C
Storage temperature	-40 °C - +80 °C
Temperature coefficient	<0,3%/10°C

Safety

The meter connects via the rack to protective earth.

EMC (electro magnetic compatibility)

Inputs	4 kV, 50 Hz, 1 min
Radio frequency interference	according to IEC 801-3; 10 V/m, 27 - 500 MHz
Transients	according to IEC 801-4; 2 kV, 15 ms/300 ms
Electrostatic discharge	according to IEC 801-2; 15 kV
Radio frequency emission	according to CISPR 14.6; 0,15 - 30 MHz, CISPR 14.7; 30 - 300 MHz
Surge voltage test	according to IEC 255-4; 6 kV, 12 µs/50 µs

Protection class

IP51 according to IEC529

Display

128 x 64 pixels graphical display in extended temperature range, -20 - +70 °C

Real time clock

Accuracy	<6 s/month (En61038 15 s/month) , TCXO crystal controlled
Backup variants	Super capacitor gives 3 days backup. A lithium battery can be added for longer backup; >1,5 year

Memory for configuration register and data

Data flash for logging and configuration	1 Mb
FRAM (non volatile) for energy registers	8 kb
RAM for software	128 kb

Connections CewePrometer-R

Entrelec Essailec connectors with current circuit short-circuiting device.



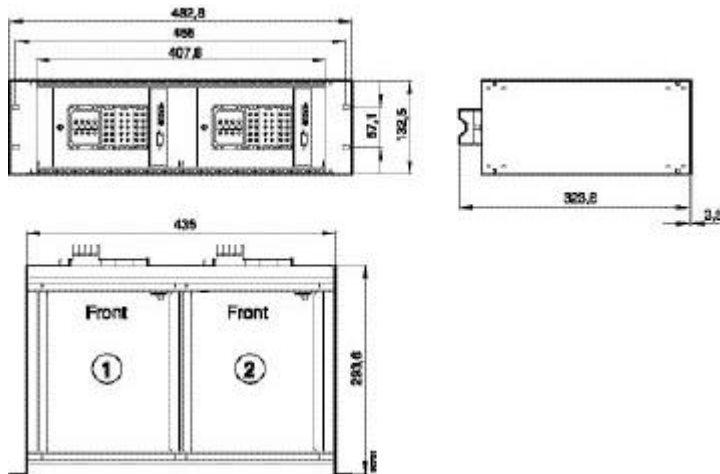
Serial port RS-232	9-pin D-sub
Serial port RS-485	Screw terminal
Protective earth	crimped lug for M4

Connections CewePrometer-W

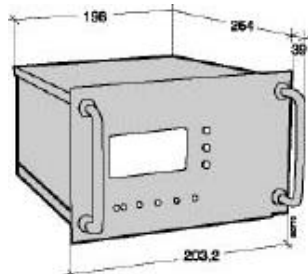
Screw terminal

Dimensions

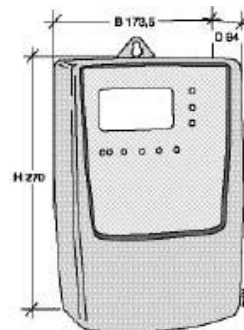
Dimensions 19" rack, DIN 43862



Weight rack approx. 2,8 kg



Weight meter approx. 3,8 kg



Weight meter approx. 2,5 kg

Materials and components – CewePrometer-R

Parts	Material	Trade name (example)	Self-exting
Meter case parts	Steel		ULV0
Connector		GE Cycoloy 2950	ULV0
Display window	PC	GE Lexan 141 transparent	ULV0
Small parts	PC-ABS	GE Lexan 141 IR-filter	ULV0
PC boards	FR4 GF epoxy		ULV0

Materials and components – CewePrometer-W

Parts	Material	Trade name (example)	Self-exting
Meter case parts	PC-ABS	GE Cycoloy 2950	ULV0
Terminal block	PPO +10%GF	GE Noryl GFN1SE1	ULV0
Display window	PC	GE Lexan 141 transparent	ULV0
Small parts	PC	GE Lexan 141 IR-filter	ULV0
PC boards	FR4 GF epoxy		ULV0

Test and approvals

Performed by the SP Swedish National Testing and Research Institute

SP
Box 857
S-501 15 BORÅS
SWEDEN

To the following standards:

- EN60687:1992 (IEC 687-92) class 0.2S and 0.5S
“Alternating current static watt-hour meters for active energy”
- EN61268:1996 (IEC1268) Class 2
“Alternating current static var-hour meters for active energy”

Tests have also been done in part for the following standards:

- EN61038:1996 Time switches for tariff and load control. Applicable parts according to accuracy requirements for the real time clock.

Ordering – CewePrometer-R

Accuracy class	360	=	0.2	2-element (3 wire) measuring	<input type="checkbox"/>
	361	=	0.5	2-element (3 wire) measuring	<input type="checkbox"/>
	365	=	0.2	3-element (4 wire) measuring	<input type="checkbox"/>
	366	=	0.5	3-element (4 wire) measuring	<input type="checkbox"/>
Measuring module	0	=	3x48/83...138/239 V *)3x48...138 V	1 A 50 Hz	<input type="checkbox"/>
	1	=	3x48/83...138/239 V *)3x48...138 V	1 A 60 Hz	<input type="checkbox"/>
	2	=	3x48/83...138/239 V *)3x48...138 V	5 A 50 Hz	<input type="checkbox"/>
	3	=	3x48/83...138/239 V *)3x48...138 V	5 A 60 Hz	<input type="checkbox"/>
	4	=	3x96/166...276/478 V *)3x96...276 V	1 A 50 Hz	<input type="checkbox"/>
	5	=	3x96/166...276/478 V *)3x96...276 V	1 A 60 Hz	<input type="checkbox"/>
	6	=	3x96/166...276/478 V *)3x96...276 V	5 A 50 Hz	<input type="checkbox"/>
	7	=	3x96/166...276/478 V *)3x96...276 V	5 A 60 Hz	<input type="checkbox"/>
Auxiliary supply	0	=	30...100 VAC/40...130 VDC	<input type="checkbox"/>	
	1	=	85...265 VAC/100...300 VDC	<input type="checkbox"/>	
I/O-module	0	=	No out- or inputs	<input type="checkbox"/>	
	1	=	6 outputs, 4 inputs	<input type="checkbox"/>	
Communication	100	=	No communication	<input type="checkbox"/>	
	101	=	RS485 + RS232	<input type="checkbox"/>	
	102	=	RS485 + RS485	<input type="checkbox"/>	

*) 2 element meter

Article number 365-201-101 is:

One CewePrometer-R, class 0.2S, 3-element meter for 3x48/83...138/239 V, 5 A, 50 Hz, Aux 30...100 VAC/40...130 VDC, 6 outputs and 4 inputs, RS485 and RS232 communication.

Ordering – Rack

Extras	369-1	= Rack	<input type="checkbox"/>
Set up for left mounted meter	0	= No communication	<input type="checkbox"/>
	1	= RS485 + RS232	<input type="checkbox"/>
	2	= RS485 + RS485	<input type="checkbox"/>
Set up for right mounted meter	0	= No communication	<input type="checkbox"/>
	1	= RS485 + RS232	<input type="checkbox"/>
	2	= RS485 + RS485	<input type="checkbox"/>

Article number 369-111-001 is:

A rack with room for two meters. Both meters has connections for communication via RS485 and RS232. **If the rack is for one meter only, it will be placed to the left.**

CeweConfig Software	379810001
CeweConfig Software Kit	379811001