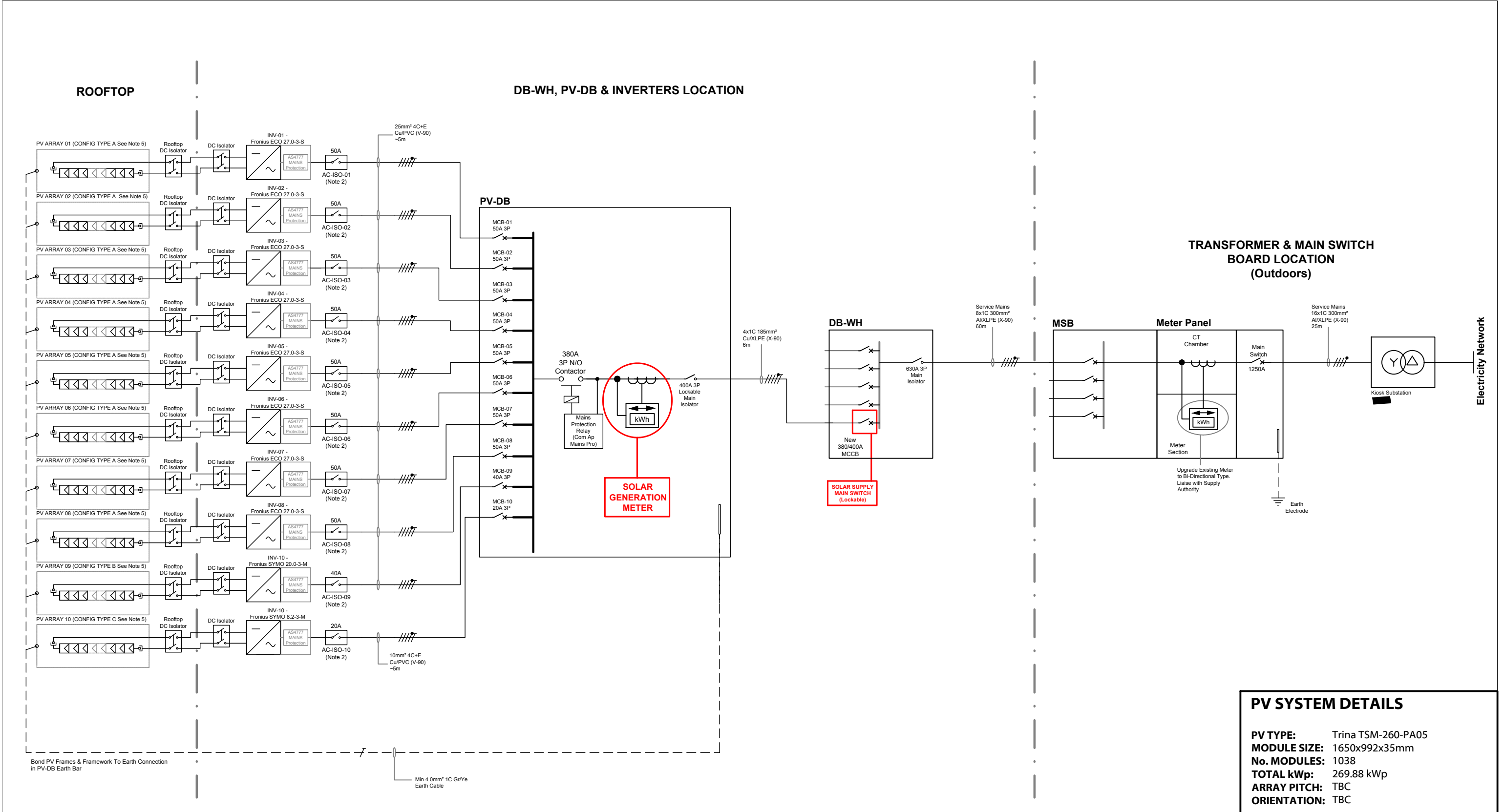




CEC Designer: [Redacted]
CEC Accreditation No: [Redacted]

*The accredited designer confirms that all sizings and component specifications shown on this drawing are accurate and conform to Clean Energy Council (C.E.C) guidelines and relevant Australian Standards. Unless previously agreed between Clean Technology Partners & the installation contractor it is the responsibility of the contractor using this drawing to establish all relevant site factors via a site visit and ensure all required information is provided to the client as required by C.E.C design & installation guidelines including an estimate of yearly energy output for the site. If unclear of your responsibilities, please contact the listed accredited designer on this drawing or refer to the C.E.C website: www.solaraccreditation.com.au/acccec/installerresources/compliance/guidelines.html



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Client: [Redacted]

- Notes:
- All installation works shall comply with; AS3000, AS3008, AS5033, AS4777, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
 - All AC isolators shall be load break type. AC isolators installed externally shall be min IP65. An AC isolator is not required if the inverter is in line of sight of the PV-DB, where the inverter CB can be used for isolation.
 - Utilise WEEB 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, AS4777.1, CEC guidelines and relevant state requirements.
 - Some DC details have been omitted for clarity.
 - Installer is to verify cable runs onsite. Installation method assumed to be 'enclosed touching' for Inverters sub-mains and 'unenclosed touching' for PV-DB sub-mains. If any variations from the runs or installation method are required onsite, please contact CTP for guidance on cable sizing.

FOR APPROVAL

Project: [Redacted]

Title: [Redacted]

Dwg No: J1400-300 Rev: A1

Rev	Date	Comments	Dwn	Chkd
A1	06/10/16	For Approval Issue	[Redacted]	[Redacted]

Dwn: [Redacted] Chkd: [Redacted] Date: 06/10/16
Job No: J1400 Scale: NTS@A3

Device Id	ComAp MainsPro
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Field Settings

Setpoint group	Setpoint name	New Value	Checked/Updated	Step	Unit	Setting
Basic	Uin	230V	Y	-	-	Measurement range
Basic	System	3ph	Y	-	-	Measured system
Basic	DispT	2	Y	1	[min]	Display timeout
Basic	Auto FR	ENABLED	Y	-	-	Automatic Fault Reset enabling
Basic	Auto FR Del	60	Y	1	[s]	Automatic Fault Reset timer
Basic	Start Trip	ENABLED	Y	-	-	TRIP at the unit startup
Basic	Imp Len	3	Y	1	[s]	Common impulse length
Basic	Bak Trp Del	0.5	Y	0.1	[s]	Back-up Trip Delay Timer for CB Fdb
Basic	Ext	ENABLED	Y	-	-	Enabling the external trip binary switch
Basic	F.R.	DISABLED	Y	-	-	Enabling the fault Reset binary switch
Basic	Alt	DISABLED	Y	-	-	Enabling the Alt settings binary switch
Basic	Dis	DISABLED	Y	-	-	Enabling the blocking binary switch
V<>	V>	265	Y	1	[V]	Overvoltage limit 1
V<>	V> Del	1.8	Y	0.01	[s]	Overvoltage delay 1
V<>	V>>	0 (OFF)	Y	1	[V]	Overvoltage limit 2
V<>	V>> Del	0	Y	0.01	[s]	Overvoltage delay 2
V<>	V<	202	Y	1	[V]	Undervoltage limit 1
V<>	V< Del	1.8	Y	0.01	[s]	Undervoltage delay 1
V<>	V<<	0 (OFF)	Y	1	[V]	Undervoltage limit 2
V<>	V<< Del	0	Y	0.01	[s]	Undervoltage delay 2
V<>	Avg V>	0 (OFF)	Y	1	[V]	10 minutes floating average overvoltage
V<>	Rst V>, V>>	100	Y	1	[%]	Reset threshold for overvoltage
V<>	Rst V<, V<<	100	Y	1	[%]	Reset threshold for undervoltage
dU	V unb	20	Y	1	[%]	Voltage asymmetry limit
dU	V< pos	0 (OFF)	Y	1	[%]	Positive sequence undervoltage limit
dU	V> neg	0 (OFF)	Y	1	[%]	Negative sequence overvoltage limit
dU	dU Del	2	Y	0.01	[s]	Common delay of all voltage asymmetry protections
f<>	f>	51	Y	0.1	[Hz]	Overfrequency limit 1
f<>	f> Del	1.8	Y	0.01	[s]	Overfrequency delay 1
f<>	f>>	0 (OFF)	Y	0.1	[Hz]	Overfrequency limit 2
f<>	f>> Del	0	Y	0.01	[s]	Overfrequency delay 2
f<>	f<	48	Y	0.1	[Hz]	Underfrequency limit 1
f<>	f< Del	1.8	Y	0.01	[s]	Underfrequency delay 1
f<>	f<<	0 (OFF)	Y	0.1	[Hz]	Underfrequency limit 2
f<>	f<< Del	0	Y	0.01	[s]	Underfrequency delay 2
f<>	Rst f>, f>>	100	Y	0.1	[%]	Reset threshold for overfrequency
f<>	Rst f<, f<<	100	Y	0.1	[%]	Reset threshold for underfrequency
LOM	Vs Lim	8	Y	1	[*]	Vector shift limit
LOM	ROCOF	1	Y	0.01	[Hz/s]	ROCOF limit
LOM	ROCOF Filt	25	Y	1	[-]	ROCOF filter
LOM	LOM Init Del	3	Y	1	[s]	Delay of Vector shift and ROCOF evaluation after measured voltage connection
LOM	LOM Trip Del	3	Y	1	[s]	Vector shift and ROCOF signalization time (TRIP duration)
f(BI)	f(BI1)	Ext	Y	-	-	Function of 1st Binary Input
f(BI)	f(BI2)	F.R.	Y	-	-	Function of 2nd Binary Input
f(BI)	f(BI3)	Alt	Y	-	-	Function of 3rd Binary Input
f(BI)	f(BI4)	CB Fdb	Y	-	-	Function of 4th Binary Input
f(RE)	f(RE1)	!CommTrpPer	Y	-	-	Function of 1st relay output
f(RE)	f(RE2)	!InternFail	Y	-	-	Function of 2nd relay output
f(RE)	f(RE3)	!BakTrpPer	Y	-	-	Function of 3rd relay output
f(RE)	f(RE4)	!InternFail	Y	-	-	Function of 4th relay output
f(RE)	f(RE5)	!CommTrpPer	Y	-	-	Function of 5th relay output

* Please note these variables are very sensitive and spurious tripping may occur. If spurious tripping is identified please contact CTP for further guidance.

Alternative setpoint menus. (Not configured.)

By activating the Alt settings binary switch, the unit is immediately switched to the setting in the "A.xxx" group.

A.V<>
A.dU
A.f<>
A.LOM



CEC Designer: [Redacted]
 CEC Accreditation No: [Redacted]

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Client: [Redacted]

- Notes:
- All installation works shall comply with; AS3000, AS3008, AS5033, AS4777, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
 - Refer to "Complete Office Supplies - CTP Relay Settings - For Approval" for full list of proposed relay settings.
 - To be determined in conjunction with Ausgrid Protection Engineers.
 - All inverters MCB's Shall be 10kA rated.

Grid Protection Strategy (note 3)

Protection System Operation

During normal operation with grid parameters within the set limits, the MainsPro relay will hold the main contractor 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 contractor.

The status of the main contractor (open / closed) is monitored and if it remains closed after a trip occurs for any reason slave relay 1 (R1) will be de-energised and as a result alarm lamp will be illuminated on the switchboard and the remote monitoring contact will be opened (TB1-3 & TB1-4) to notify the system owner. Note the external protection relay is backed up by the AS4777 inverter protection.

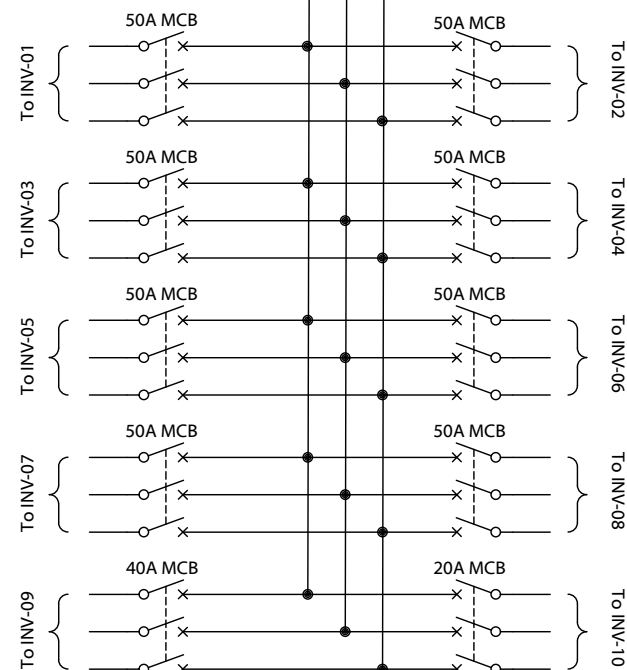
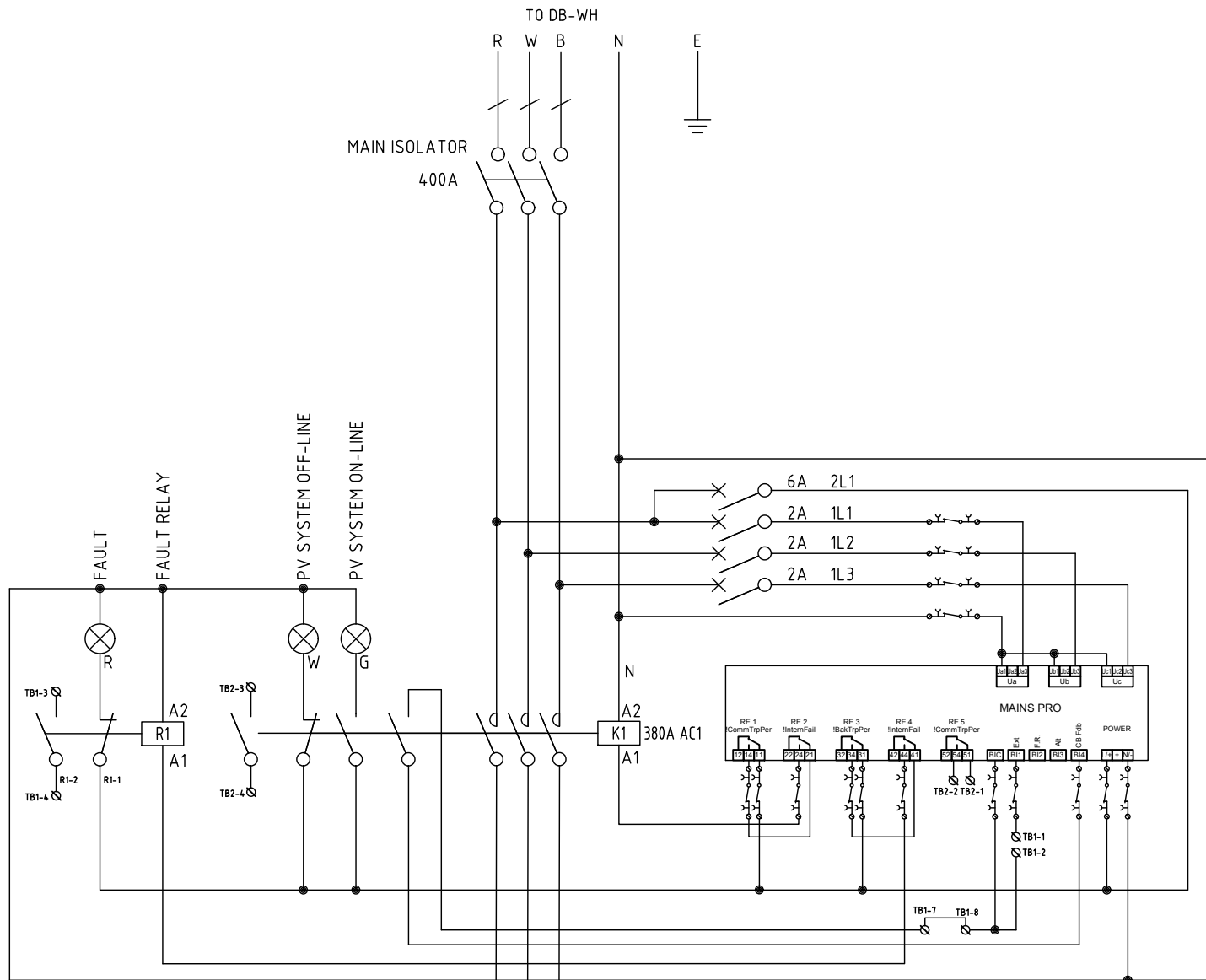
In addition, the MainsPro has an internal watchdog (RELAY 2) that will trip the system in the instance of an internal fault in the relay and activate the alarm lamp. RELAY 5 is for testing.

Protection Settings

	Inverter Settings	Proposed MFR Settings	Trip Time (s)
Over-voltage (59)	260.0V	265.0V	1.80s
Under-voltage (27)	202.0V	202.0V	1.80s
Over-frequency (81O)	51.0Hz	51.0Hz	1.80s
Under-frequency (81U)	49.0Hz	48.0Hz	1.80s
RoCoF (81R)	N/A	1.0Hz/s	0.5s*
Vector Shift (78)	N/A	8°	0.045s**
Re-connection Delay Time (s)	>60s		

* RoCoF filter (number of cycles) before trip set to 25, giving a response time of 0.5s.

** Vector Shift reaction time, according to ComAp documentation, is 1.5 period of measured signal + 15ms (0.045s).



FOR APPROVAL

Project: [Redacted]

Title: Protection Schematic

Dwg No: J1400-301 Rev: A2

Rev	Date	Comments	Dwn	Chkd
A2	11/11/16	Protection Settings Updated		
A1	06/10/16	For Approval Issue		
Dwn:		Chkd:		Date: 06/10/16
Job No: J1400				Scale: NTS@A3