

***IGEM/G/1. 3rd Impression
Communication 1733***

***Defining the end of the Network, a meter
installation and installation pipework***



*Founded 1863
Royal Charter 1929
Patron: Her Majesty the Queen*



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SECTION 1 : INTRODUCTION

1.1 This Standard provides a framework and standard approach for new gas distribution mains, services, primary meter installations and installation pipework and include:

- definitions for the end of the gas network, the primary meter installation (including any associated regulator) and installation pipework
- illustrations of a range of recommended arrangements and those which, for historical reasons, are not recommended with respect to their design or layout and are "legacy" arrangements
- identification of boundaries and interfaces.

This 3rd Impression of IGE/G/1 contains enhancements to the 2006 version (Communication 1723) and 2004 version (Communication 1703) which do not affect the currency of either the 2006 or the 2004 version which do not require to be updated.

These enhancements address:

- the change from 'General Gas Procedures' to an IGEM Standard
- updated references (Appendix 2).

The 2006 enhancements addressed:

- change of series title from "General Gas Guidance" to "General Gas Procedures" (now superseded)
- updated general information as given in Sub-Sections 1.3 and 1.5
- confirmation that both distribution main valves and service isolation valves represent pipeline isolation valves (PIVs) as used in later IGEM technical publications, for example IGE/G/5
- updated references (Appendix 2).

1.2 For the purposes of this Standard, definitions have been agreed between parties involved in the introduction of competition into metering activities in Great Britain. The Institution of Gas Engineers and Managers (IGEM) consulted appropriate regulatory bodies (HSE, Ofgem and CORGI), associations of gas transporters (GTs), suppliers and shippers, primary meter/regulator and installation pipework owners and installers and manufacturers of pipe, meters, regulators and other equipment associated with gas systems at the end of networks.

1.3 Arising from the provision in the Gas Act 1986 (as amended) (see clause 3.1.2), metering services and, in particular, the provision of gas supply meters at gas consumers' premises are provided by competitive service providers under the revision of gas metering arrangements (RGMA).

In order to facilitate the operation of the market and to provide necessary controls, a number of industry documents have been published which include:

- OFGAS Gas Metering Definitions
- OFGAS Codes of Practice, CoP1/a, 1/b and 1/c, which specify standards and processes applicable to meter installations
- Ofgem CoP for meter asset managers (MAMs)
- OFGAS Meter Competition Focus Group – Definitions Expert Group Final Report, June 2000, which defines the competitive area for meter installations.

Note: It is anticipated that some definitions in these documents have or will change now that IGE/G/1 has been published.

IGE/G/1 was developed by the Ofgem Metering Technical Issues Sub-Group. It builds on the above documents to provide additional and supplementary detail

to assist parties who have statutory duties under legislation in the development of arrangements and to assist in the provision of a safe and secure supply of gas to consumers.

1.4 In defining the end of the network, there are repercussions with respect to the boundaries of responsibility between a GT with network management responsibilities, the meter installation owner/MAM and the installation pipework owner/operator. Notwithstanding the Notes (below), the document is, to IGEM's best knowledge, consistent with the current editions of:

- Gas Safety (Management) Regulations (GS(M)R)
- Gas Safety (Installation and Use) Regulations (GS(I&U)R)
- Pipeline Safety Regulations (PSR)
- Pressure Systems Safety Regulations (PSSR).

Note 1: This Standard contains specific terminology which may differ from the legal meaning.

Note 2: This Standard does not include all possible configurations, and the law may allow deviation from the common practices shown. For example, the designation of an "emergency control" in a particular situation will, ultimately, rest on the facts of the case i.e. primarily on intended use by a consumer of gas.

It is not the intention of IGE/G/1 to define the party responsible for any part of a whole installation or to set constraints on GT responsibilities.

1.5 This Standard recognises inconsistency between relevant official CoPs, guidance to legislation, and national and industry standards. They attempt to consolidate the varied use of different terms across such publications, to provide a base for their future amendment and to represent current best practice. These publications include:

- HS (L) 56
- HS (L) 80
- HS (L) 81
- HS (L) 82
- HS (L) 122
- OFGAS Gas Metering Definitions (see Sub-Section 1.3)
- OFGAS CoPs: 1/a, 1/b and 1/c (see Sub-Section 1.3)
- Ofgem MAMCoP (see Sub-Section 1.3)
- IGE/GM/5
- IGE/GM/6
- IGE/GM/7
- IGE/GM/8
- IGE/UP/1
- IGE/UP/1A
- IGE/UP/1B
- IGE/UP/2
- IGE/TD/3
- IGE/TD/4
- IGE/TD/13
- IGE/TD/15
- IGE/G/5
- BS 6400-1
- BS 6400-2
- BS 6891.

Appendix 2 provides detail of these publications.

SECTION 2 : SCOPE

- 2.1 This Standard is applicable to all Natural Gas systems and defines the boundaries and interfaces between the end of the Network, a primary meter installation and installation pipework and, in addition, provides a definition of recommended gas supply arrangements which will simplify any new arrangements that are required to ensure a safe and secure supply of gas to a consumer.

Note: The definition of these boundaries and interfaces is essential so that relevant information can be exchanged between organisations and persons who have a duty to ensure a safe and secure supply of gas to premises.

- 2.2 All pressures are gauge pressures unless otherwise stated.

- 2.3 The term "regulator" is intended to mean "meter regulator" unless otherwise stated.

SECTION 3 : LEGISLATION, CODES OF PRACTICE AND OFFICIAL GUIDANCE

3.1 GENERAL

3.1.1 This Standard assumes that organisations and persons are aware of relevant legislation. It does not change, replace or supersede the requirements of legislation nor any arrangements that are in place to manage the supply of gas nor does it detail any duties or requirements that may arise as a conveyor of gas on the Network, the operator of a pipeline, the user of a pressure system, the owner of a primary meter, an installer or a gas consumer.

3.1.2 Relevant to this Standard are:

- Gas Act 1986 which has been amended by:
 - Competition and Service (Utilities) Act 1992 (clause 43)
 - Gas (Exempt Supplies) Act 1993 (c.1)
 - Gas Act 1995
 - Competition Act (1998 (c.41)
 - Utilities Act 2000 (c.27)
- Gas Safety (Installation and Use) Regulations 1998 (GS(I&U)R), as amended
- Gas Safety (Management) Regulations 1996 (GS(M)R)
- Health and Safety at Work etc. Act 1974 (HSWA)
- Management of Health and Safety at Work Regulations 1999 (MHSWR)
- Pipeline Safety Regulations 1996 (PSR)
- Pressure Systems Safety Regulations 2000 (PSSR)
- HS (L) 56
- HS (L) 80
- HS (L) 81
- HS (L) 82
- HS (L) 122.

3.2 SELECTED EXTRACTS

Note: This Standard does not always, and is not intended to, use precisely the definitions given below (see Sub-Section 1.4). Where definitions for terms within this sub-section are not given in Section 4 or 5, the definition as given in the appropriate Regulations, ACoP or Guidance applies.

3.2.1 GS(M)R

Regulation 6 (8)

"A person who conveys gas in a network shall, where he is requested to do so by a person proposing to carry out work in relation to a gas fitting, provide him with information about the operating pressures of the gas at the outlet of a service pipe."

Guidance 2 (1)

"An emergency control is a valve intended for use by a consumer for turning off the gas supply in an emergency. An emergency control will always be found at the end of a service pipe but additional controls may be found in premises, for example, if the primary meter is moved to assist a disabled person."

"A service pipe connects the distribution main to individual premises, terminating at the outlet of the emergency control valve immediately upstream of the installation pipework and other gas fittings."

3.2.1.3 *Guidance 2 (2)*

"A network starts from a processing facility, storage facility or interconnector importing gas into Great Britain but does not include it. However, where a pipeline, for the time being, is used to convey gas from Great Britain, it will be necessary for the gas transporter on that pipeline to prepare a safety case in accordance with these Regulations. The end of the network is the outlet of the emergency control at the end of the service pipe."

3.2.2 **GS(I&U)R**

3.2.2.1 *Part A Regulation 2 (1)*

"Service pipe" as being "means a pipe for distributing gas to a premises from a distribution main, being a pipe between the distribution main and the outlet of the first emergency control downstream from the distribution main".

3.2.2.2 *Part B Regulation 9 (1)*

"No person shall for the first time enable gas to be supplied for use in any premises unless there is provided an appropriately sited emergency control to which there is adequate access."

3.2.2.3 *Part B Regulation 9 (2)*

"Any person installing an emergency control shall ensure that:

- a) any key, lever or hand-wheel of the control is securely attached to the operating spindle of the control;
- b) any such key or lever is attached so that –
 - 1) the key or lever is parallel to the axis of the pipe in which the control is installed when the control is in the open position; and
 - 2) where the key or lever is not attached so as to move only horizontally, gas cannot pass beyond the control when the key or lever has been moved as far as possible downwards;
- c) either the means of operating the key or lever is clearly and permanently marked or a notice in permanent form is prominently displayed near such means as to indicate when the control is open and when the control is shut; and
- d) any handwheel indicates the direction of opening or closing of the control."

3.2.2.4 *Part B Regulation 9 (3)*

"Where a person installs an emergency control which is not adjacent to a primary meter, he shall immediately thereafter prominently display on or near the means of operating the control a suitably worded notice in permanent form indicating the procedure to be followed in the event of an escape of gas."

3.2.2.5 *Part B Regulation 14 (1)*

"No person shall install a primary meter or meter bypass used in connection with a primary meter unless –

- 1) there is a regulator controlling the pressure of gas supplied through the meter or the bypass, as the case may be, which provides adequate automatic means for preventing the gas fittings connected downstream side of the regulator from being subjected to a pressure greater than that for which they were designed;
- 2) where the normal pressure of the gas supply is 75 mbar or more at the inlet to the regulator, there are also adequate automatic means for

- preventing, in case the regulator should fail, those gas fittings from being subjected to such a greater pressure; and
- 3) where the regulator contains a relief valve or liquid seal, such valve or seal is connected to a vent pipe of adequate size and so installed that it is capable of venting safely."

3.2.3 **Guidance to GS(I&U)R (HS(L)56)**

3.2.3.1 *Guidance 2*

"Although there may be more than one emergency control serving a particular premises, it is the outlet of the first emergency control downstream of the distribution main which marks the interface between a service pipe and installation pipework. There is a similar interface in other related legislation, e.g., the Pipeline Safety Regulations 1996."

3.2.3.2 *Guidance 9 (2)*

"The emergency control can operate by a key, lever or a handwheel which should be securely attached to the operating spindle of the control. Where a key or lever is used, the 'open' position should be when the key or lever is parallel with the axis of the pipe. The 'off' position should be approximately one quarter turn of the key or lever to the right or left, where the key or lever moves in the vertical plane, the move to the 'off' position should be in the downwards direction. Either the key or lever itself, or a nearby permanent notice, should indicate how the control operates and when the gas is 'off' and 'on'."

"Controls operated by handwheels need to indicate the opening and/or closing directions for the control."

3.2.4 **PSR**

Regulation 3

"A pipeline for supplying gas to premises shall be deemed not to include anything downstream of an emergency control."

"Emergency control means a valve for shutting off the supply of gas in an emergency, being a valve intended for use by a consumer of gas."

SECTION 4 : PRIMARY DEFINITIONS

The definitions in this section represent IGEN's interpretation of legislation in Great Britain and the OFGAS Gas Metering Definitions. In general, all the definitions accommodate all "recommended gas supply arrangements" (see Sub-Section 6.1 and Appendix 3) but some also accommodate "legacy gas supply arrangements" (see Sub-Section 6.2 and Appendix 4).

4.1 NETWORK

The Network comprises interconnecting pipes which are downstream of a gas reception terminal, processing facility, storage facility or importing interconnector, and used for the conveyance of gas to consumers as defined in GS(M)R.

Note: A "network" is part of the "Network".

4.2 END OF THE NETWORK

The end of the Network is the outlet of the emergency control valve (ECV) as defined by relevant legislation and explained further in Sub-Section 4.3.

4.3 EMERGENCY CONTROL VALVE (ECV)

The ECV is a valve, not being an "additional emergency control valve" (AECV) (see Sub-Section 4.5) for shutting off the supply of gas in an emergency, intended for use by a consumer of gas and being installed at the end of a service or distribution main. The outlet of the ECV terminates, and thus defines the end of, the Network.

Note: The gas conveyer (which is, normally, a GT) has to agree the designation of the ECV which defines the end of the Network. For all "recommended gas supply arrangements", the ECV will be upstream of all components of the meter installation.

4.4 METER INSTALLATION

4.4.1 A meter installation includes a primary meter and any associated volume conversion system, valve, filter, meter regulator or PRI, flexible connection, meter by-pass, interconnecting pipework, fitting and support.

4.4.2 A meter installation commences at either:

- the outlet of the first common valve through which all the gas entering the meter installation will pass and which is upstream of the first meter regulator/PRI (including any filtration) upstream of the meter or,
- in the case of a meter upstream of a regulator/PRI, or of an unregulated supply, the outlet flange of the first common valve upstream of the primary filter(s) for the meter installation.

4.4.3 A meter installation terminates at either:

- the outlet connection of the meter (if a meter outlet valve (MOV) is not fitted) or,
- the outlet of the meter outlet adaptor if fitted or,
- the outlet of the MOV (or outlet spool) if fitted or,
- the outlet of the tee fitted downstream of the meter where a meter by-pass rejoins the pipework on the outlet of the meter or,
- in the case of a meter upstream of a regulator/PRI, the outlet of the regulator/PRI outlet valve (PRIOV) or spool piece for a regulator by-pass or, where a twin stream regulator/PRI is installed, the outlet of the tee where the two streams join or,
- if provided, the outlet of the meter installation outlet valve (MIOV) or,

- in the case of a semi-concealed domestic meter with a flexible connection downstream of the meter, the outlet of the meter box outlet adaptor, whichever is appropriate for the system.

4.5 **ADDITIONAL EMERGENCY CONTROL VALVE (AECV)**

An AECV is a valve, not being the ECV, for shutting off the supply of gas in an emergency, intended for use by a consumer of gas. An AECV may be located within either the meter installation or installation pipework and, as such, may not isolate all of the consumer's pipework or meter installation.

Note 1: An AECV does not denote the end of the Network and is always fitted downstream of the ECV. The existence of an AECV does not affect the existence of an ECV (which is always required).

Note 2: Advice on labelling ECVs and AECVs is given in IGE/GM/8 Part 5, IGEM/UP/2 and IGE/TD/4, as appropriate.

4.6 **INSTALLATION PIPEWORK**

Installation pipework is any pipework or fitting from the outlet of the meter installation (see Sub-Section 4.4) to points at which appliances/equipment are to be connected. It does not mean:

- a service (pipe) or distribution main or other pipeline
- a pipe or fitting comprised in a gas appliance
- a pipe or fitting within a meter installation
- any valve attached to a storage container or cylinder.

SECTION 5 : SECONDARY DEFINITIONS

arrangements	The processes, practices and contracts that an organisation or person has in place to manage their undertaking.
badged meter	A gas meter which has been stamped and/or approved by OFGEM or other metrological authority acceptable to OFGEM, as legal metrology and which operates within prescribed statutory limits.
consumer	An end-user of gas.
creep relief valve	A relief valve of limited capacity, provided to protect the downstream system from excess pressure resulting from poor regulator lock-up or any thermal expansion of gas in the downstream system.
distribution main	Any pipeline through which a transporter is for the time being distributing gas and which is not being used only for conveying gas in bulk.
distribution main valve (DMV)	<p>A valve (other than an ECV or service isolation valve (SIV)) for controlling the supply of gas, being a valve:</p> <ul style="list-style-type: none"> • incorporated in a distribution main • intended for use by a transporter • not situated in a building. <p><i>Note: Both DMVs and SIVs (see below) represent pipeline isolation valves (PIVs), a term used in later IGEM technical publications.</i></p>
duty holder	A person or organisation having responsibility in law.
filter inlet valve (FIV)	A valve fitted upstream of, and adjacent to, a filter to shut off the supply of gas.
filter outlet valve (FOV)	A valve fitted downstream of, and adjacent to, a filter to shut off the supply of gas.
gas conveyor	A person who conveys gas through pipes and the Network and having duties under GS(M)R and PSR and who may also hold a Gas Transportation Licence.
gas fitting	<p>Gas pipework, valves (other than the ECV), regulators, meters, fittings, apparatus and appliances designed for use by consumers of gas for heating, lighting, cooking or other purposes for which gas can be used, but it does not mean:</p> <ul style="list-style-type: none"> • any part of a distribution main or service (pipe) • any part of a pipeline upstream of a distribution main or service (pipe) • a gas storage vessel • a gas cylinder or cartridge designed to be disposed of when empty.
gas meter	A measuring instrument that records the volume of gas passing through it.
gas system	A system comprising the distribution main/service (pipe), ECV, meter installation and installation pipework and any AECV to supply a consumer's appliance.

gas transporter (GT)	A company, licensed by Ofgem, which transports gas through its network on behalf of a gas shipper.
inlet isolation valve (IIV)	A valve, normally not being an ECV and never installed downstream of an ECV, to enable isolation of gas to all parts of a building, by an authorised party which (usually) is not the gas consumer. <i>Note: In some instances, it may be permissible for the IIV to be the designated ECV.</i>
legacy gas supply arrangements	Gas supply arrangements (usually that have been installed prior to the publication of IGE/G/1) and that are not consistent with the installations defined as being recommended gas supply arrangements.
legacy meter owner	A GT which provided a meter under licence conditions prior to the publication of IGE/G/1 in a configuration not consistent with "recommended gas supply arrangements".
maximum operating pressure (MOP)	The maximum pressure at which a system can be operated continuously under normal operating conditions.
meter asset manager (MAM)	An organisation that works on behalf of the meter owner to install, replace, repair and maintain a meter installation.
meter by-pass	Any pipe, and associated gas fittings used in connection with it, used to supply gas to a consumer without passing through the meter.
meter inlet valve (MIV)	A valve fitted upstream of, and adjacent to, a gas meter to shut off the supply of gas.
meter installation inlet valve (MIIV)	A valve fitted upstream of all the other components of a meter installation to shut off the supply of gas.
meter installation outlet valve (MIOV)	A valve fitted downstream of all the other components of a meter installation to shut off the supply of gas through a meter installation.
meter outlet adaptor	A fitting which facilitates the connection of a gas consumer's installation pipework to the outlet of a meter.
meter outlet valve (MOV)	A valve fitted downstream of, and adjacent to, a gas meter to shut off the supply of gas.
meter owner	The person owning a meter and/or a meter installation (see also "legacy meter owner").
meter regulator	A device located in close proximity to a primary meter which is solely to control the pressure of the gas within the measurement device and/or installation pipework and is not separated from the measurement device by buried pipework, except short lengths specifically included in the installation design for access purposes. <i>Note 1: A "low pressure" regulator is a device, with maximum operating pressure (MOP) upstream not exceeding 75 mbar, that maintains a controlled outlet pressure within pre-determined limits of accuracy under flow conditions and ensures that the downstream pressure is kept within acceptable limits under no-flow conditions.</i>

Note 2: A "medium pressure" regulator is a device, with MOP upstream exceeding 75 mbar but not exceeding 2 bar, that maintains a controlled outlet pressure within pre-determined limits of accuracy under flow conditions and ensures that the downstream pressure is kept within acceptable limits under no-flow conditions. This may include integral safety devices, for example slam-shut valves (in which case it is defined as a PRI).

operator (of a gas pipeline)	The person who is to have or (once gas is conveyed) has, control over the conveyance of gas in the pipeline.
pipeline isolation valve (PIV)	Either a DMV or a SIV.
premises (HSA 1974)	<p>"Premises" includes any place, and in particular, includes:</p> <ul style="list-style-type: none"> (a) any vehicle, vessel, aircraft or hovercraft, (b) any installation on land (including the foreshore and other land intermittently covered by water), any offshore installation, and any other installation (whether floating, or resting on the seabed or the subsoil thereof, or resting on other land covered with water or the subsoil thereof, and (c) any tent or movable structure. <p><i>Note: "Domestic premises" means premises occupied as a private dwelling (including any garden, yard, garage, outhouse or other appurtenance of such premises which is not used in common by the occupants of more than one such dwelling), and "non-domestic premises" are construed accordingly.</i></p>
premises pipework	Pipework provided by the occupier of premises which is not adopted by the upstream GT but which is not "installation pipework".
primary meter	<p>A gas meter, the index reading of which constitutes the basis of charge for all gas supplied through that meter.</p> <p><i>Note: This definition is a variation of the legal definition taken from GS(I&U)R.</i></p>
pressure regulating installation (PRI)	An assembly of equipment designed to regulate, or reduce, the pressure of gas. A PRI comprises all pressure-containing and associated equipment between the upstream face of the PRIIV and the downstream face of the PRIOV.
recommended gas supply arrangements	Gas supply arrangements that are recognised by IGE/G/1, its drafting Panel, and gas industry representatives on IGE/G/1's technical Committees, and other endorsing bodies, as being preferred arrangements.
regulator/PRI inlet valve (PRIIV)	A valve fitted upstream of, and adjacent to, a regulator/PRI to shut off the supply of gas.
regulator/PRI outlet valve (PRIOV)	A valve fitted downstream of, and adjacent to, a regulator/PRI to shut off the supply of gas.
relief valve	A valve which automatically opens at a pre-determined pressure to vent gas so as to relieve the pressure in a gas system.
service (pipe)	A pipe for conveying gas to premises from a distribution main, being any pipe between a distribution main and the outlet of the ECV.

Note: The service (pipe) is, normally, owned by, or is the responsibility of, a GT.

service isolation valve (SIV)

A valve (other than an ECV) for controlling the supply of gas, being a valve:

- incorporated in a service (pipe)
- intended for use by a transporter
- not situated inside a building.

Note: Both DMVs and SIVs (see above) represent pipeline isolation valves (PIVs), a term used in later IGEM technical publications.

shipper

As defined in the Gas Act.

slam-shut valve

A valve that is designed to close quickly in the event of an abnormal (usually excess) pressure being detected downstream, and which requires manual intervention to reset.

supplier

As defined in the Gas Act.

SECTION 6 : RECOMMENDED AND LEGACY GAS SUPPLY ARRANGEMENTS

6.1 RECOMMENDED GAS SUPPLY ARRANGEMENTS

6.1.1 The end of the Network and the inlet and outlet of a meter installation need to be defined so that the boundaries of responsibility are clear and arrangements between duty holders made which will ensure a safe and secure supply of gas.

6.1.2 Arrangements are simplified if the meter installation and installation pipework are wholly downstream of the outlet of the ECV and all recommended gas supply arrangements require this to be the case, in which case the meter installation and installation pipework are not part of the Network. The owner or user of the meter installation and of the installation pipework would not, therefore, be conveyors of gas on the Network and would not be subject to the general duties required of a gas conveyor under GS(M)R.

Similarly, the owner or user of a meter installation and of installation pipework are not operators of a pipeline and, therefore, are not subject to the requirements of PSR. However, the meter installation may be subject to the requirements of PSSR.

The provision of distribution mains, services, meter installations and installation pipework in accordance with recommended gas supply arrangements will meet the relevant requirements of legislation and assist in the development and maintenance of arrangements.

6.1.3 Appendix 3 illustrates recommended gas supply arrangements with a number of generic examples. The examples are not exhaustive and, where other types of system are provided, the principles set out in Appendix 3 apply.

6.2 LEGACY GAS SUPPLY ARRANGEMENTS

6.2.1 Some existing arrangements will not be fully consistent with the specified definitions and recommended gas supply arrangements but, nevertheless, the interface between duty holders has to be defined. Appendix 4 illustrates a number of examples of such arrangements. These suggestions do not form any part of any definition in this document, unless otherwise stated. For such systems, any arrangements would be complex. However, in general, the network and a meter installation are owned and operated by a single organisation, usually a GT, which is the relevant duty holder.

Parties agreeing to continue with legacy gas supply arrangements will need to be fully aware of the legal issues involved. In particular, compliance with GS(M)R, PSR and GS(I&U)R will need to be achieved.

Unless all involved parties are in agreement to continue the design, it is expected that such existing systems will be modified to meet the recommended approach, if reasonably practicable.

Legacy gas supply arrangements are not considered appropriate for new gas supply arrangements.

APPENDIX 1 : ACRONYMS

ACoP	Approved Code of Practice
AECV	Additional emergency control valve
CoP	Code of Practice
CORGI	Council for Registered Gas Installers
DMV	Distribution main valve
ECV	Emergency control valve
FIV	Filter inlet valve
FOV	Filter outlet valve
GC	Gas conditioning
GS(I&U)R	Gas Safety (Installation and Use) Regulations
GS(M)R	Gas Safety (Management) Regulations
GT	Gas transporter
HSWA	Health and Safety at Work etc. Act
HSE	Health and Safety Executive
IGE	Institution of Gas Engineers
IGEM	Institution of Gas Engineers and Managers
IIV	Inlet isolation valve
MAM	Meter Asset Manager
MBV	Meter by-pass valve
MHSWR	Management of Health and Safety at Work Regulations
MIIV	Meter installation inlet valve
MIOV	Meter installation outlet valve
MIV	Meter inlet valve
MOP	Maximum operating pressure
MOV	Meter outlet valve
OFGAS	Office of Gas Supply
Ofgem	Office of Gas and Electricity Markets
PE	Polyethylene
PIV	Pipeline isolation valve
PRI	Pressure regulating installation
PRIIV	PRI inlet valve
PRIOV	PRI outlet valve
PSR	Pipeline Safety Regulations
PSSR	Pressure Systems Safety Regulations
RD	Rotary displacement
SIV	Service isolation valve.

APPENDIX 2 : REFERENCES

A2.1 LEGISLATION

- Gas Act 1986 which has been amended by:
 - Competition and Service (Utilities) Act 1992 (clause 43)
 - Gas (Exempt Supplies) Act 1993 (c.1)
 - Gas Act 1995
 - Competition Act (1998 (c.41)
 - Utilities Act 2000 (c.27)
- Gas Safety (Installation and Use) Regulations 1998, as amended
- Gas Safety (Management) Regulations 1996
- Health and Safety at Work etc. Act 1974
- Management of Health and Safety at Work Regulations 1999
- Pipeline Safety Regulations 1996
- Pressure Systems Safety Regulations 2000.

A2.2 OFFICIAL CODES OF PRACTICE

- OFGAS Gas Metering Definitions 1996
- OFGAS Codes Of Practice 1/a, 1/b and 1/c
- Ofgem MAMCoP.

A2.3 INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM)

- IGE/GM/5
Edition 2
Selection, installation and use of electronic gas meter volume conversion systems
- IGE/GM/6
Specification for low pressure diaphragm and rotary displacement meter installations with badged meter capacities exceeding 6 m³/h (212 ft³/h) but not exceeding 1076 m³/h (38000 ft³/h)
- IGE/GM/7
Edition 2
Electrical connections and hazardous area classification for gas metering equipment
- IGE/GM/8
Non-domestic meter installations. Flow rate exceeding 6 m³ h⁻¹ and inlet pressure not exceeding 38 bar
- IGE/UP/1
Edition 2
Reprint with Amendments
Strength testing, tightness testing and purging of industrial and commercial gas installations
- IGE/UP/1A
Edition 2
Reprint with Amendments
Strength testing, tightness testing and direct purging of small low pressure industrial and Natural Gas installations
- IGE/UP/1B
Edition 2
Tightness testing and purging of domestic sized Natural Gas installations
- IGE/UP/2
Edition 2
Installation pipework on industrial and commercial premises
- IGE/UP/9
Edition 2
Application of Natural Gas and fuel oil systems to gas turbines and supplementary and auxiliary fired burners
- IGE/TD/1
Edition 4
Steel pipelines for high pressure gas transmission
- IGE/TD/3
Edition 4
Steel and PE pipelines for gas distribution
- IGE/TD/4
Edition 4
PE and steel gas services and service pipework

- IGE/TD/13 Pressure regulating installations for transmission and distribution systems
- IGE/G/5 Gas installations in flats and other multi-dwelling buildings

A2.4 **BRITISH STANDARDS INSTITUTION (abbreviated titles)**

- BS 6400-1 Domestic meter installations (≤ 75 mbar)
- BS 6400-2 Domestic meter installations (> 75 mbar ≤ 2 bar)
- BS 6891 Domestic pipework installations.

A2.5 **OTHER DOCUMENTS**

- Meter Competition Focus Group - Definitions Expert Group Final Report 30th June 2000
- HS (L) 56 Safety in the installation and use of gas systems and appliances (AcoP and Guidance)
- HS (L) 80 A guide to the Gas Safety (Management) Regulations 1996 (Guidance)
- HS (L) 81 Design, construction and installation of gas service pipes (AcoP and Guidance)
- HS (L) 82 A guide to the Pipelines Safety Regulations 1996 (Guidance)
- HS (L) 122 Safety of pressure systems (ACoP).

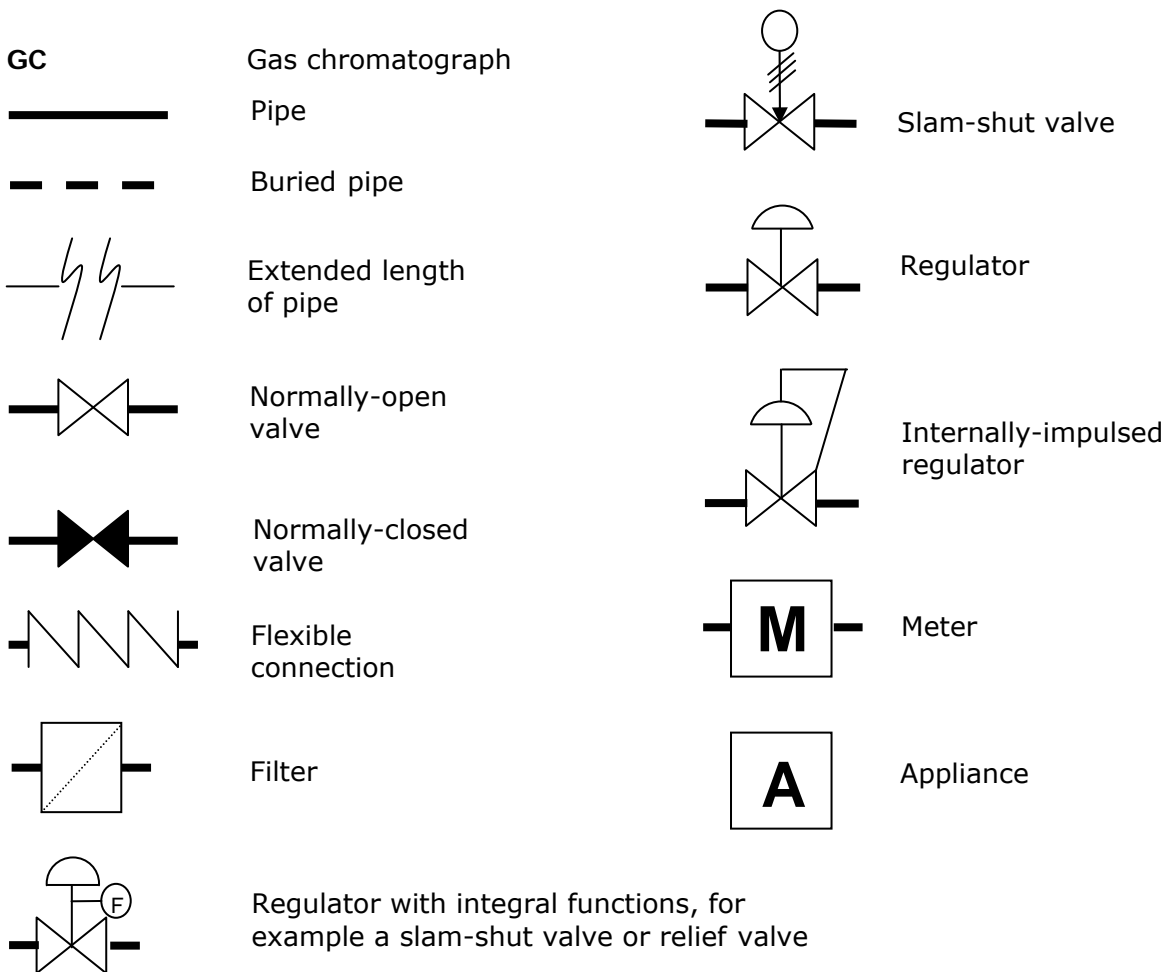
APPENDIX 3 : RECOMMENDED GAS SUPPLY ARRANGEMENTS

All new system designs need to be produced in accordance with current standards.

Figure 2 provides an overview of which standards apply to the different types of equipment in different applications.

The examples which follow show a number of more detailed line diagrams of recommended arrangements and indicate the boundary between the Network, a meter installation and installation pipework.

The line diagrams do not show all aspects of a system but simply the major components. Components such as creep relief valves, top hat strainers, purge and vent points, installation pre-heating, equipotential bonding etc. generally are not shown.



Colour Code for Figures 3 to 25 (not Figure 2):





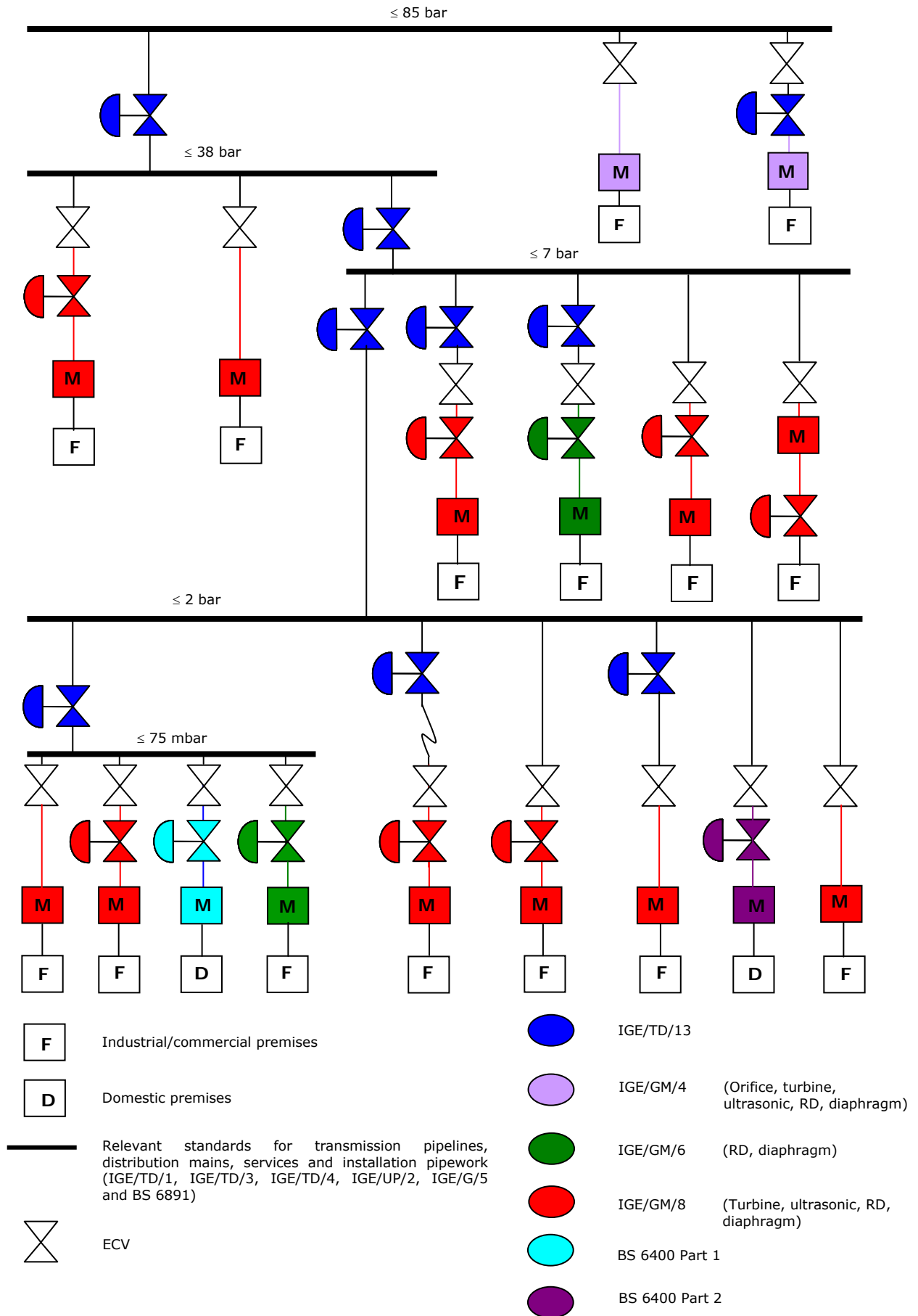
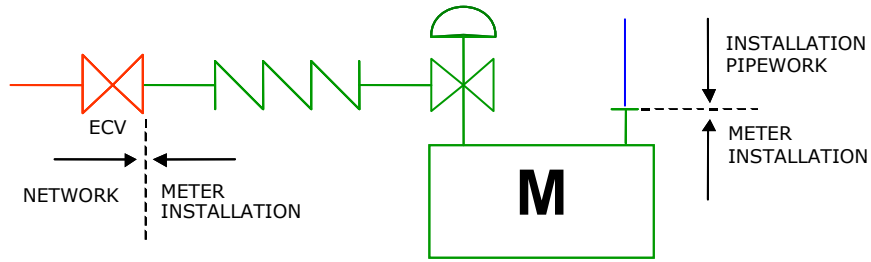
-  - Pipework which is on the Network
-  - Parts of a meter installation not on the Network
-  - Installation pipework
-  - Ancillary plant.

FIGURE 1 - KEY TO FIGURES 2 to 25



Note: The colour coding given in Figure 1 does not apply to this figure.

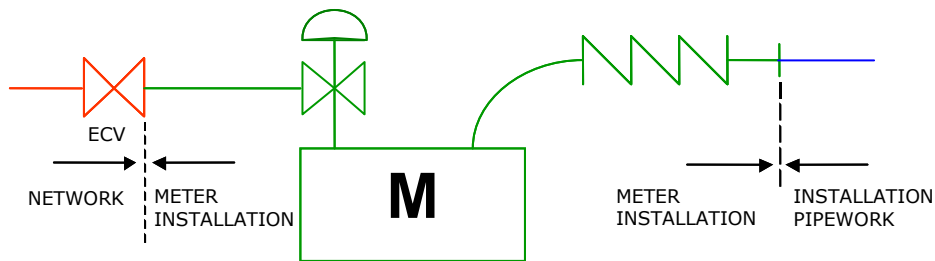
FIGURE 2 - STANDARDS APPLICABLE TO RECOMMENDED GAS SUPPLY ARRANGEMENTS



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-1
- installation pipework to BS 6891 (domestic) and/or IGEM/UP/2 (industrial and commercial).

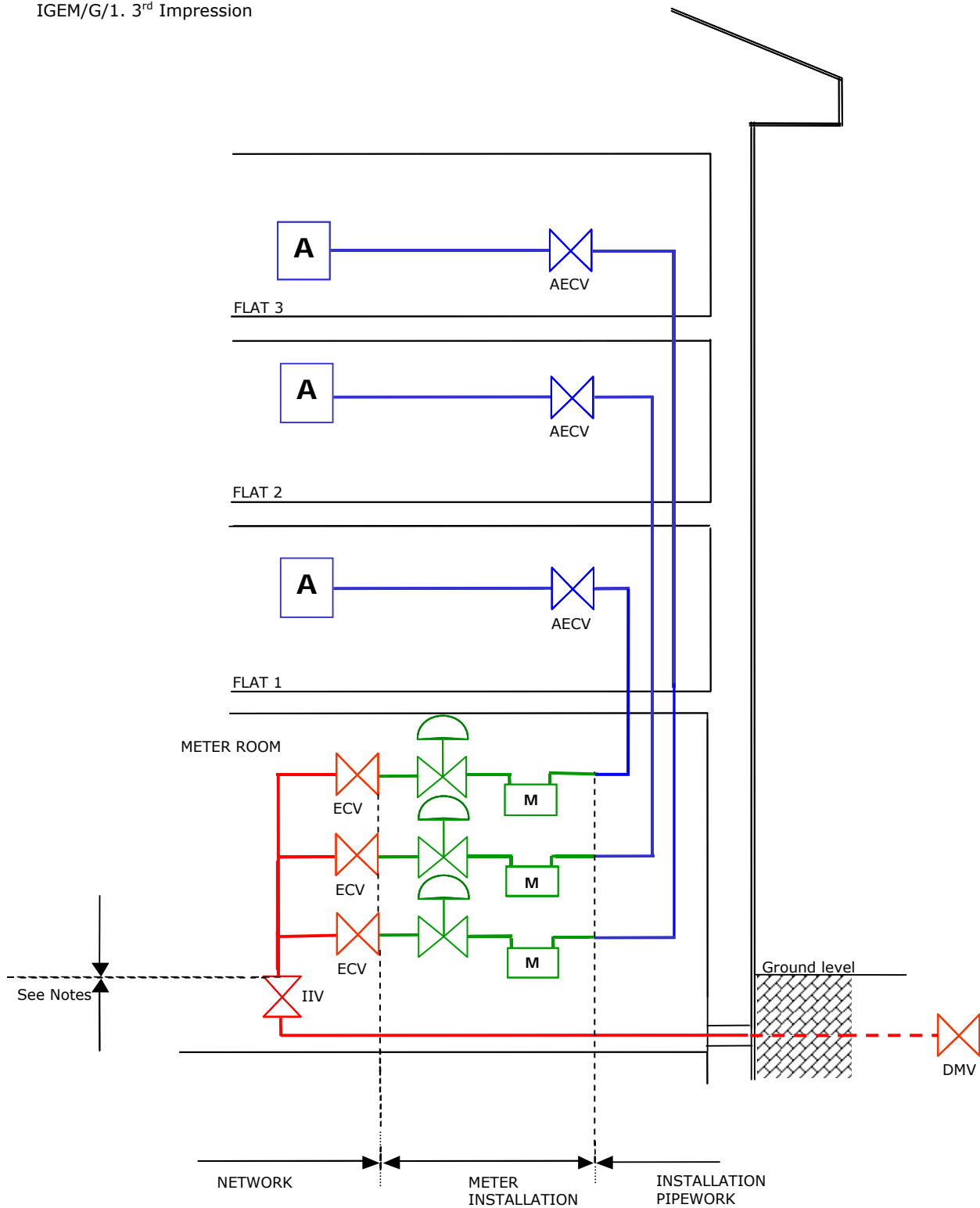
FIGURE 3 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
CAPACITY \leq 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-1
- installation pipework to BS 6891 (domestic) and/or IGEM/UP/2 (industrial and commercial).

FIGURE 4 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
SEMI-CONCEALED INSTALLATION.
CAPACITY \leq 6 m³ h⁻¹



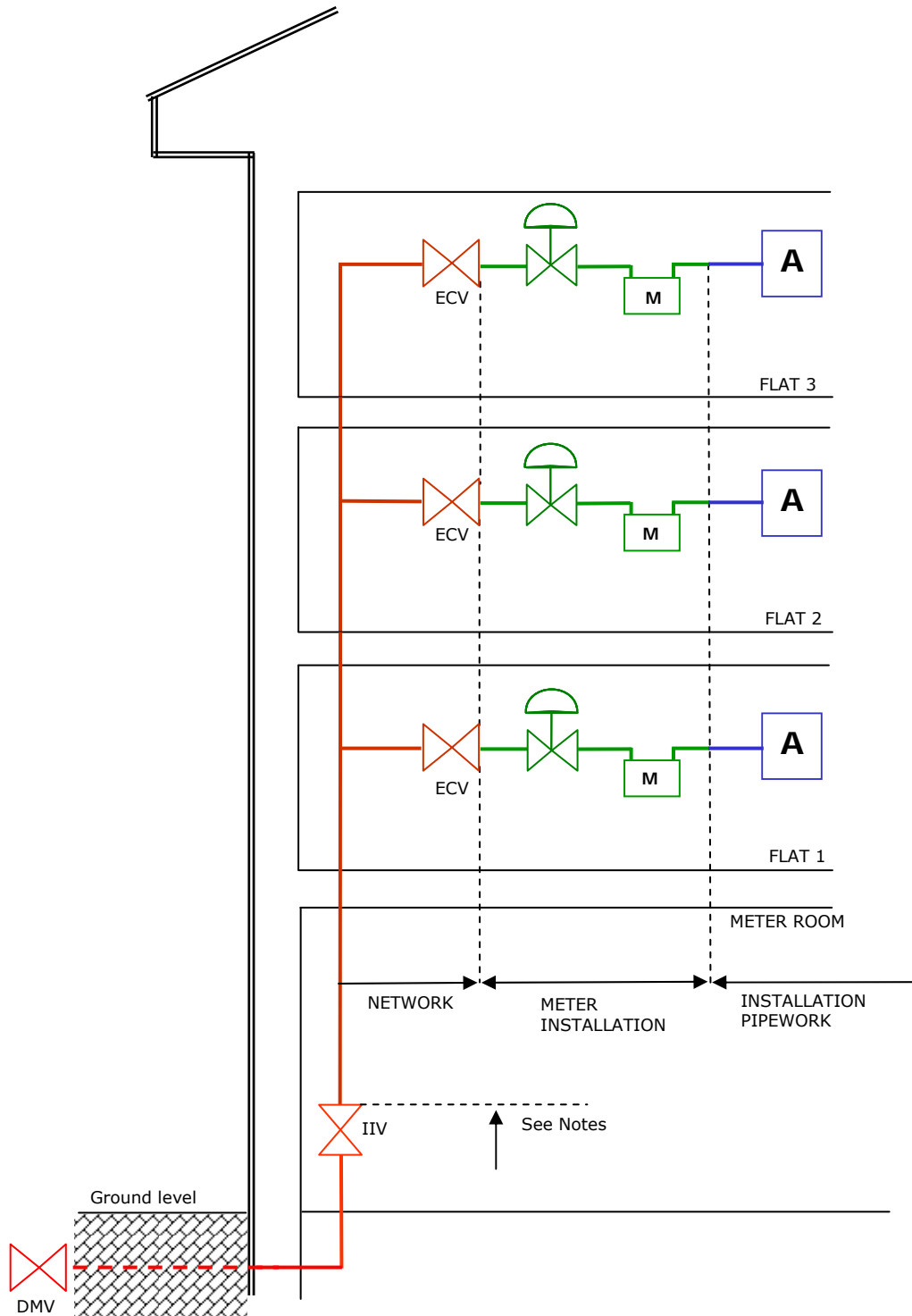
Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-1
- installation pipework to BS 6891 (domestic) and/or IGEM/UP/2 (industrial and commercial)
- generally to IGE/G/5.

Notes: In some situations, a conveyor may change to another GT or to an organisation such as a local authority at the outlet of the IIV. If there is more than one conveyor on the Network, arrangements between conveyors include exchange of information to ensure a suitable pressure is available at the end of the Network and all parties have to be aware of their statutory duties.

The alternative arrangement is that the upstream conveyor (usually a GT) is asked to adopt the pipework between the outlet of the IIV and the outlet of each ECV.

**FIGURE 5 - RECOMMENDED ARRANGEMENT.
 SUPPLY MOP ≤ 75 mbar.
 LOCATED IN HIGH RISE BUILDINGS (BANKED METERS).
 EACH METER CAPACITY ≤ 6 m³ h⁻¹**



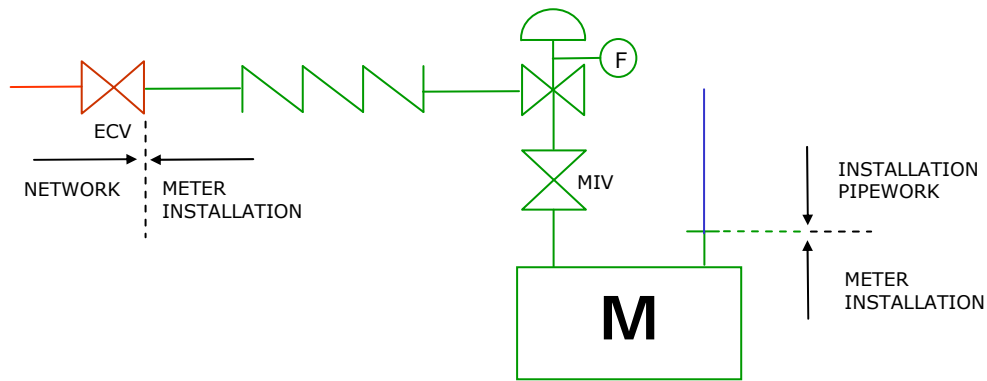
Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-1
- installation pipework to BS 6891 (domestic) and/or IGE/UP/2 (industrial and commercial)
- generally to IGE/G/5.

Notes: In some situations, a conveyor may change to another GT or to an organisation such as a local authority at the outlet of the IIV. If there is more than one conveyor on the Network, arrangements between conveyors include exchange of information to ensure a suitable pressure is available at the end of the Network and all parties have to be aware of their statutory duties.

The alternative arrangement is that the upstream conveyor (usually a GT) is asked to adopt the pipework between the outlet of the IIV and the outlet of each ECV.

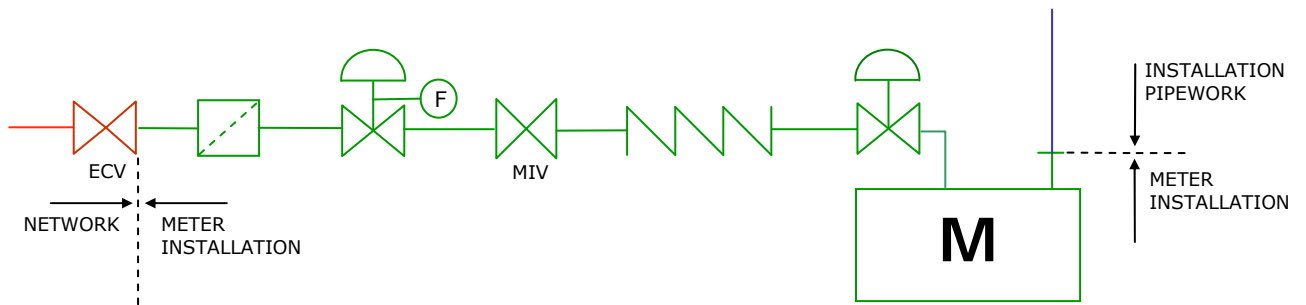
FIGURE 6 - RECOMMENDED ARRANGEMENT. SUPPLY MOP \leq 75 mbar. LOCATED IN HIGH RISE BUILDINGS (SINGLE SERVICE RISER TO INDIVIDUAL METERS). EACH METER CAPACITY \leq 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-2
- installation pipework to BS 6891 and/or IGE/UP/2.

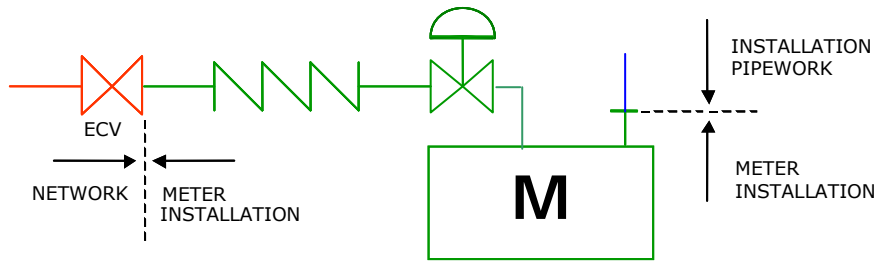
FIGURE 7 - RECOMMENDED ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
CAPACITY ≤ 6 m³ h⁻¹ (see also Figure 8)



Functional standards:

- network to IGE/TD/3 or IGE/TD/4 and IGE/TD/15
- meter installation to BS 6400-2
- installation pipework to BS 6891 and/or IGE/UP/2.

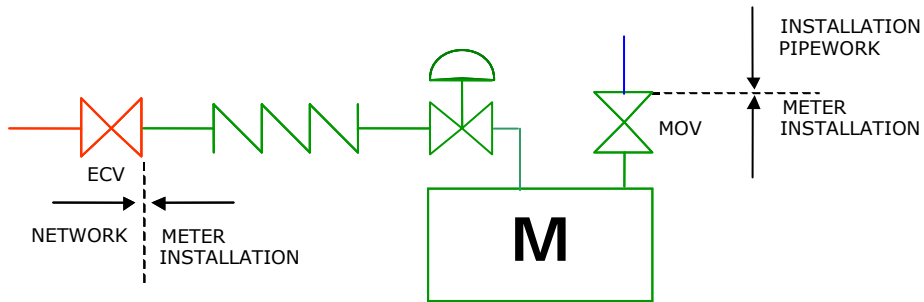
FIGURE 8 - RECOMMENDED ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
CAPACITY ≤ 6 m³ h⁻¹ (see also Figure 7)



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/6 or IGE/GM/8
- installation pipework to IGEM/UP/2.

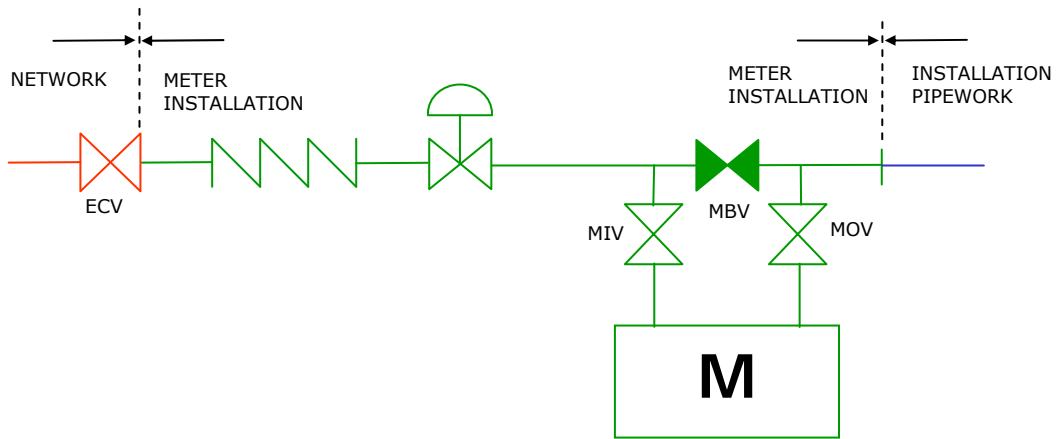
FIGURE 9 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
DIAPHRAGM METER.
 $6 \text{ m}^3 \text{ h}^{-1} < \text{CAPACITY} \leq 25 \text{ m}^3 \text{ h}^{-1}$



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/6
- installation pipework to IGEM/UP/2.

FIGURE 10 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
DIAPHRAGM METER.
 $\text{CAPACITY} > 25 \text{ m}^3 \text{ h}^{-1}$



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/6 or IGE/GM/8
- installation pipework to IGEM/UP/2.

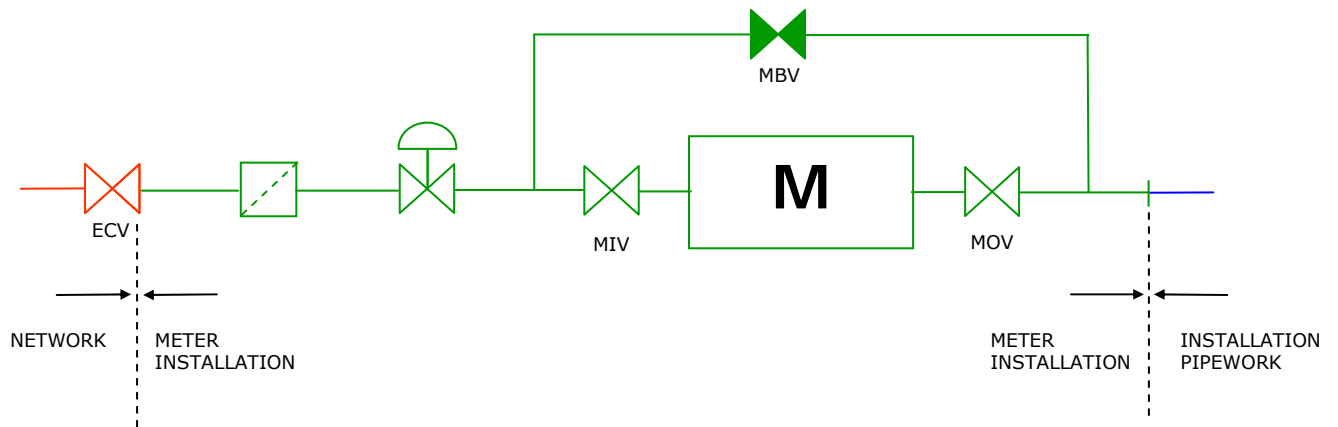
FIGURE 11 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
DIAPHRAGM METER WITH BY-PASS.
CAPACITY $>$ 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/6 or IGE/GM/8
- installation pipework to IGEM/UP/2.

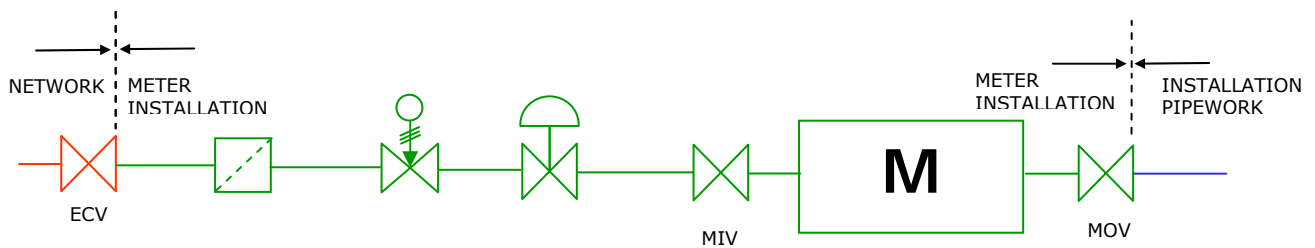
FIGURE 12 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
RD OR TURBINE METER.
CAPACITY $>$ 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/6 or IGE/GM/8
- installation pipework to IGEM/UP/2.

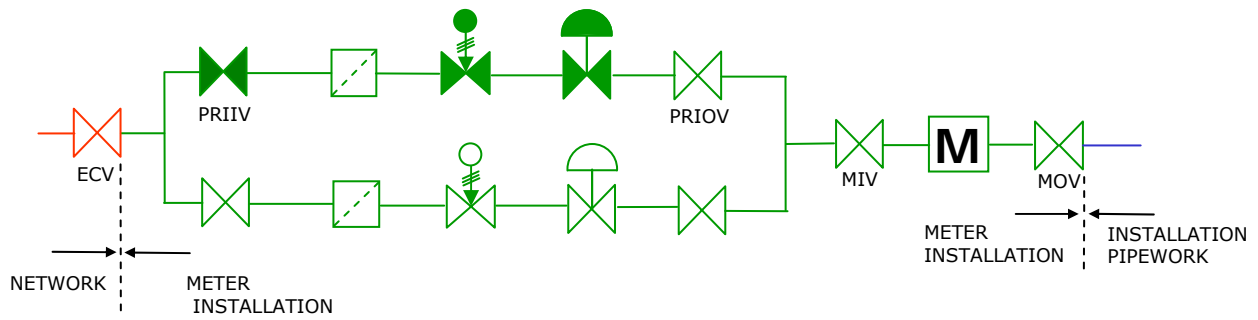
FIGURE 13 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
RD or TURBINE METER WITH BY-PASS.
CAPACITY $>$ 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8
- installation pipework to IGEM/UP/2.

FIGURE 14 - RECOMMENDED ARRANGEMENT.
75 mbar $<$ SUPPLY MOP \leq 2 bar.
SINGLE STREAM.
DIAPHRAGM, RD OR TURBINE METER.
CAPACITY $>$ 6 m³ h⁻¹

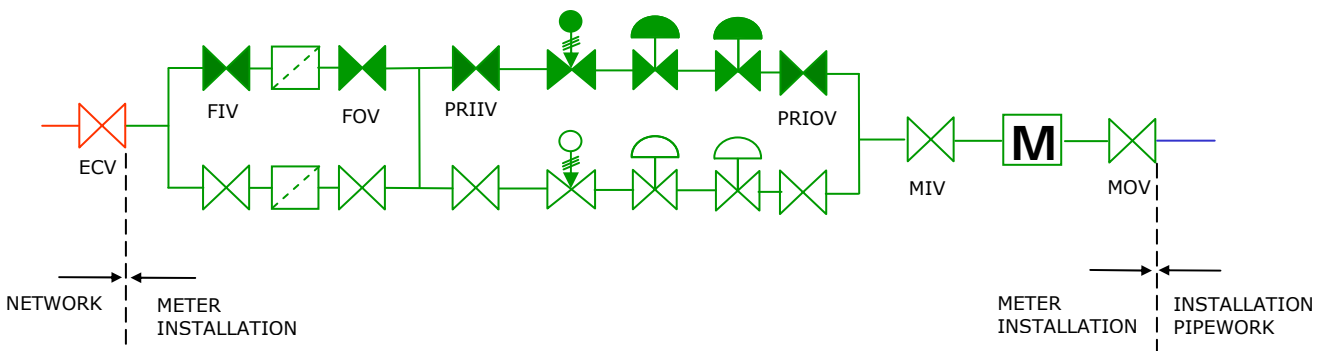


A meter by-pass may be fitted.

Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8
- installation pipework to IGE/UP/2.

FIGURE 15 - RECOMMENDED ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
TWIN STREAM.
DIAPHRAGM, RD OR TURBINE METER.
CAPACITY > 6 m³ h⁻¹

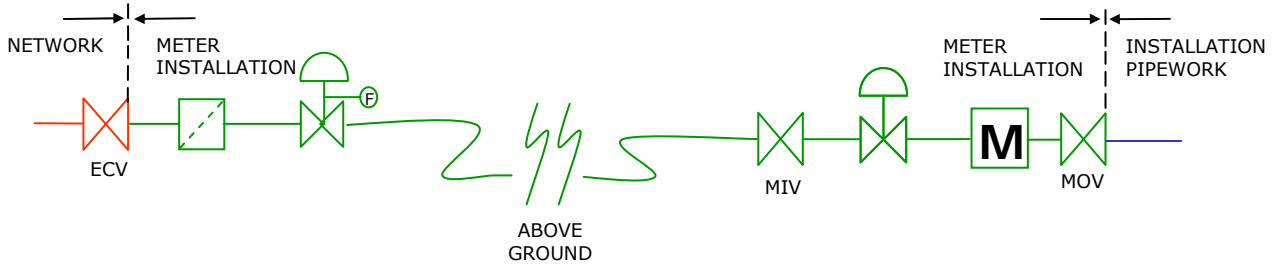


A meter by-pass may be fitted.

Functional standards:

- Network to IGE/TD/1 or IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8
- installation pipework to IGE/UP/2 or IGE/UP/9.

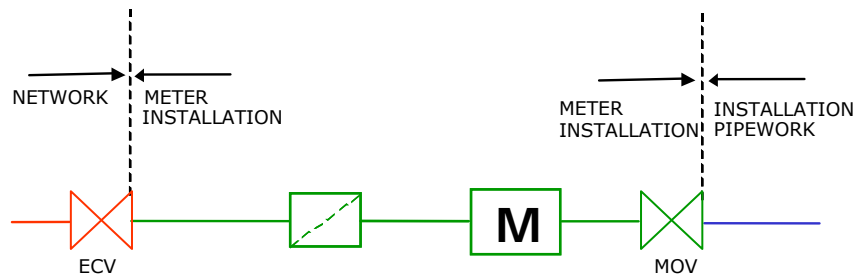
FIGURE 16 - RECOMMENDED ARRANGEMENT.
2 bar < SUPPLY MOP ≤ 38 bar.
TWIN STREAM.
DIAPHRAGM, RD OR TURBINE METER.
CAPACITY > 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/1 or IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8
- installation pipework to IGEM/UP/2 or IGE/UP/9.

FIGURE 17 - RECOMMENDED ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 38 bar.
REMOTE REGULATORS SEPARATED BY ABOVE GROUND
PIPEWORK.
CAPACITY > 6 m³ h⁻¹

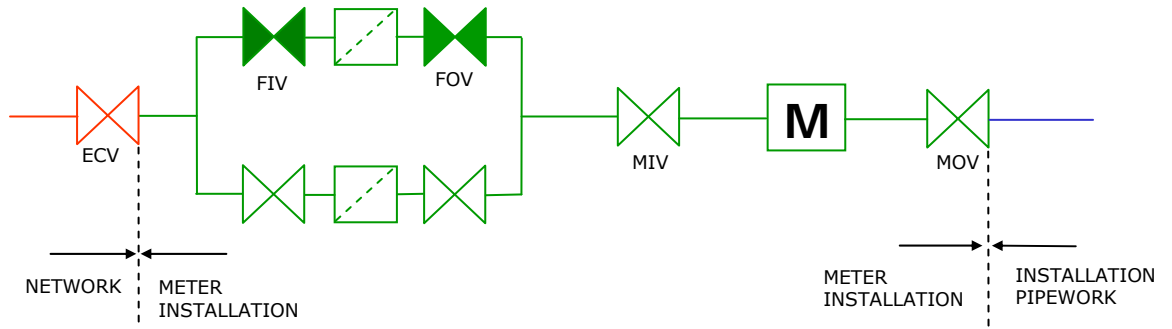


Note: An unregulated supply requires exemption if GS(I&U)R apply, (Reg 40).

Functional standards:

- Network to IGE/TD/1 or IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8 (MOP ≤ 38 bar) or principles of IGE/GM/4 (MOP > 38 bar)
- installation pipework to IGEM/UP/2 or IGE/UP/9.

FIGURE 18 - RECOMMENDED ARRANGEMENT.
ANY SUPPLY MOP.
UNREGULATED SINGLE STREAM.
NON-DOMESTIC.
CAPACITY > 6 m³ h⁻¹

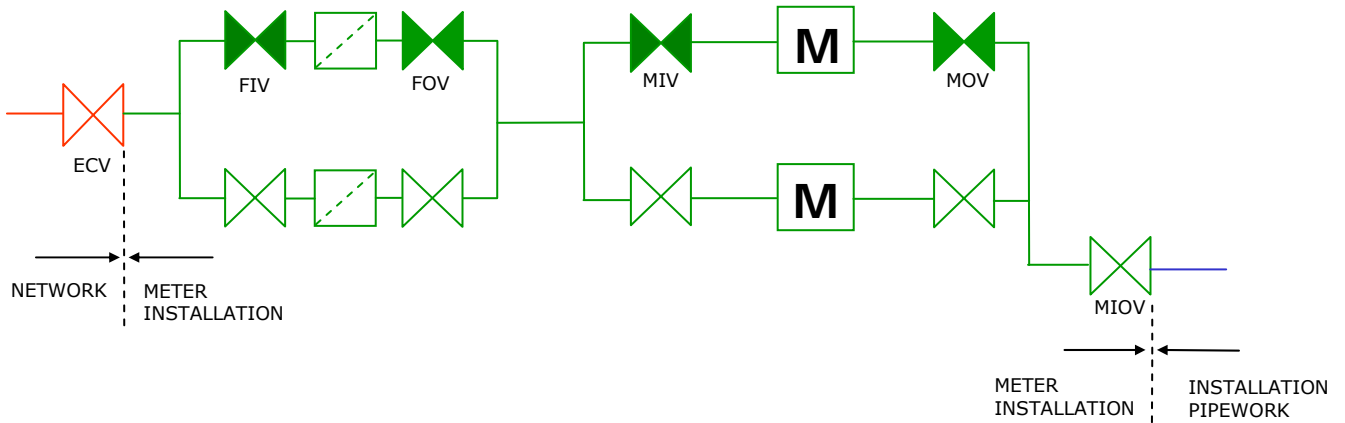


Note: An unregulated supply requires exemption if GS(I&U)R apply, (Reg 40).

Functional standards:

- Network to IGE/TD/1 or IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8 (MOP ≤ 38 bar) or principles of IGE/GM/4 (MOP > 38 bar)
- installation pipework to IGEM/UP/2 or IGE/UP/9.

**FIGURE 19 - RECOMMENDED ARRANGEMENT.
ANY SUPPLY MOP.
UNREGULATED TWIN FILTER STREAM.
NON-DOMESTIC.
CAPACITY > 6 m³ h⁻¹**

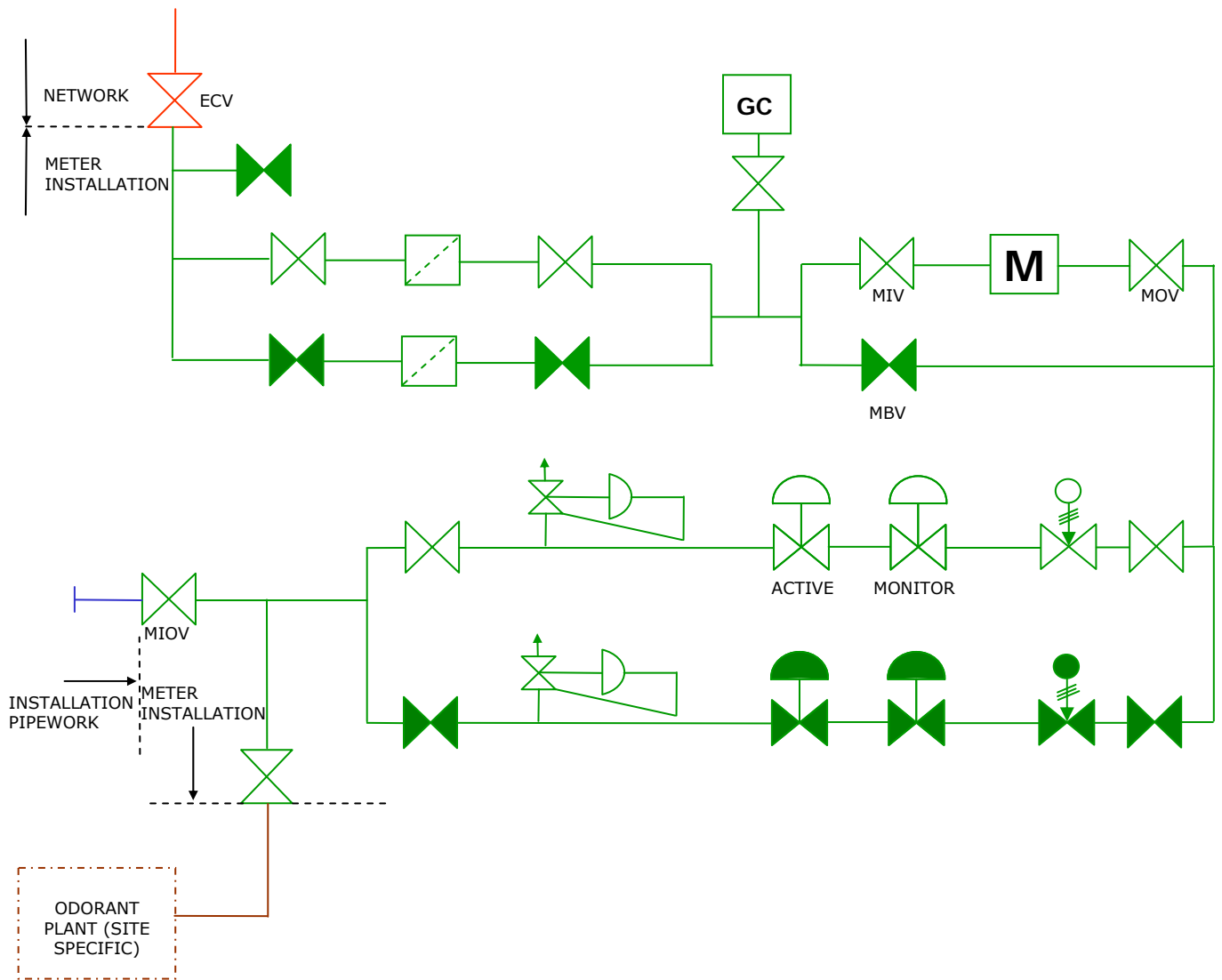


Note: An unregulated supply requires exemption if GS(I&U)R apply, (Reg 40).

Functional standards:

- Network to IGE/TD/1 or IGE/TD/3 or IGE/TD/4
- meter installation to IGE/GM/8 (MOP ≤ 38 bar) or principles of IGE/GM/4 (MOP > 38 bar)
- installation pipework to IGEM/UP/2 or IGE/UP/9.

**FIGURE 20 - RECOMMENDED ARRANGEMENT.
ANY SUPPLY MOP.
UNREGULATED LARGE TWIN FILTER AND TWIN METER
STREAM.
NON-DOMESTIC.
CAPACITY > 6 m³ h⁻¹**

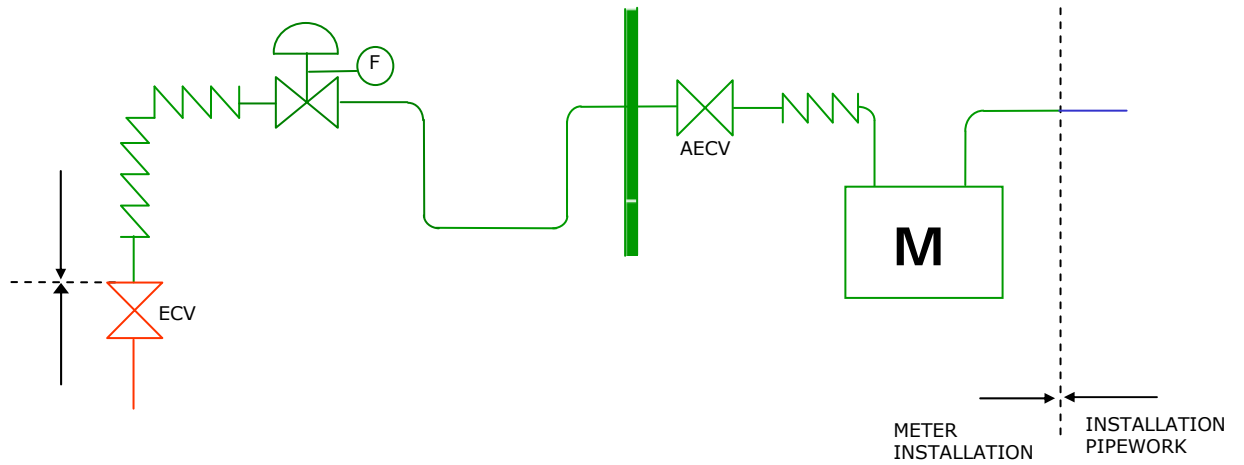


Example of supply to a power generation plant.

Functional standards:

- Network to IGE/TD/1 or IGE/TD/3
- PRI to IGE/TD/13
- meter installation to IGE/GM/8 or IGE/GM/4
- installation pipework to IGEM/UP/2 or IGE/UP/9.

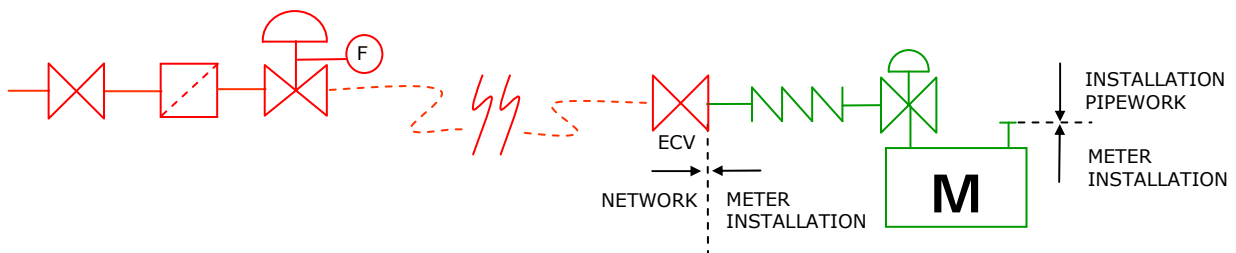
**FIGURE 21 - RECOMMENDED ARRANGEMENT.
TYPICAL HIGH PRESSURE METER INSTALLATION FOR
LARGE CONNECTED SYSTEMS.
CAPACITY > 6 m³ h⁻¹**



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- meter installation to BS 6400-2
- installation pipework to BS 6891.

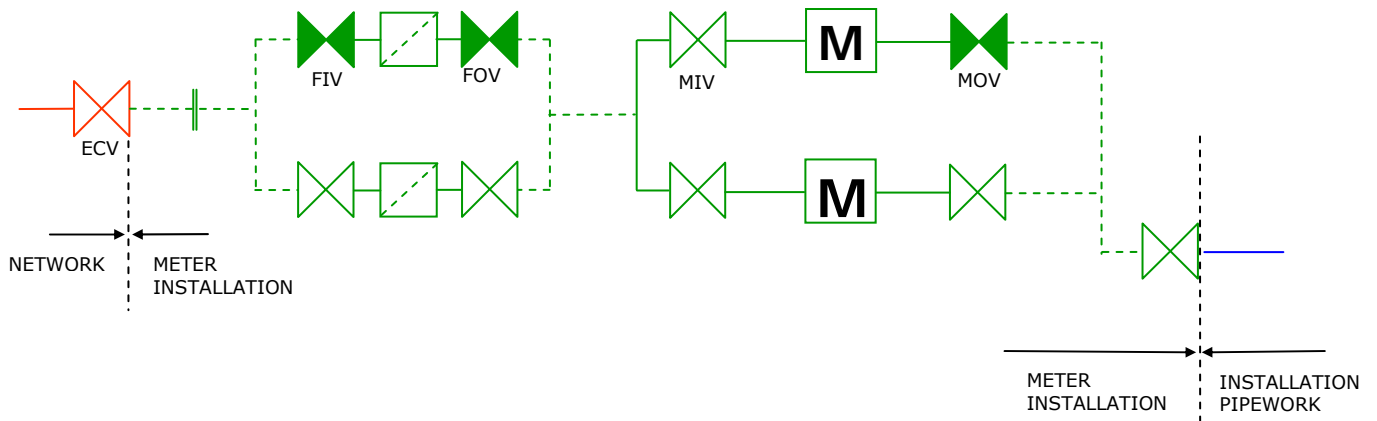
FIGURE 22 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP ≤ 2 BAR.
METER RE-POSITIONED INSIDE THE PREMISES.
CAPACITY ≤ 6 m³ h⁻¹



Functional standards:

- Network to IGE/TD/3 or IGE/TD/4
- PRI to IGE/TD/13
- meter installation to BS 6400-2
- installation pipework to BS 6891.

FIGURE 23 - RECOMMENDED ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
REMOTE SERVICE REGULATOR AND ECV AND LOCAL "LP" REGULATOR.
CAPACITY ≤ 6 m³ h⁻¹

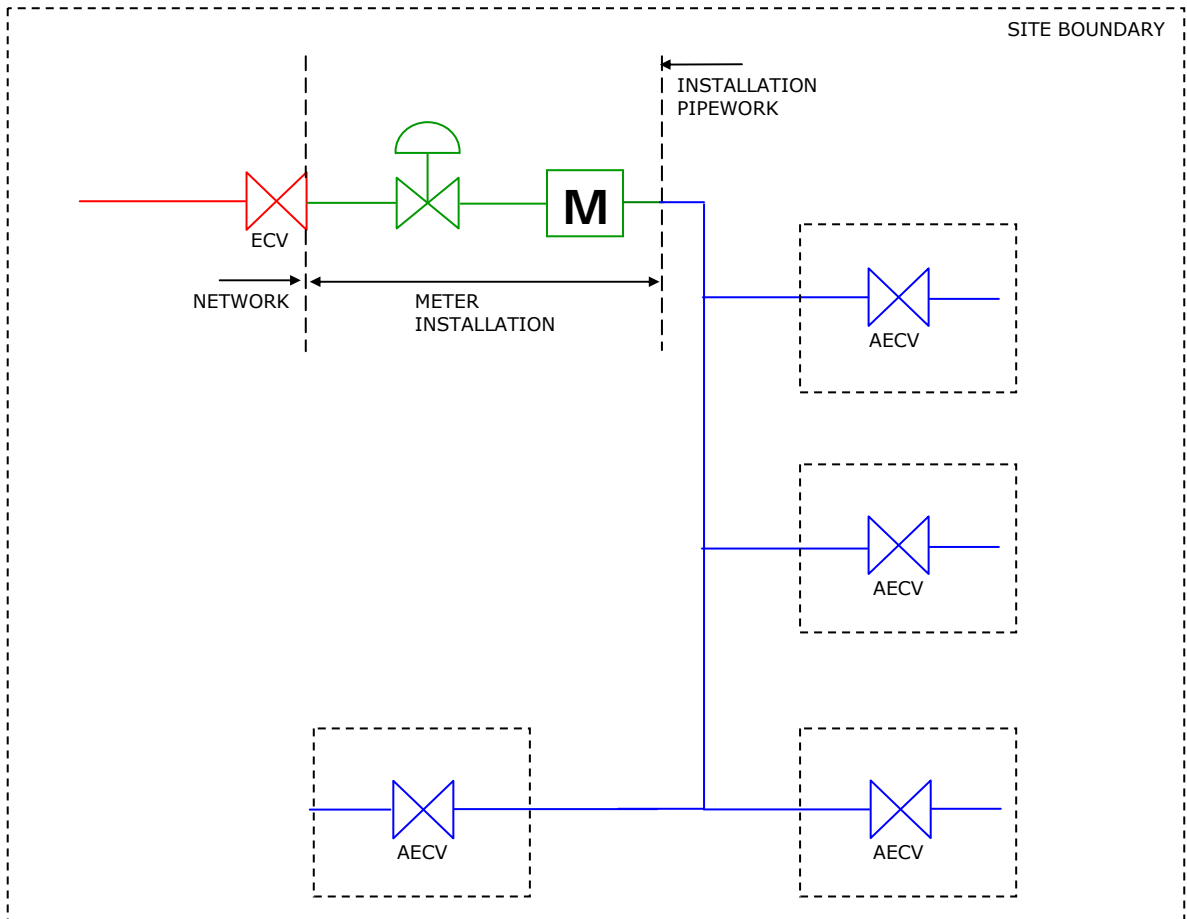


Functional standards:

- Network to IGE/TD/1, IGE/TD/3 and IGE/TD/4
- meter installation to IGE/GM/8
- installation pipework to IGEM/UP/2 or IGE/UP/9.

An unregulated supply is shown.

**FIGURE 24 - RECOMMENDED ARRANGEMENT.
LARGE INSTALLATION.
ABOVE AND BELOW GROUND PIPEWORK.
ECV LABELLED ON INLET**

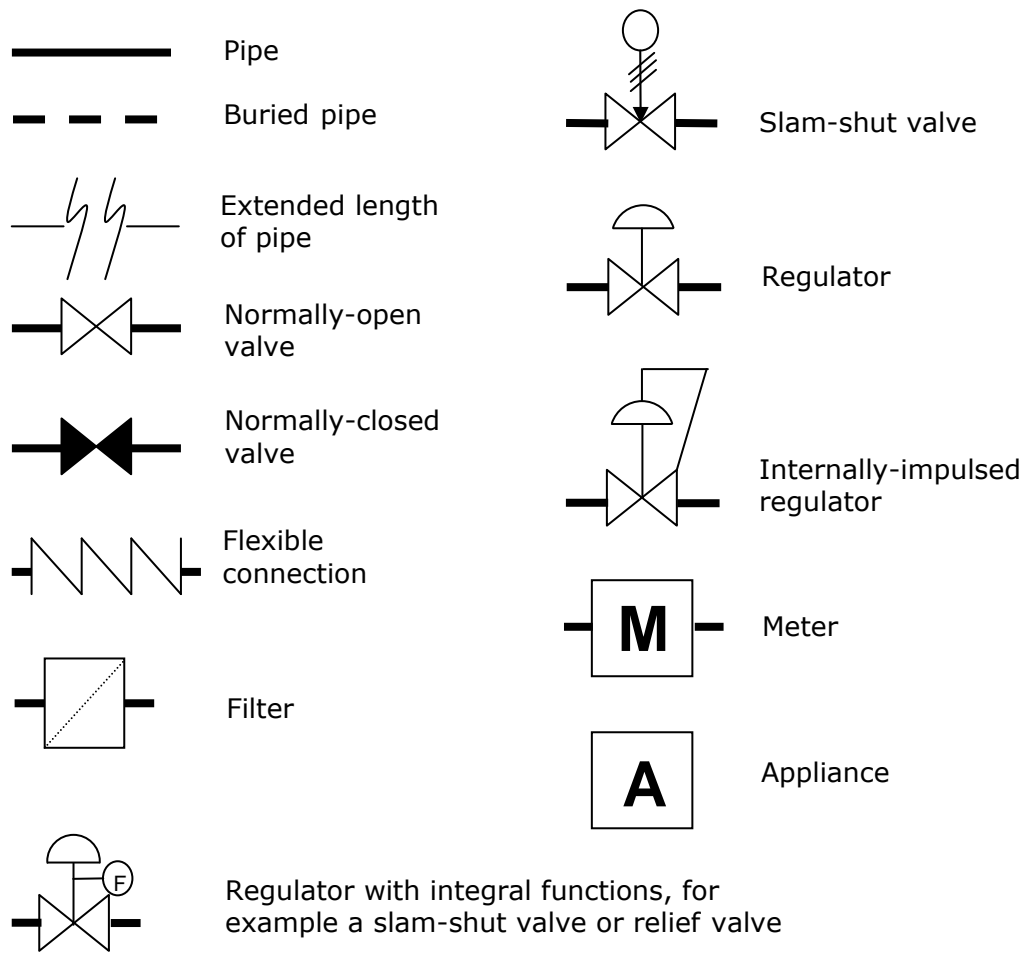


Buildings and site occupied by a single business that is the gas consumer, e.g., a hospital, an educational establishment, etc.

Note: The ECV has to be accessible to premises occupiers.

FIGURE 25 - RECOMMENDED ARRANGEMENT.
SUPPLY MOP \leq 75 mbar.
CAPACITY $>$ 6 m³ h⁻¹

APPENDIX 4 : LEGACY GAS SUPPLY ARRANGEMENTS



Colour Code for Figures 27 to 38:

- - Pipework which is on the Network
- - Parts of a meter installation not on the Network
- - Installation pipework
- - Ancillary plant.

FIGURE 26 - KEY TO FIGURES 27 TO 38

The following examples are not a comprehensive list of legacy arrangements but are intended to illustrate a number of arrangements that are not consistent with recommended arrangements but where the interface needs to be defined.

The line diagrams indicate the boundary between a network, a meter installation and installation pipework. They do not identify the demarcation between the GT and the meter installation owner/meter asset manager but these will need to be identified in practice. This document is not intended to suggest such demarcation.

These legacy systems do not present a problem where the network and meter installation are the responsibility of the same organisation. However, they may be modified to meet a recommended arrangement (see Appendix 3) at a time when the responsibilities or the management of the meter installation changes. The line diagrams do not show all aspects of the system, simply the major components. Components such as creep relief valves, top hat strainers, purge and vent points, pre-heating, etc., are not shown.

Note: Usually, an arrangement is defined as legacy only because a valve which has been designated as the ECV does not "fit" with recommended arrangements. Frequently, it seems likely that this designation took place assuming an AECV is the same as an ECV, which it is not.

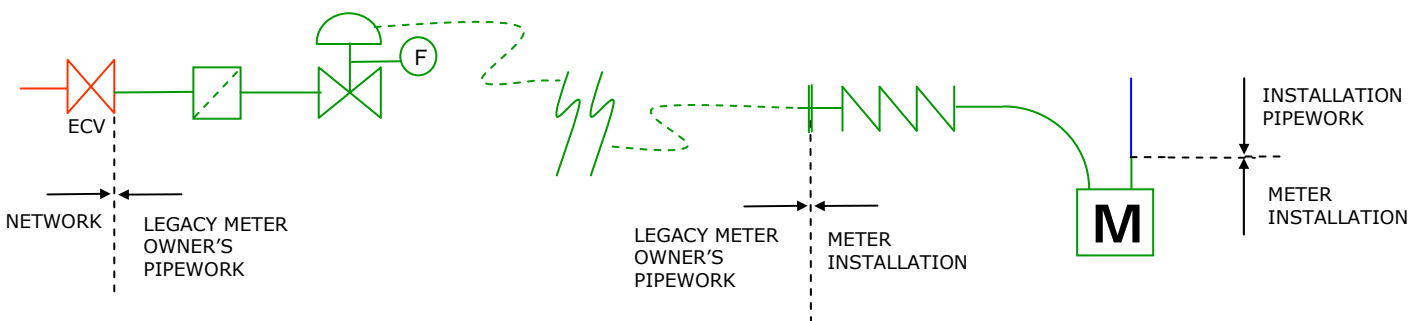


FIGURE 27 - LEGACY ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
REMOTE REGULATOR.
CAPACITY > 6 m³ h⁻¹

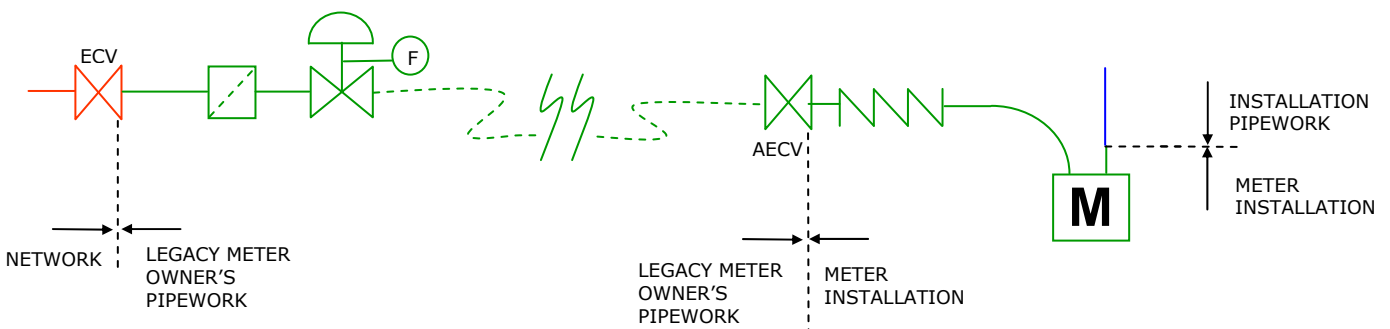
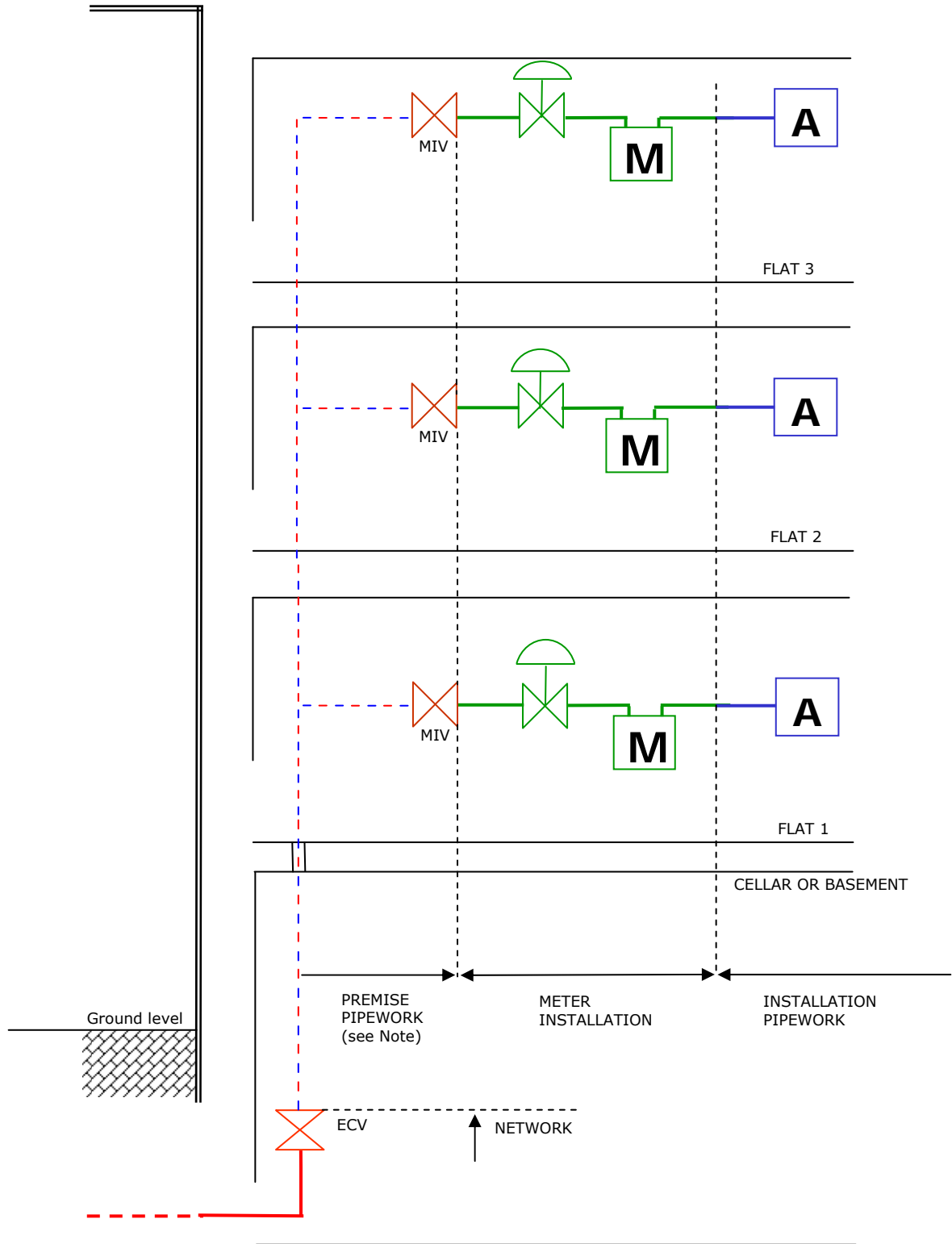


FIGURE 28 - LEGACY ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 2 bar.
REMOTE REGULATOR AND AECV.
CAPACITY ≤ 6 m³ h⁻¹



Note: This arrangement is no longer considered appropriate and the valves and pipework would need to be re-defined in accordance with Figure 6. The consequences of the arrangement shown in this figure would be that the Network extends to the MIV and there would be a "conveyor" created between the common "ECV" and the individual MIV which would become the ECV. The "conveyor" would need to be aware of this and its duties under GS(M)R and PSR.

**FIGURE 29 - LEGACY ARRANGEMENT.
 ANY SUPPLY MOP.
 METERS LOCATED IN HIGH RISE BUILDINGS.
 CAPACITY $\leq 6 \text{ m}^3 \text{ h}^{-1}$**

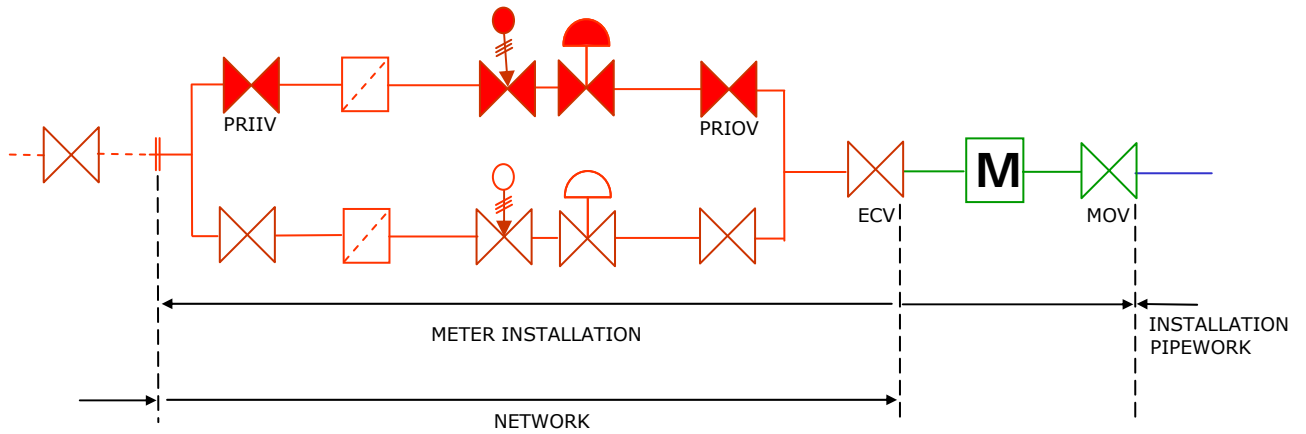


FIGURE 30 - LEGACY ARRANGEMENT.
 75 mbar < SUPPLY MOP ≤ 2 bar.
 TWIN STREAM.
 RD OR TURBINE METER.
 CAPACITY > 6 m³ h⁻¹

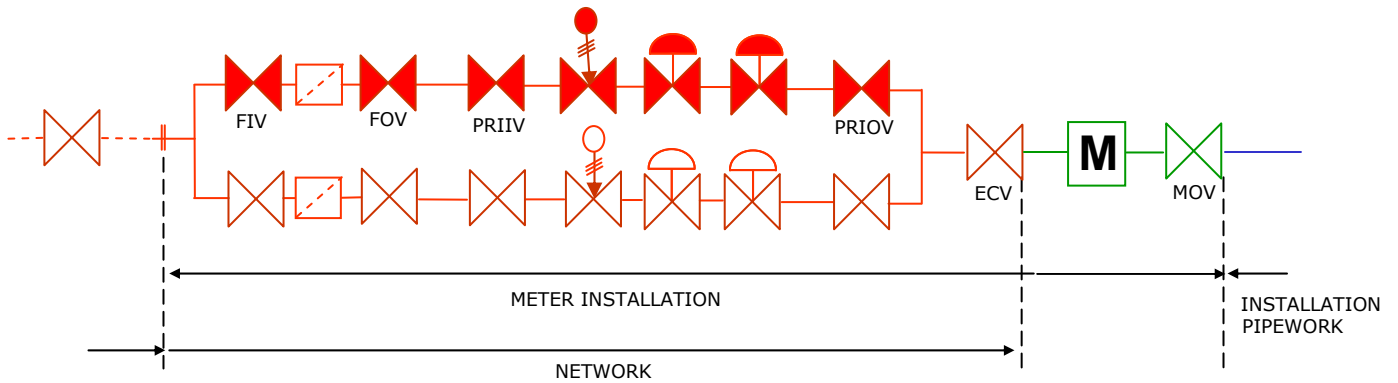


FIGURE 31 - LEGACY ARRANGEMENT.
 2 bar ≤ SUPPLY MOP ≤ 100 bar.
 TWIN STREAM WITH SEPARATE FILTER SET.
 RD OR TURBINE METER.
 CAPACITY > 6 m³ h⁻¹

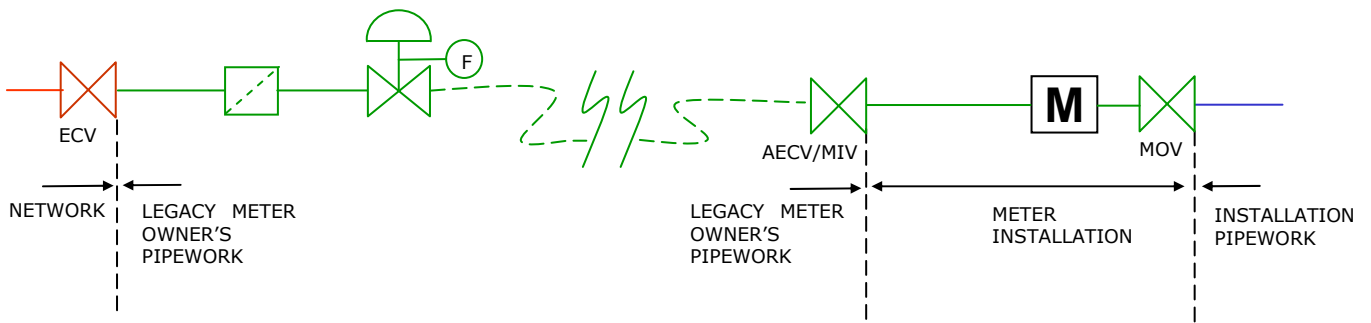


FIGURE 32 - LEGACY ARRANGEMENT.
75 mbar < SUPPLY MOP ≤ 7 bar.
REMOTE REGULATOR AND AECV.
CAPACITY > 6 m³ h⁻¹

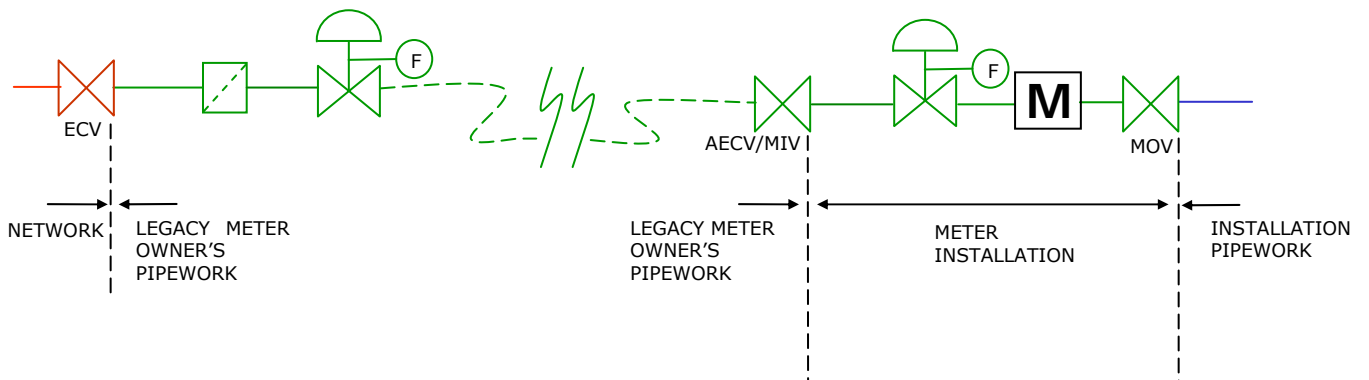


FIGURE 33 - LEGACY ARRANGEMENT.
75 mbar ≤ SUPPLY MOP ≤ 7 bar.
REMOTE REGULATOR AND AECV AND LOCAL LP
REGULATOR.
CAPACITY > 6 m³ h⁻¹

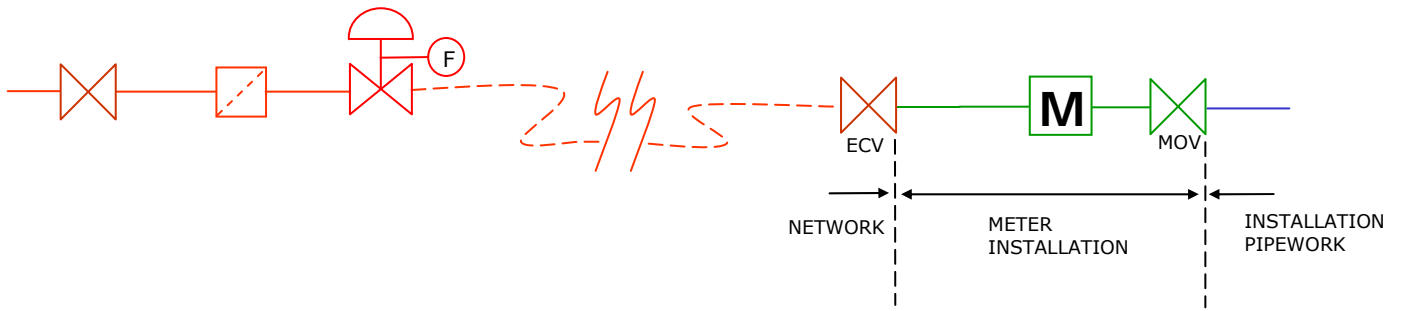


FIGURE 34 - LEGACY ARRANGEMENT.

75 mbar < SUPPLY MOP ≤ 7 bar.

REMOTE SERVICE REGULATOR AND NO METER REGULATOR.

CAPACITY > 6 m³ h⁻¹

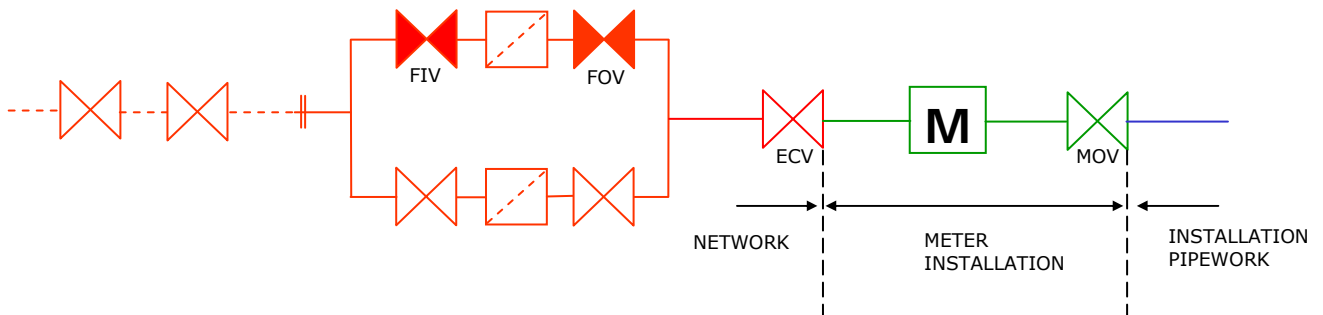


FIGURE 35 - LEGACY ARRANGEMENT.

ANY SUPPLY MOP.

UNREGULATED WITH TWIN STREAM FILTER SET.

CAPACITY > 6 m³ h⁻¹

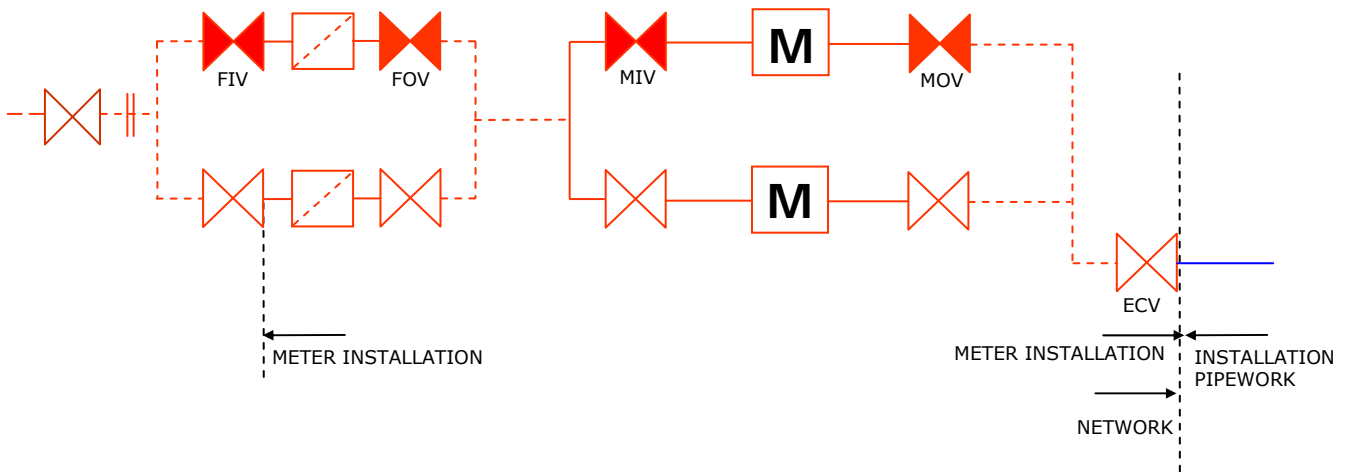


FIGURE 36 - LEGACY ARRANGEMENT. LARGE INSTALLATION. ABOVE AND BELOW GROUND PIPEWORK. ECV LABELLED ON OUTLET

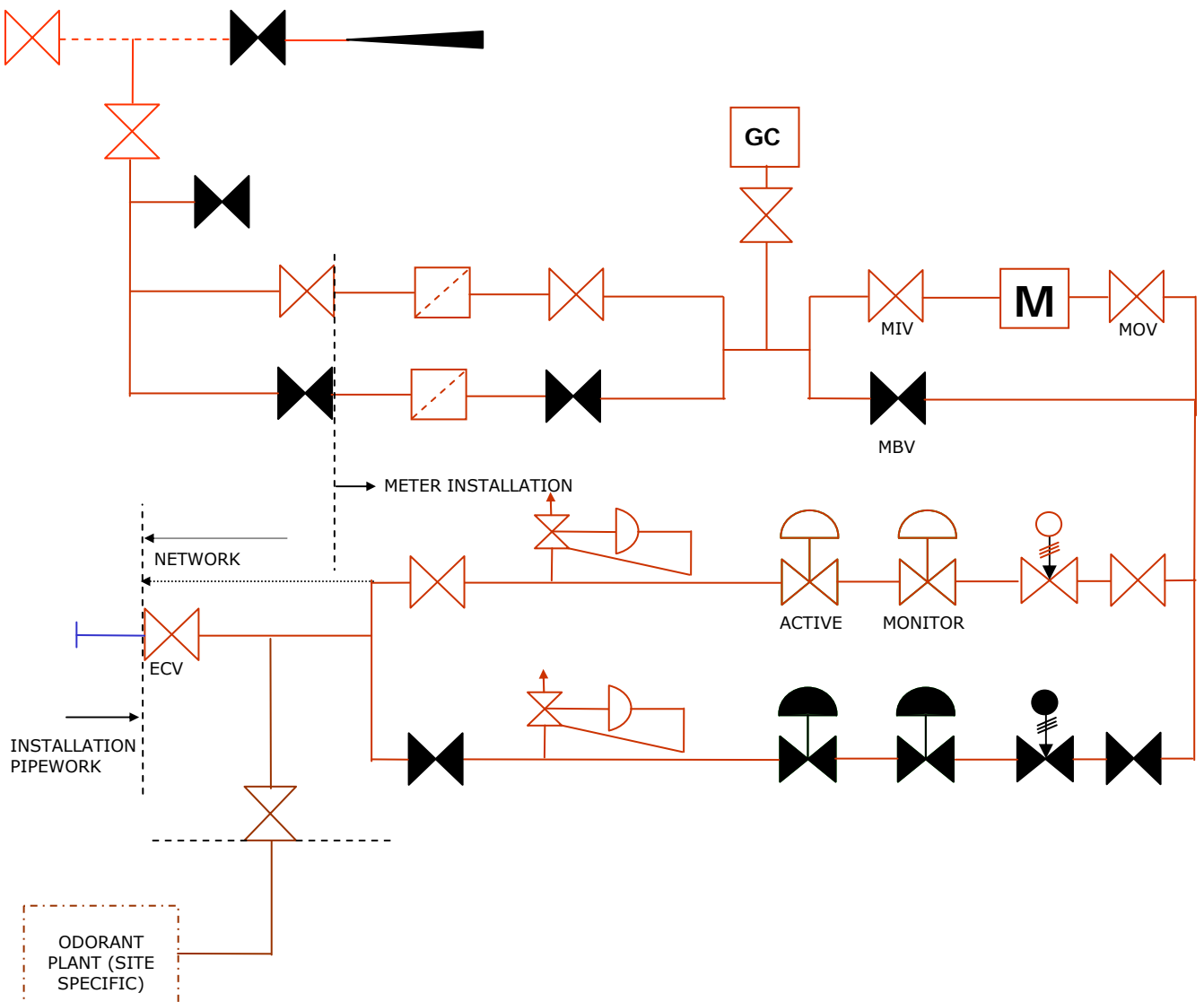
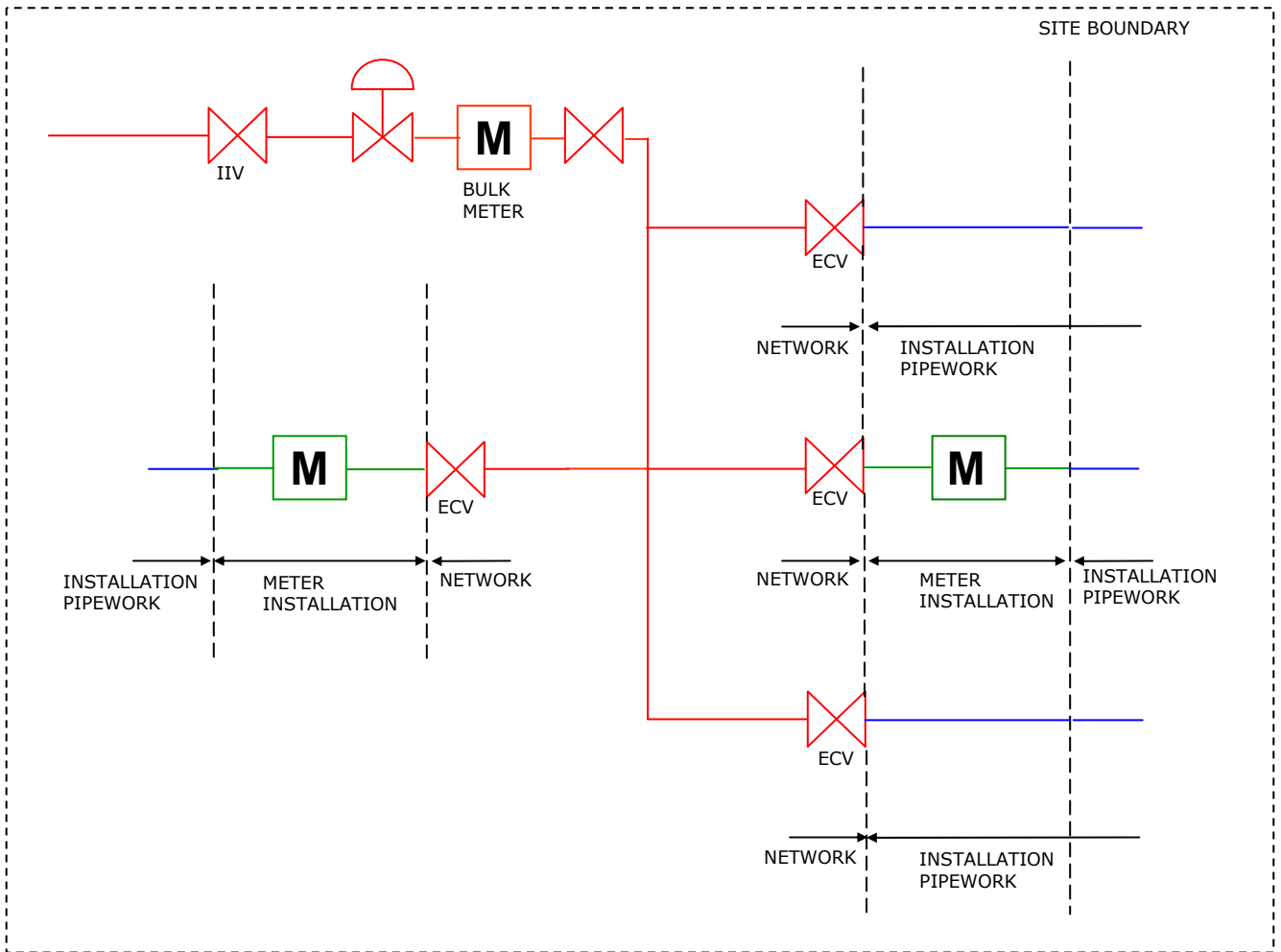


FIGURE 37 - LEGACY ARRANGEMENT. LARGE CONNECTED SYSTEMS



Typical examples include a housing estate under the control of a local authority or Housing Trust or a business park site under the control of a single company where buildings are leased to the individual building occupiers (consumers of gas) and access is not provided to the building occupiers to the valve at the meter (marked IIV), to use to shut off the supply of gas in an emergency.

Note 1: The estate may have developed from a site where all the buildings were occupied by the site owner. If the site owner continues to be a consumer of gas, they may designate the valve at the meter (marked IIV) as an ECV for their purposes. In this case, the site owner must provide instructions to the effect and access to the valve to all the building occupiers.

Note 2: GS(M)R and PSR apply to all ECVs and GS(I&U)R only applies downstream of the ECVs.

**FIGURE 38 - LEGACY ARRANGEMENT.
A GAS CONVEYOR'S NETWORK DOWNSTREAM OF A GT'S NETWORK**

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