



کنترل گاز اکباتان

:::: EKBATAN  
:::: GAS CONTROL

Manufacturer of Energy Safety, Regulation and Metering Equipment

▶ [www.egc.ir](http://www.egc.ir)

همدان ، کیلومتر 3 بلوار سردار شهید حسین همدانی  
( بلوار فرودگاه ) ، ضلع غربی  
تلفن دفتر فروش : 081-32547502  
تلفن کارخانه : 081-32545401  
فکس : 081-32545406

3rd Km of Airport Blvd.- Hamedan - Iran  
Tel : +98 - 81 - 32545401 / 32547502  
Fax : +98 - 81 - 32545406  
[www.egc.ir](http://www.egc.ir) [info@egc.ir](mailto:info@egc.ir) [sales@egc.ir](mailto:sales@egc.ir)





## Introduction

Ekbatan Gas Control Knowledge Based Company (Public Joint Stock) is a large manufacturer and exporter of safety equipment, regulators, and domestic gas meters in Iran and the Middle East. The company was established in 1983, aiming to (meet) the national policies relating to development of the nationwide gas distribution network and meet the needs of the National Iranian Gas Company (NIGC) and the affiliated provincial gas companies to the previously mentioned equipment entered the oil and gas equipment market as a designer and manufacturer of domestic gas regulators.

Utilizing experience and technical knowledge of the staff and corporation resources, the company has always played a leading role in localization, innovation, development and improvement of oil and gas industry equipment. Currently, different types of domestic gas regulators in 5-160 m<sup>3</sup> capacities, as well as steel and aluminum domestic gas meters are produced in this industrial unit.

Considering the government's intention to reform the energy consumption pattern, and the country's urgent need to up-to-date domestic gas metering equipment for efficient gas consumption management, Ekbatan Gas Control Co. started design and production of smart remotely reading domestic gas meters, using the latest communication technologies, such as LORA and NB-IOT. The company has also put production and localization of the new generation gas meters, known as ultrasonic meters (UGM) into agenda.

Besides producing safety and domestic gas metering equipment, Ekbatan Gas Control Co. pays specific attention to testing and calibration of these products, and produces a wide range of new-generation testing and calibration equipment and regulators used by quality control laboratories as well as testing and calibration centers. The company is also the exclusive producer of portable domestic gas meters used for on-site testing and troubleshooting of the subscribers' gas meters.

Relying on the great capacity of producing die-cast products and the existing machining and assembly lines, the company started producing automotive parts in 2004, besides production of oil and gas industry equipment. Currently, a wide range of automotive parts are produced and supplied to the major domestic automotive industries under "Ekbatan Part" brand. This industrial unit utilized the existing technical capacities to set up a multi-jet domestic water meter production line in 2017, in order to enter the water metering industry and complete the company's metering products portfolio.

Products of this production line are available under "Ekbatan Water Meter" brand.



## Memberships

- ◆ Vendor lists of the Ministry of Petroleum and Iranian National Gas Company
- ◆ Vendor list of the Turkmenistan National Gas Company (Turkmengaz)
- ◆ Society of Iranian Petroleum Industries Equipment Manufacturers (SIPIEM)
- ◆ Iranian Auto Parts Manufacturers Association (IAPMA)
- ◆ North American Die Casting Association (NADCA)
- ◆ Iranian Die Casting Association (IDCA)
- ◆ Iran-Kazakhstan Council of Commerce
- ◆ Iran-Italy Chamber of Commerce, Industries, and Mines
- ◆ Hamedan Province Chamber of Commerce, Industries, Mines, and Agriculture

## Licenses and Certificates

- ◆ Knowledge-Based Company License issued by the Workgroup for Evaluation of Knowledge-Based Companies and Institutions, affiliated to the Vice-Presidency for Science and Technology
- ◆ Research and Development (R&D) Certificate issued by the Ministry of Industries, Mine, and Trade
- ◆ Partner Laboratory Qualification Certificate, issued by the National Institute of Standards and Industrial Research of Iran
- ◆ Incentive right to use the Iranian Standard Mark for domestic gas meters and regulators, issued by the National Institute of Standards and Industrial Research of Iran
- ◆ ISO 9001:2015 standard certificate for quality management system
- ◆ ISO/TS 29001:2010 standard certificate for quality management system in oil and gas industries
- ◆ IATF 16949:2016 standard certificate for quality management system in automotive industries
- ◆ ISO 14001:2015 standard certificate for environment management system
- ◆ ISO 45001:2018 standard certificate for safety and occupational health management system
- ◆ ISO 50001:2018 standard certificate for energy management system
- ◆ HSE-MS standard certificate for safety, health, and environment management system
- ◆ ISO 10002:2014 standard certificate for customer complaints and customer-orientation management system
- ◆ Patent for invention of domestic gas regulator testing and calibration device, issued by Real Estate Registration Organization of Iran
- ◆ Patent for invention of safety valve driver for domestic gas regulator, issued by Real Estate Registration Organization of Iran
- ◆ Patent for invention of diaphragm gas meter endurance testing device, issued by Real Estate Registration Organization of Iran
- ◆ National Certificate of Observing the Consumers Rights, issued by the Consumers and Producers Protection Organization
- ◆ Certificate and Gold Award of Top Industrial Unit Involved in Instrumentation Industries, presented by the Ministry of Industry, Mine, and Trade
- ◆ Certificate and Gold Award of Top Industrial Unit Involved in Instrumentation Industries, presented by the National Production National Pride Festival





# Certificates





## Domestic Gas Regulator (Low Size)

Regulators play an important role in safe and continuous supply of domestic gas with a convenient pressure.

A regulator is a device that reduces the gas pressure and maintain it in at a predefined level. The device regulates delivery of gas to different systems to ensure that gas is delivered to different parts with a suitable pressure. Regulator is an important component of gas delivery systems and can be deemed the heart of such systems.

A regulator consists of three major parts:

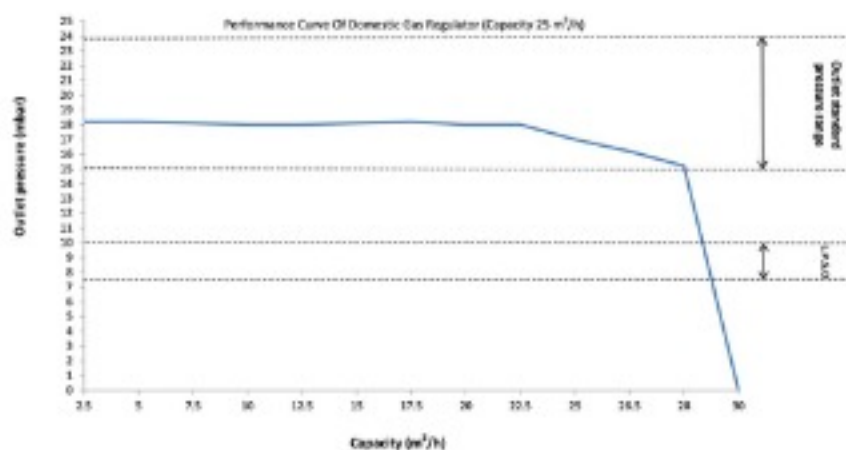
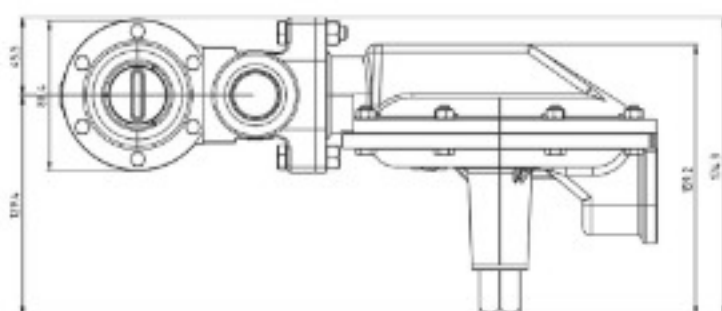
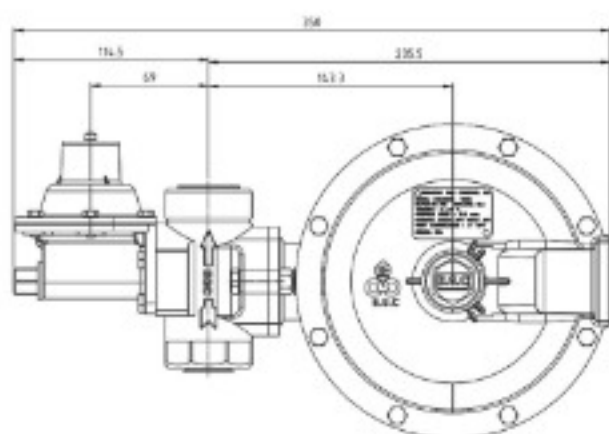
1. Pressure measurement device or pressure sensor that measures and regulates the output pressure
2. Flow restrictor that is a type of valve used to reduce or increase the flow rate
3. Loading part that controls the flow restrictor, in response to the pressure sensor, to keep the output pressure at the predefined range.

In terms of performance, regulators produced by Ekbatan Gas Control Company are categorized as Self Operated Regulators.

## Features

- ◆ Preventing transmission of the utility network pressure to the local network in all conditions
- ◆ Passed all long-term and short-term tests as prescribed by National Iranian Gas Company Standard (IGS)
- ◆ Passed all continuous operation tests beyond the requirements of National Iranian Gas Company Standard (IGS)
- ◆ Main and safety springs replaced with no need to open the regulator
- ◆ Performance diagram with slight slope that contributes to improved performance of gas equipment
- ◆ Crowbar system used to regulate the low input pressure
- ◆ Housing, main cap, and safety cap made of die cast aluminum
- ◆ Plastic parts made of ABS and polyacetal
- ◆ Rubber parts made of NBR
- ◆ Diaphragms made of reinforced NBR with top quality tissues for increased endurance
- ◆ Die cast iron valves produced in accordance with ANSI 1316.4 CLASS 125 with NPT threads
- ◆ Springs made of stainless steel or zinc-coated CK75 (depending on client's order and climatic conditions)
- ◆ Coated by electrostatic paints using automatic coating machines
- ◆ Comply with IGS-M-IN-201 standard of the National Iranian Gas Company
- ◆ Standard Mark of Institute of Standards and Industrial Research of Iran

# Technical Specifications



Capacity	6 m <sup>3</sup> /h	10 m <sup>3</sup> /h	25 m <sup>3</sup> /h
Orifice Size	3.2 mm	3.9 mm	5.5 mm
Inlet Pressure	1.03 - 4.14 bar	1.03 - 4.14 bar	1.03 - 4.14 bar
Out Pressure	15 - 23.7 mbar	15 - 23.7 mbar	15 - 23.7 mbar
High Pressure Shut Off (HPSO)	42.3 ± 2.5 mbar	42.3 ± 2.5 mbar	42.3 ± 2.5 mbar
Low Pressure Shut Off (LPSO)	8.7 ± 1.2 mbar	8.7 ± 1.2 mbar	8.7 ± 1.2 mbar
Full Internal Relief Valve (FIRV)	62.3 ± 7.5 mbar	62.3 ± 7.5 mbar	62.3 ± 7.5 mbar
Temperature Range	-29 to +60°C	-29 to +60°C	-29 to +60°C
Inlet size	3/4 inch NPT	3/4 inch NPT	3/4 inch NPT
Outlet size	1 inch NPT	1 inch NPT	1 inch NPT



## Domestic Gas Regulator (Hight Size)

Regulators play an important role in safe and continuous supply of domestic gas with a convenient pressure.

A regulator is a device that reduces the gas pressure and maintain it in at a predefined level. The device regulates delivery of gas to different systems to ensure that gas is delivered to different parts with a suitable pressure. Regulator is an important component of gas delivery systems and can be deemed the heart of such systems.

A regulator consists of three major parts:

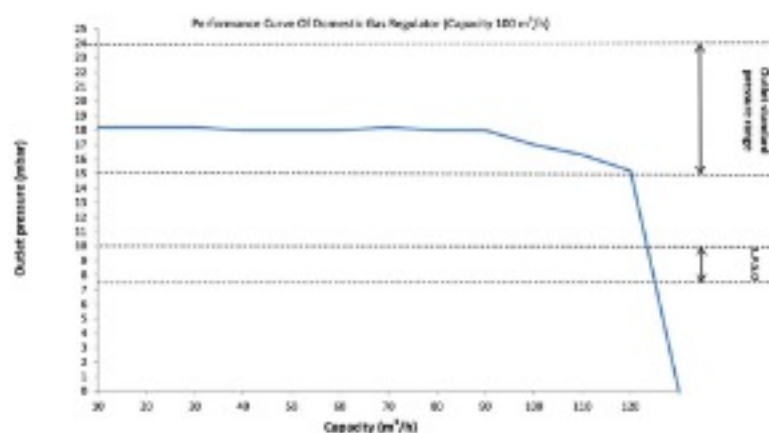
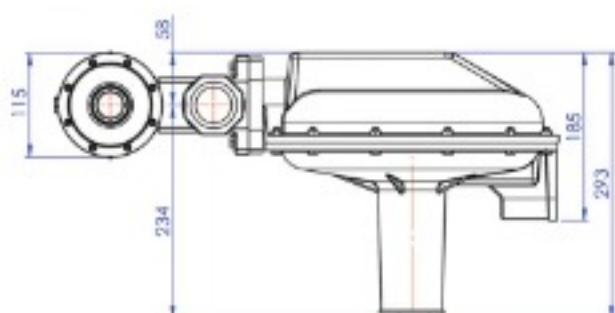
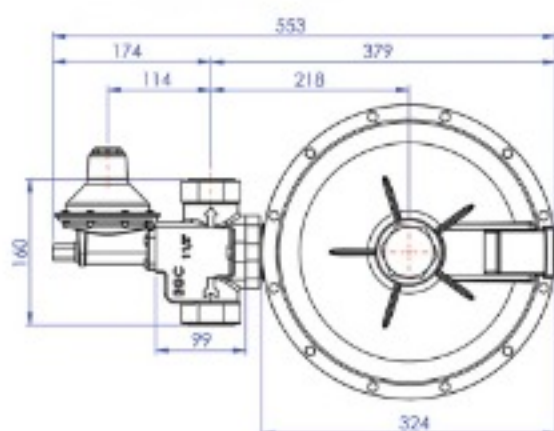
1. Pressure measurement device or pressure sensor that measures and regulates the output pressure
2. Flow restrictor that is a type of valve used to reduce or increase the flow rate
3. Loading part that controls the flow restrictor, in response to the pressure sensor, to keep the output pressure at the predefined range.

In terms of performance, regulators produced by Ekbatan Gas Control Company are categorized as Self Operated Regulators.

## Features

- ◆ Preventing transmission of the utility network pressure to the local network in all conditions
- ◆ Passed all long-term and short-term tests as prescribed by National Iranian Gas Company Standard (IGS)
- ◆ Passed all continuous operation tests beyond the requirements of National Iranian Gas Company Standard (IGS)
- ◆ Main and safety springs replaced with no need to open the regulator
- ◆ Performance diagram with slight slope that contributes to improved performance of gas equipment
- ◆ Crowbar system used to regulate the low input pressure
- ◆ Housing, main cap, and safety cap made of die cast aluminum
- ◆ Plastic parts made of ABS and polyacetal
- ◆ Rubber parts made of NBR
- ◆ Diaphragms made of reinforced NBR with top quality tissues for increased endurance
- ◆ Die cast iron valves produced in accordance with ANSI 1316.4 CLASS 125 with NPT threads
- ◆ Springs made of stainless steel or zinc-coated CK75 (depending on client's order and climatic conditions)
- ◆ Coated by electrostatic paints using automatic coating machines
- ◆ Comply with IGS-M-IN-201 standard of the National Iranian Gas Company
- ◆ Standard Mark of Institute of Standards and Industrial Research of Iran

## Technical Specifications



Capacity	40 m <sup>3</sup> /h	65 m <sup>3</sup> /h	100 m <sup>3</sup> /h	160 m <sup>3</sup> /h	160 m <sup>3</sup> /h (2 psf)
Orifice Size	9 mm	12 mm	12 mm	16 mm	16 mm
Inlet Pressure	1.03 - 4.14 bar	1.03 - 4.14 bar	1.03 - 4.14 bar	1.03 - 4.14 bar	1.03 - 7 bar
Out Pressure	15 - 23.7 mbar	15 - 23.7 mbar	15 - 23.7 mbar	15 - 23.7 mbar	124 - 152 mbar
HPSO	42.3 ± 2.5 mbar	42.3 ± 2.5 mbar	42.3 ± 2.5 mbar	42.3 ± 2.5 mbar	240 ± 20 mbar
LPSO	8.7 ± 1.2 mbar	8.7 ± 1.2 mbar	8.7 ± 1.2 mbar	8.7 ± 1.2 mbar	69 ± 14 mbar
FIRV	62.3 ± 7.5 mbar	62.3 ± 7.5 mbar	62.3 ± 7.5 mbar	62.3 ± 7.5 mbar	345 ± 35 mbar
Temperature Range	-29 to +60 °C	-29 to +60 °C	-29 to +60 °C	-29 to +60 °C	-29 to +60 °C
Inlet size	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT
Outlet size	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT	1 ½ inch NPT



## G4 and G6 Aluminum Diaphragm Gas Meters

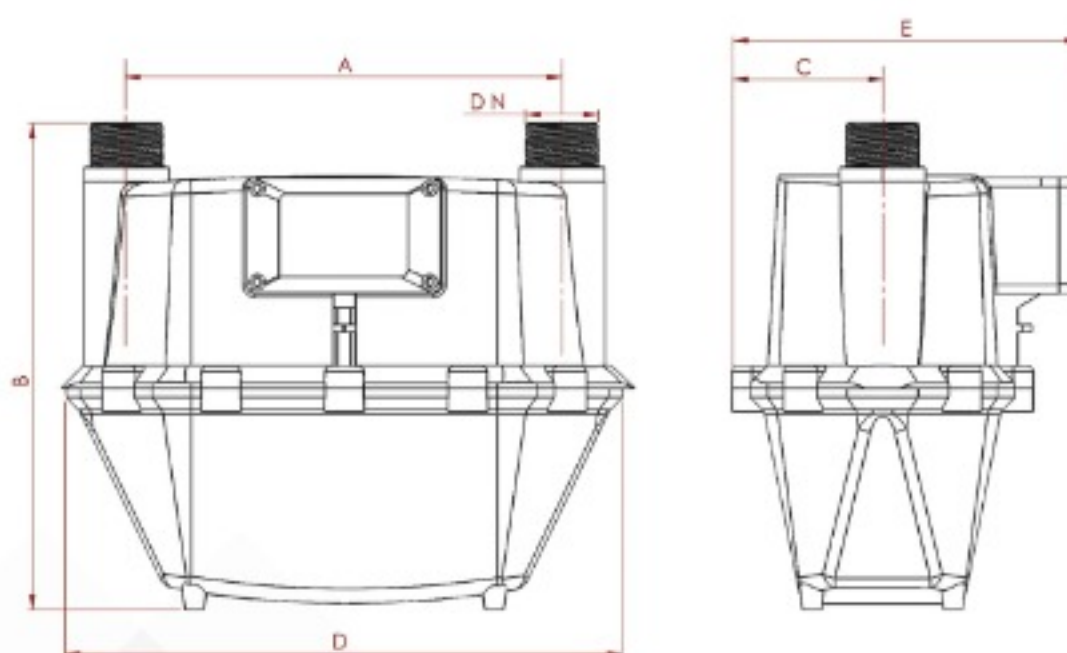


### Features

- ◆ Housing Material: Die Cast Aluminum
- ◆ Highly durable
- ◆ Great moisture resistance for operation in wet areas
- ◆ Not affected by magnetic field to prevent magnet tampering
- ◆ Proper performance during earthquake and other natural disasters and accelerated gas flow cut off
- ◆ Not affected by changes of the ambient temperature
- ◆ Inner elements (internal motor) designed by NP of Italy
- ◆ Diaphragms made of reinforced NBR, highly resistant to heat and wear, highly flexible in different temperature ranges, and highly resistant to hydrocarbon liquids contained in natural gas
- ◆ High measurement accuracy
- ◆ Integrated numerator frame
- ◆ Anti-tampering indicator available
- ◆ Insignificant pressure drop
- ◆ Electrostatic painted using automatic machines
- ◆ Reverse operation disabled
- ◆ No manipulation or interference possible
- ◆ Convertible to automatic reading meter (AMR) or prepayment meter
- ◆ Produced in accordance with IGS-M-IN-101 standard of the National Iranian Gas Company

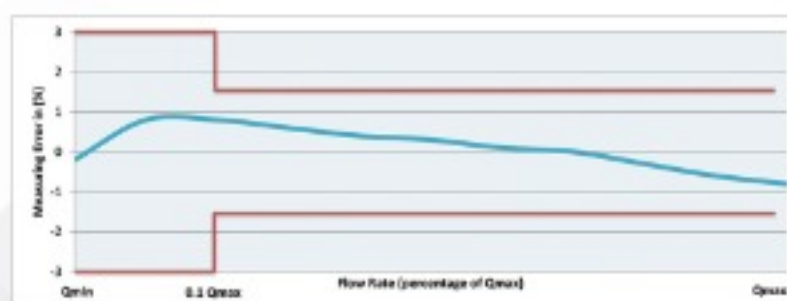
## Technical Specifications

Characteristics		G4 - AL	G6 - AL
Max Flow Rate (Q max)		6 m <sup>3</sup> /h	10 m <sup>3</sup> /h
Min Flow Rate (Q min)		0.040 m <sup>3</sup> /h	0.060 m <sup>3</sup> /h
Cyclic Volume		2.0 dm <sup>3</sup>	3.0 dm <sup>3</sup>
Maximum working pressure		0.1 bar	0.1 bar
Inlet/Outlet Nominal size		1 ¼ inch	1 ¼ inch
Connection	Type	THREADED, MALE	THREADED, MALE
	Location	TOP	TOP
	Reading Capacity Resolution	0.2 dm <sup>3</sup>	0.2 dm <sup>3</sup>
Number of Digits		5 digits plus 3 decimals last decimal divided in 0.2 dm <sup>3</sup>	
Accuracy at atmospheric pressure		±3% from Qmin. Up to 2Qmin. ±2% from 2Qmin. Up to Qmax.	
Temperature range		-29 to +60 °C	



Dimension (mm)

A	B	C	D	E
247	257	85	315	196





## G4 Diaphragm Gas Meter (STE)

The National Iranian Gas Company has launched a nationwide project to replace the enhanced domestic gas meters in collaboration with the selected gas meter manufacturers in order to refurbish the natural gas metering equipment, enhance performance of the domestic gas meters for better management of gas consumption and reducing waste of natural gas across the country.

Ekbatan Gas Control Company as a leading manufacturer and exporter of domestic gas meters, relying on technical knowledge of the organization, years of experience in production of gas metering equipment, and potentials of the technical and engineering staff, has managed to design and produced the enhanced diaphragm meters using the latest technologies.

The enhanced meters produced by this company comply with the latest version of IGS-M-IN-101(4) standard of the National Iranian Gas Company. The products meet the requirements of enhanced meters replacement projects as well as the customers' expectations.

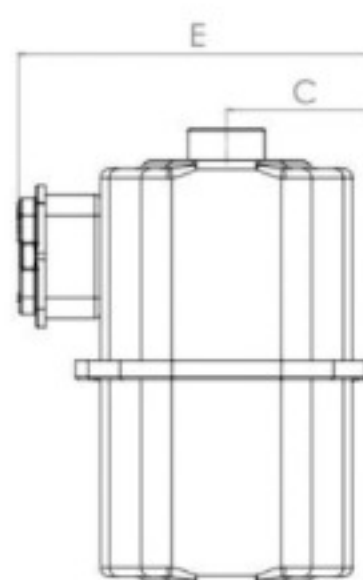
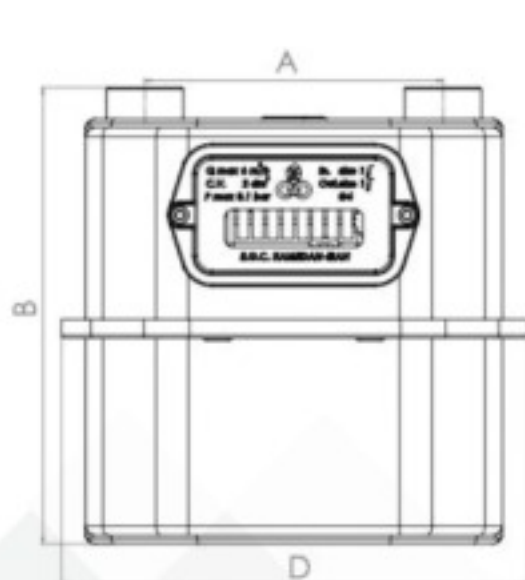


## Features

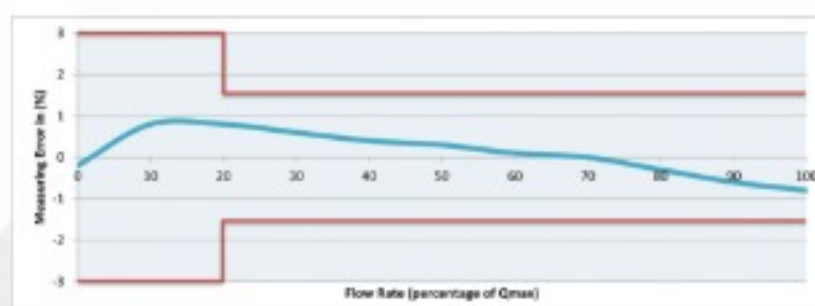
- ◆ Housing Material: ST14 Ultra-High Tensile Strength Steel
- ◆ Metal core (internal motor) with two-way mechanism
- ◆ ST12 stainless steel diaphragm box with high strength anti-corrosion coating
- ◆ POM crowbars, arms, and joints
- ◆ POM gear wheels
- ◆ Impact and UV resistant polycarbonate (PC) numerator shield
- ◆ Anti-manipulation numerator frame
- ◆ NBR diaphragm, highly resistant to heat and wear, highly flexible in different temperature ranges, and highly resistant to hydrocarbon fluids contained in natural gas
- ◆ Bakelite parts made of gas grade materials by ISMI Company of Italy (ELCHI raw materials) with more than 50 years of experience and history of sales to well-known companies like Elster and Itron
- ◆ Including sealable swivel nut (seals have serial number)
- ◆ Indexed magnetic test indicator, convertible to smart meter
- ◆ All components and main parts have traceable identification numbers
- ◆ Produced in accordance with IGS-M-IN-101(4) standard of the National Iranian Gas Company
- ◆ Standard Mark of the National Iranian Standards and Industrial Research Organization
- ◆ 5-Year Guarantee and 10-Year Aftersales Service

## Technical Specifications

Characteristics		Diaphragm Gas Meter G4 (STE)
Max Flow Rate (Qmax)		6 m <sup>3</sup> /h
Min Flow Rate (Qmin)		0.04 m <sup>3</sup> /h
Cyclic Volume		2.0 dm <sup>3</sup>
Maximum working pressure		0.5 bar
Inlet/Outlet Nominal size		1 ¼ inch
Connection	Type	THREADED, MALE
	Location	TOP
	Reading Capacity Resolution	0.2 dm <sup>3</sup>
Number of Digits		5 digits plus 3 decimals, last decimal divided in 0.2 dm <sup>2</sup>
Accuracy at atmospheric pressure		±3% from Qmin. Up to 0.1Qmax. ±1.5% from 0.1Qmax. Up to Qmax.
Temperature range		-29 to +60 °C



Dimension (mm)					
Model	A	B	C	D	E
G4-STE	160	272	71	283	176



G4-STE



## G4 Diaphragm Gas Meter (MTX)

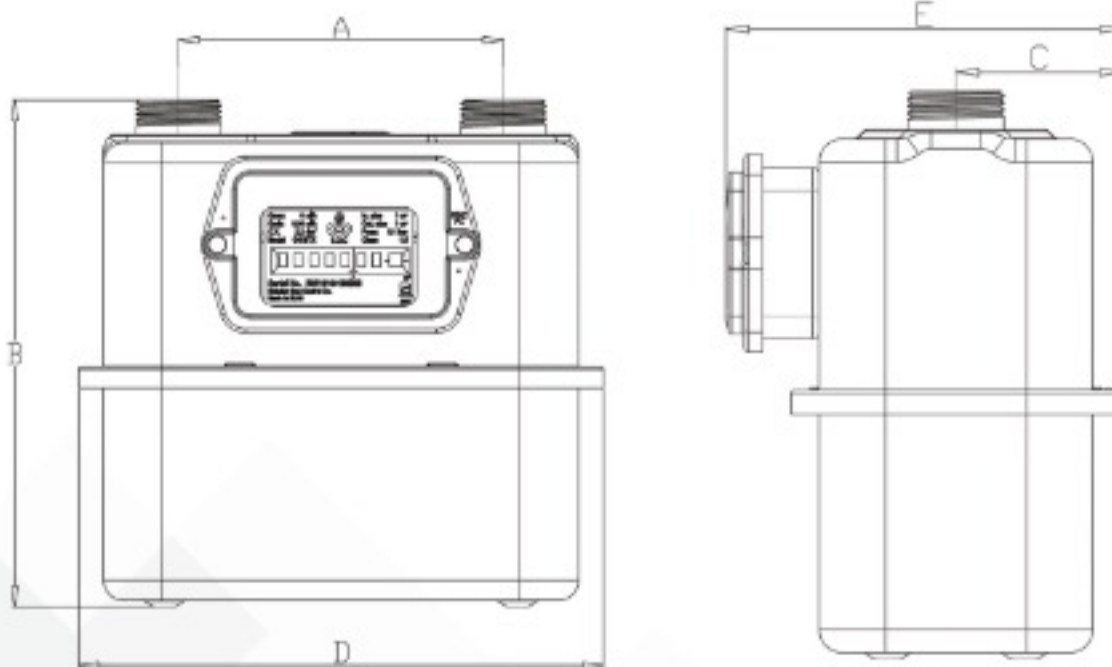


## Features

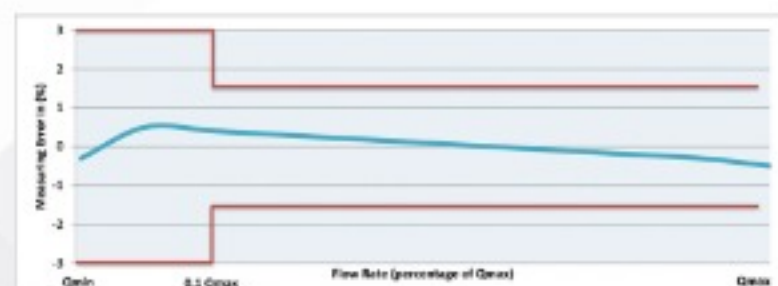
- ◆ Housing Material: Ultrahigh Tensile Strength Steel Plate ST14
- ◆ Internal motor with two-way mechanism
- ◆ Diaphragms made of POM polymer
- ◆ Brachial, flag, stalk, elbow, under-elbow... made of POM, PBT, and PA6-GF30
- ◆ Gear wheels made of POM
- ◆ Indicator shield made of impact and UV resistant polycarbonate (PC)
- ◆ Anti-tampering indicator frame
- ◆ Diaphragms made of reinforced NBR, highly resistant to heat and wear, highly flexible in different temperature ranges, and resistant to hydrocarbon fluids contained in natural gas
- ◆ Gas grade Bakelite parts produced by SMI Co. of Italy (Italian ELCHI materials) with more than fifty years of experience and history of selling parts to well known companies like Elster and Itron
- ◆ Plumb traceable by meter serial number
- ◆ Indexed magnetic test indicator, convertible to smart meter
- ◆ All main parts and components have traceable identification number
- ◆ Produced in accordance with IGS-M-IN-101(4) standard of the National Iranian Gas Company
- ◆ Five-year guarantee and ten-year aftersales service

## Technical Specifications

Characteristics		G4-MTX Diaphragm Gas Meter
Max Flow Rate (Qmax)		6 m <sup>3</sup> /h
Min Flow Rate (Qmin)		0.04 m <sup>3</sup> /h
Cyclic Volume		2.2 dm <sup>3</sup>
Maximum working pressure		0.5 bar
Inlet/Outlet Nominal size		1 ¼ inch
Connection	Type	THREADED, MALE
	Location	TOP
	Reading Capacity Resolution	0.2 dm <sup>3</sup>
Number of Digits		5 digits plus 3 decimals, last decimal divided in 0.2 dm <sup>2</sup>
Accuracy at atmospheric pressure		±3% from Qmin. Up to 0.1Qmax. ±1.5% from 0.1Qmax. Up to Qmax.
Temperature range		-29 to +60 °C



Dimension (mm)					
Model	A	B	C	D	E
G4-MTX	160	250	75	260	175





## Smart Gas Meter

Since the beginning of smart domestic gas meters projects of the National Iranian Gas Company (NIGC), Ekbatan Gas Control Knowledge-Based Company has sponsored and paved the ground for this excellent program. The company, owned by staff and retired personnel of the petroleum industries, presented G4 AMR domestic gas meter with M-Bus radio communication technology as the first automating meter reading (AMR) without external antenna in 2007, at the same time with the advent of AMR technology. Later, due to progress of the technology advancement of the National Iranian Gas Company's requirements, this company started using newer technologies like LORA, and finally the latest and most cost effective internet-of-thing communication technology known as NB-IOT. Accordingly, this company is able to provide services using the latest global technologies upon the National Iranian Gas Company's demand.

Research and Development Department of this company has been working on this project for more than 10 years. With no exaggeration, more than 100,000 man-hours of different hardware, software, and mechanical engineering specialists have been involved in this project. The most modern and efficient internet-of-thing communication method, known as NB-IOT is the fundament of design and development of this product. The product, developed in collaboration with different companies in the fields of communication (Irancell), software (Fanap Zirsakht), and communication modules (Ettesal Sanat Mianeh), is currently in use in operator and LORA networks after passing laboratory tests. The company now introduces G4-Smart Meter, which complies the most with the requirements of the National Iranian Gas Company as prescribed in their request for proposal (RFP). According to the certificate issued by NIGC laboratory and the Smart Domestic Gas Metering Committee, G4-Smart is the only locally-produced meter that passes ATEX test of the Energy and Power Industries Laboratory. As agreed with the domestic operators, this company is ready to install the smart meters and provide NB-IOT coverage services all over the country.

## Structure Automatic Meter Reading System

"Smart System" complies the idea of using hardware, software, communication, and information technologies for monitoring, controlling, and automating utility water, electricity, and gas grids in order to improve management of generation, transmission, and distribution operations.

The first step toward design and development of smart grid is development of an integrated system to transfer and collect energy consumption (or generation) data of the system in order to monitor, control, and analyze the information. As explained about integrity of the smart systems, such systems consist of four subsystems:

- ◆ Smart metering system
- ◆ Communication system
- ◆ Service platform
- ◆ Applications or applied software
- ◆ Smart meter handheld



## Smart Metering System

A smart meter is designed to improve consumption management grid. The system consists of several main components. In this type of meters, the measurements are collected in form of analog signals and then converted to digital data. The computation unit uses the raw data to measure and record the other information required for monitoring and controlling the grid. The meter also includes another unit that records all events and incidents such outage, failures, and tampering.

## Specifications

- ◆ 32 bit cortex M0+ ultralow power processor, a wide range of 32k-32MHz frequencies used to adjust the system performance speed and low power consumption in performance speed of 86uA/MHz, AES encryption algorithm in accordance with FIPS PUB 197, Nov 26, 2001)
- ◆ Tampering detector
- ◆ Temperature sensor with accuracy of 0.1°C, digital, covering a wide range of temperatures (-40 to +125°C), short response time, low consumption
- ◆ LED Graphic Display
- ◆ Bilingual Graphic Display (English-Persian)
- ◆ Password enables setting menu
- ◆ Remote control valve
- ◆ 70-Day Consumption history
- ◆ Modified consumption, alarmed consumption, events, meter status, battery status, date, and time displayed
- ◆ door open detecting system
- ◆ Sustainable memory
- ◆ Data stored for 20 years after power outage
- ◆ Separate memory for firmware backup
- ◆ Firmware loaded in emergency cases like firmware error
- ◆ Optical port for reading/writing under EN62056-21 protocol
- ◆ Compensating and correcting gas consumption in different temperatures
- ◆ Smart communication board using NB-IOT technology
- ◆ Integrated MDM and CMM network for updating firmware



## Communication System

Second phase of implementing the smart domestic gas management system is transferring the generated and recorded data from the meter to the central system through an internet-of-things communication system with wireless technologies such as NB-IOT and LORA.

LORA is a communication network that uses the latest internet-of-things technology. It is a cost effective, high-frequency, and low consumption solution for IOT application, which is preferred to the other communication technologies.

NB-IOT is a hardware infrastructure that facilitates tow-way exchange of information between devices and monitoring center, using 4G narrow band mobile communication technology.



## Service Platforms and Applications

The central system, including datacenter and software packages, as the analytical core of the system, plays an important role in the smart gas management system. Storing a large amount of data in the datacenter is of no benefit to the users. The data will be useful only when they are analyzed and provide significant information to the managers. Without data analysis software, we shall practically have a large amount of meaningless and useless data. The service platform consists of MDM/CMM back up system as well as administrator and user dashboards. The dashboards provide the following features:

- ◆ Two-way communication with the meter
- ◆ Mobile application for prepayment subscribers
- ◆ Backup system and meter settings
- ◆ System report generation
- ◆ Data analysis
- ◆ Billing
- ◆ Updating firmware of the meters
- ◆ Supporting big data
- ◆ Defining alarms, events, and trends

## Technical Specifications



Characteristics		Smart Gas Meter
Max Flow Rate (Qmax)		6 m <sup>3</sup> /h
Min Flow Rate (Qmin)		0.040 m <sup>3</sup> /h
Cyclic Volume		2.0 dm <sup>3</sup>
Maximum working pressure		0.5 bar
Normal Working Pressure		20 mbar
Maximum Pressure Absorption		2 mbar
Connection	Type	THREADED, MALE
	Location	TOP
	Inlet/Outlet Nominal size	1 1/8 inch
Accuracy at atmospheric pressure		±3% from Qmin. Up to 0.1Qmax. ±1.5% from 0.1Qmax. Up to Qmax.
Ambient Temperature Range		-29 to +60 °C
T <sub>b</sub>		15.5 °C (Depends to Customer Demand)
Gas Specification		IGS-M-CH-033
Antenna		Internal
Batteries		Lifetime More than 10 years C+D Lithium Battery, Replaceable
Meter Case IP Protection		IP54. Acc. to EN60529
Smart Electronic Index Ingress		IP65 or IP67 Acc. to EN60529
EMC Approval Electromagnetic Compatibility		Acc. to EN61000-4,6
Local Interface		In Acc. With EN62056-21 or IEC62056-21
Communication Modules		Based on LPWAN
Communication Protocol		NB-IoT
Standard		EN 1359 (Diaphragm gas meter) EN 14236 (Ultrasonic domestic gas meter) OIMLR137-1&2 (Gas meters) EN16314:2013 (Additional Functionalities Devices) WELMEC 7.2 IGS-M-IN-101(4) (Diaphragm gas meter)
Hazardous Area & ATEX		Zone 2 EX iC Acc. to EN60079-0, EN60079-10, EN60079-11, EN60079-15



## Ultrasonic Domestic Gas Meter

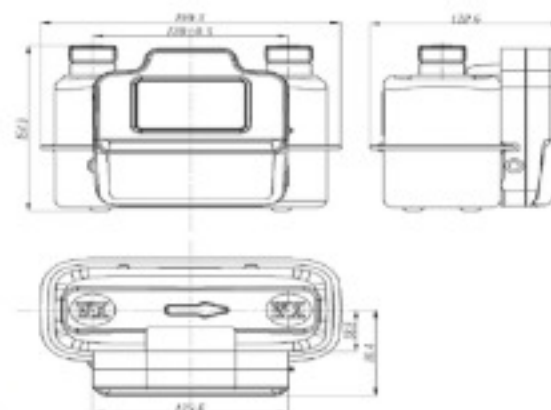
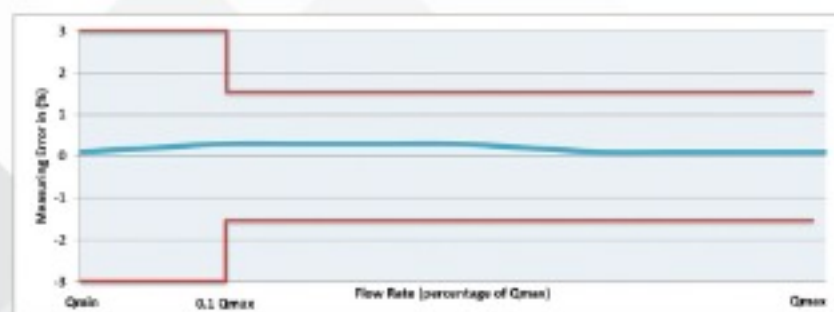


## Features

- ◆ Using ultrasonic waves for measurement
- ◆ Measuring a wide range of gas consumptions with insignificant pressure drop
- ◆ High accuracy due to high sensitivity of the ultrasonic sensors
- ◆ No mechanical parts, no wear or corrosion
- ◆ Two-way measurement of the gas flow
- ◆ Zero-fault measurement in low flow rates
- ◆ Self-testing and detecting internal errors using the extracted date
- ◆ Available with lithium or replaceable AA batteries
- ◆ Less sensitive to dust and deposits due to not including mechanical parts
- ◆ Compatible with wet gases
- ◆ Not sensitive to changes of gas composition and components
- ◆ Low erosion and long lifetime
- ◆ Converted easily to AMR by a radio system
- ◆ Smart metering for AMR/AMI systems
- ◆ Highly repeatable
- ◆ Easy to calibrate
- ◆ Small size (one-third of the diaphragm meters)
- ◆ Lightweight (half of the diaphragm meters)

## Technical Specifications

Model		UG-2.5	UG-4	UG-6
Maximum Flow		2.5 m <sup>3</sup> /h	4.0 m <sup>3</sup> /h	6.0 m <sup>3</sup> /h
Minimum Flow		0.016 m <sup>3</sup> /h	0.025 m <sup>3</sup> /h	0.04 m <sup>3</sup> /h
Working Pressure Range		0.5 - 10 kPa		
Maximum Pressure Loss with valve		250 Pa		
Accuracy	$Q_{min} \leq Q \leq 0.1Q_{max}$	± 3%		
	$0.1Q_{max} \leq Q \leq Q_{max}$	± 1.5%		
Minimum Measurement	Using	0.001 m <sup>3</sup>		
Working Voltage	Alkaline battery	4.5V( 3x5# Alkaline Batteries)		
Meter connection external thread		M30*2 mm		
Distance between connection center		130 mm		
IC Card Seat lifetime (Prepaid Gas Meter)		> 10000 Times		
IC Card lifetime (Prepaid Gas Meter)		> 10000 Times		
Valve lifetime		> 10000 Times		
LCD showing range	Used volume	0000.000-9999999 m <sup>3</sup>		
	Gas flow	0.0000-10.000 m <sup>3</sup>		
Operation current		< 350 uA		
Working environment temperature		-10 to 40°C		
Storage environment temperature		-20 to 60°C		
Relative humidity		≤ 95%		
Net weight		1.3 kg		
Meter shell material		Steel		





## Portable Domestic Gas Meter Testing Device

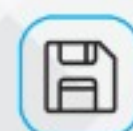
The portable domestic gas meter testing device is designed and produced to verify performance of the subscribers meters at the subscribers premises. The device compares the subscriber's meter with a reference meter approved by the NIGC. In this test, a given amount of air passes through the two meters, and the measured amounts are compared to detect potential error of the subscriber's meter. Finally, the test data are printed and submitted to the subscriber.

This device has advantages such as easy to use, move, install, and operate in maintenance vehicles. The device facilitates instant inspection and testing of the meters and the required operations are done at the lowest cost, with no need to unnecessary transportation, at the subscribers premises.



## Features

- ◆ Can be transported by maintenance vehicles to do the test at the subscribers premises
- ◆ Saving time and cost and improving the testing process
- ◆ Compatible with G2.5, G4, and G6 meters
- ◆ Color touch-controlled display
- ◆ Testing in automatic and manual modes
- ◆ Printing the test data and performance report at the subscribers presence
- ◆ Storing data of 4000 tests
- ◆ Adjustable testing time
- ◆ Supporting English and Persian languages
- ◆ USP port used to transfer the tests data to external memory
- ◆ Adjustable error allowance
- ◆ Minimized operator interference in automatic mode
- ◆ Software updated through USB port
- ◆ Compatible with utility power and car battery



## Technical Specifications

Technical Specifications	
Overall Dimensions	800×400×670 mm
Weight	40±1
Housing Material	ST 37 Steel
Moisture Resistance	N/A
UV Resistance	N/A
Temperature Resistance	-10 to +60°C
Compatible Meters	G2.5, G4, G6
Accuracy	±0.03 liter
Flow Rate	0.04m <sup>3</sup> /h – 10m <sup>3</sup> /h
Start Power	Utility Power or Car Battery
Voltage	12V DC and 220V AC
Display Specifications	7" Color display with a resolution of 480×800 pixels, adjustable background light, capacitive touch screen reading 5 points at the same time, and powerful graphic processor
Main Processor	480 MHz 4-layer industrial board
Modem Connectivity	Yes – Connectable to GPRS and 3G modems for transferring and storing data on the server
Jack Specification	Compatible with gas meter lifting jack
Internal memory	Sufficient memory to store 4000 records on internal memory (can be increased to 12,000 records where needed)
External Memory	Data can be stored on USB flash memory. Firmware can be updated through USB port in place, without sending to the manufacturer
Data output	Digital display, USB flash, built-in thermal printer (for printing reports in Persian with EGCC logo), connection to smart meter to read the consumption measurements
Other specifications	<ul style="list-style-type: none"> <li>• Adjustable access level to prevent operator tampering</li> <li>• Converting Georgian calendar to solar Hijri calendar to store new records based on solar Hijri calendar</li> <li>• Persian and English Menus (more languages can be added)</li> <li>• Restoring the test data</li> <li>• Test parameters and system settings adjusted by graphic interface</li> <li>• Printing test data including date and time, subscription number, meter values (tested and reference meters), error factor</li> </ul>



## Gas Meter Testing and Calibration Device (Bell Prover)

Bell Prover device is a reference system used for calibration of gas metering equipment in different capacities at a given pressure. The device shows capacity, pressure, and flow rate, and is a suitable tool for calibrating commercial and household gas meters. Test data as well as temperature, pressure, displacement, etc. is recorded by sensors installed on the device to do the computations.

The information is then sent to the relevant software. The entire testing process is controlled by a highly accurate software developed exclusively for this device. The user-friendly graphic interface guides the operator throughout the process step by step.

This device is produced in accordance with the latest international standards and has the most up-to-date specifications to make highly accurate computations.

## Features

- ◆ Compatible with diaphragm, ultrasonic, and other types of meters
- ◆ Fully automated calibration system
- ◆ User friendly software under Windows operating system with graphic interface
- ◆ Self-calibration system
- ◆ Meter errors detected, and correction gear determined by the software
- ◆ Exclusive balance system for fast calibration for all devices
- ◆ Initial isobaric error correction system
- ◆ Oil orifice
- ◆ Oil viscosity calculator
- ◆ Ergonomic design for increased workforce efficiency and reduced operator errors
- ◆ Sensor meter reading (reduced calibration time and operator errors)
- ◆ High quality design taking into account production errors, size, temperature, pressure, etc.

## Options

- ◆ Pressure drop calculation system available for each meter
- ◆ Automatic meter reading and extracting statistics online
- ◆ Easy to configure for calibrating larger meters

## Technical Specifications

Characteristics	Features
Meter Type Tested	Diaphragm and Ultrasonic Gas Meters
Tested Fluid	Air (Standard Conditions)
Operating Temperature	21±2 °C
Pressure Drop (Max)	0.5 mbar
Displaced Volume	300 lit
Uncertainty of Volumetric Flow Rate Measurement	±0.2%
Minimum Measurable Volume	0.2 lit
Operating Pressure	18 mbar
Working Humidity Range	Up to 95%
Weight	900 kg
Dimensions	2x1.2x3 m
Blower Power	470 W
Operating System Software	Microsoft Windows XP, Vista, 7, ...
Test Results	Displayed on Screen Monitor (%Proof, %Accuracy, %Error, %Correction) Accept or Reject Indication Differential Pressure reading displayed during test
Communication of Test Data	RS232
Test Sequence	Microprocessor controlled, User selectable
Automatic Leak Test Cycle	User selects sensitivity and duration of the leak test
Automatic Test Cycle	Automatically Controls Speed to Maintain Selected Flow Rate

### Bell Prover Gas Meter Testing and Calibration Device





## Domestic Gas Regulator Test and Calibration Device



Type1



Type2

## Features

- ◆ Easy to operate
- ◆ Capable of testing different domestic gas regulators with different capacities with no need to change the equipment
- ◆ High accuracy
- ◆ Capable of doing all performance tests required by NIGC standards (IGS)
- ◆ Produced exclusively by Ekbatan Gas Control Company
- ◆ Ergonomic design for operator's convenience
- ◆ Easy to install and operate
- ◆ Easy maintenance
- ◆ Exclusive support and aftersales services of Ekbatan Gas Company
- ◆ Approved by NIGC
- ◆ Approved by accredited scientific centers of Iran
- ◆ Patented

## Technical Specifications

### Technical Specifications

Input Pressure Range	0-10 bar
Output Pressure Range	0-2 bar
Pressure Measurement Accuracy	0.1 mbar
Flow Rate Measurement Accuracy	95% of the Nominal Capacity
Testable Regulators	Type 1: 6-10-25m <sup>3</sup> /h (1/4 psi) Type 2: 40 – 65 – 100 – 165 m <sup>3</sup> /h (1/4 psi) , 165 m <sup>3</sup> /h (2 psi)
Dimensions	Type 1 : 150x80x95 cm Type 2 : 200x100x210 cm

## Perfomable Tests

No.	Test name
1	Functional test
2	Set point test
3	Test of Low pressure shut off while closing the inlet flow
4	Test of Low pressure shut off while the outlet flow is over the specified rang
5	Lock up test
6	High pressure shut of test
7	Full internal relief valve test
8	Droop test
9	Internal leakage test
10	Performance curve sketching



## Multi-Jet Water Meter (½ inch)

Water meter is a device used to measure and store amount of water passing through a channel. The main components of the water meter are housing and internal parts.

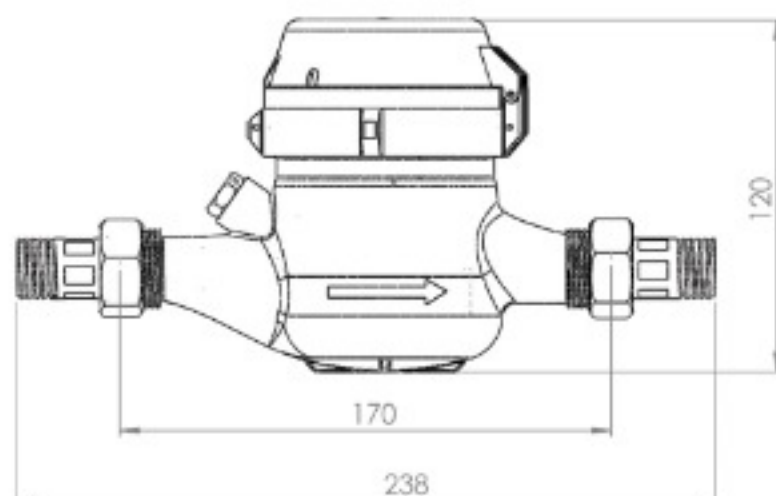
Internal parts are referred to as mechanism, and consist of three main units; i.e. measuring unit (turbine or piston) that is always in contact with water, transmission unit (gearbox), and numerator.

Multi-jet water meters are the most popular water meters used in Iran. This type of meters are available in three types: wet, semi-dry, and dry. If all parts of a meter are in contact with water, it is known as wet; if all parts other than numerator are in contact with water, it is known as semi-dry; and if only turbine is in contact with water, it is known as dry. The meters are categorized in terms of measurement accuracy in A, B, C, and D classes, or classified by  $R=Q3/Q1$  equation.

## Features

- ◆ Designed and produced in accordance with ISO 4064 and OIML-R49 standards
- ◆ Mechanism: Dry and Semi-Dry
- ◆ Measurement accuracy: R160
- ◆ Brass Housing (CuZn40Pb2) and electrostatic paint coating
- ◆ Starting Flow Rate: Less than 6 l/h in pressure of 0.3 bars
- ◆ Pressure drop: less than 0.63 bars
- ◆ Impact and stress resistant shield
- ◆ Suitable for cold water with temperature of less than 50°C
- ◆ Health certificate for all parts in contact with water
- ◆ CE Approved Mechanism
- ◆ Convertible to AMR
- ◆ Compatible with LORA and NB-IOT based integrated energy management system
- ◆ Produced in accordance with National Water and Wastewater Engineering requirements

## Technical Specifications



### Technical sheet

Water meter size		inch	1/2
Permanent flowrate to minimum flowrate ratio	R		160
Maximum flowrate	Q4	Lit/h	3125
Permanent flowrate	Q3	Lit/h	2500
Transfer flowrate	Q2	Lit/h	25
Minimum flowrate	Q1	Lit/h	15.625
Maximum operating pressure	MAP	bar	16
Pressure loss	$\Delta p$	bar	$\Delta p \leq 0.63$
Maximum operating temperature	MAT	°C	50
Water meter readout accuracy		Lit/h	0.5
Maximum reading		m <sup>3</sup>	99999
Minimum reading		m <sup>3</sup>	0.00005
Mounting on the network			Horizontal



## Multi-Jet Water Meter (¾ inch)

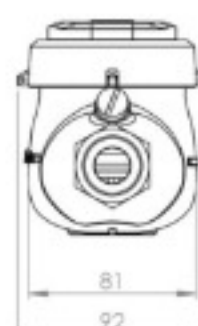
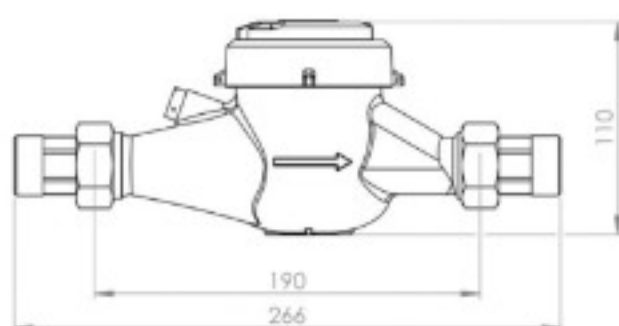
Water meter is a device used to measure and store amount of water passing through a channel. The main components of the water meter are housing and internal parts. Internal parts are referred to as mechanism, and consist of three main units; i.e. measuring unit (turbine or piston) that is always in contact with water, transmission unit (gearbox), and numerator.

Multi-jet water meters are the most popular water meters used in Iran. This type of meters are available in three types: wet, semi-dry, and dry. If all parts of a meter are in contact with water, it is known as wet; if all parts other than numerator are in contact with water, it is known as semi-dry; and if only turbine is in contact with water, it is known as dry. The meters are categorized in terms of measurement accuracy in A, B, C, and D classes, or classified by  $R=Q3/Q1$  equation.

## Features

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- ◆ Mechanism: Dry and Semi-Dry
- ◆ Measurement accuracy: R160
- ◆ Brass Housing (CuZn40Pb2) and electrostatic paint coating
- ◆ Starting Flow Rate: Less than 6 l/h in pressure of 0.3 bars
- ◆ Pressure drop: less than 0.63 bars
- ◆ Impact and stress resistant shield
- ◆ Suitable for cold water with temperature of less than 50°C
- ◆ Health certificate for all parts in contact with water
- ◆ CE Approved Mechanism
- ◆ Convertible to AMR
- ◆ Compatible with LORA and NB-IOT based integrated energy management system
- ◆ Produced in accordance with National Water and Wastewater Engineering requirements

## Technical Specifications



### Technical sheet

Water meter size		inch	3/4
Permanent flowrate to minimum flowrate ratio	R		160
Maximum flowrate	Q4	Lit/h	5000
Permanent flowrate	Q3	Lit/h	4000
Transfer flowrate	Q2	Lit/h	40
Minimum flowrate	Q1	Lit/h	25
Maximum operating pressure	MAP	bar	16
Pressure loss	$\Delta p$	bar	$\Delta p \leq 0.63$
Maximum operating temperature	MAT	°C	50
Water meter readout accuracy		Lit/h	0.2
Maximum reading		m <sup>3</sup>	99999
Minimum reading		m <sup>3</sup>	0.00002
Mounting on the network			Horizontal



## Domestic Water Meter Fatigue Testing Device



Domestic water meter fatigue testing device is used to verify accuracy of ½" and ¾" multi-jet water meters. The device is produced exclusively by the skilled engineers and experts of Ekbatan Gas Control Company, using the latest technologies.

The device can be equipped with human machine interface (HIMI) system to perform and monitor continuous/discontinuous fatigue tests as well as pressure drop test in accordance with ISO4064 and OIML-R49 standards, under the exclusive software, and send the data to the network.

## Features

- ◆ Easy to use
- ◆ Compatible with ½" and ¾" meters
- ◆ Produced exclusively by Ekbatan Gas Control Company
- ◆ No similar products imported or produced locally
- ◆ Ergonomic design for operators' convenience
- ◆ Customer support and aftersales services provided by Ekbatan Gas Control Company
- ◆ Human Machine Interface (HMI) enabled
- ◆ Transfer data to the network

## Specified Tests

- ◆ Fatigue test in accordance with ISO 4064 and OIML-R49
- ◆ Pressure Drop test in accordance with ISO 4064 and OIML-R49

## Technical Specifications



Specifications	
Flow rate range	50-5000 L/h
Working pressure	0-2.5 bar
Compatible meters	½" and ¾"
Dimensions	2300 x 700 x 2030 mm

## Specifications of HMI Smart Control System

- ◆ Touch Control
- ◆ Instant monitoring of all electrical equipment
- ◆ System error detection
- ◆ Full/Empty Tank Detection
- ◆ Water pressure detection
- ◆ Compatible with internet and intranet for data transfer and remote testing
- ◆ Continuous and discontinuous testing modes
- ◆ Testing time recorded in continuous mode
- ◆ Number of tests recorded in discontinuous mode
- ◆ No data missing in case of power outage
- ◆ Testing halted at high pressures to prevent damages made to the booster pump
- ◆ Testing halted when the tank is empty to prevent damages made to the booster pump
- ◆ Store and display all errors that terminated testing
- ◆ Solar Hijri calendar and time enabled
- ◆ Upgradable software and hardware





Manufacturer of Energy Safety, Regulation and Metering Equipment

