



Proportional controlling element

VKP...

Proportional controlling element designed for fitting between counter-flanges, for integration into gas trains.

- Wide modulation range
- Flanged connections 1/2...2"
- Angular rotation 90°
- Suited for use with gases of families I...III and air
- For use with actuators SQN13..., SQN72..., SQM33... or SQM4...
- Can be attached to VGD2... double gas valves

The VKP... and this Data Sheet are intended for use by OEMs which integrate the controlling elements in their products!

Use

Proportional controlling element for the control of gas or air volume in combustion plants with demanding requirements, such as ...

- proportional increase of volumetric flow across angular rotation of 0...90°,
- small start volume/extremely small volume,
- wide modulation range of >1:25,
- high positioning cycle frequencies.



Note!

For supplementary documentation, refer to *Accessories*.

Warning notes



To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!

Do not interfere with or modify the controlling element!

- All activities (mounting, installation and service work, etc.) must be performed by qualified personnel
- Fall or shock can adversely affect the safety functions. Such **controlling elements** must not be put into operation, even if they do not exhibit any damage
- The VKP... must be used in connection with the actuators specified in this Data Sheet
- The VKP... is only suited for the applications covered by this Data Sheet. If not observed, there is a risk of personal injury or damage to property
- The VKP... is intended for exclusive use by OEMs/heating installers. If not observed, there is a risk of personal injury or damage to property

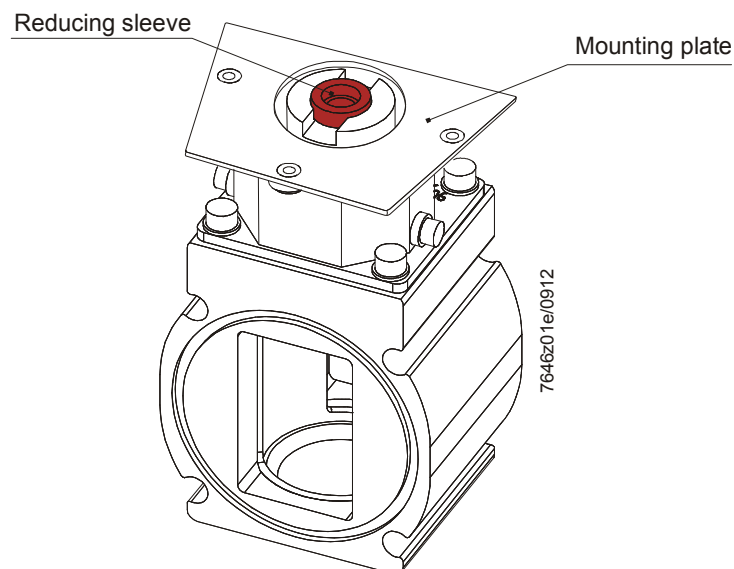
Mounting notes

- Ensure that the relevant national safety regulations are complied with
- Proportional controlling element, actuator and mounting plate can be straightforwardly assembled on site. Special tools are not required
- The 0°-position of the VKP... and the 0°-position of the actuator must correspond
- When the actuator is correctly positioned in relation to the mounting plate, secure the actuator and then the coupling
- Observe the direction of flow and the maximum permissible inlet pressure

ASK33.1 When using the SQN72... actuator (axis dia. 10 mm) in place of the SQN... (axis dia. 8 mm), the center part of the coupling (red reducing sleeve) is removed and the larger mounting plate ASK33.1 be mounted

ASK33.2 When using the SQN13... actuator in place of the SQN72..., an additional mounting plate ASK33.2 must be mounted between VKP40... and SQN13... actuator

ASK33.3 If a SQM50 actuator with AGA58.5 is used in place of the SQN72 actuator, the red reducing sleeve must be removed and the larger ASK33.3 mounting plate mounted.



Commissioning notes

Commission the proportional controlling element only when mounting plate, flange and the respective actuator are correctly assembled.

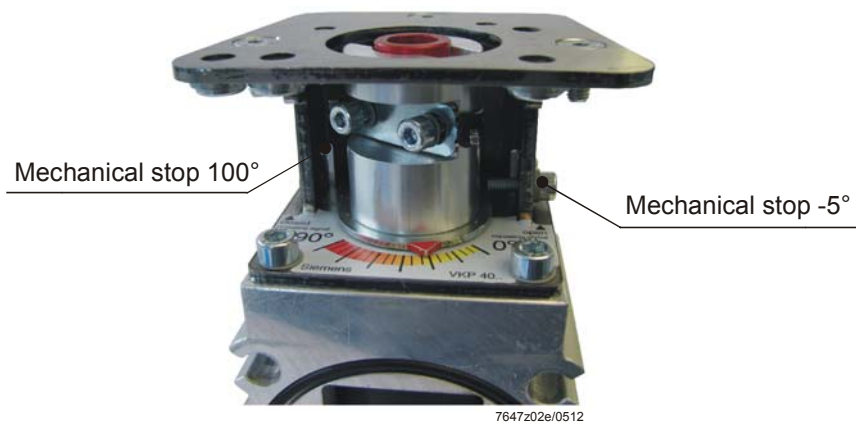


Note!

SQ position 0° corresponds to VKP position 0° (closed position).

Option when used in connection with burner management system LMV2.../LMV3...

A screw can be fitted to provide a mechanical stop either at an angular position of approx. -5° (fully closed) or approx. 100° (fully open). The VKP... is supplied with the mechanical stop at 5°. Depending on the position of the stop, the reference travel (LMV2.../LMV3... parameters) predefined for the relevant actuator is prevented. Incorrectly fitted / connected or interchanged air or gas actuators can be detected (also refer to Basic Documentation LMV2.../LMV3...).



Note!

- Mechanical stop OPEN at -5° fully closed
- Mechanical stop CLOSED at 100° fully open



Note!

To fix the position of the control valve with a fixed linear controlling element setting (manual setting without actuator), the stop screw (M4) can be replaced with a 20 mm long screw.

Standards and certificates

VKP... and AGF10...



Applied directives:

- Directive for gas-fired appliances

2009/142/EC

Compliance with the regulations of the applied directives is verified by the adherence to the following standards / regulations:

- Safety and control devices for gas burners and gas burning appliances
- DIN EN 13611
CE-0085

The relevant valid edition of the standards can be found in the declaration of conformity!



EAC Conformity mark (Eurasian Conformity mark)



ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007



Service notes

- The VKP... is maintenance-free
- The VKP... must be commissioned again when mounting plate and actuator are correctly fitted and coupling is fixed
- Check tightness when fitting or replacing flanges

Disposal notes



Prior to disposal, the VKF... must be dismantled and separated into its various materials. Local and currently valid legislation must be observed. The VKP... does not contain electronic components.

Mechanical design

Proportional controlling element VKP...

- Housing with rotation cylinder and coupling
- Basic mounting plate for actuator SQN72...

Mounting plates ASK33...

In all cases, ASK33... mounting plates are required to assemble the SQM4... / SQM5... / SQN1... actuator and the VKP... (see *Accessories*).

Connecting flanges AGF...

When mounting the VKP... in a gas pipe, 2 connecting flanges AGF... are required.

See Mounting Instructions 74 319 0865 0 (M7631/M7646).

Type summary

Product no.	Housing size	Nominal size of built-in rotation cylinder *)	Available flange sizes at AGF10... **)
VKP40.15	DN 40	15	1/2"
VKP40.20	DN 40	20	3/4"
VKP40.25	DN 40	25	1"
VKP40.32	DN 40	32	1 1/4"
VKP40.40	DN 40	40	1 1/2"
VKP40.50	DN 40	50	2"
VKP40.50H	DN 40	50 H	2"
VKP40.50S	DN 40	50 S	2"

*) With flow rate / characteristic with corresponding flange size

***) Randomly combined

See Mounting Instructions 7431908430 (M7646).

Suitable actuators	Required mounting plate	Running time in s	Cam switch no.	Mains voltage	Potentiometer	Degree of protection	Data Sheet
SQN13...	ASK33.2	5...120 Stepper motor	---	---	---	IP54	N7803
SQN72.2C4A21 ^{1) 2)}	---	4	4	AC 230 V	ASZ12.30	IP54	N7804
SQN72.4C4A21	---	12	4	AC 230 V	ASZ12.30	IP54	N7804
SQN72.6C4A11 ^{1) 2)}	---	30	4	AC 120 V	ASZ12.30	IP54	N7804
SQN72.6C4A21 ¹⁾	---	30	4	AC 230 V	ASZ12.30	IP54	N7804
SQN72.6E5A21	---	30	5	AC 230 V	ASZ12.30	IP54	N7804
SQM33...	ASK33.1	5...120 Stepper motor	---	---	---	IP54	N7813
SQM40.025A21	ASK33.1	5	5	AC 230 V	included	IP66	N7817
SQM40.245A11	ASK33.1	30	5	AC 120 V	included	IP66	N7817
SQM40.145A21	ASK33.1	15	5	AC 230 V	included	IP66	N7817
SQM40.245A21	ASK33.1	30	5	AC 230 V	included	IP66	N7817
SQM45.295A9	ASK33.1	5...120 Stepper motor	---	---	---	IP54	N7814
SQM50... with AGA58.5	ASK33.3	10...60	8	AC 24 V AC 120 V AC 230 V	ASZ12.30	IP54	N7815

1) Required connectors for SQN72... are included in the VKP package

2) On request

Ordering

Proportional controlling element, actuator and mounting plate, if required, must be ordered as individual items.

When ordering, please give quantities, descriptions and product nos.

Example:

- 1 proportional controlling element VKP40.50
- 2 flanges AGF10.50
- 1 mounting plate ASK33.1 (only if SQM33... or SQM4... is used)
- 1 actuator SQM40.245A21

Delivery

Proportional controlling element, actuator, mounting plate and flanges are packed and delivered as separate items.

Accessories

Mounting plate
ASK33...



Mounting plate ASK33.1

Larger mounting plate required to replace existing mounting plate when using actuators SQM4... or SQM33...
Refer to Mounting Instructions 74 319 0843 0 (M7646)



Note!

The screws required are included in the VKP40 basic package.



Mounting plate ASK33.2

Additional mounting plate is required for mounting the actuator SQN13...
Refer to Mounting Instructions 74 319 0843 0 (M7646)



Note!

The screws required are included in the ASK33.2 package.



Mounting plate ASK33.3

Larger mounting plate required to replace the existing mounting plate when mounting SQM5 actuators with AGA58.5
Refer to Mounting Instructions 74 319 0843 0 (M7646)



Note!

The screws required are included in the ASK33.3 package.

Connecting flanges
AGF...

Connecting flanges AGF...

- The following flange types with connection thread are available:

Connection thread	Product no. of connecting flange (Rp)	US version (NPT)
1/2"	AGF10.15	AGF10.15U
3/4"	AGF10.20	AGF10.20U
1"	AGF10.25	AGF10.25U
1 1/4"	AGF10.32	AGF10.32U
1 1/2"	AGF10.40	AGF10.40U
2"	AGF10.50	AGF10.50U



Note!

Scope of delivery: 1 O-ring
4 screws M8x25
4 nuts M8
4 lock washers 8 mm dia.
1 Mounting Instructions



Double nipple

- Required for mounting the gas pressure switch QPL25...
- Double nipple 1/8" to 1/4" (to be provided by supplied by thirds, if required)
- Gas pressure switch QPL15... can be mounted directly on the AGF...

Accessories (cont'd)

Fixing material

Fixing material

- To fix the controlling element to a VGD2... double gas valve and to fit the flanges and secure the actuator, the VKP... is supplied with the following material:

Accessories	Number of	Type of package	Size	Mounting location	Remarks
Hexagon socket screws	4	Supplied in a plastic bag inside the VKP40 basic package	M5x16	Mounting plate ASK33.1	3 screws for mounting the SQN72 4 screws for mounting the SQM4 or SQM33
Screws for mounting the flange	4		M8x95	AGF flange and VGD2 attachment	For mounting on/attaching to VGD20
Spacer washers for M8 screws	4		To M8 (10 mm long)	Directly fixed to VGD2...	For screws M8, to be fitted under the head
Stelvio plug connector	2		1x CuF4/5 1x CuF5/5	Plug connector for SQN72	Not included in the scope of delivery of the SQN72
Double-O-ring	1	Individually in plastic bag	Ø 66,34 x 5,24 mm	Directly fixed to VGD2...	To be fitted between VGD2... and VKP....
Mounting Instructions	1	Folded, immediately underneath cardboard cover	A7	---	---

Technical data

General unit data	Types of gas	Gases of families I...III or air Max. 0.1% H ₂ S	
	Operating pressure	Max. 70 kPa	
	Mounting positions	Optional	
	Leakage rate	Inside, in the fully closed position max. 0.7 m ³ /h / Δp 5 kPa	
	Angular rotation	90°	
	CLOSED position to reopening	0...-5°	
	OPEN position to reclosing	90...95°	
	Mechanical stop	Optionally at approx. -5° / approx. 100° Factory mounted at -5°	
	Weight	See <i>Dimensions</i>	
	Internal volume	106 cm ³	
	Material	No non-ferrous metals	
	Number of control cycles	500,000 OPEN/CLOSED	
	Environmental conditions	Storage	DIN EN 60721-3-1
		Climatic conditions	Class 1K3
Mechanical conditions		Class 1M2	
Temperature range		-20...60 °C	
Humidity		<85% r.h.	
Transport		DIN EN 60 721-3-2	
Climatic conditions		Class 2K3	
Mechanical conditions		Class 2M2	
Temperature range		-20...60 °C	
Humidity		<85% r.h.	
Operation		DIN EN 60 721-3-3	
Climatic conditions		Class 3K3	
Mechanical conditions		Class 3M2	
Temperature range		-20...60 °C	
Humidity	<85% r.h.		



Caution!
Formation of ice and ingress of water are not permitted!

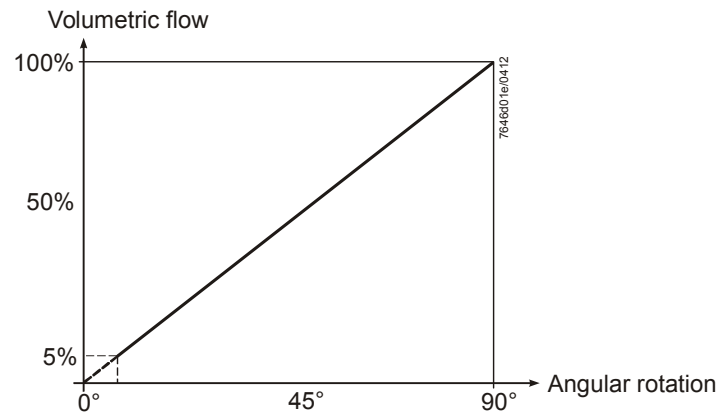
Flow chart

Positioning characteristic

The differential pressure Δp_{VKP} should be such that positioning characteristic will be as linear as possible.

Δp_{VKP} with rotation cylinder fully open (90°) = 0.2...0.4 * prepressure.

Idealized positioning characteristic:

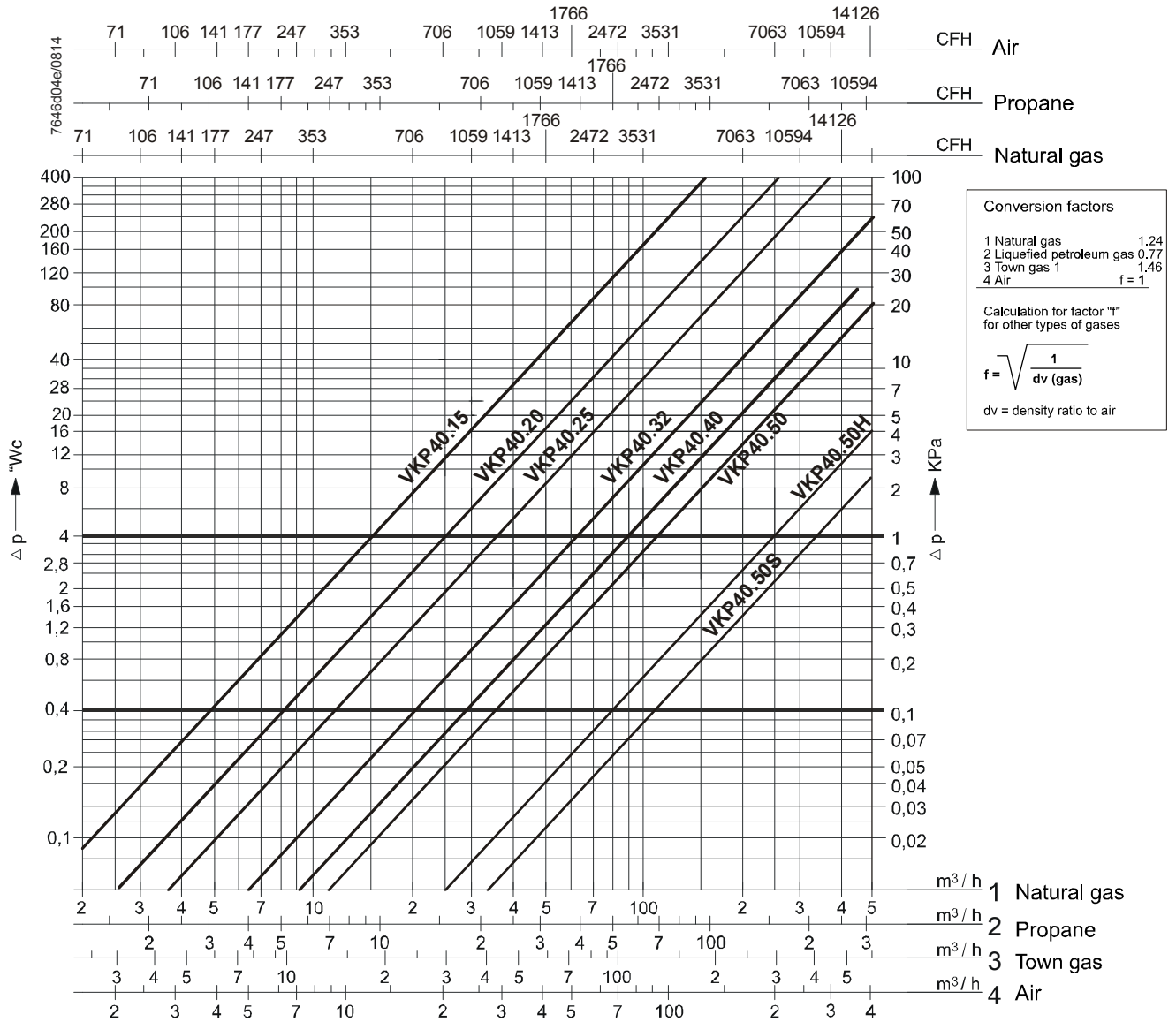


Flow characteristic with rotation cylinder fully open (90°):

Product no.	Connection	Flanges fitted to both sides	Air-volumetric flow m ³ /h at Δp 1 kPa when fully open
VKP40.15	1/2"	AGF10.15	11
VKP40.20	3/4"	AGF10.20	20
VKP40.25	1"	AGF10.25	28
VKP40.32	1 1/4"	AGF10.32	50
VKP40.40	1 1/2"	AGF10.40	69
VKP40.50	2"	AGF10.50	88
VKP40.50H	2"	AGF10.50	200
VKP40.50S	2"	AGF10.50	270

Flow chart (cont'd)

Flow characteristic



Conversion factors

1 Natural gas	1.24
2 Liquefied petroleum gas	0.77
3 Town gas	1.46
4 Air	f = 1

Calculation for factor "f" for other types of gases

$$f = \sqrt{\frac{1}{dv(\text{gas})}}$$

dv = density ratio to air

Legend — Maximum flow rates



- Caution!**
- If the gas pressure exceeds the maximum permissible operating pressure, reduce the gas pressure with a pressure controller
 - The pressure drop (curves of maximum flow) is based on a fully open rotation cylinder

Conversion of air flow rate to a corresponding gas flow rate (natural gas):

Basis for scale

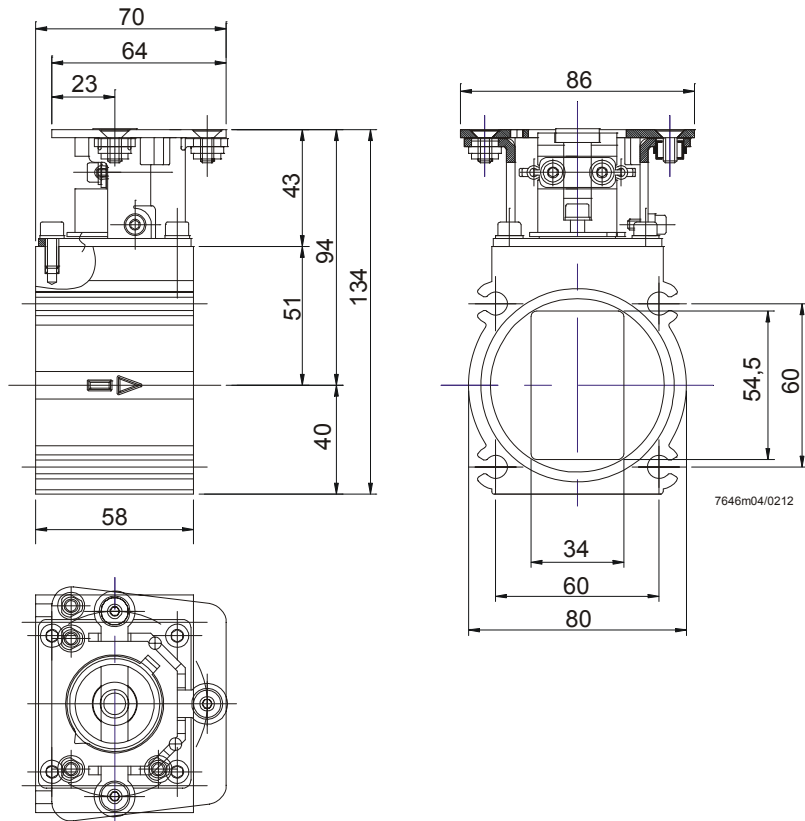
Abscissa	Medium volumetric flow (QG) in m³/h	Density ratio (dv) to air	Conversion factor $f = \sqrt{\frac{1}{dv}}$
1	Air	1	1
2	Natural gas	0.61	1.28
3	Propane	1.562	0.8
4	Town gas	0.46	1.47

Conversion to air (m³/h) from other types of gases: $QL = \frac{QG}{f}$ QL = air volume in m³/h that produces the same pressure drop as QG

Dimensions

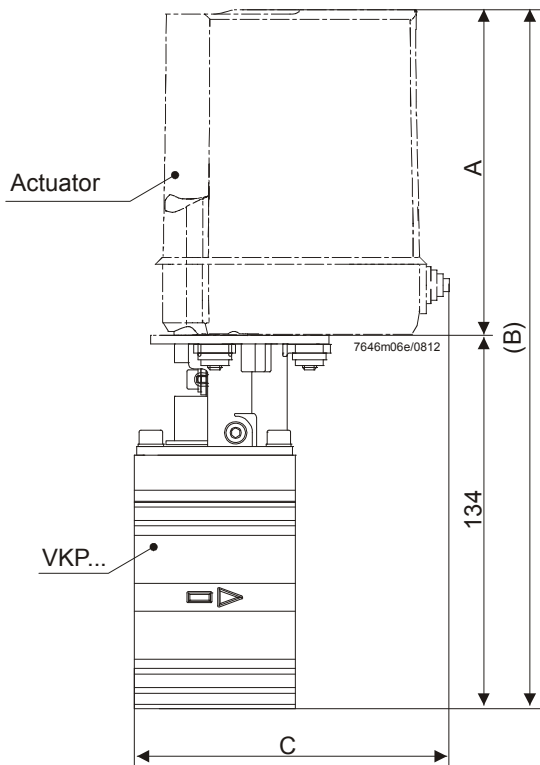
Dimensions in mm

VKP...



Type	Weight [kg]
VKP40.15	1.2
VKP40.20	1.2
VKP40.25	1.2
VKP40.32	1.2
VKP40.40	1.2
VKP40.50	1.2
VKP40.50H	1.2
VKP40.50S	1,2

VKP... with actuator (Example shows illustration with SQN72)

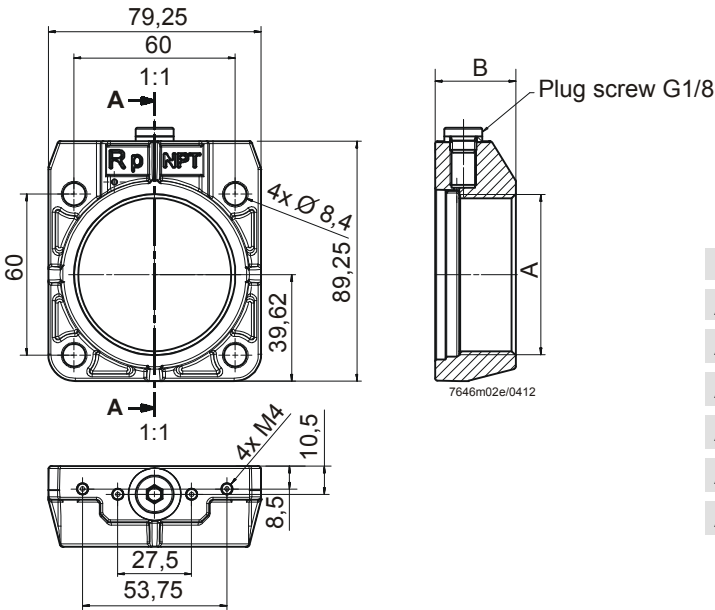


	A	B	C approx.
SQN13...	74	208	90
SQN72	134	251	100
SQM33...	116	233	130
SQM40...	149	266	150
SQM45...	116	233	130
SQM50...	175	310	120

Dimensions (cont'd)

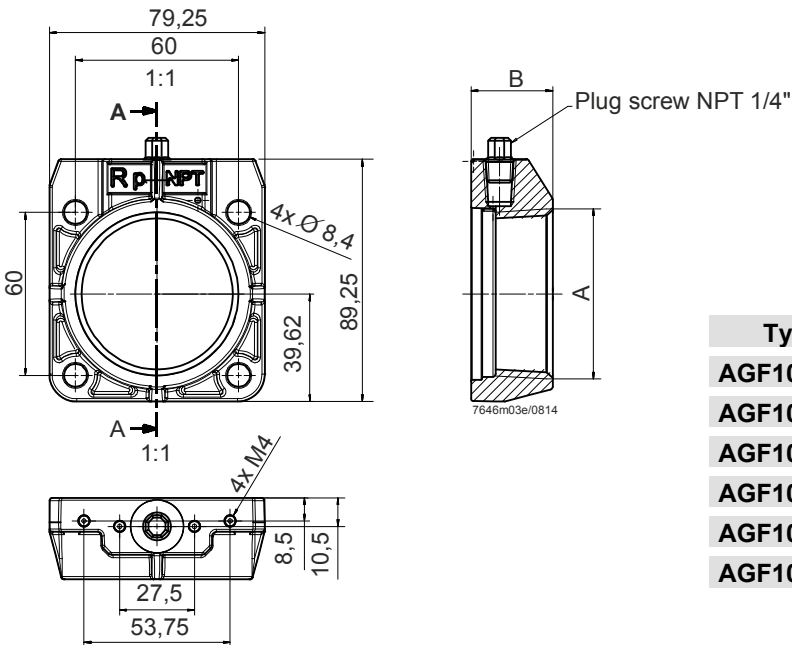
Dimensions in mm

AGF... (Europe)



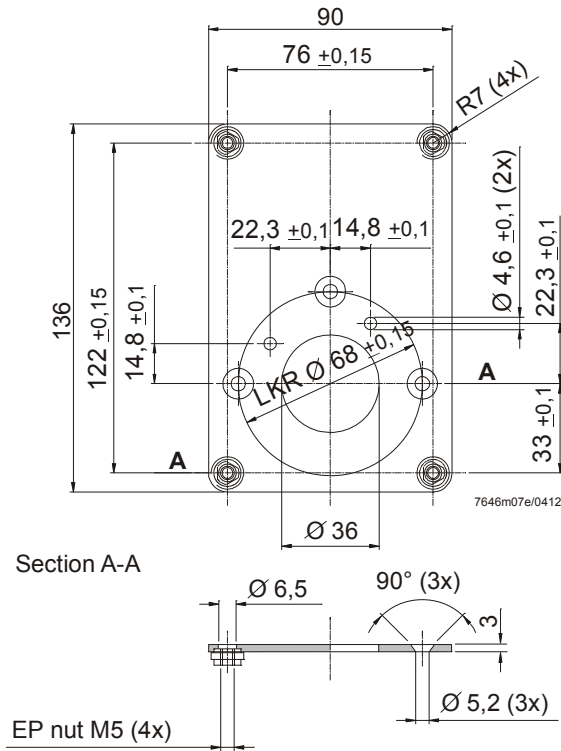
Type	A	B	Weight [kg]
AGF10.15	RP1/2"	26	0.19
AGF10.20	RP3/4"	26	0.19
AGF10.25	RP1"	26	0.19
AGF10.32	RP1 1/4"	26	0.19
AGF10.40	RP1 1/2"	26	0.19
AGF10.50	RP2"	30	0.19

AGF... (U.S.)



Type	A	B	Weight [kg]
AGF10.15U	NPT1/2"	26	0.19
AGF10.20U	NPT3/4"	26	0.19
AGF10.25U	NPT1"	26	0.19
AGF10.32U	NPT1 1/4"	26	0.19
AGF10.40U	NPT1 1/2"	26	0.19
AGF10.50U	NPT2"	30	0.19

ASK33.1



ASK33.2

