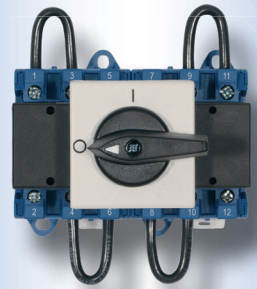


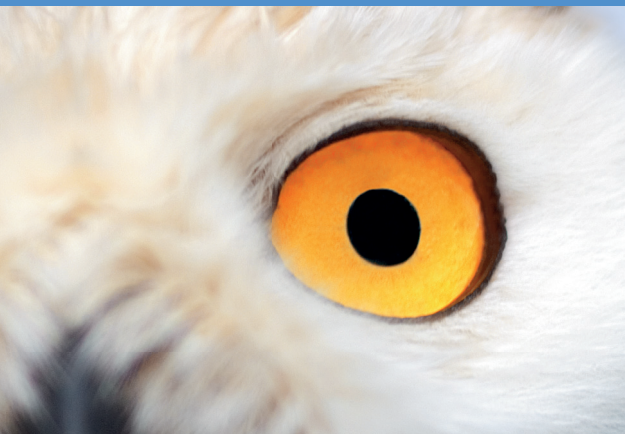
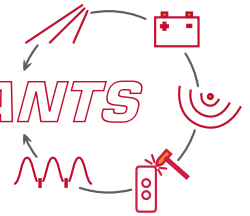
Selection Guide

DC - Photovoltaic Switches



Kraus & Naimer

SYSTEM VARIANTS



We are focused
on the solution

Since 1907 Kraus & Naimer has produced low-voltage switchgear. We developed the world's first modular rotary cam switches and are the undisputed market leader of rotary cam switches world wide. Our product line is designed to fit the needs of a global marketplace. We offer quality, variety, the latest technology, superior customer service, along with economy and quick deliveries.

DC Voltage & Current in PV Systems

DC Voltages in PV systems:

DC Voltage in PV systems is determined by the solar panel output and how the MPPT controls it. Voltage values for the DC isolator selection is based on the V_{oc} multiplied by a correction factor (generally a 1.15 multiplication) as outlined in current standards / guidance documents.

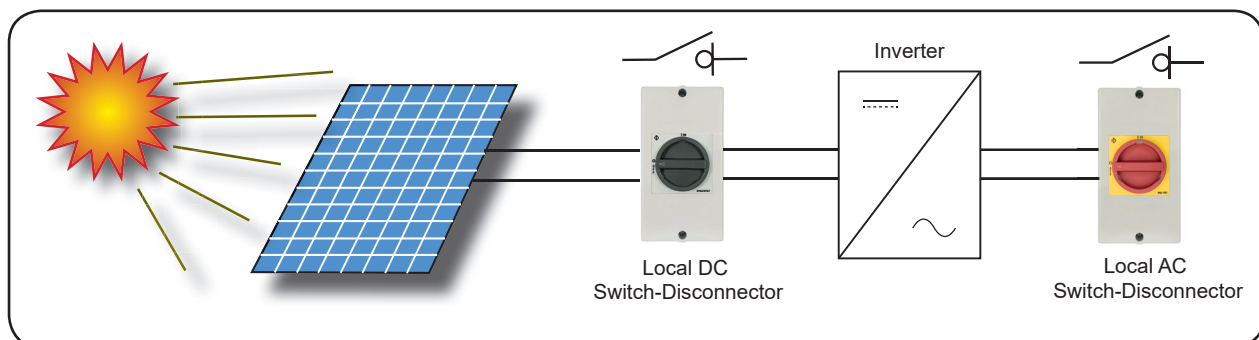
At present the ceiling value for PV systems is 1000V DC, this is the maximum voltage given by solar panel and inverter manufacturers alike. Typically you will find a statement like “the following limiting values at the DC input of the inverter may not be exceeded” or “the maximum open circuit voltage (V_{oc}), which can occur at a cell temperature of -10°C , may not exceed the maximum input voltage of 1000V”.

DC Currents in PV systems:

DC Current in PV systems is determined by the solar panel output and how the MPPT controls it. Current values for the DC isolator selection is based upon the I_{sc} of the panel multiplied by the number of panels or strings there are in parallel and including a correction factor (generally a 1.25 multiplication) as outlined in current standards / guidance documents.

Most solar panels have a I_{sc} of between 5A & 9A I_{sc} so typically when a customer is asking for an isolator to isolate 1 series connected string the current should be no more than 11.25A.

If a client were to ask for a DC isolator to isolate 2 strings connected in parallel then it would be nearer 22.5A and so on.



Product Information


- IP66/67 protection
- Insulated enclosure, grey, RAL7035
- Range from 8A-50A @1000Vdc
- Non polarity sensitive
- KGD40 switch type has permanent magnets in the contact body to reduce arcing time

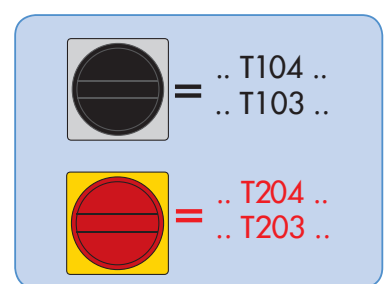
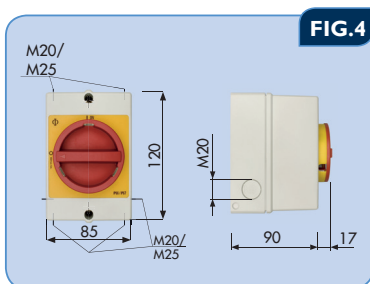
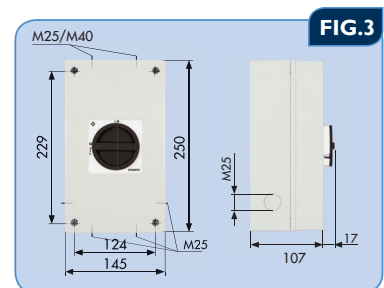
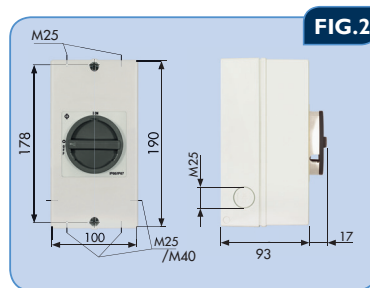
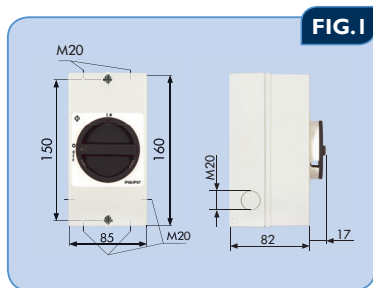
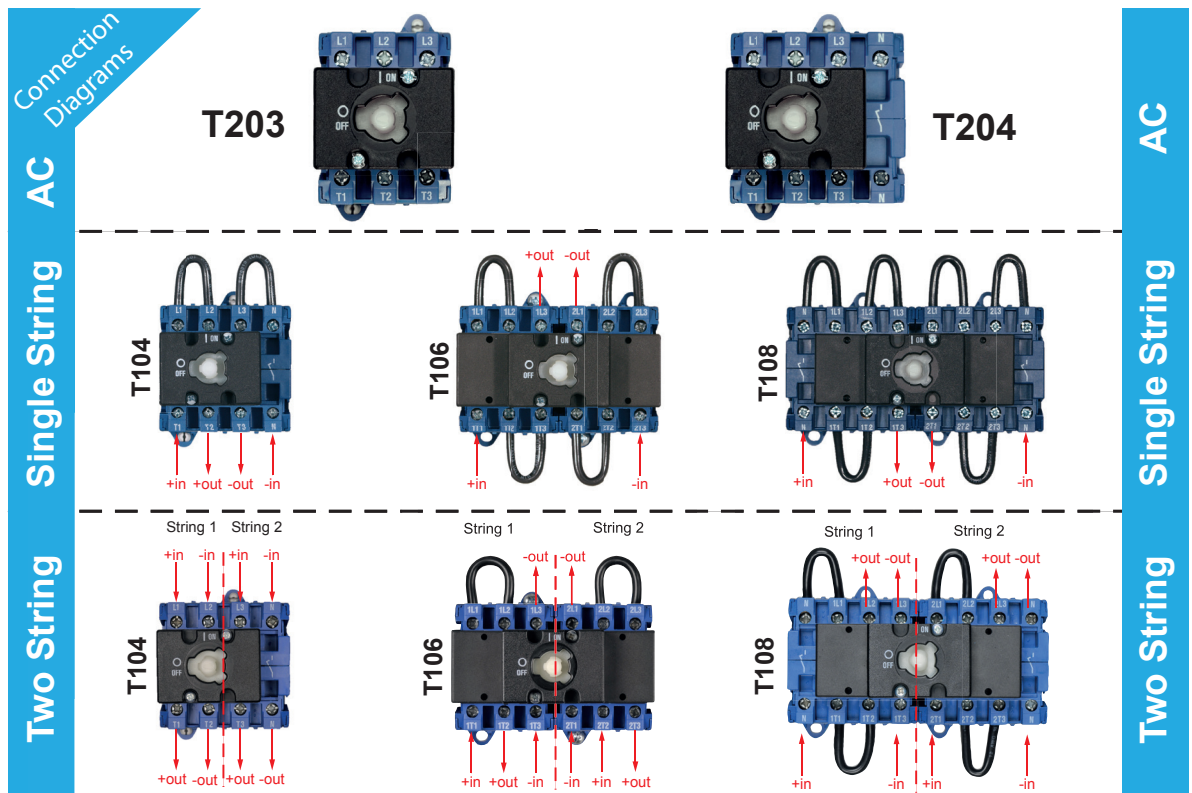
Enclosed	Ampere at Voltage category DC-21B																			
One String (2 pol)	220V	240V	280V	320V	340V	400V	440V	460V	480V	510V	560V	600V	640V	660V	680V	690V	800V	880V	920V	1000V
KG20 T104/D-P003 KL51V				25A			25A				21A				20A		18A		11A	
KG32 T104/D-P003 KL51V				32A			32A				28A				25A		23A		15A	
KG32B T108/D-P003 KL11V													32A					32A		
KGD40 TD102/D-P003 KL11V				40A		40A			34A	30A				20A			12A			8A
KGD40 TD103/D-P003 KL11V		50A							40A		40A	40A				30A				20A
KGD40 TD104/D-P003 KL11V				50A									40A				40A			30A
KGD40B TD106/D-P003 KL11V															50A					40A
KGD40B TD108/D-P003 KL11V													50A							50A

Enclosed	Ampere at Voltage category DC-21B																			
Two String (4 pol)	220V	240V	280V	320V	340V	400V	440V	460V	480V	510V	560V	600V	640V	660V	680V	690V	800V	880V	920V	1000V
KG20 T104/GB-P103 KL51V	25A		21A		20A	18A		11A												
KG32 T104/GB-P103 KL51V	32A		28A		25A	23A		15A												
KG32B T106/GB-P103 KL11V		32A								25A		23A				15A				
KG32B T108/GB-P103 KL11V				32A			32A				28A				25A		23A		15A	
KGD40 TD104/D-P004 KL11V						40A			30A					17A						
KGD40B TD106/D-P004 KL11V		50A							40A		40A	40A				30A				20A
KGD40B TD108/D-P004 KL11V				50A									40A				40A			30A
KGD40B TD108/D-P003 KL11V																				



Product Data & Connection Diagrams

Terminal Capacity / Tightening Torque for Terminal Screws / Cable Stripping Length				
Switch Type	Terminal Capacity		Tightening Torque for Terminal Screws	Cable Stripping Length 
	Single core / Stranded wire	Flexible wire, with sleeve		
KG20 / KG32	6mm ²	4mm ²	1.25Nm	9mm
KG41 / KG64	16mm ²	10mm ²	1.80Nm	10mm
KGD40	16mm ²	10mm ²	1.80Nm	10mm



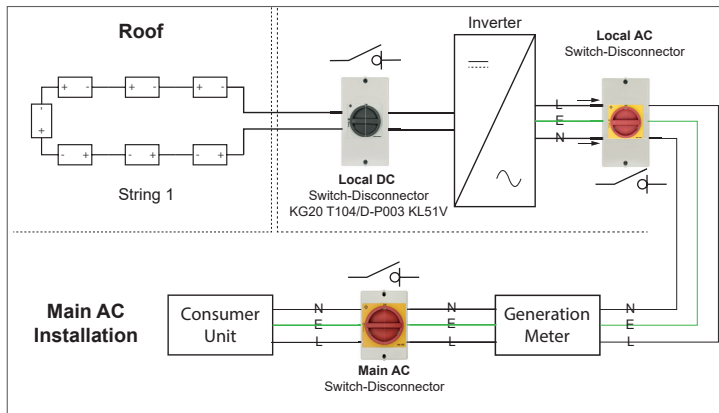


Disconnectors for
Photovoltaic

El nummer Norway	E-nummer (Sweden)	Enclosed One String (2 pol)	Enclosure dimensions HxWxD mm	
1470056	3161030	KG20 T104/D-P003 KL51V	160 x 85 x 82	Fig 1
1470057	3161031	KG32 T104/D-P003 KL51V	160 x 85 x 82	Fig 1
1470058	3161032	KG32B T108/D-P003 KL11V	250 x 145 x 107	Fig 3
1470059	3161033	KGD40 TD102/D-P003 KL11V	190 x 100 x 93	Fig 2
1470060	3161034	KGD40 TD103/D-P003 KL11V	190 x 100 x 93	Fig 2
1470061	3161035	KGD40 TD104/D-P003 KL11V	190 x 100 x 93	Fig 2
1470062	3161036	KGD40B TD106/D-P003 KL11V	250 x 145 x 107	Fig 3
1470063	3161037	KGD40B TD108/D-P003 KL11V	250 x 145 x 107	Fig 3

El nummer Norway	E-nummer (Sweden)	Enclosed Two String (4 pol)	Enclosure dimensions HxWxD mm	
1470064	3161038	KG20 T104/GB-P103 KL51V	160 x 85 x 82	Fig 1
1470065	3161039	KG32 T104/GB-P103 KL51V	160 x 85 x 82	Fig 1
1470066	3161040	KG32B T106/GB-P103 KL11V	190 x 100 x 93	Fig 2
1470067	3161041	KG32B T108/GB-P103 KL11V	190 x 100 x 93	Fig 2
1470068	3161042	KGD40 TD104/D-P004 KL11V	190 x 100 x 93	Fig 2
1470069	3161043	KGD40B TD106/D-P004 KL11V	250 x 145 x 107	Fig 3
1470070	3161044	KGD40B TD108/D-P004 KL11V	250 x 145 x 107	Fig 3

Example Systems - typical 3kW system



Correction Factors	
For Voltage, Voc	1.15
For Current, Isc	1.25

AC Selection

Local = KG20 T203/40 KL11V
 Main = KG20 T203/40 KL51V

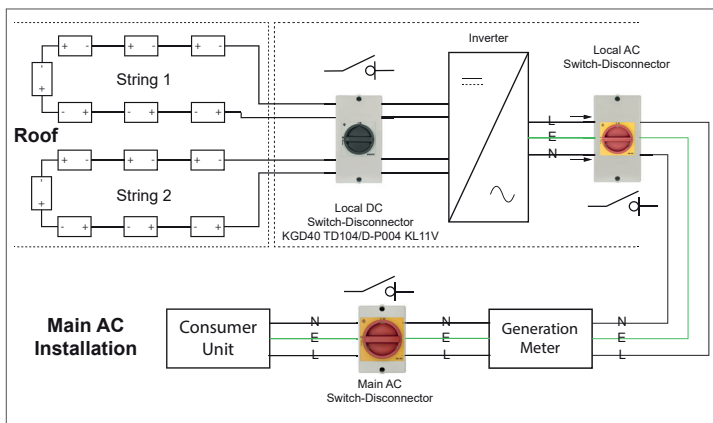
DC Selection Ratings

Voltage = $12 \times 37V \times 1.15 = 510.6V$
 Current = $8.6A \times 1.25 = 10.75A$

Therefore the **KG20 T104/D-P003 KL51V** is suitably rated 20A at 600V, DC-21B.

Typical Installation Data		
Type	AC	DC
Max Voc Inverter input	N/A	550V
Max Isc Inverter input	N/A	17A
Max Inverter output (A)	16A	N/A
Cable size used	4mm ²	2.5mm ²
Max Ambient temp at local isolator location	50°C	50°C
Max Ambient temp at main isolator location	35°C	N/A
Circuit Protection	20A	N/A
Solar Panel Data		
Maximum Power Rating	235Wp	
Number of panels	12	
Voc of individual panel	37V	
Isc of individual panel	8.6A	

Example Systems - typical 5kW system



Correction Factors	
For Voltage, Voc	1.15
For Current, Isc	1.25

AC Selection

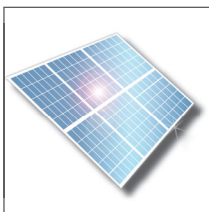
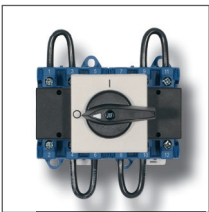
Local = KG20 T203/40 KL51V
 Main = KG20 T203/40 KL51V

DC Selection Ratings - per string

Voltage = $12 \times 37V \times 1.15 = 510.6V$
 Current = $8.6A \times 1.25 = 10.75A$

Therefore the **KGD40 TD104/D-P004 KL11V** is suitably rated 20A at 560V, DC-21B - per string.

Typical Installation Data		
Type	AC	DC
Max Voc Inverter input	N/A	550V Per string
Max Isc Inverter input	N/A	15A Per string
Max Inverter output (A)	22A	N/A
Cable size used	6mm ²	4mm ²
Max Ambient temp at local isolator location	50°C	50°C
Max Ambient temp at main isolator location	35°C	N/A
Circuit Protection	25A	N/A
Solar Panel Data		
Maximum Power Rating	235Wp	
Number of panels in each string	12	
Voc of individual panel	37V	
Isc of individual panel	8.6A	



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