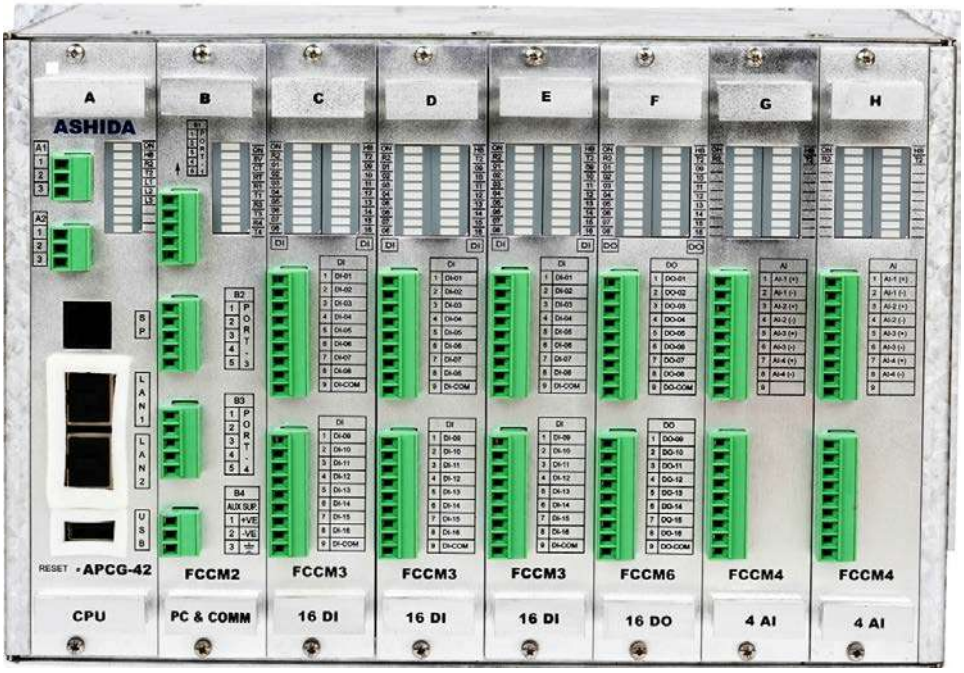


ASHIDA Feeder Remote Terminal Unit (APCG – 42)

Introduction

The APCG–42 with its compact size is specially designed for Ring Main Unit Automation, which commonly known as APCG-42 or AFRTU2. APCG–42 is a customized implementation of various ASHIDA SCADA components & modules.

Support for I/Os using modular cards.

The APCG–42 is available in two models depending on the number of input/output requirements.

- Side Modular
- Front Modular

Features

- 32 bit Processor
- Communication Protocols:
  - IEC 60870-5-101
  - IEC 60870-5-104
  - IEC 60870-5-103
  - MODBUS RTU or TCP
  - DNP3 (Optional)
  - IEC 61850 (Optional)
- Interface with numerical Relays/ Multifunction Meters.
- 3 Serial Ports.
- 2 Ethernet Ports
- Wired/Wireless connectivity to master system.
- GSM/GPRS connectivity support for wireless.
- Ease of configuration using OP+ configuration tool.
- Optional HMI
- LED Indications for status indications of CB / isolators, monitoring the ports & health of APCG–42.

- 8 Front push buttons for CB/Isolator control (Available in Small Cabinet)
- Temperature monitoring and alarm available (Optional).
- Time sync using user SNTP.
- Power Rating: 24V-48V DC.

APCG-42 – Side Modular (Small Cabinet)

APCG-42 – Side Modular (Big Cabinet)

APCG-42 – Front Modular

Description

APCG-42 modular RTU (AFRTU2) consists all the necessary monitoring and communication function required for controlling remote feeders. It consists of mainly two variants, side Modular (Big) & Modular having 6 (DI/DO/AI) cards while side Modular (small) version having provision of 2 cards.

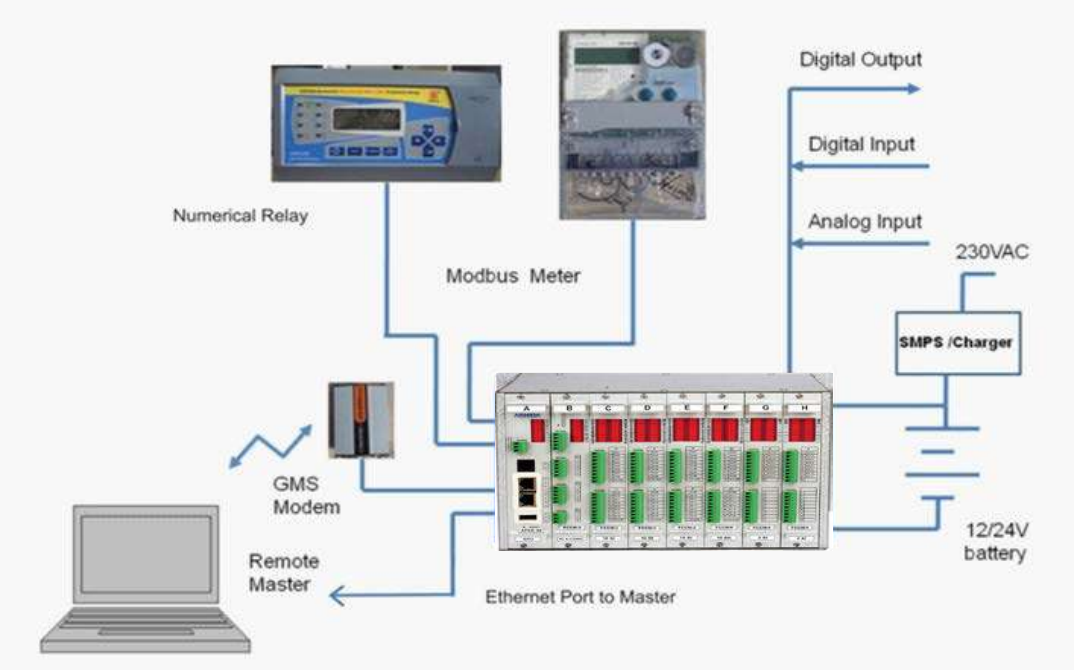
The APCG-42 is designed using modular construction. It consists of following main components.

1. OpenPro+
2. I/O Cards consisting of

- Digital Input Card
- Digital Output Card
- Analogue Card
- CT & PT Card

The heart of the system is a data concentrator or communication gateway internally known as OpenPro+ Controller. The OpenPro+ controller mainly consists of high speed controller, various communication ports and storage memory. It has two port for master connections and three slave ports. The master ports are Ethernet interface capable of communicating of IEC 60870-5-104 protocol; OpenPro+ also has three high speed RS slave communication ports.

The 1st Port is capable of communication of IEC 60870-5-103 protocol with internal I/O cards, external Protection relay or even external expansion (FCCM3/5) unit. The 2nd slave port with RS485 physical interface is capable on communicating on MODBUS & DNP3 protocol. This port can be used to interface Energy meter or similar device having MODBUS protocol. All these ports are independent and can be independently programmed on different speeds and settings.



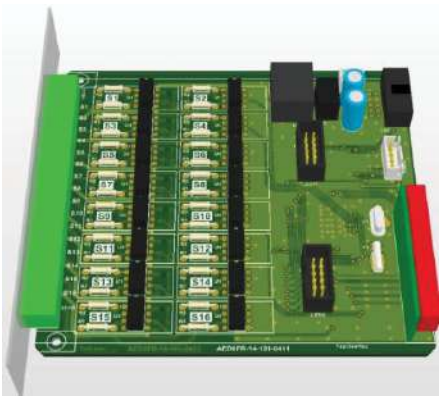
The APCG-42 unit has 6 slots for Big Cabinet & Modular version and 2 for Small cabinet APCG-42 on which various cards can be connected such as Digital Input (DI) card, Digital Output (DO) card or Analog Input (AI) card. These 6 internal I/O Cards are used to monitor various events, CB status, Isolators, Status, Etc. The various events are monitored by DI card and event generated in APCG-42 are controlled by OpenPro+ controller along with various parameter such energy, voltage, current, power from Energy Meters. These are used to report to the various masters such as local HMI or Remote Load Dispatch centre (LD) or any master system along with time stamp. The RTC (Real Time Clock) of the APCG-42 can be time-synchronised from remote master or a GPS time server using IEC60870-5-101/104 protocol of through SNPT server.

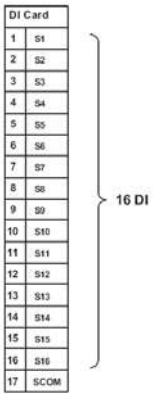
Three (3) Different types of I/O cards are available for acquiring status of associated switchgear, issuing control outputs or acquiring analog inputs.

Digital Input Card:

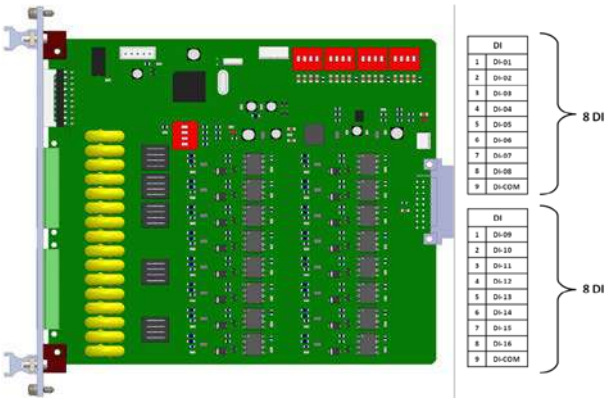
The digital input card has 16 status inputs. On change of any status, an event is generated; each input is optically isolated and has input range of 24V DC.

The Terminal definition of Digital Input (DI) card is shown in figure.





Side Modular APCG-42



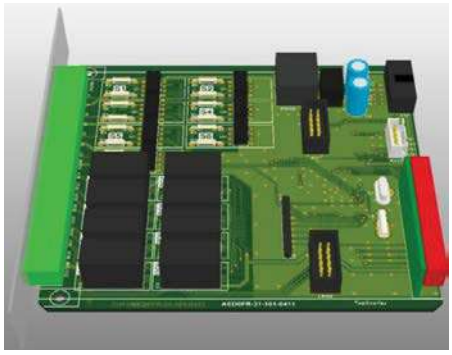
Front Modular APCG-42

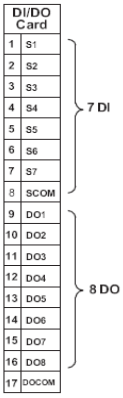
Digital Output Card:

The Typical APCG-42 has 7 digital inputs and 8 Control outputs.

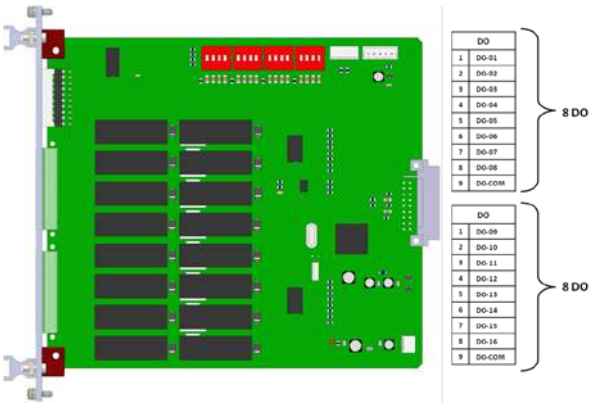
The Modular version has 16 Control outputs. All outputs are potential free contacts.

The Terminal definition of Digital Output (DO) card is shown in figure.





Side Modular APCG-42

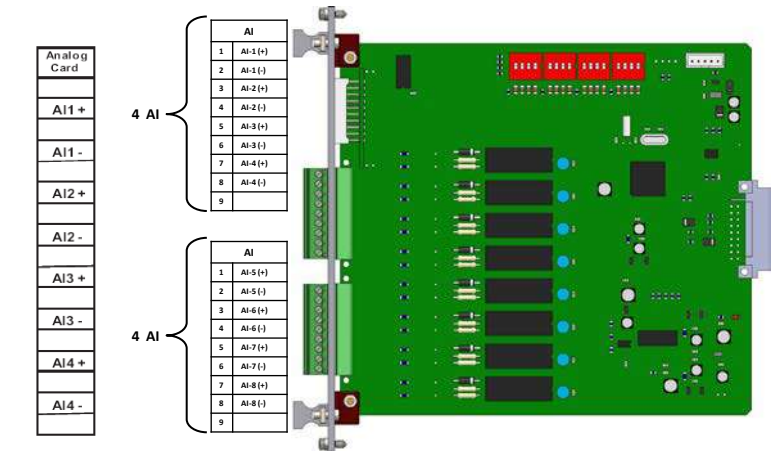


Front Modular APCG-42

Analogue Card:

The digital output or input card can be replaced with analog card as per requirement. The Typical APCG-42 has 4 analogue inputs and Modular version has 8 analogue inputs which can be used as 0 to +10V or 4 to 20mA input to various interface various transducers.

The Terminal Definition is as shown in figure.



Side Modular APCG-42

Front Modular APCG-42

Depending on the actual requirement any combination of cards can be formed.

For example

Modular version consist of Maximum

6 x 16 = 96 Digital Inputs, OR

6 x 16 = 96 Digital Outputs, OR

6 x 8 = 48 Analogue Inputs

Big Cabinet can have :

6 x 16 = 96 Digital Inputs OR

6 x 8 = 48 Digital Outputs & 6 x 7 42 Digital Inputs OR

6 x 4 = 24 Analogue Inputs

A typical APCG-42 (Small Cabinet) can have

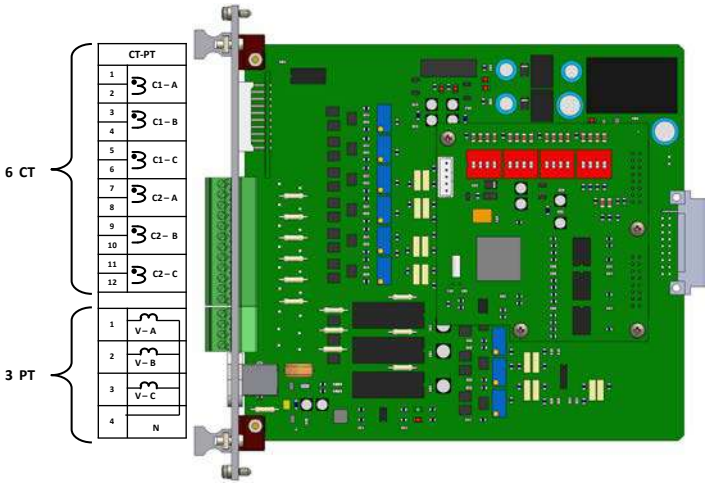
1 x 6 + 1 x (7+8) = 23 Digital Inputs (DI) and 8 Digital Outputs (DO)

For more DI/DO requirement an expansion unit can be connected to RS485 slave ports on IEC 60870-5-103 protocol.

CT & PT Card (Optional):

The Front access FRTU2 is provided with CT & PT card (Optional). The digital output or input card can be replaced with CT & PT card as per requirement. The Typical APCG-42 has 6 CT & 3 PT inputs which can be used for current & voltage input.

The Terminal Definition is as shown in figure.



Temperature Sensor (Optional):

The Front access FRTU2 is having provision for temperature sensor. The temperature sensor with 1 meter cable will be provided with FRTU2 as an additional accessory. The sensor will detect the change in temperature of CB / Isolator and generates alarm. The sensor can be programmed by using software tool (RTV2).

Application

Ring Main Unit Automation:

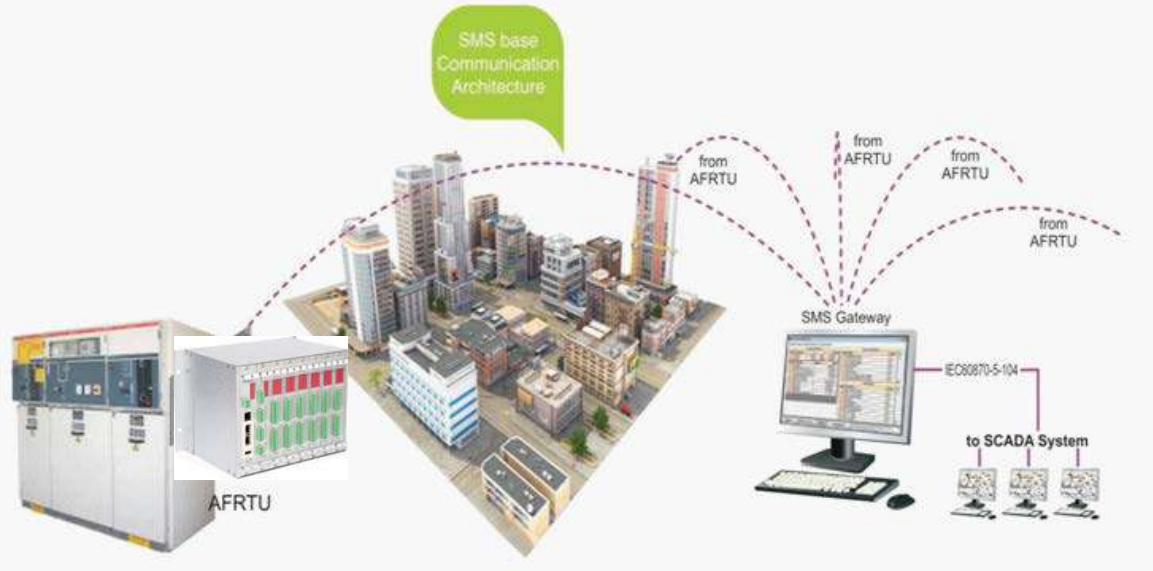
The APCG-42 due to its compact size finds its main application for RMU Automation. The data from remote Ring Main Units is sent to central system for further analysis.

Substation Automation

The APCG-42 can also be used for substation Automation where less number of I/Os are required. The data can be integrated with any SCADA system for user ease.

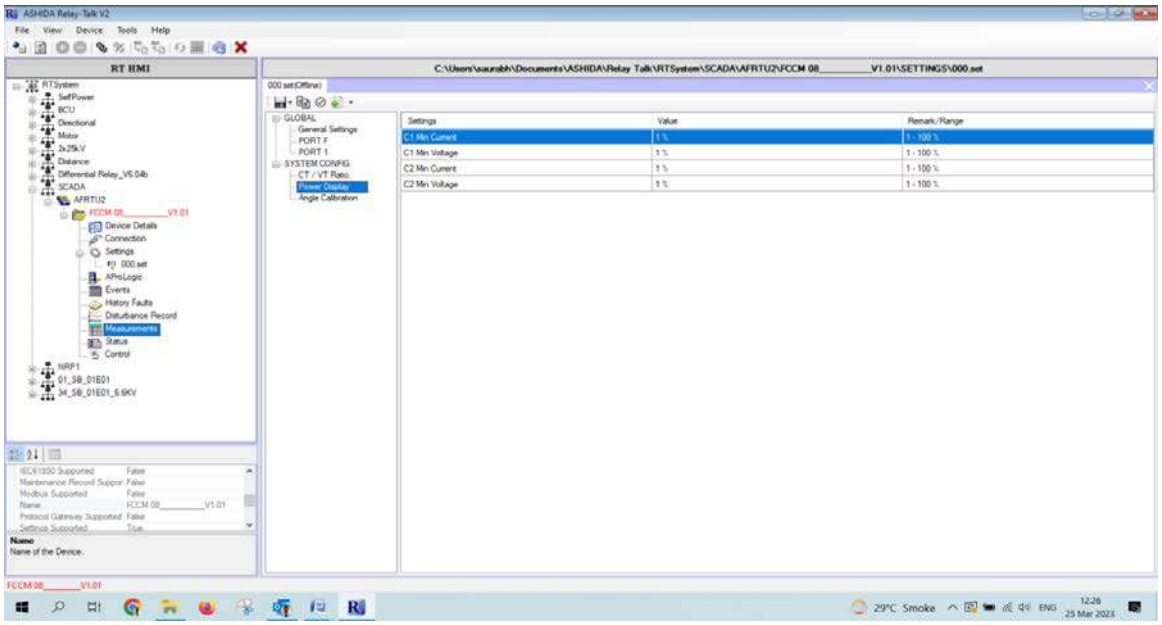
SAIDI – SAIFI Calculation

Major concern in the power distribution sector today is poor power distribution reliability. APCG-42's can form an integral part of the System for improving SAIDI & SAIFI for any distribution utility.



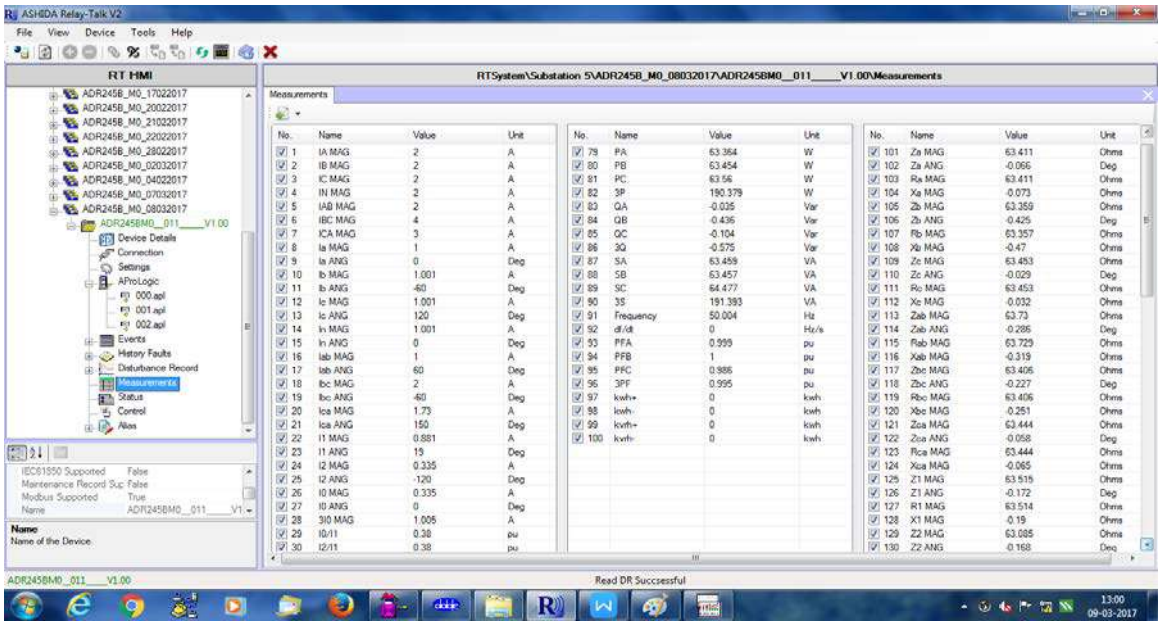
Relay Talk – V2 (RTV2) Software:

The general communication software is provided to communicate with APCG-42, known as RT. By using this software, the user can set CT and PT ratio, Angle calibration, Power measurement.

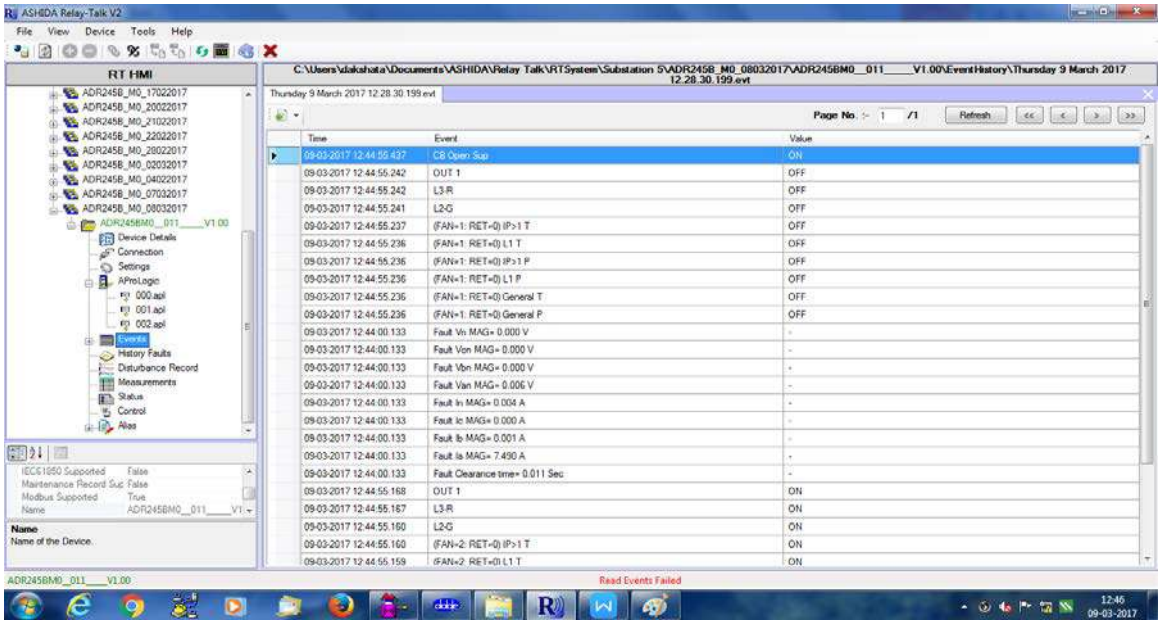


In the RTV2 user can arrange setting in different files and maintain as per feeder or bay level. The setting file can be done offline

The User can view the online measurement of APCG-42.

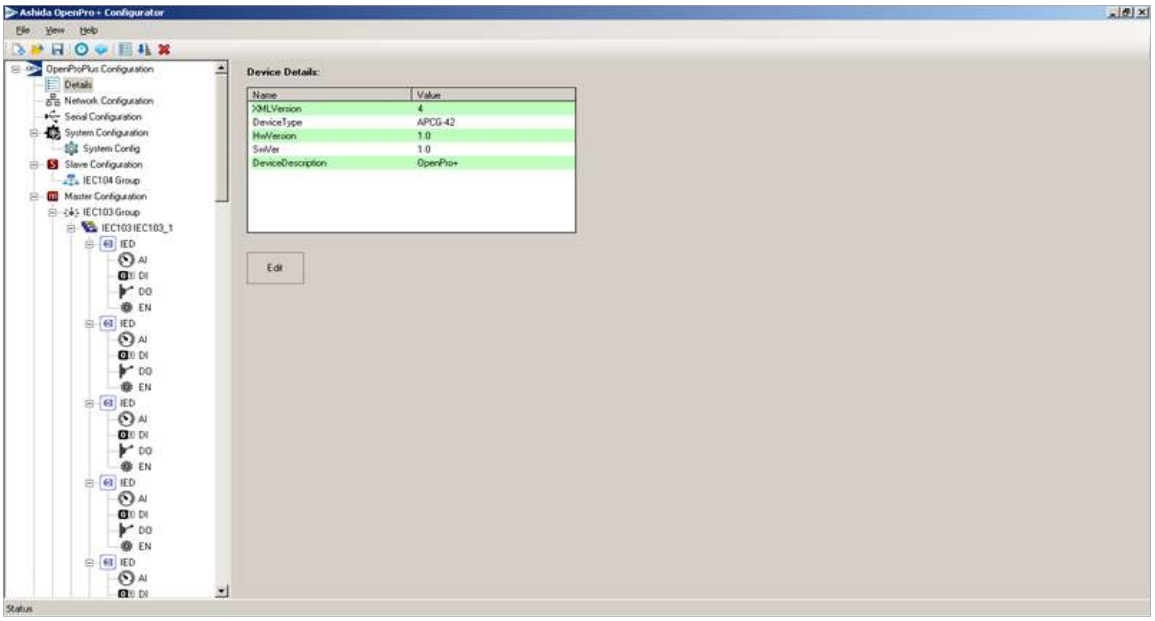


To view events data, double click on Event file. Event list with time, date and parameters will display on screen. Following window will appear on screen.

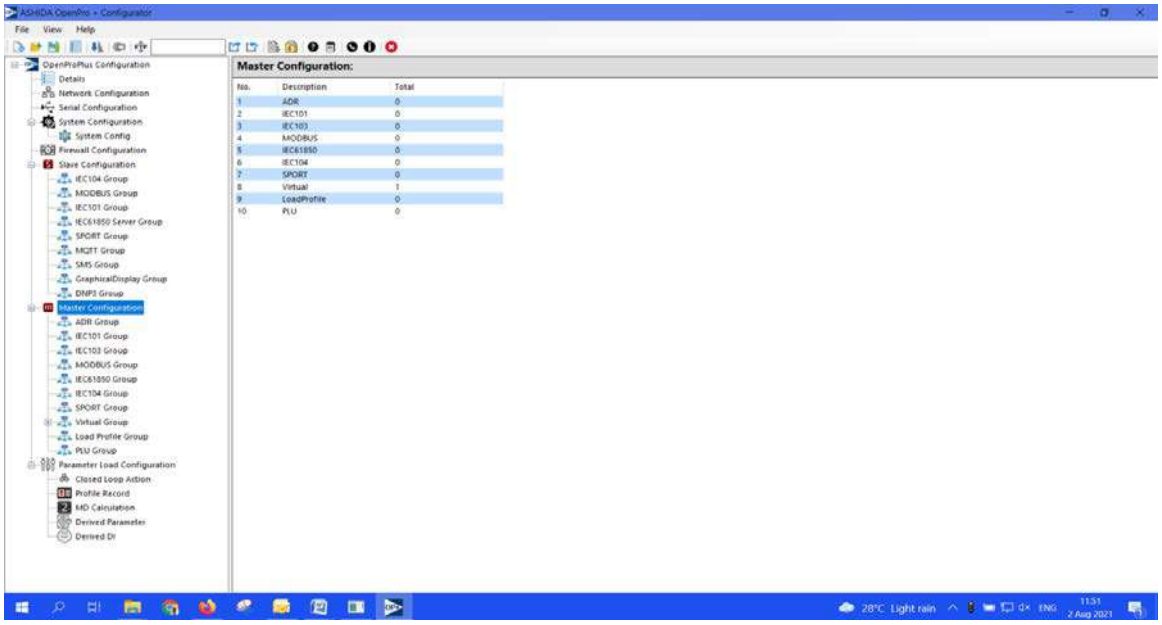


OpenPro+ Configurator:

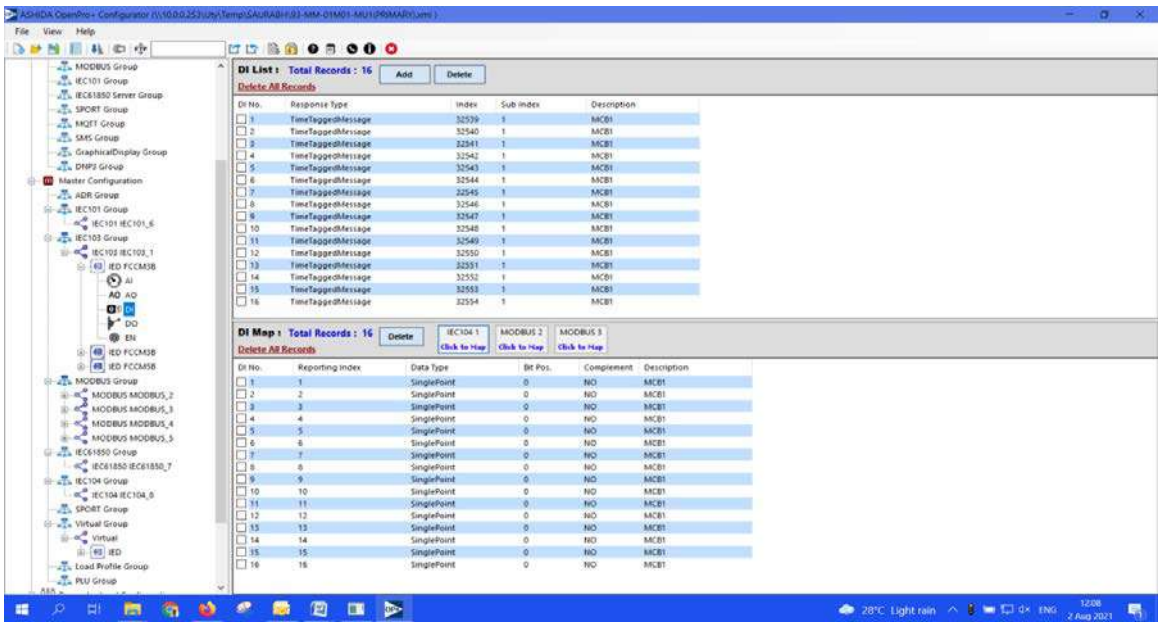
For OpenPro+ to act like protocol gateway it has to be configured for protocol master and slave. This can be done with the help of OpenPro+ Configurator tool. By using OpenPro+ Configurator user can generate XML file, export/import IED templates, export INI file, do master/slave mapping, etc.



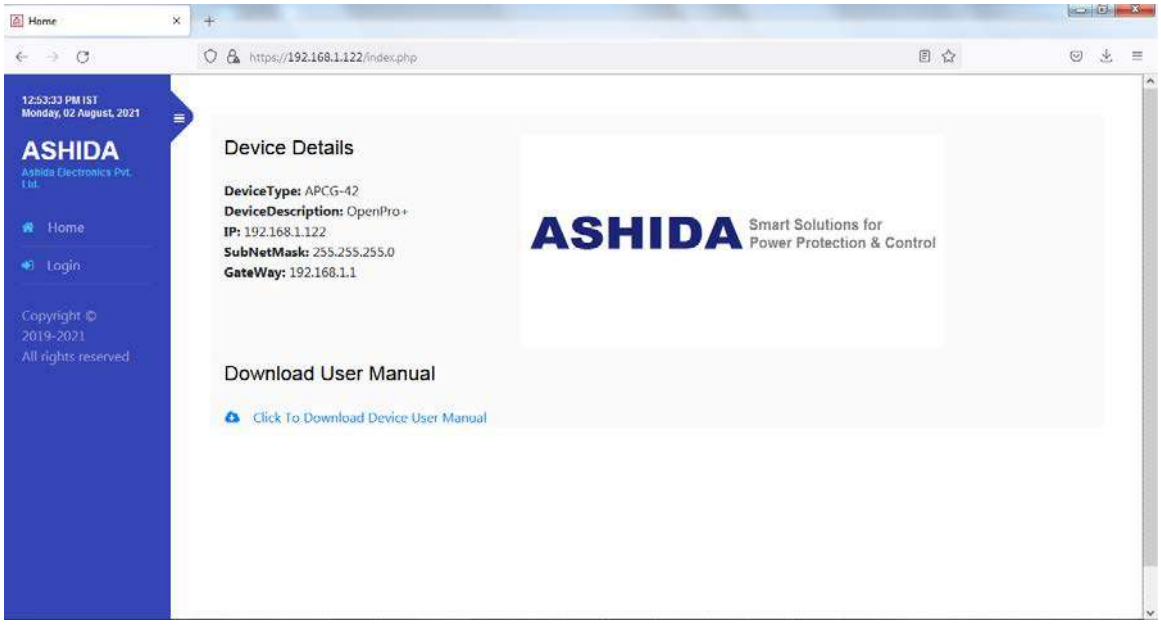
OpenPro+ can be configured any protocol as Master/Slave. User can add multiple masters/slaves and configure its parameters. To make Master/Slave online mark it as "Run".



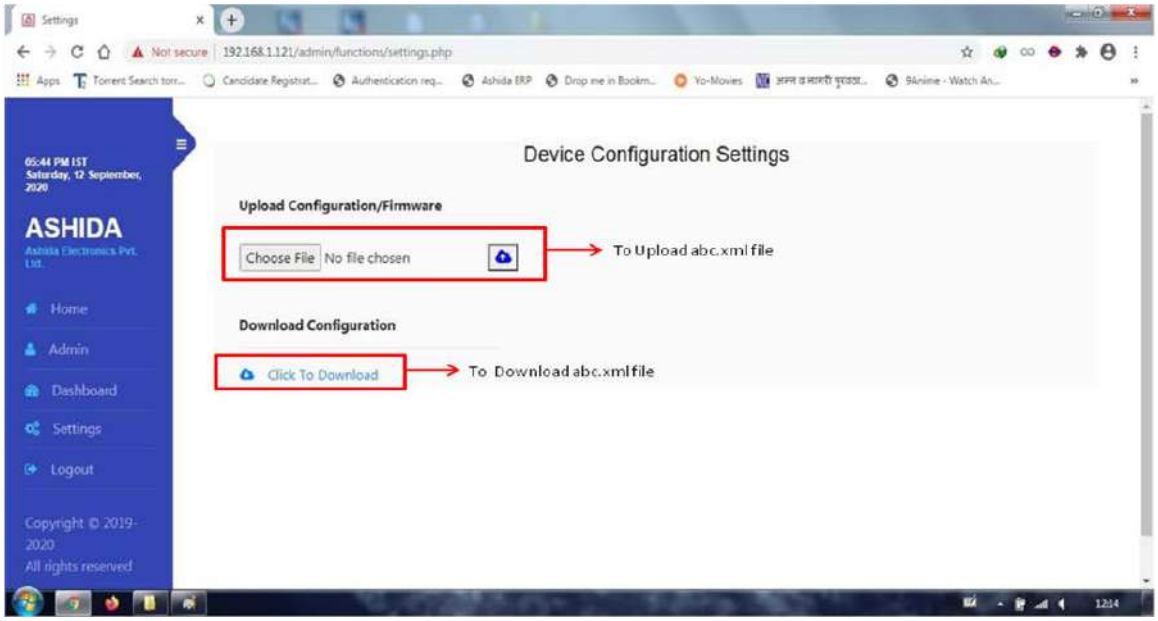
By using OpenPro+ Configurator, user can add multiple Master/Slave & set their parameters like Analogue Input, Digital Input, Digital Output etc.



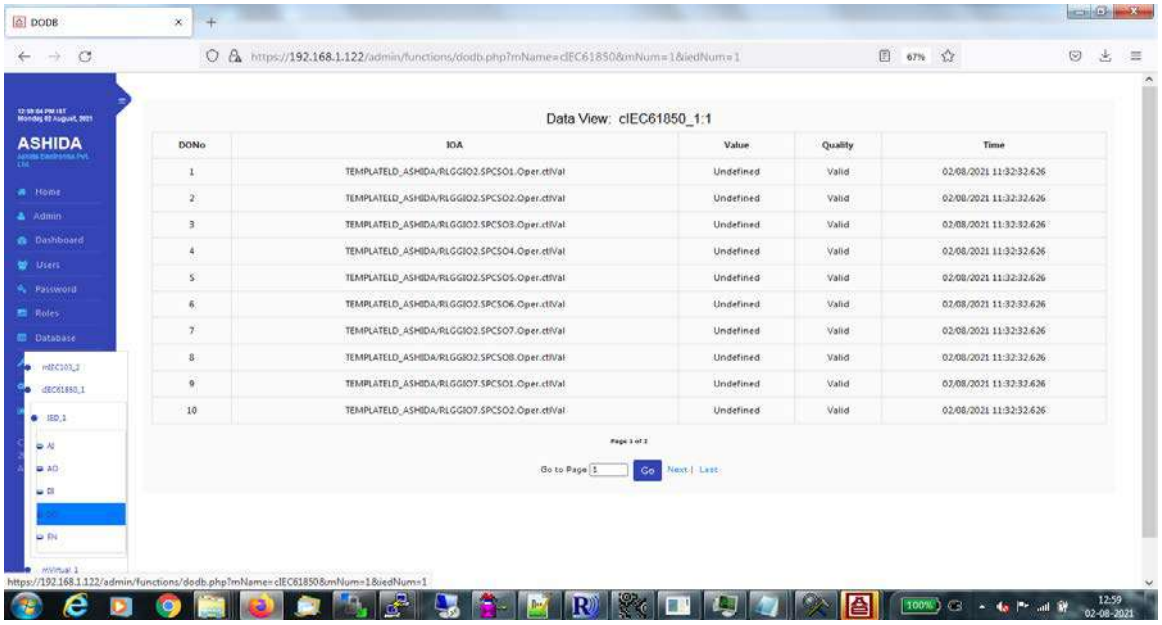
Open the Web browser, type OpenPro+ IP address in address bar, the home page will open.



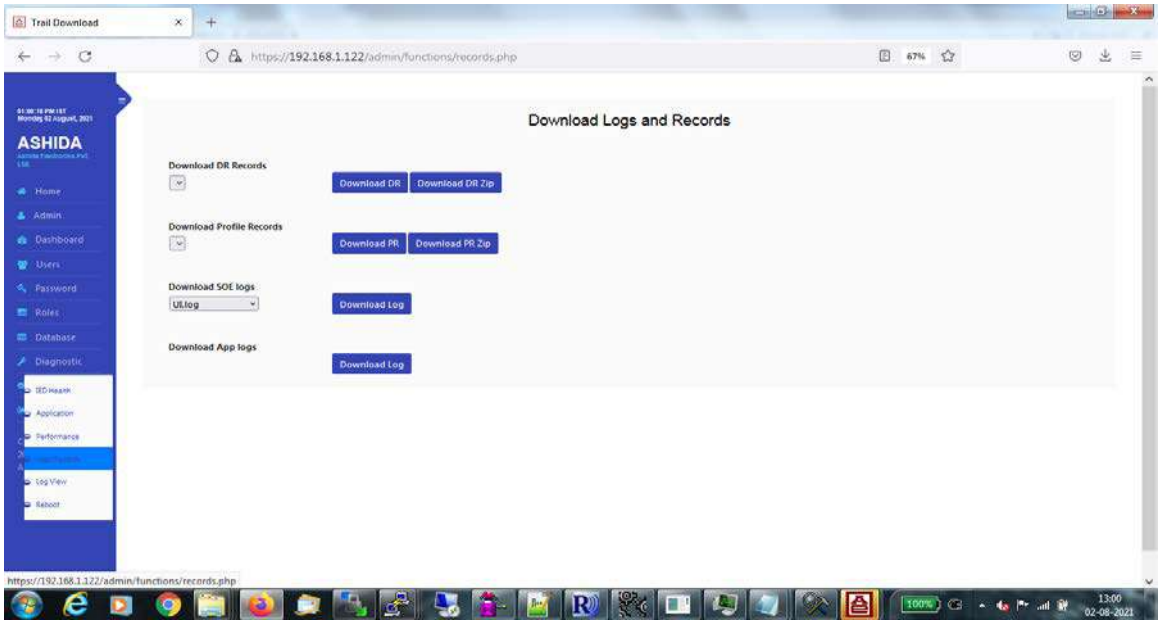
After login, the user can upload the configuration file in the OpenPro+ or download the exiting configuration file from OpenPro+.



The Online Data can be viewed



The Disturbance records can be extracted from IED's on IEC-103 & IEC 61850 protocol.



Technical Specifications:

General Specification		
Sr. No.	**Specification**	**Particulars**
1.	Auxiliary Supply	: 24 to 48V DC
2.	VA Burden on Auxiliary	: Less than 6 Watts (unloaded) for Side Modular : Less than 10 Watts for Front Modular
3.	Operating Temperature Range	: -10 deg. to +65 deg
4.	Each Digital Input Card	: 16 with 2kV Isolation
5.	Each Digital Output Card	: 8 Potential Free contacts + 7 DI with 2kV Isolation : 16 Potential Free contacts
6.	Contact Rating	: Continuous 5A at 230V AC
7.	Each Analogue Input Card	: 4 AI : 8 AI
8.	Each CT & PT Card	: 6 CT & 3 PT
9.	Impedence for CT & PT sensor	: For CT >20kΩ For PT >100kΩ
10.	Temperature Sensor Type	: Analogue Temperature Sensor
	Measurement Accuracy	: ± 2°C
	Setting Range	: -50°C to 150°C

Typical Tests Information:

The APCG-42 confirms to following Standard

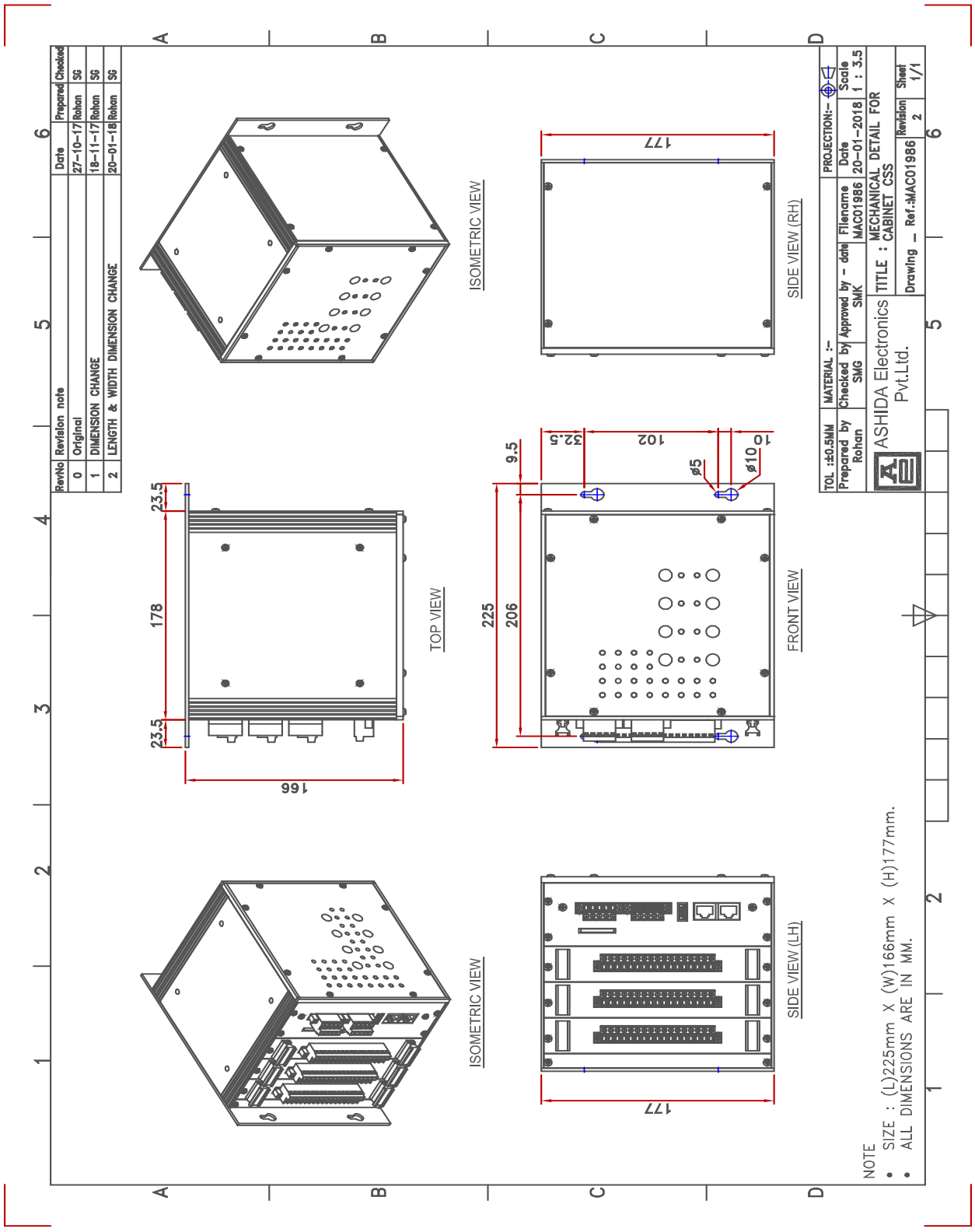
Sr. No.	**Test**	**Standard**
Electromagnetic Compatibility Type Test:		
1.	Electrostatic Discharge Direct Application	IEC 60870-2-1 Level 3
2.	Damp Oscillatory Wave Test	IEC 60870-2-1 Level 3
3.	Fast Transient Disturbance Test	IEC 60870-2-1 Level
4.	Surge Immunity Test	IEC 60870-2-1 Level 3
5.	Power Frequency Magnetic Field Test	IEC 60870-2-1 Level 3
6.	Damped Oscillatory Magnetic Field Test	IEC 60870-2-1 Level 3
7.	Related Electromagnetic Field Disturbance	IEC 60870-2-1 Level -3
Insulation Tests:		
8.	Power Frequency Voltage Test	IEC 60870-2-1
9.	Insulation Test	Insulation ar resistance 500V DC
10.	Impulse Voltge Test	IEC 60870-2-1
Environmental tests:		
11.	Dry heat test	IEC 60068-2-2
12.	Damp heat test, steady state	IEC 60068-2-3

*NOTE: Detailed type test reports are available on request.

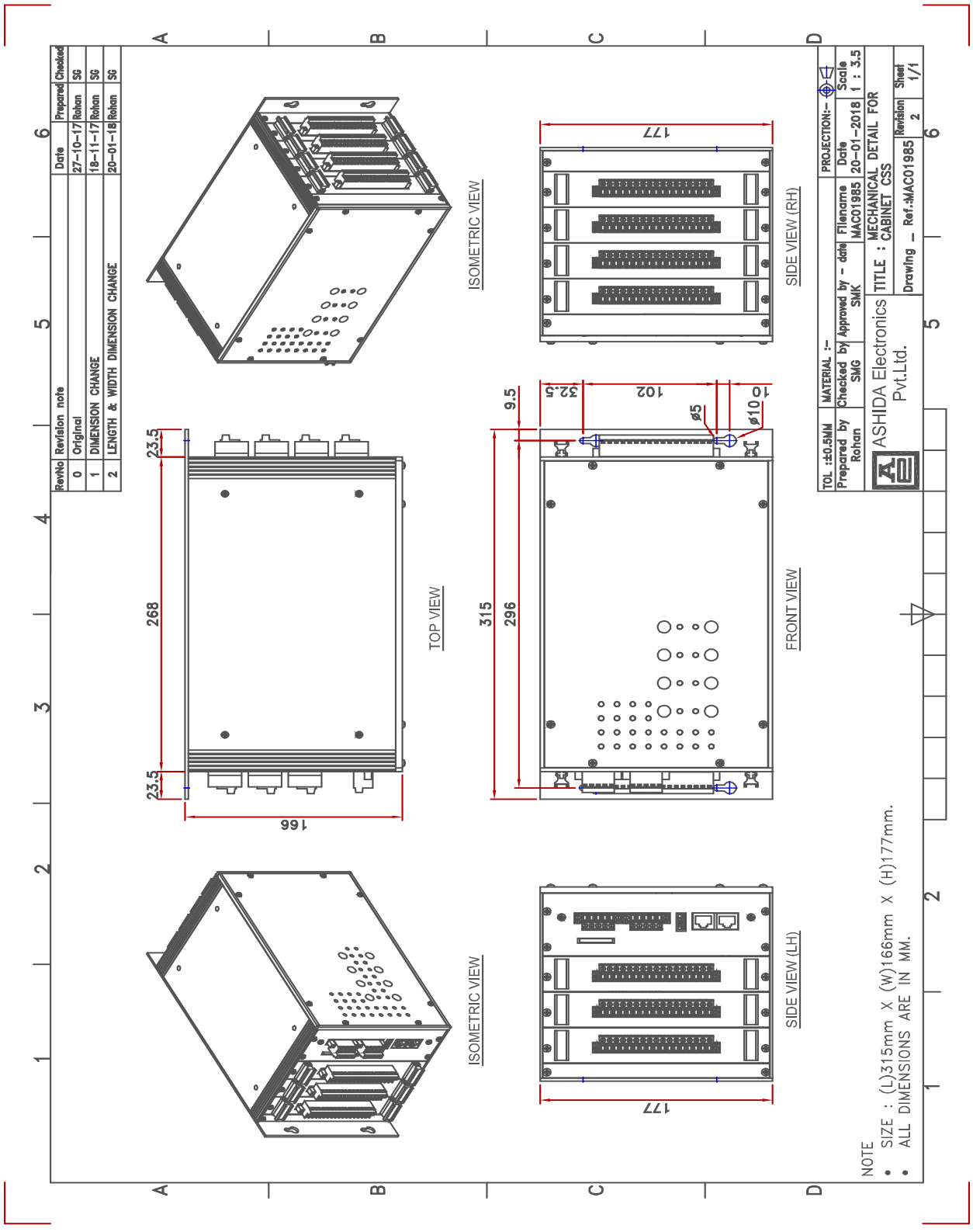
Drawings Information:

I.	Drawing References	: For Cabinet Type CSS – Side Modular (Small)	- MAC01986
		: For Cabinet Type CSS – Side Modular (Big)	- MAC01985
		: For Cabinet Type CSS – Front Modular	- AEM1933003
		: For Back Terminal Details	- FRTU00701
		: For Back Terminal Details With CT & PT Card	- FRTU00801

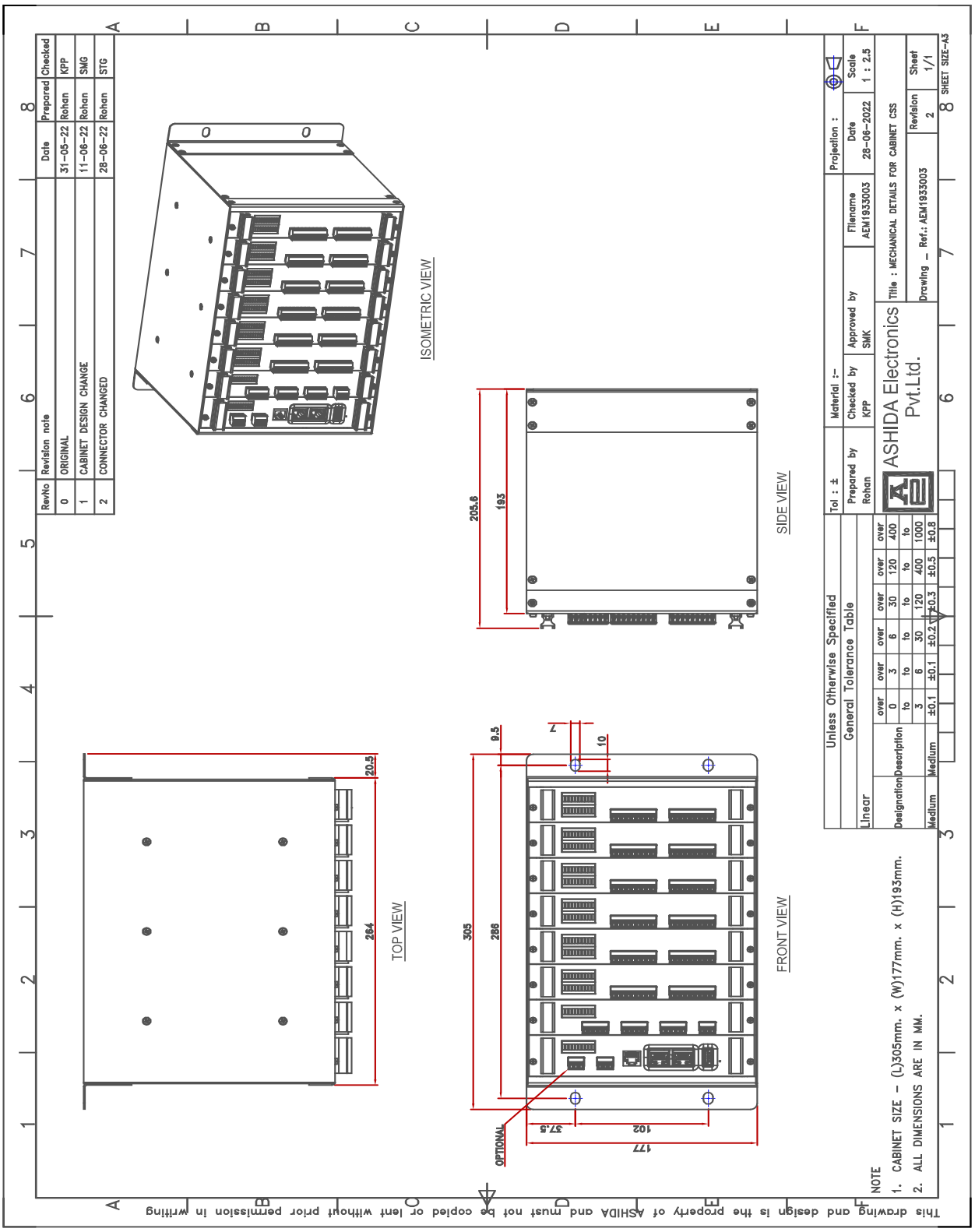
Mechanical Details for CSS – Side Modular (Small Cabinet):



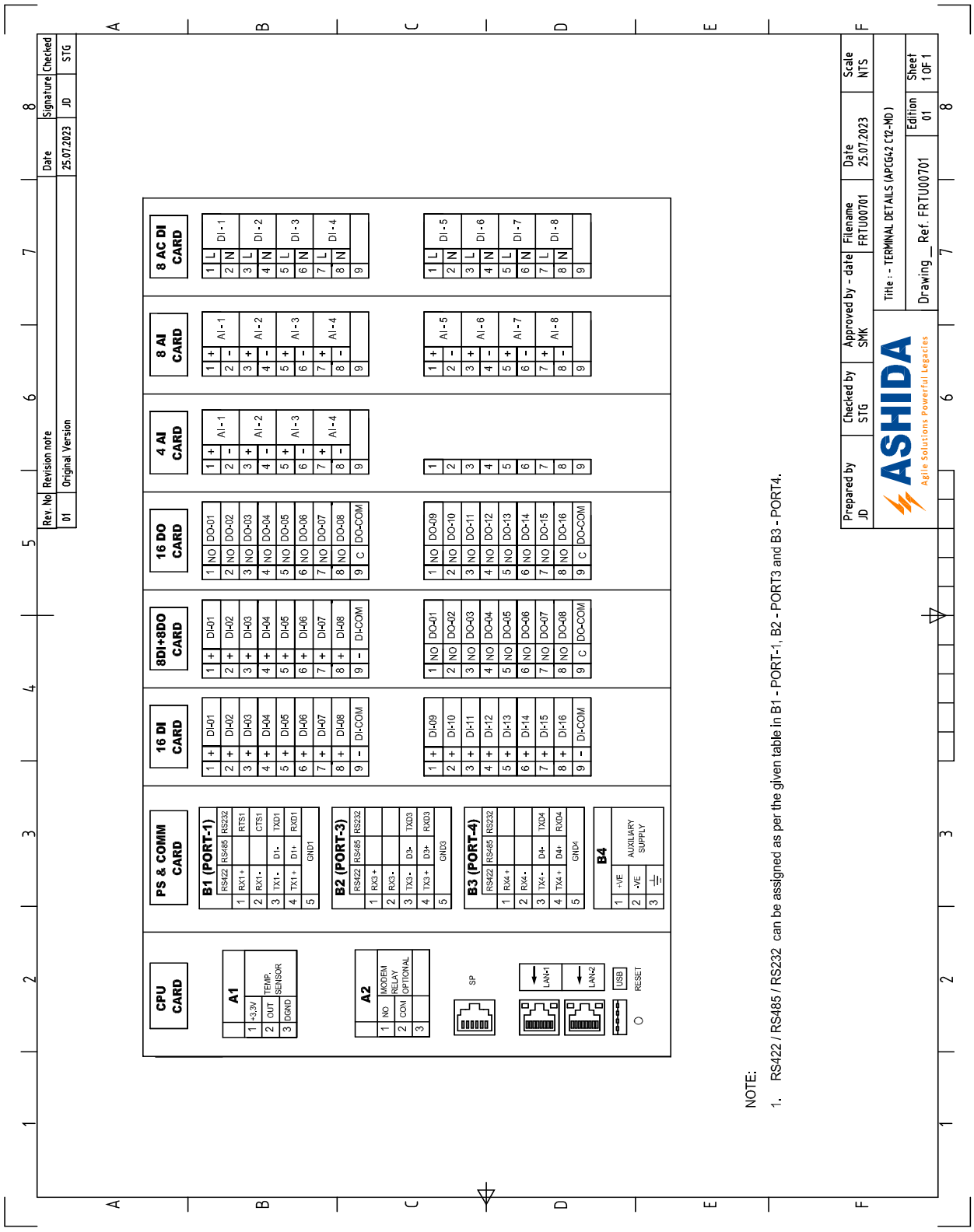
Mechanical Details for CSS – Side Modular (Big Cabinet):



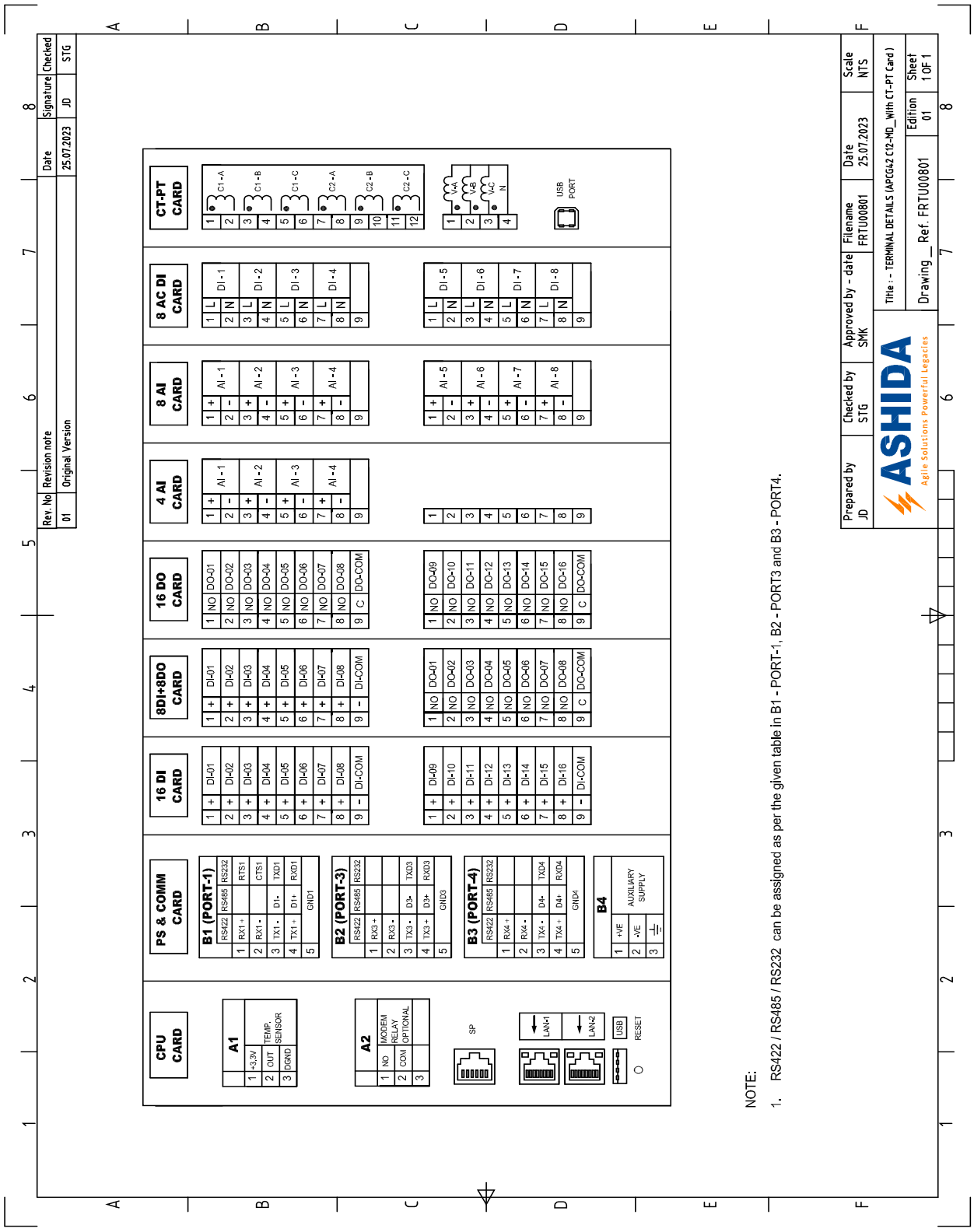
Mechanical Details for Front Modular:



Back Terminal Details (Front Modular)



Back Terminal Details (Front Modular) – With CT-PT Card



Ordering Information

Ordering Information of Side Modular

Ordering Information – Side Modular												
		5	6	7	8	9	10	11	12	13	14	15
Model	**FRTU**	X	X	X	X	X	X	X	X	X	X	X
Example	**FRTU**	**B**	**0**	**X**	**X**	**B**	**X**	**X**	**X**	**1**	**4**	**A**
AFRTU												
Sub Type												
Basic Version		B										
Variant												
Without Leds and Keys			0									
With Leds and Keys			1									
MODEM version (Internal)												
Not Applicable				X								
With GPRS MODEM				0								
Analog Input												
Not Applicable					X							
4AI for Current input					0							
4AI for Voltage input					1							
Communication Port - Ethernet												
DUAL 10/100 Base-T Ethernet RJ45 Port						B						
Digital I/O												
Not Applicable							X					
Default :7 DI - 8 DO							0					
Default :14 DI - 16 DO							1					
Digital Input												
Not Applicable								X				
Default :16 DI								0				
Default :32 DI								1				
DI Setting Threshold												
Not Applicable									X			
18VDC									0			
35VDC									1			
77VDC									2			
9VDC									4			
Auxiliary Supply												
24VDC – 48VDC										1		

Cabinet Details	
Modular Version W-09	4
Modular Version W-12	5
Modular Version W-09 (new dimention)	6
Modular Version W-12 (new dimention)	7
Communication Port - Serial	
Not Applicable	X
1xRS-232 Port, 2xRS-485 Port	A
1xRS-232 Port, 1xRS-485 Port, 1xRS-422 Port	B

Ordering Information Front Modular

Ordering Information for APCG 42 Rack												
	1 – 4	5	6	7	8	9	10	11	12	13	14	15
Model	APCG42	X	X	X	X	X	X	X	X	X	X	X
Example	APCG42	C	3	3	3	B	X	X	X	5	5	B
APCG-42												
Sub Type												
Compact Version		C										
Variant												
Front Access			3									
CPU Memory												
With EMMC, 512 RAM				3								
CPU Type												
Standard					3							
Communication Port - Ethernet												
DUAL 10/100 Base-T Ethernet RJ45 Port						B						
Digital Outputs												
Not Applicable							X					
Digital Input												
Not Applicable								X				
DI Setting Threshold												
Not Applicable									X			
Auxiliary Supply												
24VDC – 48VDC										5		
Cabinet Details												
With 6 I/O slots											5	

Communication Port - Serial	
NA	X
Three RS-485 Port	B
Two RS-485 Port + RS-232 Port	F
Two RS-485 Port + RS-422 Port	G

Ordering Information for FCCM Cards of front access modular

Ordering Information for APCG 42 [FCCM Cards]												
	1 – 4	5	6	7	8	9	10	11	12	13	14	15
Model	APCG42	X	X	X	X	X	X	X	X	X	X	X
DI Card	FCCM/3	C	3	X	X	X	X	1	X	X	X	X
AI Card	FCCM/4	C	3	0	X	X	X	X	X	X	X	X
DI & DO Card	FCCM/5	C	3	X	X	0	X	X	X	X	X	X
DO Card	FCCM/6	C	3	X	X	X	1	X	X	X	X	X
CT-PT AI Card	FCCM/8	C	3	2	X	X	X	X	X	X	X	X
FCCM Cards												
Sub Type												
Compact Version		C										
Variant												
Front Access			3									
Analogue Input [AI Card]												
Not Applicable				X								
4AI for Current input				0								
Protocol												
Not Applicable					X							
Digital I/O												
Not Applicable						X						
Digital Outputs												
Not Applicable							X					
16 DO							1					
Digital Input												
Not Applicable								X				
16 DI								1				
DI Setting Threshold												
Not Applicable									X			
9 V									0			
18 V									1			
35 V									2			

Auxiliary Supply		
Not Applicable	X	
Cabinet Details		
Not Applicable	X	
Communication Port		
Not Applicable		X

ASHIDA
Agile Solutions Powerful Legacies
ISO 9001 Company

ASHIDA Electronics Pvt. Ltd.
ASHIDA House, Plot No. A-308, Road No. 21,
Wagle Industrial Estate, Thane - 400604, INDIA
Tel : +91 - 21 - 2582 7524 / 6129 9100
Fax : +91 - 21 - 2580 4262
Email : sales@ashidaelectronics.com
Web : www.ashidaelectronics