# PRESSURE REDUCING & METERING STATION
# SMART METER GUIDELINE

## 1.01 GENERAL

This document presents technical and installation guidelines for smart meter capability to the Pressure Regulating and Metering Stations (PRMS). The conventional diaphragm, rotary and turbine gas meters are units without communication possibilities. Smart meters are a new kind of energy meter. This gas meters is a replacement for manual read meters and can sends electronic meter readings to gas energy supplier automatically without the need of physical access to the meter. Smart meters come with in-home displays, which give real-time feedback on energy usage and what it is costing. The intelligence of the smart meter is integrated in the gas meter and the three basics functions are to measure the gas used or generated, remotely switch the customer on and off and possibility to remotely control the gas consumption. Therefore no personnel required to be sent to site frequently, however Marafeq's personnel shall have unconditional access to the smart meter 24/7.

## 1.02 TECHNICAL REQUIREMENTS

A. Smart meter shall be equipped with its gas meter, temperature sensor and pressure sensors, volume pulses shall be provided for billing computation, it shall also provide solenoid valve status, and control to enable the gas supply to be on and off remotely from Gas Farm PLC/SCADA system.

B. Sensor cables shall be long enough to connect the sensors to gas meter without splices or joints.

C. Temperature shall be measured via resistance temperature devices (RTDs), 4-wire, Pt 1000, class A accuracy according to EN 60751 standard.

D. The meter must comply below standard :

1) BS EN 1359:1999 - Gas meters. Diaphragm gas meters

2) BS EN 12480:2002 - Gas meters. Rotary Positive Displacement (RPD) gas meters

3) BS EN 12261:2002 - Gas meters. Turbine gas meters

4) BS EN 12405-1:2005 - Gas meters. Conversion devices. Volume conversion.

5) BS 6400 – Specification for the Installation of domestic-sized gas meters maximum rated capacity not exceeding 6 m3/h (2nd and 3rd family gases)
   a. Part 1 Natural Gas (low pressure)
   b. Part 2 Natural Gas (medium pressure)

E. The meter shall communicate with the PLC/RTU via Modbus RTU or hardwired.

F. The meter shall have large back-lit LC display or mechanical index display

G. The smart meter shall have quick and safe commissioning with application-guided operation (Quick Setup)

H. The meter and its associated instruments shall be from the same supplier.

I. The meter time/date stamping and able to synchronize with Gas Farm PLC/SCADA system

J. The meter shall be capable of storing at least total 12 months data; EEPROM historical memory storage.

K. The meter shall have internal real time clock with battery backup which shall able to synchronize with PLC/RTU.

L. Enclosure of the meter shall be IP 54 and for sensors shall be IP65

M. PRMS smart meter system architecture is illustrated in Figure 1.

N. Printing system for billing and reporting purpose inclusive of the hardware and A4 papers.(include local capability).

**O. PLC/RTU**

System shall provide following capabilities:

1. Control of PRMS solenoid valve and gathering all necessary data from gas meter and its instruments.
2. Modbus RTU communication with gas meter and or volume corrector
3. Field instrumentation wiring terminations, instrument signal input/output for system, monitor and control functions, and self-diagnostics.
4. System hardware shall have sufficient data protection to prevent erroneous data communication during power-up or power-down.
5. System shall recognize transmission format errors and either correct or request retransmission.
6. PLC/RTU shall communicate with PRMS gas meter to monitor Gas volume, temperature, pressure, compressibility factor etc. for billing purpose and solenoid valve for remotely monitor & control
7. One solenoid valve control
    a. If gas leak is detected in safety control panel located inside PRMS shall close the solenoid valve overriding PLC/RTU system and any other system command issued, in this condition solenoid valve shall not be operated from PLC system.
    b. If gas leak is not detected, the PLC system shall able to monitor and control solenoid valve
8. All process variables shall be communicated from sub developer plot PRMS PLC/RTU to Gas farm main PLC & SCADA control system utilizing standard open Modbus TCP/IP communication protocol.
9. PLC/RTU manufacture : Allen Bradley, Kingfisher, HIMA, Honeywell, Siemens, GE

1.03 SERVICE CONDITIONS

A. Design Pressure : 0-500 mbar,

Ambient temperature: -5 to 60 ºC

B. Design Pressure: 0- 6 bar

Ambient temperature: -5 to 60 ºC

1.04 SERVICE BACK-UP

A. The smart meter vendor / sub-developer shall arrange training for Marafeq's operation & maintenance staff by the manufacturer's experts.

B. The smart meter vendor / Sub-developer shall provide manufacturer's contact detail locally in Qatar authorized for sales and service. Each manufacturer shall confirm they can provide service technicians with 24 hours' notice.

C. Provide contact details for authorized service center in Qatar for repair, overhaul, or after sales service.

D. Manufacturer shall confirm essential spare parts are available locally in Qatar.

E. Manufacturer shall confirm he has an established QA/QC program.

F. Warranty: 3 years.

1.05 HARDWARE AND SOFTWARE RELEASES

A. Provide hardware to manufacturer's latest revision level. Provide hardware release upgrades, on overlapped exchange basis, as issued by manufacturer, from date of initial equipment shipment through end of warranty period of Contract.

B. Provide manufacturer's system software upgrades as issued, from date of initial equipment through end of warranty period of Contract. Display software revision level on main menus.

1.06 RESET FUNCTIONS AND HISTORICAL DATA RECORDING :

A. The reset shall be carried through the following way:

1. Manual, by pressing reset button / pin number by authorised person

B. On every reset all registered data along with date and time of reset shall be transferred to historical register storage

1.07 INSTALLATION

The smart meter shall be installed inside the IP54 rated enclosure with window glass.

1.08 DELIVERY, HANDLING, AND STORAGE

A. Delivery, storage, and protection shall be in accordance with manufacturer's recommended procedures.

B. Accept products on site in factory containers and verify any damage.

C. Store products in clean, dry area.

1.09 WARRANTY

A. Warranty shall not begin until final acceptance of system by Owner.

B. Specified availability shall be maintained throughout warranty period. Failure to achieve specified availability may, at Owner option, result in extension of warranty period until specified performance has been met for continuous period equivalent to warranty period.

## SYSTEM ARCHITECTURE

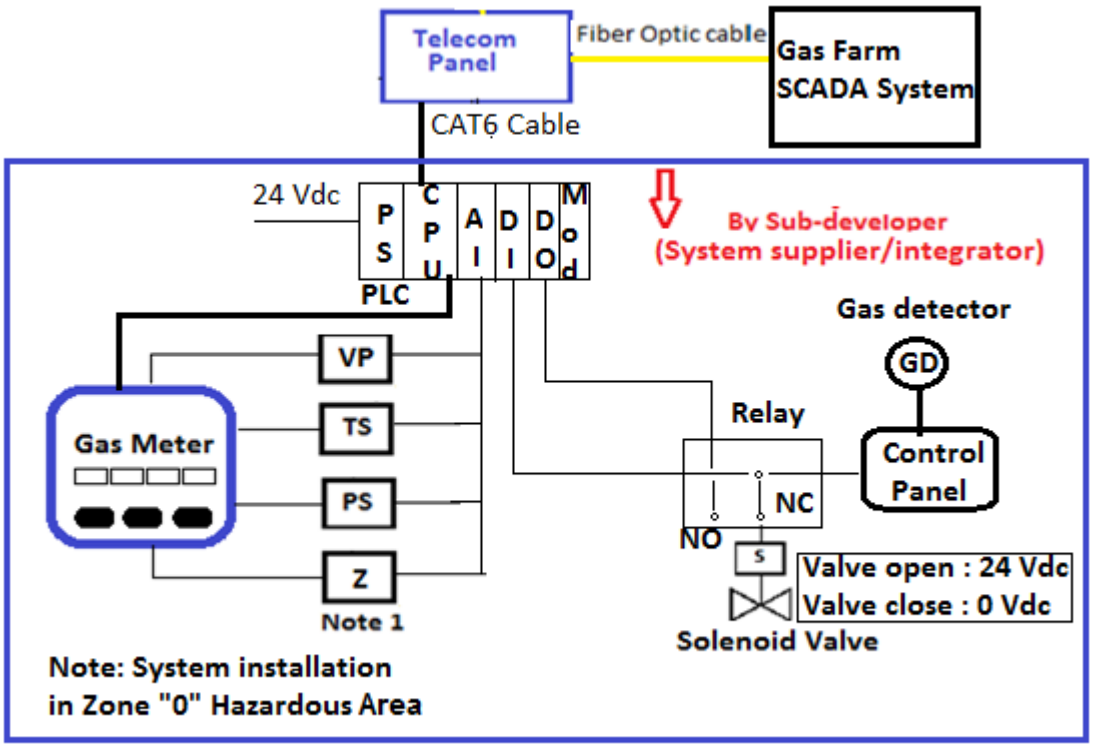


**Figure 1 : PRMS smart meter system**

**Note 1: Abbreviation**

**TS: Temperature sensor**
**PS: Pressure sensor**
**VP: Volume pulse**
**Z: Compressibility factor**
**PLC : Programming logic controller**