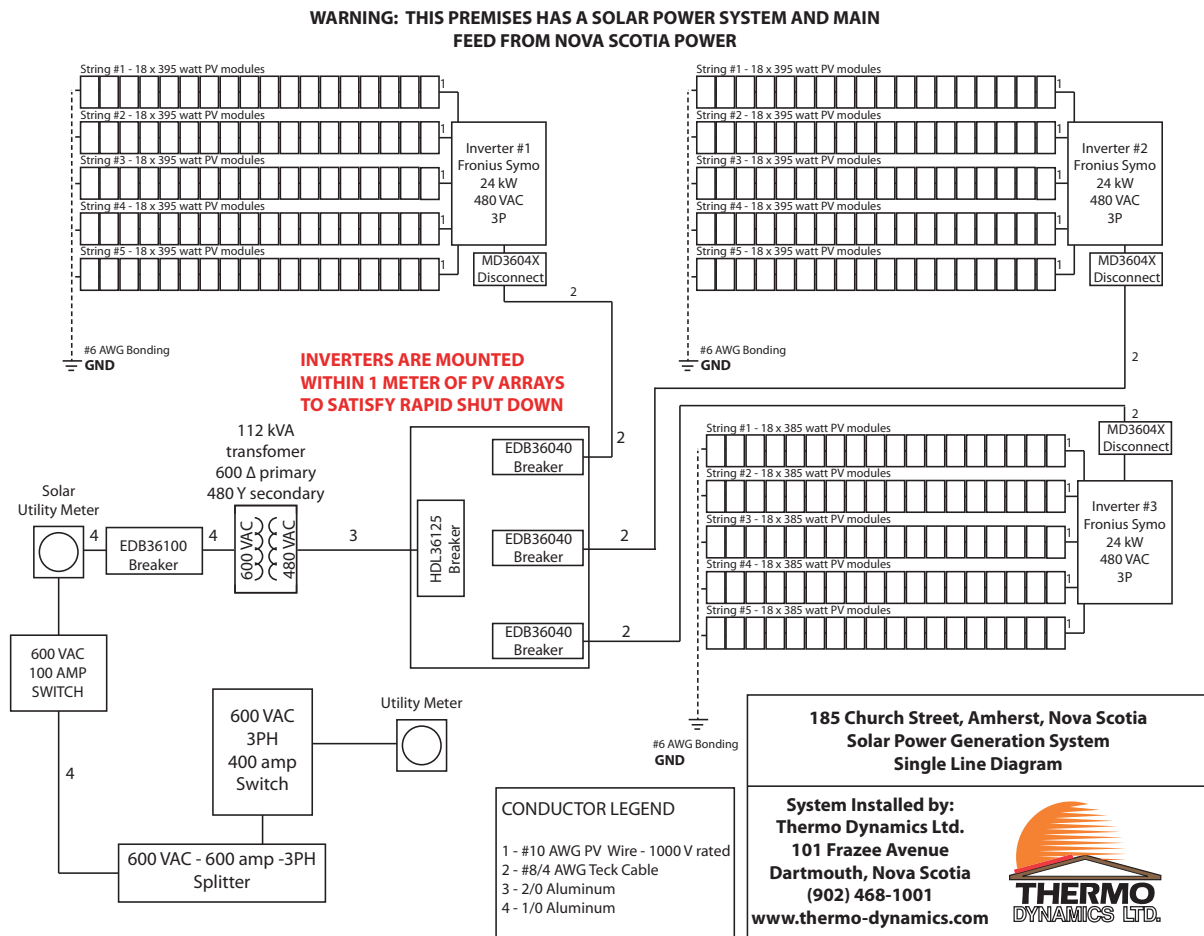


Operation and Maintenance of Photovoltaic (PV) System Amherst Stadium, Amherst, NS

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The photovoltaic (PV) system consists of 270 PV modules and three 24.0 kW AC inverters. The modules are Hanwha Q.Peak Duo 385 and 395-watt modules. The 385/395 watt-rating is at a solar flux of 1000 W/m^2 ("full sun") and a module cell temperature of 25°C . The Fronius Symo inverters convert the DC power from the solar panels to AC power. A single-line-diagram (SLD) of the system is shown below.



The 270 modules in this system are divided into three sub-arrays of 90, 90 and 90 modules (an east array, a middle array and a west array). The east array has 385-watt modules; the middle and west array have 395-watt modules. Each sub-array is divided

into 5 strings of 18 modules. The modules in a string are wired in series electrically; the strings are in parallel electrically. Each sub-array supplies a 24.0-kW_AC inverter. The maximum power rating of a sub-array is 90 modules x 395 W/module = 35,550 watts (35.55 kW_DC, or 34.7 kW_DC for the east sub-array), at full sun and a cell temperature of 25°C.

The three inverters are mounted on the north side of the roof adjacent to the arrays of PV modules. The maximum power output of the inverter is 24.0-kW_AC. The output of the inverters is three-phase 480 VAC. A transformer raises the voltage to 600 VAC, which is then fed into the NS Power grid.

The PV system is 100% passive, other than for a thermostatically controlled fan in each inverter. It does not require maintenance, nor does anyone need to operate this system. Thermo Dynamics Ltd. (TDL) has tested the system and no further testing is required. No regular inspections are required.

TDL has provided a monitoring system, at TDL's expense, other than the expense of the cable supplied by Amherst to allow internet-based monitoring of this system. TDL monitors continuously all PV systems provided by TDL, and alarms are provided to TDL if there is an issue with the system.

TDL has provided a link that Amherst can use to monitor the system. TDL has also added personnel within the Amherst organization, designated by Amherst, to the list of people receiving error messages from this system.

PV modules

No maintenance is required. No washing of the PV modules is required. Snow, if it accumulates on the PV modules, should be allowed to melt and/or slide off as weather conditions change. Snow should not be removed by mechanical means.

Inverter

No on-site maintenance can be performed on the inverter. The inverter, once set up by TDL, requires no further attention by an operator. If an inverter malfunctions, TDL will replace it under the terms of the manufacturer's warranty on the inverter. Once on-site, replacement is a 15-minute operation. However, it should be undertaken by TDL personnel, because TDL personnel will be required to program the replacement inverter.