GOODWE ARC DETECTION AND PPROTECTION SOLUTION

WHAT IS ARC FAULT

Electric arc fault often leads to alternating voltage waveform and current waveform in a circuit, accompanying with arcing sound, arcing flash, heating and high frequency electromagnetic waves. A common practice to deal with an arc fault is using sensors to detect and analyze variations in physical characteristics and electrical characteristics of the circuit when an arc fault is happening. Since arc faults may occur under various conditions, it is hardly possible to embed and use sensors wherever an arc fault may occur. Nonetheless, on whichever circuit is there an arc fault happening, characteristics of the arcing current shall be reflected by the characteristics of DC bus current of PV system. For this reason, a most widely applied solution to arc fault detection is based on the detection of arcing current.
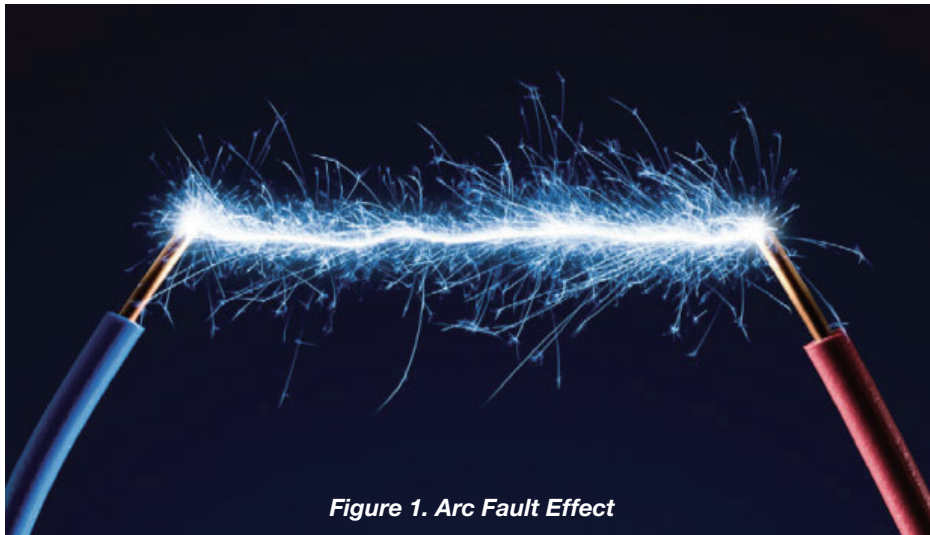

Figure 1. Arc Fault Effect

WHAT IS GOODWE ARC DETECTION & PROTECTION SOLUTION

GoodWe arc detection and protection solution adopts the same application. With an arc detection board and magnetic rings integrated in a GoodWe inverter, an arc fault can be determined whenever there is occurrence of abnormal arcing current detected and protective measures in consequence are triggered and taken automatically.

The realization mechanism is as following:
Current data of one or multiple PV strings collected through current transformer (CT) are transmitted to DSP after a series of processes such as sampling, amplifying and filtering in which DC voltage signals (with certain frequency range featuring arcing included) acquired through sampling are transformed into digital signals. The voltage signals are processed in embedded ARM on the arc detection board by using FFT algorithm. A number of filters based on FFT algorithm can detect and analyze the variations of high frequency vibration (spikes) and identify whether any arc fault occurs or not according to the preset threshold value for such variations. If an arc fault or faults are identified, visible alerts will be generated. Within certain time (two seconds to the maximum), DC pathway will be automatically cut off. In this way, any potential damages caused by an arc fault accident will be mitigated to certain extent. Such alerts need to be purged manually by qualified personnel only when troubleshooting has been performed and the fault or faults are cleared.

GOODWE ARC DETECTION AND PPROTECTION SOLUTION
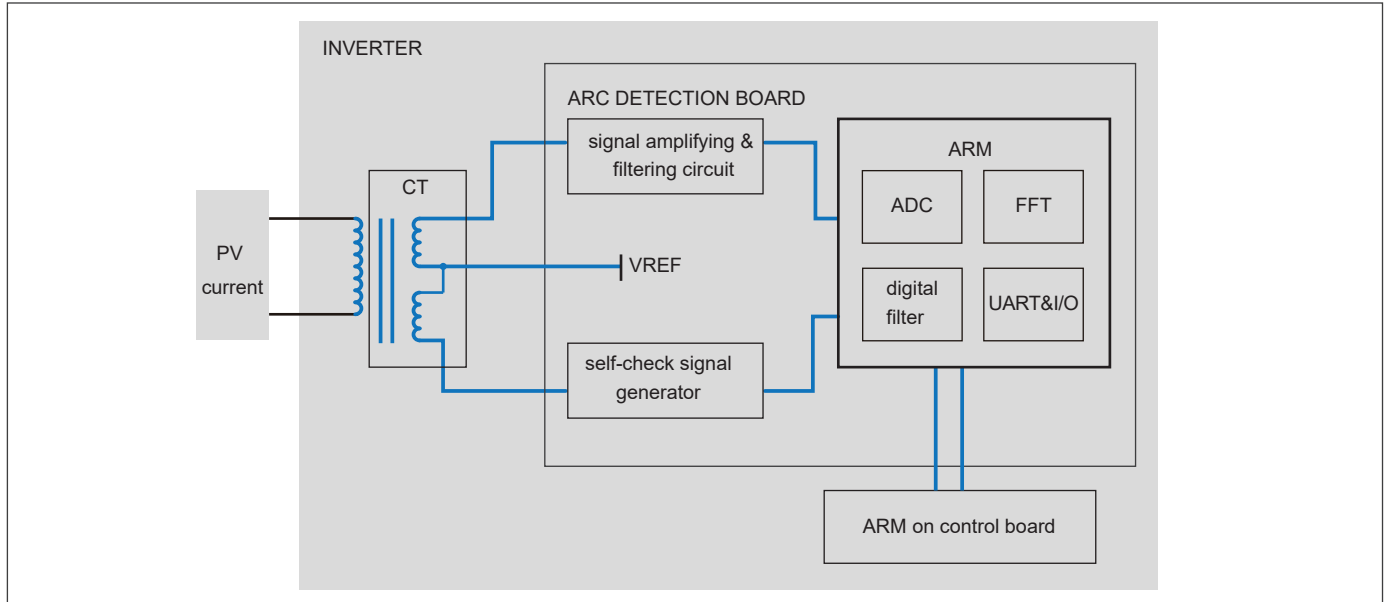
VER: 02, UPDATED ON AUG 31TH, 2021

Figure 2. Schematic of Arc Detection and Protection Circuit

Notice

The algorithm adopted in this solution enables us to select certain frequency range to be processed and the weights of waveforms to be filtered as well as the threshold values to be set so that this solution becomes widely applicable to different inverters in different operation environments.

ABOUT GOODWE ARC DETECTION BOARD

GoodWe arc detection board applied in this solution is an optional device, which consumes less than 1W with a 5-volt power supply. Once you have chosen GoodWe arc detection and protection solution, the board is integrated in the inverter and requires no more wiring or connection. The factory default setting of arc detection and protection function is off and you need to turn this function on manually and locally through the inverter screen or the configuration APP SolarGo and PV Master.

ON THE REQUIREMENTS OF UL STANDARD

According to UL1699B standard, when an arc fault is detected, an integrated arc fault detection device (AFCI as known) must generate alerts on the local display of inverter and/or on the remote monitoring and control platform and such alerts should keep on until arc fault or faults are resolved and cleared. The alerts shall not disappear even a reboot of inverter happens. At the same time, commands shall be sent to inverter to go off from grid and to disconnect from DC input. When the arc fault or faults have been cleared, qualified personnel are permitted to manually purge such alerts. The whole process and results of self-checking are displayed on the local screen and/or on the remote monitoring and control platform.

ON THE REQUIREMENTS OF UL STANDARD

Model	Optional or Default
GW5000A-ES GW6000A-ES GW7000A-ES GW7600A-ES GW8600A-ES GW9600A-ES	Default
GW4K-DT GW5K-DT GW6K-DT GW8K-DT GW10KT-DT GW12KT-DT GW15KT-DT	Optional
GW17KT-DT GW20KT-DT GW25KT-DT	Optional
GW25K-MT GW30K-MT GW36K-MT GW12KLV-MT GW15KLV-MT GW20KLV-MT	Optional
GW73KLV-HT GW75K-HT GW80K-HT GW100K-HT GW110K-HT GW120K-HT GW136K-HTH	Optional

Welcome visiting **GoodWe Solar Community (community.goodwe.com)**
to check all technical articles, guidance videos, webinars and activities released by GoodWe and GoodWe Solar Academy.