CRAIG & DERRICOTT

Photovoltaic Isolators

What is Photovoltaic?

pho·to·vol·ta·ic adj.

- A system capable of producing a voltage when exposed to radiant energy, especially light.

What does a PV system look like?

Solar Array

PV Inverter

Meter

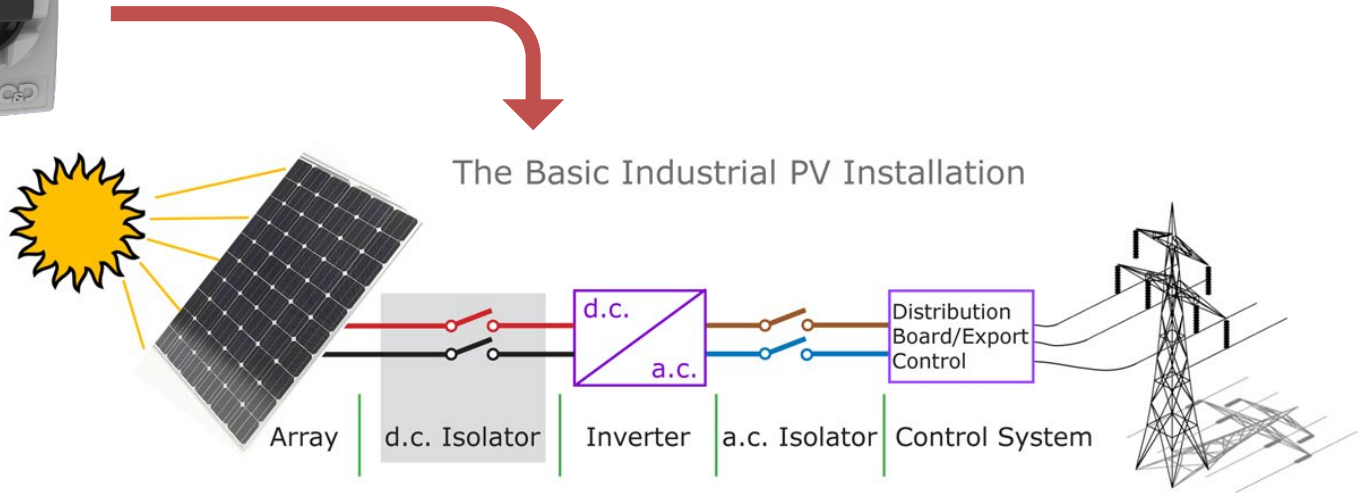
Components of a PV System

Protection

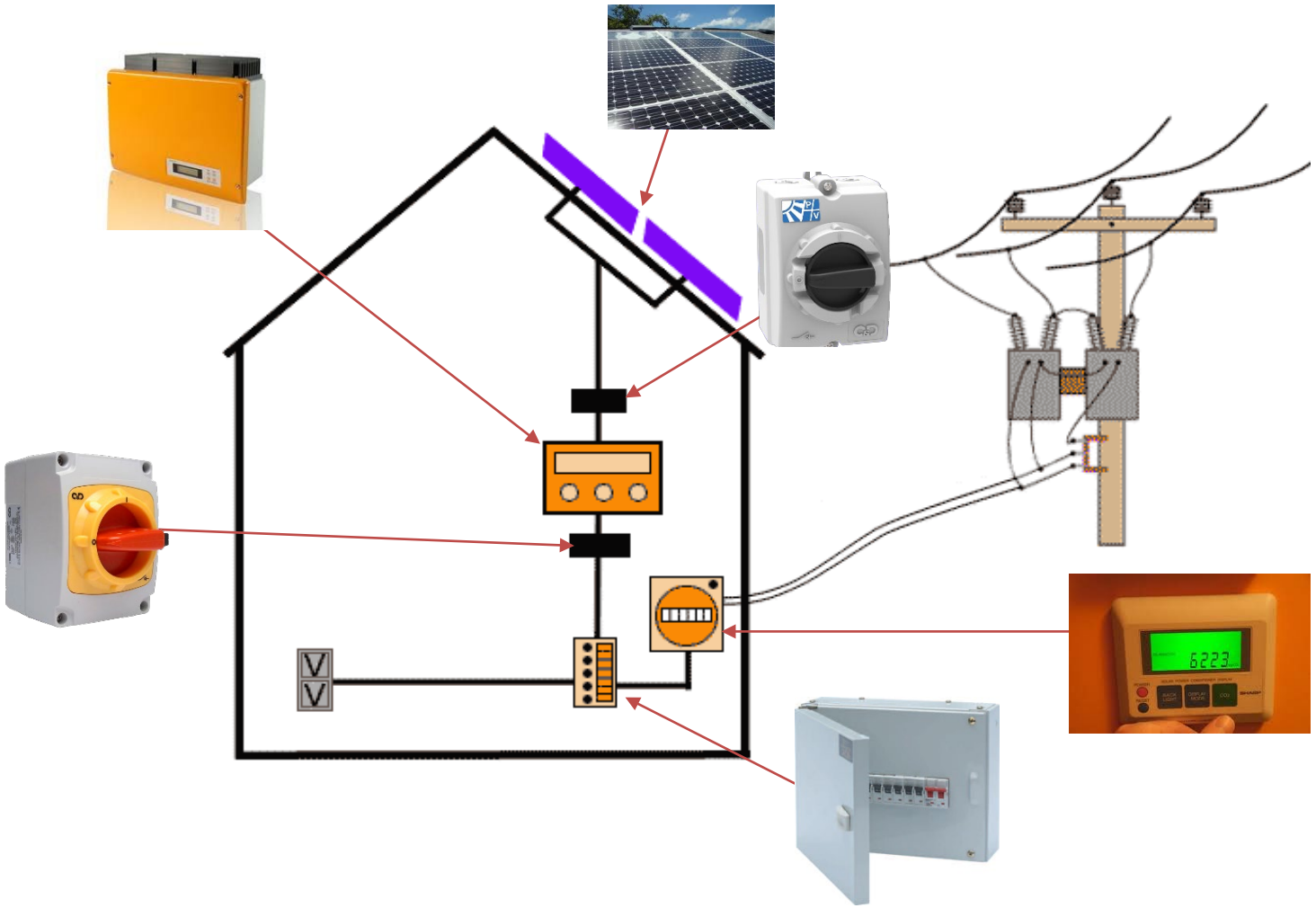
Cable & Connectors

Isolation Devices

How do C&D isolators fit into PV systems?



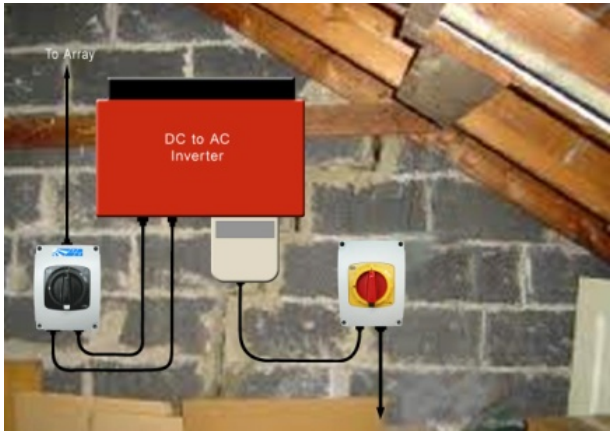
How does this all fit into a building?



Where are C&D PV isolators being fitted?

Local to the array….

In the loft/plant room



More accessible position….

Near consumer unit/switch room

How do I select the correct PV isolator?

C&D have a number of PV switch disconnectors each with different current ratings at different voltages.

*1 = Designed to isolate twin arrays *2 = Pollution Degree 2

Rating	Format	Cat. No.	Internal Switch	Rated Operational Current	Rated Operational Voltage d.c.					
					300/400V	600V	800V	1,000V	1,200V*2	1,500V*2
16A	DC 2P	EPV162	SPV162	DC21B	16A	16A	16A	-	-	-
	DC 4P	PVP164	SPV164		-	-	-	-	16A	16A
	Twin Array DC 2x2P	PVP1622*1	SPV1622*1		16A	16A	16A	-	-	-
25A	DC 2P	EPV252	SPV252	DC21B	25A	25A	25A	16A	-	-
	DC 3P	EPV253	SPV253		-	-	-	25A	-	-
	DC 4P	PVP254	SPV254		-	-	-	-	20A	16A
	Twin Array DC 2x2P	PVP2522*1	SPV2522*1		25A	25A	25A	16A	-	-
32A	DC 2P	EPV322	SPV322	DC21B	32A	32A	-	-	-	-
	DC 3P	EPV323	SPV323		-	-	32A	32A	-	-
	DC 4P	PVP324	SPV324		-	-	-	-	25A	20A
	Twin Array DC 2x2P	PVP3222*1	SPV322*1		32A	32A	-	-	-	-
40A	DC 2P	EPV402	SPV402	DC21B	40A	-	-	-	-	-
	DC 3P	EPV403	SPV403		-	40A	40A	-	-	-
	DC 4P	PVP404	SPV404		-	-	-	40A	32A	25A

Photovoltaic (PV) Isolators

To select the correct PV switch Disconnector we first need to know the maximum voltage and current output from each solar panel.

When calculating the maximum Voltage & Current for an array the manufacturers test figures for V_{oc} & I_{sc} should be used with an appropriate safety factor.

For std mono and multi-crystaline silicon modules the minimum figures would be:-

Voltage: V_{oc}(stc) x 1.15

Current: I_{sc} (stc) x 1.25

V_{oc} – Open Circuit Voltage I_{sc} – Short Circuit Current stc – Standard test conditions

Photovoltaic (PV) Isolators

To select the correct PV switch Disconnector we first need to know the maximum voltage and current output from each solar panel….

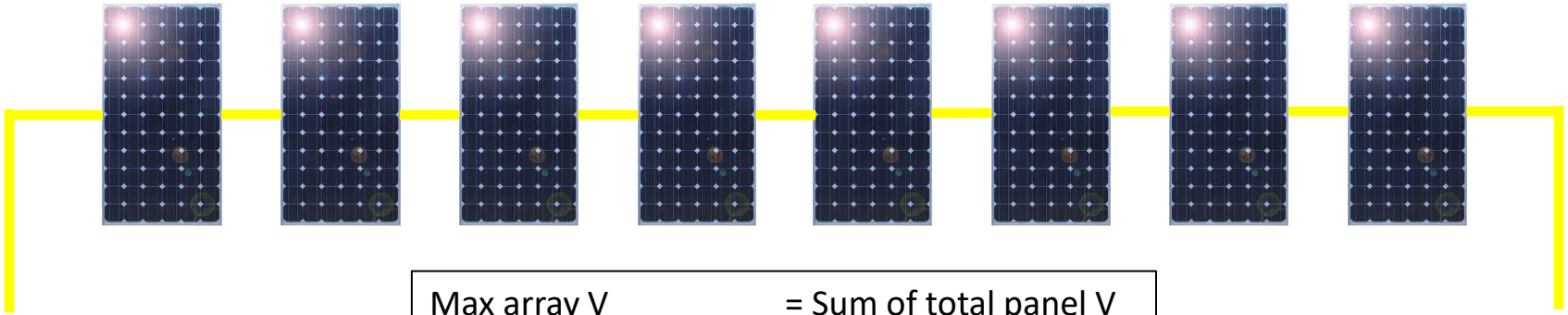
- Max voltage d.c. (V_{oc}stc x 1.15) = 30V
- Max current d.c. (I_{sc}stc x 1.25) = 4.5A
- Power output (watts) = 135W

Next we need to know how the array (all of the panels together) is connected……

Photovoltaic (PV) Isolators

Next we need to know how the array (all of the panels together) is connected…

Example 1 - Series



Positive (+)

Negative (-)

Max array V	= Sum of total panel V = 30V x 8 panels = 240Vdc
Max array I	= Highest max I of panels = 4.5A
Max array W	= V x I = 240V x 4.5A = 1080W

Photovoltaic (PV) Isolators

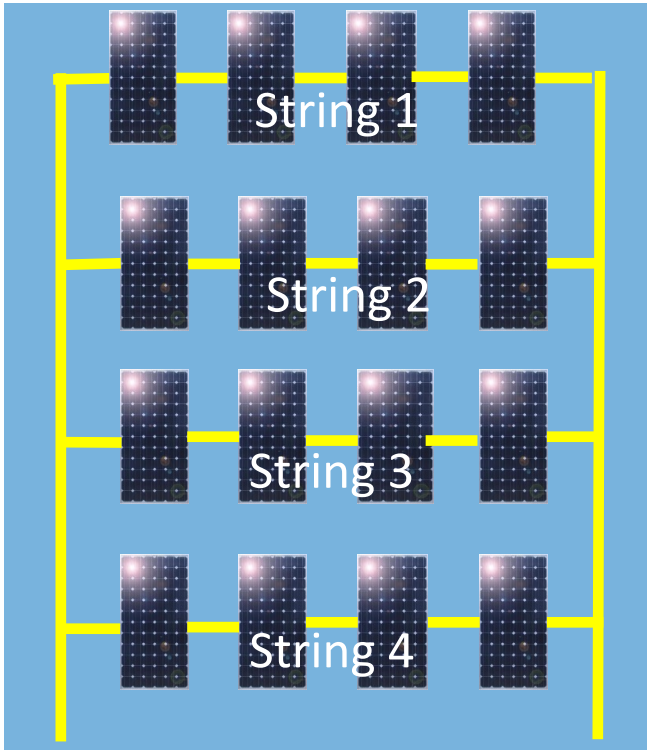
Therefore… EPV162 would be the correct choice

Rating	Format	Cat. No.	Internal Switch	Rated Operational Current	Rated Operational Voltage d.c.					
					300/400V	600V	800V	1,000V	1,200V*2	1,500V*2
16A	DC 2P	EPV162	SPV162	DC21B	16A	16A	16A	-	-	-
	DC 4P	PVP164	SPV164		-	-	-	-	16A	16A
	Twin Array DC 2x2P	PVP1622*1	SPV1622*1		16A	16A	16A	-	-	-
25A	DC 2P	EPV252	SPV252	DC21B	25A	25A	25A	16A	-	-
	DC 3P	EPV253	SPV253		-	-	-	25A	-	-
	DC 4P	PVP254	SPV254		-	-	-	-	20A	16A
	Twin Array DC 2x2P	PVP2522*1	SPV2522*1		25A	25A	25A	16A	-	-
32A	DC 2P	EPV322	SPV322	DC21B	32A	32A	-	-	-	-
	DC 3P	EPV323	SPV323		-	-	32A	32A	-	-
	DC 4P	PVP324	SPV324		-	-	-	-	25A	20A
	Twin Array DC 2x2P	PVP3222*1	SPV322*1		32A	32A	-	-	-	-
40A	DC 2P	EPV402	SPV402	DC21B	40A	-	-	-	-	-
	DC 3P	EPV403	SPV403		-	40A	40A	-	-	-
	DC 4P	PVP404	SPV404		-	-	-	40A	32A	25A

Photovoltaic (PV) Isolators

Next we need to know how the array (all of the panels together) is connected…

Example 2 - Parallel



Positive (+)

Negative (-)

Max array V	= Highest max V of strings = 30V x 4 panels = 120Vdc
Max array I	= Sum of total I of strings = 4.5A x 4 = 18A
Max array W	= V x I = 120V x 18A = 2160W

Photovoltaic (PV) Isolators

Therefore… EPV252 would be the correct choice

Rating	Format	Cat. No.	Internal Switch	Rated Operational Current	Rated Operational Voltage d.c.					
					300/400V	600V	800V	1,000V	1,200V*2	1,500V*2
16A	DC 2P	EPV162	SPV162	DC21B	16A	16A	16A	-	-	-
	DC 4P	PVP164	SPV164		-	-	-	-	16A	16A
	Twin Array DC 2x2P	PVP1622*1	SPV1622*1		16A	16A	16A	-	-	-
25A	DC 2P	EPV252	SPV252	DC21B	25A	25A	25A	16A	-	-
	DC 3P	EPV253	SPV253		-	-	-	25A	-	-
	DC 4P	PVP254	SPV254		-	-	-	-	20A	16A
	Twin Array DC 2x2P	PVP2522*1	SPV2522*1		25A	25A	25A	16A	-	-
32A	DC 2P	EPV322	SPV322	DC21B	32A	32A	-	-	-	-
	DC 3P	EPV323	SPV323		-	-	32A	32A	-	-
	DC 4P	PVP324	SPV324		-	-	-	-	25A	20A
	Twin Array DC 2x2P	PVP3222*1	SPV322*1		32A	32A	-	-	-	-
40A	DC 2P	EPV402	SPV402	DC21B	40A	-	-	-	-	-
	DC 3P	EPV403	SPV403		-	40A	40A	-	-	-
	DC 4P	PVP404	SPV404		-	-	-	40A	32A	25A

What are the additional features of the C&D PV range?

- IP65 moulded plastic enclosures with multiple knockouts for cable entry
- Door interlock handles and operating shafts for panel mounting applications
- Up to 3 Padlocks can lock the handle in the ‘OFF’ position. Standard hasp dia 6.4mm
- C&D PV isolators incorporate a mechanical interlock which when a padlock is inserted prevents the enclosure lid from being removed