

VGD / VRD Series

VGDxx.xxxU / VRD40.xxxUx Gas Valves for use with SKPx5.xxxU electro-hydraulic actuators



VGD20.xxxU



VGD40.xxxU



VRD40.xxxUx

ISO 9001 and 14000
REGISTERED FIRM



Only with series SKPx5.xxxU actuators

Description

The normally closed VGDxx.xxxU / VRD40.xxxUx series of modular double-body gas valves combine with SKPx5.xxxU series electro-hydraulic actuators to provide safety shut-off, gas pressure regulation and/or air-gas ratio control for commercial or industrial gas burners.

Table 1. VGDxx.xxxU / VRD40.xxxUx model numbers

Model Numbers	Body size and style	Connection
VGD20.253U	1" double	NPT thread
VGD20.323U	1 ¼" double	NPT thread
VGD20.403U	1 ½" double	NPT thread
VGD20.503U	2" double	NPT thread
VGD40.065U	2 ½" double	NPT thread
VGD40.080U	3" double	NPT thread
VGD40.100U	4" double	ANSI flange
VGD40.150U	6" double	ANSI flange
VRD40.040U	1 ½" double	NPT thread
VRD40.050U	2" double	NPT thread
VRD40.065UF	2 ½" double	ANSI flange
VRD40.080UF	3" double	ANSI flange
VRD40.100UF	4" double	ANSI flange
VRD40.150UF	6" double	ANSI flange

Features
All Models

- UL listed, FM approved, CSA certified, ISO 9001 and 14000 certified. CE, Australian approved versions available
- ¼"-inch NPT pressure taps on the inlet and the outlet, and between main valves (see *Table 2* for details)
- Stainless steel mesh inlet screen protects the valve seat(s)
- Dual stem guides ensure precise disc alignment and tight shut-off
- Valves in connection with SKPx5.xxxU actuators open slowly and close rapidly

VGD20.xxxU models

- Compact VGD20.xxxU double-valve bodies consist of 2 safety shut-off valves in series. The first (inlet) valve has a flat valve disc applicable for safety shut-off function. The second (outlet) valve has a contoured valve disc for use with pressure regulating / safety shutoff actuators (SKP25.xxxU, SKP55.xxxU, SKP75.xxxU) or safety shutoff (SKP15.xxxU)
- A 1-inch NPT vent connection is provided between the valves
- Each VGD20.xxxU double-valve requires 2 NPT threaded mounting flanges (AGF10.xxU). Each flange includes the necessary installation hardware (bolts, nuts and O-ring). Each mounting flange has a ¼-inch NPT pressure tap. The flanges can be pre-mounted onto the pipe, and then bolted onto the VGD20.xxxU gas valve body. This feature eliminates the use of pipe unions and permits the gas valve assembly to be easily removed from a gas train
- The bolt pattern of the 1...2 inch AGF10.xxU flanges are identical. This permits any AGF10.xxU flange to be mounted to any VGD20.xxxU valve body



NOTE:

VGD20.xxxU valves and AGF10.xxU flanges must be ordered as separate items (see *Tables 2 and 3*).

VGD40.xxxU /
VRD40.xxxUx models

- Compact VGD40.xxxU / VRD40.xxxUx double-valve bodies consist of 2 safety shut-off valves in series
- Each individual safety shut-off valve has double seats to achieve high flow
- Patented seat construction with individual closing spring for each seat to assure reliable shut-off and high close-off pressure rating
- Strong sealing force, withstands up to 4 psi differential back pressure
- Full port vent line connection plates are available



NOTE:

VGD40.xxxU / VRD40.xxxUx valves and AGA40.xxxxU vent connection plates must be ordered as separate items (see *Tables 2 and 3*).

Application

All VGDxx.xxxU / VRD40.xxxUx valves can be combined with any SKPx5.xxxU series actuator. The actuator can be mounted while the valve is installed and under pressure.

SKPx5.xxxU regulating actuators are applicable for a wide range of outlet pressures, eliminating excessive regulator inventories. Maximum pressure ratings vary with valve size (see *Table 2*).

All VGDxx.xxxU / VRD40.xxxUx valves perform these functions in combination with each of the following actuators:

SKP15.xxxU	Safety shut-off
SKP25.xxxU	Safety shut-off, constant pressure regulation, ratio regulation or zero governor
SKP55.xxxU	Safety shut-off, pressure regulation and differential pressure air-gas ratio control
SKP75.xxxU	Safety shut-off, pressure regulation and adjustable air-gas ratio control

Since more than one function can be performed by a single valve, fewer components and fittings are required-significantly reducing both the size and weight of the gas train. In many applications, smaller gas valves can be used. For details on valve sizing see the flow chart (figure 3).

**CAUTION:**

Do not oversize valves equipped with a regulating SKP25.xxxU / SKP55.xxxU / SKP75.xxxU actuator. Oversizing may limit turndown and could cause oscillations.

Ordering information

Gas valves and actuators are ordered separately. For additional SKPx5.xxxU actuator information, see the following technical instructions:

SKP15.xxxU	CC1N7643us
SKP25.xxxU	CC1N7643us
SKP55.xxxU	CC1N7643us
SKP75.xxxU	CC1N7643us



NOTE:

The SKPx5.xxxU actuators have an operating temperature range of 14 °F to 140 °F (-10 °C to 60 °C)!

Table 2. Product numbers

Product number	Size	Maximum operating pressure psi	Close-off pressure psi	Capacity CFH Natural gas at $\Delta P = 1''$ W.C.	Number of test points, 1/4" NPT		Valve body material
					Inlet	Outlet	
VGD20.253U *)	1"	20	30	600	Two ¼-inch and one 1-inch port between valves		Aluminum
VGD20.323U *)	1¼"	20	30	1,200			Aluminum
VGD20.403U *)	1½"	20	30	1,850			Aluminum
VGD20.503U *)	2"	20	30	2,300			Aluminum
VGD40.065U	2½" NPT	10	75	3,880	1	1	Aluminum
VGD40.080U	3" NPT	10	75	5,370	1	1	Aluminum
VGD40.100U **	4" flanged	10	30	9,680	1	1	Aluminum
VGD40.150U **	6" flanged	10	30	17,490	1	1	Aluminum
VRD40.040U	1-1/2" NPT	20	75	1,800	1	1	Aluminum
VRD40.050U	2" NPT	20	75	2,300	1	1	Aluminum
VRD40.065UF	2-1/2" flanged	10	75	3,880	1	1	Aluminum
VRD40.080UF	3" flanged	10	75	5,370	1	1	Aluminum
VRD40.100UF	4" flanged	10	30	9,680	1	1	Aluminum
VRD40.150UF	6" flanged	10	30	17,490	1	1	Aluminum

*) VGD20.xxxU double valves require 2 AGF10.xxU threaded flanges for installation

***) VGD40.1x0U / VRD40.xxxUF flanged valves must be installed using non-metallic flange gaskets. Gasket material must be chemically compatible with the fuel gas being used in the application and must be softer than the aluminum flange sealing surface. Acceptable gasket materials include but are not limited to rubber, paper, and plastic. Observe flange bolt torque specifications as stated in the VGD40.xxxU / VRD40.xxxUx installation instructions. Also refer to ANSI / ASME B16.24.

Accessories

Table 3. Accessories

Part Number	Description	Notes
AGF10.15U	Single ½" connecting flange with ¼" port for VGD20.xxxU	Larger flange may be used to increase the outlet pipe size when required. 2 required per valve. Order separately
AGF10.20U	Single ¾" connecting flange with ¼" port for VGD20.xxxU	
AGF10.25U	Single 1" connecting flange with ¼" port for VGD20.xxxU	
AGF10.32U	Single 1¼" connecting flange with ¼" port for VGD20.xxxU	
AGF10.40U	Single 1½" connecting flange with ¼" port for VGD20.xxxU	
AGF10.50U	Single 2" connecting flange with ¼" port for VGD20.xxxU	
AGA40.4050U	1" NPT vent connection plate for VGD40.xxxU / VRD40.xxxUx	Each vent connection includes ¼" NPT test port, see chapter <i>Mounting instruction</i>
AGA40.6580U	1 ¼" NPT vent connection plate for VGD40.xxxU / VRD40.xxxUx	
AGA40.0100U	2" NPT vent connection plate for VGD40.xxxU / VRD40.xxxUx	
AGA40.0150U	2 ½" NPT vent connection plate for VGD40.xxxU / VRD40.xxxUx	

AGA61



Manual adjusting throttle attachment AGA61 permits VGDxx.xxxU / VRD40.xxxUx series valves to be used as adjustable limiting orifice valves. Once adjusted, the AGA61 has a provision to be sealed from tampering.

AGA66

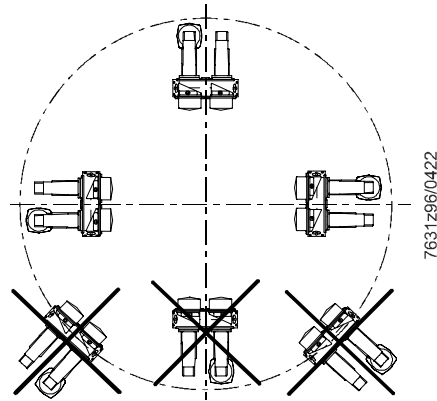


Sealing gasket to provide NEMA 3, NEMA 3R, and NEMA 4 protection.
 Gasket kit to mount SKPx5.xxxU
 - Place between actuator SKPx5.xxxU and valve VGDxx.xxxU / VRD40.xxxUx
 - Increases degree of protection from IP54 to IP65
 - Refer to chapter *Mounting instruction*

Specifications	Agency approvals/standards	UL/429, FM/7400, CSA/ANSI Z21.21/CSA 6.5 C / I
Approvals		Commercial / Industrial Agency marks apply only for VGDxx.xxxU / VRD40.xxxUx series gas valve bodies assembled with SKPx5.xxxU actuators.
Operating environment	Maximum operating pressure	See <i>Table 2</i>
	Maximum back pressure (differential)	VGD20.xxxU: 2 psi (150 mbar) VGD40.xxxU: 4 psi (300 mbar) VRD40.xxxUx: 4 psi (300 mbar)
	Close-off pressure	See <i>Table 2</i>
	Permissible gases	See <i>Type of gases and Use</i>
	Permissible gas temperature	14 °F to 140 °F (-10 °C to 60 °C)
	Permissible operating temperature	14 °F to 140 °F (-10 °C to 60 °C)
Use for VGDxx.xxxU VRD40.xxxUx	The valve is used as:	
	- Safety shutoff valve (in connection with SKP15.xxxU)	
	- Control valve with safety shutoff function (in connection with SKP25.xxxU, SKP55.xxxU or SKP75.xxxU)	
Specific use for VRD40.xxxUx	The valve can be used with many different gases, including:	
	<ul style="list-style-type: none"> • Digester gas • Process gas • Natural gas • Hydrogen • Air 	
	When used with any gas, the following restrictions must be considered:	
	<ul style="list-style-type: none"> • Maximum operating temperature is 140 °F (60 °C) • Gas must be dry. The dewpoint of the gas must be low enough so that water vapor does not condense in the valve body. The dew point of the gas should be at least 20 °F (11 °C) lower than the temperature of the coldest part of the valve body • Piping must be sloped and/or a drip leg employed so that condensate will not flow into the valve body • If a SKP25.xxxU, SKP55.xxxU or SKP75.xxxU pressure regulating actuator is used with the VRD40.xxxUx valve the sensing line (tube) must be sloped away from the pressure regulator • Concentration of Hydrogen Sulfide (H₂S) in the gas must be less than 1% or 10,000 ppm • Concentration of Ammonia (NH₃) in the gas must be less than 1% or 10,000 ppm 	
	As with all gas safety shutoff valves, it is recommended to install a means to manually leak check the valves.	
	The VRD40.xxxUx is also conducive to automatic valve proving systems.	

Specifications

Perm. mounting position



See *Mounting notes*

Operating pressure See *Type summary*

Types of gases

VGD20.xxxU / VGD40.xxxU models Suitable natural gas, propane, butane, hydrogen and air

For more information see *Use* section.

VRD40.xxxUx models

Suitable for biogas, digester gas, process gas, natural gas, hydrogen or air

- Concentration of Hydrogen Sulfide (H₂S) less than 1% or 10,000 ppm
- Concentration of Ammonia (NH₃) less than 1% or 10,000 ppm
- Gas must be dry so that condensation of water vapor does not occur in valve body

For more information see *Use* section.

Screen Built-in, mesh size 0.9 mm.
 Not serviceable on VGD20.xxxU models.

Physical characteristics

Body materials	See <i>Table 2</i>
Weight	See <i>Tables 4</i>
All valve parts	Nonferrous

Connections

Pipe connections	NPT threads or ANSI class 150 flanges (see <i>Table 2</i>)
Pressure and vent taps	See <i>Tables 2 and 3</i> , see <i>Dimensions</i> sections

Operation

All VGDxx.xxxU / VRD40.xxxUx gas valves are normally closed, two-way valves. The valves have a standard, integral, stainless steel screen (0.9 mm) in the inlet to protect the valve seats against contamination.

All valves have ¼ NPT ports for pressure test connection. A full size vent connection plate is available as an accessory for VGD40.xxxU / VRD40.xxxUx valves. See *Table 2 and 3* for details on ports and vent connection plates.

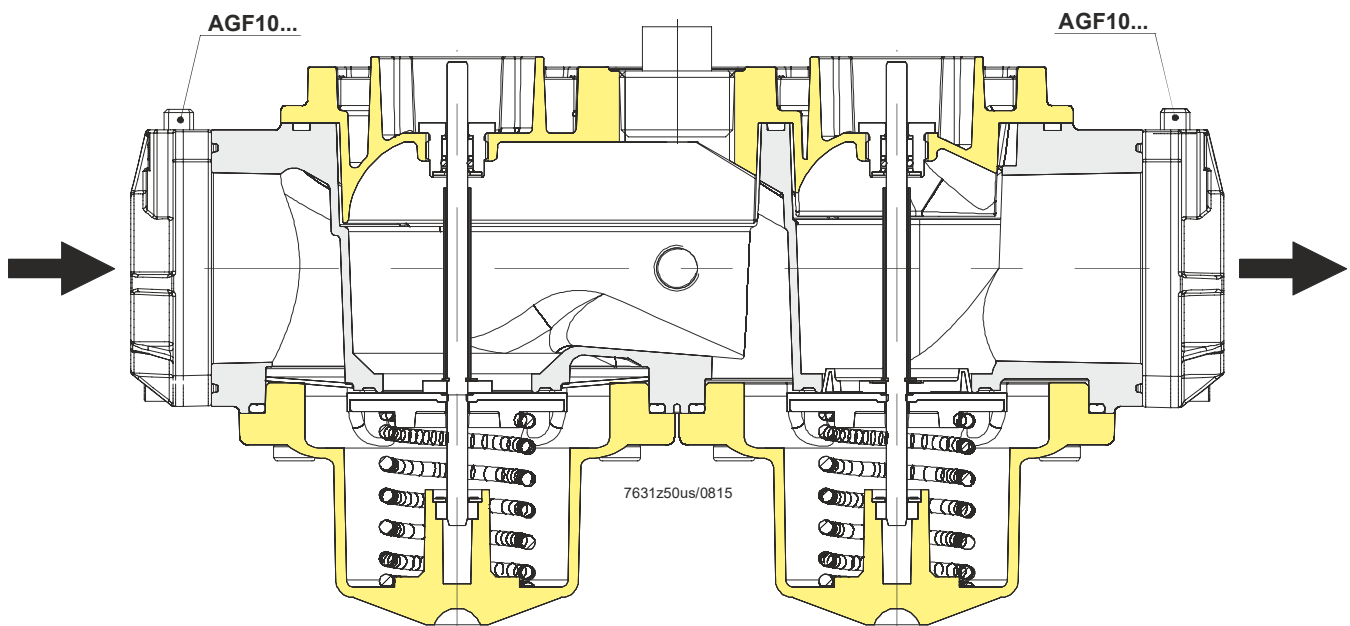


Figure 1. Sectional view of VGD20.xxxU

VGD20.xxxU double valves consist of two valves in series. The first (inlet) valve has a flat valve disc suitable for the safety shut-off function only. The second (outlet) valve has a contoured valve disc for stable regulating control and smooth release of gas.

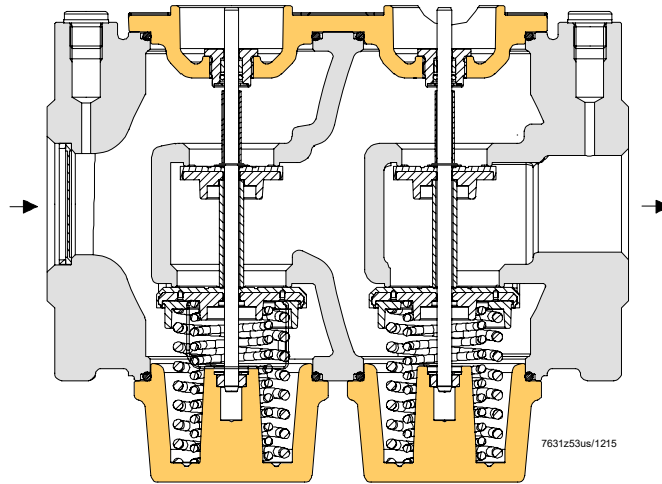
Operation, continued

Figure 2. Sectional view of VGD40.xxxU / VRD40.xxxUx flange models

VGD40.xxxU / VRD40.xxxUx double valves consist of two valves in series. Each valve has a double seat to achieve high flow (see *Figure 2*).

Closing springs:

Each double seat uses one pair of springs. The spring forces act separately as closing forces on the individual valve seats.

Gas flow charts

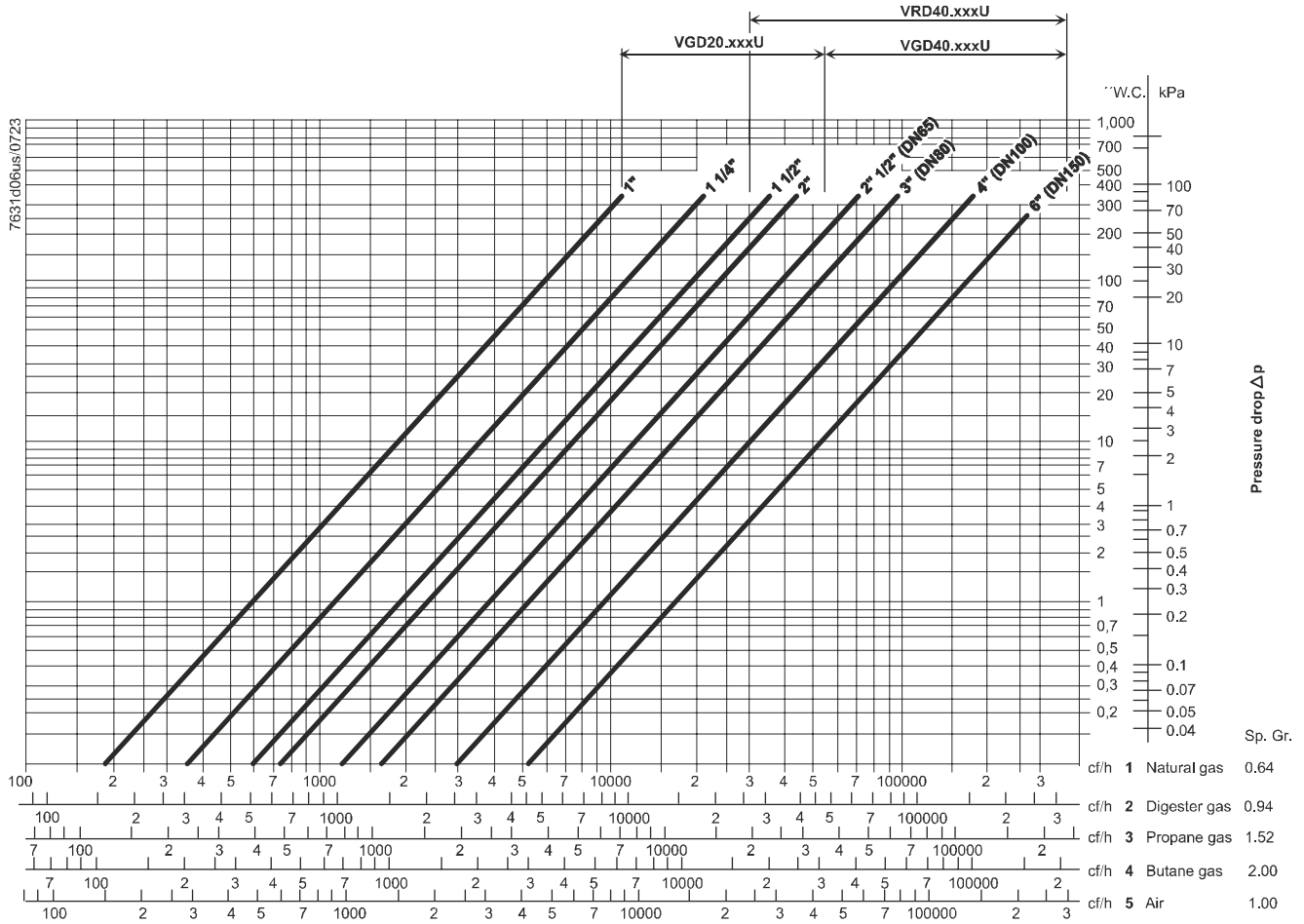


Figure 3. Sizing double valves

Assumptions:

- 1) Pressure downstream of valve is atmospheric
- 2) Maximum gas temperature of 140 °F
- 3) Valve in fully open position



NOTE:

Pressure drop is total drop across both valves when using a SKPx5.xxxU actuator, with or without an AGA66.



CAUTION:

Do not oversize valves equipped with regulating actuators SKP25.xxxU, SKP55.xxxU or SKP75.xxxU. Oversizing may limit turndown and could cause oscillations.

Mounting instructions

VGD40.xxxU / VRD40.xxxUx North America



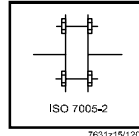
NOTE:

Installing a 20 mesh (or finer) strainer upstream of the VGD40.xxxU / VRD40.xxxUx valves is highly recommended.



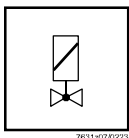
Installation only by qualified person

Operating pressure: max. 10 PSI
 Some VRD40.xxxUx are rated for 20 PSI

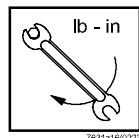


Max. torque/flange connection

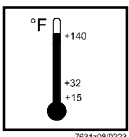
Tighten plugs and screws properly.
 Make sure of proper material combinations, aluminum-steel!



Agency approvals:
CSA
UL
FM

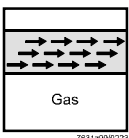


Max. torque/system accessories



Ambient temperature

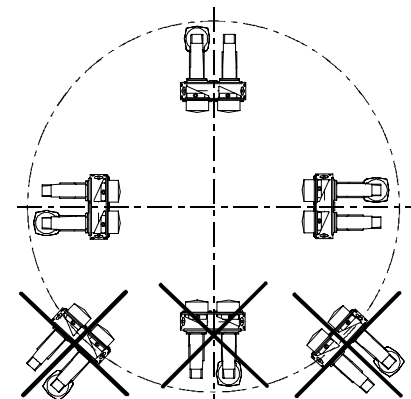
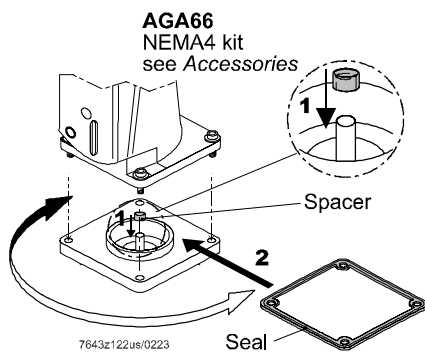
+15 °F...+140 °F
(-10 °C...+60 °C)



<140 °F (60 °C)

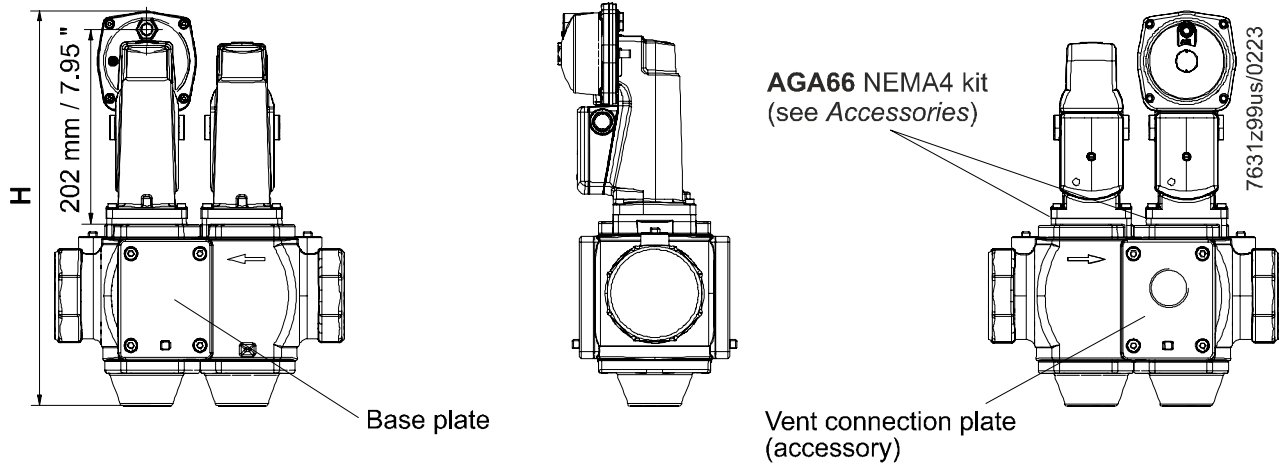
Natural gas
 Propane
 Butane
 Hydrogen
 Air
 Biogas (only VRD40.xxxUx)
 Digester gas (only VRD40.xxxUx)

Pipe size	Flange bolt size	Max. tightening torque
2 1/2"	5/8" x 2 1/2"	37 ft*lb
3"	5/8" x 2 1/2"	37 ft*lb
4"	5/8" x 2 1/2"	37 ft*lb
6"	3/4" x 3 1/4"	67 ft*lb



Mounting instructions, continued

Mounting possibilities VGD40.xxxU / VRD40.xxxUx / SKPx5.xxxU



Type	H =	SKP15.xxxU mm / inch	SKP25.xxxU mm / inch	SKP55.xxxU mm / inch	SKP75.xxxU mm / inch
VRD40.040U		382 / 15.04	415 / 16.34	427 / 16.81	463 / 18.23
VRD40.050U		382 / 15.04	415 / 16.34	427 / 16.81	463 / 18.23
VGD40.065U/VRD40.065UF		388 / 15.28	421 / 16.57	433 / 17.05	469 / 18.46
VGD40.080U/VRD40.080UF		412 / 16.22	445 / 17.52	457 / 17.99	493 / 19.41
VGD40.100U/VRD40.100UF		443 / 17.44	476 / 18.74	488 / 19.21	476 / 18.74
VGD40.150U/VRD40.150UF		521 / 20.51	554 / 21.81	566 / 22.28	566 / 22.28

Dimensions

Dimensions in Inches (mm)

VGD20.xxxU

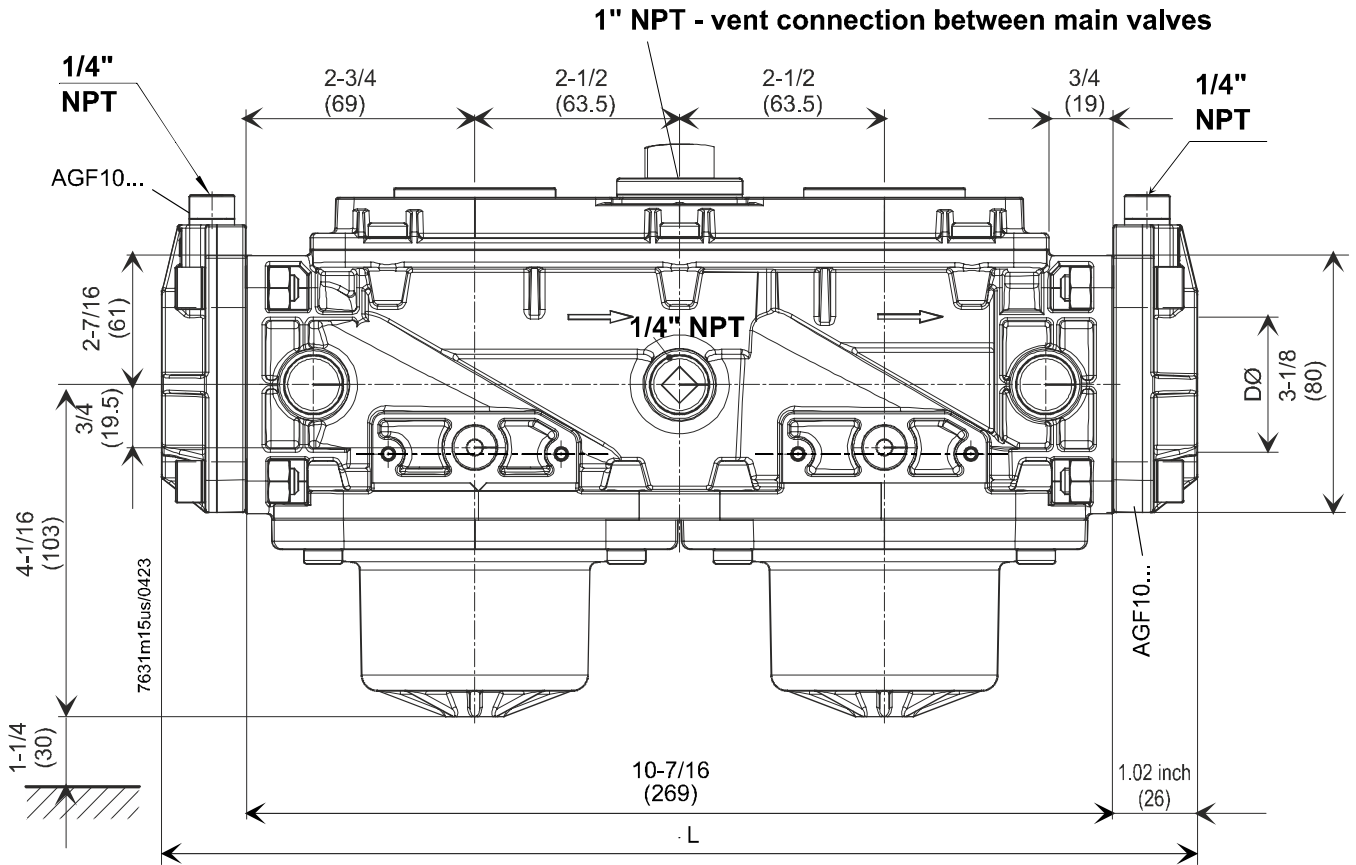


Table 4. VGD20.xxxU dimensions in inches (mm) with 2 flanges AGF10.xxU

Valve model	Nominal size D inch	Length (L) inch (mm)	Weight pounds (Kg)
VGD20.xxxU	1"	10.59 + 2 x 1.02 (269 + 2 x 26)	7 (3.2)
	1 1/4"	10.59 + 2 x 1.02 (269 + 2 x 26)	7 (3.2)
	1 1/2"	10.59 + 2 x 1.02 (269 + 2 x 26)	7 (3.2)
	2"	10.59 + 2 x 1.18 (269 + 2 x 30)	7 (3.15)

Dimensions, continued

Dimensions in Inches (mm)

VGD40.065U / VGD40.080U / VRD40.040U / VRD40.050U

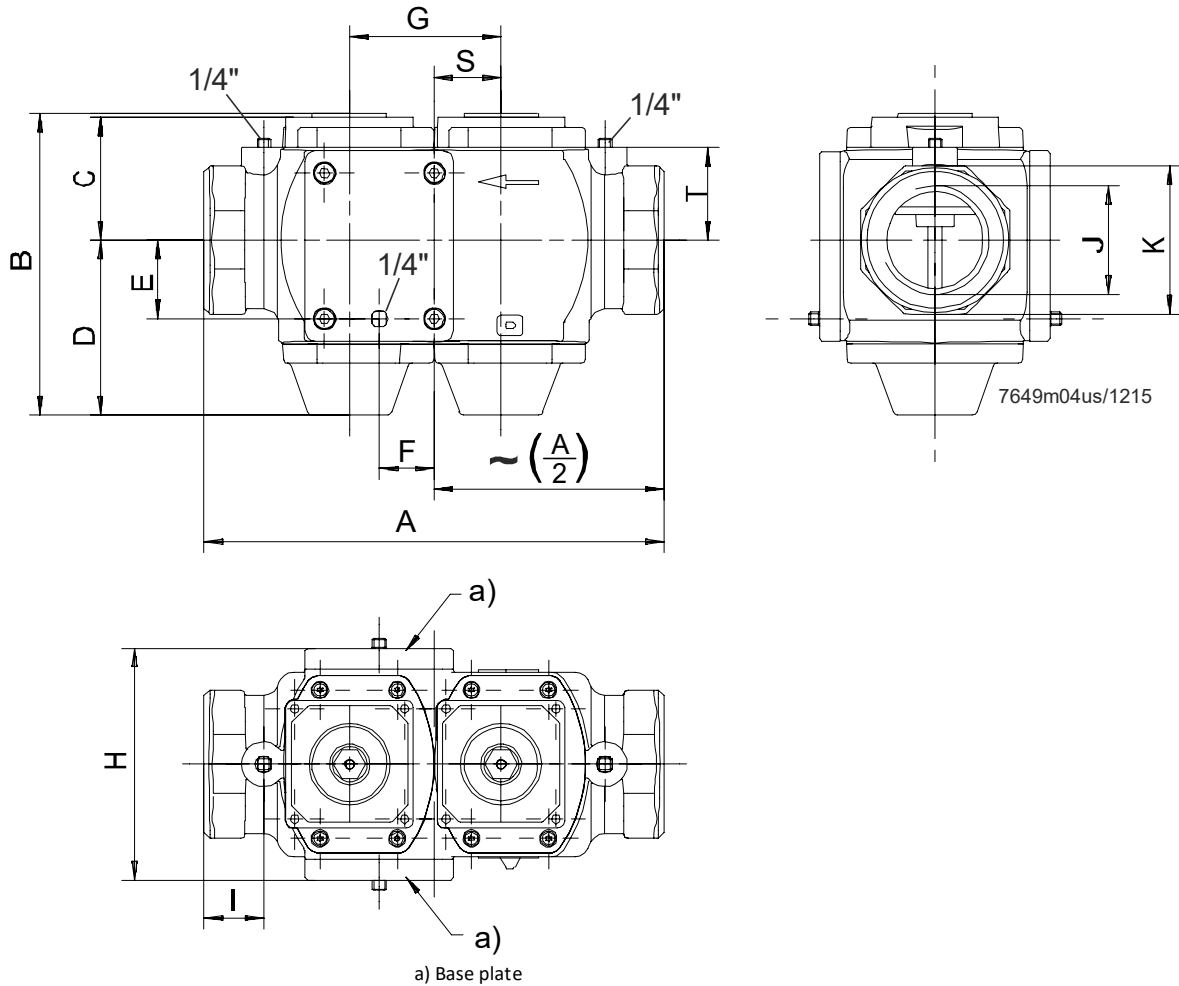


Table 5. VGD40.xxxU / VRD40.xxxU dimensions in inches (mm)

Type	A inch (mm)	B inch (mm)	C inch (mm)	D inch (mm)	E inch (mm)	F inch (mm)	G inch (mm)	H inch (mm)	I inch (mm)	J inch NPT	K (SW*) inch (mm)	S inch (mm)	T inch (mm)
VGD40.065U	11.42 (290)	8.54 (217)	3.25 (82.5)	4.63 (117.5)	2.09 (53.1)	1.46 (37)	4.02 (102)	6.14 (156)	0.63 (16)	2 ½"	4 (100)	1.77 (45)	3.64 (92.5)
VGD40.080U	12.20 (310)	9.39 (238.5)	3.64 (92.5)	5.18 (131.5)	2.09 (47)	0.79 (20)	4.21 (107)	6.30 (160)	0.63 (16)	3"	4.7 (120)	1.2 (30.5)	3.94 (100)
VRD40.040U	10.24 (260)	7.76 (197)	3.11 (79)	4.53 (115)	1.97 (50)	0.55 (14)	3.46 (88)	5.35 (136)	1.18 (30)	1 ½"	2.76 (70)	0.83 (21)	2.8 (71)
VRD40.050U	10.24 (260)	7.76 (197)	3.11 (79)	4.53 (115)	1.97 (50)	0.55 (14)	3.46 (88)	5.35 (136)	1.18 (30)	2"	3.15 (80)	0.83 (21)	2.8 (71)

*) SW = width across flats

Dimensions, continued

Dimensions in Inches (mm)

VGD40.100U / VGD40.150U

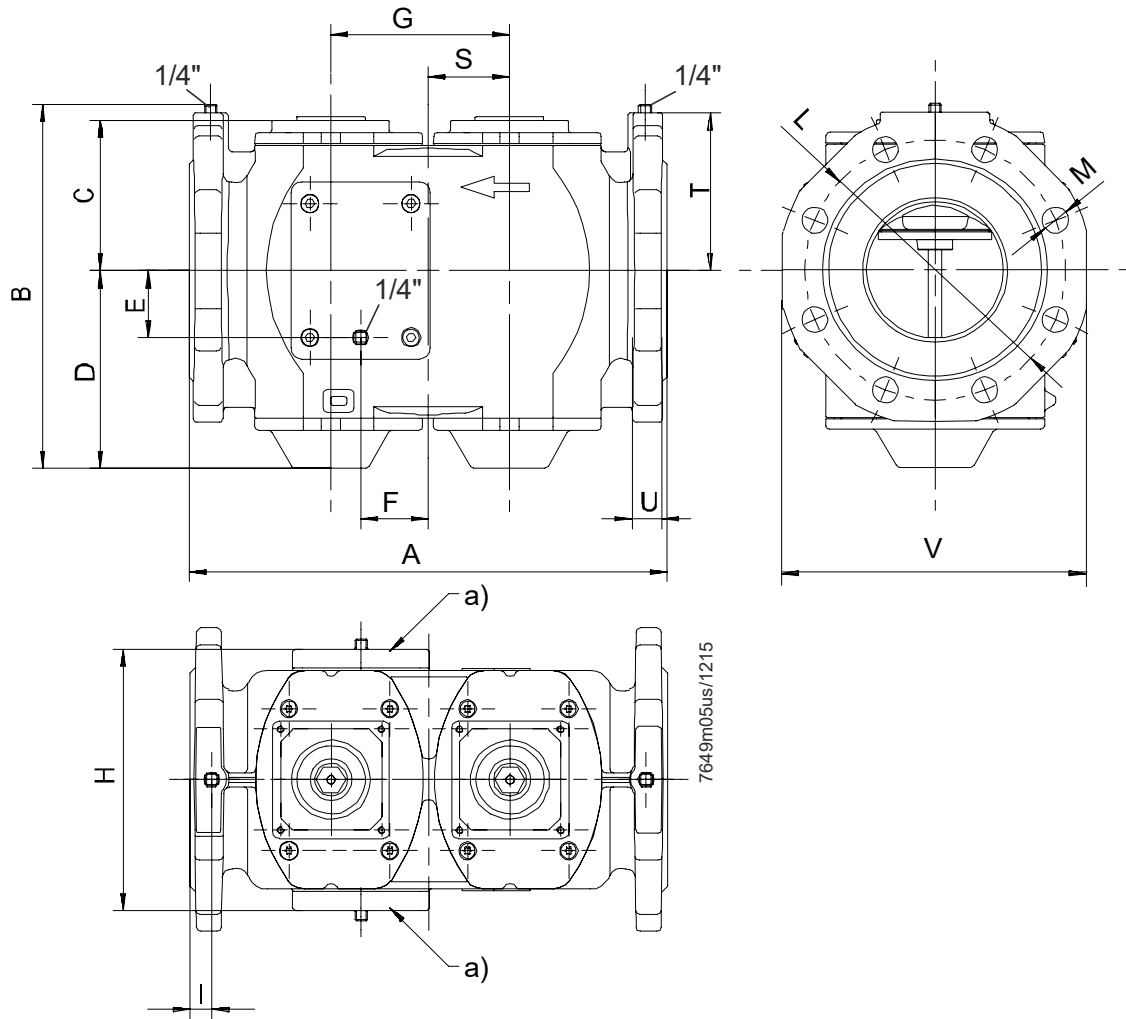


Table 6. VGD40.xxxU dimensions in inches (mm)

Type	A	B	C	D	E	F	G	H	I	L (d =)	M (d =)	S	T	U	V
	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
VGD40.100U	13.78 (350)	10.52 (267.3)	4.33 (110)	5.70 (144.8)	1.93 (49)	1.95 (49.5)	5.16 (131)	7.56 (192)	0.63 (16)	7.5 (190.5)	0.75 (19)	2.83 (72)	4.55 (115.5)	0.87 (22)	8.74 (222)
VGD40.150U	18.90 (480)	13.29 (337.5)	5.71 (145)	7.40 (188)	2.09 (53)	2.30 (58.5)	6.61 (168)	10.31 (262)	0.63 (16)	9.5 (241)	0.91 (23)	3.92 (99.5)	5.61 (142.5)	0.90 (22.9)	10.63 (270)

*) SW = width across flats

Dimensions, continued

Dimensions in Inches (mm)

VRD40.065UF / VRD40.080UF / VRD40.100UF / VRD40.150UF

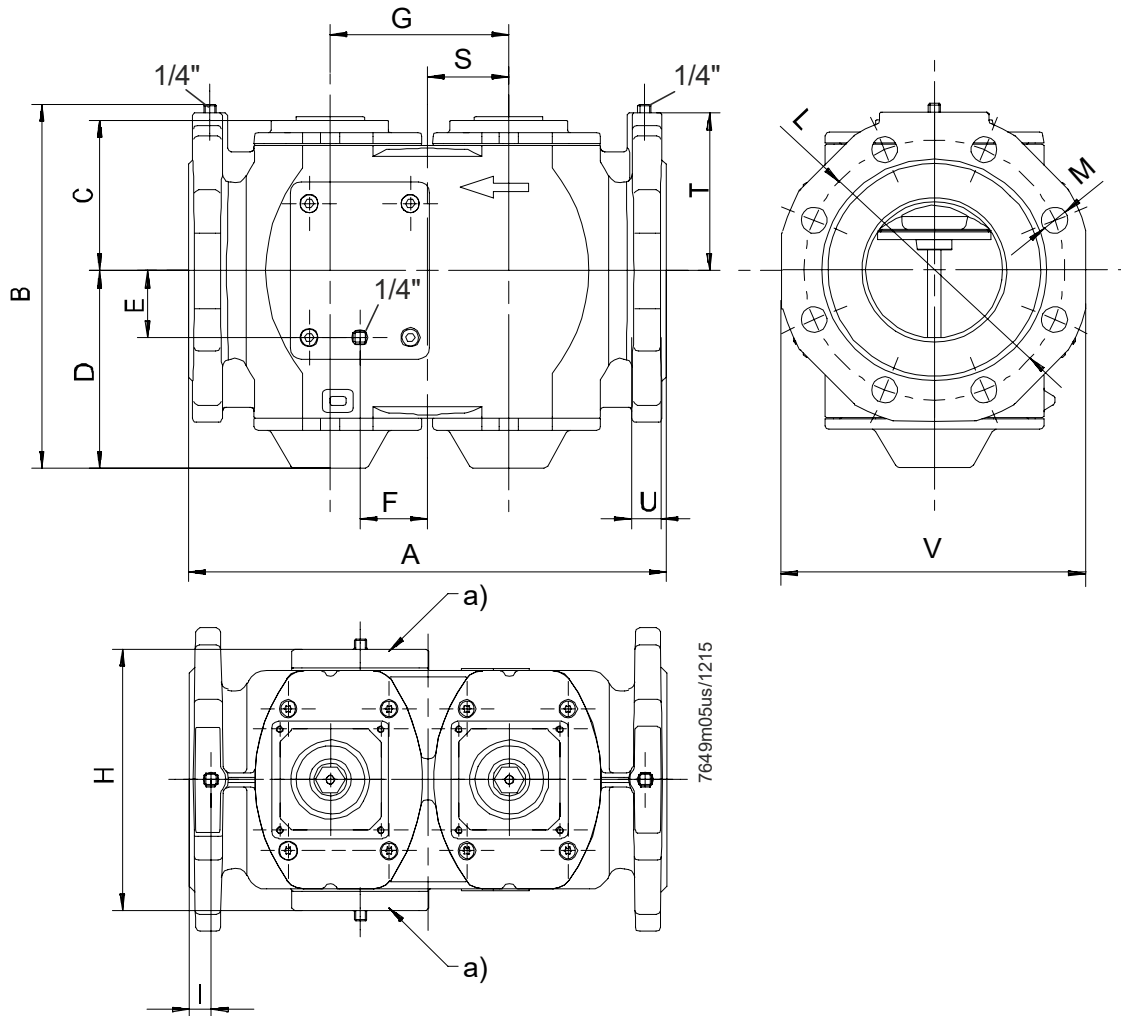


Table 7. VRD40.xxxUx dimensions in inches (mm)

Type	A	B	C	D	E	F	G	H	I	L (d =)	M (d =)	S	T	U	V
	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)
VRD40.065UF	11.42 (290)	8.54 (217)	3.25 (82.5)	4.63 (117.5)	2.09 (53.1)	1.46 (37)	4.02 (102)	6.14 (156)	0.63 (16)	5.5 (139.7)	0.75 (19)	1.77 (45)	3.64 (92.5)	0.80 (20.4)	7.01 (178)
VRD40.080UF	12.20 (310)	9.39 (238.5)	3.64 (92.5)	5.18 (131.5)	2.09 (47)	0.79 (20)	4.21 (107)	6.30 (160)	0.63 (16)	6.0 (152.4)	0.75 (19)	1.2 (30.5)	3.94 (100)	0.88 (22.4)	7.56 (192)
VRD40.100UF	13.78 (350)	10.52 (267.3)	4.33 (110)	5.70 (144.8)	1.93 (49)	1.95 (49.5)	5.16 (131)	7.56 (192)	0.63 (16)	7.5 (190.5)	0.75 (19)	2.83 (72)	4.55 (115.5)	0.87 (22)	8.74 (222)
VRD40.150UF	18.90 (480)	13.29 (337.5)	5.71 (145)	7.40 (188)	2.09 (53)	2.30 (58.5)	6.61 (168)	10.31 (262)	0.63 (16)	9.5 (241)	0.91 (23)	3.54 (90)	5.61 (142.5)	0.90 (22.9)	10.63 (270)

*) SW = width across flats

Dimensions, continued

Dimensions in Inches (mm)

VGD40.xxxU / VRD40.xxxUx valve with vent connection plate

- Option: a) Base plate
 b) Vent connection plate AGA40.xxxxU (optional) to be ordered separately

Base plate and vent connection plate are interchangeable

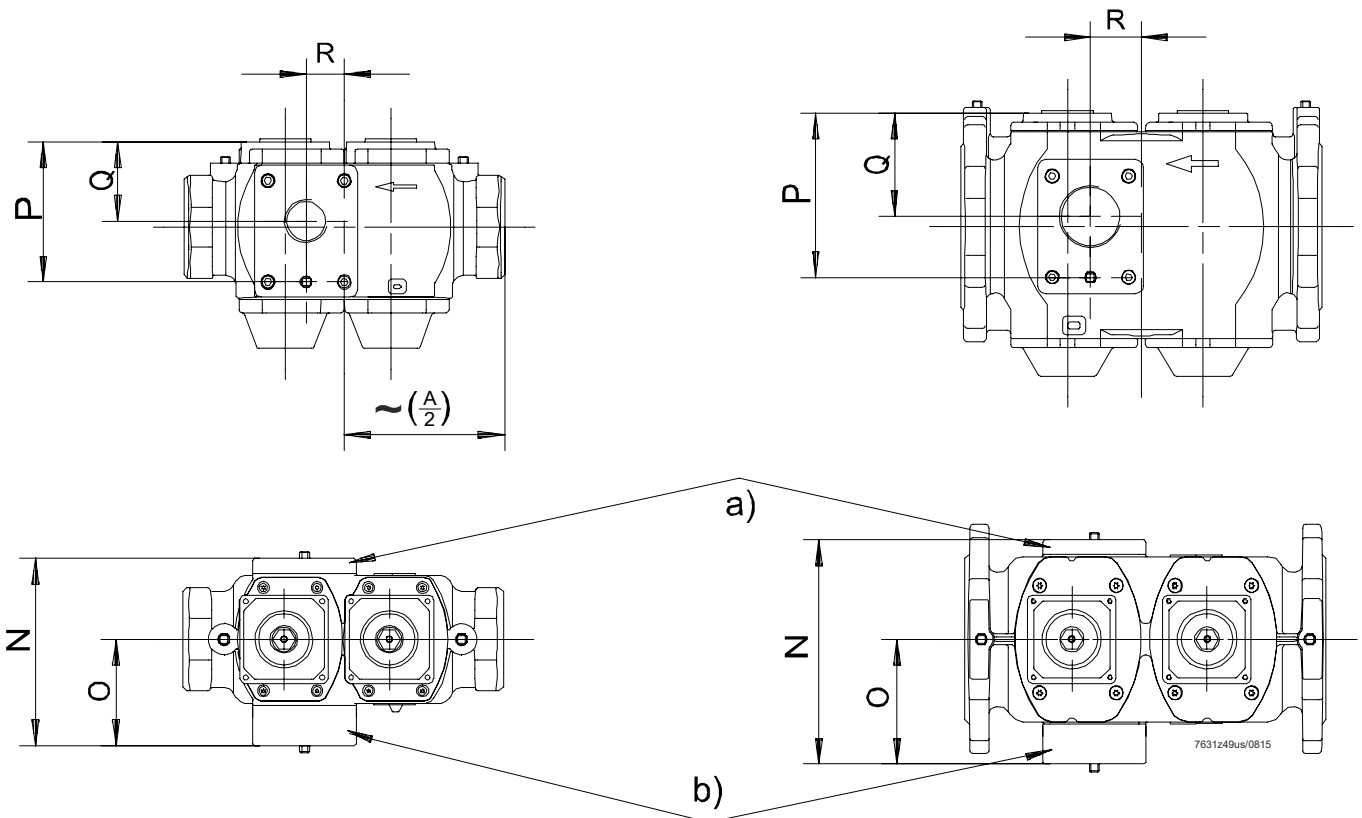


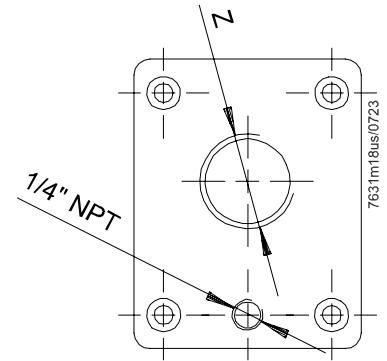
Table 6. VGD40.xxxU / VRD40.xxxUx dimensions in inches (mm) with mounted vent connecting plate.

Valve model	N inch (mm)	O inch (mm)	P inch (mm)	Q inch (mm)	R inch (mm)	Weight pounds (kg)
VGD40.065U	7.13 (181)	4.06 (103)	5.34 (135.6)	3.02 (76.59)	1.46 (37)	1.6 (7)
VGD40.080U	7.28 (185)	4.13 (105)	5.49 (139.5)	3.17 (80.5)	0.79 (20)	19 (8)
VGD40.100U	8.54 (210)	4.76 (121)	6.26 (159)	3.94 (100)	1.95 (49.5)	29 (13)
VGD40.150U	11.30 (287)	6.14 (156)	7.80 (198)	5.47 (139)	2.28 (58)	53 (24)
VRD40.040U	6.38 (162)	3.66 (93)	5.08 (129)	2.76 (70)	0.55 (14)	13.7 (6.2)
VRD40.050U	6.38 (162)	3.66 (93)	5.08 (129)	2.76 (70)	0.55 (14)	13.7 (6.2)
VRD40.065UF *	7.13 (181)	4.06 (103)	5.34 (135.6)	3.02 (76.59)	1.46 (37)	18.5 (8.4)
VRD40.080UF *	7.28 (185)	4.13 (105)	5.49 (139.5)	3.17 (80.5)	0.79 (20)	21 (9.6)
VRD40.100UF *	8.54 (210)	4.76 (121)	6.26 (159)	3.94 (100)	1.95 (49.5)	29 (13)
VRD40.150UF *	11.30 (287)	6.14 (156)	7.80 (198)	5.47 (139)	2.28 (58)	53 (24)

Dimensions, continued
 Dimensions in Inches (mm)

Table 9. AGA40.xxxxU Models

Vent connection plate (optional)							
	VRD40.040U	VRD40.050U	VGD40.065U VRD40.065UF	VGD40.080U VRD40.080UF	VGD40.100U VRD40.100UF	VGD40.150U VRD40.150UF	Vent connection thread "Z"
AGA40.4050U	•	•					1" NPT
AGA40.6580U			•	•			1¼" NPT
AGA40.0100U					•		2" NPT
AGA40.0150U						•	2½" NPT



Information in this publication is based on current specifications. The company reserves the right to make changes in specifications and models as design improvements are introduced. Other product or company names mentioned herein may be the trademarks of their respective owners.

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