

# INSTALLATION INSTRUCTION MANUAL UNDER / OVER VOLTAGE RELAY

**minilec**<sup>®</sup>



**D1 VCR1**



**D2 VCT1**  
(3Ø - 3 W / 3Ø - 4 W)



**S2 VMR4**



**S2 VMR5**



Thank you for selecting and purchasing Minilec make Under / Over Voltage Relay. The following installation instructions would guide you in installing Under / Over Voltage Relay (i.e. D2 VCT1/D1 VCR1/S2 VMR4/S2 VMR5) and making the best use of it. The above models are used in 3Ø 3 W Or 3Ø 4W OR 1Ø 2W system supply where under / over voltage protection is required. D2 VCT1 is a 3Ø - 3W / 3Ø - 4W (Selectable), D1 VCR1 is a 1Ø 2W (L&N), S2 VMR4 is a 3Ø - 3W / S2 VMR5 is a 3Ø - 4W, Under/Over voltage Relays

**It offers protection against :**  
Under Voltage Condition  
Over Voltage Condition  
Neutral Fail Condition

D2 VCT1/S2 VMR4/S2 VMR5 are also having facility of test mode, Fail Safe / Non fail safe Relay operation & 2 CO Or 1 CO + 1 CO relay contact selection. (common/separate relay selection mode is not applicable for model with 2CO relay output.)  
These relays are an auxiliary relay & is to be used along with the motor starter/contactor control ckt only. The effective working of D2 VCT1 will depend on efficient working of the control ckt. Before installing D2 VCT1 check whether the motor starter/control ckt is operating perfectly by starting the motor with the "START" push button and switching it off by "STOP" push button. If the motor does not "START" or "STOP" on respective operations the starter/control ckt needs to be serviced.

**Do not install Relay with faulty motor starter/control ckt.**

**TRIP SETTING, TRIP DELAY AND RESETTING**  
Refer respective Table.

**MOUNTING**

Relays can be RAIL mount or PANEL mounted. See Fig. for DIN RAIL & Panel Mounting. Also see Fig for mounting on and releasing from DIN RAIL.

**CAUTION -**

- Ensure that Relays are -
- Not installed near any heat sources like Burner, Sunlight, Electric arc etc.
- Not subjected to abnormal vibrations.
- Not subjected to direct heat, sunlight, rain, stormy wind and dust.
- Installed as near to the starter as possible.

**ELECTRICAL CONNECTIONS OF RELAYS -**

See respective Fig. for terminal details of Relays. Even See respective Fig. for installation in power and Control wiring of Relays. Do all connections in Power Off condition Connect

L1, L2, L3 phases at terminal no. 1, 2, and 3 (N at terminal no.4 in case of 3Ø - 4W). The output relay contacts 13, 15 & 16, 18 are to be connected in series For 3Ø - 3W, connect link at terminal no.5 & 6. For 3Ø - 4W, remove link at terminal no.5 & 6.

**D2 VCT1 DEFAULT SETTING IN PROGRAM MODE**

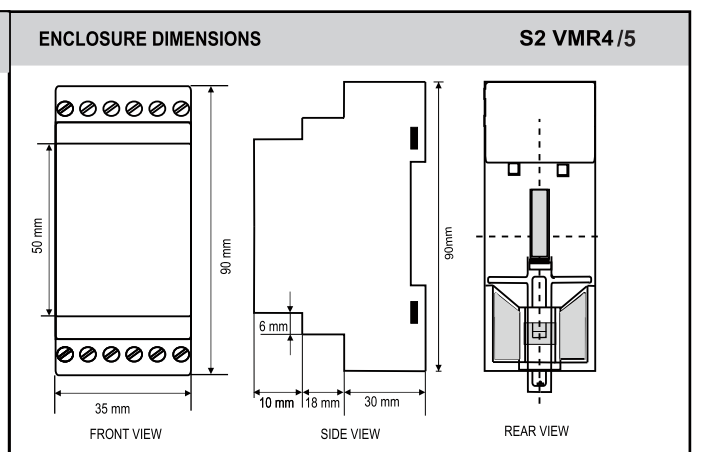
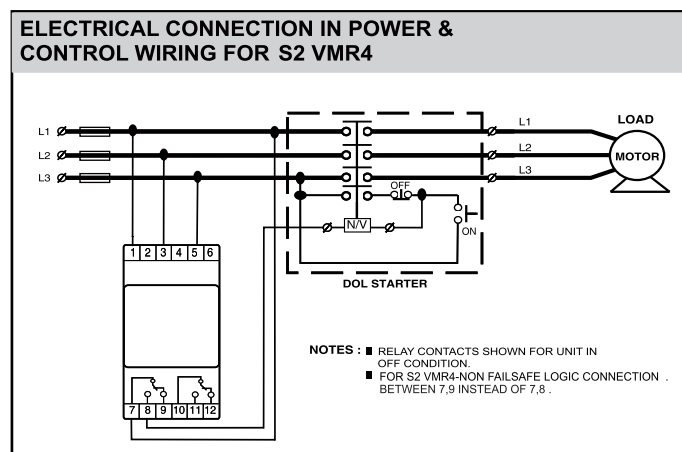
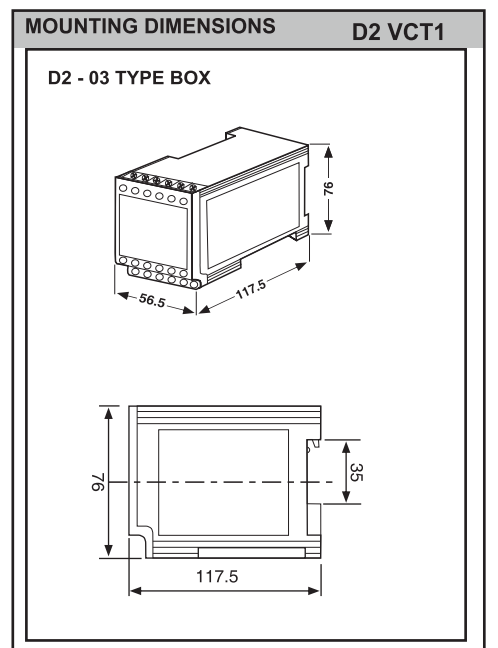
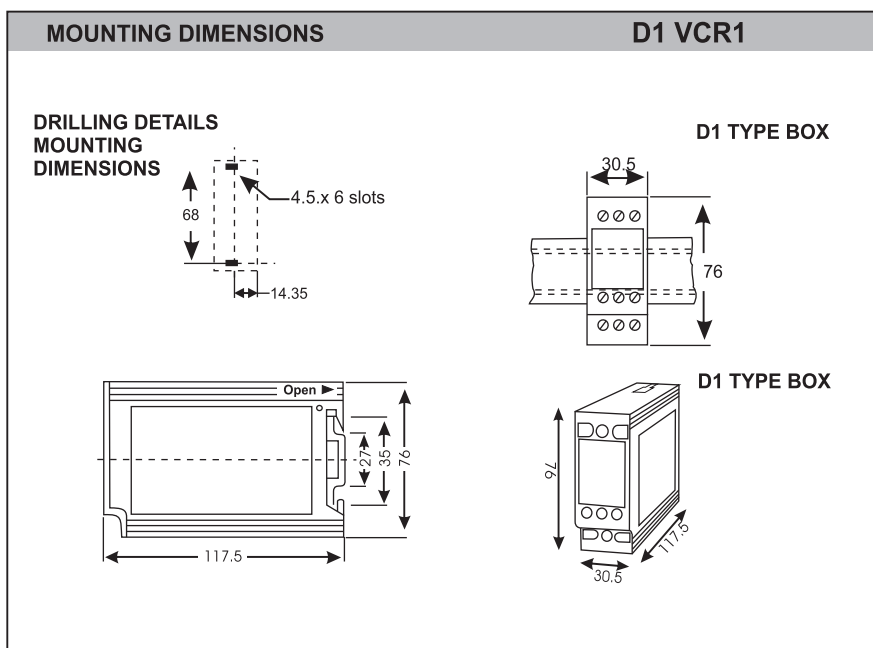
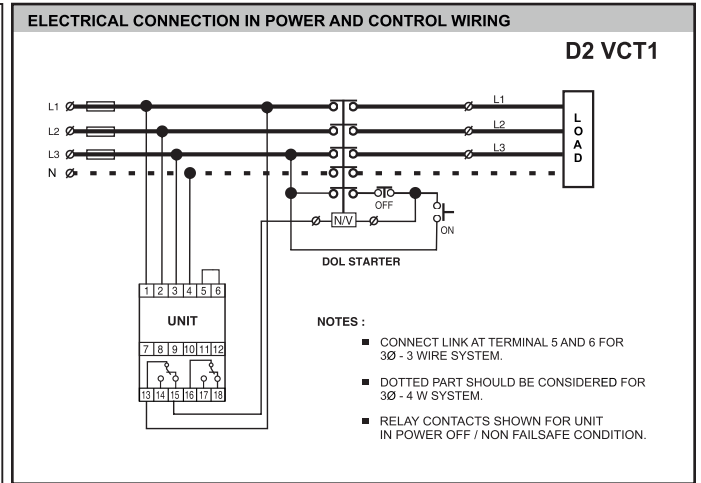
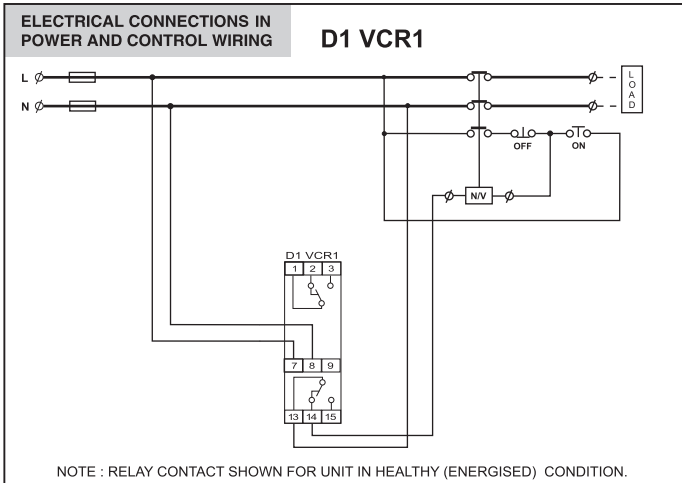
- Auto Reset.
  - Non Fail Safe Relay Operation.
  - 1 CO + 1CO For 1CO UV,1CO-OV.
- Note :**  
Refer Table 2 to change above default settings in program mode

TECHNICAL SPECIFICATIONS OF	D2 VCT1	D1 VCR1	S2 VMR4	S2 VMR5
1. System Supply :	100 - 110 - 120 / 220 - 230 - 240 / 380 - 415 - 440 VAC ± 20 %	110/220/230/240 VAC, +20%, -25%	Model #1: 380-415-440 vac ± 20 % Model #3: 100-110-120 vac ± 20 % Model #2: 220-230-240 vac ± 20 % 3phase, 3 wire	100-120/220-240/380-440VAC ± 20 %, 3 phase, 4 wire system
2. Aux. Supply :	In - Built	In - Built	In - Built	In - Built
3. Frequency :	50 / 60 Hz.	50/60/ Hz ±3%	48 to 63 hz.	48 TO 63 HZ.
4. Output Relay Contacts :	(1 CO + 1CO) / 2CO	2 CO	(1 CO + 1CO) / 2CO	(1 CO + 1CO) / 2CO
5. Output contact rating :	5 Amp, 240VAC [Resistive]	5A, 240 VAC [Resistive]	5 Amp, 240VAC [resistive]	5 AMP, 240VAC [Resistive]
6. Power consumption :	26 VA (max.)			
7. Test Facility :	Refer Table 2	NA	Test Push Botton	Test Push Botton
8. Under / Over Voltage Trip Setting :	Refer Table 2	UV: 75% to 95% of system supply OV: 105 % to 120% of System supply	Refer Table 1	Refer Table 1
9. Power ON Delay :	1 to 10 Sec. [Variable]	NA	1 - 10 sec, ± 5 % of full scale	1 to 10 Sec. [Variable]
10. Trip Time Delay : UV/OV :	1 to 10 Sec. [Variable]	3.5 se. (± 1.5 sec)	UV/ OV - 1 - 10 sec,	± 5 % of full Scale
11. Neutral Fail :	2 sec ± 1.5 sec [Fixed]	NA	NA	NA
12. Set Accuracy : UV & OV : Power ON : Trip delay :	± 2 % of set value(± 3 % of set value for 110VAC system) ± 5 % of full scale(± 10% for 1st marking of P. ON Dly) ± 5 % of full scale	± 2 % of set value.	± 2 % Of Set Value ± 5% Of Full Scale ± 5 % Of full scale (± 10 % for 1st marking)	± 2 % Of Set Value ± 5% Of Full Scale ± 5 % Of full scale (± 10 % for 1st marking)
13. Resetting :	Auto / Manual Reset	Auto reset	Auto / Manual Reset	Auto / Manual Reset
14. Reset Gap :	3 % ± 1 % of set value	3% (± 1%) of sys. supply.	For UV/OV = 3 %, ± 1 %	3 % ± 1 % Of Set Value.
15. Indications: ON : NF : UV : OV :	Steady On : Power ON Steady On : Neutral Fail Steady On : Under voltage Steady On : Over Voltage	POWER ON (Green) : Power On UV (RED) : Under Voltage Trip OV (Red) : Over Voltage Trip	POWER ON (Green) : Power On UV (RED) : Under Voltage Trip OV (Red) : Over Voltage Trip	: ON : UV /NF(Steady - UV & Flashing - NF) : OV
16. Additional Features :	Fail Safe / Non Fail Safe Relay 2 CO / 1 CO + 1CO	NA	Fail Safe / Non Fail Safe Relay 2 CO / 1 CO + 1CO	Fail Safe / Non Fail Safe Relay 2 CO / 1 CO + 1CO
17. Enclosure :	ABS	ABS	S2 SERIES, ABS, PC-ABS	: S2 Series, ABS / PC-ABS.
18. Dimensions ( mm ) : Overall : Mounting :	76 X 56.5 X 117.5 66.6 X 46 35mm Rail Mounting & Panel Mounting	Overall : 76x30.5x117.5 Mounting : 68 center to center 35mm Rail Mounting & Panel Mounting	temperature -5°C to +60 °C Humidity upto 95% R.H. Overall (LXWXD) = 90 x 35 x 60 35mm Rail Mounting & Panel Mounting 35mm Rail Mounting & Panel Mounting	: 35 X 90 X 60 35mm Rail Mounting & Panel Mounting 35mm Rail Mounting & Panel Mounting
19. Weight ( Approx. ) : 300 gms.	300 gms.	180 gms.	150 gms.	: 150 gms.
20. Operating Conditions : Temperature : Humidity :	- 5 °C To + 60 °C Up To 95 % Rh	: - 5 ° C TO + 60 ° C : UP TO 95 % Rh.	Temperature = -5°C to +60°C Humidity = upto 95 % rh.	: - 5 ° C TO + 60 ° C : UP TO 95 % Rh.
21. Life Expectancy :	0.5 x10 <sup>6</sup> operations at 100% rating rating.	0.5 x10 <sup>6</sup> operations at 100% rating rating.	0.5 x10 <sup>6</sup> operations at 100% rating rating.	0.5 x10 <sup>6</sup> operations at 100% rating rating.

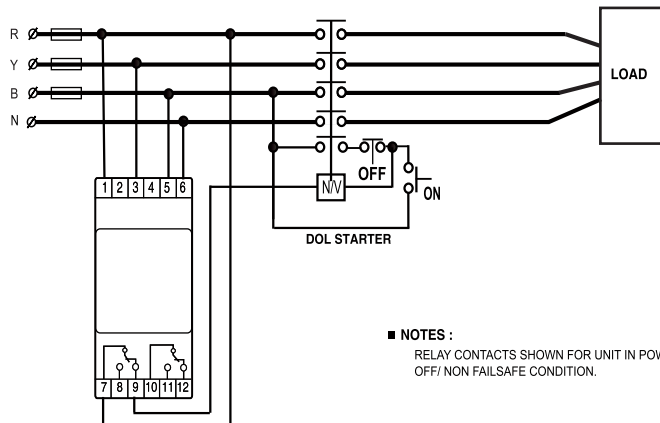
TRIP SETTING, TRIP DELAY AND RESETTING		D1 VCR1	
	Under Voltage	Over Voltage	
1. Cut off at	Site selectable between 75% to 95% (of monitored supply) (± 2 % of set value)	Site selectable between 105% to 120% (of monitored supply) (± 2 % of set value)	
2. Trip Time Delay	3.5 sec.(± % of set value)	3.5 sec.(± % of set value)	
3. Auto Reset Gap	Cut off value plus 3% (±1%) of system. supply	Cut off value Less 3% (±1%) of system. supply	

Table 1 : TRIP SETTINGS		D2 VCT1	S2 VMR4	S2 VMR5
Parameters	Under Voltage	Over Voltage		
Cut off at (For 3Ø - 3 W)	285 - 425 VAC FOR 380 - 415 - 440 VAC 165 - 225 VAC FOR 220 - 230 - 240 VAC 75 - 115 VAC FOR 100 - 110 - 120 VAC [ Variable ]	400 - 550 VAC FOR 380 - 415 - 440 VAC 230 - 300 VAC FOR 220 - 230 - 240 VAC 105 - 150 VAC FOR 100 - 110 - 120 VAC [ Variable ]		
Cut off at (For 3Ø - 4 W)	165 - 245 VAC FOR 380 - 415 - 440 VAC 95 - 135 VAC FOR 220 - 230 - 240 VAC 45 - 65 VAC FOR 100 - 110 - 120 VAC [ Variable ]	230 - 320 VAC FOR 380 - 415 - 440 VAC 130 - 170 VAC FOR 220 - 230 - 240 VAC 60 - 90 VAC FOR 100 - 110 - 120 VAC [ Variable ]		
Power on delay	1 to 10 sec. ± 5 % Of Full Scale [ Variable ]	1 to 10 sec. ± 5 % Of Full Scale [ Variable ]		
Trip time delay	1 to 10 sec. ± 5 % Of Full Scale [ Variable ]	1 to 10 sec. ± 5 % Of Full Scale [ Variable ]		
Auto reset gap	3 % ± 1 % of set value	3 % ± 1 % of set value		

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

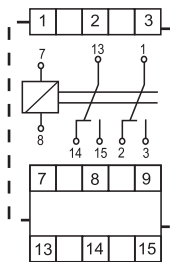


**ELECTRICAL CONNECTION IN POWER & CONTROL WIRING S2 VMR5**



■ **NOTES :**  
RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NON FAILSAFE CONDITION.

**CONNECTIONS DIAGRAM D1 VCR1**



**INDICATIONS**

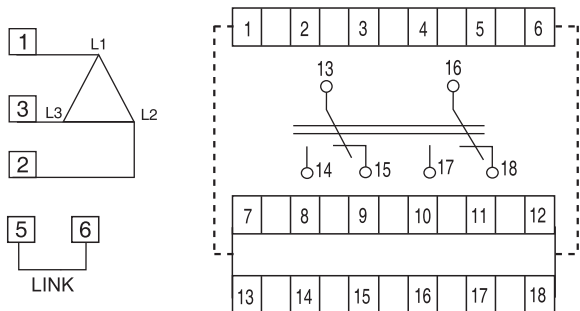
POWER ON  
UV : UNDER VOLTAGE TRIP  
OV : OVER VOLTAGE TRIP

**TERMINAL DETAILS**

7 - 8 : SYSTEMS SUPPLY AS MARKED ON THE UNIT  
13-14-15 : OUTPUT RELAY CONTACT (C1 - NO1 - NC1)  
1 - 2 - 3 : OUTPUT RELAY CONTACT (C2 - NO2 - NC2)  
9 : DUMMY TERMINAL.

**NOTES:**  
● SYSTEM SUPPLY TO BE CONNECTED AS MENTIONED ON THE UNIT.  
● RELAY CONTACTS SHOWN FOR UNIT IN HEALTHY ( ENERGISED) CONDITION.  
● UNIT WILL REMAIN IN TRIPPED CONDITION IF SYSTEM VOLTAGE IS BELOW UV SETTING OR ABOVE OV SETTING DURING POWER ON.

**TERMINAL DETAILS OF 3Ø - 3 W D2 VCT1**



**INDICATIONS**

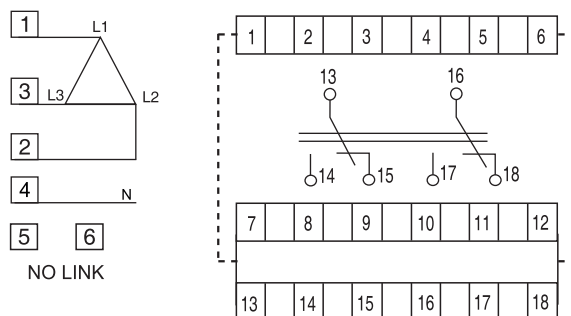
- 'ON' : Steady on : Power On
- 'NF' : -----
- 'UV' : Steady on : Under Voltage
- 'OV' : Steady on : Over Voltage

**TERMINAL DETAILS**

TERMINAL NO.	D2 VCT1
1 - 2 - 3	L1-L2-L3 PHASE VOLTAGE INPUT.
4	DUMMY
5, 6	LINK
7 - 12	DUMMY
13 - 14 - 15	C1 - NO1 - NC1
16 - 17 - 18	C2 - NO2 - NC2

■ **NOTE :** RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NON FAILSAFE CONDITION.

**TERMINAL DETAILS OF 3Ø - 4 W D2 VCT1**



**INDICATIONS**

- 'ON' : Steady on : Power On
- 'NF' : Steady on : Neutral Fail
- 'UV' : Steady on : Under Voltage
- 'OV' : Steady on : Over Voltage

**TERMINAL DETAILS**

TERMINAL NO.	D2 VCT1
1 - 2 - 3	L1-L2-L3 PHASE VOLTAGE INPUT.
4	NEUTRAL POINT
5, 6	NO LINK
7 - 12	DUMMY
13 - 14 - 15	C1 - NO1 - NC1
16 - 17 - 18	C2 - NO2 - NC2

■ **NOTE :** RELAY CONTACTS SHOWN FOR UNIT IN POWER OFF/ NON FAILSAFE CONDITION.

**COMPLIANCE TO STANDARDS**

	TEST	IEC STD.
1.	EFT Test of Auxiliary Supply	61000-4-4
2.	Surge Test of Auxiliary Supply	61000-4-5
3.	Voltage Interruption, Variation & Dip Test	61000-4-11
4.	ESD Test (Contact Discharge)	61000-4-2
	ESD Test (Air Discharge)	61000-4-2
5.	H.V. Test (Dielectric Test)	60255-5
6.	Insulation Resistance Test	60255-5
8.	Dry Heat Test	60068-2-2
9.	Damp Heat test (Steady State)	60068-2-30
10.	Damp Heat test (cyclic test)	60068-2-78

Table 2

PROGRAM MODE SETTING			S2 VMR4	S2 VMR5
PRESS PRG./ RST P.B. FOR	LED STATUS			MODE
	ON LED	UV/NF LED	OV LED	
	●	○	○	Run Mode
≥ 8 SEC	☆	☆	☆	Program Mode
< 4 SEC	●	●	●	Test Facility
WAIT 3 SEC	○	○	○	Exit Test Mode.
≥ 4 SEC	☆	○	○	Auto / manual Reset selection
≤ 4 SEC	●/○	○	○	● Auto Reset / ○ Manual Reset
≥ 4 SEC	○	☆	○	Fail Safe/ Non Fail Safe selection
≤ 4 SEC	○	●/○	○	● Fail Safe /○ Non Fail Safe
≥ 4 SEC	○	○	☆	Common or Separate Relay selection
≤ 4 SEC	○	○	●/○	● Relay 1, Relay 2 FOR UV & OV ○ Relay1 for UV & Relay2 for OV
≥ 4 SEC	☆	○	○	MODE setting Cycle repeat.
IF P. B. IS NOT PRESSED FOR >10 SEC	☆	☆	☆	AUTO EXIT program mode after flashing led.

● LED ON      ○ LED OFF      ☆ LED FLASHING

Note:- 1) S2 VMR5 BY DEFAULT IN NON FAIL SAFE MODE.  
2) OV IS NOT APPLICABLE FOR 2CO.

TABLE 2

PRODUCT	LED STATUS		
	L1-LED	L2-LED	L3-LED
S2 VMR5	ON	UV/NF	OV
S2 VMR4	ON	UV	OV

Instructions for Screw Gun torque adjustment -

- Torque should be 1 Nm max.
- Max 2.5 sq. mm size wire can be used.

WEEE (Waste Electrical & Electronic Equipment)  
Regulations: After end of equipment life, recycle or disposal needs to be done as per guidelines or handover it to Ewaste processing authorized agencies. For more details contact us.

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