ElitePro XC Phase Check Indicators:

Preamble:

The ElitePro XC energy logger, is a versatile instrument & data logger, for measuring numerous electric supply power parameters, as well as any other engineering parameters, that have sensors that provide a 0-10Vdc or 0-20mA outputs.

These four (4) off Low Voltage inputs, are located at the low voltage end of the logger, where the USB coms cable is inserted.

At the High Voltage end of the logger, where the High Voltage (HV) cables, & Current Transformers (CTs) are connected, there are four (4) off "PhaseChek" LEDs, that are located directly adjacent to the four CT inputs, representing voltage & current parameters measured by that particular channel.

The ElitePro/ELOG19 instruction manual describes in detail, the function, of these "Chek LEDs", on page 48 & 49.

LED Diagnostics PHASECHEK™ LEDS

PhaseChek is a unique feature of DENT meters that simplifies installation, by ensuring proper CT-to Voltage phase installation and avoiding faulty data collection. The ELITEpro XC has four tri-color PhaseChek LEDs, one green/red/blue LED for each CT input. These LEDs provide the following information: ▪ All LEDs are green—the system power factor is greater than 0.55, and the CTs are properly placed on the corresponding voltage phases, and the CT is oriented properly (arrow toward the load).

▪ LED is red—there is a CT voltage phase placement error (or the Power Factor is less than 0.55)

▪ LED is blue—the CT is on backwards (-kW) with the arrow pointed away from the load

▪ LED flashes red and blue—CT is on backwards and on the wrong voltage phase

If the total system power factor is less than 0.55, the LEDs will be red even if connected properly. This situation is rare, but could occur if, for example; if the load to be monitored is a lightly loaded electric motor. It is common for an individual phase power factor to be less than 0.55 and the corresponding LED will be "red". This does not necessarily mean that the CTs &/or HV leads, have been hooked up incorrectly.

If the Physical Power Channel (CT) is turned off in the setup table, the corresponding PhaseChek LED will be dark/not illuminated, at all.

The PhaseChek LEDs, are there, to confirm that the Cosine of the phase shift on any input channel; between the AC voltage reading, & the AC current reading, is positive, & between 0.55 & 1.0. When both AC voltage & AC current readings are perfectly in phase, the Power Factor (P.F.) would be 1.0. That would indicate the load to be purely resistive, with no lag or lead between the AC voltage & Current waveforms.

So understanding the PhaseChek LED indications, is very important.

eg: You could hook up a system, & find you are presented, with a Red PhaseChek LED, & assume wrongly; that You have placed the CT, on the wrong phase cable, when the reality was that It was connected correctly, but the Power Factor of the load, was so poor, that the P.F. was less than 0.5.

The ElitePro XC relies on the operator, installing . . . .

1. The three phases, & maybe the neutral, to the right phase connection points on the switchboard. This can sometimes be a problem, as I personally have come across switchboards, where the cable colour for each of the 3 phases, was the exact same colour.
2. The CTs (current transformers) on channel#1/#2/#3 being placed around the cable that is supplying AC current on Phase#1/#2/#3.
3. The CT (current transformer) in the right orientation, such that the arrow on the CT, is pointing towards the load side of the power cable.

On a three phase system, the PhaseChek LEDs indications, are usually totally independent of each other. However, a CT, that is inadvertently fitted to the incorrect phase cable; will automatically result in another CT, also being on an incorrect phase cable, resulting in two PhaseChek LEDs flashing.

Bear in mind, that an operator, may not be needing, or wanting, to measure both voltage & ampere load on a particular phase. There are occasions where Line voltage will be the only parameter of interest, or that an “Amperes Only” load will be carried out. This is quite common, where the switchboard HV Isolation switch; cannot be switched off to allow connection of the ElitePro XC HV cables, or maybe CTs.

The setup table for an “amperes only” application, should only include the “ticked” parameters, that you are requiring to log, so that “false” PhaseChek LEDs, are not illuminated; but that memory is not wasted logging parameters, not connected.

The ElitePro XC logger, can only log the parameters, that have been tagged in the setup table, for each particular application. The logger relies totally, on the technician/electrician, to physically connect the ElitePro’s CTs & HV leads to the system, under test.

There are several things, that the technician, can do incorrectly.

1. Fit the phase#1, phase#2, & phase#3 HV leads to the wrong phases,

2. Fit the corresponding CTs around the wrong phases.
3. Fit the corresponding CTs, around the right phases, but in the wrong orientation.

The PhaseChek LEDs, are a quick way, of automatically, checking the validity of a system setup, especially, if there is no onsite PC or laptop, running ELOG software to check the real-time readings, which is the preferred method.

There is nothing more annoying than to come back to a site; a week, or a month, after You set it up, to find the data is corrupted or useless, because the logger setup table, or the physical connections of voltage & CTs, was incorrect.

Summary:

The PhaseChek LEDs, are an excellent tool, to assist in preventing installation issues, but they will not fix a Setup Table, which notifies the XC logger, that the CT s fitted to it are a particular model, but in reality, it is a different type. Real-Time readings after a setup, on site, are the best way, to confirm, after an ElitePro XC installation, that everything is good to go.