

SMART LOAD MANAGER



**SL 6300
SERIES**



NIPPEN ELECTRICAL INSTRUMENTS CO.
www.nippenco.com

DESCRIPTION:

The NIPPEN SL 6300 series is a micro-controller based 0.5 Class Multifunction Power and Energy meters which, covers not only measures a host of electrical parameters, displayed in three rows of four digits, of Red Seven Segment LEDs along with eighteen LED indicator and also manages load & control demand.

The instrument offers versatile and unmatched features and functions to monitor, profile, control, log data, protect and even check the quality of an electrical system ,with good stability and high accuracy.

UNIQUE FEATURES

- True RMS measurement & 4 quadrant operation.
- Simultaneous sampling of volts & amps .
- 0.5 % accuracy in Multifunction Metering.
- %Harmonics measurement for voltage and current (up to 31st Harmonic)
- CT reverse polarity Auto detecting.
- Phase sequence error indication.
- Single Relay output for alarm trip.(VLN,VLL,HZ,Amps,THD %,kw,PF)
- Manual and Auto scrolling facility.
- Password protection.
- User configurable (Editable) Password.
- Communication with PCs, PLCs, DCS through an optional RS485 Serial Port (MODBUS RTU).

- Monitors Energy kWh,Import & Export, Reactive of capacitive, Reactive of Inductive,kVAh.
- Dual Source(DG) sensing with energy.
- Pulse 1000 pulses/kWh.
- Minimum & maximum values stored for VLN,VLL,I,H.

INPUTS

- Voltage Input : 80 to 500VAC
- CT primary setting from 5A-9999A
- Auxiliary Supply : 80 - 300VAC/DC.
- Frequency : 45 to 60Hz
- Power factor : 0.5lead - Unity-0.5Lag

MODELS

- SL 6300 (Basic+RS 485+1 relay output)
- SL 6300DS (Basic+RS 485+1 relay output+DG)
- SL 6300MDC (Basic+RS 485+1 relay output+MDC)

FRONT PANEL

> The particular parameters displayed are indicated by a glowing LED on the left hand side of the front panel
> Energy is indicated by 2LEDs viz. Respective LEDs representing active, reactive and apparent.

NOTE

- 1) All voltage readings are multiplied by the PT RATIO
 - 2) All current readings are multiplied by CT RATIO
 - 3) All power and energy are multiplied by CT & PT RATIO
- >K (LED) in ON condition - indicates reading in KILO
>M (LED) in ON condition - indicates reading in MEGA
>K & M (LED) in ON condition - indicates reading in GIGA

Applicable For All parameter.

MEASURED PARAMETER DISPLAYED

- Voltage :- 3 phase Line -neutral voltage(VLN),Average
- Voltage :- 3 phase Line -line voltage (VLL), Average
- Current :-3 phase Current (IL1,IL2,IL3),Average current (Acc. 0.5%)
- Frequency :- 45-65Hz(Acc. 0.2%)
- Active power (kW) :- L1,L2,L3 and Total.
- Re active power (kW) :- L1,L2,L3 and Total.
- Apparent power (kW) :- L1,L2,L3 and Total.
- Power factor :- L1,L2,L3 and Average. (Acc. 1 Elect.)
- THD for Voltage and current of all phases.(upto 31st harmonic for %A,%V for all model)
- RTC(REAL TIME CLOCK)

- EB Energy :- Active energy (kWh)(active import & active export energy)
- (Acc.1.0%) Reactive energy (kVAh) (active capacitive & inductive energy) .
- DG Energy :- Active energy (kWh)(active import & active export energy)
- (Acc.1.0%) Reactive energy (kVAh) (active capacitive & inductive energy) .
- Apparent energy (kVAh).
- Alarm status.
- Run Hours (min current >50mA) resettable
- ON hours (lifetime counter)
- RS 485 serial port with standard MODBUS RTU protocol.
- Measures Minimum value of VLN,VLL,I,A.
- Measures Maximum value of VLN,VLL,I,A.
- Measures Maximum Demand Value.
- Error Indication of Phase sequence and CT reverse.

RELEVANT STANDARDS

EMC: IEC 61326
Fast Transient Burst Test (EFT): IEC 61000-4-4
Safety: IEC 61010-1-2001
Test of insulation properties; IEC 60060-1
Test of accuracy requirements: IEC 62052-11
Test of electrical requirements: IEC 62052-1

ENVIRONMENT

Enclosure: IP-52(Front)
IP-20 (Terminal back)

Temperature:

Ambient temperature: -10° C to 55° C
Storage temperature: -10° C to 70° C
Relative Humidity: <95%, Non-condensing
Net Weight: 550 gm(approx)
Gross Weight: 600 gm(approx)

PAGEWISE DETAILS

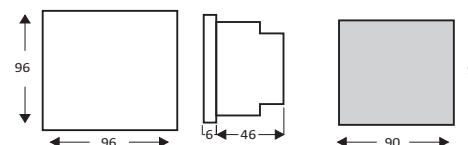
S.No	Display	LED'S "ON"	Description	Model
1	VLN	• VLN	Voltage line to Neutral	All model
2	VLL	• VLL	Voltage line to line	All model
3	A	• A	Line current	All model
4	F _{RE}	• HZ	Frequency	All model
5	W	• W	Active power	All model
6	VAr	• Var	Reactive power	All model
7	VA	• VA	Apparent power	All model
8	P.F.	• P.F.	Power Factor of system	All model
9	VLN THD%	• VLN THD%	% Harmonics for Voltage	All model
10	A THD%	• A THD%	% Harmonics for Current	All model
11	kW or kVA	• MD	Maximum Demand	MD model
12	RTC		Real Time Clock	All model
13	RLRP	• AL 1	Alarm status	All model
14			Maximum Demand Relay status	MD model
15	ERR PSE PPR		PSE- Phase sequence error PPR- CT reverse phase wise	All model
16	RUG	• VLN	Average voltage line to Neutral	All model
17	RUG	• VLL	Average voltage Phase to Phase	All model
18	RUG	• A	Average Current	All model
19	EdtL	• W	Total Active Power ie W, kW etc	All model
20	EdtL	• kVar	Total Reactive Power Var kVar etc	All model
21	EdtL	• kVA	Total Apparent Power VA, kVA etc	All model
22	RUG	• P.F	Average PF	All model

S.No	Display	LED'S "ON"	Description	Model
23	HR'S		Run hours (Life Time Counter)	All model
24	LHR'S		Load hours (re-settable)	All model
25	RCET	• k	Total Active Energy (kwh) consumed (EB)	All model
26	REET	• k	Energy Export (EB)	All model
27	RJET	• k	Energy Import (EB)	All model
28	REET	• E	Reactive Energy Total (Algebraic Sum) (EB)	All model
29	RCET	• E	Capacitive reactive Energy (EB)	All model
30	RLT	• E	Inductive reactive Energy (EB)	All model
31	RPEt	• k	Apparent Energy (EB) KVAh	All model
32			RS 485 communication port(Modbus-RTU)	All model
33	RCdt	• k • DG	Total Active Energy (kwh) consumed (DG)	DG model
34	REdt	• k • DG	Energy Export (DG)	DG model
35	RJdt	• k • DG	Energy Import (DG)	DG model
36	REdt	• k • DG	Reactive Energy Total (Algebraic Sum) (DG)	DG model
37	RCdt	• k • DG	Capacitive reactive Energy (DG)	DG model
38	RLdt	• k • DG	Inductive reactive Energy (DG)	DG model
39	RPEdt	• k • DG	Apparent Energy (DG) KVAh	DG model

For installing the meter

(1)Prepare the panel cutout with proper dimension as shown below:

Mechanical Installation



OVERALL DIMENSIONS (All dimensions in mm)

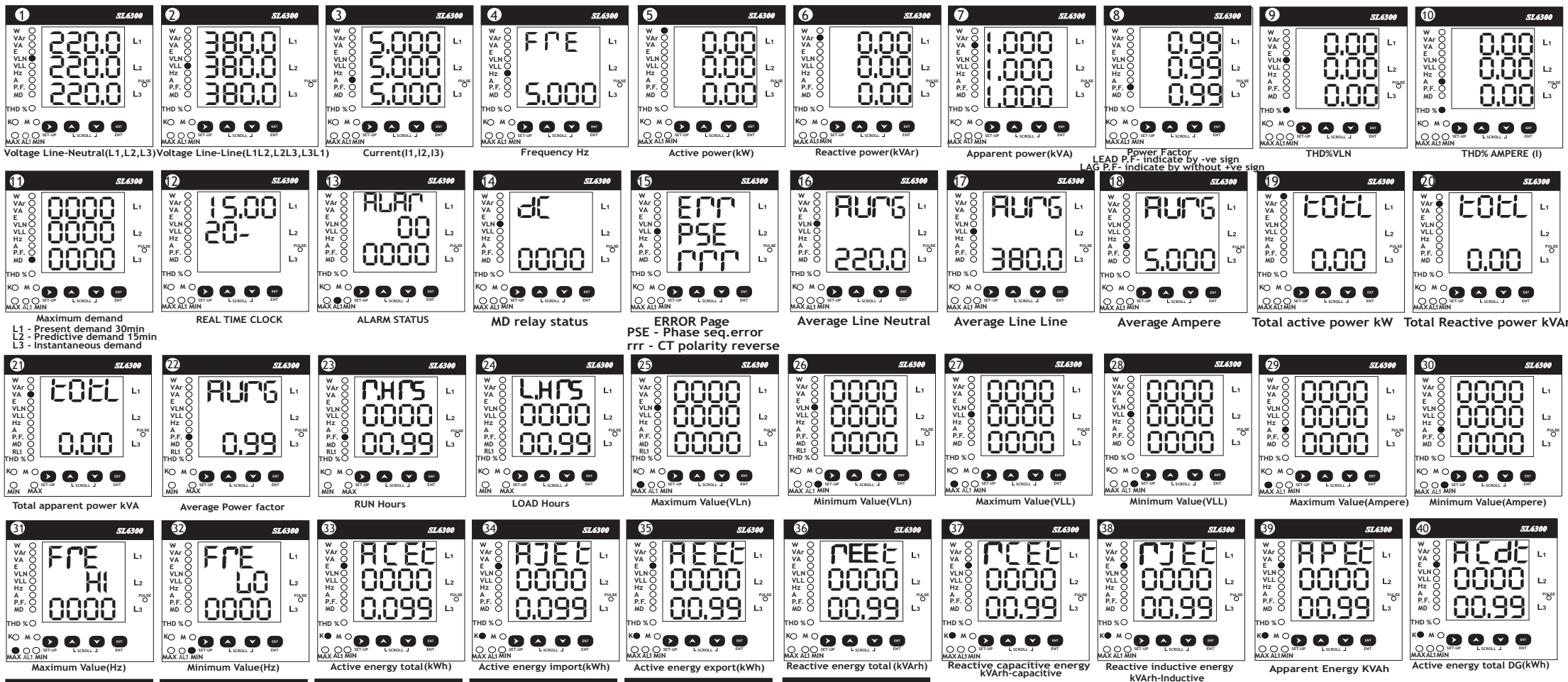
- (2)Push the meter into the panel cutout. Secure the meter in its place by pushing the clamp on the rear side. The screws, of the pane of the clamp ,must be in the farthest forward slot.
- (3)For proper sealing ,tighten the screws evenly with required torque.

WARNING GUIDELINES



WARNING:

- 1-To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
- 2-Wiring shall be done strictly according to the terminal layout .confirm that all connections are correct.
- 3-Use lugged terminals.
- 4-To eliminate electromagnetic interference use of wires with adequate rating and twists of the same in equal size shall be made.
- 5-Cable used for connection to power source, must have a cross section of 1.5mm². these wires shall have current carrying capacity of 5A.



Programming Mode

Press ► SET UP key on Run Mode for about FIVE seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

In order to operate for all the field programmable parameters, it is easy for user interface by pressing the keys such as ►, ▲, ▼ and ◀. Once the display is in Programming Mode, press ▲ key to move into the following programmable parameters:

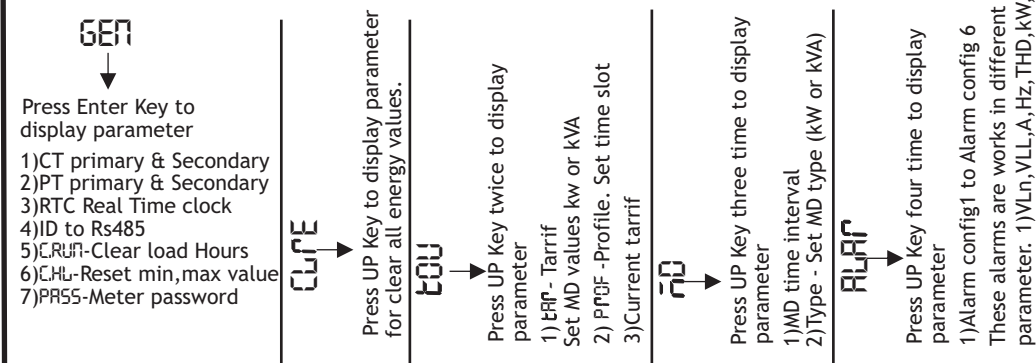
There are basically two modes of operation in :

1. Programming Mode
2. Run Mode

After supplying power (230 VAC), the unit displays immediately power Receiving information, on LED display screen and by default stored last display at factory comes into Run Mode. Now, the unit can be operated by using the following keypad provided for both the Programming Mode and Run Mode such as shown below.

Keypad Description

- SET UP key to go to set up menu and exit from programming mode. SET UP Key to move the cursor from left to right side in programming mode.
- ▲ UP Direction key to scroll the alpha numeric value 0-9 in programming mode and To scroll the pages forward direction in RUN mode. To go into Scroll mode ON continuous press 7Sec.
- ▼ Down Direction key to scroll the alpha numeric value 9-0 in direction and To scroll the pages reverse direction in RUN MODE. To go into Scroll mode OFF continuous press 7Sec.
- ◀ Complete the operation in programming mode once have done, ENTER.



Setting the Main CT Ratio

In order to give actual current values in your systems, the main CT Ratio between the primary and secondary current should be set accordingly. The CT Ratio can be set from 5 A to 9999 A.

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

On Pressing Enter key once, the display will prompt

CTPR

1. The CT primary value to be set here. Press Enter, the display indicates the default value 0005. Set CTR by pressing ►, ▲, ▼ keys until desired CT value is received, Press ENTER key to conform the value and Press ▲ key to proceed into CT secondary value. Press Enter key the display indicates the default value 0005. Press Enter to conform.
2. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Setting the Main PT Ratio

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing enter key once, the display will prompt CTPR
2. Press ▲ key **two** time, the display will prompt PTRP
3. The PT primary value to be set here. Press enter key, display indicates the default value 0220. Set PTR by pressing ►, ▲, ▼, keys until desired PT value is received, press enter key to conform the value stored. Then Press ▲ key to proceed into PT secondary value. Then display will prompt PTSC. On pressing enter key once the display indicates default value 0220. Set PT secondary by pressing ►, ▲, ▼ keys until desired PT value is received. Press enter key to conform the value stored.
4. If the CONTROL mode is not desired, Press ▲ key to go to the parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Example

11KV/110V PTPR -1100 ; PTSC - 0011
22KV/110V PTPR -2200 ; PTSC - 0011

Meter ID to RS 485

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing enter key once, the display will prompt CTPR.
2. Press ▲ key **five** time, the display will prompt ID.
3. Here meter ID to be set for RS 485 communication protocol. On pressing enter key once, the display indicates default 001 on the display. Set meter ID by pressing, ►, ▲, ▼ until the desired value is received. Then press enter key to conform the ID value is stored.
4. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Clear load Hours

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing enter key once, the display will prompt CTPR.
2. Press ▲ key **six** time, the display will prompt CLH
3. Here meter load hours to be clear, if required. On pressing enter key once, the display indicates SURE screen on the display. Then press enter key to conform the load hours value is cleared.
4. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Reset Min Max Value

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing enter key once, the display will prompt CTPR.
2. Press ▲ key **seven** time, the display will prompt RML
3. Here initially RESET the minimum, maximum value of Vln, VLL, Ampere, Frequency. On pressing enter key once, the display indicates SURE screen on the display. Then press enter key to conform the value is resetted.
4. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Setting Password

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing enter key once, the display will prompt CTPR.
2. Press ▲ key **eight** time, the display will prompt PASS.
3. Here user can set desired password. On pressing enter key once, the display indicates default value 0000. Set password by using ►, ▲, ▼, key until desired password value is received. Press enter key to conform the value is stored.
4. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Clear Energy Value

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. On pressing ▲ key once, the display will prompt CLRE.
2. Here kwh, kVAh, Re active energy value to be clear.
3. Press enter key **once**, the display will prompt total active energy(kWh) ACET. On pressing enter key once SURE screen appear on the display. Press enter key to conform the energy value cleared.
4. Press ▲ key to go active import energy to Apparent energy. Do setting same as kwh.
5. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Setting TOU (Time of Unit)

Here we can set 4 number of tariff with 4 relay output and four different time slot.

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

1. Press UP key twice, the display will prompt TOU Time of unit.
2. On pressing ENTER key, the display will prompt TAR Tariff.
3. Press ENTER key, to set the number of tariff as per required and enter to store the same.
TAR - TARRIF. To set demand value(kW or kVA)
TAR.1 TAR.2 TAR.3 TAR.4

4. Then display goes TRIP1 of TARRIF1. Set demand value in trip relay 1 to relay 4. Set Value by pressing ►, ▲, ▼, keys until desired value is received, Press enter key to go to trip relay 2 to relay 4. Once TARRIF1 done, Press ENTER key to set TRIP relay 1 to TRIP4 of TARRIF2. Do same setting.

4 relay outputs are indicated

TRP.1 TRP.2 TRP.3 TRP.4
relay 1 relay 2 relay 3 relay 4

5. Once TARRIF 2 to 4 done, On pressing ENTER key the display will return to tariff function.
6. Then Press DOWN key, to display indicates Profile PROF. Here to be set time slot.
7. **PROFILE**- To set Time Slots. It depends on tariff, If the number of Tariff 1, the time slot will be one. or the number of Tariff 4, the time slot will be four. Time slot 1 works, according to set value of Tariff1. Time slot 2 works, according to set value of Tariff2. Time slot 3 works, according to set value of Tariff3. Time slot 4 works, according to set value of Tariff4.
8. Time slots are indicated
S1 S2 S3 S4
TNE TNE TNE TNE
Time 1 Time 2 Time 3 Time 4
Time Slot 0000 -first 2 digits are in HOURS, Remain 2 digits are in MINUTES.
9. Press ENTER key, to set **Time Slot 1**. Set time by pressing ►, ▲, ▼, keys until desired value is received. Once entered Time slot 1, Press enter key to go to time slot 2. Do setting same as time slot 1. On Pressing ENTER key, the display will return to profile function.
10. If the CONTROL mode is not desired, Press ▲ key to go to the parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Setting Current Demand Interval

Press ► SET UP key on Run Mode for about **FIVE** seconds continuously, the unit will therefore enter into Programming Mode such as shown below.
GEN

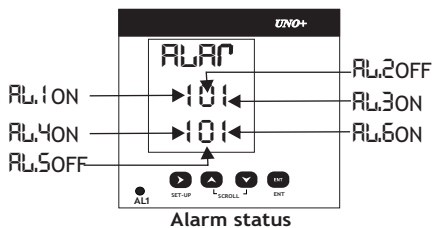
1. On pressing UP key three time, the display will prompt Ad.
2. Press ENTER key to set the maximum demand interval
3. Here maximum current demand Interval to be set here. The default value indicates 015. Set interval by pressing ►, ▲, ▼ key until desired value is received. Then Press enter key to conform the value is stored. Then Press UP & down key to select the Demand Type(kW or kVA)
ACLP - kW APPP - kVA
4. If the CONTROL mode is not desired, Press ▲ key to go to the desired parameter. Or else, Press ► SET UP key twice to return into Run Mode.

Alarm configuration

Press ► SET UP key on Run Mode for about FIVE seconds continuously, the unit will therefore enter into Programming Mode such as shown below.

GEN

- On pressing ▲ key four time, the display will prompt **ALP**.
- There is a single relay output for alarm. Here we can set **ALARM** trip point to relay output, for VLn, VLL, Current, Hz, THD%, kW, PF.
- Press enter key to indicates the display **ALP.1**.
- On pressing enter key again, the display indicates **VLL** screen on the display. Suppose, we required VLL or current, Hz, THD, kW, PF. Press ▲ key to select the desired parameters. Once the desired parameters selected, Press enter key to display indicates **OVER**. It means over limit relay selected. Then Press ENTER key to conform or Press ▼ key to select under **UNDER**.
- Once OVER or UNDER selected, Press ENTER key to go **ALP.0**. It means relay works **Automatically**. Suppose, we require to works relay **MANUAL**, Press ▲ key to, select Manual operation **MAN**.
- Once Auto or Manual selected, Press ENTER key to select relay ON or OFF.
ON - relay output on
OFF - relay output off. But Alarm status ON in display.
- Once relay condition selected, Then Press enter key to Set the ON delay of relay. Set ON delay, by pressing ►, ▲, ▼, keys until desired value is received.
- Once ON delay selected, Then Press enter key to Set the OFF delay of relay. Set OFF delay, by pressing ►, ▲, ▼, keys until desired value is received.
- Once OFF delay selected, Then Press enter key to Set the TRIP value of the selected parameters. Set TRIP value, by pressing ►, ▲, ▼ keys until desired value is received.
- Once done, Press UP key to go **ALP.2** to **ALP.6**. Do setting same as per **ALP.1**. Or else, Press ► key twice to return into Run Mode.



- In display indicates 1 means alarm relay ON. 0 means alarm relay OFF.

COMMUNICATION REGISTER MAP

Parameters as follows

Data Bits : 8
Baud Rate : 9600Bps (19200Bps on Request)
Stop Bits : 1
Parity : None
Data Format : Float

Address	Parameter	Multitplier
1000	VLN-L1	1
1002	VLN-L2	1
1004	VLN-L3	1
1006	Current - I1	1
1008	Current - I2	1
1010	Current - I3	1
1012	kw-L1	1
1014	kw-L2	1
1016	kw-L3	1
1018	kVar (L1)	1
1020	kVar (L2)	1
1022	kVar (L3)	1
1024	kVA (L1)	1
1026	kVA (L2)	1
1028	kVA (L3)	1
1030	PF-L1	1
1032	PF-L2	1
1034	PF-L3	1
1036	Total kW	1
1038	Total kVar	1
1040	Total kVA	1
1042	Frequency	1
1044	CT Ratio	1
1046	PT Ratio	1
1048	THD VLN -L1	1
1050	THD VLN -L2	1
1052	THD VLN -L3	1
1054	THD ILN -L1	1
1056	THD ILN -L2	1
1058	THD ILN -L3	1
1060	MD Fast(Set time/60)	1
1062	MD Predict(Set time/2)	1
1064	MD Fast(Set time)	1
1066	VLL-L1L2	1
1068	VLL-L2L3	1
1070	VLL-L3L1	1
1100	MAX VLN-L1	1
1102	MAX VLN-L2	1
1104	MAX VLN-L3	1
1106	MIN VLN-L1	1
1108	MIN VLN-L2	1
1110	MIN VLN-L3	1
1112	MAX VLL-L1L2	1
1114	MAX VLL-L2L3	1
1116	MAX VLL-L3L1	1
1118	MIN VLL-L1L2	1
1120	MIN VLL-L2L3	1
1122	MIN VLL-L3L1	1
1124	MAX Current - I1	1
1126	MAX Current - I2	1
1128	MAX Current - I3	1
1130	MIN Current - I1	1
1132	MIN Current - I2	1
1134	MIN Current - I3	1
1136	MAX Hz	1
1138	MIN Hz	1
2000	kWh RCEt	1
2002	kWh Export - REEt	1
2004	kWh Import - RJEt	1
2006	kVarh - REEt	1

2008	kVarh Capacitive RCEt	1
2010	kVarh Inductive RLEt	1
2012	kVAh - RPEt	1
2014	kWh DG RCEt	1
2016	kWh DG Export - REEt	1
2018	kWh DG Import - RJEt	1
2020	kVarh DG - REEt	1
2022	kVarh Capacitive RCEt	1
2024	kVarh Inductive RLEt	1
2026	kVAh DG - RPEt	1

ENERGY RESOLUTION

CT Primary& PT Primary/Secondary	Wh	VAh	kW	kVA
5Primary<=5	00000.000K	00000.000K	0.000K	0.000K
5>Primary<=50	000000.00K	000000.00K	00.00K	00.00K
50>Primary<=500	0000000.0K	0000000.0K	000.0K	000.0K
500>Primary<=5000	00000000K	00000000K	0.000M	0.000M
5001>Primary<=9999	000000.00M	000000.00M	0.000M	0.000M
<=5 & PT11KV/110V	000000.00K	000000.00K	000.0K	000.0K
<=5 & PT22KV/110V	00000000K	00000000K		
5>to<=50 & PT11KV/110V	00000000K	00000000K	0.000M	0.000M
5>to<=50 & PT22KV/110V	000000.00M	000000.00M		
51>to<=500 & PT11KV/110V	000000.00M	000000.00M	00.00M	00.00M
51>to<=500 & PT22KV/110V	0000000.0M	0000000.0M		
501>to<=5000 & PT11KV/110V	0000000.0M	0000000.0M	000.0M	000.0M
5001>to<=9999 & PT11KV/110V	00000000M	00000000M	0.000G (K&M Led ON)	0.000G (K&M Led ON)

TEST CERTIFICATE

S.No.	TEST	TEST CONDITION	STATUS
1	Insulation	a)Voltage Circuit and Earth b)Current Circuit and Earth	Complied
2	H V Test	2kV for 1min a)Voltage Circuit and Earth b)Current Circuit and Earth	Complied
3	Accuracy Test	Parameter 100% 50% 5%	Complied
		PF Less than 1eect.	Complied
		kW Within 0.5%	Complied
		kVA Within 0.5%	Complied
		V Within 0.5%	Complied
		A Within 0.5%	Complied
		F Less than 0.1Hz	Complied

Ref Calibration standards

- MTE SWS 1.3 class 0.1
 - YEW 2533E 31 class 0.1
- >12 months WARRANTY

Tested by :

S.No. 39822 ☒
S No 26BU006513 ☐

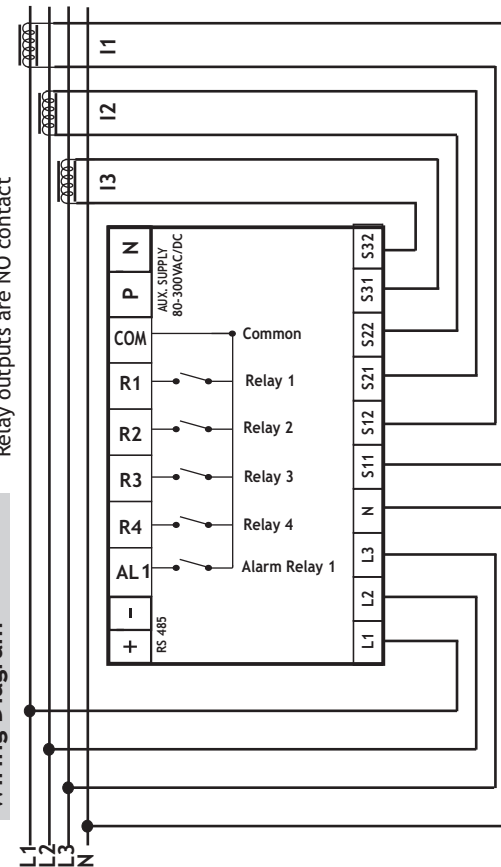
S.No.22904 ☐

Approved by :

Date.....

Relay outputs are NO contact

Wiring Diagram



ADDRESS
NIPPEN ELECTRICAL INSTRUMENTS CO
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