SELF-POWER RELAY : ADR241S

Protection Features:

- 4 Element (3 Phase + EF) Over Current IDMT/DMT with instant Trip.
- 16 x 2 back - lit LCD display for settings.
- Display of Load Current in terms of primary & secondary.
- **Over current, Earth Fault, Cold Load Pickup, Thermal Overload, Under Current and Inrush Blocking Protection functions.**
- Separate curve selection for Phase and EF.
- Selection of Curve: Eleven selectable curves Definite Time / IEC S Inverse / IEC S Inverse (1.3 Sec) / IEC V Inverse / IEC E Inverse / UK LT Inverse / IEEE M Inverse / IEEE V Inverse / IEEE E Inverse / US Inverse / US ST Inverse
- **Design using DSP technology.**
- Latching of fault current up to last 5 faults with time stamping.
- **Disturbance Recorder:** Actual waveform of current along with logical and physical status are captured and saved in the built-in memory, with date time stamping for analyzing fault condition & fault location.
- Password protection for all settings.
- **Programmable (Non- Volatile) setting by local keys as well as remote setting by communication port.**
- Relay can be made either IDMT or Define time
- **2 Setting Groups.**
- Fully communicable with IEC standard open protocol **IEC 60870-5-103.**
- **IP54 Compliance (Required optional Protective Cover)**

Relay Design Features:

- **An Auxiliary Voltage supply is not required. (Aux. supply is Optional)**
- Low energy pulse output tripping for RMU
- Self Power Design.
- **USB (at front) and RS485 (at rear side) Communication Port for remote SCADA**
- Continuous monitoring of internal hardware modules and error message generation in case of failure of any critical components.
- Facility to synchronised Relay time from SCADA.
- ***Site Selectable Frequency i.e. 50 / 60 Hz.***
- **Available with 1A or 5A CT secondary.**
- 4 Optically isolated digital inputs.
- One dedicated input for CB status (CBNO), one dedicated input for Remote Trip and two spare status inputs for SCADA. (Same as selected Auxiliary supply voltage).
- 1 C/O potential free contact for Protection Healthy and 3 potential free contacts for Phase, EF and Trip.
- Magnetic flag provided on the front panel for FAULT indication.

Description:

ADR241S is second generation of Numerical Self Powered OC / EF IDMT/DT Relay. It consist all the necessary protection and monitoring functions required for compact RMU,

The High speed Digital Signal Controller continuously monitors line phase current and E/F current through CTs along with different status input's through optical isolated status connections. The high-speed micro-controller samples these current signals through **12-bit A/D converter**. The Digital Signal performs powerful **Numerical Algorithms** to find out RMS of fundamental & harmonic contents of the current. All measurement is tuned to fundamental frequency i.e. 50Hz or 60Hz depending upon setting, thus relay remain stable during distorted waveform by various industrial load. All these measure values are then used for different protection function such as IDMT / DT Over current protection, E/F protection, Cold load pickup, Thermal Overload etc. These measured values are also displayed on large 16 x 2 LCD display for metering purpose. The power supply module is special electronics circuit which derives power from current flowing through line; therefore external power supply is not required. The minimum required current to power ON relay is 20% in any one phase or 12% in any 2 phases or 8% in all three phases. Relay also provides pulse output to Trip the RMU or compact CB having low energy tripping coil.

Protection Function

The ADR241S gives maximum benefit/cost ratio. The ADR241S give all the advantage of numerical relay at affordable cost. Following is summary of different protection functions provided by relay

ANSI	IEC	Protection Function
50 / 51	I>1, I>2, I>3	: IDMT / DT Over Current Protection : Instantaneous Over Current Protection
50N / 51N	IN>1, IN>2, IN>3	: IDMT / DT Earth Fault Protection : Instantaneous Earth Fault Protection
CLP	-	: Cold Load Pickup
37	I<	: Under Current detection (Low Load) Function
49	-	: Thermal Overload Protection
68	-	: Inrush Blocking

Over Current Protection:

The relay is designed for Over Current Protection Function with three independent stages (I>1, I>2 & I>3). Each stage can be programmed as IDMT or Definite Time (DT) provided with range of 0.10*In to 2.50*In for IDMT and 0.10*In to 35.0*In for DT. All major international IDMT curves are available.

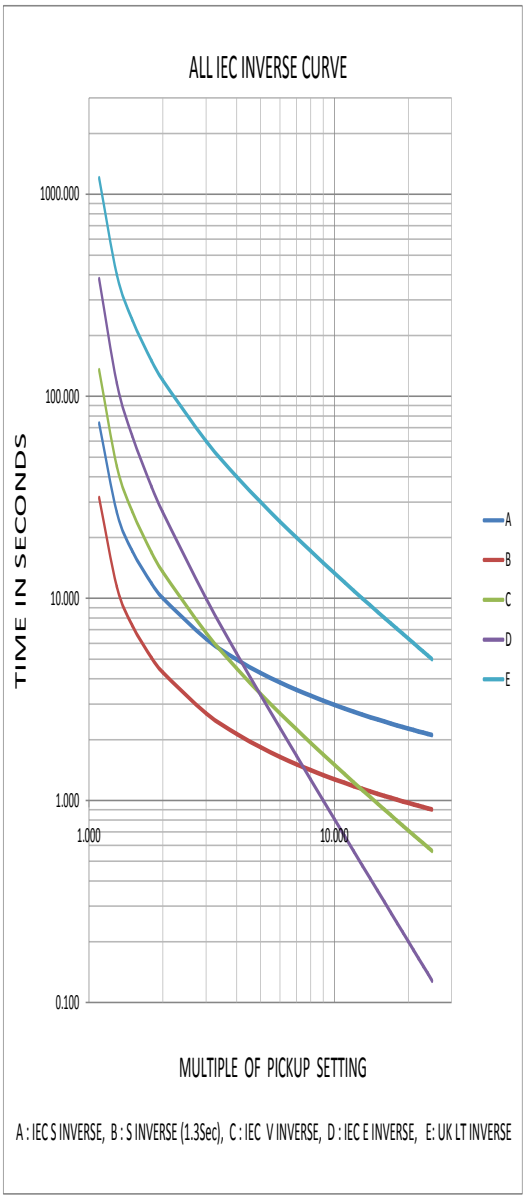
Earth Fault Protection:

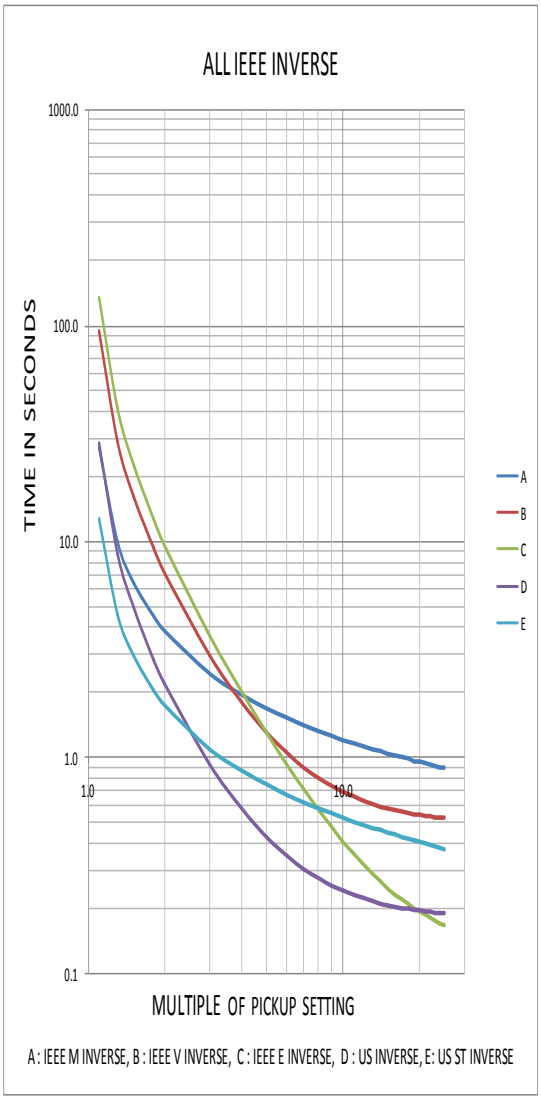
The relay is designed for Earth Fault Protection Function with three independent stages (IN>1, IN>2 & IN>3). Each stage can be programmed as IDMT or Definite Time (DT) provided with range of 0.05*In to 2.50*In for IDMT and 0.05*In to 35.0*In for DT. All major international IDMT curves are available.

The stages of over current and earth fault function are programmable as per IDMT characteristic based on IEC and IEEE standards. The inverse time delay is calculated with the following mathematical formula:

$$t = T^* \left(\frac{K}{\left(\frac{I}{Is} \right)^{\alpha} - 1} + L \right)$$

Curve	K	α	L
IEC Standard Inverse	0.14	0.02	0
Standard Inverse (1.3Sec)	0.06	0.02	0
IEC Very Inverse	13.5	1	0
IEC Extremely Inverse	80	2	0
UK Long Time Inverse	120	1	0
IEEE Moderately Inverse	0.0515	0.02	0.114
IEEE Very Inverse	19.61	2	0.491
IEEE Extremely Inverse	28.2	2	0.1217
US Inverse	5.95	2	0.18
US Short Time Inverse	0.0239	0.02	0.0169





Timer Hold Facility / Reset Characteristics:

This feature is very useful to have proper grading with electromechanical over current relays, which have inherent reset time.

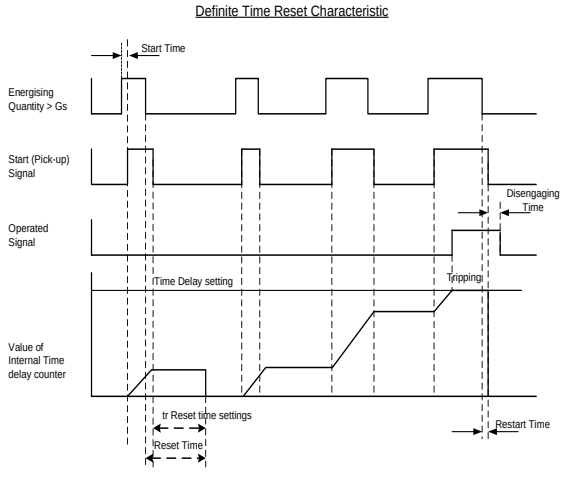
All the stages of phase over current and earth fault protection are provided with a timer hold facility "tReset". It can be programmable as a Definite Time (DT).

A possible situation arises where the reset timer may be used to reduce the

fault clearance time where intermittent faults occur.

For example, a cable with plastic insulation application, it is possible that the fault energy melts the cable insulation, which then reseals after clearance, thereby eliminating the cause for the fault. This process repeats itself to give a succession of fault current pulses, each of increasing duration with reducing intervals between the pulses, until the fault becomes permanent.

The range of DT time setting is 0 – 100 sec in steps of 0.01 sec.



Cold Load Pickup Function:

CLP operation occurs when the circuit breaker remains open for a time greater than tcold and is subsequently closed. CLP operation is applied after tcold time and remains for a set time delay of tclp following closure of the circuit breaker.

The relay monitors the status of NO contact of CB and starts tclp Time delay, during this time it takes separate set of setting, and inhibit one or more stages of over current/earth protection function for a set duration, so that relay will not generate false trip on inrush current.

When the set tclp Time is elapsed, all the relevant settings will revert back to their original values or become unblocked.

Under Current Protection Function:

The relay includes undercurrent elements that can be used to provide additional functions to prevent damage to the power system. This function allows typical applications such as loss of load. The undercurrent protection function is available only if the auxiliary contact of the CB status is connected to the relay i.e. when NO contact of CB is high. (Note: - Proper operation of this function relay should have auxiliary power supply)

Inrush Blocking:

During switching of load, there is sudden surge of magnetizing inrush current. The relay is designed to block this inrush current to avoid the false tripping. If inrush blocking is enable and level of 2nd harmonic/fundamental in any phase current or neutral current exceeds the setting, the over current/earth protection will be blocked as selected.

If the ratio of 2nd harmonics current to the respective fundamental phase current or neutral current exceeds above 2nd harmonics threshold setting and

neutral current is below the I>lift 2H setting then respective over current /Earth fault protection will be blocked. The reset level is 90% of these thresholds.

Thermal Overload Protection Function:

Thermal overload protection is designed to prevent the electrical equipment when operating temperature is exceeded the maximum designed temperature. The fundamental currents are measured and analyzed to monitor the thermal state. In case of thermal overload function the calculation of the Time to Trip is given by:

$t = \tau \ln ((K^2 - A) / (K^2 - 1))$

Where

t: Time to trip

τ: Time constant 1 of the equipment to be protected

K: Thermal overload capacity (Ieq / k* Th. Trip)

Where:

Ieq. : The largest phase current of three phase.

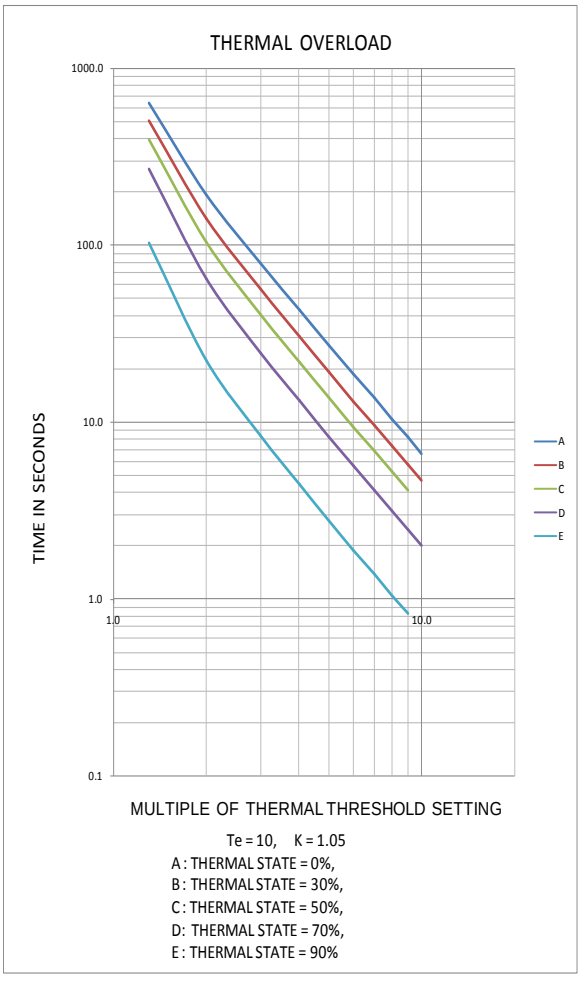
Th. Trip : Th. Trip or Full load current setting

k : constant is settable.

A: Initial thermal state. If the initial thermal state is 50% then A =0.5

The calculation of the thermal state is given by the following formula:

$\Theta i+1 = (Irms / k* Th. Trip)^2 \cdot [1 - \exp(-t/Te)] + \Theta i \cdot \exp(-t/Te)$



Measurement Function:

In normal condition the relay displays actual current flowing through the relay. Using the front keyboard all relay settings can be viewed. If current is in fault range the relay gives trip command. The type of the fault is displayed on LCD display. During the fault condition, the relay measures the fault current and stores it in non-volatile memory. The fault current can be read using keyboard on LCD display. All settings can be done locally as well as remotely via communication port and saved in non-volatile memory.

Self - Supervision Function

The relay continuously keeping track on its internal hardware and the moment it detects any failure of any component, it give message on LCD display. This feature is very useful to give pre information to avoid any mal-operation. In such situation it uses some default setting and remains in protection mode.

Impulse Output for the Tripping Coil:

Low Energy tripping coil of the circuit breaker can be connected to the coil terminal marked as (TRIP COIL + and –) at back terminal. The trip energy (12 - 24 V DC ± 0.1 W/sec) is provided by a capacitor in the protection relay. Length of the trip impulse is 40ms and pause between the individual pulses depends on the impedance of the tripping coil and the current level. Pulsing is continued until the CB operates and the fault current becomes zero.

Status Input:

The relay is provided with 4 no's of Opto isolated status input. One dedicated status input for Remote Trip, One dedicated input for CBNO and two spare status input for SCADA purpose. The status input can be connected to any contact to be monitored such as position of isolator switch etc; the status of this hardware is transmitted to remote SCADA station. The auxiliary supply required for Status is same as relay auxiliary supply.

Output Contact:

The relay is provided with 4 no's of output contacts. 1 C/O potential free contact for Protection Healthy and three potential free contacts for Phase, EF and Trip which can be used for tele-signalling or annunciation purpose. These contacts are operating at the time of tripping.

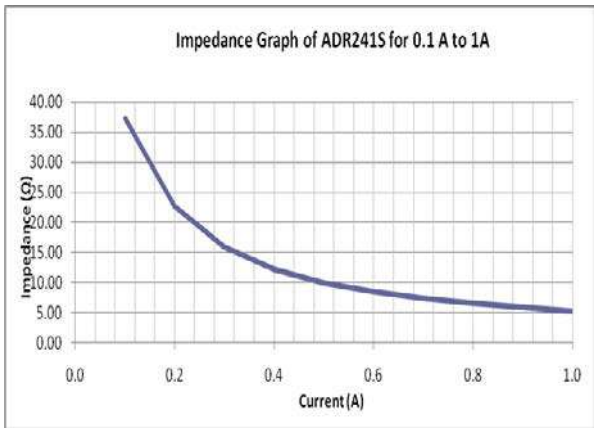
Magnetic Flag

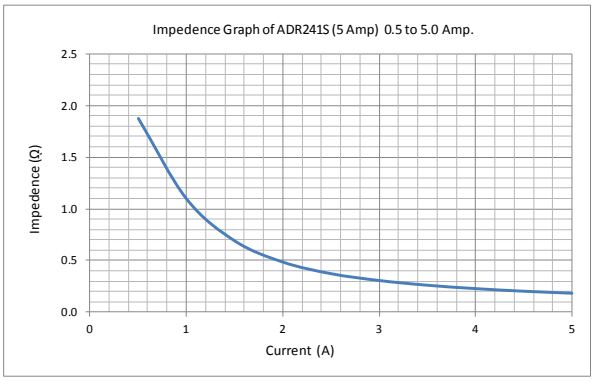
Magnetic flag provided on the front panel for FAULT indication. When relay operates in any protection function, the flag will be SET. The magnetic flag can be RESET even when relay is in Power off condition within 18 hrs of fault.

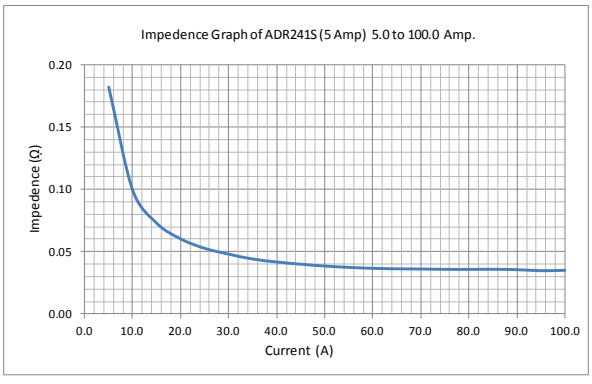
Current transformers Requirement:

The ADR241S relay is self power numerical relay and derived all power required for it internal operation as well as for CB operation is derived from external CT. For the proper operation it is necessary to select proper rated CT.

The Impedance to current characterise of ADR241S is as shown in figures. The graph is non linear, i.e. at low current Z of CT input is high while at high current it is low.







From impedance Graph, the maximum Voltage required across the relay terminal at fault current of 20 times of rated:

The Impedance value at 20 Times is 0.62 Ohm for 1A Rated CT, Thus Voltage required is

V Max. = 0.62 x 20 = 12.4V

VA Min. required for external CT is

$$VA = \frac{\text{V max x Safety Factor}}{\text{Over Load Factor of CT}}$$

Considering the Safety Factor 2 for Lead resistance / Connecting Impedance Etc.

$$VA = \frac{12.4 \times 2}{20} = \frac{24.8}{20}$$

= 1.24 VA for CT Class 5P20

= 2.48 VA for CT class 5P10

This is minimum VA required for 1A Rated CT.

The Impedance value at 20 Times is 0.035 Ohm for 5A CT Rated, Thus Voltage required is

V Max. = 0.035 x 100 = 3.50 V

VA Min. required for external CT is

$$VA = \frac{\text{V max x Safety Factor}}{\textit{Over Load Factor of CT}}$$

Considering Safety Factor 2 for Lead resistance / Connecting Impedance etc.

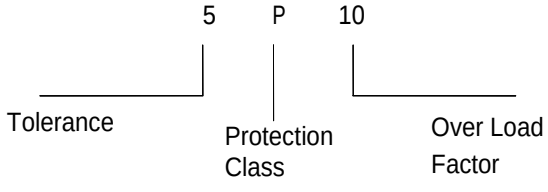
$$VA = \frac{3.50 \times 2}{20} = \frac{7.0}{20}$$

= 0.35 VA for CT Class 5P20

= 0.70 VA for CT class 5P10

This is minimum VA required for 5A Rated CT

Form Definition of the CT



The recommended current transformers (CT) are as follows.

The actual CT design will be carried out by considering the site condition, Transformer capacity, required V max. For the relay and fault level. User should follow necessary design practice.

Rated Secondary Current	1A
Performance	2.5 VA
Rated Secondary Current	5A
Performance	1 VA
Precision	5P10
Service Frequency	50-60 Hz

Communication Function:

The ADR241S relay is communicable with IEC standard open protocol **IEC 60870-5-103** There are two communication ports are available for communication. The IEC 60870-5-103 protocol is available at both USB and RS485 communication port. The MODBUS protocol is available at RS485 communication port.

NOTE: The IEC-103 and MODBUS protocols are software auto selectable i.e. relay will communicate as per the external communication software (IEC-103 or MODBUS) commands.

USB port is provided at front side for local testing. This is very useful for downloading relay data analysis it.

RS485 port is provided at the back side of relay for permanent SCADA connectivity. Using RS485 port Fault data, live event, Disturbance record, etc can be downloaded.

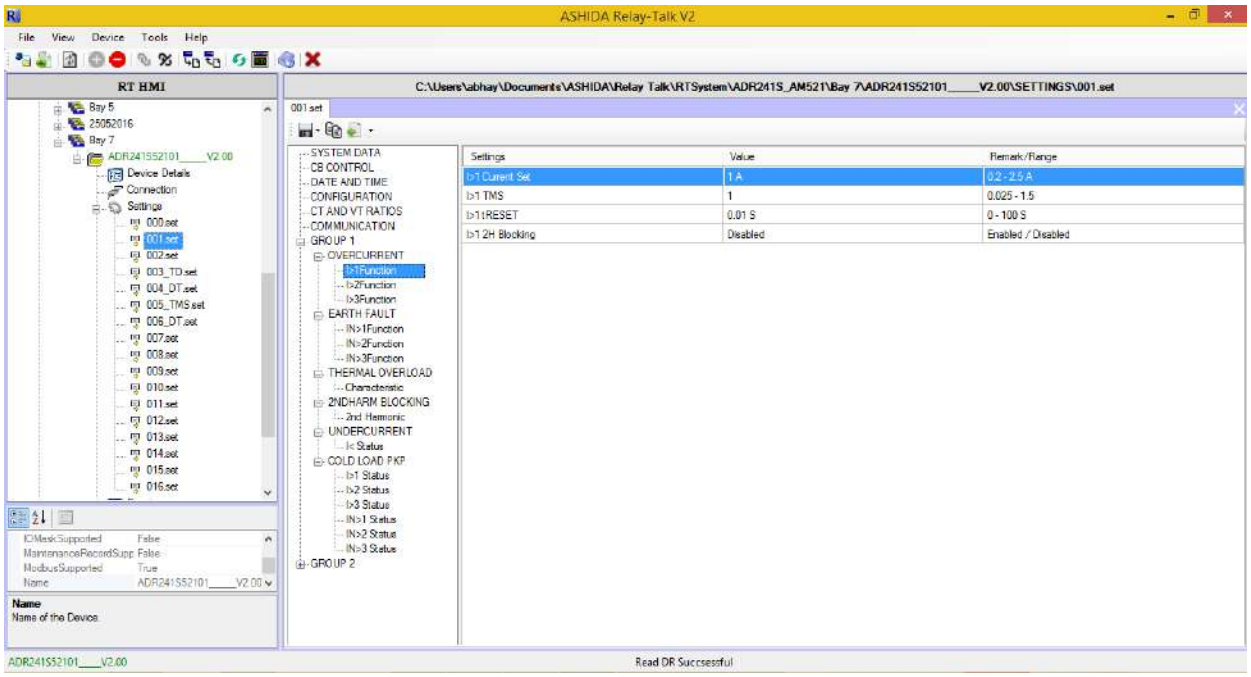
Relay Talk - V2 (RT) Software:

The general communication software is provided to communicate with relay, known as RT. By using this software data such as event log, disturbance records etc can be down loaded for further analysis. The disturbance record data can be saved in standard COMTRADE Format which is understandable by numbers of relay testing units for play back.

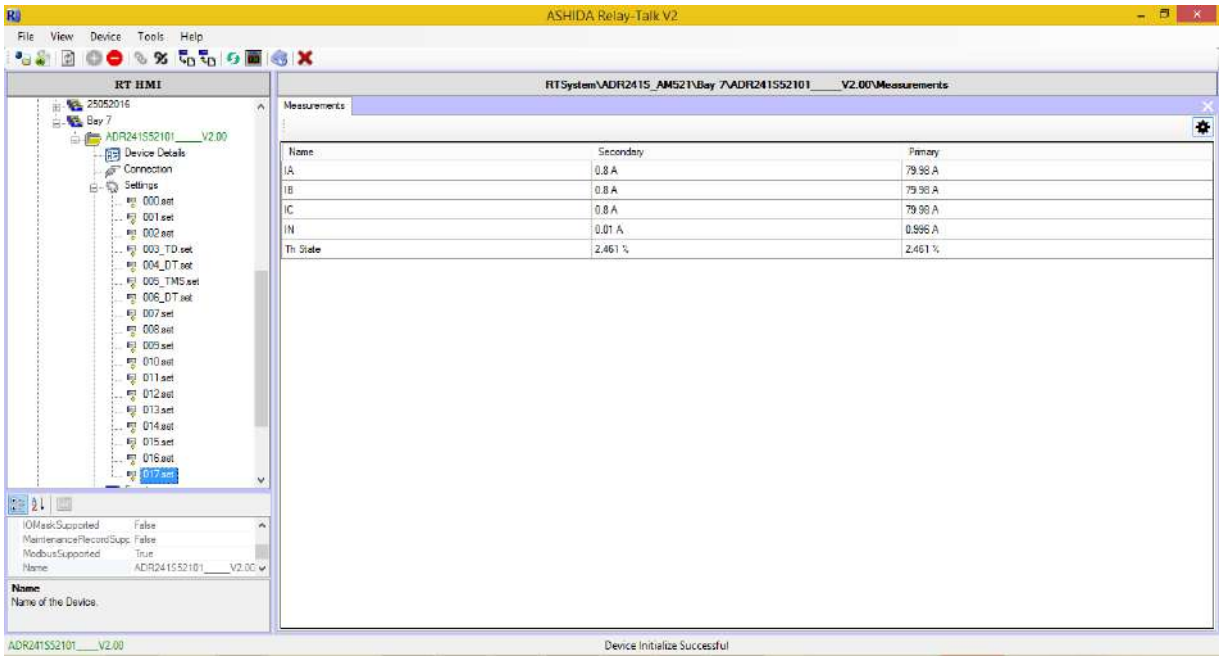
Following are some of software clips

In the software you can arrange setting in different files and maintain as per feeder or bay level

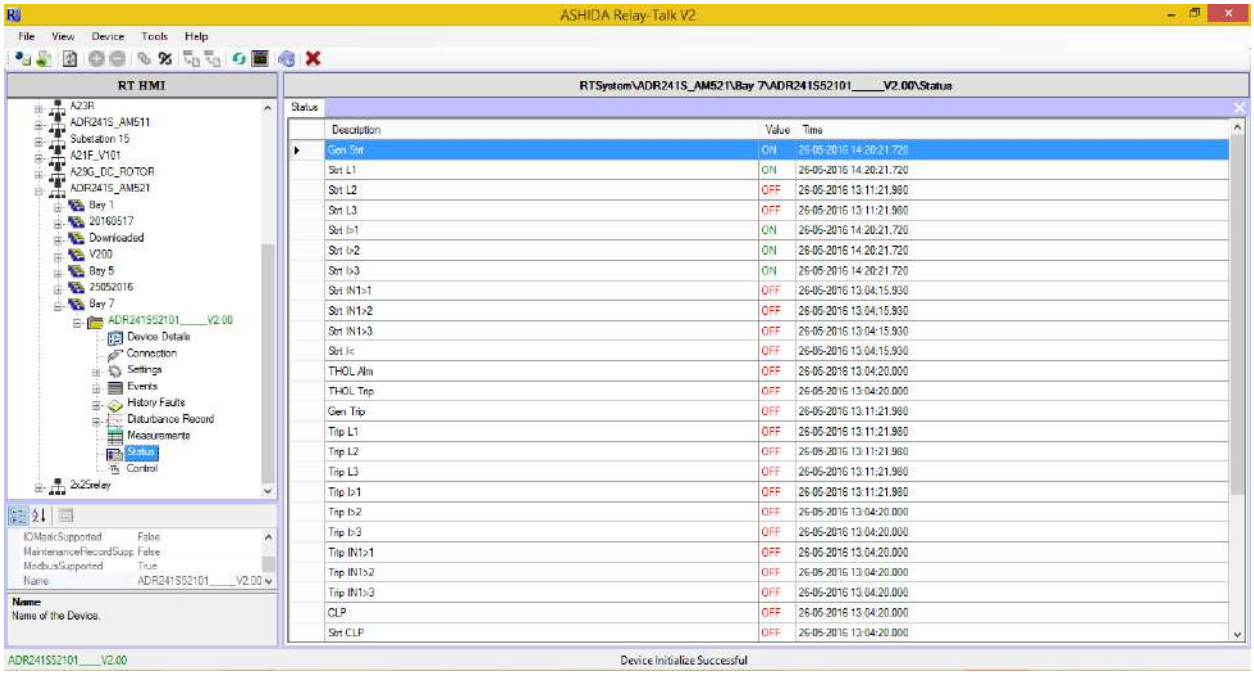
The setting file can be done offline



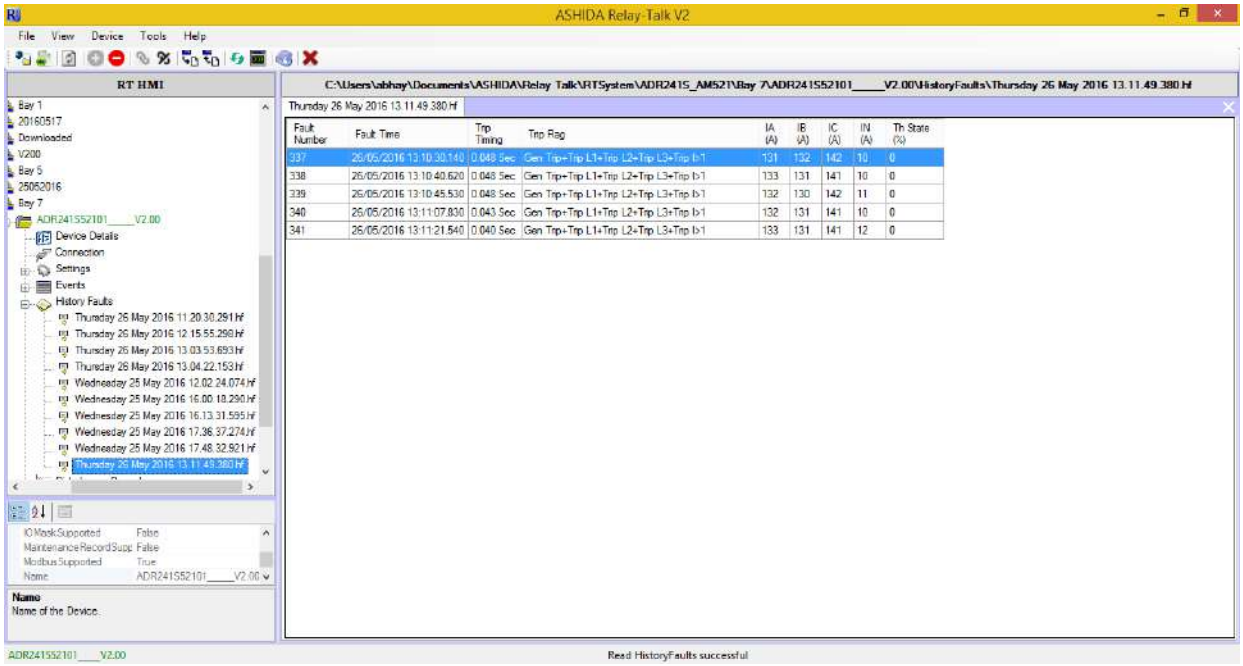
The User can view the online measurement and status of relay



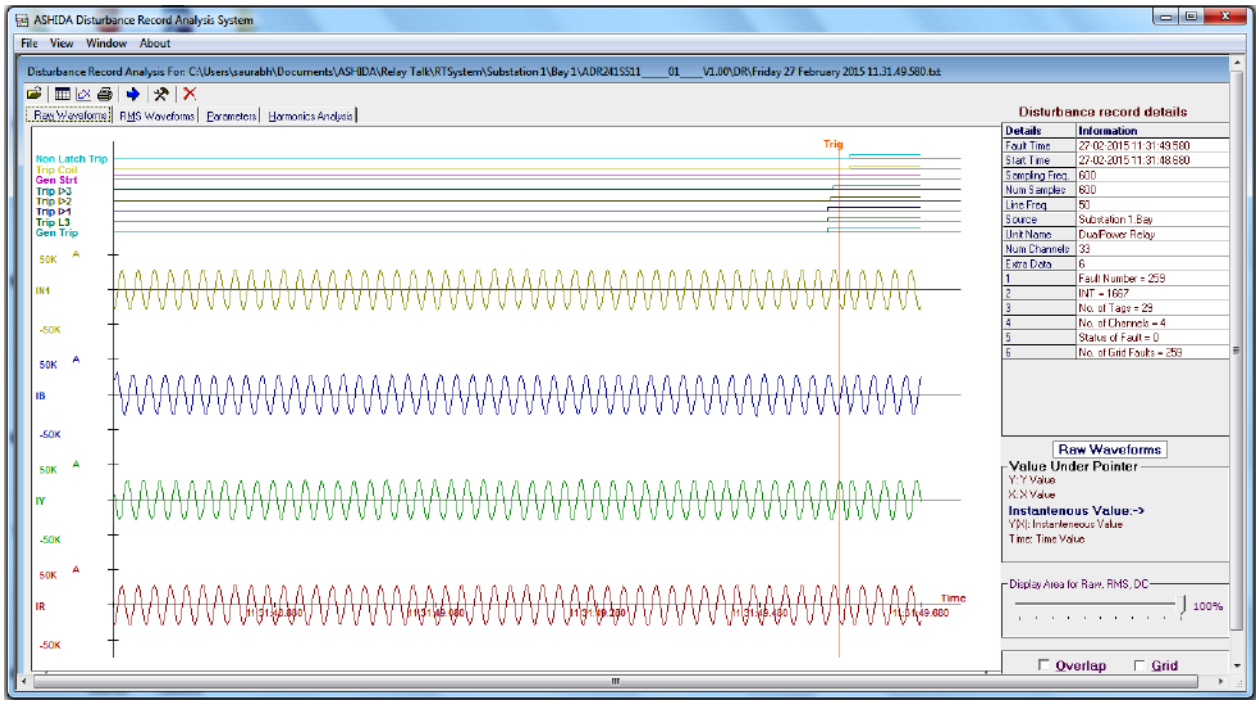
Relay maintain various time stamped event which can be down load and save in file for further analysis



Similarly Fault data can be maintain



Similarly Disturbance record latched by relay can be downloaded and saved in RT



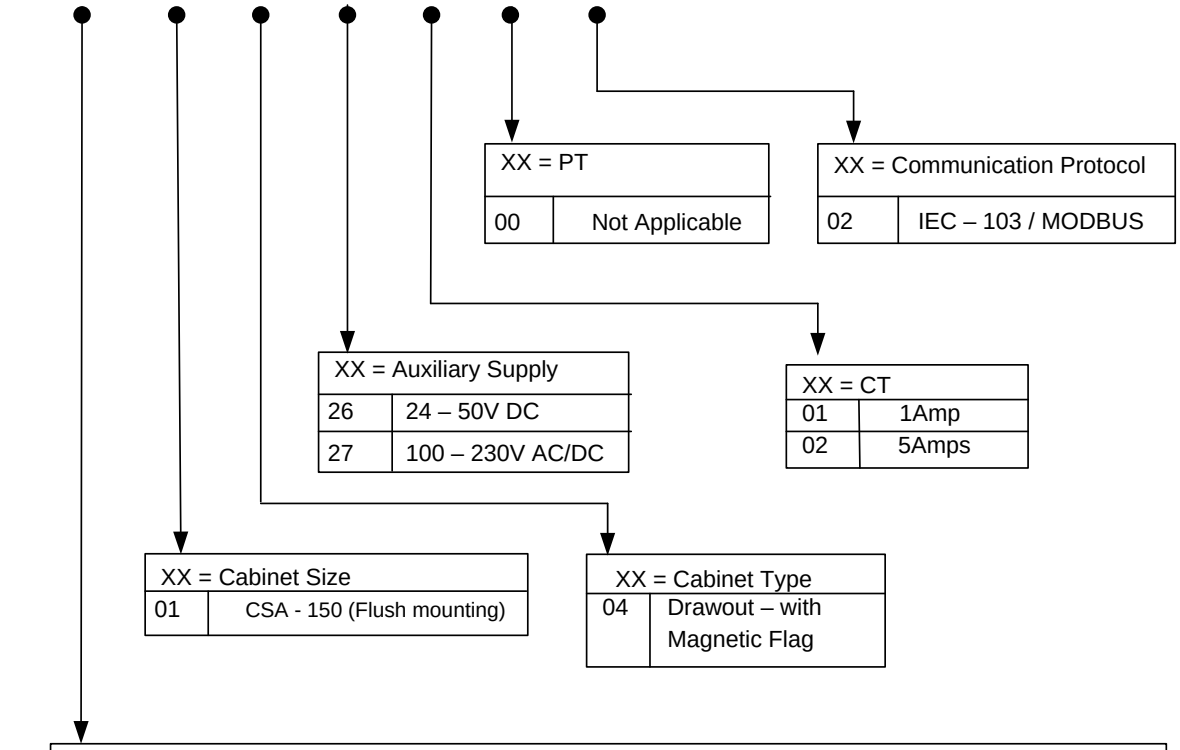
For ordering following information is needed:

The relay is available with nos. of different option. The option is specified by model no. It is user responsibility to specify correct model no. while ordering.

While Ordering Specify the following Information for ADR241S Relay

Definition of Model No For Aditya Series Relays

AM XXX – XX – XX – XX – XX – XX – XX



XXX = Sub Type	
521	Relay For RMU Setting OC for IDMT 0.2 -2.5xIn for DT 0.2 – 35.0 x In TMS 0.025 – 1.500 Time Dial 0.01-100. tReset Delay 000-100 EF for IDMT 0.1 -2.5xIn for DT 0.1 – 35.0 x In TMS 0.025 – 1.500 Time Dial 0.01-100. tReset Delay 000-100 With Cold load pickup, Thermal OL. Under Current and Inrush Blocking Contacts: 1 C/O Latching Type for Annunciation Protection Healthy, 1 Trip duty Contact for CB Operation & 2 dedicated duty trip contact for Phase and Earth Fault. Status: 3 status input (One dedicated for CBNO) , Remote Trip.

Ordering information:

A	D	R	2	4	1	S	-	A	M	-	X	X	X	-	X	X	-	X	X	-	X	X	-	X	X	-	X	X	-	X	X	-	X	X

Example

ADR241S-AM-521-01-04-26-01-00-02

ADR241S-AM-521-01-04-27-01-00-02

Technical Specifications:

Current Input:			
1.	CT secondary	: 1 Amp or 5 Amp to be specify while ordering	
2.	Nominal Burden at In (without tripping condition)	: OC CT < 4.2 VA (@ In = 1 A) : OC CT < 4.5 VA (@ In = 5 A) : EF CT <0.10 VA (@ In= 1A) : EF CT <0.10 VA (@ In= 5A)	
3.	Thermal Withstand Capacity	: 50 x rated current (In) for 1sec : 30 x rated current (In) for 3sec : 2 x rated current (In) continuous	
4.	Operating Range	: For OC 0.2 – 35 In : For EF 0.1 – 35 In	
5.	Measurement Accuracy	: Typical ± 2% at In for Phase and EF	
6.	Nominal Frequency Range For Current Inputs	: 50 / 60 Hz (Site selectable)	
7.	Minimum current require to energize the relay	: In 1Ø ≥ 20%, 2Ø ≥ 12% and 3Ø ≥ 10%.	
8.	Frequency measurement range	: 45 Hz – 65 Hz	
9.	Current transformer requirements	Detailed information of CT requirements is given on page no. 7	

Auxiliary Supply voltage:			
1.	Nominal operating range	: 100 – 230V DC /AC (50Hz / 60Hz) or 24 - 50 VDC (ordering option)	
2.	Voltage operating range	: 80% of lower nominal range and 120% of upper nominal range (For DC Supply) : 80% of lower nominal rang and 110% of upper nominal range (For AC Supply)	
3.	Nominal Burden on 100 – 230V Auxiliary Power Supply	100-230VAC	: <10 VA No output or LED energized. : <12VA with status S1, S2 & S3 energise
		100-230 VDC	: <4W No output or LED energized. : <4W with status S1, S2 & S3 energise
4.	Nominal Burden on 24 - 50 VDC Auxiliary Power Supply	: <3 watt No output or LED energized. : <4 watt with status S1, S2 & S3 energise	
5.	Tolerable AC ripple	: Up to 15% of highest dc supply, As per IEC 60255-11: 2008	
6.	Relay power up time with Aux. Supply	: <50ms	
7.	Auxiliary Power Supply Voltage Interruption (without powering by CT):	: As per IEC 60255-11 100 - 230Vdc, the relay withstand for 50 ms; 100 - 230Vac, the relay withstand for 50 ms; 24-50Vdc, the relay withstand for 20 ms;	

Opto Isolated input :		
1.	Opto Isolated input operating Range	:Same as Auxiliary supply range 100 – 230V DC /AC (50Hz / 60Hz)
2.	VA Burden of Opto Isolated Status Input (S1, S2 & S3)	: For AC at nominal voltage range (100 to 230V) < 0.8 VA : For DC at nominal voltage range (100 to 230V) < 0.8 Watt
3.	VA burden of Status S4 (Remote Trip)	: For AC at nominal voltage range (100 to 230V) < 12 VA : For DC at nominal voltage range (100 to 230V) < 4 Watt Note : Relay take power from Remote trip input to power it electronics and provide tripping output to CB even if there is NO Auxiliary supply and CT current is less than minimum operating value
4.	Operating voltage range	: 80% of lower nominal range to 110% of upper nominal range (For AC) : 80% of lower nominal range to 120% of upper nominal range (For DC)
5.	Pick up Voltage (Logic High)	: 60V – 80Volts (for 100V – 230 Volts Aux. Supply)
6.	Drop off voltage range (Logic Low)	: 30V – 60Volts (for 100V – 230 Volts Aux. Supply)
7.	Filtering Time	: < 40ms for S1, S2 & S3
8.	Logic input recognition time	: For S1, S2 & S3 filtering time + 5ms ± 5 ms : 3.5sec for Remote Trip ± 5%

Output Contact:			
1.	Output contacts	Continuous	: 5A/250Vac
		Make & carry	: 30Amp for 3sec AC /DC
		Short time withstand	Carry : 50Amp for 1sec AC /DC
		Breaking capacity	AC- 1250VA max. 5A or 300V(PF 0.4)
			DC- 100W Resistive max. 5A or 300V
			50Watt Inductive (L/R 45ms) max. 5A or 300V
		Operating Time	<10msec
		Minimum no. of operations	10,000 operation loaded condition & unloaded 100,000 operations
2.	Impulse Output for tripping coil	Impulse output for the tripping coil	12 V - 24 VDC (Energy <= 0.1 J)
		Note: The trip energy for the trip coil is stored by a capacitor built into the protection relay. The capacitor is charged by a current input or the auxiliary voltage. The duration of the trip pulse is 50 ms (if output is not burden). The pause between the individual pulses depends on the impedance of the trip coil and on the current level. The pulse lasts as long as the activation threshold is exceeded. The voltage level of the energy output depends on the discharging time	

Accuracy of protection function:			
1.	**Over current & Earth Fault:**		
	For operating Value	Pick-up	Setting +10% / - 5%
		Minimum Trip Level of IDMT	1.05 x Settings ± 5%
		Drop –off	0.95 x setting ± 5% for settings >=20% 0.90 x setting ± 10% for settings < 20%
	For operating Time	IDMT Characteristic shape with Relay Power ON condition	as per class5 of 60255-151 cl.5.2 or ± 60ms whichever is greater *(Under reference Condition)
		DT Operation with Relay Power ON condition	± 5% or ± 60ms whichever is greater**
		IDMT Characteristic shape with Relay Power OFF condition	as per class5 of 60255-151 cl.5.2 or ±80ms whichever is greater * (Under reference Condition)
		DT Operation with Relay Power OFF condition	± 5% or ± 80ms whichever is greater **
		* Reference Condition	TMS=1 i>setting of 1A Operating range 2-20In
		** Reference Condition	Fault current 2.0 time above set value
2.	**Under current:** (For Proper operation relay must Power ON in Auxiliary supply)		
	For operating Value	Pick-up	Below 0.20In 0.95 x settings ± 7.50%
		Drop–off	Below 0.20In 1.05 x settings ± 7.50%
	For operating Time	DT Operation	± 5% or ± 60ms whichever is greater
3.	**Thermal Overload:**		
	For operating Time	Thermal Trip operation	± 10% of calculated time
4.	**Cold Load:**		
	tcold operating Time	tcold	Setting ± 10%
	tclp operating Time	tclp	Setting ± 10%
	For operating Value	Pick-up	Setting +10% / - 5%
		Minimum Trip Level of IDMT	1.05 x Settings ± 5%
		Drop –off	0.95 x settings ± 5%
	For operating Time	IDMT Characteristic shape with Relay Power ON condition	as per class5 of 60255-151 cl.5.2 or ± 60ms whichever is greater *(Under reference Condition)
		DT Operation with Relay Power ON condition	± 5% or ± 60ms whichever is greater**
		IDMT Characteristic shape with Relay Power OFF condition	as per class5 of 60255-151 cl.5.2 or ± 80ms whichever is greater * (Under reference Condition)
		DT Operation with Relay Power OFF condition	± 5% or ± 80ms whichever is greater**
		*Reference Condition	TMS=1 i>setting of 1A Operating range 2-20In
		** Reference Condition	Fault current 2.0 time above set value

5.	**2nd Harmonic:**		
	For operating Value	2ndHarm Thresh	Setting ±15%
		I>lift 2H	Setting ±15%

Operational Indicators (Flags):		
1.	ON	: RED LED indicates that the actual current is ≥ 20% In
	PROTH.H	: Green LED indicates relay hardware is healthy.
	PKP	: Red LED Indicates that Input current is above threshold limit
	TRIP	: Red LED Indicates that Fault, Relay trips the breaker.
	FAULT	: Magnetic Flag indicate relay tripped on Fault (HR type)

Operating condition:		
1.	Relative Humidity	: Humidity (RH) 95% maximum
2.	Operating temperature range	: -25 ºC to +65 ºC (without battery)
3.	Storage temperature range	: -25 ºC to +70 ºC. (without battery)

Terminals specification:		
1.	AC current Input Terminals	M4 Threaded terminals for ring lug connection. Suitable up to 4 mm^2
2.	Auxiliary & Input/output Terminals	M4 Threaded terminal. Suitable up to 2.5 mm^2
3.	Note on M4/M5 Terminal Torque	Use torque control screw driver with 1.2 Nm torque maximum
4.	Rear Communication Terminal	For two wire RS 485 signal levels Suitable up to 2.5 mm^2

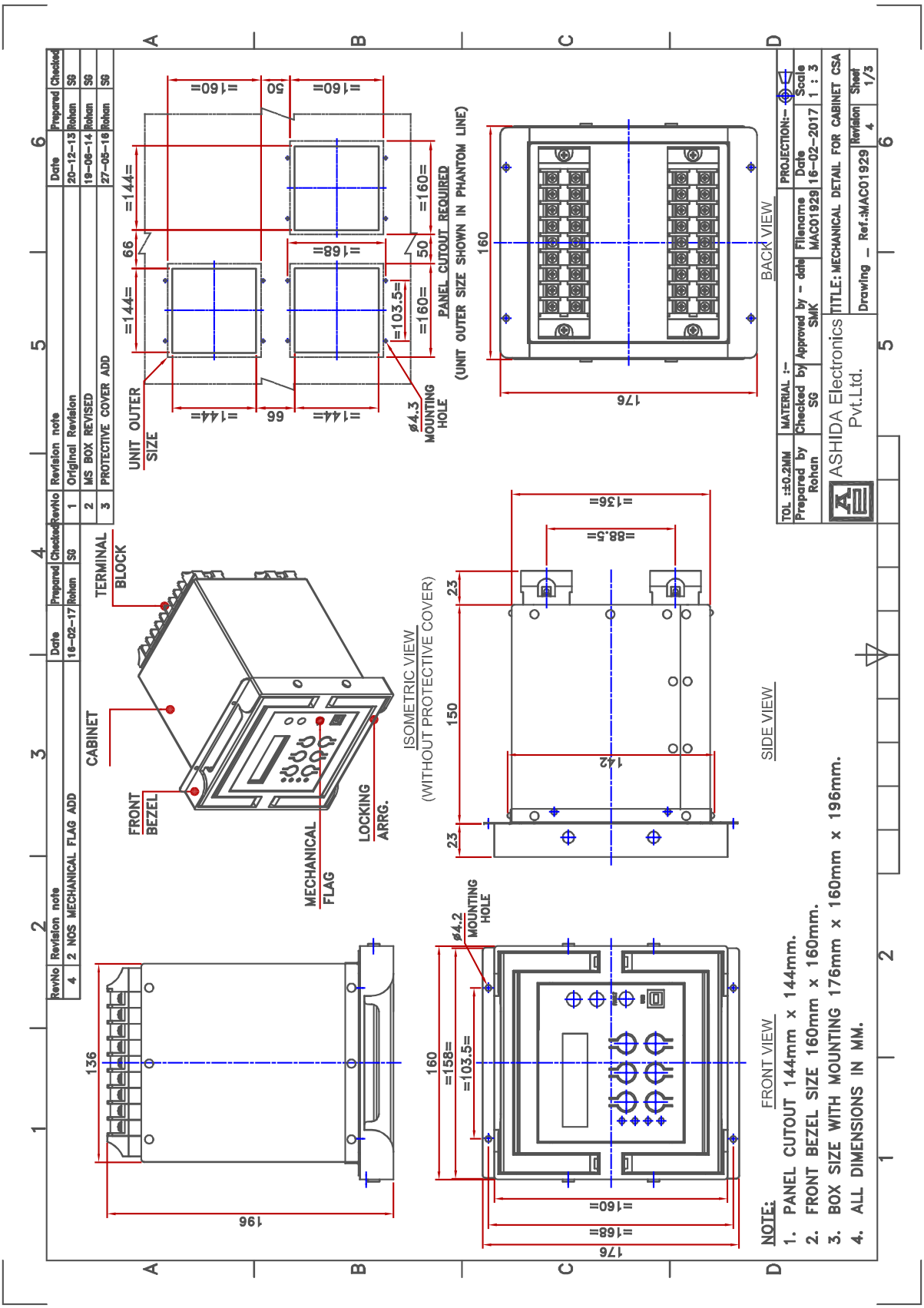
Mechanical & Environmental specification:		
1.	Design	Flush mounting case
2.	Weight	3.50 Kg approximate
3.	Pollution Degree	II

Drawing References:			
1.		: For Cabinet Type	- MAC01929
		: For Block Diagram	- APR07504
		: For Back Terminal Details	- APR06619

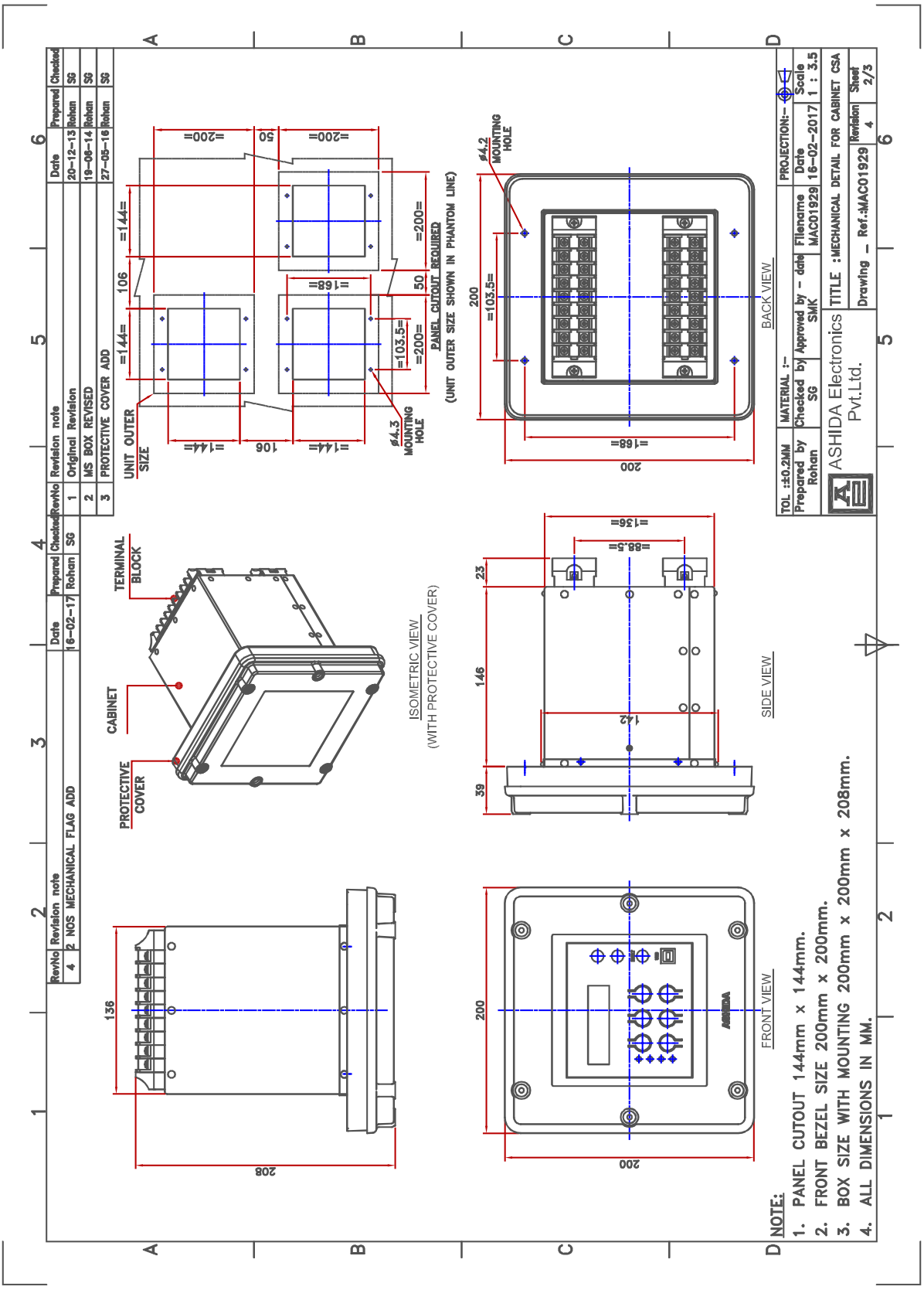
Conformance to Standards:

SR. NO.	TEST	STANDARDS
1	**Packaging Test**	
1.1	Packaging Test	ISTA 1C
2	**Complete Safety Type Test**	
2.1	L.V.D. Test	IEC 60255-27:2005
3	**Impulse, Dielectric and Insulation Requirement**	
3.1	Impulse Voltage Test	IEC 60255-27:2005
3.2	Dielectric Voltage Withstand Test	IEC 60255-27:2005
3.3	Insulation Resistance Test	IEC 60255-27:2005
4	**Auxiliary Supply Tests**	
4.1	D.C. Voltage Dips	IEC60255-26 (ed3.0)-2013
4.2	D.C. Voltage Interruption	IEC60255-26 (ed3.0)-2013
4.3	A.C. Voltage Dips	IEC60255-26 (ed3.0)-2013
4.4	A.C. Voltage Interruption	IEC60255-26 (ed3.0)-2013
4.5	Reversal of D.C. Power Supply Polarity test	IEC 60255-11
5	**Emission Test**	
5.1	Radiated Emission Test	IEC60255-26 (ed3.0)-2013
5.2	Conducted Emission Test	IEC60255-26 (ed3.0)-2013
6	**Immunity Test**	
6.1	Electrostatic Discharge	IEC60255-26 (ed3.0)-2013
6.2	Surge Test	IEC 61000-4-5, IEC60255-26 (ed3.0)-2013
6.3	Fast Transient	IEC 61000-4-4, IEC60255-26(ed3.0)-2013
6.4	Radiated radio freq. Electromagnetic field	IEC60255-26 (ed3.0)-2013
6.5	Conducted Disturbance Inducted By Radio Freq. Field	IEC60255-26 (ed3.0)-2013
6.6	Power Frequency Magnetic Field Immunity	IEC60255-26 (ed3.0)-2013
6.7	Pulsed Magnetic Field Immunity	IEC61000-4-9: Level 5
7	**Mechanical Tests**	
7.1	Vibration Response Test	IEC60255-21-1: Class 1
7.2	Vibration Endurance Test	IEC60255-21-1: Class 1
7.3	Shock Response Test	IEC60255-21-2: Class 1
7.4	Shock Withstand Test	IEC60255-21-2: Class 1
7.5	Enclosure Protection (IP54)	IEC60529

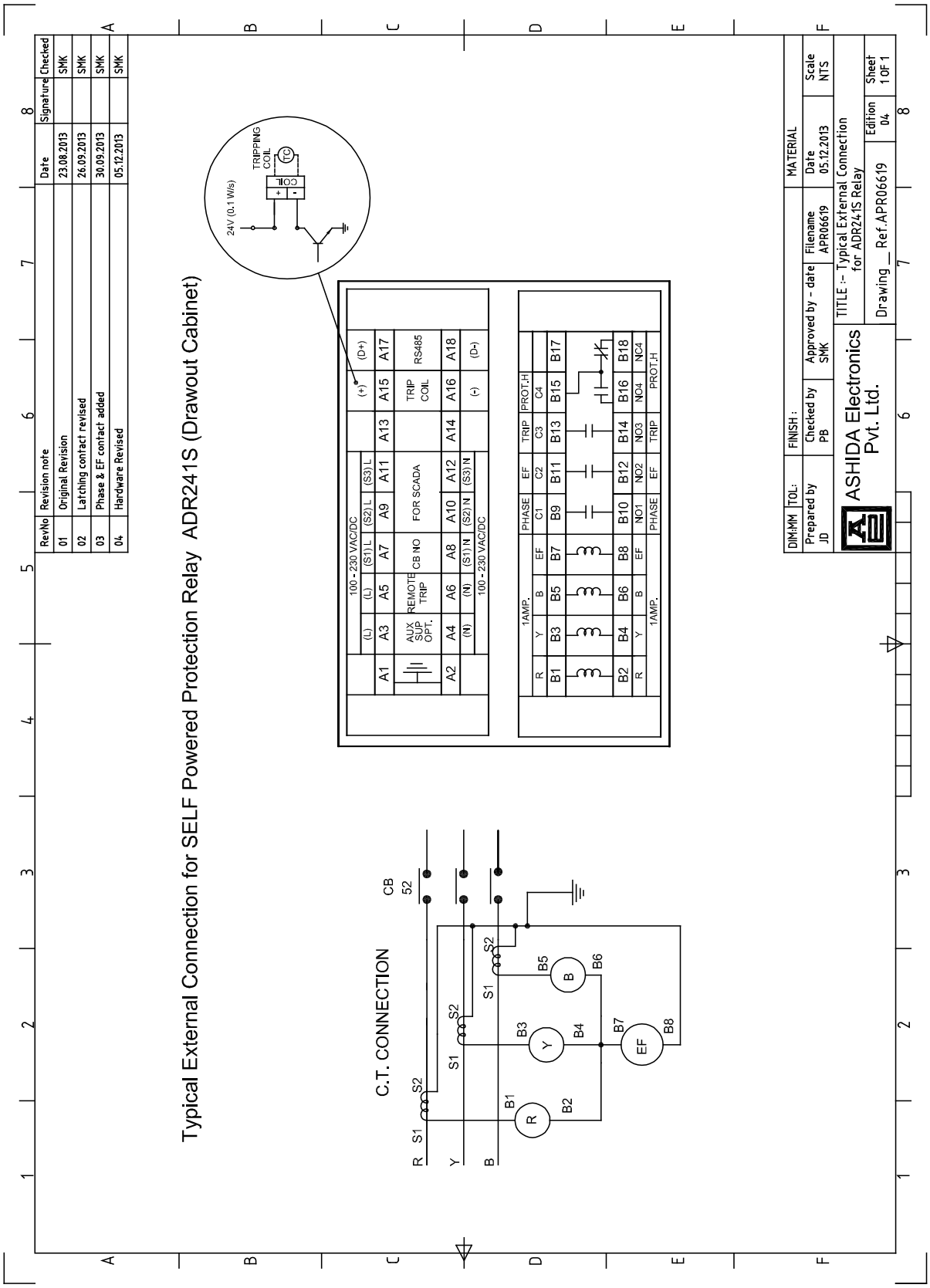
Mechanical Dimensions



Mechanical Dimensions with optional protective cover

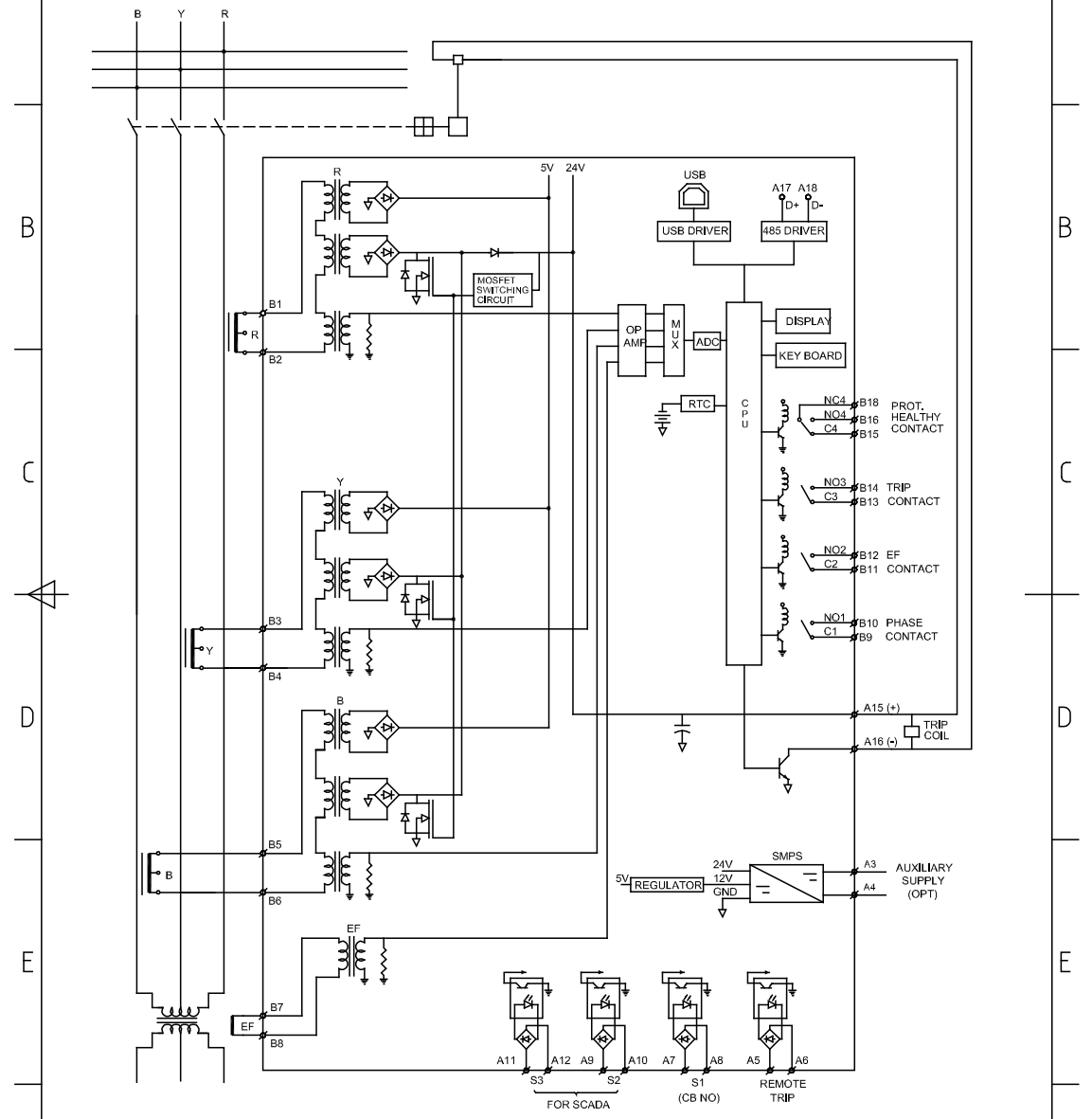


Back Terminal Connection



Block Diagram

RevNo	Revision note	Date	Signature	Checked
01	Original Revision	26.09.2013		SSJ
02	Trip contacts Revised	30.09.2013.		SSJ
03	Modified as per Hardware Revision	05.12.2013		SSJ



Dim : MM TOL :	FINISH:			MATERIAL:	
Perpaed by JD	Checked by SSJ	Approved by – date SMK	Filename APR07504	Date 05.12.2013	Scale NTS

ASHIDA Electronics Pvt. Ltd.

Title : – BLOCK DIAGRAM FOR ADR241S_DO

Drawing_ Ref. APR07504 | Edition 03 | Sheet 1 OF 1

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