Sonel PQM-700

Power Quality Analyzer ● Quick Start

CE

CLASS S (IEC 61000-4-30) | CAT IV 300 V | EVENTS | 55°C HEAVY DUTY -20°C | IP65

v1.00 | 09.01.2020

Status signalization

ON	LED is on. The analyzer is on.	ERROR	LED flashes. Problem in at least one mains phase: ▪ reverse phase sequence, ▪ incorrect values of voltages and/or currents, ▪ energy generation. See tolerances in step ⑤ in the second page.
ON	LED flashes. The meter is ready for software update (press **START** to confirm).	ERROR MEM	ERROR is off, MEM is on. Problem with the memory or memory full.
ON MEM	LEDs flash. Software update in progress.	ERROR MEM	LEDs are on. No memory card or unformatted memory card. If LEDs are still on after pressing **START** - the memory is damaged.
BATT	LED flashes. Battery charge level ≤20%.	ON LOG	ON is on, LOG flashes. Recording in progress.
BATT	LED is on. Battery completely depleted. After 5 s the analyzer shuts down.	ON LOG	ON is off, LOG flashes in every 10 s. Recording in progress. Analyzer in sleep mode.

Li-Ion BATTERY **3.7 V 4.4 Ah**

External AC power
MAX. 100…415 V AC
MAX. 40…70 Hz

External DC power
MAX. 140…415 V

Maximum input voltage

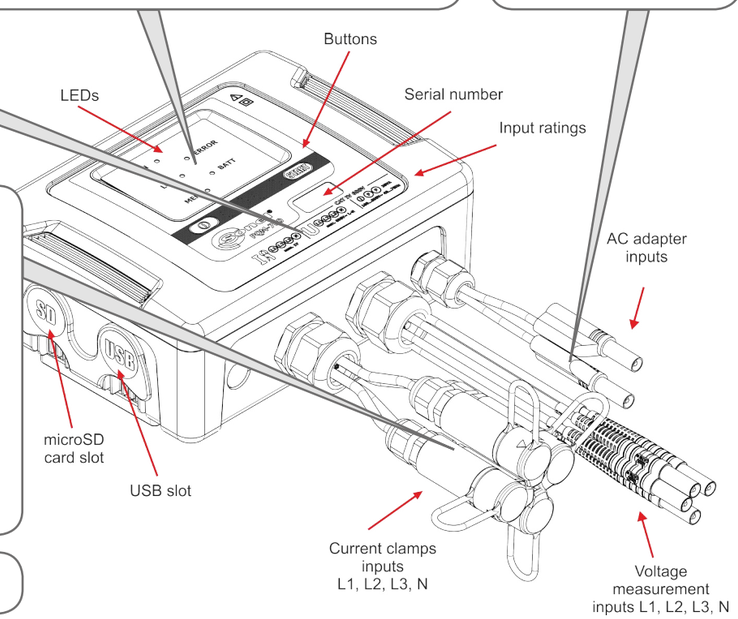
U L1 L2 L3 N
max. 760 V~

Measurement inputs

Voltage - 4 inputs
L1, L2, L3, N
AC: **MAX. 760 V_{RMS}**
DC: **±760 V**
referred to ground

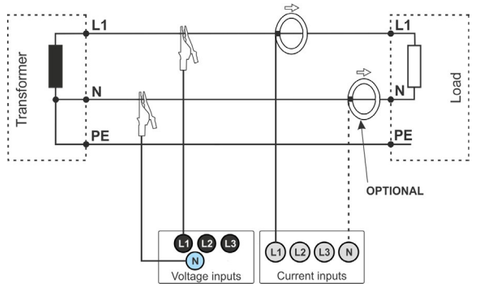
Current - 4 inputs
Flexible probes: **F-xA1: 1…1500 A AC**
F-xA: 3…3000 A AC
F-xA6: 6…6000 A AC
Hard clamps: **C-4A: 0.1…1000 A AC**
C-5A: 0.5…1000 A AC/DC
C-6A: 0.01…10 A AC
C-7A: 0.1…100 A AC

Only flexible current probes can be used outdoor (IP65 ingress protection).

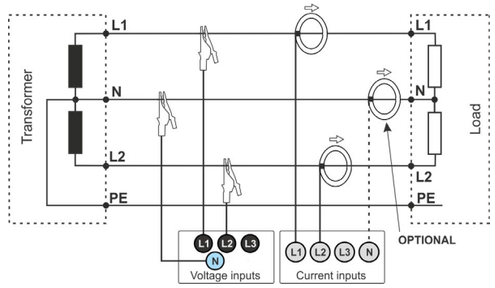


Mains systems

Single-phase

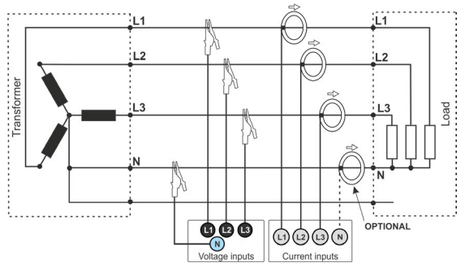


Split-phase

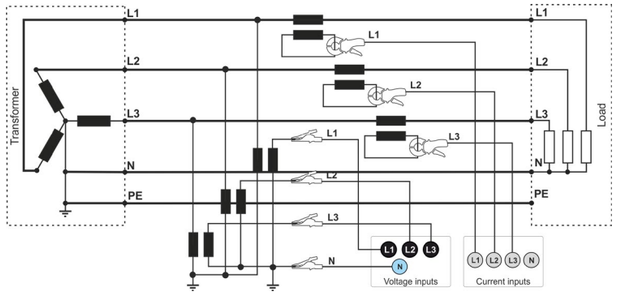


3-phase 4-wire (WYE with a neutral conductor)

Direct connection

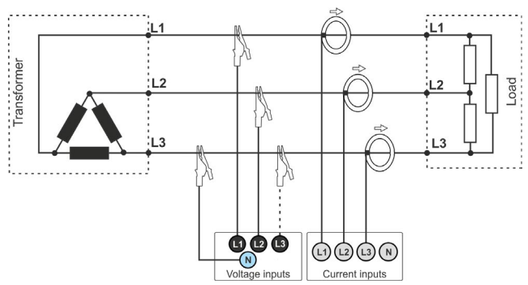


Connection with transducers

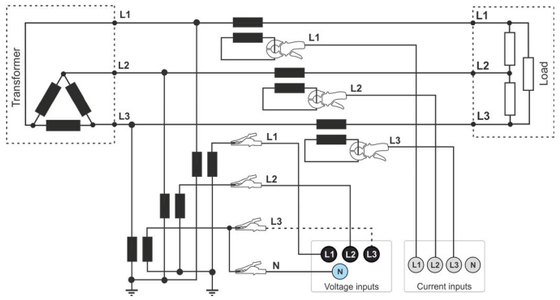


3-phase 3-wire (Delta)

Direct connection



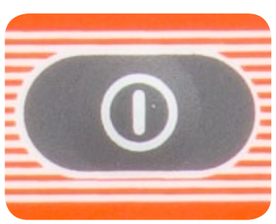
Connection with transducers



In the Delta system, in order to ensure the correct of measurements, the N conductor must be connected to the L3 phase.

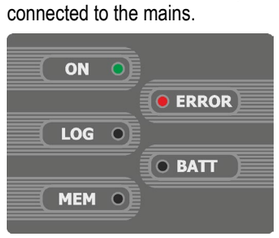
Quick start

① Turn on the analyzer



② Check the configuration

ON - the analyzer is on.
ERROR - the analyzer is not yet connected to the mains.



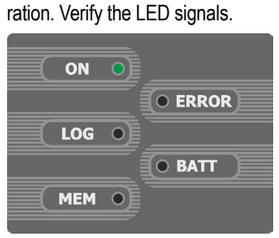
③ Connect

Connect the analyzer to the mains according to the uploaded configuration. Check if the connection is correct.

Arrows on all clamps have to be pointed towards the electrical load.

④ Check

Check if you have connected the analyzer according to the configuration. Verify the LED signals.



⑤ Start

Press **START/STOP** to start recording.

LOG
LOG flashes.
Tone notice sounds:
3 short signals.

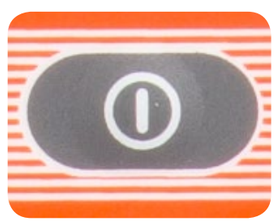
⑥ Stop

Press **START/STOP** to finish recording.

LOG
LOG stops flashing.
Tone notice sounds:
1 long and 3 short signals.

⑦ Turn off the analyzer

Hold the button to turn off the analyzer.



From preparations to data analysis

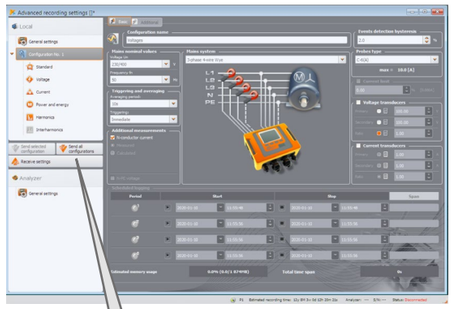
1 Turn on the analyzer and check the battery

Turn the meter on and check the battery status. If it is depleted (BATT) connect the analyzer to external power.

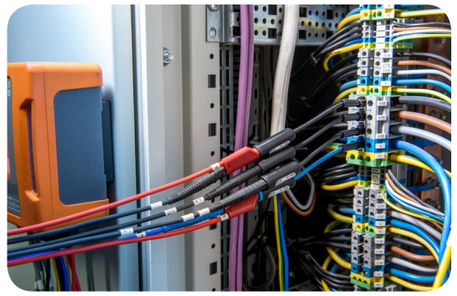
Remember to upload the measurement configuration to the instrument (using **Sonel Analysis** software) before going to worksite.

2 Upload the configuration to the analyzer

Create a measurement configuration and upload it to the analyzer using **Sonel Analysis** software.

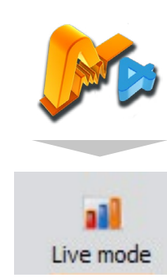


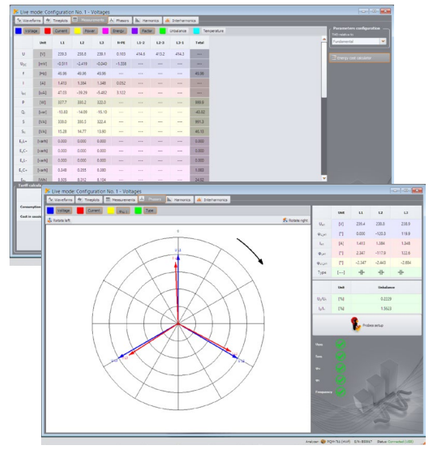
3 Connect the analyzer to the network acc. to the configuration



- Arrows on all clamps have to be pointed towards the electrical load.
- Pay close attention to connecting the analyzer in systems with transducers. In these systems, C-6A clamps will be useful - they are dedicated to measure current at transducers.

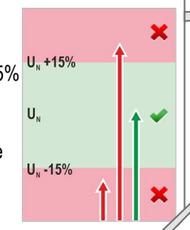
4 Check the connection correctness and readings



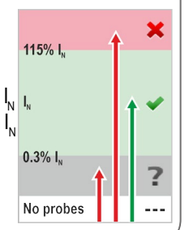


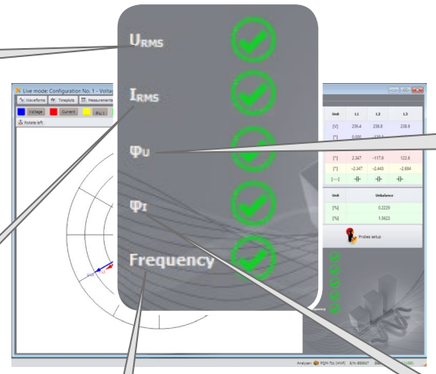
5 Check the network status and the analyzer connection status

RMS voltages
- ✔ U_{RMS} within ±15% U_N range
- ✖ U_{RMS} outside of ±15% U_N range



RMS currents
- ✔ I_{RMS} within 0.3%...115% I_N range
- ✖ I_{RMS} exceed 115% I_N
- ? I_{RMS} below 0.3% I_N
- --- current probes not selected

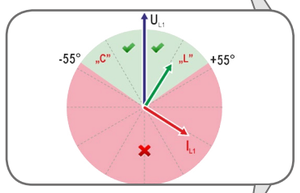




Frequency
- ✔ is within ±10% f_N range
- ✖ is outside the ±10% f_N range
- ? too low voltage: <10 V

In Sonel instruments, the clockwise phase sequence is assumed to be correct.

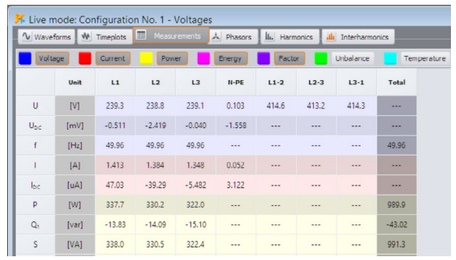
Voltage angles - phase succession (clockwise)
- ✔ angles of the range of ±30% of the theoretical values 0°, 120°, 240°
- ? too low voltages: <1% U_N
- ✖ incorrect angles



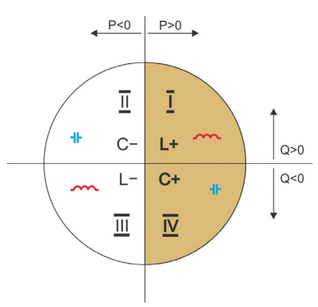
Current angles - relative to voltage
- ✔ current vectors are within ±55° range in relation to corresponding voltage vector
- ✖ at least one current vector is outside the acceptable range ±55°
- ? too low currents: <0.3% I_N

6 Check the credibility of the readings

In **Measurements** menu you can get information about the basic network parameters.



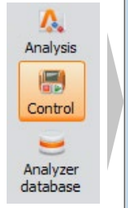
	Unit	L1	L2	L3	N-PE	L1-2	L2-3	L3-1	Total
U	[V]	239.3	238.8	239.1	0.103	414.6	413.2	414.3	---
U_{DC}	[mV]	-0.511	-2.419	-0.040	-1.558	---	---	---	---
f	[Hz]	49.96	49.96	49.96	---	---	---	---	49.96
I	[A]	1.413	1.384	1.348	0.052	---	---	---	---
I_{DC}	[uA]	47.03	-39.29	-5.482	3.122	---	---	---	---
P	[W]	337.7	330.2	322.0	---	---	---	---	989.9
Q_1	[var]	-13.83	-14.09	-15.10	---	---	---	---	-43.02
S	[VA]	338.0	330.5	322.4	---	---	---	---	991.3

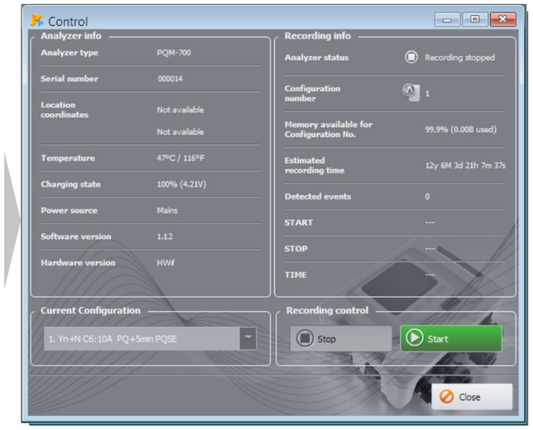


Energy reception
- Active power P:
  P > 0 - in each phase
- Reactive power Q:
  Q > 0 - inductive character
  Q < 0 - capacitive character

Energy generation
- Active power P:
  P < 0 - in each phase
- Reactive power Q:
  Q < 0 - inductive character
  Q > 0 - capacitive character

7 Verify the rest of analyzer properties





Before starting measurements, make sure that:
- there is enough available memory for planned measurements,
- the analyzer's clock indicates the correct time (**Analyzer ► Analyzer settings**),
- power is connected (**battery life only up to 6 hours**),
- unused sockets and holes are secured with plugs.

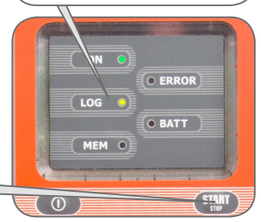
8 Start recording

START STOP Press **START/STOP**

or

use **Sonel Analysis** software.

LOG LOG flashes. **Tone notice sounds**: 3 short signals.

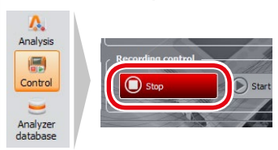


9 Finish recording

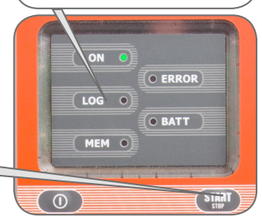
START STOP Press **START/STOP** for 3 s

or

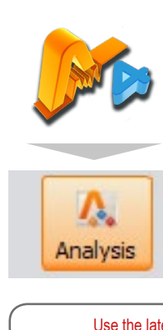
use **Sonel Analysis** software.

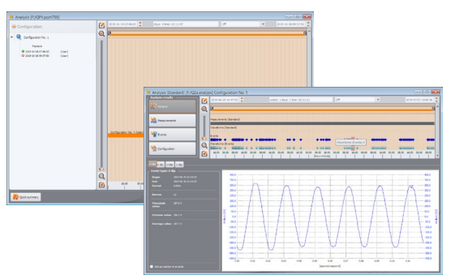


LOG LOG stops flashing. **Tone notice** sounds: 1 long and 3 short signals.



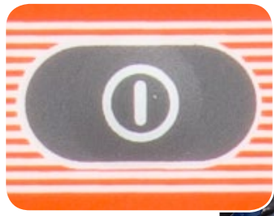
10 Read data





Use the latest version of **Sonel Analysis** to download and analyze data.

11 Turn off the analyzer and disconnect it from the network



Press and hold the button to turn off the analyzer.

The saved data can be read directly at the measurement site or after returning to the office - after switching the instrument on again.