



MOTOR PROTECTION RELAY : ADR244B

Introduction:

ASHIDA has designed economical & reliable Multifunction ADR244B Protection & Control System. The simple and compact construction of ADITYA series ADR244B relay provides integrated Protection, Control and Monitoring functions for Electric Motors.

The ADR244B Modular relay is available in 19" and 14" rack mounting cabinet.

Functional Overview:

Key Protection & Control Functions:

- Four Independent Settings Groups.
- Directional/ Non Directional Phase & Ground Over Current Function (50/51/51N/51).
- Four Independent Stages for Phase Over Current Protection.
- Three Stages of Ground Over Current Protection.
- Internally Derived (3I0>) / Externally Measured Ground Over Current Protection.
- Inverse time Over Current Protection (IEC curves according to IEC60255).
- High Impedance Restricted Earth Fault Protection (64R).
- Inverse & Definite time Positive & Negative Phase Sequence Over Current Protection (46).
- Broken Conductor Protection (46BC)
- Positive & Negative Phase Sequence Over Voltage Protection (47).
- Under and Over Voltage Protections (27 /59).
- Externally Measured (VN>) / Internally Derived (3Vo>) Over Voltage Protection (59N).
- Locked rotor / Motor stall Protection (50LR)
- Prolong start Protection (66)
- Number starts function

- Phase reversal Protection (47)
- Under current Protection (37)
- Under/Over Power Protection (32P)
- Reverse Power Protection (32R)
- Power factor Protection (55)
- Under and Over Frequency Protection (81U/O)
- SOTF (Optional)
- Breaker Failure detection (50BF)
- VT and CT supervision function
- Trip circuit supervision function
- Programmable Inputs & Outputs
- CB Close / Trip from HMI
- Programmable & Target LEDs for indication with dual colours
- Self Supervision of relay
- Metering function
- Disturbance Recording (10 nos.)
- Event Recording (512 nos.)
- Fault Recording on HMI display (10 nos.)
- Non-Volatile memory
- Fully communicable with IEC standard open protocol IEC60870-5-103, MODBUS & IEC 61850.
- SCADA communication
- Single / Dual Ethernet ports (RJ45/ FO), RS485 port at rear side.
- PRP/ HSR option for fast & redundant network (Optional).
- PC front port communication for convenient relay settings
- User friendly local operation with key pad.

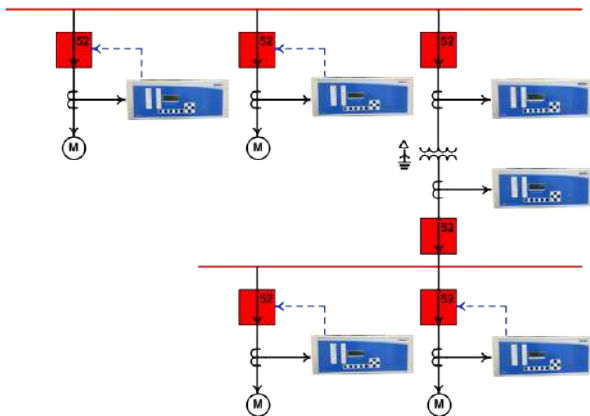
- Large Liquid crystal display (20X4) with backlight.
- Password Protection.
- If Special connector is removed from the back side of the CT Terminal, CT secondary terminal will be automatically shorted.
- Measurement of Voltage, current magnitude, symmetrical components, Real, Reactive and Apparent Power, Power factor and frequency.

Software Support:

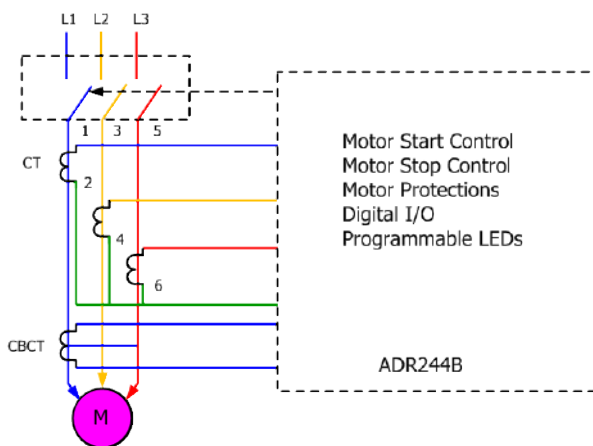
- Online/ Offline Setting Editor.
- Programmable scheme logic Editor.
- Settings upload / download.
- Online Measurement.
- Disturbance analysis.
- Relay assistant for testing relay at site

Applications:

ADR244B numerical multifunction relay designed for electric motor protection applications. Relay designed with fast and selective tripping ensures the stability and availability of electrical power system. ADR244B relay apply for protection of motor feeder to achieve sensitivity and selectivity on phase & ground faults as well as on abnormal conditions.



Motor Protection Application

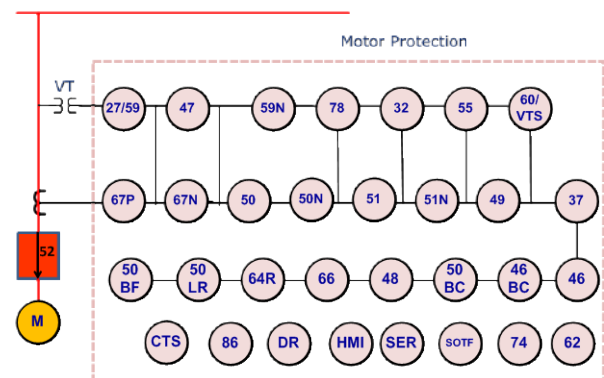


Motor Protection Application

ANSI Code	Description
27/59	Under/Over Voltage Protection
32	Directional Power Protection
37	Under current Protection
46	Negative Phase Sequence Protection
46BC	Broken Conductor Protection
47	Negative Phase Sequence Over Voltage Protection
48	Motor Prolong Start Protection
49	Thermal Overload Protection
50	Instantaneous/Definite Time Phase Over current Protection
50N	Instantaneous/Definite Time Ground Over current Protection

50BC	Broken Conductor Protection
50BF	Breaker Failure Detection
50LR	Locked rotor Protection
51	Inverse Time Phase Over current Protection
51N	Inverse Time Ground Over current Protection
55	Power factor Protection
59N	Residual Over Voltage Protection
62	Time Delay Stopping or Opening Relay
64R	High Impedance Restricted Earth Fault Protection
60/VTS	VT Supervision Detection
CTS	CT Supervision Detection
66	Number of starts
74	Trip Circuit Supervision
81O/U	Frequency Protection
86	Lockout (Trip command)
SOTF	Switch On To Fault

The functional overview of ADR244B:



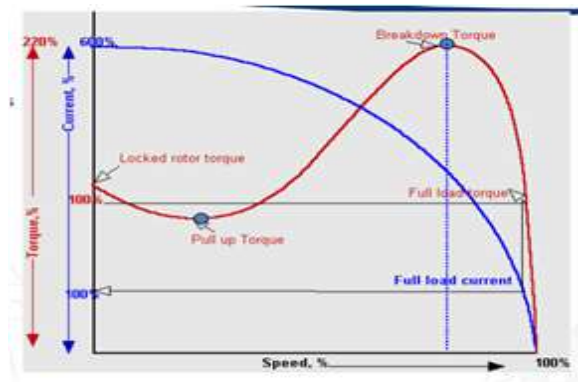
Protection functions Overview of ADR244B

The core functionality of ADR244B relay is equipped with Motor protection & Control functions.

Motor Prolong start Protection (48):

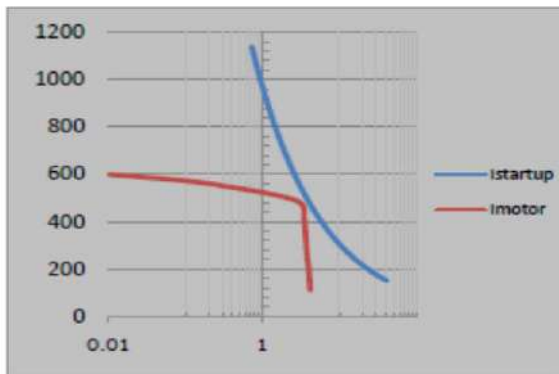
For an induction motor to stall during normal operation (during motor starting

conditions), load torque may exceeds very high and above the breakdown torque, may cause damages of stator winding and rotor bars. Stator draws heavy current due to the heavy current flows in rotor bars.



The ADR244B relay detects motor prolong start conditions effectively and provides protections to motor.

$$\text{Delay} = (I_{\text{startup}} / I)^2 * T_{\text{startup}}$$

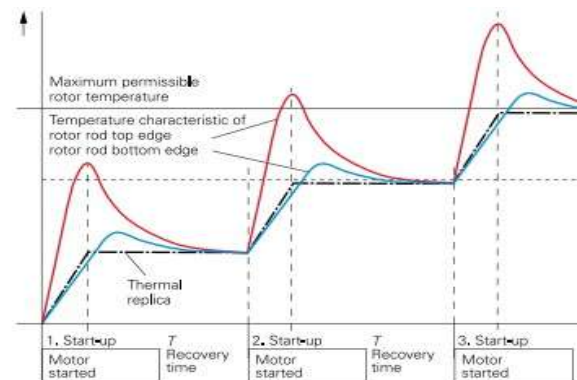


Number of Starts (66):

Induction motor can be start frequently/periodically based on their rotor bar thermal capacity design. ADR244B provides number of start protection for motor against too many / frequent starts (cold or hot starts per hour) per hour. The

rotor temperature rise drastically high if the motor starts frequently (beyond duty cycle mentioned in motor datasheet). The rotor temperature can be calculated from stator current. The number of starts only permits, if the rotor can have sufficient thermal reserves for complete start up. The cooling time between starts allowed to restart motor, when the calculated rotor temperature falls down to safe level.

ADR244B allows user to program number of cold / hot starts per hour as per the information available from motor datasheet. Users can set the number of starts protection (number of starts and time between starts) according to motor start data available from motor datasheet.



Directional/ Non Directional Over Current Protection(50/50N/51/51N):

The core functionality of ADR244B relay is equipped with multi function Motor protection. The relay provides Directional/ Non Directional phase and ground over current protection with multiple settings (four stages for phase over current and three stages for ground over current) for

various power system applications and wide range of protection settings. The function is equipped with digital filter algorithms, providing the rejection of higher harmonics & DC offset. Selectable IEC/IEEE inverse time curves with directional/non directional over current protection will be providing greater selectivity, flexibility and sensitivity to users for better relay co-ordinations.

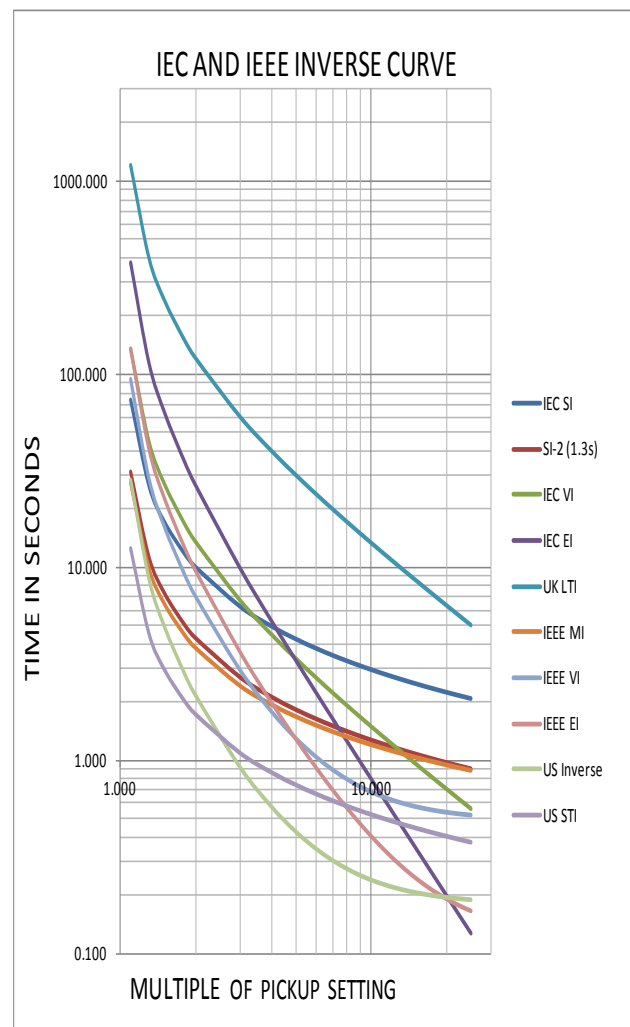
ADR244B relay provides inverse time over current characteristic for phase and ground over current elements. Each stages of phase and ground over current elements are independently settable with inverse time or definite time characteristic. The following tripping characteristics are available;

- IEC Standard Curves
- IEEE Standard Curve
- Definite Time Over current
- User Defined over current

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

Curve Description	K	α	L
Definite Time	-	-	-
IEC S Inverse	0.14	0.02	0
S Inverse 1.3s	0.06	0.02	0
IEC V Inverse	13.5	1	0
IEC E inverse	80	2	0
UK LT Inverse	120	1	0
Define Time	-	-	-

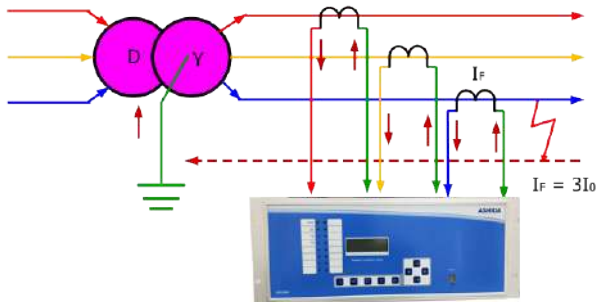
IEEE M Inverse	0.0515	0.02	0.114
IEEE V Inverse	19.61	2	0.491
IEEE Inverse	28.2	2	0.1217
US Inverse	5.95	2	0.18
US ST Inverse	0.0239	0.02	0.0169
User Define Curve 1	-	-	-
User Define Curve 2	-	-	-



IEC / IEEE Inverse curves for tripping of over current elements

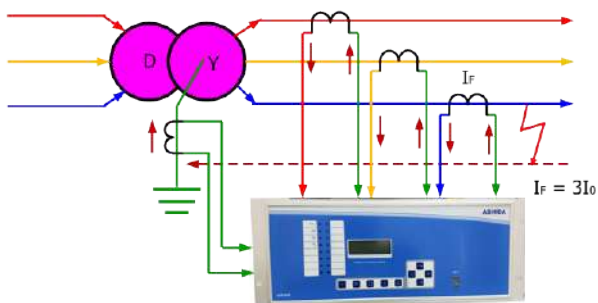
ADR244B relay provides three stages of definite time/inverse time internally derived zero sequence over current (3I0>)

protection to detects asymmetrical faults in electrical network. It can apply to overhead transmission line, underground cable, and feeder. The ground current ($3I_0$) calculated from three line currents.

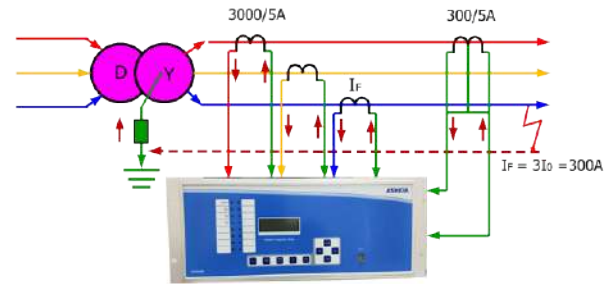


Derived Zero sequence over current from three phases

ADR244B relay provides three stages of externally ground over current protection. ADR244B relay measures ground fault current through neutral CT input. Externally ground CT input can also apply for high impedance restricted earth fault protection or sensitive ground fault protection through CBCT.



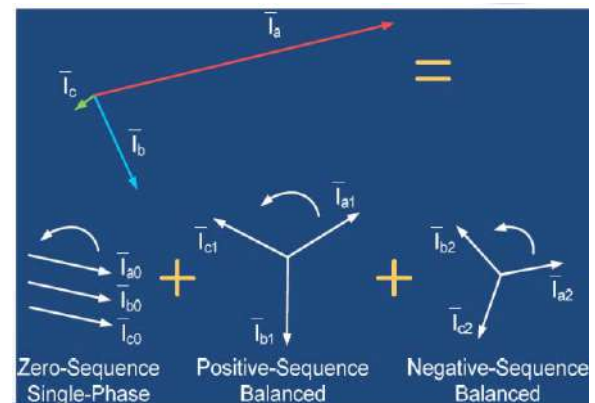
Externally measured ground over current through neutral CT



Externally measured ground over current through CBCT

Sequence Over Current Protection (50P/46):

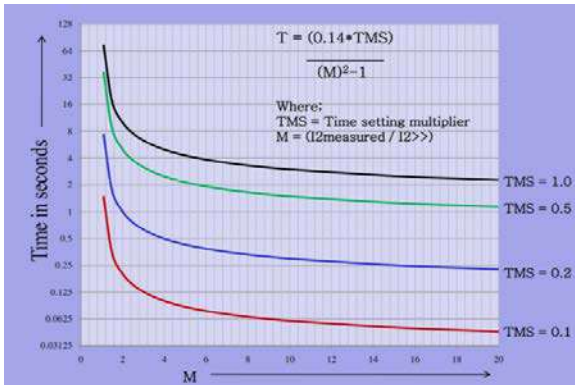
ADR244B provides sequence over current against unbalance faults/condition or high impedance faults over transmission line/under ground cable or over load condition. Sequence over current function provided in two modes; Positive sequence and Negative sequence over current function. User can select the mode based on their application and requirement.



The negative phase sequence over current element can be programmed as IDMT or definite time characteristic. ADR244B relay provides ten selectable IEC & IEEE inverse curves for each stage.

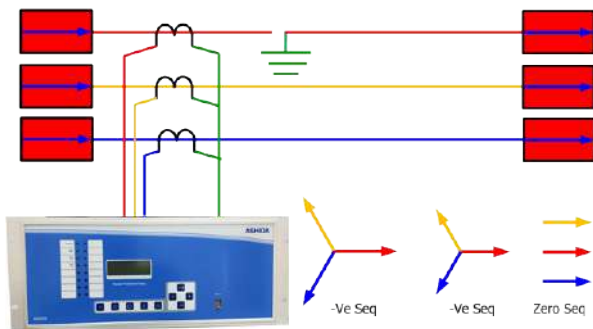
Protection can also apply in condition when

there is a very high resistive ground fault and ground element may not sense the fault current.



Broken Conductor Protection (46BC):

ADR244B equipped with broken conductor detection protection. Broken conductor condition can be detected by ratio of Negative sequence current to Positive sequence current (I_2/I_1). Protection provides higher sensitivity on High resistive fault.

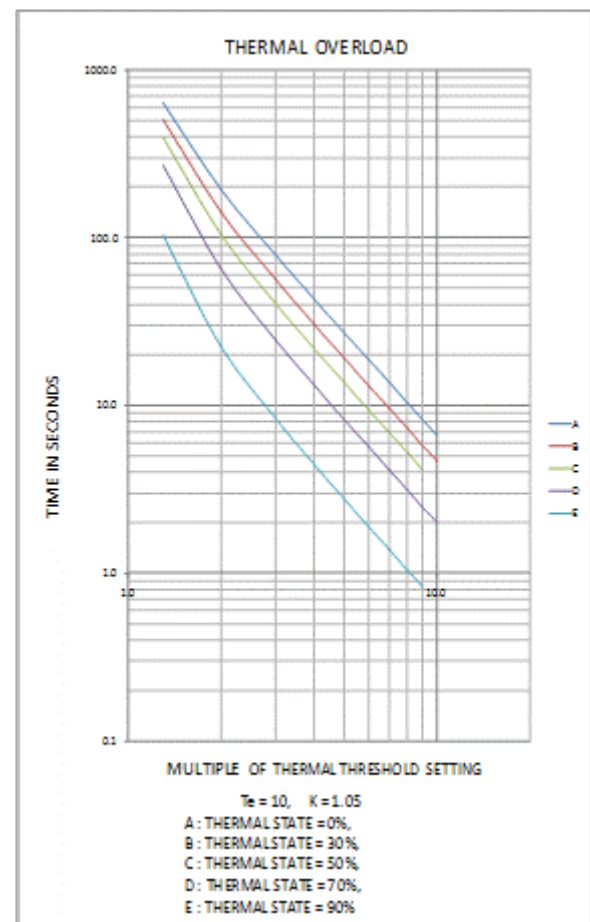


Broken Conductor Protection (50BC):

ADR244B provide independent I_0/I_1 function for sensitive ground fault detection. Relay measure the ratio of zero to positive sequence current precisely.

Thermal Overload Protection (49):

The thermal withstand capability of the power system equipment is affected by overheating prior to a fault. The temperature should not exceed the thermal withstands capability of power system equipment. The RMS currents are measured and analyzed to monitor the thermal state

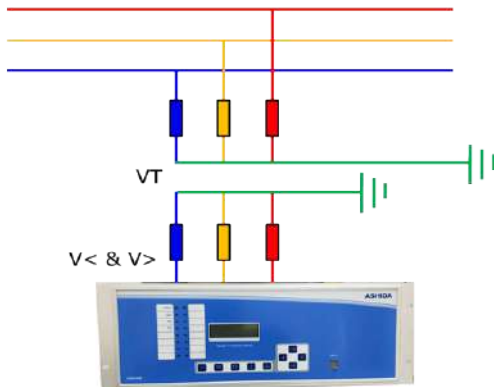


Graph of Thermal Overload Characteristic.

Under & Over Voltage Protections (27/59):

ADR244B relay provides independent phase over and under voltage protections with definite time delay range. Protection

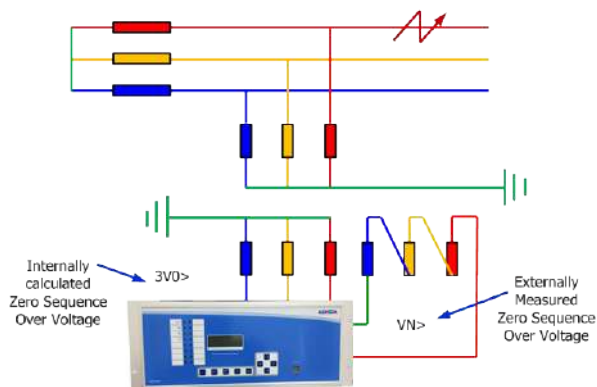
functions can be programmed for alarm signal or trip signal through programmable logic.



Under & Over voltage detection through 3-phase VT connection

Residual Over Voltage Protections (59N):

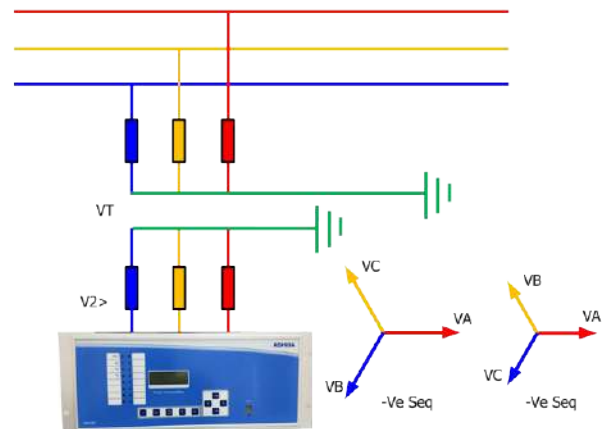
ADR244B relay provides zero sequence / residual over voltage protection with definite time delay range. Protection can be achieved by externally measured residual voltage through open delta VT or the zero sequence voltage internally calculated from three phases.



Zero sequence Over voltage / Externally measured residual Over Voltage detection through 3-phase VT & Open delta VT connections

Sequence Over Voltage Protections (47):

ADR244B relay provides positive & negative sequence over voltage protections with definite time delay range. It provides protection against high resistive faults and unbalance loading condition.



Positive / Negative Phase Sequence Over voltage detection through 3-phase VT connection

Directional Power Protection (32):

The directional power protection designed for protection against reverse power mode and over / under load protection in forward power mode. It can also be settable as a active / reactive power mode. ADR244B provides four elements for power protection with independent definite time delay characteristic.

Frequency Protection (81O/U):

Frequency protection function provides either under or over frequency protection of line/feeder/machine. ADR244B relay provides six independent stages with definite time delay characteristic. Stages can be settable in a under or over

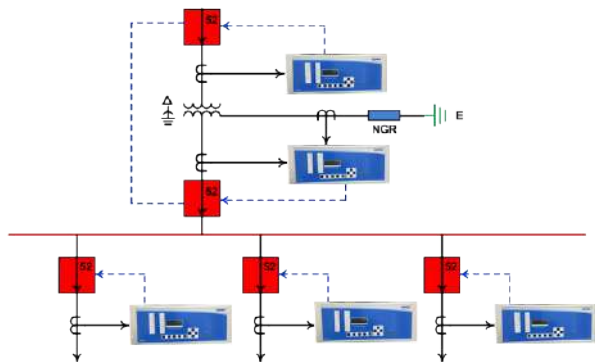
frequency mode. Protection function can also be use for load shedding scheme.

Breaker Failure detection (50BF):

If the fault current is not interrupted after a time delay expired, circuit breaker failures detected, and execute trip command to upstream circuit breaker. ADR244B relay incorporates circuit breaker failure protection to detect failure of tripping command execution due to mechanical or electrical problems in circuit breaker.

SOTF

The ADR244B provides SOTF function to protect feeder against switch on to fault condition during feeder/transformer energisation. (The SOTF can be acheived by using Group change facility through AProLogic.)



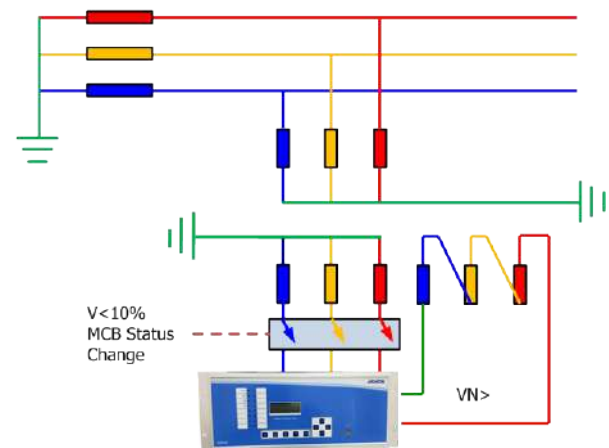
Trip circuit supervision (74):

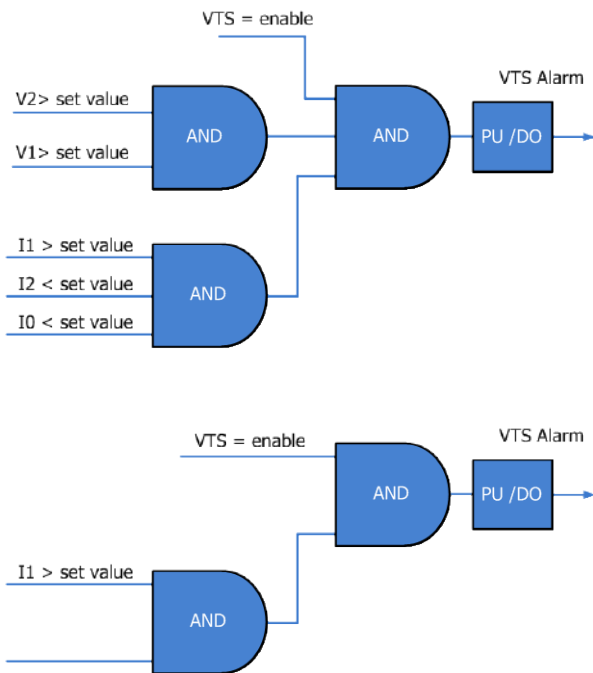
The trip circuit supervision is used to monitor healthiness of circuit breaker. The trip circuit extends beyond the relay enclosure and passes through more

components, such as fuse, wires, relay contacts, auxiliary switch contact and so on. The failure of any component result bypassing the protection. The relay is provide with special trip circuit supervision function which continuously monitor continuity of trip discontinuity observed it generates Alarm signal.

VT supervision Function (60 / VTS):

ADR244B relay provides VT supervision function to detecting a loss of phase voltage input such as that caused by failure of fuses (figure) or molded case/miniature circuit breaker (MCB). Relay declares the VT supervision when the below logic shall be stratified.

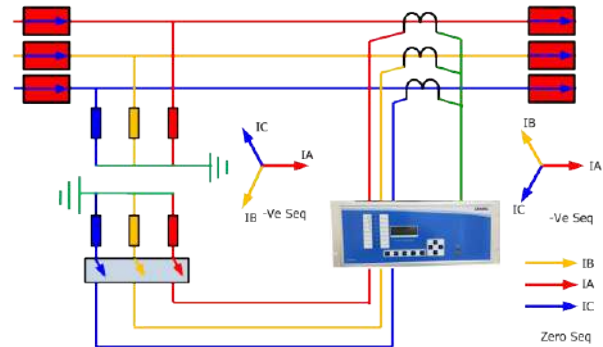




CT supervision function (CTS):

ADR244B relay provides CT supervision function to detecting a loss of phase current due to the failure of ct secondary wiring.

If the power system currents are healthy, negligible negative & zero sequence voltage could be derived. If, however, one or more of the AC current inputs are missing, a negative & zero sequence currents would be derived, even if the actual power system phase currents are healthy. CTS works by using these criteria; that is by detecting a ratio of derived negative to positive sequence currents & ratio of derived zero sequence to positive sequence currents in the absence of a corresponding derived negative & zero sequence voltage from VT.



Programmable Inputs, Outputs & Logic:

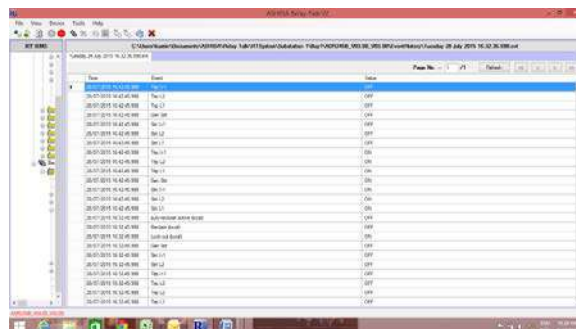
The relay is provided with tool known as AproLogic, in which user can program his/her logics as per the requirement. such as Motor reacceleration/ Auto Bus Transfer Scheme (ATS) etc. All type of gates such OR/NOR/NOT/NAND/AND/XOR/XNOR/SR Flip-flop are available along with Operating & Resetting Timer. For more details please refer to Instruction Manual

The modular version of ADR244B provides max. 64 nos. of programmable inputs and outputs in 19" and max. 32 nos. of programmable inputs and outputs in 14" rack mount size.

Cabinet size depends on the ordering information.



Back side terminals Modular version (19")

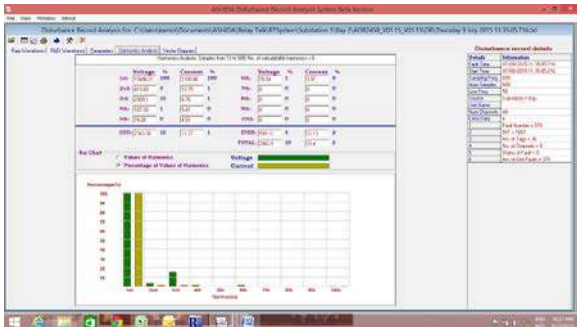


Disturbance recording:

ADR244B relay provides built in disturbance recording facility for recording of analogue and digital channels. Relay records 10 nos. of disturbances and store in non-volatile memory. Disturbance records can be saved in IEEE COMTRADE format and same can be analyzed in disturbance analysis software.

For saving DR two mode of sampling are available, first is RAW samples (DR of 1.5 seconds) & second is 16 samples (DR of 3 seconds), user can set as required.

The screenshot shows the NI-MAX software interface. The main plot displays multiple channels of data over time, with a vertical cursor at 01:00:00.000. The right panel shows the 'Disturbance record details' for the selected channel, including parameters like 'Disturbance Type', 'Disturbance Value', and 'Disturbance Time'.



Fault recording:

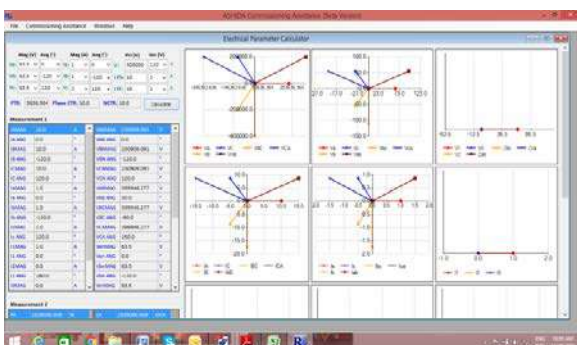
ADR244B relay is providing fault record facility. The fault records can be display either on HMI display or in RTV2 software. The relay can records 10 nos. of fault records in non-volatile memory.

Metering:

Online metering feature of ADR244B relay is providing metering of parameters (i.e. voltage/current magnitude, power, power factor measurement etc.) on HMI display or in RTV2 software.

Relay Assistant:

RTV2 software provides relay assistant tool for testing and commissioning of relay at site/field area.

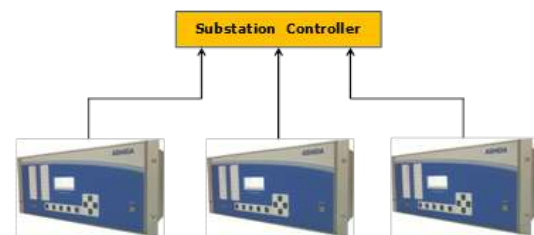


Independent Protection settings groups:

ADR244B relay provides multiple independent settings groups to allow operate relay on different power system operating conditions. The Modular versions provides four independent settings groups.

IEC 60870-5-103 Protocol:

ADR244B relay provides internationally standardized protocol for communication via RS485 port of protection relays. IEC 60870-5-103 protocol used worldwide and supported by relay manufacturers.



IEC60870-5-103 star type RS232 copper conductor connection

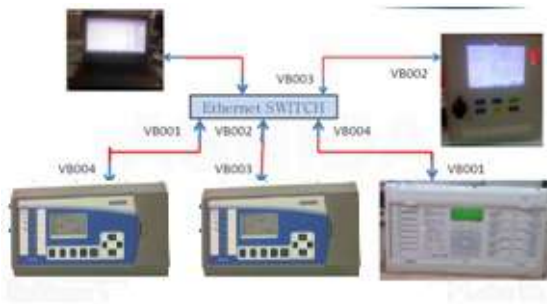
Ethernet base Protocol (IEC 61850 / MODBUS TCP):

ADR244B relay provides internationally standardized protocol such as IEC61850 / MODBUS TCP for substation automation via Ethernet port of protection relays (Ref ordering information for details)

IEC61850 GOOSE and Interoperability:

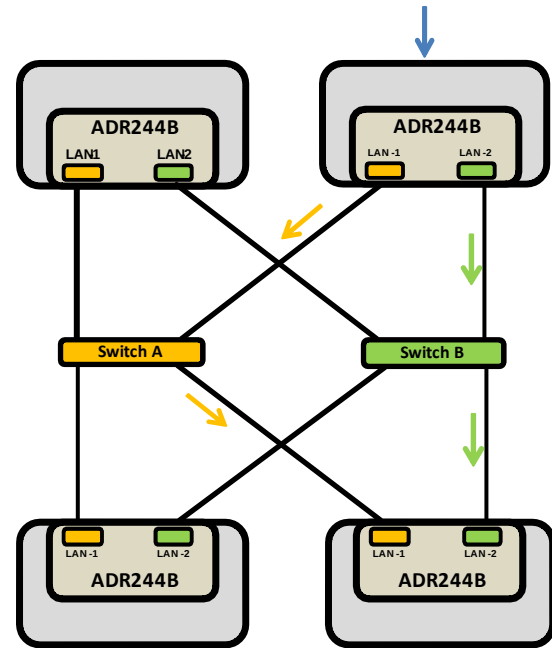
ADR244B support standard GOOSE messaging for relay to relay communication. Any logical (pickup , trip,

etc) and physical (Digital Optical Isolated signal such CBNO /NC etc) can be publish via GOOSE configurator. ADR244B support total 16 simultaneous GOOSE signals which can publish and received by other relays having IEC61850 protocol. Similarly ADR244B can able subscribed total 16 nos. of simultaneous signal published by other relays and can be use for interlocks. The ADR244B is tested for most of other make relays.

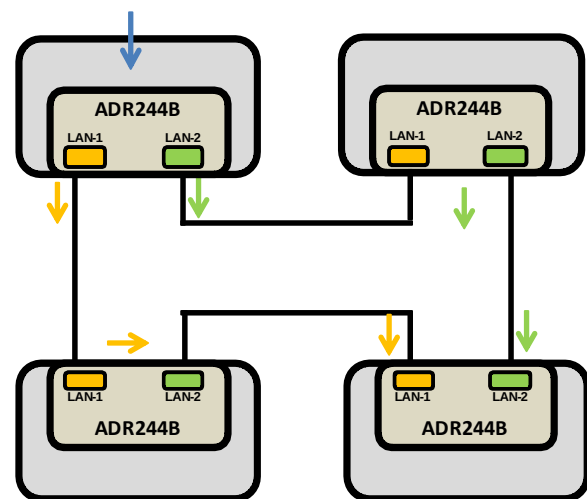


Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR):

Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR) provides redundant communication over station bus running the available communication protocols. Redundant communication is obtained through the built-in PRP and HSR features which can be used in star or ring bus architectures.



Parallel Redundancy Protocol (PRP)



High Availability Seamless Redundancy (HSR)

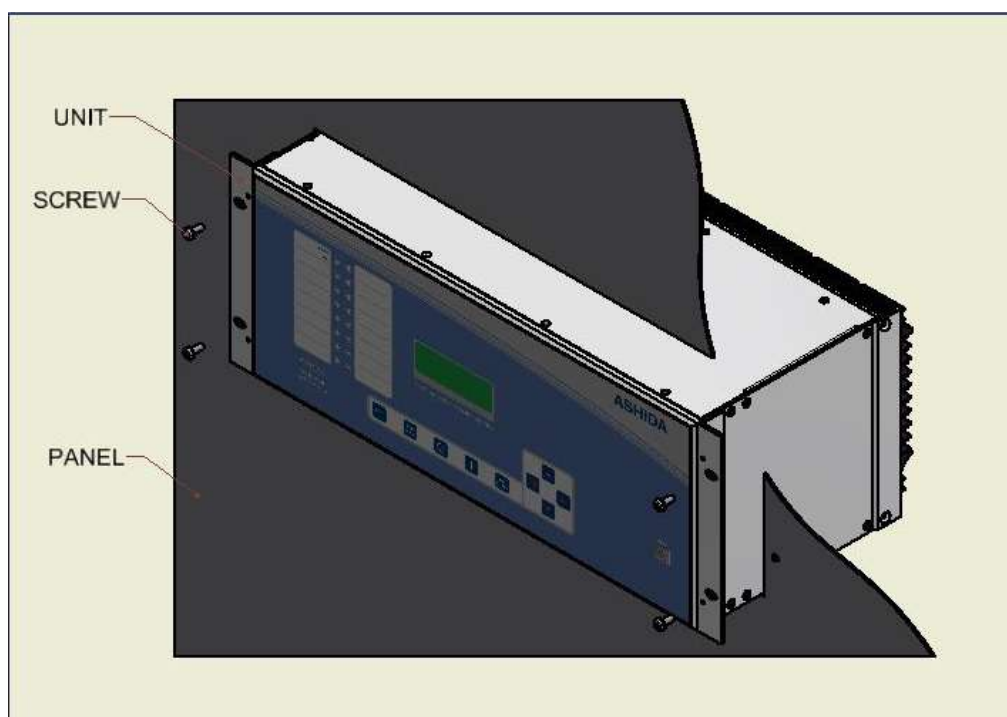
Typical Tests Information:

The Relay Confirm to following standard		
Electromagnetic Compatibility Type Test:		
Sr. No.	Test	Standard
1.	High Frequency Disturbance Test	IEC 60255-26 (ed-3):2013, IEC 60255-22-1
2.	Electrostatic Discharge Test	IEC 60255-26 (ed-3):2013, IEC 60255-22-2
3.	Fast Transient Disturbance Test	IEC 60255-26 (ed-3):2013, IEC 60255-22-4
4.	Surge Immunity Test	IEC 60255-26 (ed-3):2013, IEC 60255-22-5
5.	Power Frequency Magnetic Field Immunity Test	IEC 60255-26 (ed-3):2013, IEC 61000-4-8
6.	Radiated Electromagnetic Field Disturbance Test	IEC 60255-26 (ed-3):2013, IEC 60255-22-3
7.	Conducted Disturbance Induced By Radio Frequency Field	IEC 60255-26 (ed-3):2013, IEC 61000-4-6
8.	Power Supply Immunity Test	IEC 60255-26 (ed-3):2013, IEC 60255-11 & IEC 61000-4-11
9.	Conducted & Radiated frequency Emission Test	IEC 60255-26 (ed-3):2013, IEC 60255-25
Insulation Tests:		
10.	High Voltage Test	IEC 60255-27
11.	Impulse Voltage Test	IEC 60255-27
12.	Insulation Resistance	IEC 60255-27
Environmental tests:		
13.	Cold test	IEC 60068-2-1
14.	Dry heat test	IEC 60068-2-2
15.	Damp heat steady state test	IEC 60068-2-78
16.	Change of Temperature	IEC 60068-2-14
17.	Damp heat cyclic test	IEC 60068-2-30
	Enclosure Protection Test (IP54)	IEC 60529
CE compliance		
18.	Immunity	IEC 60255-26
19.	Emissive Test	IEC 60255-26
20.	Low voltage directive	EN 50178
Mechanical tests		
21.	Vibration Endurance Test	IEC 60255-21-1
22.	Vibration Response Test	IEC 60255-21-1
23.	Bump Test	IEC 60255-21-2
24.	Shock Withstand Test	IEC 60255-21-2
25.	Shock Response Test	IEC 60255-21-2
26.	Seismic Test	IEC 60255-21-3

Drawings Information:

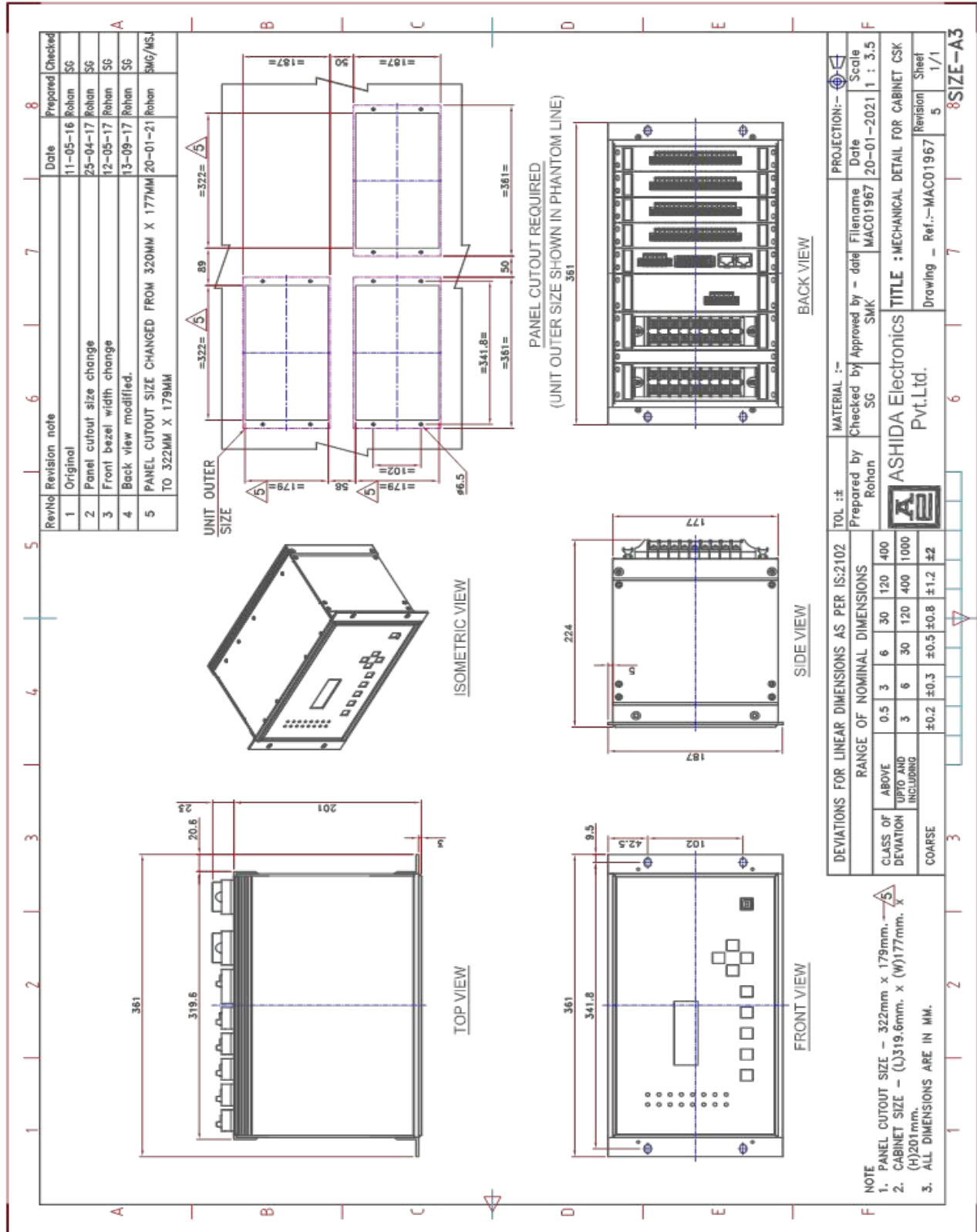
	Drawing References	Modular 14"	
		: For Cabinet Type	- MAC01967
		: For Back Connections	- ADV06504
		: For Typical External Connections	- ADV06604
		Modular 19"	
		: For Cabinet Type	- MAC01953
		: For Back Connections	- ADV06704
		: For Typical External Connections	- ADV06804

Mounting Information:

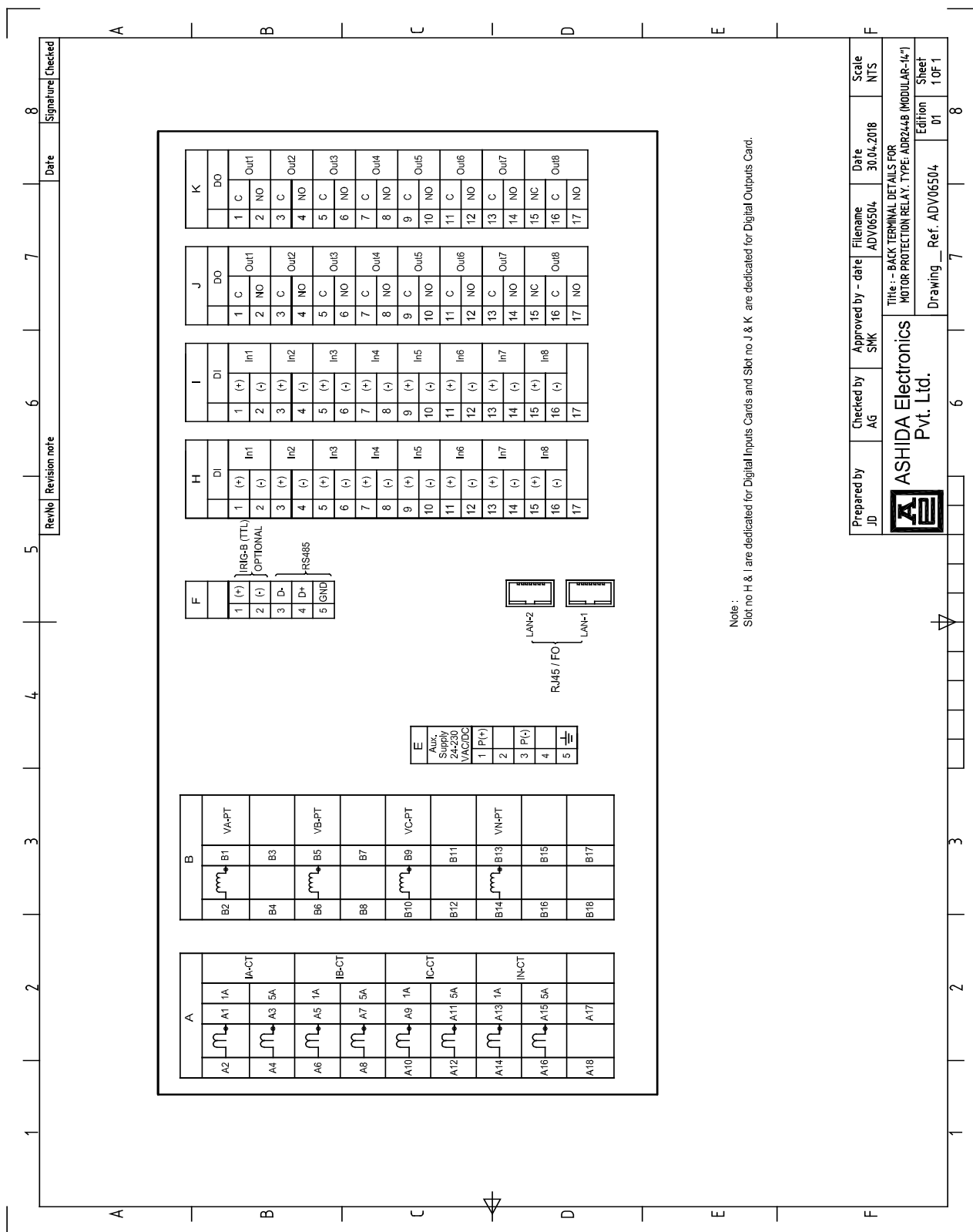


19" / 14" Modular – Rack mounting arrangement

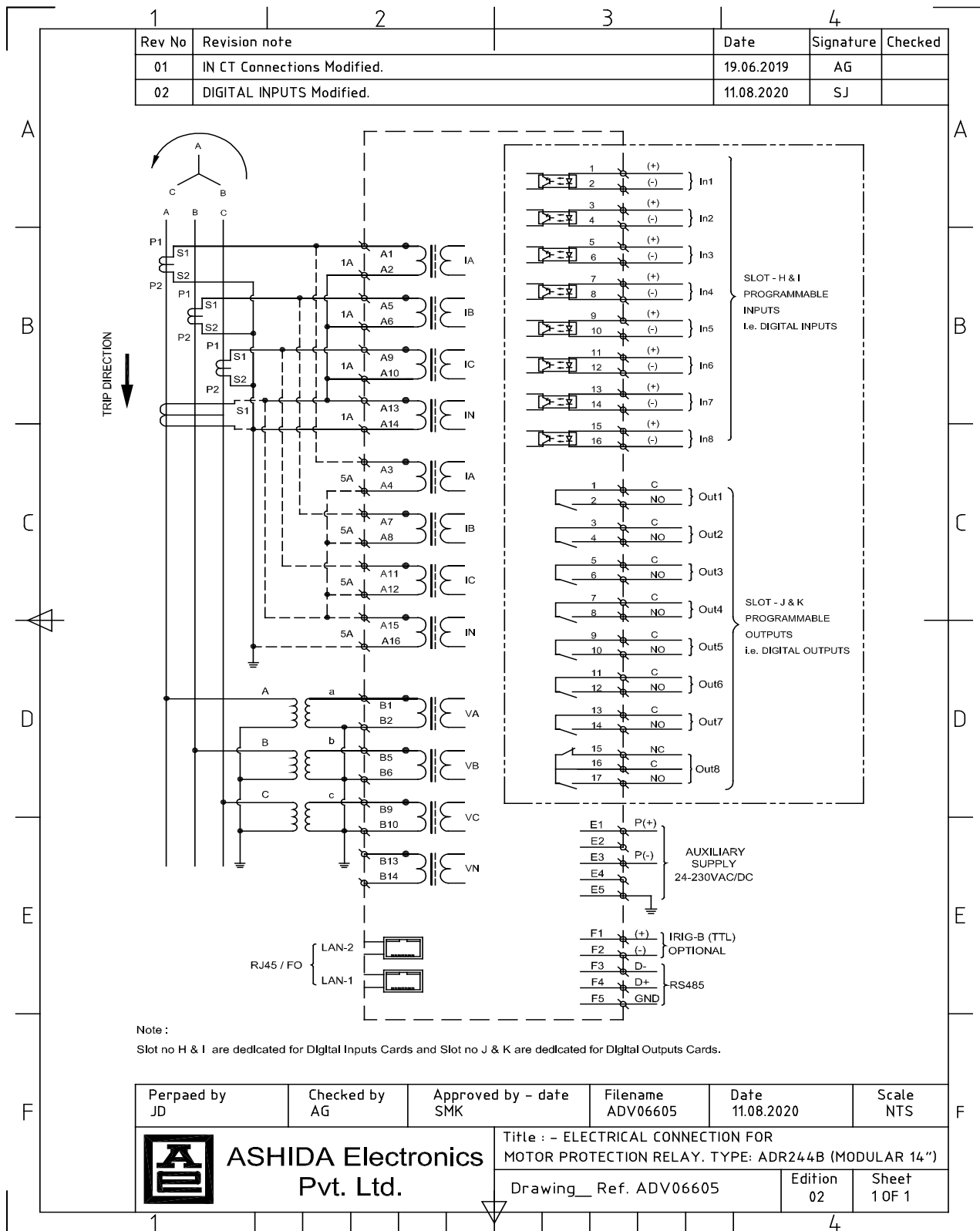
Mechanical Details – Modular 14" Model



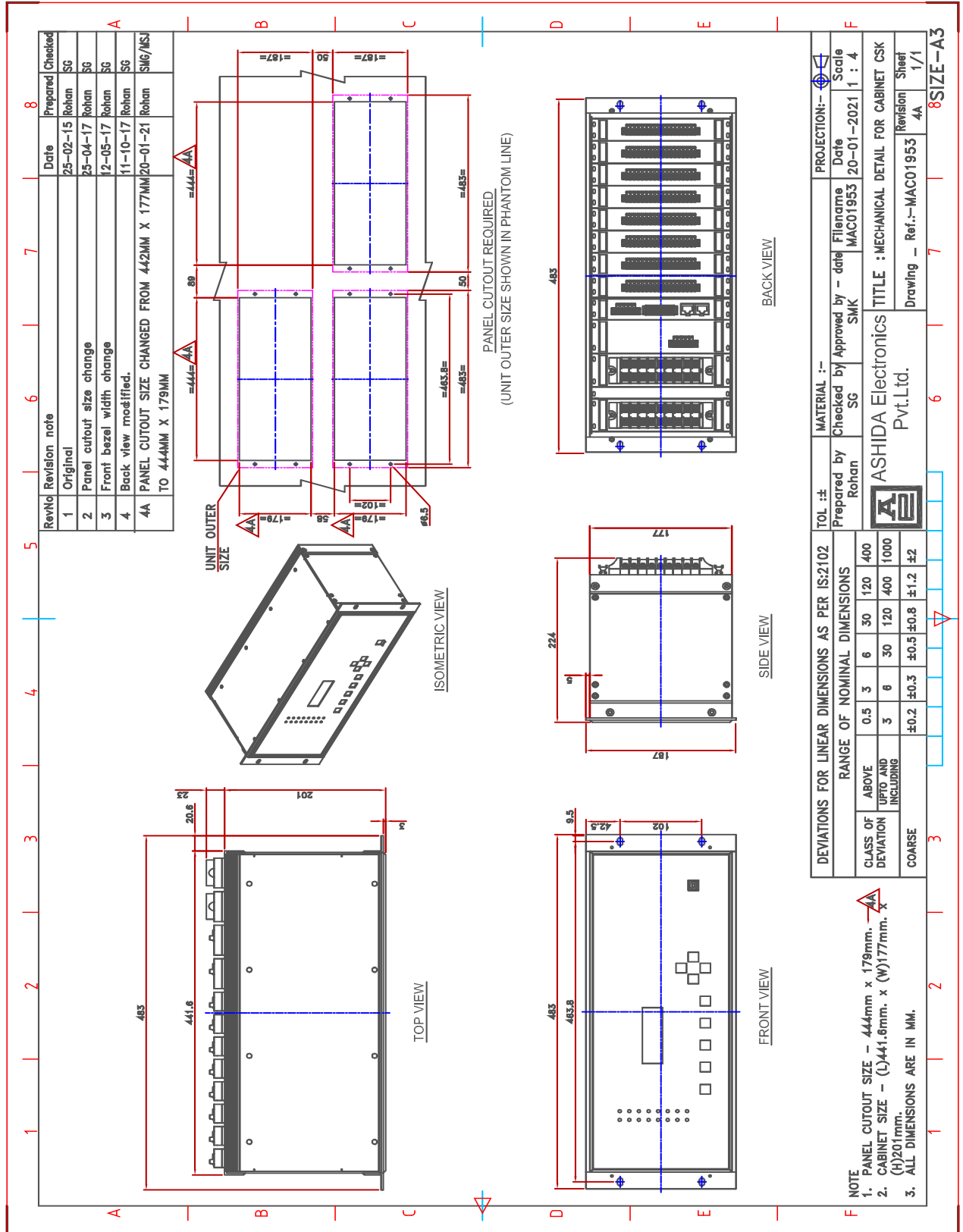
Back Terminal Details – Modular 14” Model



Electrical Connection Details – Modular 14" Model



Mechanical Details – Modular 19" Model



1	2	3	4	5	6	7	8		
Rev/No					Revision note		Date	Signature	Checked

F

1 (+)	2 (+)	3 (-)	4 (-)	5 (GND)
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IRIG-B (TTL)
OPTIONAL
RS485

E

1 (+)	2 (-)	3 (+)	4 (-)	5 (GND)
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ANALOG
Supply
24VDC
VCC/DO

A

A2	A1	1A
A4	A3	5A
A6	A5	1A
A8	A7	5A
A10	A9	1A
A12	A11	5A
A14	A13	1A
A16	A15	5A
A18	A17	

B

B2	B1	VA
B4	B3	
B6	B5	VB
B8	B7	
B10	B9	VC
B12	B11	
B14	B13	VN
B16	B15	
B18	B17	

I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)

J

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C

K

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C

L

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C

M

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C	NO	C

N

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)

O

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)

Note :

- Slot no H, I, N & O are dedicated for Digital Inputs Cards and Slot no J, K, L & M are dedicated for Digital Outputs Cards.
- In case of 24 Digital Inputs and 24 Digital Outputs configuration Slot no O and M will remain blank.
- In case of 24 Digital Inputs and 16 Digital Outputs configuration Slot no O, L and M will remain blank.

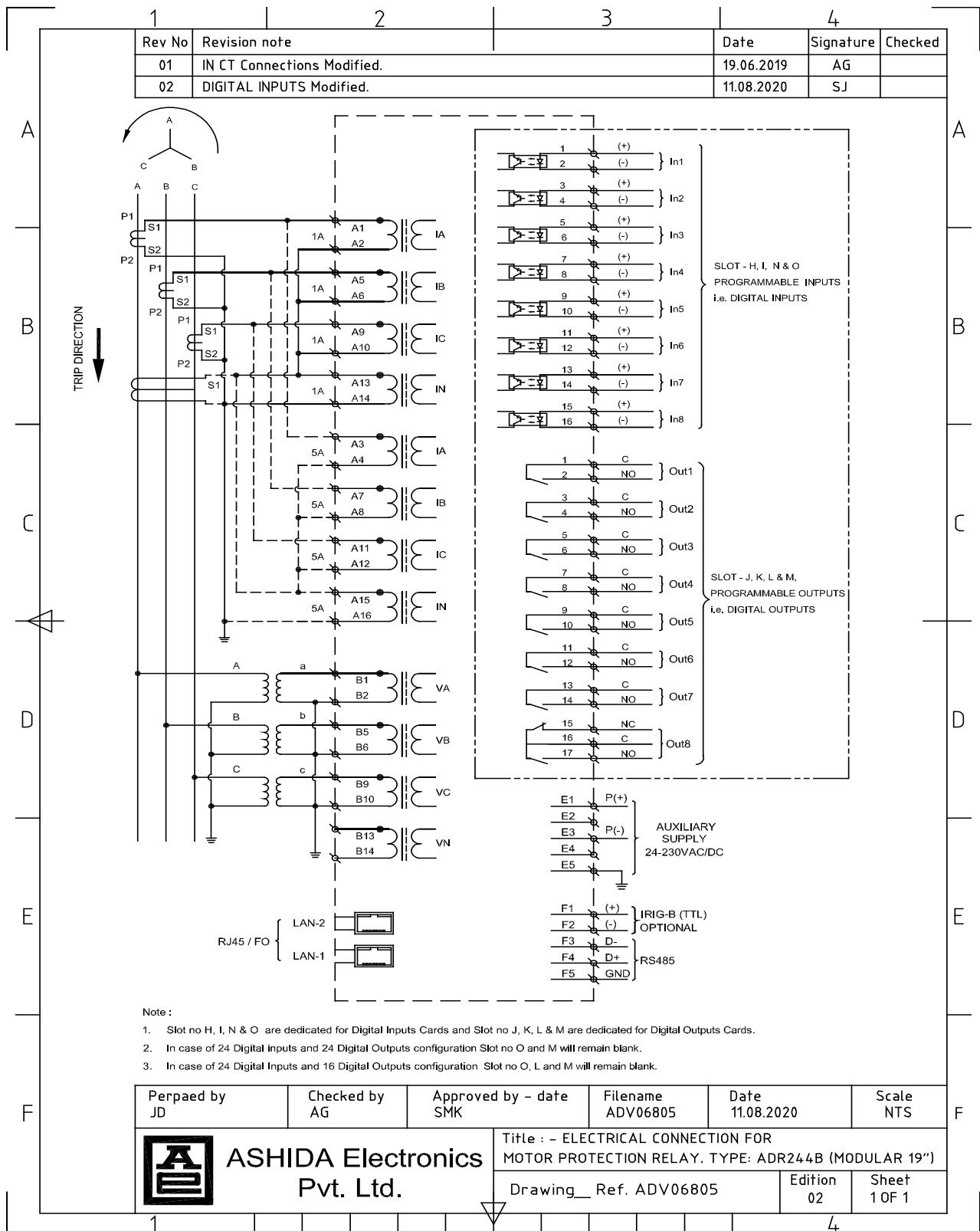
ASHIDA Electronics Pvt. Ltd.

Title : - BACK TERMINAL DETAILS FOR MOTOR PROTECTION RELAY. TYPE: ADP2448 (MODULAR-19)

Drawing _ Ref. ADV06704

Sheet 01 of 1

Electrical Connection Details – Modular 19" Model



General Specifications:

AC Current Inputs:

1A Nominal

5A Nominal

Continuous Thermal Rating:

250 X In for 1s

20 X In for 3s

4 X In for Continuous duty

Dynamic Thermal rating

1250 for 10ms dynamic timing

Burden Rating:

< 0.2VA for 1A Nominal

< 0.2VA for 5A Nominal

AC Voltage Inputs:

2 X Vn for Continuous duty

2.6 X Vn for 10s

Over Voltage Category III

Pollution Degree 2

Rated Insulation Voltage: 2.5kV

Burden: <0.2VA

System Frequency:

50Hz / 60Hz

Frequency Tracking: 45 – 55Hz for 50Hz

and 55 – 65 for 60Hz

Power Supply:

Range: 24 to 230V AC/DC

Burden: < 15watts for DC

Digital Outputs:

Continuous carry: 5A/ 250V AC

Make: 30A for 3sec AC /DC

Breaking capacity: 1250VA @ 250V AC,

100 watts @ 250V DC resistive,

50 watts @ 250V DC inductive (L/R = 45ms)

Digital Inputs:

Operating range: Threshold Voltage

24 – 230Vac/dc 18V

48 – 230Vac/dc 35V

110 – 230Vac/dc 77V

220Vdc/230Vac 154V

Communication Ports:

Front Port –USB

Rear Ports – RJ45 (10-100/Base T Copper) &
RS485

IRIG Port – Demodulated (Optional)

Fiber Optic Port (Optional)

Operating Temperature:

Operating Temperature: -25°C to +65°C

Storage Temperature: -25°C to +70°C

Humidity: 95% RH

Weight: < 8.2kg Approx. Modular 19"

< 6kg Approx. Modular 14"

Ordering Information:

Ordering Information												
	1-4	5	6	7	8	9	10	11	12	13	14	15
Model	244B	X	X	X	X	X	X	X	X	X	X	X
Example	244B	M	0	0	2	0	1	1	1	2	2	M
Motor PROTECTION												
Sub Type												
Modular Version		M										
Variant												
Standard			0									
With Sensitive EF			1									
Language												
English				0								
Protocol												
IEC 103					0							
IEC 61850					2							
MODBUS TCP					4							
CT / PT & RTD												
Default: 4CT, CT Selection: 1A/5A, 4PT: 63.5V					0							
Digital Outputs												
16DO						1						
24 DO						2						
32 DO						3						
Digital Inputs												
16DI						1						
24 DI						2						
32 DI						3						
DI Setting Threshold												
18VDC								0				
35VDC								1				
77VDC								2				
154VDC								3				
Auxiliary Supply												
24 – 230 VDC / VAC									2			
Cabinet Details												
Modular Version M-14											2	
Modular Version M-19											3	
Communication Ports												
Disable / No Rear Port												0
RS-485 Rear Port												B

10/100 Base-T Ethernet RJ45 Rear Port & RS-485 Rear Port	E
DUAL 10/100 Base-T Ethernet RJ45 Rear Port & RS-485 Rear Port	H
RS-485 Rear Port + IRIGB Port	I
10/100 Base-T Ethernet RJ45 Rear Port & RS-485 Rear Port + IRIGB Port	K
DUAL 10/100 Base-T Ethernet RJ45 Rear Port & RS-485 Rear Port + IRIGB Port	M
DUAL FO Ethernet Rear Port & RS-485 Rear Port	N
Single FO Ethernet Rear Port & RS-485 Rear Port	O
DUAL FO Ethernet Rear Port & RS-485 Rear Port + IRIGB Port	P
Single FO Ethernet Rear Port & RS-485 Rear Port + IRIGB Port	Q
DUAL 10/100 Base-T Eth RJ45 Rear Port & RS-485 Rear Port (with PRP/ HSR)	R
DUAL FO Eth Rear Port & RS-485 Rear Port (with PRP/HSR)	S

Note:

For Modular Relay; selection of **DI & DO** available combinations are as follows:

16 DI & 16 DO (Available in **Cabinet Details** "Modular Version M-14")

24 DI & 24 DO (Available in **Cabinet Details** "Modular Version M-19")

32 DI & 32 DO (Available in **Cabinet Details** "Modular Version M-19")

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