

Insulation coordination & TLI4971 isolation specification for industrial inverter

2021-03
Version 1.1



Isolation definitions

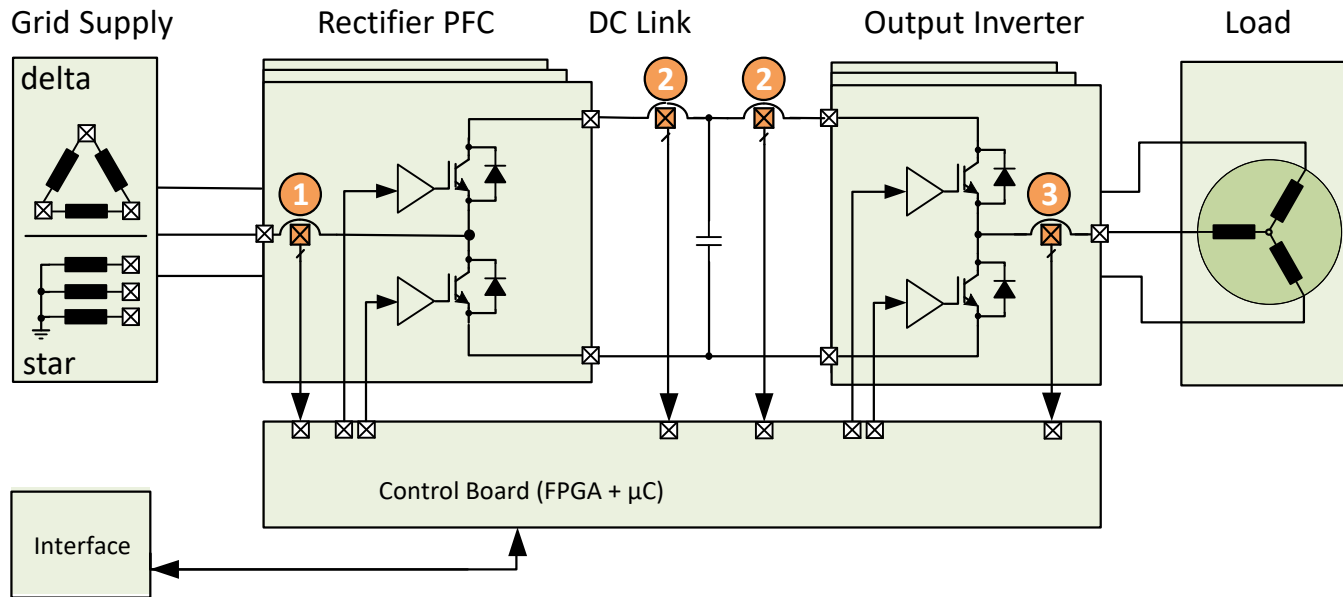
Commonly used isolation parameters

Parameter	description	definition
V_{ISO}	Isolation withstand voltage	Withstand transient unintended over-voltage
V_{ISOM}	Maximum surge isolation voltage (not required for functional isolation)	Withstand high transient voltage impulses of a certain profile
V_{PDtest}	Apparent charge voltage capability	Partial discharge test to detect discharge inside the insulation material to proof insulation integrity
V_{IORM}	Maximum repetitive working voltage	The ability of an isolator to handle high voltage on a continuous, daily basis over its lifetime. Defined as the maximum repetitive peak voltage that the isolation can withstand
V_{IOWM}	Maximum working voltage	The ability of an isolator to handle high voltage on a continuous, daily basis over its lifetime. Defined as the maximum RMS voltage or equivalent DC voltage that the isolation can withstand

TLI4971 Isolation Characteristics

HV Isolation Parameter	Parameter	Note	Value
Isolation level	-		functional
Minimum Clearance	Clr	-	4mm
Minimum Creepage	Crp	-	4mm
Isolation test pulse voltage Dielectric surge strength test voltage	V_{PULSE} (V_{IOSM})	Peak, rise time = 1.2 μ s, fall time = 50 μ s, type tested, According IEC61800 (extended)	6500V (min)
Production test voltage	V_{ISOP}	RMS, in production, 1.2s, UL1577 certified version	3000V RMS (min)
Dielectric Strength Test Voltage	V_{ISO}	Agency type tested for 60s per UL1577	3500V RMS (min)
Apparent charge voltage capability (method B)	V_{PDtest}	Partial discharge < 5pC peak @ 0m altitude	1500V (min)
Maximum repetitive isolation voltage	V_{IORM}	Max DC voltage, spike, @ 4000m altitude	1150V (max)
Maximum rated Working Voltage (sine wave)	V_{IOWMP}	Peak, @ 4000m altitude	975V peak (max)
Maximum rated Working Voltage (sine wave)	V_{IOWM}	RMS, @ 4000m altitude	690V RMS (max)
Minimum Comparative tracking index	CTI	-	Material group II

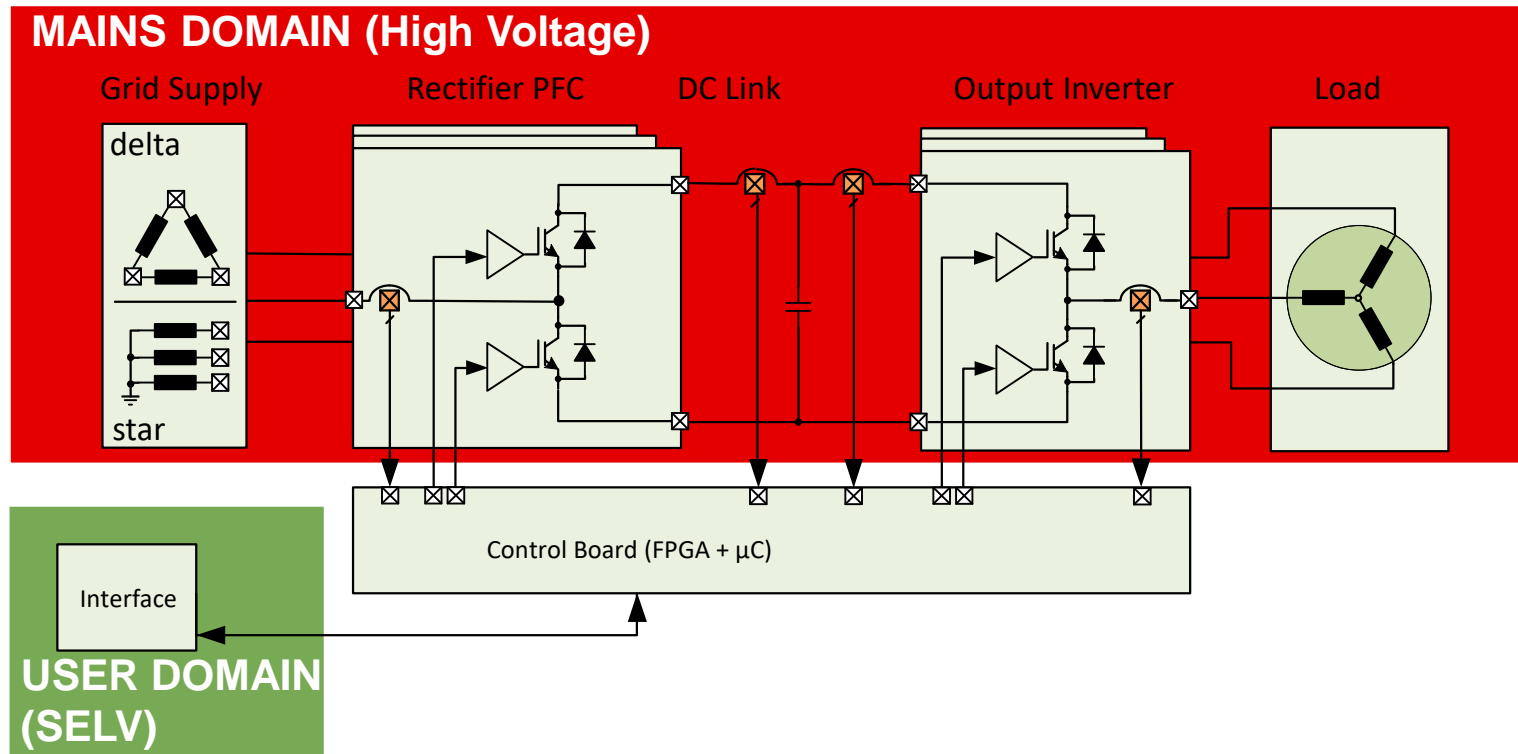
Required Working Voltage



Phase	Line to GND/ neutral Voltage (RMS)	Line to Line Voltage (RMS)	Voltage (peak)	DC Voltage
One phase	230V	-	325V	325V
Three phase	230V	398V	563V	563V
Three phase	398V	690V	975V	975V

TLI4971 is specified to withstand above listed isolation voltage on a daily basis over lifetime

System Insulation Partitioning (Given Environment)



HV

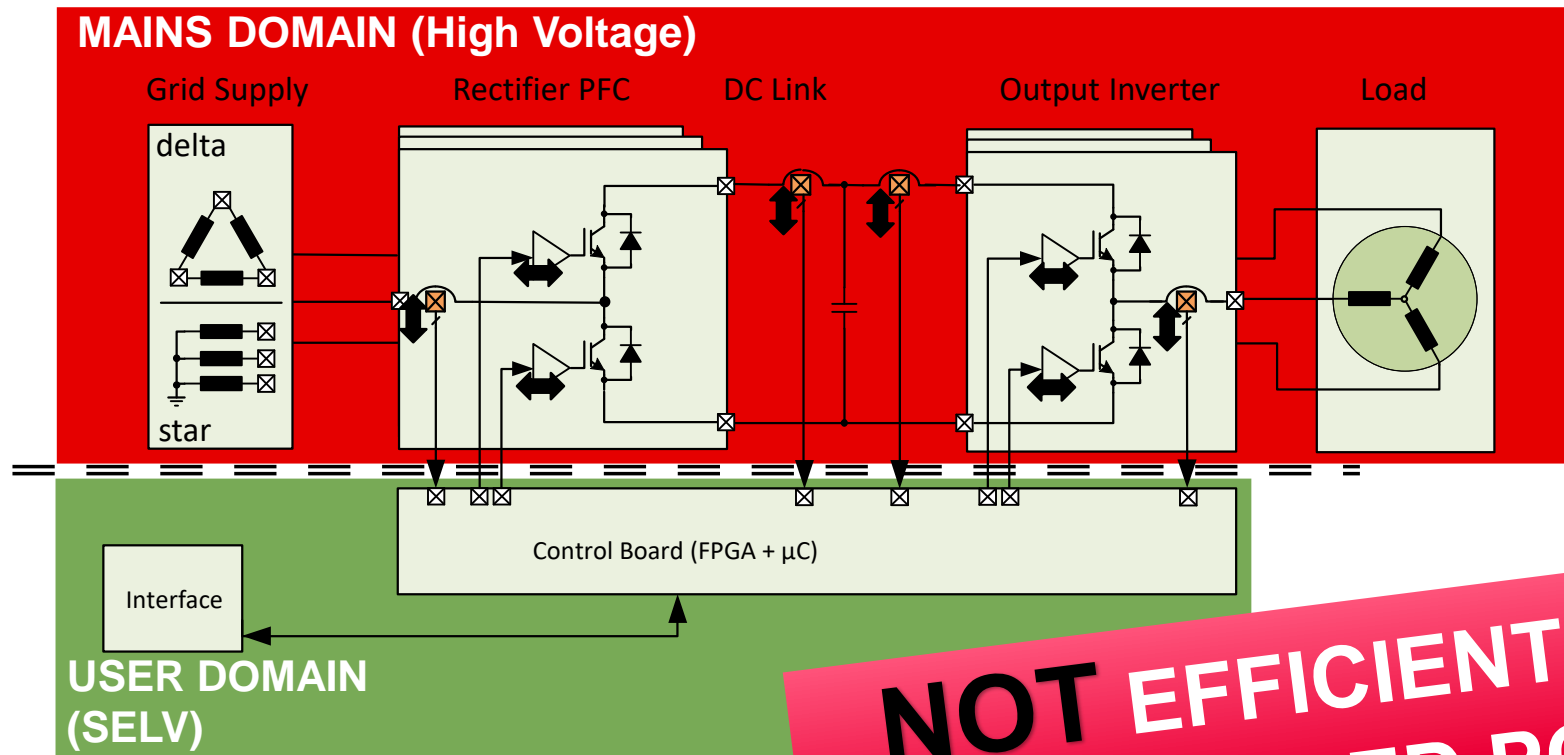
High Voltage

SELV

Safe Extra Low Voltage

System Insulation Partitioning

Control path and sensing path in SELV domain

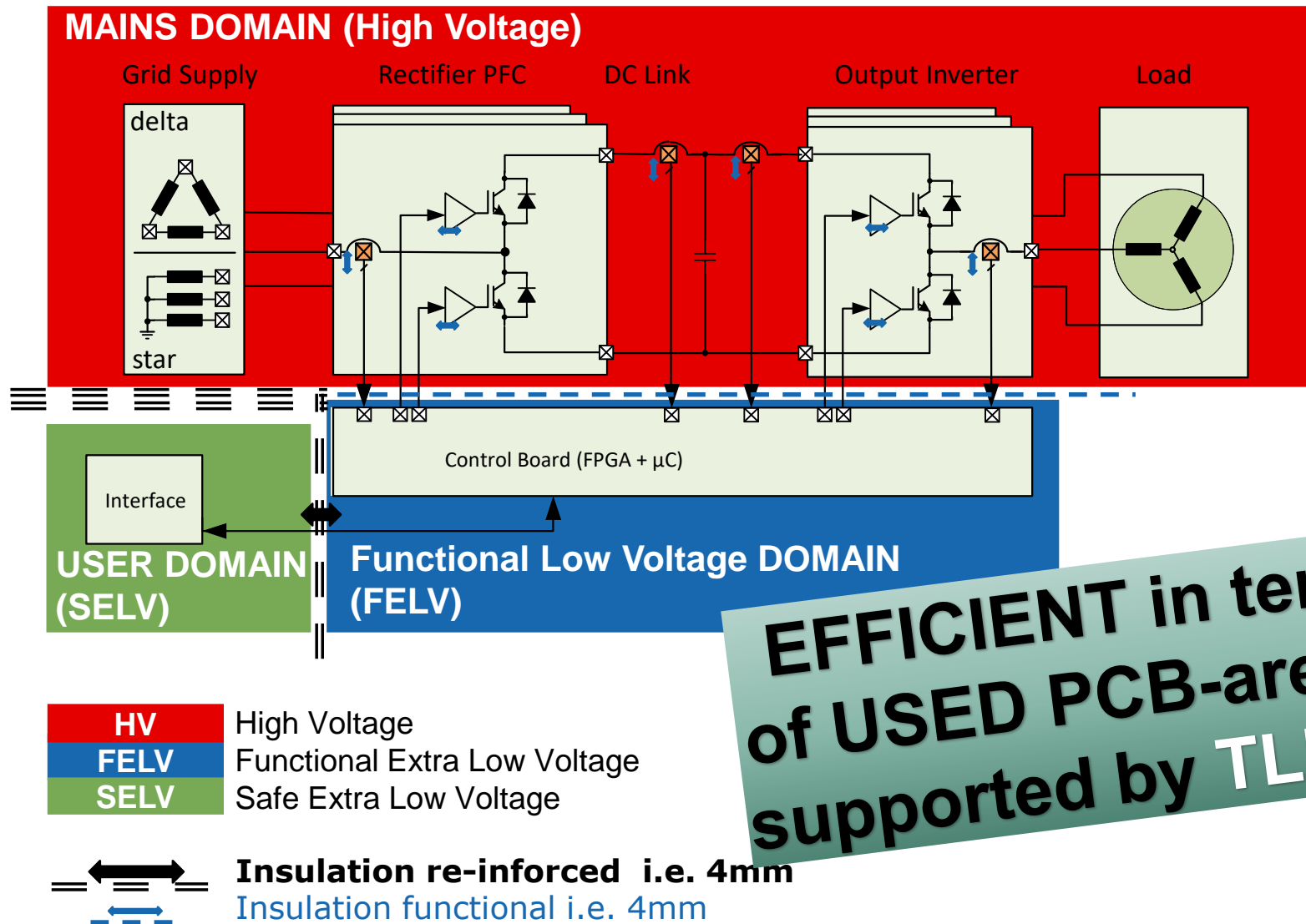


NOT EFFICIENT in
terms of **USED PCB-**
area and power density



System Insulation Partitioning

Control path and sensing path in LV domain





Part of your life. Part of tomorrow.