

Technology Cooperation Office of the Presidency



IRAN

Technological Potential

Single Phase Multi Tariff Energy Meter

By introducing the Bulletins of “Iran Technological Potential” provided by Technology Cooperation Office of the Presidency (TCO), we intend to encourage international cooperation aiming at sharing technological resources with others. We would put forward more publications of such bulletins in different arenas of science and technology in near future.

As a matter of fact, science and technology has a global nature rather than local or even national, so geographic boundaries has been crossed and as a result, exchanging ideas and maintaining joint research activities has become crucial to many scientists and researchers all over the world. In addition, developments of electronic communication tools as well as IT advances facilitate this process as never before.

The main objective of these bulletins is to improve the international community’s knowledge about recent advances of Iran capacities and capabilities in Science and Technology and to facilitate technological collaborations with other countries.

Provided by Technology Cooperation Office of the Presidency,
International Affairs Department.

Tel: (+9821) 44667322-3

Fax: (+9821) 44656983

<http://www.tco.gov.ir>

E-mail: internationaltco@tco.ir

NRI (Niroo Research Institute) of Iran, started its activities in 1982. It has played a leading role in developing new technologies for Electric Power Industry ever since.

NRI is the major research organization affiliated to the Ministry of Energy of Iran.

NRI is performing the dual task of meeting the present and future demands of electric power industry, while making a better use of available resources, preserving the environmental and maintenance costs as low as possible.

NRI has invested considerably in providing adequate conditions to achieve its objectives. The main building and laboratories of this institute are located in the north-west of Tehran, in a block of land with about 140,000sqm area. Research activities are carried out in 6 various research centers, consisting of 18 technical research departments, using the facilities of 9 advanced laboratories.

Electronic AfzarAzma P.J.S. Co. (EAA) started their activity as a trading and manufacturing company in 1977 by graduates of Electronic Engineering of Sharif Industrial University. EAA began by producing Electronic Testing Instruments in 1980. In 1990, EAA established their production plant (5,000 sq. meters * 1,800 sq. meters) to which a 3,000 sq. meter product hall was added later in 2001.

At present, EAA is involved in a number of activities, of which production of Electronic and Telecommunication Test & Measuring Instruments, Digital Power Meters, Training and Installation of different ranges of Engineering Advanced Laboratories with the newest technology in hand; Electronic and Telecommunication networks as well as R&D and calibration purposes could be named as the major activities

During the past 27 years, EAA has designed and produced more than 50 different test and measuring electronic and telecommunication equipments of the highest level of reliability, performance and also complying with international standards. Electronic AfzarAzma has successfully taken part in various international exhibitions (both internal and external) which earned the company various awards.

To name just a few, in 1994, the company won the first prize in the Electronic & Computer fair and as the result was awarded by the Iranian Science & Industries R&D Organization. In 1999, Electronic AfzarAzma won the first prize of the 26th Prestige Quality Fair which was held in Madrid.

Among the various recent innovations at AfzarAzma, the establishment of the new production line of the Digital KWH-meter can be mentioned which took place in 2002. The first idea, research and design of Power Meter Products were conducted by Niroom Research Institute and Electronic AfzarAzma P.J.S. Co. has developed this project and after detecting the defects and improving the capabilities, has the potential of mass production of these products.

Power Meter Products

Single Phase Multi Tariff Energy Meter JM-110B (Rectangular Type)



Features

- Measuring and Registering Active Energy KWH (class1) Compatible IEC62052, IEC2053
- Measuring and Displaying Voltage, Current, Power and Power index (Cos phi)
- Equipped with Iranian Calendar, adjustable Clock, automatic Exertion of Summer, Winter and Leap year hours, Also Defining Normal Days, Special Holydays and weekends Manually
- Communicating with Handy Terminal with Direct connection of Optical probe(IEC62056)for receiving information, Adjusting clock, Programming, Connectable to Computer and Lap Top with Relative Software

Technical Specification

Meter type:	Static, Single phase, Active energy, Unidirectional
Approval:	IEC 62052-11, IEC 62053-21
Mechanical Compliance:	BS Standards
Connection Type:	Single phase 2 wire
Reference Voltage/frequency:	220V 230V 240V / 50Hz
Operating voltage range:	150...300V
Over voltage operation	The meter has been designed to withstand a voltage of 420V for an indefinite period
Power Consumption	Voltage circuite ≤ 1.0 VA , ≤ 0.7 Watt @ 230 V Curent circute ≤ 0.1 VA @ 5 A
Class Index	Class 1 (Class 0.5 Guaranteed)
Basic Current	5A
Maximum Current	100 A (Permanent)
Class accuracy current range	Extended from 100 mA up to 120 A
Meter Starting Current	≤ 10 mA
Short Time over current	3.5 KA for 5 Cycles
Meter constant	1000 imp/kWh (Programmable)
Insulation Class	Double insulation
Communications	Optical port:IEC 62056-21 Read/Write ModeC.300 to 4800 baud
Battery	Internal Lithium Battery to Support the RTC and Additional Battery for R.W.P
Display	Long life 8 digit LCD (from zero to nine) Large Digit (10mm X 5mm) Viewing Angle $\pm 60^\circ$ Special Annunciators for power metering (kWh,kvarh,A,kV,Tn,MD,...) Configurable to show 4,5,6,7+1 Decimal Digits LCD Self Test & Backlight
None-volatile memory	Retention time more than 40 years
Real Time Clock	$\lt \pm 4$ ppm or ≤ 0.36 Sec/Day @ 25°C

Software

Registers	Up to 6 Tariff Rates (T1, T2...) Total import value (T) Maximum Demand for each tariff (MD) Time and Date Measured Voltage & Current & Active Power (kV,A & kW)
Historic registers	16 Sets of Historic Data
Tariff Structure	6 Tariff Rates 12 Switching times for each day 8 day for weeks(7 normal days and one exclusion date) 30 exception days 6 weeks for each season
Reserved tariff	6 seasons for each year Reserved tariff table & reserved tariff changeover date can be programmed
Event recording	Power ON and OFF time and date Maximum demand reset Meter reading Change in configuration Time adjustment
Maximum demand	Maximum Demand windows is adjustable from 1 to 60 min
Calendar	Support Christian & Iranian Calendar including correction for leap years Daylight savings feature in operating and Non-operating mode
Watch dog timer	Hardware and Software
Operating temperature range	<i>Climate and Mechanical</i> -35°C to +60°C
Limit temperature range of operation	-40°C to 60°C
Storage Temperature	-40°C to +75°C
Relative humidity	Up to 95% for 30 days per year
Mean temperature coefficient	≤ 0.02 % @ PF=1 or PF=0.5ind
Degree of Protection	IP54
Terminal material	Brass
Terminal Block Material	Reinforced polycarbonate, non-flammable, recyclable, UV stabilized
Terminal cover and case material	Polycarbonate

Iran Technological Potential
Single Phase Multi Tariff Energy Meter

Window material
Non-repetitive withstand Shocks

Transparent glass polycarbonate
>30g , half-sine wave ,18msec , in each 6
direction

Withstand sinusoidal vibration
Flammability
Meter weight

In comply with IEC 60068-2-6
None-flammable, in comply with 60695-2-11
750g

Insulation test
Impulse withstand test
Fast transient burst (EFT)

EMC-Compatibility

> 4KV , 1min,50HZ

>12KV , 1.2/50µsec 500Ω source

In comply with IEC 61000-4-4

±4 kV on Line, & Null with 5 and 100kHz

Electrostatic Discharge test (ESD)
Surge Immunity test

In comply with IEC 61000-4-2 (±15 kV Air)

In comply with IEC 61000-4-5 (±4 kV

Differential Mode)

Immunity to electromagnetic RF fields

In comply with IEC 61000-4-3 Frequency range

80 to 2000mHz 10V/m @ I=Ib and 30V/m @ I=0

Immunity to conducted RF

In comply with IEC 61000-4-6 Frequency range

150 kHz to 80Mhz @ 10V

Conducted and Radiated Emission
Voltage dips & interrupts

In comply with CISPR22 Class B

In comply with IEC 62052-11 in conjunction with

IEC 61000-4-11

AC power magnetic fields

In comply with IEC 62053-21 in conjunction with

IEC 61000-4-8

DC magnetic fields

In comply with IEC 62053-21

Iran Technological Potential
Single Phase Multi Tariff Energy Meter

Single Phase Multi Tariff Energy Meter (kWh)
JM-110

Features

- ♣ Measuring and Registering Active Energy KWH (class1) Compatible IEC62052, IEC2053
- ♣ Measuring and Displaying Voltage, Current, Power and Power index (Cos phi)
- ♣ Equipped whit Iranian Calendar, adjustable Clock, automatic Exertion of Summer, Winter and Leap year hours, Also Defining Normal Days, Special Holydays and weekends Manually
- ♣ Communicating whit Handy Terminal with Direct connection of Optical probe (IEC62056) for receiving information, Adjusting clock, Programming, Connectable to Computer and Lap Top with Relative Software



Technical Specification

General

Meter type:

Static, Single phase, Active energy,
Unidirectional
IEC 62052-11, IEC 62053-21
ANSI Standards

Approval:

Single phase 2 wire
220V 230V 240V / 50Hz
150...300V

Mechanical Compliance:

Connection Type:

Reference Voltage/frequency:

Operating voltage range:

Over voltage operation

The meter has been designed to withstand a
voltage of 420V for an indefinite period
Voltage circuite $\leq 1.0 \text{ VA}$, $\leq 0.7 \text{ Watt @}$
230 V Curent Circute:

Power Consumption

$\leq 0.2 \text{ VA @ } 10 \text{ A}$
Class 1 (Class 0.5 Guaranteed)
10A
100 A (Permanent)

Class Index

Basic Current

Maximum Current

Extended from 100 mA up to 120 A
 $\leq 10\text{mA}$

Class accuracy current range

Meter Starting Current

Short Time over current

Meter constant

Insulation Class

Communications

3.5 KA for 5 Cycles
1000 imp/kWh (Programmable)
Double insulation
Optical port:IEC 62056-21 Read/Write
ModeC.300 to 4800 baud

Iran Technological Potential
Single Phase Multi Tariff Energy Meter

Battery	Internal lithium battery to support RTC and additional Battery for R.W.P
Display	Long life 8 digit LCD (from zero to nine) Large digit (10mm X 5mm) Viewing Angle $\pm 60^\circ$ Special Annunciators for power metering (kWh,kvarh,A,kV,Tn,MD,...) Configurable to show 4,5,6,7+1 Decimal Digits LCD Self Test & Backlight
None-volatile memory Real Time Clock	Retention time more than 40 years ± 4 ppm or ≤ 0.36 Sec/Day@ 25° C
Registers	<i>Software</i> Up to 6 Tariff Rates (T1, T2...) Total import value (T) Maximum Demand for Each Tariff (MD) Time and Date Measured Voltage & Current & Active Power (kV, A & kW)
Historic registers Tariff Structure	16 Sets of Historic Data 6 Tariff Rates 12 Switching times for each day 8 day for weeks(7 normal days and one exclusion date) 30 exception days 6 weeks for each season 6 seasons for each year
Reserved tariff	Reserved tariff table & reserved tariff changeover date can be programmed
Event recording	Power ON and OFF time and date Maximum demand reset Meter reading Change in configuration Time adjustment
Maximum demand	Maximum Demand windows is adjustable from 1 to 60 min
Calendar	Support Christian & Iranian Calendar including correction for leap years Daylight savings feature in operating and Non-operating mode

Iran Technological Potential
Single Phase Multi Tariff Energy Meter

Watch dog timer	Hardware and Software
Operating temperature range	<i>Climate and Mechanical</i>
Limit temperature range of operation	-35°C to +70°C
Storage Temperature	-40°C to +75°C
Relative humidity	-40°C to +80°C
Mean temperature coefficient	Up to 95% for 30 days per year
Degree of Protection	≤ 0.02 % @ PF=1 or PF=0.5ind
Terminal material	IP54 (With Suction)
Terminal Block Material	Sn plated Copper
Terminal cover and case material	Bakelite,(deflection @ 135°C & 1.8MPA in comply with ISO75-2)
Window material	Reinforced polycarbonate,non-flammable,recyclable,UV stabilized
Non-repetitive withstand Shocks	Transparent glass polycarbonate
Withstand sinusoidal vibration	>30g , half-sine wave ,18msec , in each 6 direction
Flammability	In comply with IEC 60068-2-6
Meter weight	None-flammable, in comply with 60695-2-11
Wiring Capacity	800g + 500g (socket)
Insulation test	<i>EMC-Compatibility</i>
Impulse withstand test	> 4KV , 1min,50HZ
Fast transient burst (EFT)	>12KV , 1.2/50µsec 500Ω source
Electrostatic Discharge test (ESD)	In comply with IEC 61000-4-4 ±4kV on Line, & Null with 5 and 100kHz
Surge Immunity test	In comply with IEC 61000-4-2 (±15kV Air)
Immunity to electromagnetic RF fields	In comply with IEC 61000-4-5 (±4kV Differential Mode)
Immunity to conducted RF	In comply with IEC 61000-4-3
Conducted and Radiated Emission	Frequency range 80 to 2000MHz 10V/m @ I=Ib and 30V/m @ I=0
Voltage dips & interrupts	In comply with IEC 61000-4-6
AC power magnetic fields	Frequency range 150kHz to 80MHz @ 10V
DC magnetic fields	In comply with CISPR22 Class B
	In comply with IEC 62052-11 in conjunction with IEC 61000-4-11
	In comply with IEC 62053-21 in conjunction with IEC 61000-4-8
	In comply with IEC 62053-21

Opportunities for Cooperation

- Manufacturing
- Production of Electronic and Telecommunication Test & Measuring Instruments
- Digital Power Meters Producing
- Training and Installation of different ranges of Engineering Advanced Laboratories with new technology of world
- Electronic and Telecommunication networks as well as R&D and calibration purposes
- Information and Communication Technology
- Sales and Distribution