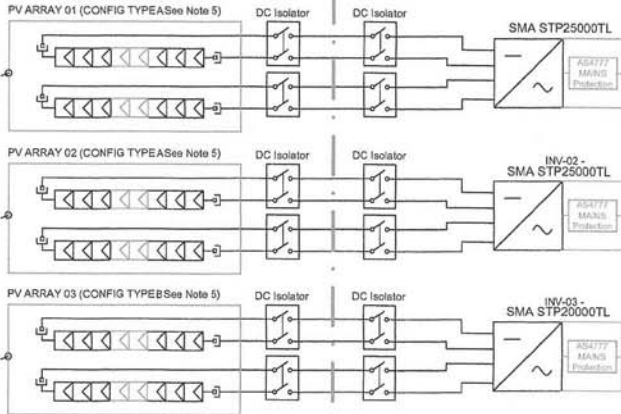


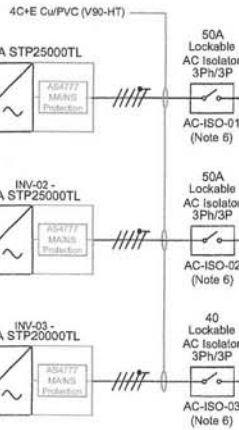


1. Technology: Solar PV
2. Maximum Power: 70 kW
3. Contribution to fault levels: N/A
4. Size & rating of the relevant Transformer: N/A
5. Single line diagram: refer to following page
6. Protection Systems & Communication Systems: refer to following page
7. Voltage Control and reactive power capability: N/A
8. Details specific to the location of facility: N/A

PV ARRAY LOCATION



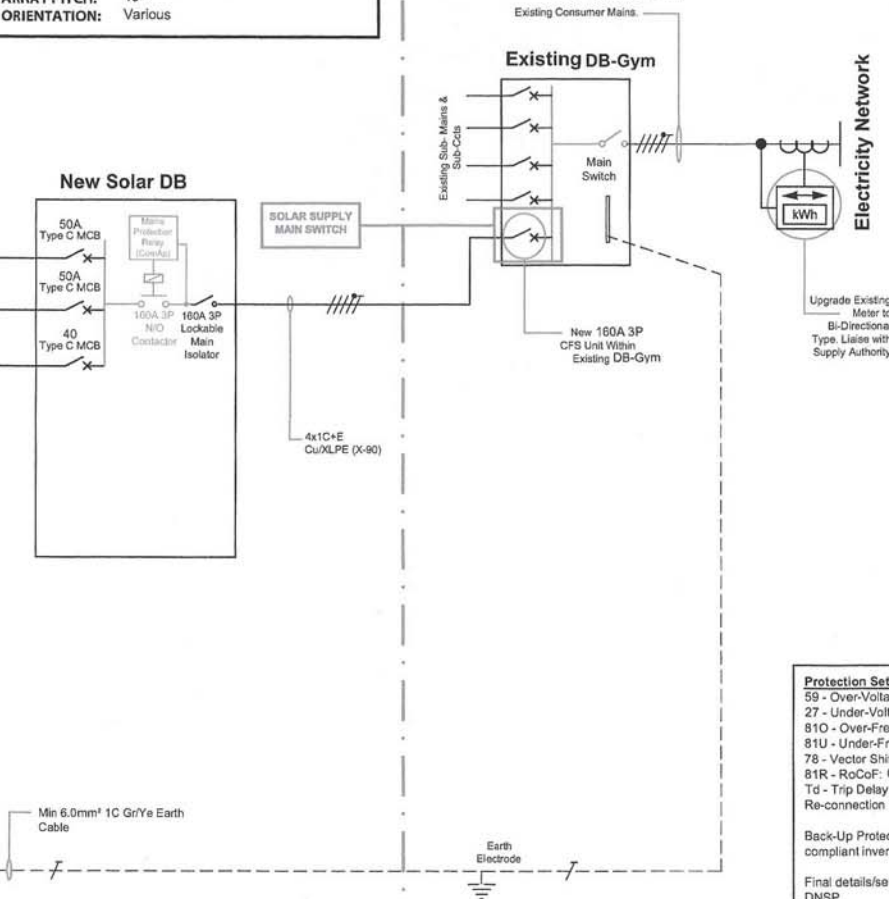
INVERTER LOCATION



PV SYSTEM DETAILS

PV TYPE: Yinli YL260P-29b
MODULE SIZE: 1650mm x 990mm x40mm
No. MODULES: 270
TOTAL kWp: 70.2
ARRAY PITCH: 10°
ORIENTATION: Various

MAIN SWITCHBOARD LOCATION



Protection Settings

59 - Over-Voltage: 257Vph-n (Td = 2s)
 27 - Under-Voltage: 208Vph-n (Td = 2s)
 81O - Over-Frequency: 51Hz (Td = 2s)
 81U - Under-Frequency: 49Hz (Td = 2s)
 78 - Vector Shift: 6deg (Td = 1s)
 81R - RoCoF: 0.4Hz/s (Td = 1s)
 Td - Trip Delay
 Re-connection Time Delay: >60s

Back-Up Protection Provided by AS4777 compliant inverters.

Final details/settings to be confirmed with DNSP.

Bond PV Frames & Framework To Earth Connection From Main Switchboard Earth Bar (Note 3)

Min 6.0mm² 1C Gr/Ye Earth Cable

Earth Electrode



CEC Designer: [Redacted]
 CEC Accreditation: [Redacted]

Notes:

1. All installation works shall comply with: AS3000, AS3008, AS5033, AS4777, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
2. External mains protection relay is dependent upon the DNSP's final requirements.
3. Utilise earthing washers and bond all array frames with earth cabling ensuring a continuous earth connection even with the removal of a PV module.
4. Ensure system is labelled to AS5033, AS4777.1, CEC guidelines and Local Regulator's requirements.
5. Some DC details have been omitted for clarity. Refer to drawing DWG-1216 for further information on string and DC isolator requirements.
6. AC isolators may be omitted and inverter CB's used instead if inverter are to be located within 3m and in direct line of sight of CB location.
7. Mains Protection Relay final settings to be confirmed by DNSP.

Project: [Redacted]

Title: PV AC Schematic

Dwg No: DWG-1215

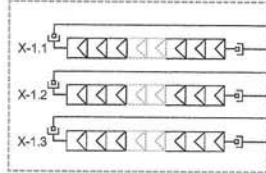
Rev:

Rev	Date	Comments	Dwn	Chkd
Dwn:	[Redacted]	Chkd:	[Redacted]	Date: 1/10/16
Job No: J1394				Scale: A3

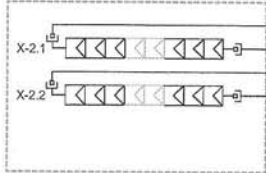
CONFIGURATION TYPE A

PV ARRAY LOCATION

PV Sub-Array X-1
3 Strings of 19x Yingli YL260P-29b
String Voc = 716 V & String Isc = 8.92A (@STC)



PV Sub-Array X-2
2 Strings of 19x Yingli YL260P-29b
String Voc = 716 V & String Isc = 8.92A (@STC)



1C PV-1F Double Insulated DC Solar Cable (Typical)

1000V DC 15A gPV Fuse

Additional 1000V 40kA DC SPD (See Note 7)

DC-ISO-X-1 55 A 1000VDC DC Isolator

DC-ISO-X-1 55 A 1000VDC DC Isolator

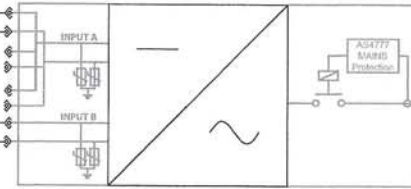
DC-ISO-X-2 25A 1000VDC DC Isolator

DC-ISO-X-2 25A 1000VDC DC Isolator

INVERTER LOCATION

4C+E AC Cable Cu/PVC (V90-HT)

INV-0X - SMA STP25000TL-20

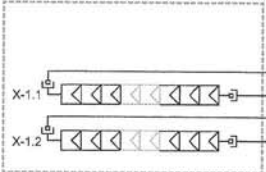


TO SOLAR DISTRIBUTION BOARD

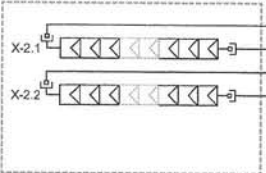
CONFIGURATION TYPE B

PV ARRAY LOCATION

PV Sub-Array X-1
2 Strings of 20x Yingli YL260P-29b
String Voc = 730 V & String Isc = 8.92A (@STC)



PV Sub-Array X-2
2 Strings of 20x Yingli YL260P-29b
String Voc = 730 V & String Isc = 8.92A (@STC)



1C PV-1F Double Insulated DC Solar Cable (Typical)

15

Additional 1000V 40kA DC SPD (See Note 7)

DC-ISO-X-1 25A 1000VDC DC Isolator

DC-ISO-X-1 25A 1000VDC DC Isolator

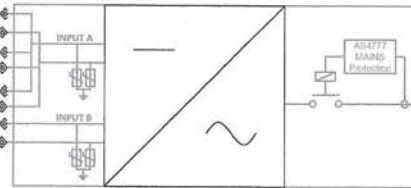
DC-ISO-X-2 25A 1000VDC DC Isolator

DC-ISO-X-2 25A 1000VDC DC Isolator

INVERTER LOCATION

4C+E AC Cable Cu/PVC (V90-HT)

INV-0X - SMA STP20000TL-20



TO SOLAR DISTRIBUTION BOARD

Notes:

- All installation works shall comply with; AS3000, AS3008, AS5033, AS4777, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
- All DC Isolator shall be load break type. DC isolators installed externally shall be min IP65. DC voltage rating specified for TL inverters must be for each conductor in accordance with AS/NZS5033(2014): Appendix B.
- Inverter shall be located within ventilated space or under cover externally. Do not locate inverter in direct sunlight.
- Utilise earthing washers and bond all array frames with earth cabling ensuring a continuous earth connection even with the removal of a PV module.
- Ensure system is labelled to AS5033, CEC guidelines and local state safety requirements.
- Where 'X' denotes the particular inverter number.
- Surge protection devices may be omitted according to a lightning protection risk assessment to AS1768.

Project: [Redacted]

Title: PV DC Schematic - System 1

Dwg No: DWG-1216

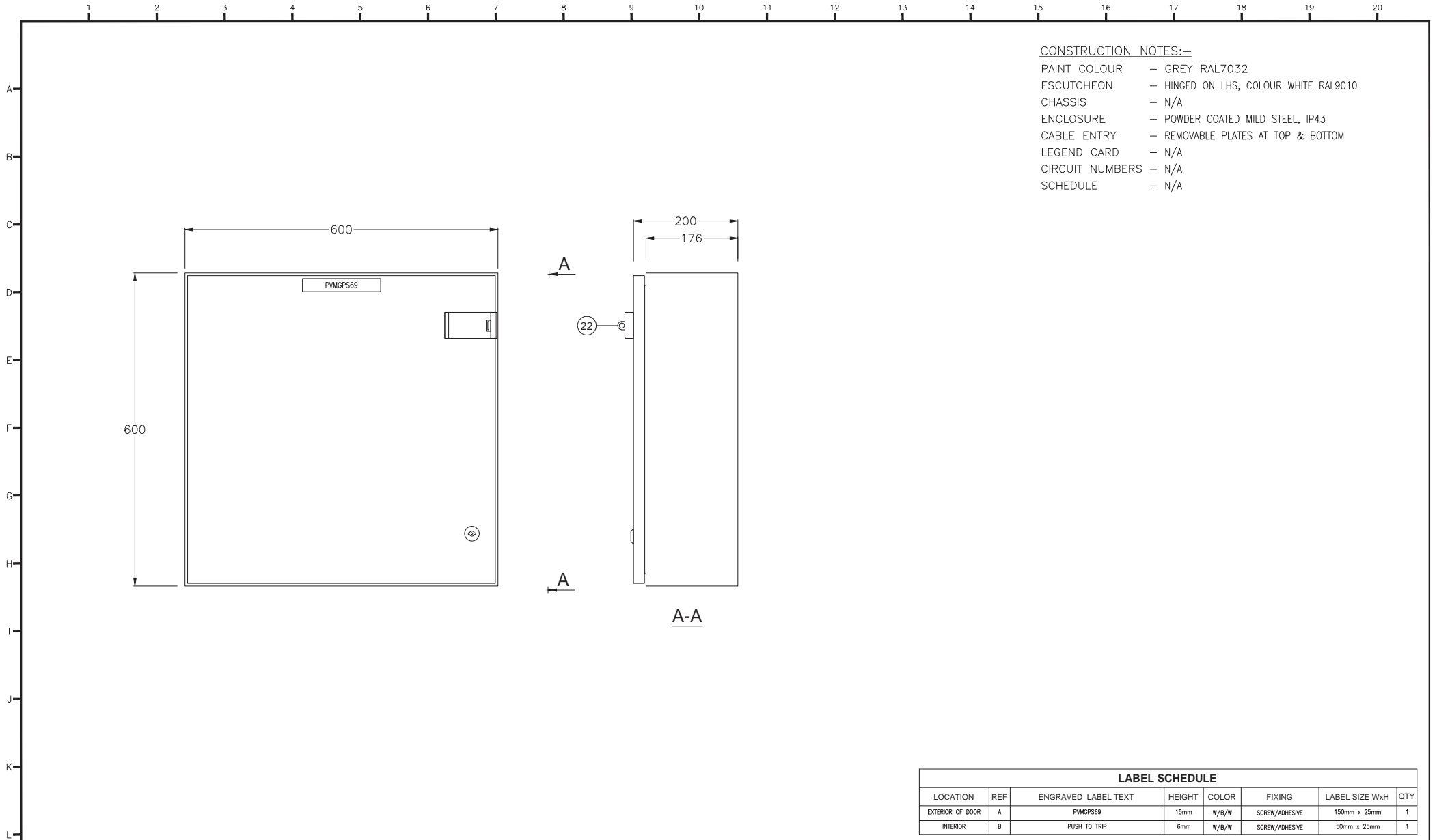
Rev:

Rev	Date	Comments	Dwn	Chkd

Dwn: [Redacted] Chkd: [Redacted] Date: 12/28/15


Job No: J1392

Scale: A3



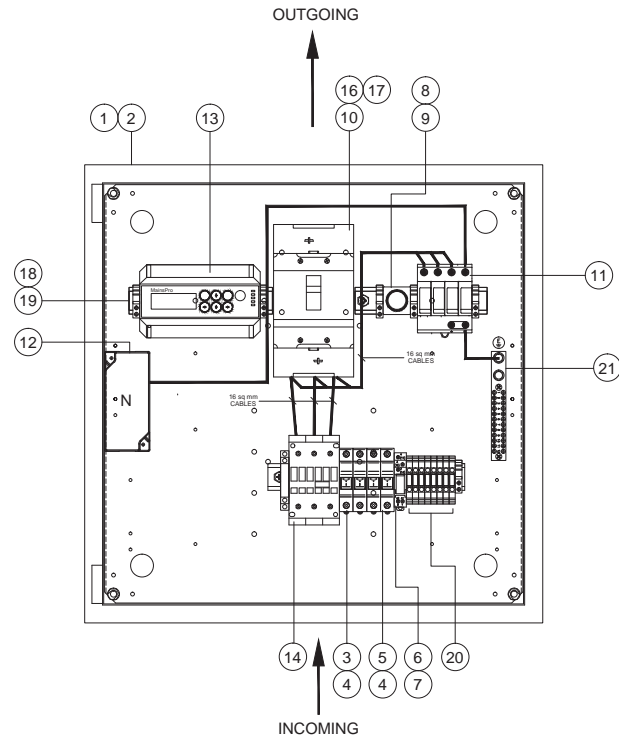
- CONSTRUCTION NOTES:-**
- PAINT COLOUR - GREY RAL7032
 - ESCUTCHEON - HINGED ON LHS, COLOUR WHITE RAL9010
 - CHASSIS - N/A
 - ENCLOSURE - POWDER COATED MILD STEEL, IP43
 - CABLE ENTRY - REMOVABLE PLATES AT TOP & BOTTOM
 - LEGEND CARD - N/A
 - CIRCUIT NUMBERS - N/A
 - SCHEDULE - N/A

LABEL SCHEDULE							
LOCATION	REF	ENGRAVED LABEL TEXT	HEIGHT	COLOR	FIXING	LABEL SIZE WxH	QTY
EXTERIOR OF DOOR	A	PVMGPS69	15mm	W/B/W	SCREW/ADHESIVE	150mm x 25mm	1
INTERIOR	B	PUSH TO TRIP	6mm	W/B/W	SCREW/ADHESIVE	50mm x 25mm	1

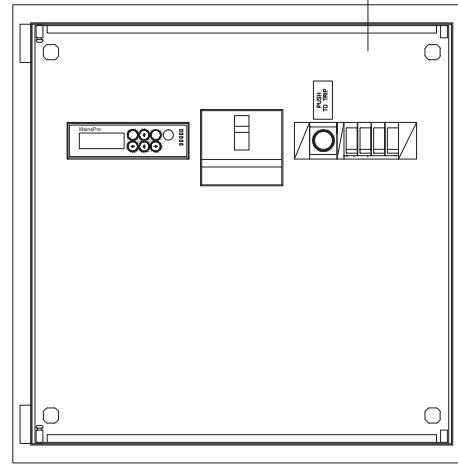
REV: A	DRAWN	CHECKED	APPROVED	DATE	REMARKS:	SHEET CONTENT:	 <p>IPD GROUP LIMITED</p>	PROJECT:
B	FOR CONSTRUCTION			16/09/13		FRONT VIEW DOOR CLOSED		CLIENT:
C	FOR CONSTRUCTION			23/09/13	DISCONNECTED TYPE TERMINALS ARE ADDED & PANEL ID CHANGED	QUO.No : QNM64-R6		PANEL ID:
D	FOR CONSTRUCTION			16/12/2014	ADDED TWO TERMINALS	W/O : 3RD ANGLE PROJECTION		PVMGPS69
E	FOR CONSTRUCTION			23/02/2015	CHANGED THE DRAWING NUMBER	S/O : NOT TO SCALE		SHEET 1 OF 3
				14/07/2015	ADDED THREE TERMINALS	LAB : 7		A3
						DWG.REF. 9PV0012-010		E

21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A
B
C
D
E
F
G
H
I
J
K
L



DOOR & ESCUTCHEON OMITTED



DOOR OMITTED

PERFORMANCE DATA

PART NUMBER	-	PVMGPS69
VOLTAGE	-	230/400VAC
FREQUENCY	-	50Hz
MAX. CURRENT	-	100A
MAX. POWER	-	69kVA
PHASES	-	3
SHORT CIRCUIT	-	50kA
MECHANICAL OPS AC1	-	1000000
POWER DISSIPATION (PER POLE)	-	14.96W

PROTECTION RELAY PERFORMANCE

OPERATING TEMPERATURE	-	-20°C to +70°C
INGRESS PROTECTION	-	IP20
POWER SUPPLY	-	85-265, 110-370VAC, 8-40VDC, 45-65Hz
MEASUREMENT RANGE	-	120/230/400VAC, 8-40VDC, 50, 60Hz
MAX. MEASURED VOLTAGE	-	130%Un
MAX. MEASURED CURRENT	-	N/A
MAX. ALLOWED CURRENT	-	90mA (AC Supply), 600mA (DC Supply)
MEASUREMENT ACCURACY	-	VOLTAGE: 1% OF THE NOMINAL VALUE AT 50Hz±10% AND 25°C, FREQUENCY: 0.1Hz WITHIN THE RANGE 40 TO 70Hz TIMING:±1%
MAX. REACTION TIMES	-	VOLTAGE FAILURES: 55ms (IF TIME DELAY SET TO 0s) FREQUENCY FAILURES: 75ms (IF TIME DELAY SET TO 0s) LOSS OF MAINS: 45ms (IF TIME DELAY SET TO 0s)
POWER CONSUMPTION	-	600mA/8VDC, 90mA/85VAC
CT INPUT BURDEN	-	N/A

EQUIPMENT SCHEDULE

PART ID	PART NO.	EQUIPMENT DESCRIPTION	QTY
1	E65SHELL6G	DB SHELL 600H IP65 GREY EXCLUDING ESCUTCHEON	1
2	E-06U-MP	MOUNTING PAN FOR 600H SHELL FOR ALL EVOLUTION BOARDS	1
3	CMS103	FUSE HOLDER 32A 3 POLE MODULAR 690V DIN MOUNT	1
4	10G02	FUSE LINK 2A 500V FERRULE 10*38MM 120KA GENERAL PURPOSE	4
5	CMS101	FUSE HOLDER 32A 1POLE MODULAR 690V DIN MOUNT FUSE = 10*38MM	1
6	SJ1S-07LW	RJ1S RELAY BASE. FINGER-SAFE DIN RAIL MOUNT	1
7	RJ1S-CL-A240	RELAY SLIM LINE, SPDT, 240VAC 12A, WITH INDICATOR	1
8	P9DINRA	DIN RAIL ADAPTOR FOR 22MM PILOT DEVICES, 2 MODULES WIDE	1
9	P9XPN52002	PUSHBUTTON,FLUSH,GREEN, C/W 1NO CONTACT BLOCK,PLASTIC	1
10	FEN36TD100JF	MCCB,FEN160,3P,50KA,100A LTMD TRIP UNIT.	1
11	DGMTTCI275	SPD 4P Class 2 25kA 8/20us 5 WIRE 275VAC NON-MEN C/W FUSE	1
12	LT350/7	350A 7 HOLE LINE TAP STYLE NEUTRAL LINK, MAX 120MM CABLES	1
13	MAINSPRO	MAINS DECOUPLING RELAY ANSI CODES:27,59,81H,81L,78,81R	1
14	CL06A311M7	CONTACTOR CL 3P,90A AC1,50A 25kW AC3,1NO 1NC AUX,240VAC	1
15	E-M06PVFE-ID	600x600 ESCUTCHEON TO SUIT GPS ENCLOSURE	1
16	FEJS3	TERMINAL SHIELDS,FE FRAME,2PCE SET,3POLE ,SHORT.	1
17	E-FETH	FE & FD TOP HAT MOUNTING BRACKET	1
18	E-DRSP	DIN RAIL SUPPORT PILLAR 87MM X 14MM A/F M6X6MM	4
19	E-DINRAIL-L	LONG DIN RAIL CUT AND PUNCHED 428MM WITH 130 & 310MM CENTRES	1
20	CDTTU	DISCONNECT & TEST TERMINAL BLK 8MM WIDE TERMINAL	8
21	EB12	EARTH BAR 12 WAYLENGTH = 143mm	1
22	80C0V52303	PADLOCK COVER FOR MILD STEEL ENCLOSURES	1

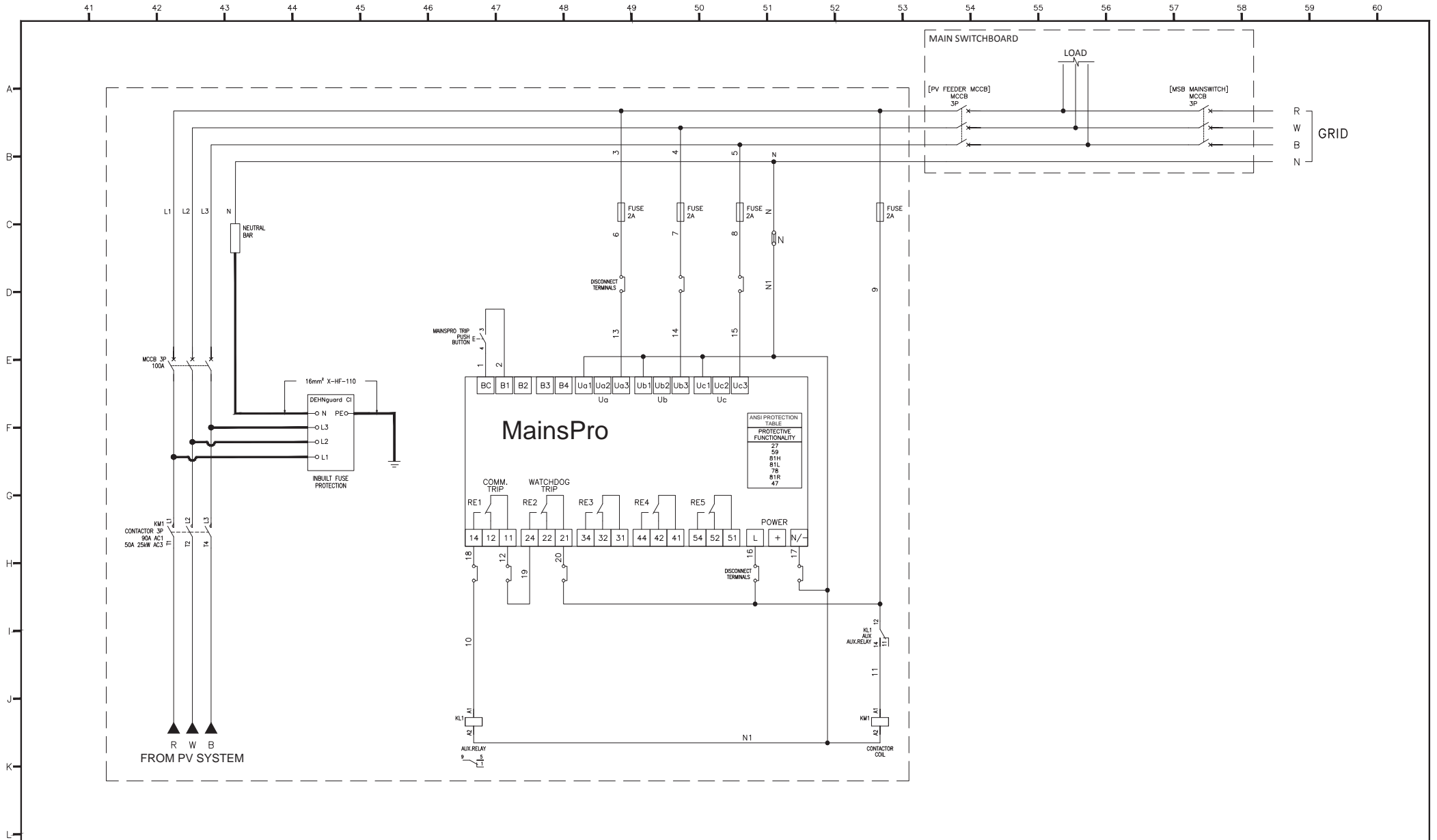
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A				16/09/13	
B				23/09/13	DISCONNECTED TYPE TERMINALS ARE ADDED & PANEL ID CHANGED
C				16/12/2014	ADDED TWO TERMINALS
D				23/02/2015	CHANGED THE DRAWING NUMBER
E				14/07/2015	ADDED THREE TERMINALS

SHEET CONTENT:	
FRONT VIEW - LAYOUT DRAWING & EQUIPMENT SCHEDULE	
QUO.No : QNM64-R6	DIMENSIONS IN MILLIMETRES
W/O :	3RD ANGLE PROJECTION
S/O :	NOT TO SCALE
LAB : 7	DWG.REF. 9PV0012-010



IPD GROUP LIMITED

PROJECT:	
CLIENT:	
PANEL ID:	PVMGPS69 SHEET 2 OF 3
	A3 E



REV:	DRAWN	CHECKED	APPROVED	DATE	REMARKS:
A				16/09/13	
B				23/09/13	DISCONNECTED TYPE TERMINALS ARE ADDED & PANEL ID CHANGED
C				16/12/2014	ADDED TWO TERMINALS
D				23/02/2015	CHANGED THE DRAWING NUMBER
E				14/07/2015	ADDED THREE TERMINALS

SHEET CONTENT:	
CONTROL CIRCUIT DIAGRAM	
QUO.No :	QNM64-R6
DIMENSIONS IN MILLIMETRES	
W/O :	3RD ANGLE PROJECTION
S/O :	NOT TO SCALE
LAB :	7
DWG.REF.	9PV0012-010

ipd

IPD GROUP LIMITED

PROJECT:	
CLIENT:	
PANEL ID:	PVMGPS69 SHEET 3 OF 3
	A3 E

Grid protection Strategy

During normal operation with grid parameters within set limits, the ComAp Mains Pro relay, will hold the main contactor closed. In the event of grid instability (Over/Under Voltage or Frequency, excess ROCOF / VECTOR SHIFT or Voltage unbalance) the relay will trip and open the main contactor complying with section 5.3 of NS194.

The SMA inverters will be reprogrammed from there default settings using the SMA grid guard code to comply with NS194 and NSW service and installation rules. The main adjustment will be to lower the overvoltage default setting from 270 V to 260 V.

Protection Settings			
Function	Inverter Setting	Proposed Relay Setting	Trip time
Under voltage (27)	200V	200V	2s
Over voltage (59)	260V	260V	2s
Under Frequency (81U)	48Hz	48Hz	2s
Over Frequency (81O)	52Hz	52Hz	2s
ROCOF (81R)	NA	1Hz/S	1s
Vector Shift (78)	NA	8 °	1s
Reconnection delay times	61 s		