Graphic LCD Display
Smart PFC
Datasheet



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SMART 18

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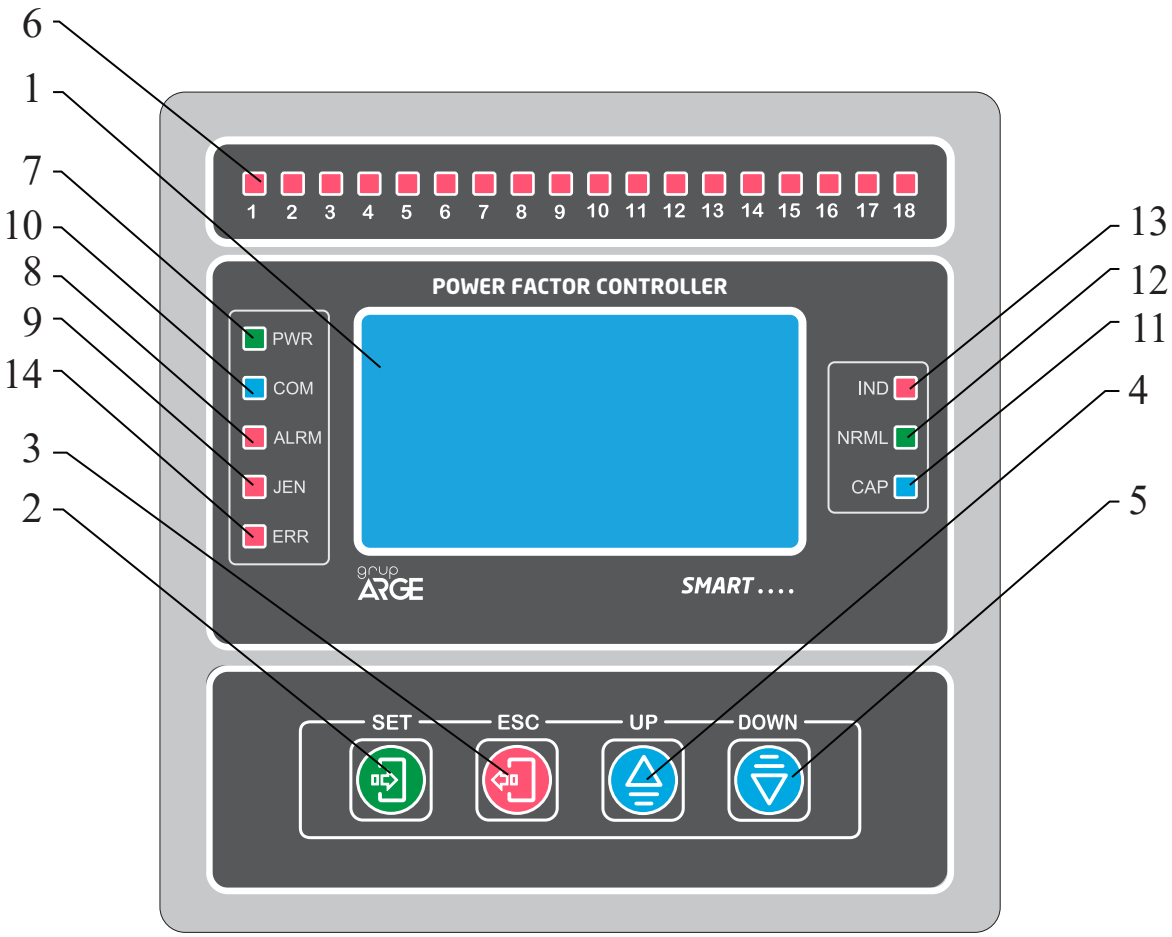
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V.25.1

1. INTRODUCTION

1.1. Front Panel View



1- LCD Display: All powers, ratios, values, warnings and menu parameters are monitored on the display. Display lighting gets off automatically if no key is pressed for 2.5 minutes in operati ng mode. In th is case it is sufficient for user to press a key to light the display again.

2- Program (SET) Key: The key to enter the menu, switch to a submenu and keep the settings.

3- Exit (ESC) Key: It enables to return to the previous process in the menu and exit from the menu.

4- Up Key: It enables to move upward in measurement and menu position.

5- Down Key: It enables to move downward in measurement and menu position.

6- Step LEDs: 18 pieces. The steps are stated on each LED. When the LED is on, it is understood the relevant LED is activated.

7- Energy (Power) LED: The LED indicating as PWR on Leksan. When there is energy in the device, this green coloured LED gets on. If it does not get on, there is a problem in the supply.

8- Alarm LED: It gets on when the system exceeds 15% cap and 20% end limits.

9- Gen LED : It gets on when the system is supplied from the generator.

10- Communication LED: This LED flashes during communication.

11- Capacitive LED: If total flowing capacitive reactive energy is above capacitive limit, this LED gets on.

12- Normal LED: If total flowing reactive energy from all phases is below Ind/Cap limits in PFCs, normal LED gets on.

13- Inductive LED: If total flowing inductive reactive energy is below inductive limit, this LED gets on.

14- Error LED: When thermal input is opened, in the errors of connection and step, no phase error, excessive inductive/capacitive errors, this LED gets on. If the LED gets on continuously, errors still exist. If error message is seen on the display and alarm LED is off, this means the errors occurred in the past and do not exist at the moment. In this case, the errors can be deleted by long press of ESC key.

1.2. Functions of Key



It is used to enter the menu and move to the next screen. Press this key for 3 sec to enter the menu. In order to store parameter which is set in the menu, press SET key and move to the next menu.



It enables to return to the previous process and exit from the menu.



It is used to change option and increase parameter value in the menu. Out of the menu, it ensures that the current display does not change for 1.5 minutes in operating time. The screens start to change automatically 1.5 minutes later. This key is used to enter step values manually during step test.



It is used to change option and decrease parameter value in the menu. Out of the menu, it is used to change screen from current to the next in operating time. The new screen stays unchanged for 1.5 minutes. The screens start to change automatically 1.5 minutes later. During the step test, this key is used to pass the tested step and proceed to the next step test.

1.3. Relationship of Key

- If you hold down up key in the step test, the manual login screen for that step comes up.
- If you hold down down key in the step test, the current step test is passed by via its previous value.
- If you hold down ESC key in any test, the test is cancelled.
- In manual step login, the value of each phase is entered separately. Transition between phases is done by pressing SET key. If you hold down ESC key during transition, the previous value of the phase is entered to another phase.
- **FORMAT:** Give energy to the device by holding down SET key and wait 5 sec in this position and press ESC key then leave firstly SET key and secondly ESC key; the format screen comes up.

If we cannot to use a step to report a load that the relay does not see:A load (capacitive effect of long MV cables or inductive loss of power transformer) that current transformer does not see can be defined to PFC via 'off set step'. For this process; firstly one of the steps is defined as 'off set', then apply 'step test' to this step and enter the convenient value is entered from manual login menu.

EXAMPLE: *The MV cable distance between electric meter and power transformer = 500m The capacitive effect of the cable = 25 kVAr (for 34.500 V voltage and 95 mm2 XLPE cable)* In this case, even if the PFC makes cosφ as 1, the meter will write capacitive due to the capacitive effect of the cable. Reactive difference between the meter and the PFC can be eliminated by making the necessary settings in the 'off set' step menu of SMART SVC PFC.

To activate a step manually;
If you want to activate a step manually, select the relevant step as 'off set' step. The PFC will activate that step manually after this process.

To take a step as a load to the system;
Select the relevant step as 'off set'. Then select the value of off set from 'off set' login screen as 0 or test 'off set' step by coming the step test and enter the value as 0 for each phase. After this process, the PFC will activate that step as a load.

If we want to report a value that the PFC does not see but the meter sees, we associate this value to a step and report to the relay. We name this step as 'off set' step. This can be any idle step. After we enter the number of this step in 'off set' login in the menu, we come to step test in the menu and test this step then we enter the value of the step for each phase as 'off set' value that the relay does not see in manual screen.

We can make 'off set' feature that is activated on any step active or passive via an external signal. The generator input of PFC can be used for this application by changing "off set" to "pin on" in the menu. When 220 Volt comes to generator input, 'off set' feature gets activated. Otherwise it gets passive.

EXAMPLE: *Assume that in our system we have a cogeneration that gives capacitive load of approximately 200 kVAr and it outputs to MV line via a step- up transformer. Let our power factor correction to be on LV side. We can use existing 'off set pin' feature to report to PFC that there is a 200 kVAr capacitive load, that the PFC does not see in the system when the cogeneration operates, and this load disappears when it is out of order. If a 220V output, that is taken when cogeneration is activated, is connected to this 'off set pin' input the 'off set' value (200 kVAr), that we entered to the PFC before, gets activated and the PFC compensates according to this. When cogeneration is passive, the PFC realizes this by pin login and makes 'off set' value, that is entered before, passive.*

In the case of alarm when the screen flashes (when it passes to 20% end or 15%kap), the alarm LED gets on and the alarm contact outputs in the alarm output. When gen gets activated and 220 Volt entered to gen input, this LED gets on.

NOTE: *The "Off set" step must be idle or you should make it ineffective by cutting the step energy. You can make it ineffective in the menu. (by making "off set out put" selection off).*

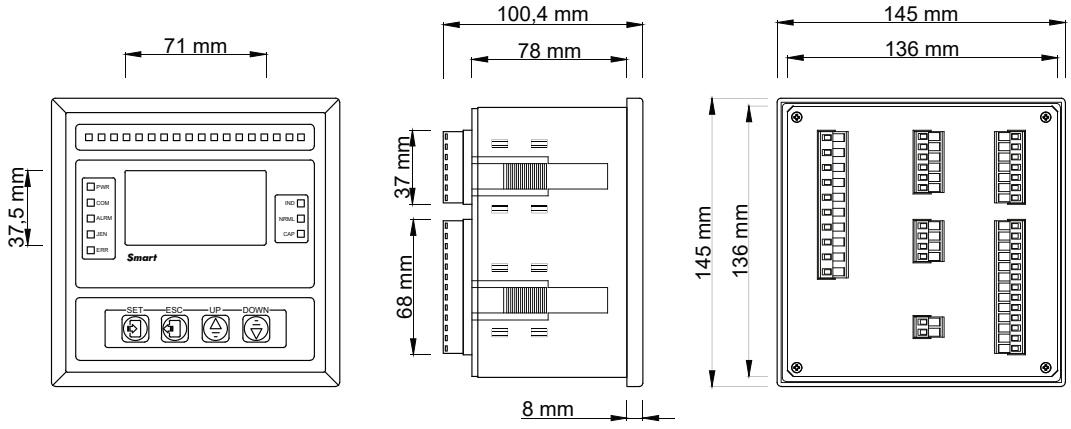
NOTE: *To get more information, you can call technical support numbers and get more detailed explanation.*

1.4. Smart PFC Features

- It is microprocessor-based.
- Provides easy compensation for fast-changing loads.
- Since it is semiconductor-controlled, the life of the power steps is much longer than that of contactors.
- With a detection current of 3 mA, it can operate easily even in small-power facilities or large-power facilities with high current transformer ratios.
- Provides full compensation capability even with aged or faulty capacitors.
- The operation can be easily analyzed with the help of a power flow graph. The maximum and minimum capacitor/reactor sizes required for each phase and phase imbalances can be determined.
- It detects faults such as faulty steps, excessive inductive/capacitive, phase errors, connection errors, etc., and informs the user.
- Step values are continuously updated with automatic step testing.
- It automatically detects and corrects current transformer connection changes.
- It extends the compensation maintenance period while also reducing maintenance costs.

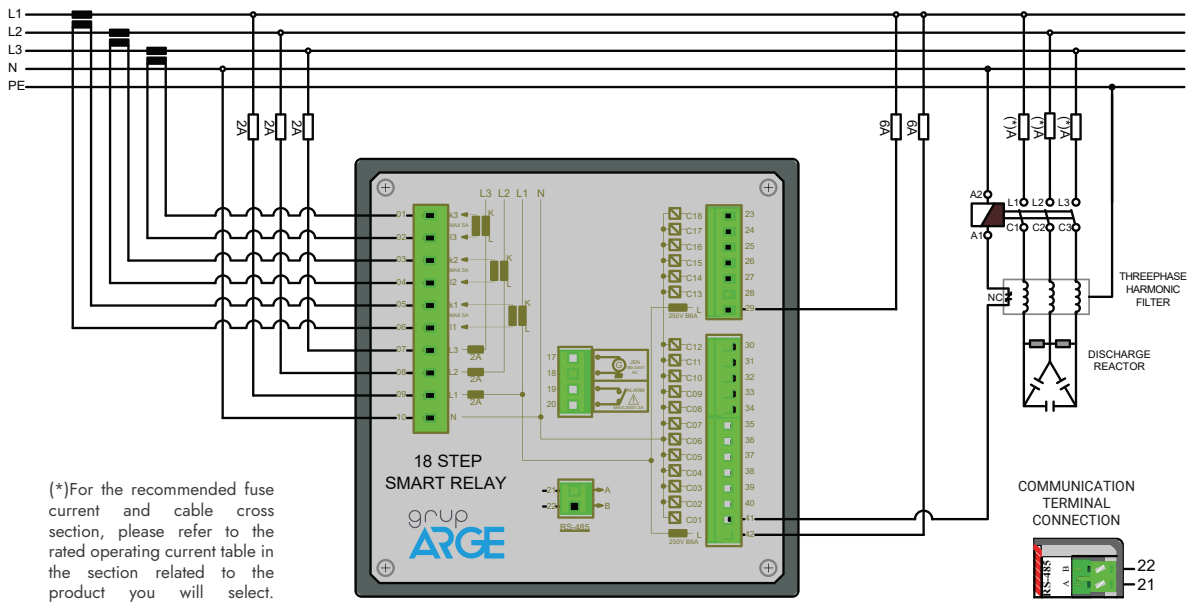
1.5. Technical Drawing

1.5.1. Graphic LCD Display Smart PFC Technical Drawing



1.6. Connection Diagrams

1.6.1. Smart 18 Connection Diagrams



(*)For the recommended fuse current and cable cross section, please refer to the rated operating current table in the section related to the product you will select.