

## **Power Interface Unit - a brief description**

Power Interface Unit, which is commonly known as PIU, is the most modern electrical interface and control unit used for GSM / Telecom installation. The system is intended to be used for replacement of Servo Stabilizer, AMF Panel, Isolation Transformer, AC Distribution Panel, Lightning and Surge Arresters, Alarm Panel, Generator Battery Charger, etc. at telecommunication site.

The advance feature of the unit provides input voltage correction in  $\mu$ s to enable the user to utilize the mains even under extreme low voltage conditions which servo technology was not able to offer due to slow response. The input voltage is isolated completely. The



unit has very fast true RMS measurement with High and Low voltages disconnect facility.

## **The Power Interface Unit (PIU) has the following sub units :**

1) Input Interface & Auto Phase Selector Panel 2) AC Distribution Panel 3) AMF & Interlock Panel 4) Static Line Conditioner 5) Alarm Interface 6) Central Supervisory Unit

### **1) Input Interface & Auto Phase Selector Panel**

The Generator & Mains Input Interface Panel provides the user termination for Mains, generator unit & power earthing. Auto phase selector is also provided in the system. If any phase is out of range from the specified range or during any phase failure, it will select another two healthy phase out of three phases.

### **2) AC Distribution Panel**

The AC Distribution panel is provided for load termination. There is group of MCBs provided with finger touch proof terminal of PE for safety and better connection. The SMPS, Air conditioners, Power Point, Tube Light, and Aviation Lamp etc shall be connected to the MCBs as per the marked stickers. A temperature sensor is also wired with the interface PCB. It is placed in the conduit.

### **3) AMF & Interlock Panel**

PIU is based on world most advance Micro Controller system with all True RMS measurement of voltages, to ensure correct analysis at right time for trouble free operation. The system is supported with its own charger and SMF battery to ensure further reliability in all possible condition. Mechanical Interlock is also provided using best electromechanical assemblies to avoid any electrical fault during micro controller failure or mishandling of systems. Micro Controller provides complete DG controls & Monitors the DG activity depending upon various conditions.

### **4) Static Line Conditioner**

Acme Line Conditioner is one of the first of its kind of line regulator in world, using most advance semiconductor and Ferro resonance technology. The equipment facilitates the user to replace servo stabilizer as well isolation transformer. The equipment operates with microprocessor-based controller to provide correction of mains even in  $\mu$ s. The design ensures the product utilization not only operating the SMPS as the load but most critical load like air conditioner etc. The system supports to operate on phase-to phase basis to get rid of neutral problem, as it is very common. The same provides mains utilization even at extreme low voltage 140V for air-condition operation, hence low utilization of generator which is costly. There are two line conditioner provided for Auxiliary electrical support system and SMPS load.

## **5) Alarm Interface\_**

The DG controls shall be extended from CPU to DG battery charger unit to control the genset for all possible condition. Same provides controlled battery charging of genset. The potential free alarms shall be extended from CPU to alarm box for monitoring complete unit. (Ref Drg. No-AAE-0141).

## **6) Central Supervisory Unit\_**

Central Supervisory Unit is designed to facilitate better interface of man and machine. The unit is provided with wide screen, glowing LCD to show the status supported with LED indication. The system can be operated in two modes automatic mode, DG manual mode.

The detailed Usage of Keys / Switches are described below.

### **i) Power ON/OFF**

The system operates in automatic mode when powered ON. The various electrical parameters like voltage, current, frequency, power plant voltage etc. & system states are displayed on the LCD, supported with corresponding LEDs. To set the various parameters refer for factory default setting sheet. (Ref. Page no. 20)

### **ii) Generator (DG) Manual mode**

The system operates in manual mode if the manual mode switch is in ON position. The system state in this case is Manual mode.

### **iii) RS232**

The settings in the menu can be down loaded or uploaded through RS232 cable.



Description	Standard Specification	Description	Standard Specification
<b>I - Structure</b>		<b>IV - Protections</b>	
Capacity	15 KVA (Range - 5 KVA to 50 KVA) wide input range	Input	4-POLE 160AMP MCCBs
Mechanical	19" CNC fabricated rack, using CRC sheet duly powder coated with white & blue size 19" dully 1800(H) x 600(W) x 400(D)mm	Voltage protection levels - 2 at input	High Voltage Disconnect (HVD) 485V after 10 milliseconds Low Voltage Disconnect (LVD) 110V after 5 seconds
Thickness	1.66 mm CRC sheet is used	Voltage protection levels-2 at LCU	Input – HVD 485V; LVD 110V Output HVD 250V (Immediate); LVD 190V after 3 sec
IP Protection	IP 21, suitable for indoor use	Insulation	>1000 megaohms
Tests	Designed to comply EMI/RFI as per FCC class-A. Burst test as per IEC 62.41 and environmental test as per TEC QM-333, category B2	Inter winding capacitance	<10nf
Safety	Designed as per IEC 60950 safety standards	Input/Output isolation	6KV
Compliance	CE Certified	Winding	Double wound with copper foil shielding
MTBF	More than 70,000 Hrs.	Inrush Current	144 Amp (Equal to Max full load Current)
<b>II - Central processing unit</b>		Temperature	-5°C to 55°C
Micro controller	High-Speed micro controller, true RMS for all voltage & current, all the inputs to the measurement board is duly protected against surge as per IEEE-62.41. The measurement circuit is rated at least twice of the maximum input range, each independent for AMF & LCU	Lightening	Protection from multistrike lightening class B+C, 50KA, as per IEC 61312-3
Time	Real time & date-programmable	Humidity	RH 95%
Event logs	Last 500 events	<b>V - Auto mains failure system</b>	
RS 232 Port	For PC interface to adjust the critical data and unload the alarms. This port is used for configuration of PFCs. Data is extended through RS 232 port.	<b>DG trip protection (safety with alarms)</b>	
Data Transfer:	PIU is equipped with suitable GPRS Modem/GPRS DTU and able to process the data It is able to connect via RS 232 Port to power plants for energy meter reading or with any other specific equipment.	Low lub oil (supply of LLOP not in scope), Low fuel level (sensor not in scope of ACME), Over load (adjustable depending on diesel generator capacity) (>110%-factory setting), Voltage protection. (a) HVD & LVD +/-5V above/ below the range, HCT/HWT	
Energy	Able to measure the Mains, DG and DC Channel Energy.	<b>Delays</b>	
Digital spare inputs	16 Digital inputs for system management (optional)	DG on load after DG starts and supply healthy (30 Seconds), Blackout delay for 10 seconds between mains and DG contactor changeover - DG cooling time - 5 minutes, Three attempt for DG start with delay between attempts (40-40-40 sec), DG lock time after three very short mains restoration 10-10-20 minutes	
Network management system	Central management system with MIS all over India sites (Optional)	Automatic SMPS Based CVCC for 12V/120AH DG Battery Charging	
<b>III - LCU with isolation transformer</b>		<b>VI - Safety &amp; security systems provided</b>	
Type	Micro controller based, true RMS, static line conditioner	<b>VII - AC distribution unit &amp; control (can be customised as per user requirement)</b>	
Power rating	3 phase input, with auto phase selector (optional)	<b>AC distribution unit</b>	Standard Configuration
Rated input voltage range	110V to 485Vac L to L	Input Protection	Yes
Rated output voltage	220V +/- 10%	MCCB/MCB's	Mains, DG, SMPS, Power point, Lighting, Aviation lamp, Battery charger, Air conditioners
Input frequency range	47-53Hz	<b>VIII - Miscellaneous</b>	
Total harmonic distortion (THD)% of Voltage/Current	<3%	<b>Real time based, Dry contact</b>	
Input power factor at 100% load@415V i/p & 215Vo/p	>0.95	Accessories	Aviation lamp controller, Surge arrester. (Class B+C), Auto phase selector, Room temperature sensor
Output load power factor at 100% load@ 415V i/p & 215Vo/p	>0.95 (Load dependent)	<b>IX - Measuring system</b>	
Efficiency at full load & min/max i/p range	>97.5%	<b>Display Frequency Currents Voltage</b>	
Dynamic response time	400V/us	<b>DG set measurements</b>	Mains/DG status, DG accumulated hours, DG voltage
Response time	<10ms	<b>Mains measurements</b>	Input voltage, Output voltages for LCU modules
		<b>LED indications</b>	Mains ON, DG ON, Smoke/Fire alarm, Over load, LCU Fail, Fuel Low, DG fail to start, DG fail to stop, Alternator fail, LLOP, DG overload, Mains fail, system battery low, DG battery low, HCT/HWT, High shelter temperature, PIU Battery Low, Mains Fail.
		<b>List of potential free contacts</b>	As per configuration

## **Features:**

Higher degree of Automation

Microprocessor based Voltage Regulators with wide Working Range

Better efficiency i.e.  $\geq 97\%$

Longer MTBF i.e. 1,00000 hrs.

Better Lightning & Surge Protections

Better DG Control Management

Inbuilt Network Management System (NMS)

Better Input Voltage Correction

Better Alarms & Securities

Automation with remote control of sites with either SMS or GPRS Gateways

Isolation Transformer, AC Distribution Board & Line Conditioning AMF Panel in a single rack

Utilize Mains under extreme low voltage condition

## **Applications:**

At any telecommunication site as PIU is

An all-in-one system

A highly efficient system

User friendly

Specifically beneficial where input voltage varies tremendously

Specifically beneficial where “single-phasing” is a frequent occurrence

Specifically beneficial where “fast roll out ” is required