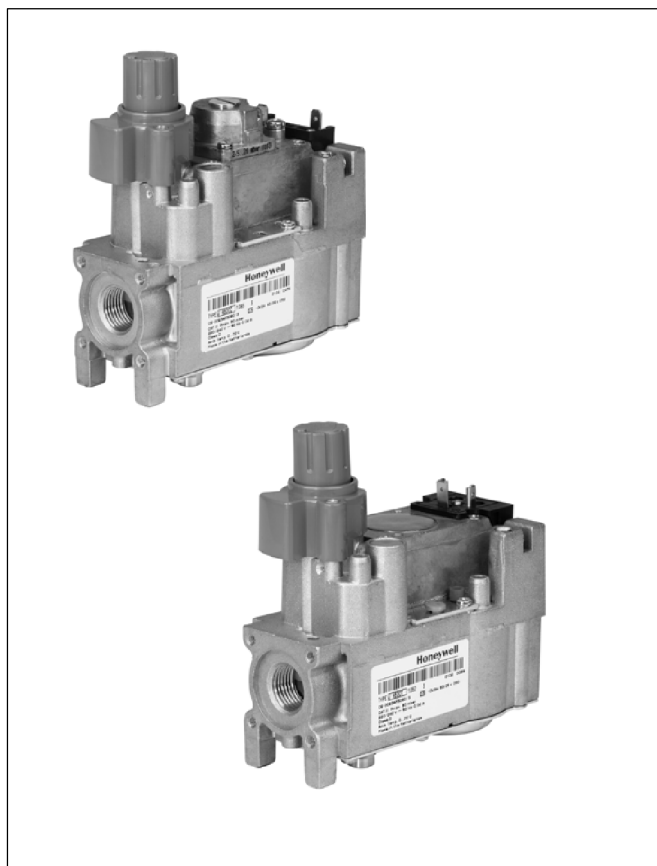


V46../V86.. series

COMPACT COMBINATION GAS CONTROLS

PRODUCT HANDBOOK



APPLICATION

The V46.. and V86.. compact gas controls are servo-operating combination gas controls and comprise a pilotstat, an operator and a straight line servo pressure regulator or throttle.

The V46.. and V86.. Compact combination gas controls can provide fully automatic control of a domestic central heating boiler, warm air furnace, back boiler or water heater when used in conjunction with a Honeywell pilot burner, thermocouple and room or boiler thermostat.

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DESCRIPTION

Application

Compact combination gas controls perform all the functions required to safely regulate gas flow to the pilot burner and the main burner of domestic central heating equipment, warm air furnaces, back boilers and water heaters.

Compact combination gas controls comprise a standard body to which a range of sub-assemblies are factory fitted to give various system options. This makes boiler system design much easier as technical specifications and most unit dimensions are the same for all system options.

All Compact combination gas controls consist of a thermo-electric safety device according to EN 125 and an electric on/off servo operator valve for opening the main valve of class C or J according to EN 161; 1997.

Compact combination gas controls comply with the additional requirements of class, C' and D' according to EN 297.

Options include servo pressure regulation, throttle valve, (switchable) softlite, electrical or mechanical modulation and high-low control for the complete range of control applications.

All the Compact combination gas controls are available in line or low voltage versions for total system versatility. Customer specific voltage models are also offered.

Alternative electrical connections are also available.

The pilot safety system contains a built-in safe lighting latch, which makes it impossible to re-establish main burner gas flow between the time the pilot gas is manually turned off and the time when the thermocouple has cooled sufficiently to drop out the reset mechanism.

Compact combination gas controls are rated for gas families MFD Group A (G110), MFD Group B (G 120), Natural H (G 20), Natural L (G25) and LP (G30).

All measurements are carried out under **standard conditions**, unless otherwise is indicated.

Standard conditions

- P_{inlet} 25 mbar nominal pressure, dry air of 20°C
- $P_{ambient}$ 1013 mbar
- $T_{ambient}$ 20°C
- Outlet orifice 2.8 mm
- Flow indication in m^3/h
- Recording of outlet pressure with a transducer connected to a $1/2"$ pipe with a length of 10 times the diameter with a short hose at 5 times the diameter.
- Attenuation x-y recorder switched on zero.
- Nominal voltage
- Upright position, i.e. the position when the knob is on top

FEATURES

General

- Specially designed for use with gas appliances with standing pilot system to light the main burner.
- Incorporates time proven design concepts assuring reliability.
- Single knob for manual ON/OFF operation.
- 100% safety shut off and safe lighting pilot system.
- ON/OFF control of main burner by electric on/off servo operator.
- At inlet side an internal fine mesh screen is incorporated in the Compact. This screen is not intended to be removable for cleaning. When flanges are used, removable screens can be placed between the flanges and the Compact.
- All adjustments are located on the top of the Compact.
- 9 mm outer diameter pressure tap at inlet and outlet side for checking and adjusting burner pressure.
- A wrench boss is incorporated at the inlet side of the Compact for pipe fitting.
- Compact mounting orientation may be within 90° in any direction from the knob up position.
- Two threaded mounting holes are provided on the base of the Compact for rigid attachment to the appliance.

Gas connection options

- Inlet and outlet connections are straight through.
- Inlet and outlet connections can also receive flanges.
- The pilot gas connection for using break away connectors for various outer diameter tubing is located at the outlet end of the Compact.

Electrical connection options

- Line voltage on/off servo operator can be provided with a ground screw and washer.
- A combination of strain relief and electrical enclosure is available for line voltage on/off servo operator.
- IP 44 connection by means of a DIN connector is possible.
- Quick connect 6.3 mm fastons on electric on/off servo operator can be applied in combination with single cover with strain relief.

Functional options

- Servo pressure regulation provides stable outlet pressure.
- Pressure feedback ensures constant burner pressure (optional).
- A throttle valve version is available, where unregulated valves may be employed.
- Softlite option to facilitate a smooth light up of burners.
- Switchable softlite option for changing over from one gas to another and vice versa.
- Electrical or mechanical modulation.
- Electrical High-Low control.
- Incorporated pilot filter.
- Built in pilot flow adjustment.
- On request Compacts with main valve that can withstand 4 mbar backpressure, are available.
- Break-away connectors can be supplied for various outer diameter tubing.
- The thermocouple connection is normally located at the base of the Compact. The thermocouple connection may be relocated to the outlet side of the Compact by installing a thermocouple re-route.
- ECO connectors can be supplied for the Compact for connecting a thermal fuse or a high limit switch in series with a thermocouple. This gives an energy cut off function that is independent on the main valve.
- The Compact can be provided with an electric ignition switch, so that it can be combined with an electronic spark generator.

SPECIFICATIONS

NOTE: Specifications for electrical modulation, mechanical modulation, electrical high low, switchable softlite and other features are available on request.

Models

See model number chart on page 28

Pipe sizes

- Inlet and outlet 1/2" ISO 7-1 internal parallel pipe thread.
- Inlet and outlet 23 mm dia.
- Inlet 3/4" ISO7-1 internal parallel pipe thread and outlet 23 mm dia.
- Inlet and outlet can also receive straight and elbow flanges

Pilot gas connection

M11 x 1 for 1/4", 6 mm or 4 mm outer diameter tubing.

Pressure feedback connection

The servo pressure regulator has an M5 thread connection for pressure feedback.

Dimensions

See Dimensional drawing

Ambient temperature

0...70 °C

Minimum regulation capacity

0.31 m³/h

Minimum adjustable capacity (throttle valve only)

0.6 m³/h air at Δp of 20 mbar

Maximum operating pressure

The P_{max} indication on the housing of the Compact is the maximum pressure at which it functions safely. However, the maximum operating pressure is limited by the pressure range of the pressure regulator concerned. (See table 1.)

Capacity in m³/h air (See also Capacity curves)

Model	Δp (mbar)	Pipe size	Capacity
V4600/V8600	2.5	1/2" x 1/2"	3.15
		23 dia x 23 dia	3.7
		3/4" x 23 dia	3.4
V4610/V8610	5	1/2" x 1/2"	3.8

NOTE: When the Compact is mounted in a horizontal position, above mentioned values will increase 0.3 m³/h.

Versions with 4 mbar backpressure will have a capacity decrease of 0.8 m³/h.

Table 1. Maximum operating pressure

Model	Pressure range (mbar)	Maximum operating pressure (mbar)
with regulation	2.5...20	30
	3...37*	45
	5...50*	60
without regulation	-	60
with throttle valve only	-	60

* This type can also be used for non regulation mode in LP applications when pressure regulator adjustment screw is clockwise turned down until it stops.

Enclosure

IP 40 with cover or plug

IP 44 with DIN plug according to DIN 43650

Mounting holes

Two M5 mounting holes are located on the bottom of the Compact.

The four holes for mounting a flange on the Compact are provided with M5 thread with min. 6.5 mm full thread.

Two M4 threaded holes on Din faced the electric on/off servo operator are also for mounting purposes.

Electrical data

Nominal voltage	Maximum power consumption (W)		Maximum current (mA)	
	At nominal voltage	At 110% of nominal voltage	At nominal voltage	At 110% of nominal voltage
24 V, 50 Hz	3.8	5.3	211	255
24 V, 60 Hz	4.7	6.4	266	315
220/240 V, 50 Hz	3.4/4.5	4.6/6.1	20.4/24	24.5/28
220 V, 60 Hz	3.5	4.8	21.1	26

PERFORMANCE CHARACTERISTICS

Leakage

Each Compact is factory tested to meet the following leakage requirements:

- outerwall 50 cm³/h air at test pressure of 150 mbar.
- reset shaft seal with knob depressed 150 cm³/h air at test pressure of 150 mbar.
- gas safety valve 40 cm³/h at test pressure of 8 and 150 mbar.
- pilot valve 20 cm³/h at test pressure of 8 and 150 mbar.
- main valve (plus operator inlet valve) 40 cm³/ air at test pressure of 8 and 150 mbar.

Outlet pressure adjustment range capability

Natural/manuf. gas: 2.5 ... 20 mbar.

Natural/LP gas: 3 ... 37 mbar.

LP gas: 5 ... 50 mbar.

10 ... 60 mbar.

Pilot flow

- Pilot flow capacity will not be less than 0.1 m³/h at 9 mbar pressure drop.
- The pilot flow adjustment can be turned down to 0.003 m³/h at 9 mbar pressure drop.

Bleed off/recovery time of servo system

The bleed off/ recovery time of the standard softlite system shall be within 15 seconds from operator de-energization.

For softlite system with switchable softlite adapter the bleed off/recovery time shall be within 30 seconds from operator de-energization.

High pressure test

In the "OFF" condition, the Compact will withstand 3 bar (air) inlet pressure without damage.

Attempts to operate the Compact, while in this condition will not damage it.

Valve closing characteristics

The Compact will close within 1 second from operator de-energization at an inlet pressure of 22.5 mbar and minimal 2.5 mbar pressure drop.

Main valve opening characteristics

Fast opening versions

Under conditions where the supply pressure is at least 2.5 mbar above the outlet pressure setting, the dead time shall be 1 s maximum except fast opening versions with 0.2 mm inlet orifice and upright position the dead time will be 2.5 s maximum.

The outlet pressure will reach 50% of the outlet pressure setting within 1 second from start of flow.

Full outlet pressure will be reached within 5 seconds.

Version without regulation or with throttle valve will reach full outlet pressure within 5 seconds.

Softlite versions (see table 2.)

At standard test conditions the adjusted outlet pressure will be reached between 5 and 20 seconds from start of flow (for LP gas between 4 and 10 seconds).

Table 2. Main valve (class D only) opening characteristics for softlite versions

Softlite number	Inlet pressure (mbar)	Kind of gas	Applicable for switchable softlite adapter	Dead time (s) max		Outlet pressure (mbar) 1.5 s after start of flow*
				Upright position	Horizontal position	
5 7 9 10	20	G 20/25	no	1.5	1.2	2.5 ... 6.0
				1.5	1.2	4.5 ... 7.5
				1.5	1.2	6.5 ... 9.0
				1.5	1.2	9.0 ... 15.0
5 7 9 10			yes	1.3	1.0	3.0 ... 5.5
				1.3	1.0	5.0 ... 7.0
				1.3	1.0	7.0 ... 9.0
				1.3	1.0	9.5 ... 15.0
5 7 9 10	37	G 30/31	no	2.5	1.8	1.0 ... 4.5
				1.8	1.5	2.5 ... 6.5
				1.8	1.5	4.5 ... 8.0
				1.8	1.5	7.5 ... 14.5
5 7 9 10			yes	2.0	1.4	1.5 ... 4.0
				1.5	1.2	3.0 ... 6.0
				1.5	1.2	5.0 ... 7.5
				1.5	1.2	8.0 ... 14.0
5 7 9 10	50	G 30/31	no	3.3	2.4	1.0 ... 4.5
				1.5	1.2	2.5 ... 6.5
				1.5	1.2	3.5 ... 8.0
				1.5	1.2	6.5 ... 14.5
5 7 9 10			yes	2.5	1.8	1.5 ... 4.0
				1.3	1.0	2.5 ... 5.5
				1.3	1.0	4.0 ... 7.5
				1.3	1.0	7.5 ... 14.0

* With throttle full open

Oscillation

Maximum oscillation under all circumstances: ≤ 0.5 mbar.

Tap sensitivity of outlet pressure set point

For all gases the maximum deviation may be 1 mbar.

Power unit current

Type	Max. hold in current (mA)
001	300
002	240

Operable voltage range

The Compact will function satisfactory between 85% and 110% of the rated voltage.

Rated Voltage	Operable Voltage
24 V, 50 Hz	19.2 ... 26.4 V
24 V, 60 Hz	19.2 ... 26.4 V
220/240 V, 50 Hz	187 ... 264 V
220 V, 60 Hz	187 ... 242 V

Repeatability of outlet pressure set point

For all gases the maximum deviation from set point is:
 ± 0.3 mbar or $\pm 3\%$ of the set point value, whichever is the greatest.

Total set point shift

Pressure range (mbar)	Tolerance
2.5 ... 20	6% of the set point value or 1 mbar whichever is the greatest
5 ... 50	6% of the set point value or 1.5 mbar whichever is the greatest
10 ... 60	6% of the set point value or 2.2 mbar whichever is the greatest

Design life

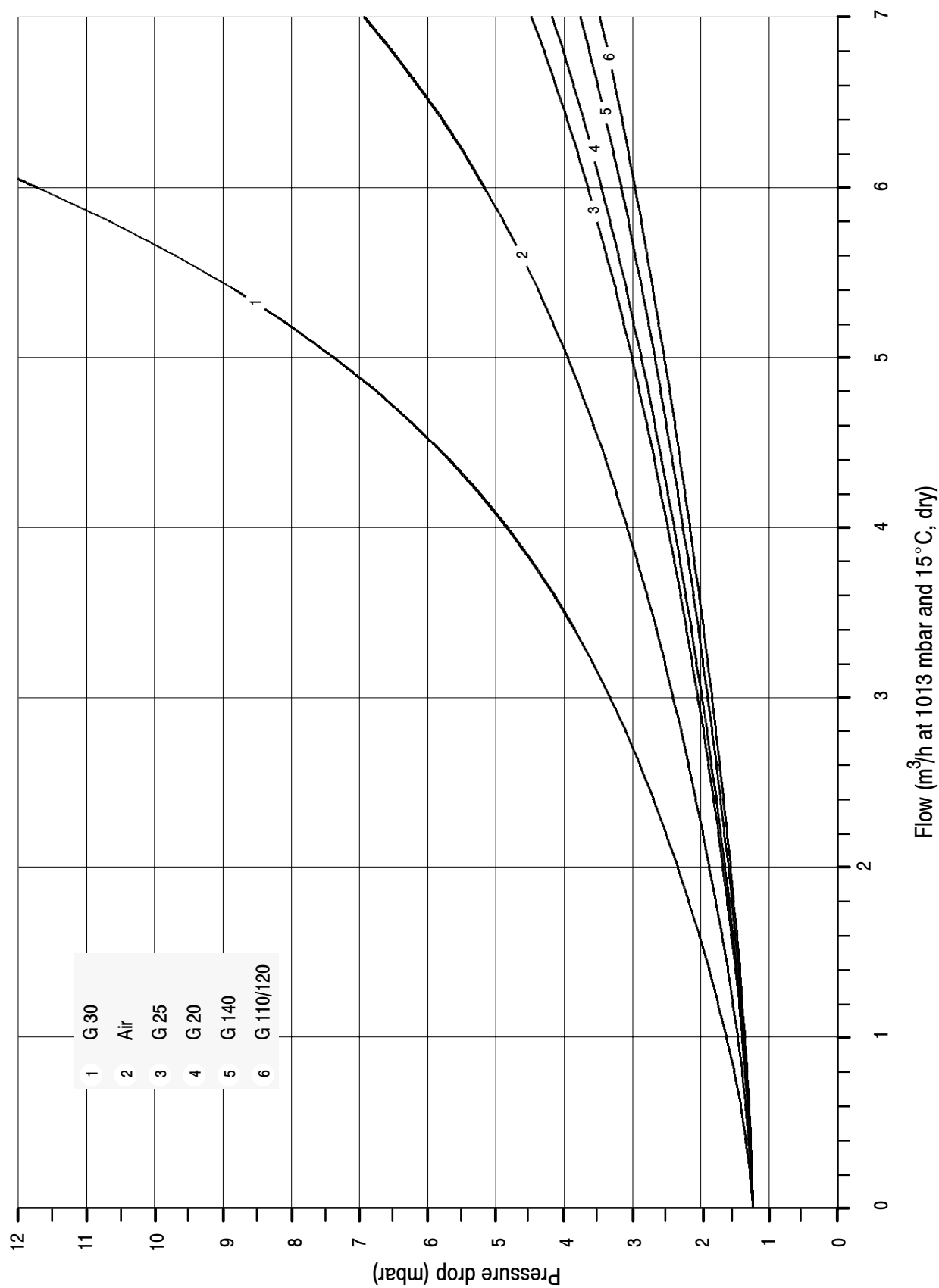
500.000 cycles for operator, regulator and main valve
 (Cycle frequency maximum 100 cycles /hour)
 10.000 cycles for pilotstat mechanism.

CAPACITY

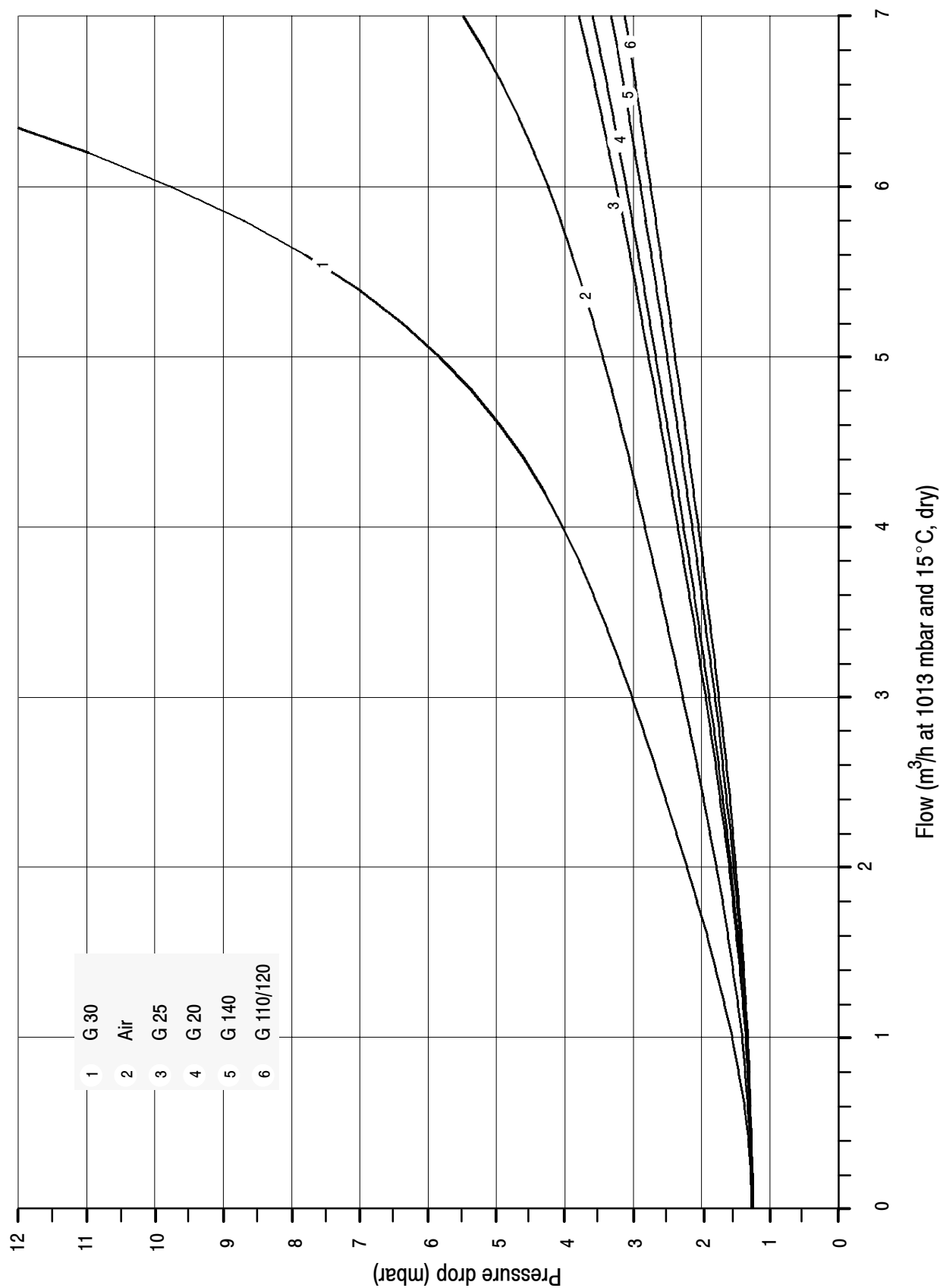
Code	Backpressure (mbar)	Inlet size	Outlet size	Page
V4600x/V8600x (ref C 20)	0	1/2"	1/2"	8
V4600x/V8600x (ref C 30)	0	3/4"	23 mm dia	9
V4600x/V8600x (ref C 40)	0	23 mm dia	23 mm dia	10
V4600x/V8600x (ref C 50)	4	1/2"	1/2"	11
V4600x/V8600x (ref C 60)	4	3/4"	23 mm dia	12
V4600x/V8600x (ref C 70)	4	23 mm dia	23 mm dia	13
V4610x/V8610x (ref C 80)	10	1/2"	1/2"	14

* x = suffix letter

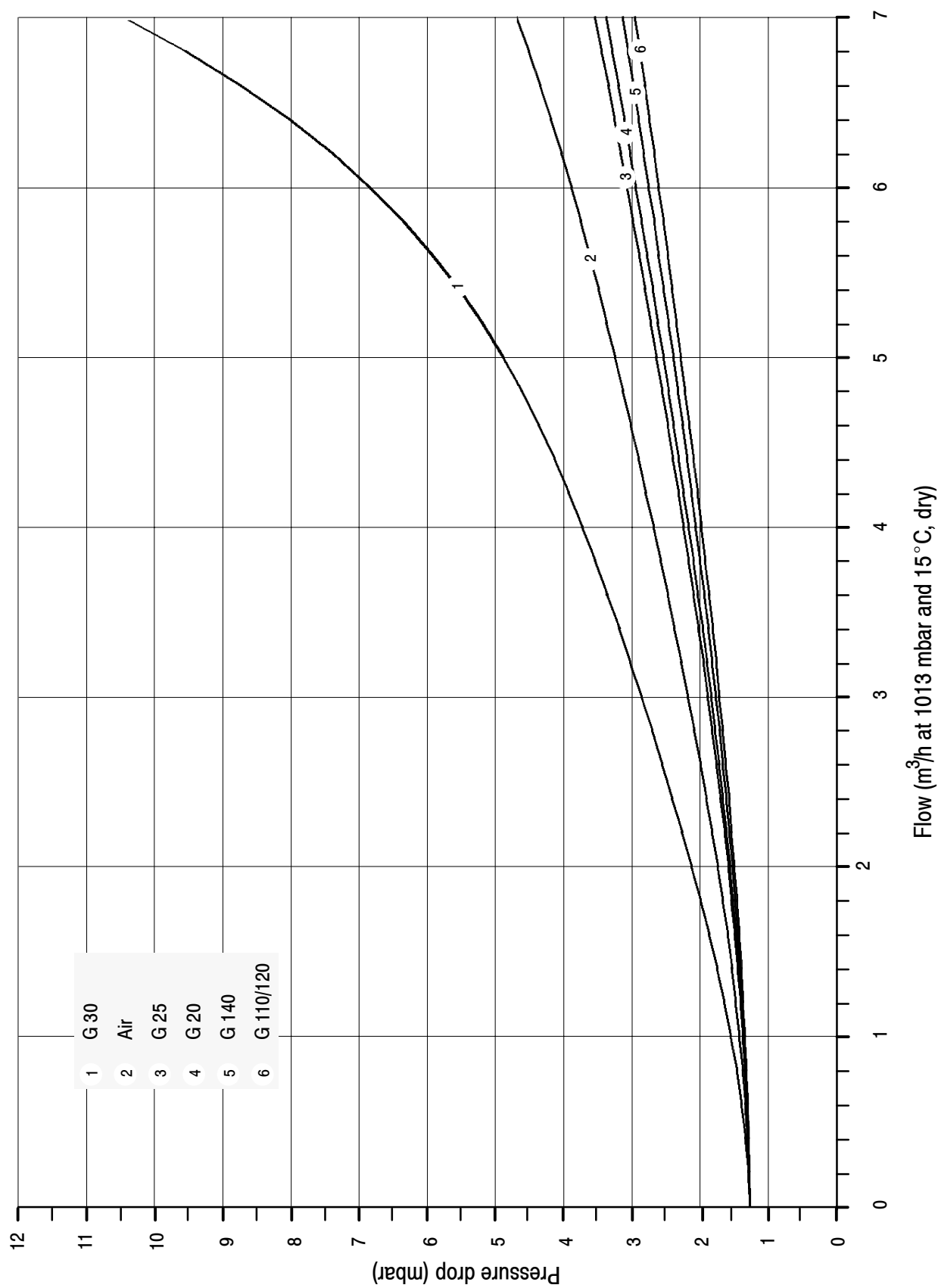
CAPACITY CURVE C 20



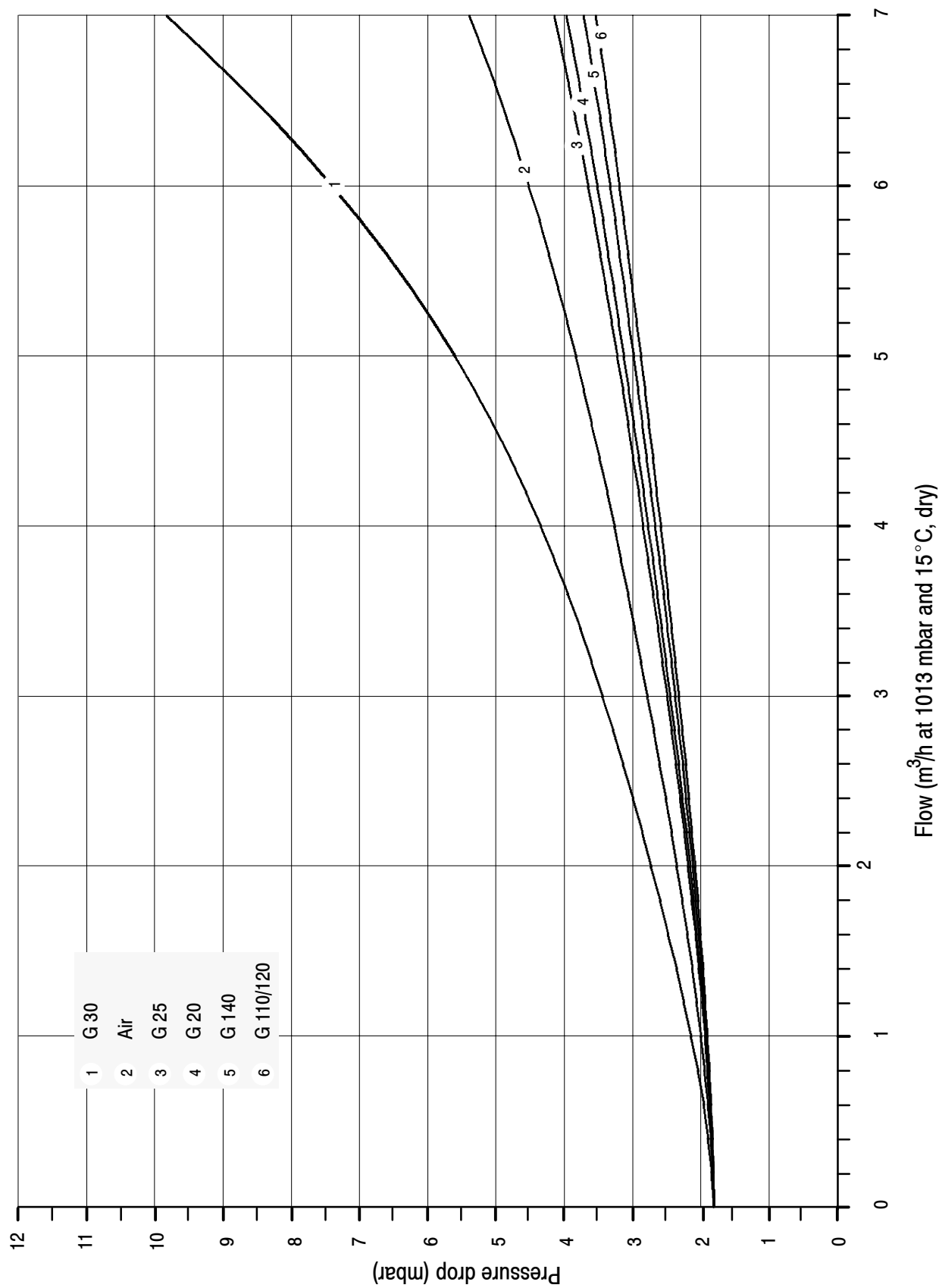
CAPACITY CURVE C 30



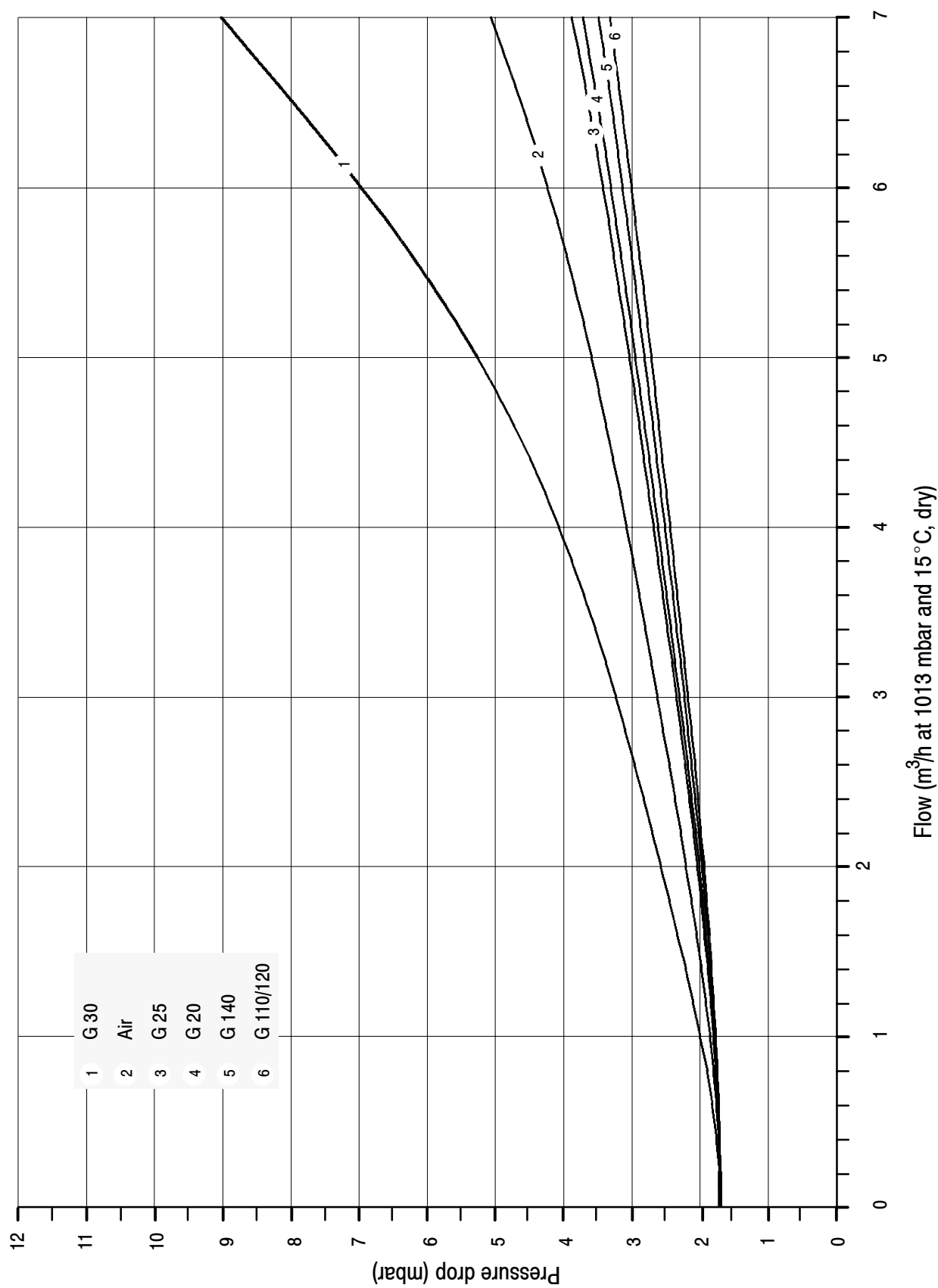
CAPACITY CURVE (REF C 40)



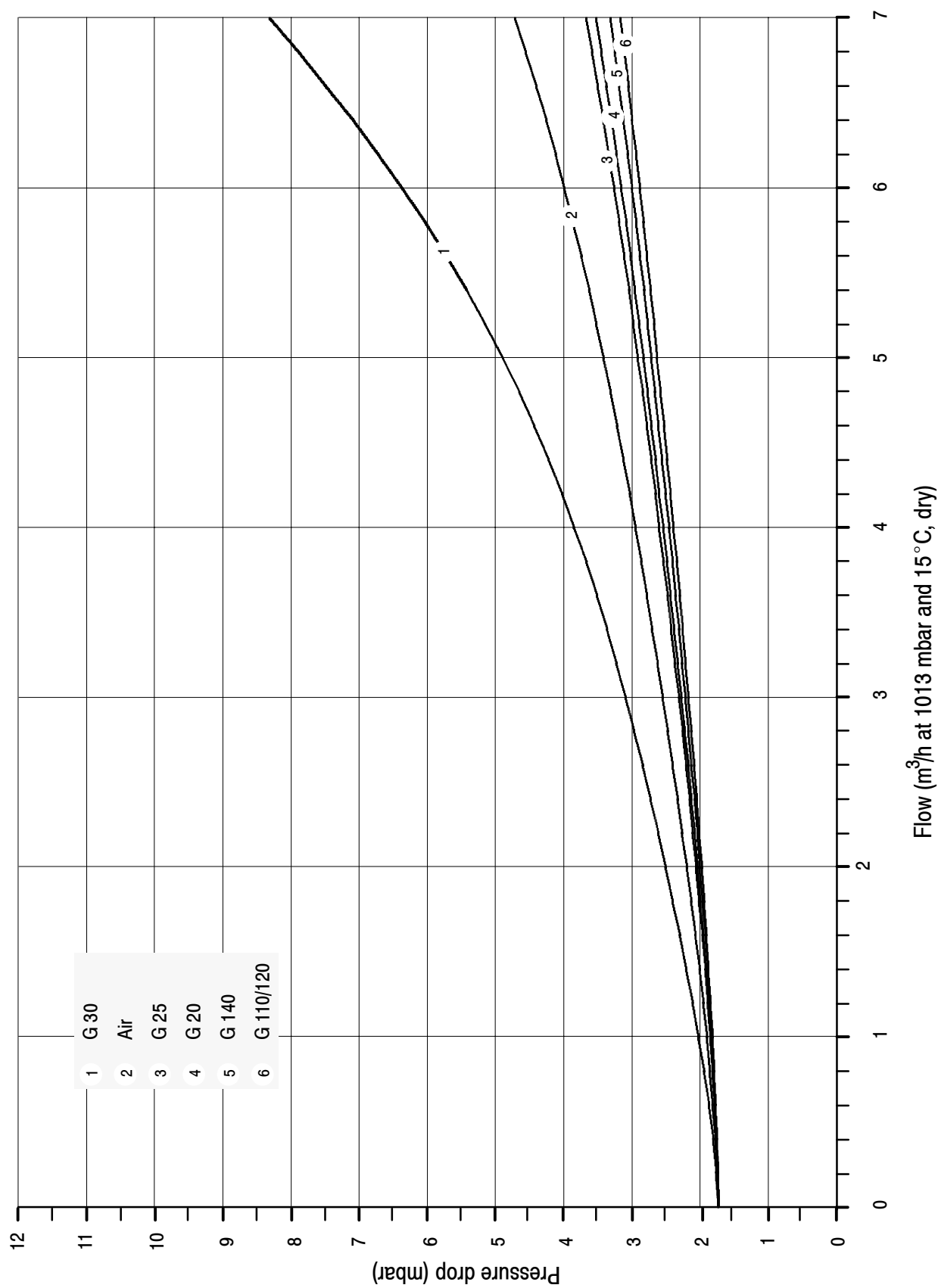
CAPACITY CURVE C 50



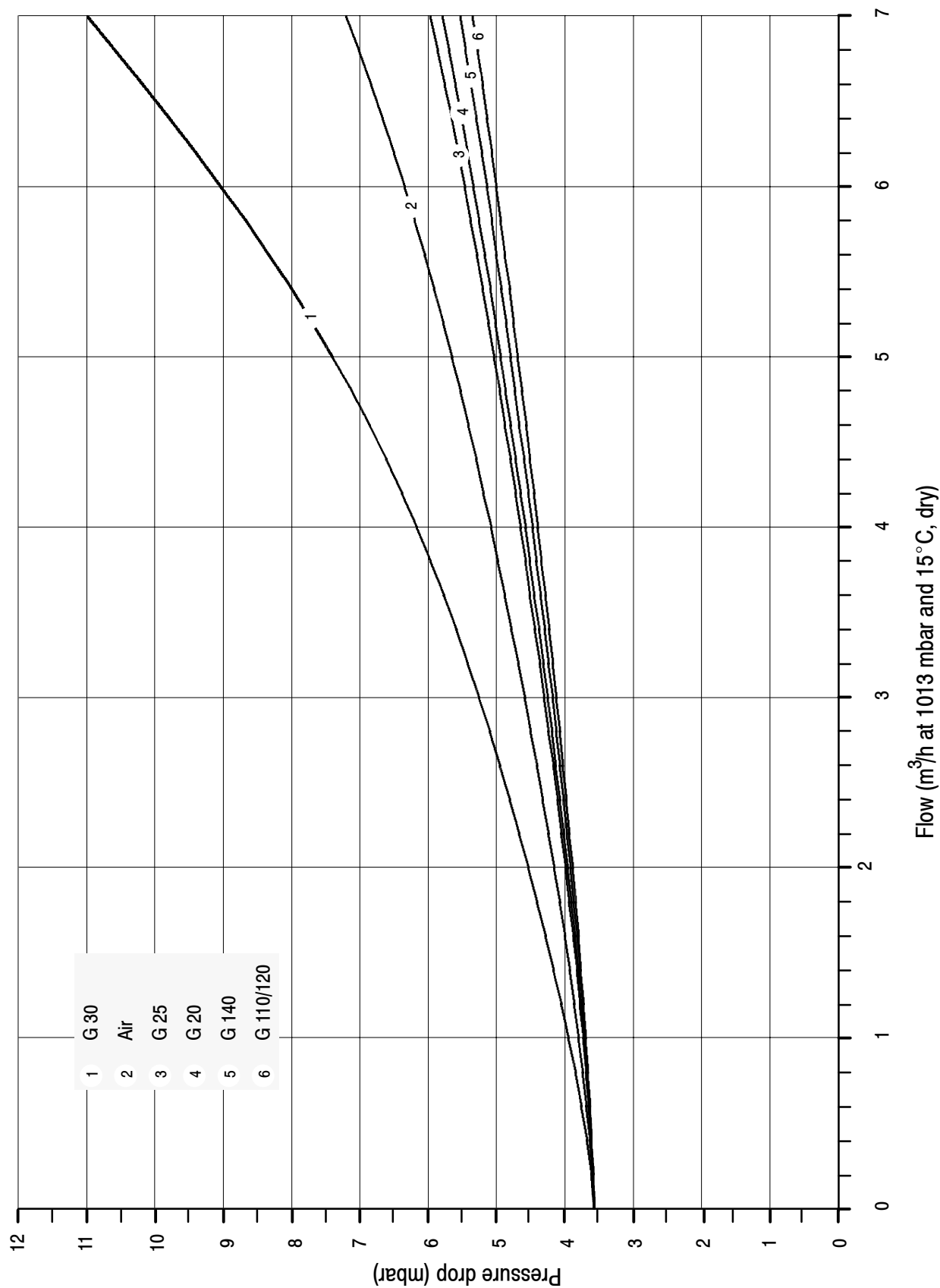
CAPACITY CURVE C 60



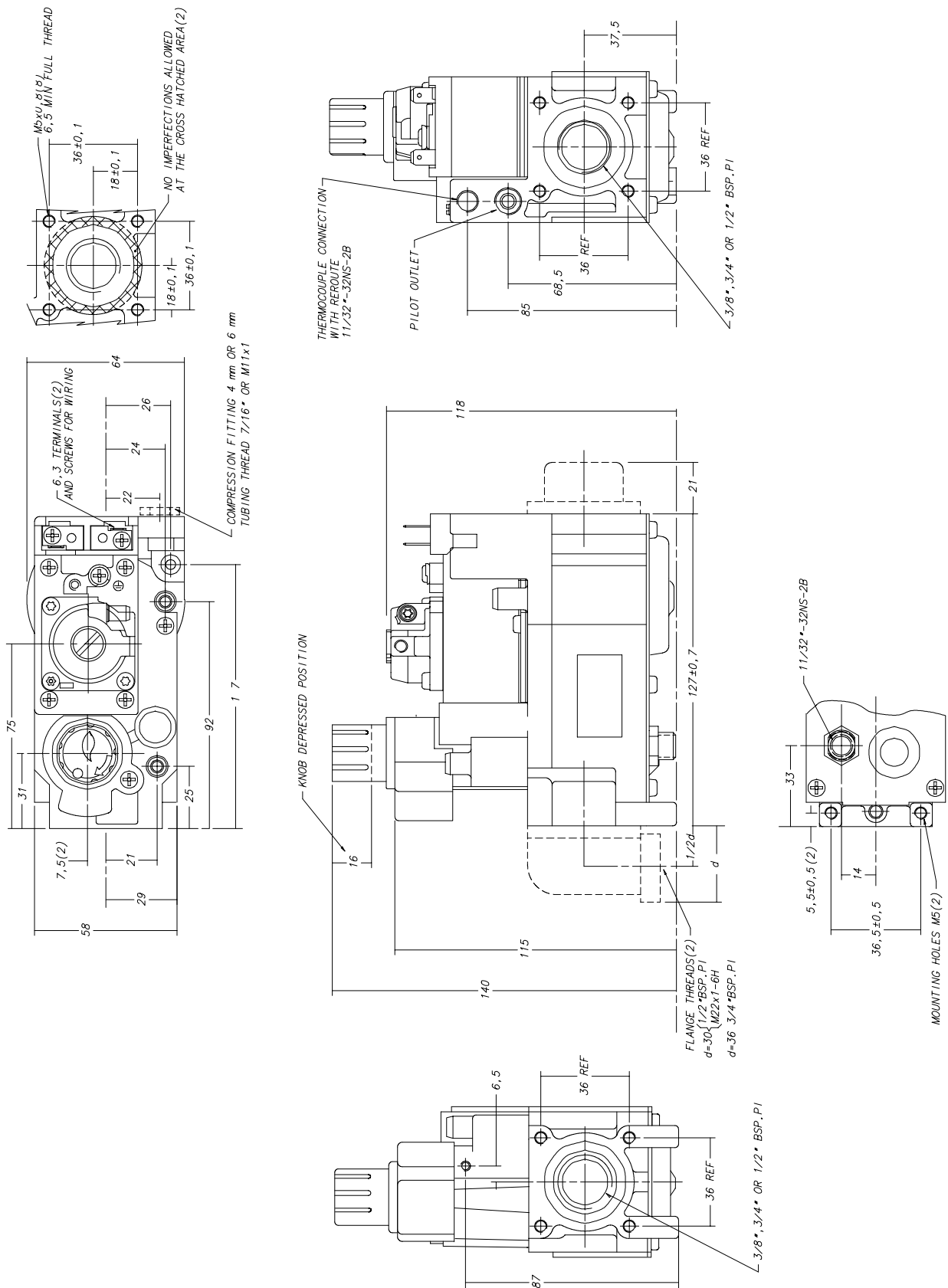
CAPACITY CURVE C 70

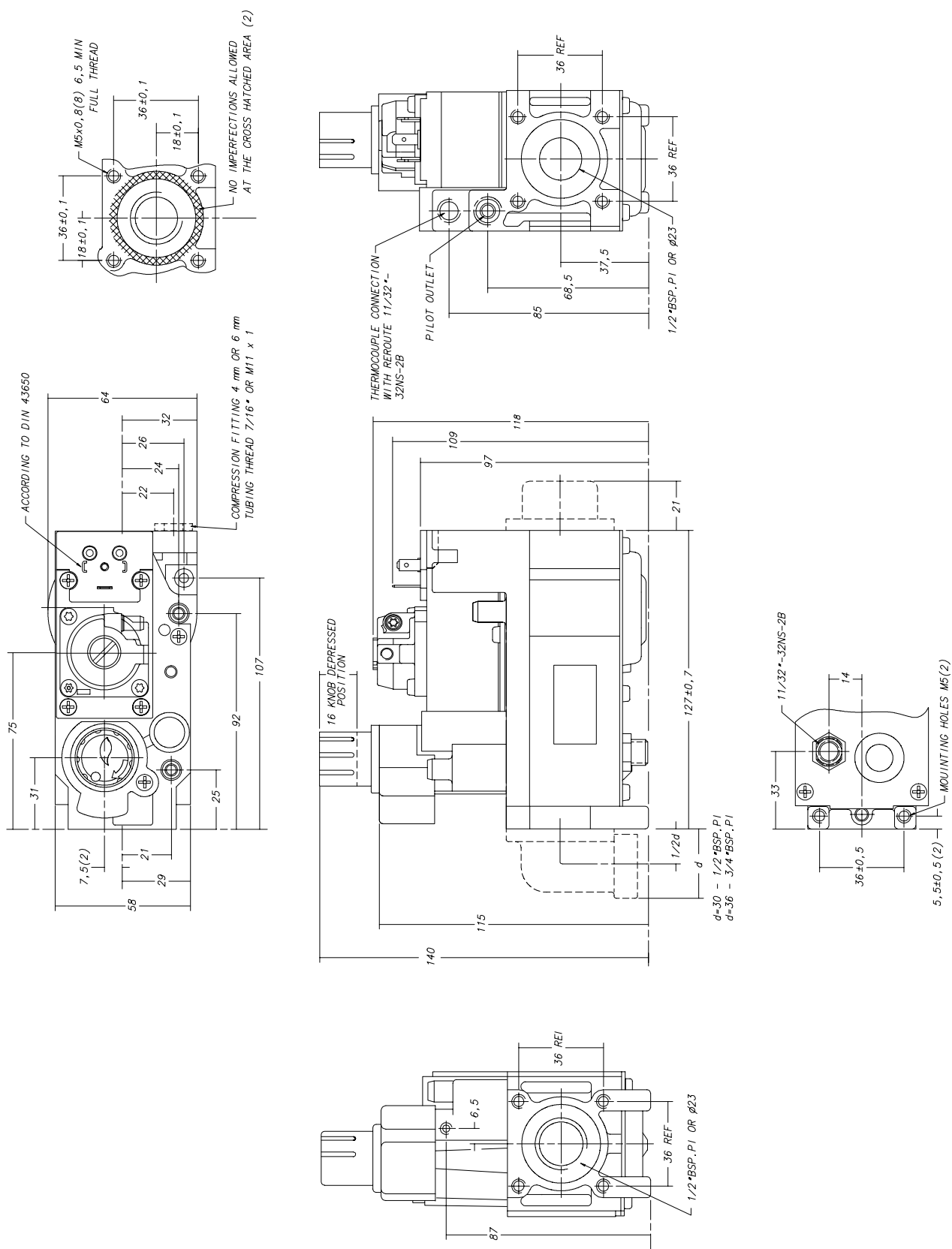


CAPACITY CURVE C 80

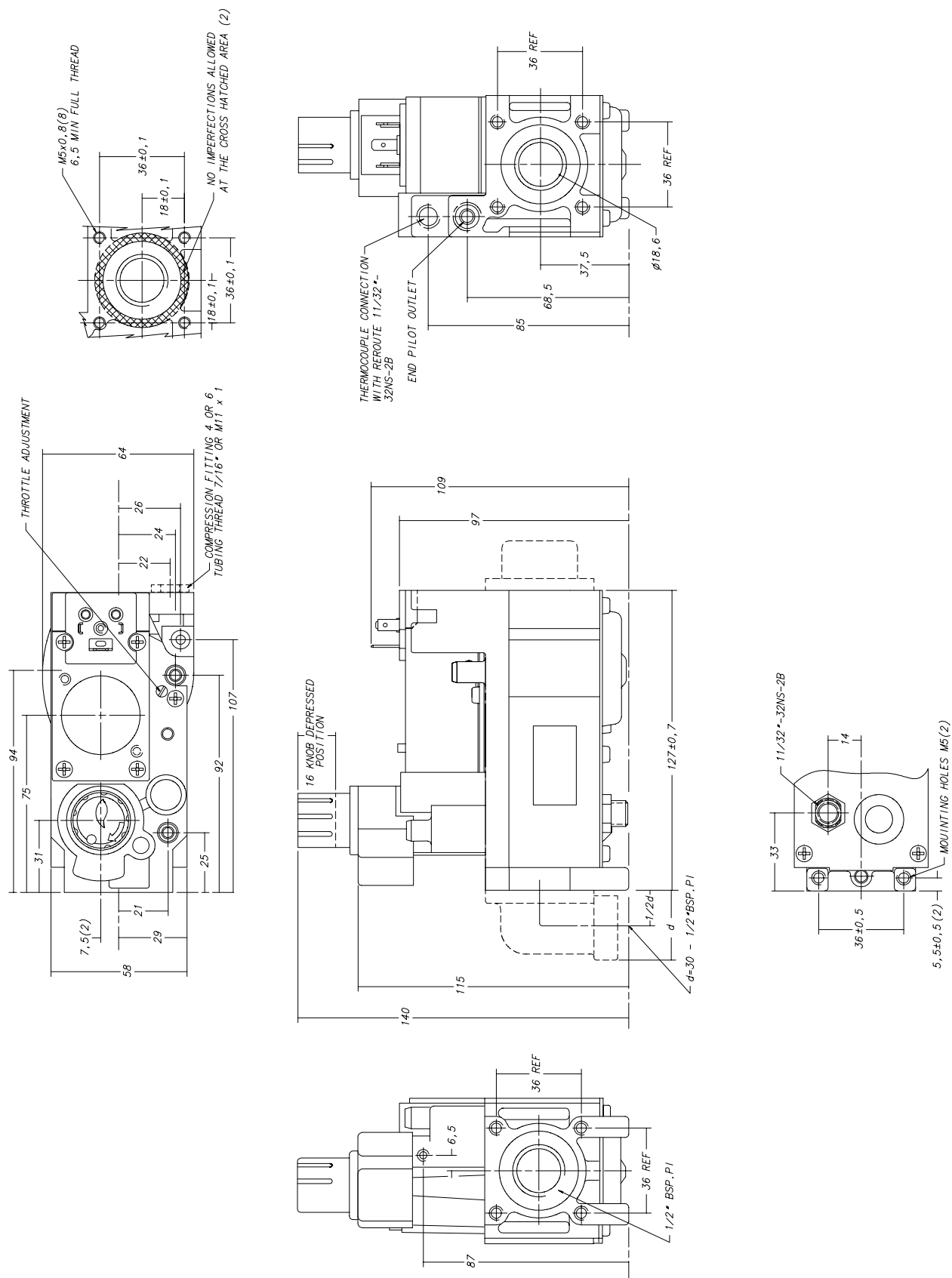


DIMENSIONAL DRAWING V4600/V8600A,C





DIMENSIONAL DRAWING V4600/V8600E, T



INSTALLATION

IMPORTANT

Take care that installer is a trained experienced service person.

Turn off gas supply before starting installation.

Disconnect power supply to prevent electrical shock and/or equipment damage.

Mounting position

The Compact can be mounted 0 to 90 degrees in any direction from the upright position (from the position when the knob is on top).

Main gas connection

- Take care that dirt cannot enter the Compact during handling.
- Use a sound taper fitting with thread according to ISO 7-1 or a piece of new, properly reamed pipe, free from swarf.
- Do not thread or tighten the pipe or pipe fitting too far (see table below). Otherwise valve distortion and malfunction could result.

Pipe size (inch)	Maximum length of pipe thread (mm)
1/2	18.6
3/4	19.9

- Apply a moderate amount of good quality thread compound to the pipe or fitting only, leaving the two end threads bare. PTFE tape may be used as an alternative.
- Ensure the gas flows in the same direction as the arrow on the bottom plate of the Compact.

Pressure feedback connection



WARNING

To avoid decreasing performance of pressure regulator by pinching off the pressure feedback tubing, it is to be recommended to use a metal tubing.

Pilot gas connection

- Square off the end of tubing and remove burrs.
- Slip compression fitting over tubing.
- Insert tubing into Compact housing until it bottoms, slide fitting into place and turn finger tight.
- Use a wrench to tighten fitting about 1 1/2 turn beyond finger tight to shear of the olive.

Do not use jointing compound.

Connect other end of tubing to pilot burner according to the manufacturer's instructions.



CAUTION

Do not bend tubing at Compact after compression fitting has been tightened, as this may result in gas leakage at the connection.

Thermocouple connection

The Compact has an electrical thermocouple connection and must therefore be kept clean and dry; thread compound should never be applied to it.

Tighten only 1/4 turn beyond finger tight in order to give good electrical connection. When routing the thermocouple tubing, do not to bend it too sharply (min. radius 2.5 mm).

Perform gas leak test



WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH

Check for gas leaks with a rich soap and water solution any time work is done on a gas control.

Gas leak test

- Paint all pipe connections upstream of the gas control with with a rich soap and water solution. Bubbles indicate a gas leak.
- If a gas leak is detected, tighten the pipe connection.
- Stand clear while lighting the main burner to prevent injury caused from hidden gas leaks, which could cause flashback in the appliance vestibule. Light the main burner.
- With the main burner in operation, paint all pipe joints (including adapters) and gas control inlet and outlet with with a rich soap and water solution or an approved leak detection fluid.
- If another gas leak is detected, tighten adapter screws, joints and pipe connections.
- Replace the part if gas leak can not be stopped.



CAUTION

Keep soap and water solution away from electrical connections.

Be careful not to clog bleed vent parts with soap solution residue. Remember bleed vents will discharge air during gas valve opening or closing giving false indication of leakage.

Electrical connection



CAUTION

Switch off power supply before making electrical connections.

Never jumper the terminals of low voltage Compact since this may burn out the room thermostat heat anticipator.

Take care that wiring is in accordance with local regulations.

Use lead wire which can withstand 105 °C ambient.

The electric on/off servo operator is provided with:
both 6.3 mm terminals suitable for 6.3 mm receptacles (e.g. "Series 250" AMP fasteners). and screw terminals,
or provided with:
quick connect terminals suitable for 6.3 mm receptacles (e.g. "Series 250" AMP fasteners) or for a female connector according to DIN 43650.

Wiring

Follow the instructions supplied by the appliance manufacturer.

OPERATION

The operation of the pilot system is accomplished by manipulation of a knob, provided with programming symbols that indicate lighting and shut off.

Lighting procedure

- Depress knob and hold it down.
- Ignite pilot burner.
- Hold knob down for 20 seconds, after pilot burner has been lit.
- Release knob.

IMPORTANT

Wait at least three minutes before a second attempt to light the pilot burner is made, when pilot flame has not been established first time.

Shut off procedure

In order to interrupt all gas flow through Compact, knob must be turned clockwise to its stop.

After release the knob will automatically rotate to its ready position.

NOTE: A safety latching device prevents the knob from being fully depressed until the thermocouple has cooled down sufficiently to de-energize the power unit, after which the knob will be effective again. When the knob is depressed during latch position, pilot gas will flow to pilot burner. However, when the knob is released, pilot gas extinguishes and main gas supply is not affected. Wait one minute after shut off before starting lighting procedure.

ADJUSTMENTS AND CHECKOUT

IMPORTANT

Adjustments must be made by qualified persons only.

If the appliance manufacturer supplies checkout and/or service and maintenance instructions carefully follow them. If these instructions are not provided then use the procedure outlined below.



CAUTION

To ensure a safe closing of the valve, it is essential that voltage over the terminals of electric servo on/off operator is reduced to 0 Volt.

Pilot flame adjustment (see fig. 6. page 24)

Compact is packed for shipment with pilot flow at maximum. Refer to the pilot burner manufacturer's instructions for recommended size of pilot flame.

If adjustment is required turn pilot flow adjustment screw clockwise to decrease or counter clockwise to increase pilot flame.

Outlet pressure adjustment servo regulated versions (see fig. 6. page 24)

- Disconnect pressure feedback connection (if applicable)
- Energize electric on/off servo operator in order to have gas input to burner.
- Check input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the outlet pressure tap.
- Remove pressure regulator cap screw to expose pressure regulator adjustment screw.
- Slowly turn adjustment screw with a screw driver until the burner pressure required is recorded on the pressure gauge. Turn adjustment screw clockwise to increase or counter-clockwise to decrease gas pressure to the burner.

- For non-regulating mode (LP gas) turn adjustment screw clockwise until it stops.
- Replace pressure regulator cap screw.
- Connect pressure feedback connection (if applicable).

Outlet pressure adjustment throttle versions (see fig. 7. page 25)

- Energize electric on/off servo operator in order to have gas input to burner.
- Check input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the outlet pressure tap.
- Open cap to expose throttle adjustment screw (if applicable).
- Turn the flow adjustment screw with a screw driver **either way** until the burner pressure required is recorded on the pressure gauge.
- Close cap.

Check of slow opening (softlite)

The softlite pressure is factory set.

Check burner performance at this pressure observing burner ignition and flame characteristics. Burner should ignite promptly and without flash back to orifice and all ports should remain lit.

Cycle burner several times (wait 30 seconds between cycles to allow servo system to resume slow open action).

Repeat check of slow opening after allowing the appliance to cool down.

Final checkout

After installation and any adjustment start the appliance and observe a complete cycle to ensure that all burner components function correctly.

TROUBLE SHOOTING

NOTE: If the current required is not generated by the pilot burner/thermocouple combination, the thermo electric safety circuit cuts off the gas supply to the main burner and pilot burner.

If the pilot burner does not light.

Possible causes are:

- Gas cock is closed. No gas supply.
- Safety valve is closed. No gas supply.
- Button has not been depressed.
- Pilot gas tubing still contains air. Purge the tube by depressing the Compact button for one minute and then attempt to relight pilot burner.
- Pilot flame is too small. For correct adjustment see **Pilot flame adjustment** page 20.

If the pilot flame goes out when start button is released.

- Pilot adjustment is incorrect. For correct adjustment see **Pilot flame adjustment** page 20.
- Thermocouple connection to body is not tight enough. Make sure that this connection is clean and dry.
- Thermocouple or power unit is faulty. Check thermocouple circuit.

If thermocouple or power unit is faulty test the thermo electric safety circuit using the Honeywell W129A 1008 systems tester as follows:

- Connect the W129A 1008 systems meter to the thermocouple adapter.
- Depress the Compact button so that gas flows to the pilot outlet. Ignite pilot gas.
- Adjust pilot flame to correct size (see **Pilot flame adjustment** page 20).
- Turn the adapter switch screw counter-clockwise to the open position, keeping the Compact button depressed and record millivoltmeter reading. This figure represents the thermocouple open circuit output (with power unit load connected).
- Turn the adapter switch screw to closed position and record the millivoltmeter reading again. This value represents the thermocouple closed circuit output (with power unit load connected). The output with the load will be approximately half the output without the load providing the power unit operates correctly (and there is no switch in the thermocouple circuit).
- Check the power unit circuit operation with the aid of charts in fig. 1. and fig. 2. Use fig. 1. for a standard thermocouple circuit and fig. 2. for a circuit with high limit control as follows:
 - Locate millivolt output (without load) along the horizontal line of the chart.
 - Locate millivolt output (with load) along the vertical line of the chart.
 - Mark the point where they intersect on the chart. If they intersect:

within the shaded area.

The thermocouple circuit is correct and should function properly.

within the hatched area.

Check gas pressure, pilot flame adjustment and the possibility of a blocked pilot orifice. If these checks are satisfactory, replace the thermocouple.

outside the shaded area.

Check components indicated on chart. Replace if necessary.

- After replacement of the thermocouple or the Compact, test power unit circuit again. If circuit functions properly disconnect measuring instrument and connect thermocouple to Compact again. If circuit still does not function properly repeat above testing procedure.
- Check power unit operation.

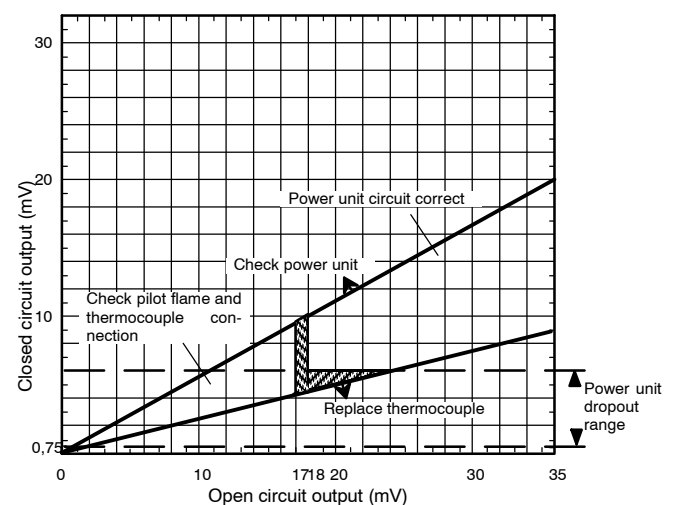


Fig. 1. Checkout chart for standard thermocouple circuit

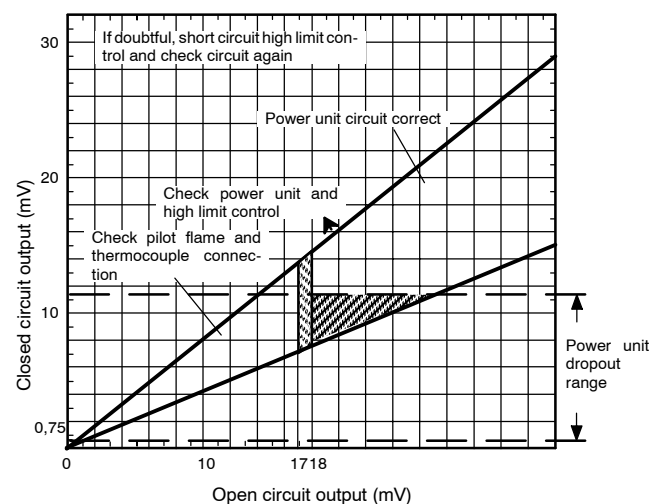


Fig. 2. Checkout chart for thermocouple circuit with high limit control

CONSTRUCTION AND WORKING PRINCIPLES

Pilotstat safety mechanism

Pilotstat provides manual light up and shut down of gas control systems. The Pilotstat sub-assembly has a built in safety mechanism which ensures that:

- main burner gas is not admitted to the appliance until it is proven that a pilot flame is present to light it.
- If the safety mechanism operates, indicating a fault condition, gas is inhibited from flowing to the pilot and main burner.

To start the appliance, push the button downwards. This opens the pilot valve and brings the power unit armature, via the power unit lever, into contact with the pole faces of the electro magnet. When the pilot flame is established, the electrical output from the thermocouple in the pilot flame energizes the electro magnet and maintains the armature to pole face connection.

When the button is released, the shaft moves upwards and the latch tilts. The latch engages the safety valve lever and

opens the safety valve (II). This allows gas to flow to the main valve. When there is a call for heat, the main valve opens and the main burner ignites.

To shut off the system, simply turn the button 15 ... 20 degrees clockwise and release it. This allows the main gas safety valve and the pilot gas valve to close by disengaging the safety valve lever (III). While the electro magnet remains energized but both pilot and safety valves have closed, relighting cannot take place because the power unit lever cannot act on the latch assembly and so the latch spring holds the latch tilted. The stop then prevents the shaft and tilted latch assembly from pushing down. This in turn prevents the safety valve lever being engaged and opens the safety valve (V).

Under normal conditions, the shaft and latch assembly do not come into contact with the stop. Only when the electro magnet is de energized does the power unit lever act against the latch spring making the control ready to start again (IV).

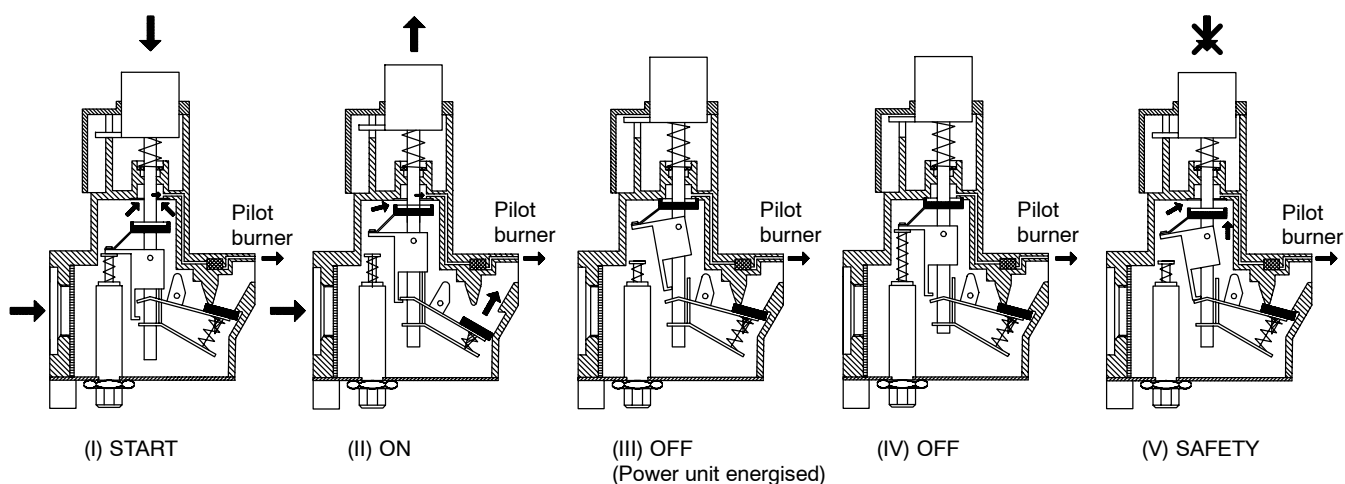


Fig. 3. Pilotstat safety mechanism working

Servo pressure regulation working

The Compact features the positive servo system, i.e. the main gas valve is closed by spring pressure in the normal shut down position and can only be opened when gas pressure is sufficient to overcome the spring force. This valuable built in safety feature ensures the main valve will automatically close in the event of power or gas supply failure.

The heart of the system is the servo pressure regulator which consists of a pressure relief valve integrated in a regulator diaphragm which is fitted above and controls the main valve.

When the electric on/off servo operator is energized, inlet gas flows through the servo orifice and through the open operator valve into the servo system and into the regulator. This servo gas moves the main valve diaphragm upwards enough to open the main valve. As soon as the main valve has opened, the outlet pressure generated by the Compact will be sensed by the regulator diaphragm via the feedback channel. When the force operated by the pressure is greater than that preset by the adjustment screw, the regulator valve opens

relieving some of the working pressure. This reduces the force against the main valve spring allowing the main valve to close proportionately. Thus the main valve limits the outlet (or burner) pressure to the preset level.

As a result outlet pressure is continuously maintained by comparing it to the preset pressure and adjusting the position of the main valve accordingly. This means that the preset outlet pressure is maintained regardless of inlet pressure variations.

At shut down, the small volume of working gas in the regulator and in the diaphragm chamber above the main valve, is dumped into the main outlet camber.

A reference pressure feedback connection further regulates the outlet pressure by compensating for differences in the air pressure in the chamber and at the valve.

If pressure regulation working is not needed, the regulator spring can be blocked by turning the adjustment screw down until it stops or the pressure regulator is removed. In these cases the full servo gas pressure opens the main valve as far as the pressure drop allows.

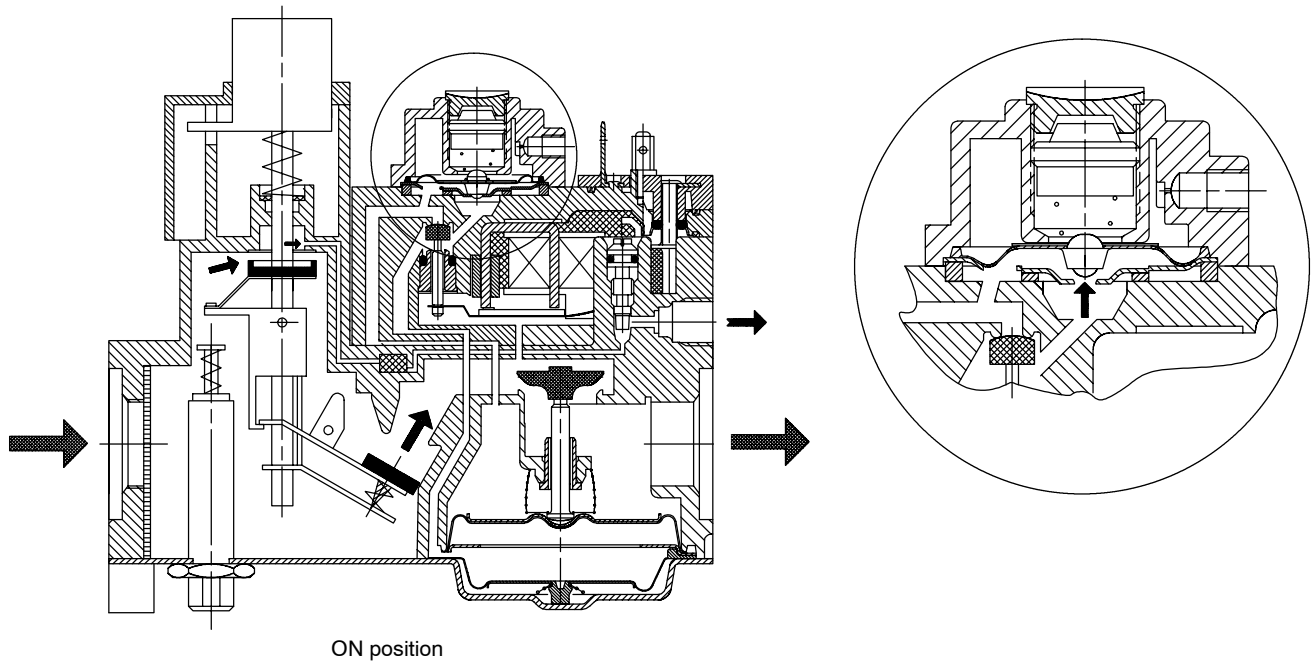


Fig. 4. Servo pressure regulator working

Softlite working

Some burners function well using a fast opening valve with the pressure build up as shown in fig. 5. However, other burner/appliance combinations need a means of improving their ignition characteristics by providing quieter ignition and reducing flame roll-out. The softlite mechanism achieves this by changing the profile of the outlet pressure curve as shown in fig. 5.

An extra diaphragm and spring are inserted below the main diaphragm. When the electric servo operator valve is opened, working gas enters the softlite module via the inlet orifice, and is fed into the space between the diaphragms. Working gas pressure rapidly increases to a preset level, partially opening the main valve (see fig. 6.).

As soon as it reaches the start level it overcomes the Softlite spring pressure. The resultant move of the Softlite diaphragm inhibits the increase of working gas pressure. Only when the Softlite spring has been totally compressed does the working gas pressure increase rapidly once again until the full fire position is reached.

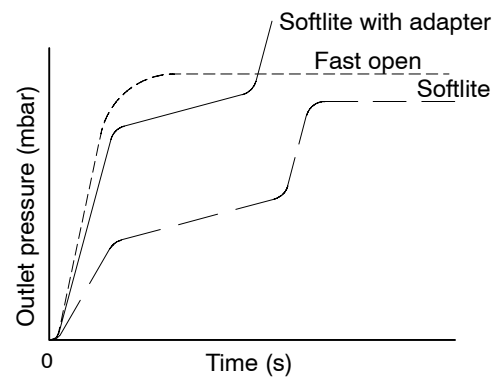
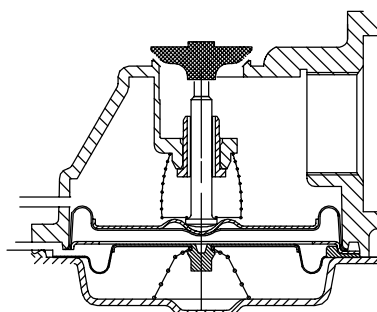
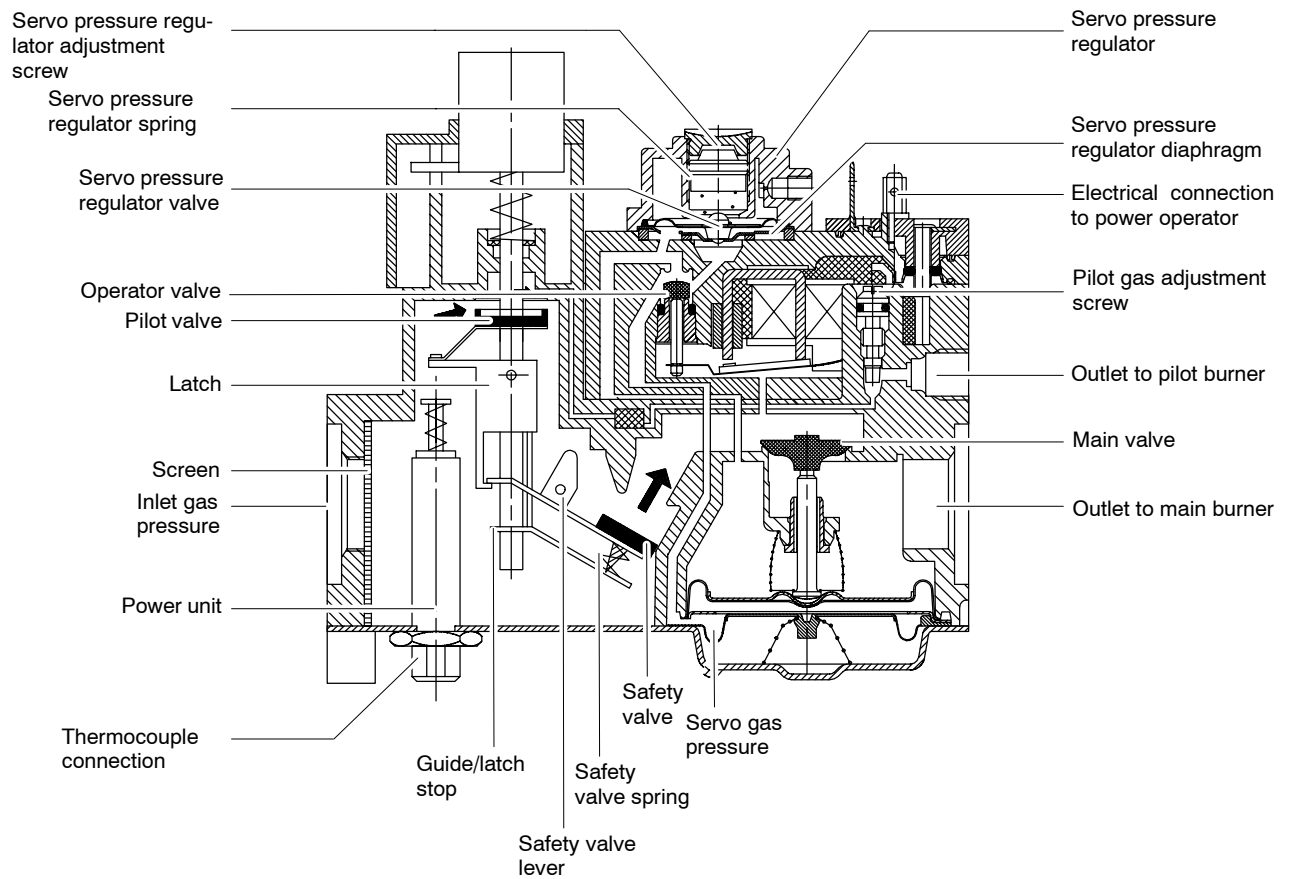
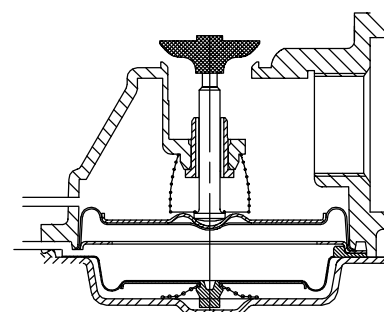


Fig. 5. Opening characteristics



Softlite ON position,
softlite gas only, main valve partially open



Softlite ON position, main valve open

Fig. 6. Servo pressure regulation Softlite models

Throttle valve working (see fig. 7.)

The throttle valve is situated after the main valve and can be adjusted by a screw.

With the throttle the outlet pressure can be adjusted in relation to the inlet pressure.

The throttle screw has a rotation reduction of 4 : 1 to the throttle and can be fully rotated in either direction.

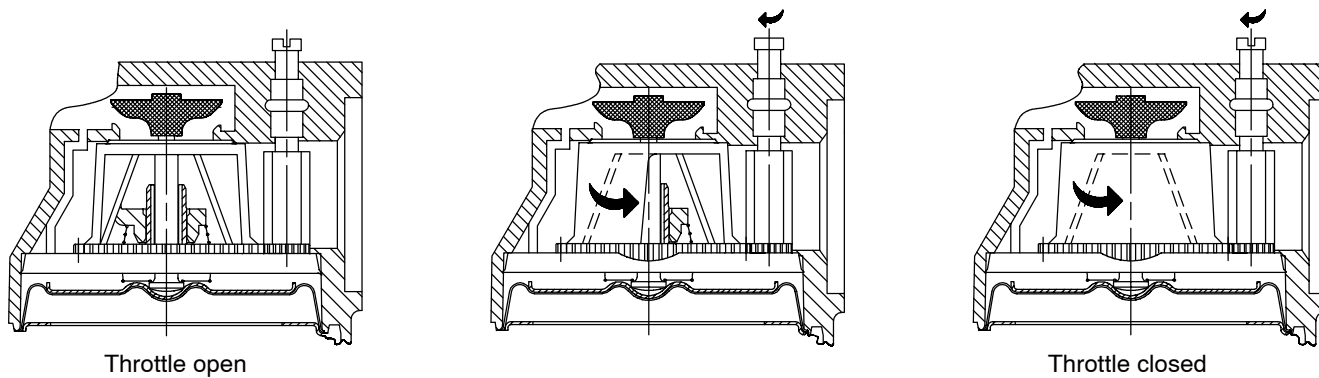


Fig. 7. Throttle adjustment

QUALITY ASSURANCE STATEMENT

Products are manufactured under an ISO 9001 (1994) based and certified Quality System.

The quality system is described in the Honeywell Combustion Controls Center Quality Assurance Programme and its related operational procedures and instructions.

The quality system is approved by Gastec against certificate number 9.302/2.

The quality organisation is responsible for defining, maintaining, improving and verification of the quality systems in the field of design, production process and field quality service.

Assembly processes are guided by work instructions. Patrol inspections form part of the assembly processes.

At the end of the assembly phase, all gas controls are leakage and performance tested/adjusted.

Assembly inspection is performed by employees of the quality control department, using their own equipment.

All inspections (incoming and assembly) are performed by trained personnel and according inspection procedures.

STANDARDS AND APPROVALS

Standards

The Compact has been designed to meet the European Standards:

- EN 88: :Pressure governors
- EN 125 :Thermo-electric flame supervision devices
- EN 126 :Multifunctional controls.
- EN 161 :Automatic shut-off valves

The thermo-electric flame supervision device has been tested for 10.000 operations.

The valves operating main gas flow and pilot gas flow through the thermo-electric flame supervision device meet class C-requirements according to their sealing force.

The electric servo operated shut-off valve meets class J requirements in case of V4600/V8600 and class C requirements in case of V4610/V8610

A class J valve as mentioned in EN 161; 1997 is equal or better than a class D' valve as mentioned in EN 297 and EN 483 and class D valves as mentioned in other standards.

According to bending stresses the Compact meets the highest (group 2) requirements.

The pressure governor meets class B performance.

Regarding electric safety, the Compact can be used in appliances according to European Standard for household electrical requirements EN 60335 series.

The Compact also meets all Electro Magnetic Compatibility standards for non-industrial appliances.

Approvals

The Compact conforms with the following EC - Directives:

- Gas Appliance Directive (90/396/EEC)
- Low Voltage Directive (73/23/EEC)
- Electro Magnetic Compatibility Directive (89/336/EEC)

The fact that the Compact gas control is certified to European standards EN 88, EN161 and EN 126 means that the Compact meets more stringent requirements than laid down in the essential requirements stated in the directives and therefore meet the requirements in all EC and EFTA countries.

Details per O.S. number can be found in the Approvals List. In addition our controls have been certified by DIN-DVGW in Germany. The registration number specific for each O.S. number is mentioned on the label of the control.

Outside Europe:

The Compacts are approved in Australia and accepted as part of the gas appliance in Korea.

ORDERING INFORMATION

When ordering specify:

- Model number of Compact required: see model number chart below.
- Inlet and outlet pipe sizes required: note pipe sizes determines capacity.
- For the correct pilot burner/thermo-couple combination for the installation concerned: refer to Honeywell ignition products guide EN0R-0038.
- Order numbers for replacement parts and accessories required, i.e. ECO connector, flanges, compression fittings, ignition switch, and thermocouple re-route connector: see replacement parts/accessories.

NOTE: Most models of valves, replacement parts and accessories will be available under "TRADELINE" label. Ask your wholesaler for details.

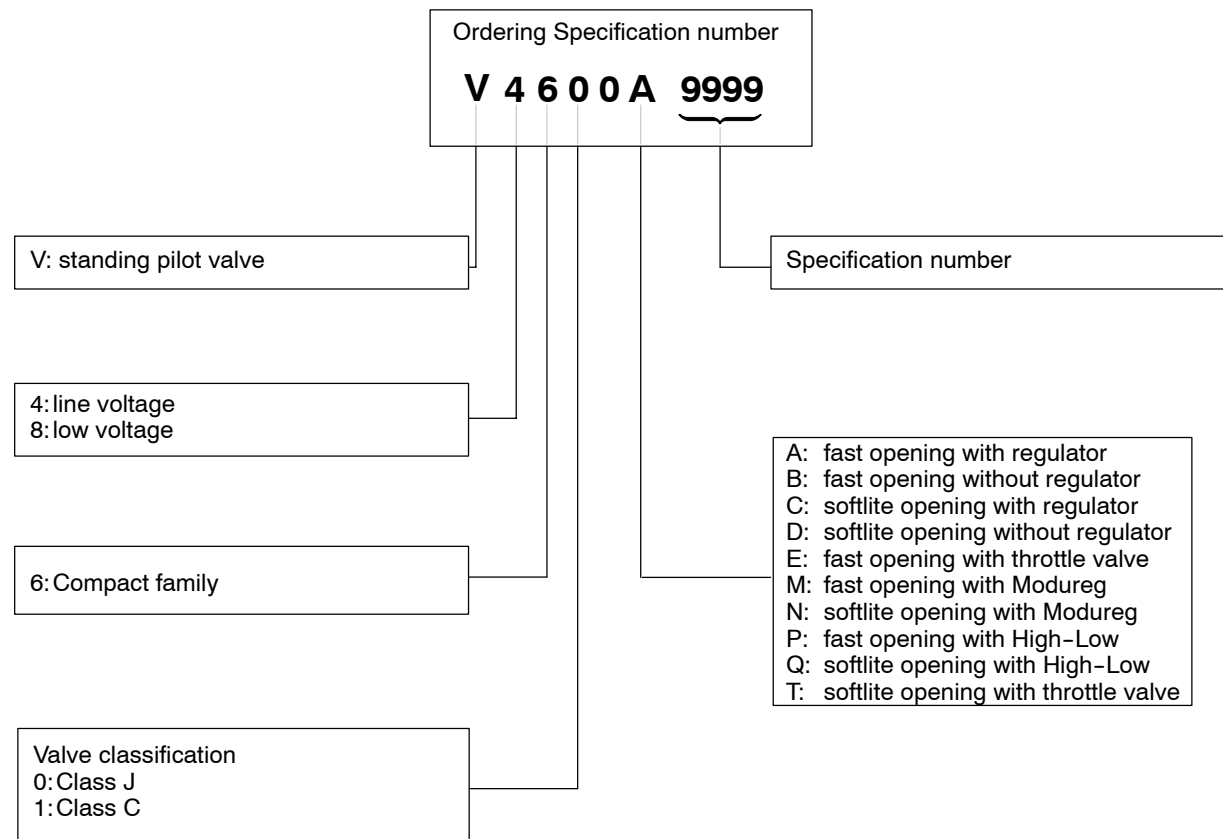


Fig. 8. Model number chart

APPLICATION NOTES

Title	Document number*
The application of characterised opening in combination gas control	EN0R-0204

* These bulletins are available upon request. Please consult your local Honeywell contact.

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