# 01 - 03.1

03.03.GB

## LDM valves with Siemens actuators (Landis & Staefa)

## Kv coefficient calculation

Calculation itself is carried out with respect to conditions of regulating circuit and operating medium according to equations mentioned below. Control valve must be designed to be able to regulate maximal flow quantity at given operating conditions. At the same time it is necessary to check whether minimal flow quantity can be even regulated or not.

Condition is the following ratio **$r > Kvs / Kv_{min}$**

Because of eventual minus tolerance 10% of $Kv_{100}$ against Kvs and requirement for possible regulation within range of maximal flow (decrement and increase of flow), producer recommends to select Kvs value higher than maximal operating Kv value:

$$Kvs = 1.1 \div 1.3\ Kv$$

It is necessary to take into account to which extent $Q_{max}$ involve "precautionary additions" that could result in valve oversizing.

## Relations of Kv calculation

| | | Pressure drop $p_2 > p_1/2$ $\Delta p < p_1/2$ | Pressure drop $\Delta p \geqq p_1/2$ $p_2 \leqq p_1/2$ |
|---|---|---|---|
| Kv = | Liquid | $\frac{Q}{100}\sqrt{\frac{\rho_1}{\Delta p}}$ | |
| | Gas | $\frac{Q_n}{5141}\sqrt{\frac{\rho_n . T_1}{\Delta p . p_2}}$ | $\frac{2.Q_n}{5141.p_1}\sqrt{\rho_n . T_1}$ |
| | Superh. steam | $\frac{Q_m}{100}\sqrt{\frac{v_2}{\Delta p}}$ | $\frac{Q_m}{100}\sqrt{\frac{2v}{p_1}}$ |
| | Sat. steam | $\frac{Q_m}{100}\sqrt{\frac{v_2 . x}{\Delta p}}$ | $\frac{Q_m}{100}\sqrt{\frac{2v.x}{p_1}}$ |

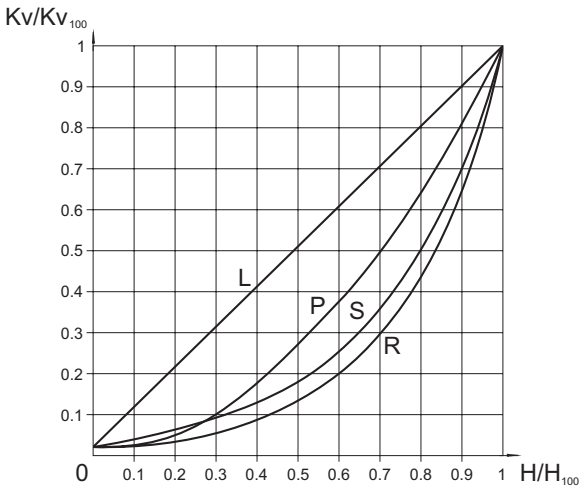
## Above critical flow of vapours and gases

When pressure ratio is above critical ($p_2 / p_1 < 0.54$), speed of flow reaches acoustic velocity at the narrowest section. This event can cause higher level of noisiness. Then it is convenient to use a throttling system ensuring low noisiness (multi-step pressure reduction, damping orifice plate at outlet).

## Flow characteristic selection in regard of valve stroke

To make right selection of valve flow characteristic, it is suitable to carry out checking of what stroke values will be reached in different operation states. We recommend to carry out such checking at least for minimal, nominal and maximal flow rates. The principle for flow characteristic selection is to avoid, if possible, 5÷10% of the beginning and end of the valve stroke range.
To calculate valve stroke at different operating conditions with different types of flow characteristics is possible with the advantage of using LDM´s calculation programme VALVES. The programme serves for complete design of valve from Kv calculation to specification of a concrete valve with its actuator.

## Valve flow characteristics




L - linear characteristic
$Kv/Kv_{100} = 0.0183 + 0.9817 . (H/H_{100})$

R - equal-percentage characteristic (4-percentage)
$Kv/Kv_{100} = 0.0183 . e^{(4 . H/H_{100})}$

P - parabolic characteristic
$Kv/Kv_{100} = 0.0183 + 0.9817 . (H/H_{100})^2$

S - LDM spline® characteristic
$Kv/Kv_{100} = 0.0183 + 0.269 . (H/H_{100}) - 0.380 . (H/H_{100})^2 + 1.096 . (H/H_{100})^3 - 0.194 . (H/H_{100})^4 - 0.265 . (H/H_{100})^5 + 0.443 . (H/H_{100})^6$

## Dimensions and units

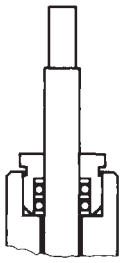
| Marking | Unit | Name of dimension |
|---|---|---|
| Kv | $m^3.h^{-1}$ | Flow coefficient under condition of units of flow |
| $Kv_{100}$ | $m^3.h^{-1}$ | Flow coefficient at nominal stroke |
| $Kv_{min}$ | $m^3.h^{-1}$ | Flow coefficient at minimal flow rate |
| Kvs | $m^3.h^{-1}$ | Valve nominal flow coefficient |
| Q | $m^3.h^{-1}$ | Flow rate in operating conditions ($T_1$, $p_1$) |
| $Q_n$ | $Nm^3.h^{-1}$ | Flow rate in normal conditions (0°C, 0.101 Mpa) |
| $Q_m$ | $kg.h^{-1}$ | Flow rate in operating conditions ($T_1$, $p_1$) |
| $p_1$ | MPa | Upstream absolute pressure |
| $p_2$ | MPa | Downstream absolute pressure |
| $p_s$ | MPa | Absolute pressure of saturated steam at given temperature ($T_1$) |
| $\Delta p$ | MPa | Valve differential pressure ($\Delta p = p_1 - p_2$) |
| $\rho_1$ | $kg.m^{-3}$ | Process medium density in operating conditions ($T_1$, $p_1$) |
| $\rho_n$ | $kg.Nm^{-3}$ | Gas density in normal conditions (0°C, 0.101 Mpa) |
| $v_2$ | $m^3.kg^{-1}$ | Specific volume of steam when temperature $T_1$ and pressure $p_2$ |
| v | $m^3.kg^{-1}$ | Specific volume of steam when temperature $T_1$ and pressure $p_1/2$ |
| $T_1$ | K | Absolute temperature at valve inlet ($T_1 = 273 + t_1$) |
| x | 1 | Proportionate weight volume of saturated steam in wet steam |
| r | 1 | Rangeability |

## Principles for plug type selection

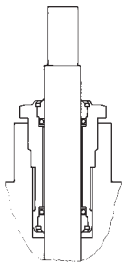
V-ported plugs should not to be used in above - critical differential pressures with inlet pressure $p_1 \geq 0,4$ MPa and for regulation of saturated steam. In these cases we recommend to use a perforated plug. The perforated plug should be also used always when cavitation may occur due to a high differential pressure value or valve ports erosion caused by high speed of process medium flow. If the parabolic plug is used (because of small Kvs) for pressures $p_1 \geq 1,6$ MPa and above - critical differential pressures, it is necessary to close both plug and seat with a hard metal overlay, i.e. stellited trim.

## Packing - O -ring EPDM

Packing is designed for non-aggressive media with temperature from 0° to 140 °C. Packing excels with its reliability and long time tightness. It has ability of sealing even if the valve stem is a bit damaged. Low frictional forces enables valve to be actuated with a low-linear-force actuator. Service life of sealing rings depends on operating conditions and it is more than 400 000 cycles on average.



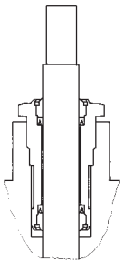
Applied to RV 102, RV 103



Applied to RV 2xx

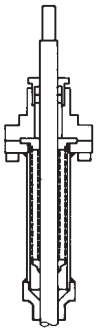
## Packing - DRSpack® (PTFE)

DRSpack® (Direct Radial Sealing Pack) is a packing with high tightness at both low and high operating pressure values.
It is the most used type of packing suitable for temperatures ranging from 0° to 260°C. The pH range is from 0 to 14. The packing enables using of actuators with low linear force. The design enables an easy change of the whole packing. The average service life of DRSpack® is more than 500 000 cycles.



## Packing - Bellows

Bellows packing is suitable for low and high temperatures ranging from -50° to 550°C. Bellows ensures absolute tightness to environment. Packing is equipped with safety PTFE packing as standard to prevent medium from leaking in case of damage to bellows. Intensive linear forces are not required.



## Application of bellows packing

Bellows packing is suitable for applications with very aggressive, toxic or other dangerous media that require absolute tightness to environment. In such case, it is necessary to check compatibility of used body material as well as the valve inner parts material with process medium. It is recommended to use bellows with safety packing preventing medium from leaking in case of damage to bellows when there is an extremely dangerous process medium used.
Bellows is also a great solution to use of process medium either with temperature below zero when ice accretions cause premature damage to packing or with high temeperatures when bellows ensures medium cooling.

## Service life of bellows packing

| Bellows material | Temperature | | | | |
|---|---|---|---|---|---|
| | 200°C | 300°C | 400°C | 500°C | 550°C |
| 1.4541 | 100 000 | 40 000 | 28 000 | 7 000 | not applicable |
| 1.4571 | 90 000 | 34 000 | 22 000 | 13 000 | 8 000 |

Values specified in the table above show minimal guaranteed number of cycles with the valve full stroke when the bellows is fully lenghtened and pressed. In regulation, when the valve moves only in a portion of the stroke range at the inner centre of the valve, the service life of the bellows is many times longer then depending on concrete operating conditions.

## Procedure for designing of two-way valve

Given: medium water, 155 °C, static pressure at piping spot 1000 kPa (10 bar), $\Delta p_{DISP}$ = 80 kPa (0,8 bar), $\Delta p_{PIPELINE}$ = 15 kPa (0,15 bar), $\Delta p_{APPLIANCE}$ = 25 kPa (0,25 bar), nominal flow rate $Q_{NOM}$ = 8 $m^3.h^{-1}$, minimal flow rate $Q_{MIN}$ = 1,3 $m^3.h^{-1}$.

$\Delta p_{DISP} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE}$

$\Delta p_{VALVE} = \Delta p_{DISP} - \Delta p_{APPLIANCE} - \Delta p_{PIPELINE} = 80 - 25 - 15 = 40$ kPa (0,4 bar)

$$Kv = \frac{Q_{NOM}}{\sqrt{\Delta p_{VALVE}}} = \frac{8}{\sqrt{0,4}} = 12,7 \ m^3.h^{-1}$$

Precautionary additions for process tolerances (provided that flow rate Q was not oversized):

$$Kvs = (1,1 \text{ to } 1,3) \, . \, Kv = (1,1 \text{ to } 1,3) \, . \, 12,7 = 14 \text{ to } 16,5 \ m^3.h^{-1}$$

Now we choose the nearest Kvs value from those available in our catalogue, i.e. Kvs = 16 $m^3.h^{-1}$. This value corresponds to nominal size of DN 32. Then if we choose flanged execution PN 16, body made of spheroidal cast iron, with metal - PTFE seat sealing, packing PTFE and equal-percentage flow characteristic, we will get the following specification No.:

**RV 21x XXX 1423 R1 16/220-32**

x in the valve code above (21x) stands for valve execution (direct or reverse) and depends on type of used actuator which should be chosen in respect to demands of regulating system (type, producer, voltage, type of control, necessary torque or linear force, etc.)

## Determination of real pressure drop value of a chosen valve at fully open

$$\Delta p_{VENTIL\ H100} = \left(\frac{Q_{NOM}}{Kvs}\right)^2 = \left(\frac{8}{16}\right)^2 = 0,25 \text{ bar (25 kPa)}$$

The control valve's real pressure drop calculated this way shall be taken into account in a hydraulic calculation of regulating circuit.

## Determination of valve´s real authority

$$a = \frac{\Delta p_{VALVEH100}}{\Delta p_{VALVEH0}} = \frac{25}{80} = 0,31$$

Value a should be at least equal to 0,3. A chosen valve checking is then satisfactory.

**Caution:** the valve's authority calculation should be related to a valve pressure difference in its closed position i.e. disposition pressure value in a branch $\Delta p_{AVAIL.}$ when flow rate is zero, not to a pressure value of a pump $\Delta p_{PUMP}$ , because, due to pipeline circuit pressure drops up to the spot where the regulating branch is connected, the following equation applies: $\Delta p_{AVAIL.} < \Delta p_{PUMP}$. In such cases we consider for simplicity the following: $\Delta p_{AVAIL.H100} = \Delta p_{AVAIL.H0} = \Delta p_{DISP}$.

## Checking of rangeability

We carry out the same checking for minimal flow rate $Q_{MIN}$ =1,3 $m^3.h^{-1}$. The following differential pressure values correspond to the min. flow rate: $\Delta p_{PIPELINE\ QMIN}$=0,40 kPa, $\Delta p_{APPLIAN.\ QMIN}$=0,66 kPa. $\Delta p_{VALVE\ QMIN}$ = 80 - 0,4 - 0,66 = 78,94 = 79 kPa.

$$Kv_{MIN} = \frac{Q_{MIN}}{\sqrt{\Delta p_{VALVE\ QMIN}}} = \frac{1,3}{\sqrt{0,79}} = 1,46 \ m^3.h^{-1}$$

Necessary rangeability value

$$r = \frac{Kvs}{Kv_{MIN}} = \frac{16}{1,46} = 11$$

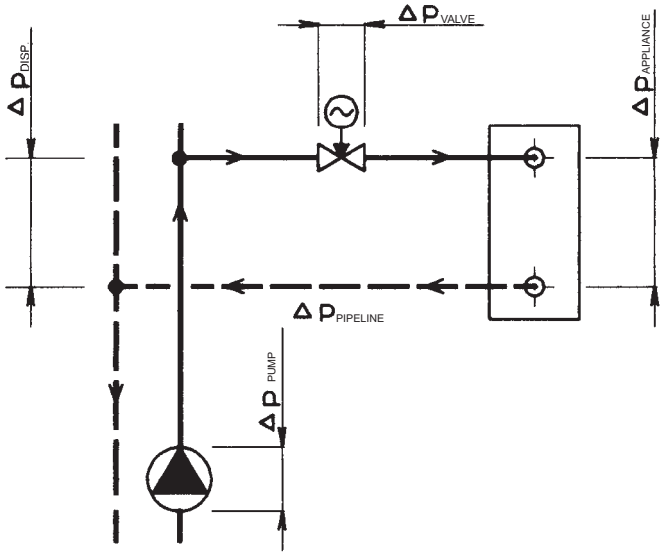
shall be lower than mentioned rangeability value of r = 50. Checking is then satisfactory.

## Selection of suitable flow characteristic

On the basis of calculated values $Kv_{NOM}$ and $Kv_{MIN}$ , it is possible to read the appropriate stroke values from the graph for individual types of flow characteristics of the valve and choose the most suitable one accordingly. Here we have $h_{NOM}$ = 95% $h_{MIN}$ = 29% for equal-percentage characteristic. In that case, LDMspline® flow characteristic is more suitable (94% and 17% of the stroke). It corresponds to the following specification code :

RV **21x XXX 1423 S1 16/220-32**

Scheme of typical regulation loop with the application of two-way control valve




Remark: More detailed information on calculation and design of LDM control valves is mentioned in calculation instructions No. 01-12.0. Equations mentiened above apply in a simlified way to water. To reach optimum results, we recommend to use original calculation programme VALVES which is available on request free of charge.

## Procedure for designing of three- way valve

Given: medium water, 90 °C, static pressure at piping spot 1000 kPa(10 bar), $\Delta p_{PUMP2}$=40 kPa (0,4 bar), $\Delta p_{PIPELINE}$=10 kPa (0,1bar), $\Delta p_{APPLIANCE}$ =20 kPa (0,2 bar), flow rate $Q_{NOM} = 7\ m^3.h^{-1}$

$\Delta p_{PUMP2} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE}$

$\Delta p_{VALVE} = \Delta p_{PUMP2} - \Delta p_{APPLIANCE} - \Delta p_{PIPELINE} = 40\text{-}20\text{-}10 = 10$ kPa (0,1bar)

$$Kv = \frac{Q_{NOM}}{\sqrt{\Delta p_{VALVE}}} = \frac{7}{\sqrt{0,1}} = 22,1\ m^3.h^{-1}$$

Precautionary additions for process tolerances (provided that flow rate Q was not oversized):

$$Kvs = (1,1\ to 1,3) \,.\, Kv = (1,1\ to\ 1,3) \,.\, 22,1 = 24,3\ to\ 28,7\ m^3.h^{-1}$$

Now we choose the nearest Kvs value from those available in our catalogue, i.e. Kvs = 25 $m^3.h^{-1}$. This value corresponds to nominal size of DN 40. Then if we choose flanged execution PN 16, body made of spheroidal cast iron, with metal - PTFE seat sealing, packing PTFE and equal-percentage flow characteristic, we will get the following specification No.:

**RV 21x XXX 1413 L1 16/140-32**

x in the valve code above (21x) stands for valve execution (direct or reverse) and depends on type of used actuator which should be chosen in respect to demands of regulating system (type, producer, voltage, type of control, necessary torque or linear force, etc.)

## Determination of real pressure drop value of a chosen valve at fully open

$$\Delta p_{VALVE\ H100} = \left(\frac{Q_{NOM}}{Kvs}\right)^2 = \left(\frac{7}{25}\right)^2 = 0,08\ bar\ (8\ kPa)$$

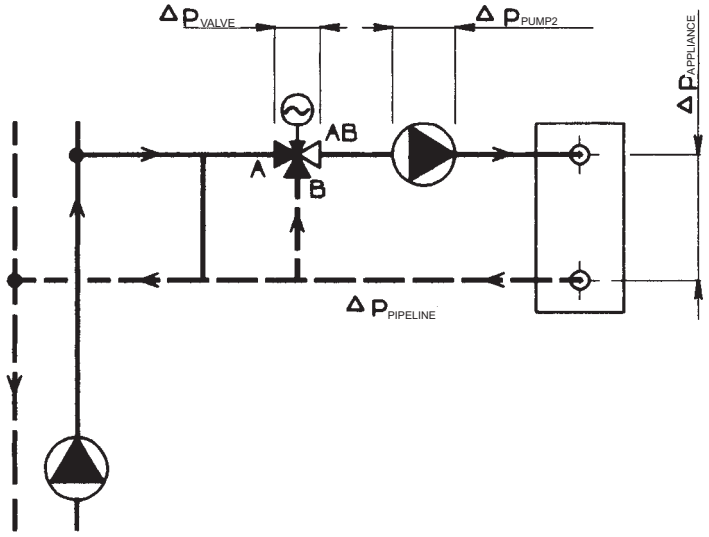
The control valve's real pressure drop calculated this way shall be taken into account in a hydraulic calculation of regulating circuit.

**Caution:** To ensure reliable function of three-way valves, the most important condition is to keep minimum available pressure difference between A and B ports. Three-way valves are capable to manage even high pressure difference between A and B ports but valve's flow characteristic deformates then and so regulation properties deteriorate. So if in doubt about pressure difference value between those two ports (e.g. when three-way valve is piped directly into primary side without pressure separation), we recommend to use a two-way valve in combination with a primary-secondary side short cut to ensure a reliable regulation. The authority of A-AB way of three-way valve is, providing a constant flow rate in appliance circuit, the following:

$$a = \frac{\Delta p_{VALVE\ H100}}{\Delta p_{VALVE\ H0}} = \frac{8}{8} = 1\ ,$$

which means that the behaviour of flow in A-AB way corresponds to ideal flow curve of the valve. In that case there are Kvs values in both ports the same with linear characteristic i.e. the total flow is nearly constant.
A combination of equal-percentage characteristic in A port and linear characteristic in B port shall be selected in those cases when loading of A port with differential pressure against B port cannot be avoided or when the primary side parametres are too high.

Scheme of a typical regulation loop with the application of a three-way mixing control valve




Remark: More detailed information on calculation and design of LDM control valves is mentioned in calculation instructions No. 01-12.0. Equations mentiened above apply in a simlified way to water. To reach optimum results, we recommend to use original calculation programme VALVES which is available on request free of charge.

# RV 102 L
# RV 103 L

## Control valves
## DN 15 - 50, PN 16
## with Siemens actuators (Landis & Staefa)

## Description

Control valves series RV 102 are two-way or three-way valves with internal threaded connection. Valve body is made of brass. Control valves series RV 103 are two-way or three-way valves with flanged connection. Valve body is made of grey cast iron. Valves are optionally manufactured in the following executions:

- three-way control valve
- two-way, reverse, control valve
- two-way, angular, control valve

Valves RV 102 L and RV 103 L are especially designed for electric or electrohydraulic actuators of producer Siemens (Landis & Staefa).

## Application

Valves are designed for application in heating, ventilation or air conditioning systems for maximal temperature 140 °C.
The maximal operating pressures in behaviour with a chosen material and process medium temperature are mentioned on page 28 of this catalogue.

## Process media

Valve series RV 102 and RV 103 are designed to regulate the flow and pressure of liquids, gases and vapours without abrasive particles e.g. water, low-pressure steam (it applies to RV 102 only), air and other media compatible with material of the valve inner parts. Medium acidity and alkalinity should not exceed range of pH 4.5 to 9.5 .
To ensure reliable regulation, producer recommends to pipe a strainer in front of the valve into pipeline.

## Installation

The valve is to be piped the way so that the direction of medium flow will coincide with the arrows on the body (inlet ports A, B and outlet port AB).
In flow-diverting valves, the process medium flow is reversed (inlet port AB and outlet ports A, B).
Valve can be installed in any position except position when the actuator is under the valve body.

## Technical data

| Series | RV 102 | RV 103 |
|---|---|---|
| Type of valve | Three-way control valve<br>Two-way, reverse control valve | |
| Nominal size range | DN 15 - 50 | |
| Nominal pressure | PN 16 | |
| Body material | Brass 42 3135 | Grey cast iron EN-JL 1040 |
| Plug material | Brass 42 3234 | |
| Operating temperature range | -5 to 140°C | |
| Face to face dimensions | Line M4 acc. to DIN 3202 (4/1982) | Line 1 acc. to ČSN-EN 558-1 (3/1997) |
| Connection | Internal threaded coupling<br>Acc. to ČSN-EN ISO 228-1 (9/2003) | Flange type B1 (raised faces)<br>Acc. to ČSN-EN 1092-1 (4/2002) |
| Type of plug | V-ported plug | |
| Flow characteristic | Linear; equal-percentage (applicable to basic Kvs values) | |
| Kvs values | 0.6 to 40 $m^3$/hour | |
| Leakage rate | Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1 % of Kvs) in A-AB way | |
| Rangeability r | 50 : 1 | |
| Packing | O - ring EPDM | |

## Note

The actuator nominal stroke value is not equal to the valve nominal stroke value. When used resistance position transmitter, it is necessary to take into account that range of resistance signal will be reduced to 500-1000 Ω at nominal stroke of 10 mm and to 200-1000 Ω at nominal stroke of 16 mm.

Range of direct control is reduced the same way with actuators controlled with continous signal, i.e. to 5-10V (12 - 20 mA) at valves with stroke of 10 mm and to 2-10V (8 - 20 mA) at valves with stroke of 16 mm.
The actuators 6xxx equipped with calibration function enables the actuator's control in the full range.

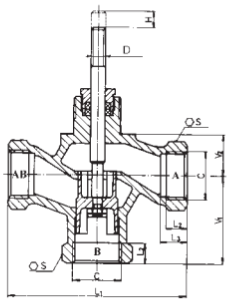
## Kvs values and differential pressures

**$\Delta p_{max}$ value is the valve maximal differential pressure when reliable opening and closing can be guaranteed. Because of seat and plug service life, it is recommended so that permanent differential pressure would not exceed 0.6 MPa for valves RV 102 and 0.4 Mpa for valves RV 103.**

| For further information on actuating, see actuators´ catalogue sheets | | Actuating (actuator) | | | | | SQX ... | SKD ... |
|---|---|---|---|---|---|---|---|---|
| | | Marking in valve specification No. | | | | | ELA, ELB | HLA, HLB, HLC |
| | | Linear force | | | | | 700 N | 1000 N |
| | | Kvs [m³/hour] | | | | | $\Delta p_{max}$ | $\Delta p_{max}$ |
| DN | H | 1 | 2 | 3 | 4 | 5 | MPa | MPa |
| 15 | 10 | 4.0 | 2.5 | 1.6 | 1.0 | 0.6 | 1.60 | 1.60 |
| 20 | | 6.3 | 4.0 | 2.5 | --- | --- | 1.57 | 1.60 |
| 25 | | 10.0 | 6.3 | 4.0 | --- | --- | 1.02 | 1.51 |
| 32 | 16 | 16.0 | 10.0 | 6.3 | --- | --- | 0.63 | 0.94 |
| 40 | | 25.0 | 16.0 | 10.0 | --- | --- | 0.40 | 0.61 |
| 50 | | 40.0 | 25.0 | 16.0 | --- | --- | 0.24 | 0.36 |

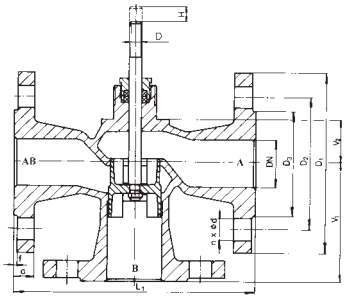
## Dimensions and weights for the type RV 102

| DN | C | $L_1$ | $L_2$ | $L_3$ | $V_1$ | $V_2$ | S | H | D | m |
|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | kg |
| 15 | G 1/2 | 85 | 9 | 12 | 43 | 25 | 27 | 10 | 8 | 0.55 |
| 20 | G 3/4 | 95 | 11 | 14 | 48 | 25 | 32 | | | 0.65 |
| 25 | G 1 | 105 | 12 | 16 | 53 | 25 | 41 | | | 0.80 |
| 32 | G 1 1/4 | 120 | 14 | 18 | 66 | 35 | 50 | 16 | | 1.40 |
| 40 | G 1 1/2 | 130 | 16 | 20 | 70 | 35 | 58 | | | 2.00 |
| 50 | G 2 | 150 | 18 | 22 | 80 | 42 | 70 | | | 2.95 |



## Dimensions and weights for the type RV 103

| DN | $D_1$ | $D_2$ | $D_3$ | n x d | a | f | $L_1$ | $V_1$ | $V_2$ | H | D | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | kg |
| 15 | 95 | 65 | 45 | 4x14 | 16 | 2 | 130 | 65 | 25 | 10 | 8 | 3.2 |
| 20 | 105 | 75 | 58 | | 18 | | 150 | 75 | 25 | | | 4.3 |
| 25 | 115 | 85 | 68 | | | | 160 | 80 | 25 | | | 5.5 |
| 32 | 140 | 100 | 78 | 4x18 | | | 180 | 90 | 35 | 16 | | 7.7 |
| 40 | 150 | 110 | 88 | | | 3 | 200 | 100 | 35 | | | 8.5 |
| 50 | 165 | 125 | 102 | | 20 | | 230 | 115 | 42 | | | 11.9 |



## Valve complete specification No. for ordering

| | | | XX | X X X | X X X | X X | X X | - | XX | / | XXX | - | XX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Type of valve | Control valve | | RV | | | | | | | | | | |
| 2. Series | Valves made of brass | | | 1 0 2 | | | | | | | | | |
| | Valves made of grey cast iron | | | 1 0 3 | | | | | | | | | |
| 3. Actuating | Electric actuator | | | | E | | | | | | | | |
| | Electrohydraulic actuator | | | | H | | | | | | | | |
| | | | | | - | | | | | | | | |
| | El. actuators SQX 32.00, SQX 32.03, SQX 82.00, SQX 82.03 | | | | E L A | | | | | | | | |
| | El. actuators SQX 62 | | | | E L B | | | | | | | | |
| | EH actuators SKD 32.50, SKD 82.50, SKD 82.8, SKD 62.9 | | | | H L A | | | | | | | | |
| *) actuators with fail-safe action (closes straight way) | EH actuators SKD 32.51, SKD 32.21, SKD 82.51 *) | | | | H L B | | | | | | | | |
| | EH actuators SKD 62, SKD 62U *) | | | | H L C | | | | | | | | |
| 4. Design | Straight, two-way, threaded valves | Applicable to RV 102 | | | | 1 | | | | | | | |
| | Angle, two-way, threaded valves | | | | | 2 | | | | | | | |
| | Mixing (diverting), three-way, threaded valves | | | | | 3 | | | | | | | |
| | Straight, two-way, flanged valves | Applicable to RV 103 | | | | 4 | | | | | | | |
| | Angle, two-way, flanged valves | | | | | 5 | | | | | | | |
| | Mixing (diverting), three-way, flanged valves | | | | | 6 | | | | | | | |
| 5. Body material | Grey cast iron | | | | | 3 | | | | | | | |
| | Brass | | | | | 5 | | | | | | | |
| 6. Flow characteristic | Linear | | | | | | 1 | | | | | | |
| 1) *Applicable to basic Kvs values only* | Equal-percentage 1) | | | | | | 2 | | | | | | |
| 7. Nominal Kvs value | Column No. acc. to Kvs values table | | | | | | X | | | | | | |
| 8. Nominal pressure PN | PN 16 | | | | | | | | 16 | | | | |
| 9. Max. operating temperature° C | | | | | | | | | | | 140 | | |
| 10. Nominal size | DN | | | | | | | | | | | | XX |

**Ordering example** : Three-way control valves DN 25, PN 16 with electric actuator SQX 32.00, body material: brass, connection: internal thread G 1, linear flow characteristic, Kvs = 10 m³/hour is specified as follows : **RV 102 ELA 3511 16/140-25**

# 200 line

# RV / HU 2x1 L

## Control valves and Fail-safe action valves DN 15 - 150, PN 16 and 40 with Siemens actuators (Landis & Staefa)

## Description

Control valves RV 211, RV 221 and RV 231 (further in text RV 2x1) are single-seated valves designed for regulation and shut-off of process medium flow. In regard of used actuators, the valves are suitable for regulation at lower differential pressures. Flow characteristics, Kvs values and leakage rates correspond to international standards.

Valves with a fail-safe action HU 2x1 have the same design as RV 2x1 with addition of increased seat sealing. Valves are equipped with fail-safe action actuators (valve closes upon power failure).

Valves RV (HU) 2x1 L are especially designed for Siemens actuators (Landis & Staefa).

## Application

These valves have a wide range of application in heating, ventilation, power generation and chemical processing industries. Valve body can be optionally made of spheroidal cast iron, cast steel and austenitic stainless steel according to operating conditions.

The materials selected correspond to the recommendation of ČSN-EN 1503-1 (1/2002) (steels) and ČSN-EN 1503-3 (1/2002) (cast). The maximal operating pressures in behaviour with a chosen material and process medium temperature are mentioned in the table on page 28 of this catalogue.

## Process media

Valves series RV / HU 2x1 are designed for regulation (RV 2x1) and for regulation and shut-off (HU 2x1)of flow and pressure of liquids, gases and vapours without abrasive particles e.g. Water, steam, air and other media compatible with material of the valve inner parts. The application of valves made of spheroidal cast iron (RV 211) for steam is limited by the following parametres: Steam must be superheated (its dryness $x_1 \geq 0{,}98$) and inlet pressure $p_1 \leq 0{,}4$ MPa when differential pressure is above-critical or $p_1 \leq 1{,}6$ MPa when differential pressure is unde-critical. In case these values are exceeded, it is necessary to use valve made of cast steel (RV 221). To ensure reliable regulation, producer recommends to pipe a strainer in front of the valve or ensure in any other way that medium will not contain abrasive particles or impurities.

## Installation

The valve is to be piped the way so that the direction of medium flow will coincide with the arrows on the body.

The valve can be installed in any position except position when the actuator is under the valve body. When medium temperature exceeds 150°C, it is necessary to protect the actuator against glowing heat from the pipeline e.g. by the means of proper insulating of the pipeline and valve or by tilting the valve away from the heat radiation.

## Technical data

| Series | | RV / HU 211 | RV / HU 221 | RV / HU 231 |
|---|---|---|---|---|
| Type of valve | | Two-way, single-seated, reverse, control valve | | |
| Nominal size range | | DN 15 to 150 | | |
| Nominal pressure | | PN 16, PN 40 | | |
| Body material | | Spheroidal cast iron<br>EN-JS 1025<br>(EN-GJS-400-10-LT) | Cast steel<br>1.0619 (GP240GH)<br>1.7357 (G17CrMo5-5) | Stainless steel<br>1.4581<br>(GX5CrNiMoNb19-11-2) |
| Seat material : | DN 15 - 50 | 1.4028 / 17 023.6 | 1.4028 / 17 023.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 65 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Plug material : | DN 15 - 65 | 1.4021 / 17 027.6 | 1.4021 / 17 027.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 80 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Operating temperature range | | -20 to 300°C | -20 to 300°C | -20 to 300°C |
| Face to face dimensions | | Line 1 acc. to ČSN-EN 558-1 (3/1997) | | |
| Connection flanges | | Acc. to ČSN-EN 1092-1 (4/2002) | | |
| Flange face | | Type B1 (raised-faced) or Type F (female) acc. to ČSN-EN 1092-1 (4/2002) | | |
| Type of plug | | V-ported, parabolic, perforated | | |
| Flow characteristic | | Linear, equal-percentage, LDMspline®, parabolic | | |
| Kvs value | | 0.4 to 360 $m^3$/hour | | |
| Leakage rate | | Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for c. valves with metal-metal seat sealing | | |
| | | Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for c. valves with metal-PTFE seat sealing | | |
| Rangeability r | | 50 : 1 | | |
| Packing | | O - ring EPDM $t_{max}$=140°C, DRSpack® (PTFE) $t_{max}$=260°C, Bellows $t_{max}$=300°C | | |

Remark: For low operating temperatures (-200 to +250°C), it is possible to supply the valve RV / HU 231 with body material made of 1.4308 (cast stainless steel).

## Kvs values and differential pressures

**$\Delta p_{max}$ value is the valve max. differential pressure when open--close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.**

| For further information on actuating, see actuators´ catalogue sheets | | Actuating (actuator) | | | | | | SQX ... | | SKD ... | | SKB ... | | SKC ... | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Marking in valve spec. No. | | | | | | ELA, ELB | | HLA, HLB, HLC | | HLD, HLE, HLF | | HLG, HLH, HLI | |
| | | Linear force | | | | | | 700 N | | 1000 N | | 2800 N | | 2800 N | |
| | | Kvs [m³/hour] | | | | | | $\Delta p_{max}$ | | $\Delta p_{max}$ | | $\Delta p_{max}$ | | $\Delta p_{max}$ | |
| DN | H | 1 | 2 | 3 | 4 | 5 | 6 | metal | PTFE | metal | PTFE | metal | PTFE | metal | PTFE |
| 15 | 20 | --- | 2.5[1] | 1.6[1] | 1.0[1] | 0.6[1] | 0.4[1] | 4.00 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 15 | | 4.0[1] | --- | --- | --- | --- | --- | 2.28 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | --- | --- | 2.5[1] | 1.6[1] | 1.0[1] | 0.6[1] | 4.00 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | --- | 4.0[1] | --- | --- | --- | --- | 2.28 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | 6.3[1] | --- | --- | --- | --- | --- | 1.27 | --- | 2.15 | --- | 4.00 | --- | --- | --- |
| 25 | | --- | --- | --- | 2.5[1] | 1.6[1] | 1.0[1] | 4.00 | -- | 4.00 | --- | 4.00 | --- | --- | --- |
| 25 | | 10.0 | 6.3[2] | 4.0[2] | --- | --- | --- | 0.69 | 1.11 | 1.24 | 1.65 | 4.00 | 4.00 | --- | --- |
| 32 | | --- | --- | --- | 4.0[1] | --- | --- | 2.28 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 32 | | 16.0 | 10.0 | 6.3[2] | --- | --- | --- | 0.34 | 0.66 | 0.67 | 0.99 | 2.40 | 2.70 | --- | --- |
| 40 | | 25.0 | 16.0 | 10.0 | --- | --- | --- | 0.16 | 0.42 | 0.38 | 0.63 | 1.50 | 1.70 | --- | --- |
| 50 | | 40.0 | 25.0 | 16.0 | --- | --- | --- | 0.06 | 0.25 | 0.18 | 0.37 | 0.80 | 1.00 | --- | --- |
| 65 | | 63.0 | 40.0 | 25.0 | --- | --- | --- | --- | 0.15 | 0.07 | 0.22 | 0.45 | 0.60 | --- | --- |
| 80 | 40 | 100.0 | 63.0 | 40.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.25 | 0.40 |
| 100 | | 160.0 | 100.0 | 63.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.16 | 0.25 |
| 125 | | 250.0 | 160.0 | 100.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.08 | 0.15 |
| 150 | | 360.0 | 250.0 | 160.0 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.05 | 0.10 |

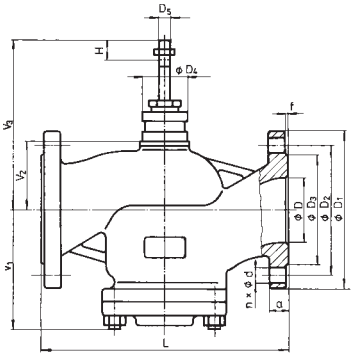
1) parabolic plug
2) V-ported plug with linear characteristic, parabolic plug with equal-percentage, LDMspline® and parabolic characteristic.

Perforated plug available only with Kvs values in shadowed frames ▭ with the following restrictions:
- Kvs values 2.5 to 1.0 m³/hour available with linear characteristic only.
- Perforated plug with Kvs value acc. to column No. 2 available with linear or parabolic characteristic only.

metal - version with metal - metal seat sealing
PTFE - version with metal - PTFE seat sealing
Bellows packing can be used with V-ported plug only.
Equal-percentage, LDMspline® and parabolic characteristic available on condition : Kvs value ≧ 1.0
Max. differential pressure Δ p for valves PN 16 must be 1.6 MPa.
Max. differential pressures specified in table apply to PTFE and O-ring packing. $\Delta p_{max}$ for bellows must be consulted with the producer.

## Dimensions and weights for the type RV 2x1

| | PN 16 | | | | | PN 40 | | | | | PN 16, PN 40 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | $D_1$ | $D_2$ | $D_3$ | d | n | $D_1$ | $D_2$ | $D_3$ | d | n | D | f | $D_4$ | $D_5$ | L | $V_1$ | $V_2$ | #$V_2$ | $V_3$ | #$V_3$ | a | $m_1$ | $m_2$ | #$m_v$ |
| | mm | mm | mm | mm | | mm | mm | mm | mm | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | kg | kg | kg |
| 15 | 95 | 65 | 45 | | | 95 | 65 | 45 | | | 15 | | | | 130 | 68 | 47 | --- | 143 | --- | 16 | 4.5 | 5.5 | --- |
| 20 | 105 | 75 | 58 | 14 | | 105 | 75 | 58 | 14 | | 20 | | | | 150 | 68 | 47 | --- | 143 | --- | 18 | 5.5 | 6.5 | --- |
| 25 | 115 | 85 | 68 | | 4 | 115 | 85 | 68 | | 4 | 25 | | | | 160 | 85 | 52 | 250 | 148 | 346 | 18 | 6.5 | 8 | 3.5 |
| 32 | 140 | 100 | 78 | | | 140 | 100 | 78 | | | 32 | | | 10 | 180 | 85 | 52 | 250 | 148 | 346 | 20 | 8 | 9.5 | 3.5 |
| 40 | 150 | 110 | 88 | | | 150 | 110 | 88 | | | 40 | | | | 200 | 85 | 52 | 250 | 148 | 346 | 20 | 9 | 11 | 3.5 |
| 50 | 165 | 125 | 102 | | | 165 | 125 | 102 | 18 | | 50 | 2 | 44 | | 230 | 117 | 72 | 270 | 168 | 366 | 20 | 14 | 21 | 3.5 |
| 65 | 185 | 145 | 122 | 18 | 4[1] | 185 | 145 | 122 | | 8 | 65 | | | | 290 | 117 | 72 | 270 | 168 | 366 | 22 | 18 | 27 | 3.5 |
| 80 | 200 | 160 | 138 | | | 200 | 160 | 138 | | | 80 | | | | 310 | 152 | 106 | 452 | 222 | 568 | 24 | 26 | 40 | 4.5 |
| 100 | 220 | 180 | 158 | | 8 | 235 | 190 | 162 | 22 | | 100 | | | 14 | 350 | 152 | 106 | 452 | 222 | 568 | 24 | 38 | 49 | 4.5 |
| 125 | 250 | 210 | 188 | | | 270 | 220 | 188 | 26 | | 125 | | | | 400 | 175 | 134 | 480 | 250 | 596 | 26 | 58 | 82 | 5 |
| 150 | 285 | 240 | 212 | 22 | | 300 | 250 | 218 | | | 150 | | | | 480 | 200 | 134 | 480 | 250 | 596 | 28 | 78 | 100 | 5 |




[1] with regard of the standard previously in force, there is an option to have the number of connection bolts as stipulated in ČSN-EN 1092-1
[#] - for valve with bellows packing
$m_v$ - weight to be added to weight of valve equipped with bellows packing
$m_1$ - for valves RV / HU 211
$m_2$ - for valves RV / HU 221 and RV / HU 231

# 200 line

# RV / HU 2x3 L

## Control valves and Fail-safe action valves DN 25 - 150, PN 16 and 40 with Siemens actuators (Landis & Staefa)

## Description

Control valves RV 213, RV 223 and RV 233 (further in text RV 2x3) are single-seated valves with pressure-balanced plug designed for regulation and shut-off of process medium flow. Its design enables the valve to be applicable to regulation at high differential pressures with low-linear-force-actuator. Flow characteristics, Kvs values and leakage rates correspond to international standards.

Valves with a fail-safe action series HU 2x3 have the same design as RV 2x3 with addition of increased seat sealing. Valves are equipped with fail-safe action actuators (valve closes upon power failure).

Valves RV 2x3 L are especially designed for Siemens actuators (Landis & Staefa).

## Application

These valves have a wide range of application in heating, ventilation, power generation and chemical processing industries. Valve body can be optionally made of spheroidal cast iron, cast steel and austenitic stainless steel according to operating conditions.

The materials selected correspond to the recommendation of ČSN-EN 1503-1 (1/2002) (steels) and ČSN-EN 1503-3 (1/2002) (cast). The maximal operating pressures in behaviour with a chosen material and process medium temperature are mentioned in the table on page 28 of this catalogue.

## Process media

Valves series RV / HU 2x3 are designed for regulation (RV 2x3) and for regulation and shut-off (HU 2x3)of flow and pressure of liquids, gases and vapours without abrasive particles e.g. Water, steam, air and other media compatible with material of the valve inner parts. The application of valves made of spheroidal cast iron (RV 213) for steam is limited by the following parametres: Steam must be superheated (its dryness $x_1 \geq 0{,}98$) and inlet pressure $p_1 \leq 0{,}4$ Mpa when differential pressure is above-critical or $p_1 \leq 1{,}6$ MPa when differential pressure is under-critical. In case these values are exceeded, it is necessary to use valve made of cast steel (RV 223). To ensure reliable regulation, producer recommends to pipe a strainer in front of the valve or ensure in any other way that medium will not contain abrasive particles or impurities.

## Installation

The valve is to be piped the way so that the direction of medium flow will coincide with the arrows on the body.

The valve can be installed in any position except position when the actuator is under the valve body. When medium temperature exceeds 150°C, it is necessary to protect the actuator against glowing heat from the pipeline e.g. by the means of proper insulating of the pipeline and valve or by tilting the valve away from the heat radiation.

## Technical data

| Series | | RV / HU 213 | RV / HU 223 | RV / HU 233 |
|---|---|---|---|---|
| Type of valve | | Two-way, single-seated, reverse, control valve with pressure-balanced plug | | |
| Nominal size range | | DN 25 to 150 | | |
| Nominal pressure | | PN 16, PN 40 | | |
| Body material | | Spheroidal cast iron<br>EN-JS 1025<br>(EN-GJS-400-10-LT) | Cast steel<br>1.0619 (GP240GH)<br>1.7357 (G17CrMo5-5) | Stainless steel<br>1.4581<br>(GX5CrNiMoNb19-11-2) |
| Seat material : | DN 25 - 50 | 1.4028 / 17 023.6 | 1.4028 / 17 023.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 65 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Plug material : | DN 25 - 65 | 1.4021 / 17 027.6 | 1.4021 / 17 027.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 80 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Operating temperature range | | -20 to 260°C | -20 to 260°C | -20 to 260°C |
| Face to face dimensions | | Line 1 acc. to ČSN-EN 558-1 (3/1997) | | |
| Connection flanges | | Acc. to ČSN-EN 1092-1 (4/2002) | | |
| Flange face | | Type B1 (raised-faced) or Type F (female) acc. to ČSN-EN 1092-1 (4/2002) | | |
| Type of plug | | V-ported, perforated | | |
| Flow characteristic | | Linear, equal-percentage, LDMspline® , parabolic | | |
| Kvs value | | 4 to 360 $m^3$/hour | | |
| Leakage rate | | Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for c. valves with metal-metal seat sealing | | |
| | | Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for c. valves with metal-PTFE seat sealing | | |
| Rangeability r | | 50 : 1 | | |
| Packing | | O - ring EPDM $t_{max}$=140°C, DRSpack® (PTFE) $t_{max}$=260°C, Bellows $t_{max}$=260°C | | |

Remark: For low operating temperatures (-200 to +250°C), it is possible to supply the valve RV / HU 233 with body material made of 1.4308 (cast stainless steel).

## Kvs values and differential pressures

**$\Delta p_{max}$ value is the valve max. differential pressure when open--close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.**

| For further information on actuating, see actuators´ catalogue sheets | | Actuating (actuator) | | | SKD ... | | SKB ... | | SKC ... | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Marking | | | HLA, HLB, HLC | | HLD, HLE, HLF | | HLG, HLH, HLI | |
| | | Linear force | | | 1000 N | | 2800 N | | 2800 N | |
| | | Kvs [m³/hour] | | | $\Delta p_{max}$ | | $\Delta p_{max}$ | | $\Delta p_{max}$ | |
| DN | H | 1 | 2 | 3 | metal | PTFE | metal | PTFE | metal | PTFE |
| 25 | 20 | 10 | 6.3 [1] | 4.0 [1] | 1.60 (1.60) | 1.60 (1.60) | 4.00 (4.00) | 4.00 (4.00) | --- | --- |
| 32 | | 16.0 | 10.0 | 6.3 [1] | 1.60 (1.60) | 1.60 (1.60) | 4.00 (4.00) | 4.00 (4.00) | --- | --- |
| 40 | | 25.0 | 16.0 | 10.0 | 1.60 (1.60) | 1.60 (1.60) | 4.00 (4.00) | 4.00 (4.00) | --- | --- |
| 50 | | 40.0 | 25.0 | 16.0 | 1.60 (1.60) | 1.60 (1.60) | 4.00 (4.00) | 4.00 (4.00) | --- | --- |
| 65 | | 63.0 | 40.0 | 25.0 | 1.60 (0.89) | 1.60 (1.60) | 4.00 (4.00) | 4.00 (4.00) | --- | --- |
| 80 | 40 | 100.0 | 63.0 | 40.0 | --- | --- | --- | --- | 4.00 (4.00) | 4.00 (4.00) |
| 100 | | 160.0 | 100.0 | 63.0 | --- | --- | --- | --- | 4.00 (3.50) | 4.00 (4.00) |
| 125 | | 250.0 | 160.0 | 100.0 | --- | --- | --- | --- | 4.00 (2.40) | 4.00 (4.00) |
| 150 | | 360.0 | 250.0 | 160.0 | --- | --- | --- | --- | 4.00 (1.60) | 4.00 (3.50) |

1) linear characteristic only

metal - version with metal - metal seat sealing

PTFE - version with metal - PTFE seat sealing

(xx) - $\Delta p_{max}$ values specified in parentheses apply to perforated plug.

Max $\Delta$ p for valves PN 16 must be 1.6 MPa.

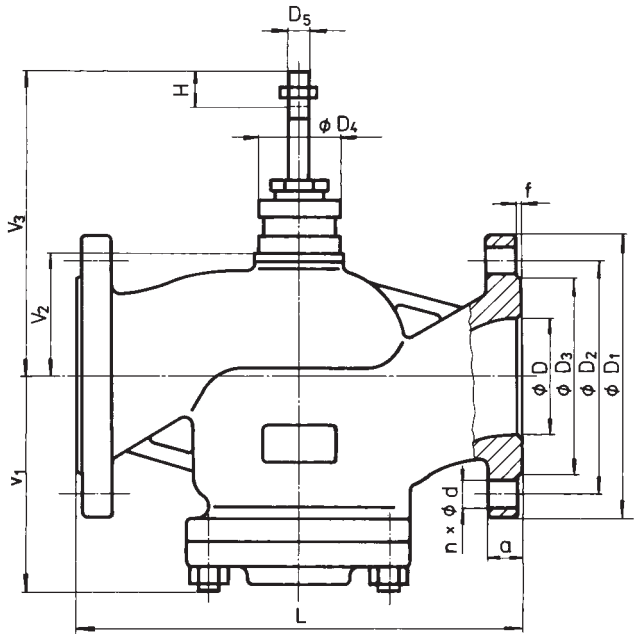
Max. differential pressures specified in table apply to PTFE and O-ring packing. $\Delta p_{max}$ for bellows must be consulted with the producer.

Perforated plug available only with Kvs values in shadowed frames ▭ with the following restrictions :

- perforated plug with Kvs value acc. to column No. 2 available with linear or parabolic characteristic only.

## Dimensions and weights for the type RV 2x3

| | PN 16 | | | | | PN 40 | | | | | PN 16, PN 40 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | $D_1$ | $D_2$ | $D_3$ | d | n | $D_1$ | $D_2$ | $D_3$ | d | n | D | f | $D_4$ | $D_5$ | L | $V_1$ | $V_2$ | $^{\#}V_2$ | $V_3$ | $^{\#}V_3$ | a | $m_1$ | $m_2$ | $^{\#}m_v$ |
| | mm | mm | mm | mm | | mm | mm | mm | mm | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | kg | kg | kg |
| 25 | 115 | 85 | 68 | 14 | 4 | 115 | 85 | 68 | 14 | 4 | 25 | 2 | 44 | 10 | 160 | 85 | 52 | 250 | 148 | 346 | 18 | 6.5 | 8 | 3.5 |
| 32 | 140 | 100 | 78 | 18 | | 140 | 100 | 78 | 18 | | 32 | | | | 180 | 85 | 52 | 250 | 148 | 346 | 20 | 8 | 9.5 | 3.5 |
| 40 | 150 | 110 | 88 | | | 150 | 110 | 88 | | | 40 | | | | 200 | 85 | 52 | 250 | 148 | 346 | 20 | 9 | 11 | 3.5 |
| 50 | 165 | 125 | 102 | | | 165 | 125 | 102 | | | 50 | | | | 230 | 117 | 72 | 270 | 168 | 366 | 20 | 14 | 21 | 3.5 |
| 65 | 185 | 145 | 122 | | 4 [1] | 185 | 145 | 122 | | 8 | 65 | | | | 290 | 117 | 72 | 270 | 168 | 366 | 22 | 18 | 27 | 3.5 |
| 80 | 200 | 160 | 138 | | 8 | 200 | 160 | 138 | | | 80 | | | 14 | 310 | 152 | 106 | 452 | 222 | 568 | 24 | 26 | 40 | 4.5 |
| 100 | 220 | 180 | 158 | | | 235 | 190 | 162 | 22 | | 100 | | | | 350 | 152 | 106 | 452 | 222 | 568 | 24 | 38 | 49 | 4.5 |
| 125 | 250 | 210 | 188 | | | 270 | 220 | 188 | 26 | | 125 | | | | 400 | 175 | 134 | 480 | 250 | 596 | 26 | 58 | 82 | 5 |
| 150 | 285 | 240 | 212 | 22 | | 300 | 250 | 218 | | | 150 | | | | 480 | 200 | 134 | 480 | 250 | 596 | 28 | 78 | 100 | 5 |




[1] with regard of the standard previously in force, there is an option to have the number of connection bolts as stipulated in ČSN-EN 1092-1

[#] - for valve with bellows packing

$m_v$ - weight to be added to weight of valve equipped with bellows packing

$m_1$ - for valves RV / HU 213

$m_2$ - for valves RV / HU 223 and RV / HU 233

# 200 line

# RV 2x5 L

## Control valves
## DN 15 - 150, PN 16 and 40
## with Siemens actuators (Landis & Staefa)

## Description

Control valves RV 215, RV 225 and RV 235 (further only RV 2x5) are three-way valves with mixing or flow-diverting function. In regard of used actuators, the valves are suitable for regulation at lower differential pressures. Flow characteristics, Kvs values and leakage rates correspond to international standards.

When assembled with a fail-safe action actuator, it closes straight way upon power failure.

Valves RV 2x5 L are especially designed for Siemens actuators (Landis & Staefa).

## Application

These valves have a wide range of application in heating, ventilation, power generation and chemical processing industries. Valve body can be optionally made of spheroidal cast iron, cast steel and austenitic stainless steel according to operating conditions.

The materials selected correspond to the recommendation of ČSN-EN 1503-1 (1/2002) (steels) and ČSN-EN 1503-3 (1/2002) (cast). The maximal operating pressures in behaviour with a chosen material and process medium temperature are mentioned in the table on page 28 of this catalogue.

## Process media

Valves series RV 2x5 are designed for regulation of flow and pressure of liquids, gases and vapours without abrasive particles e.g. water, steam, air and other media compatible with material of the valve inner parts. The application of valves made of spheroidal cast iron (RV 215) for steam is limited by the following parametres: Steam must be superheated (its dryness $x_1 \geqq 0,98$) and inlet pressure $p_1 \leqq 0,4$ MPa when differential pressure is above-critical or $p_1 \leqq 1,6$ MPa when differential pressure is under-critical. In case these values are exceeded, it is necessary to use valve made of cast steel (RV 225). To ensure reliable regulation, producer recommends to pipe a strainer in front of the valve or ensure in any other way that medium will not contain abrasive particles or impurities.

## Installation

When the valve is used as mixing, it must be piped the way so that direction of process medium flow will coincide with the arrows on the body (inlet ports A, B and outlet port AB). When the valves is used as diverting, process medium flows through common valve port AB and split streams leave through valve ports A and B.). The valve can be installed in any position except position when the actuator is under the valve body. When medium temperature exceeds 150°C, it is necessary to protect the actuator against glowing heat from the pipeline e.g. by the means of proper insulating of the pipeline and valve or by tilting the valve away from the heat radiation.

## Technical data

| Series | | RV 215 | RV 225 | RV 235 |
|---|---|---|---|---|
| Type of valve | | Three-way, reverse, control valve | | |
| Nominal size range | | DN 15 to 150 | | |
| Nominal pressure | | PN 16, PN 40 | | |
| Body material | | Spheroidal cast iron<br>EN-JS 1025<br>(EN-GJS-400-10-LT) | Cast steel<br>1.0619 (GP240GH)<br>1.7357 (G17CrMo5-5) | Stainless steel<br>1.4581<br>(GX5CrNiMoNb19-11-2) |
| Seat material : | DN 15 - 50 | 1.4028 / 17 023.6 | 1.4028 / 17 023.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 65 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Plug material : | DN 15 - 65 | 1.4021 / 17 027.6 | 1.4021 / 17 027.6 | 1.4571 / 17 347.4 |
| DIN W.Nr./ČSN | DN 80 - 150 | 1.4027 / 42 2906.5 | 1.4027 / 42 2906.5 | 1.4581 / 42 2941.4 |
| Operating temperature range | | -20 to 300°C | -20 to 500°C | -20 to 300°C |
| Face to face dimensions | | Line 1 acc. to ČSN-EN 558-1 (3/1997) | | |
| Connection flanges | | Acc. to ČSN-EN 1092-1 (4/2002) | | |
| Flange face | | Type B1 (raised-faced) or Type F (female) acc. to ČSN-EN 1092-1 (4/2002) | | |
| Type of plug | | V-ported, perforated | | |
| Flow characteristic | | Linear, equal-percentage in straight way | | |
| Kvs value | | 1.6 to 360 $m^3$/hour | | |
| Leakage rate in straight way | | Class III. acc. to ČSN-EN 1349 (5/2001) (<0.1% Kvs) for c. valves with metal-metal seat sealing | | |
| | | Class IV. acc. to ČSN-EN 1349 (5/2001) (<0.01% Kvs) for c. valves with metal-PTFE seat sealing | | |
| Rangeability r | | 50 : 1 | | |
| Packing | | O - ring EPDM $t_{max}$=140°C, DRSpack® (PTFE) $t_{max}$=260°C, Bellows $t_{max}$=550°C | | |

Remark: For low operating temperatures (-200 to +250°C), it is possible to supply the valve RV 235 with body material made of 1.4308 (cast stainless steel).

## Kvs values and differential pressures

**$\Delta p_{max}$ value is the valve max. differential pressure when open--close function is always guaranteed. In regard of service life of seat and plug, it is recommended so that permanent differential pressure would not exceed 1.6 MPa. Otherwise it is suitable to use perforated plug or sealing surfaces of seat and plug with a hard metal overlay.**

| For further information on actuating see actuators´ catalogue sheets | | Actuating (actuator) | | | SQX ... | | SKD ... | | SKB ... | | SKC ... | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Marking in valve specification No. | | | ELA, ELB | | HLA, HLB, HLC | | HLD, HLE, HLF | | HLG, HLH, HLI | |
| | | Linear force | | | 700 N | | 1000 N | | 2,8 kN | | 2,8 kN | |
| | | Kvs [$m^3$/hour] | | | $\Delta p_{max}$ | | $\Delta p_{max}$ | | $\Delta p_{max}$ | | $\Delta p_{max}$ | |
| DN | H | 1 | 2 | 3 | metal | PTFE | metal | PTFE | metal | PTFE | metal | PTFE |
| 15 | 20 | --- | 2.5 [1] | 1.6 [1] | 4.00 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 15 | | 4.0 [1] | --- | --- | 2.82 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | --- | --- | 2.5 [1] | 4.00 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | --- | 4.0 [1] | --- | 2.82 | --- | 4.00 | --- | 4.00 | --- | --- | --- |
| 20 | | 6.3 [1] | --- | --- | 1.27 | --- | 2.15 | --- | 4.00 | --- | --- | --- |
| 25 | | 10.0 | 6.3 [2] | 4.0 [2] | 0.69 | 1.11 | 1.24 | 1.65 | 4.00 | 4.00 | --- | --- |
| 32 | | 16.0 | 10.0 | 6.3 [2] | 0.34 | 0.66 | 0.67 | 0.99 | 2.40 | 2.70 | --- | --- |
| 40 | | 25.0 | 16.0 | 10.0 | 0.16 | 0.42 | 0.38 | 0.63 | 1.50 | 1.70 | --- | --- |
| 50 | | 40.0 | 25.0 | 16.0 | 0.06 | 0.25 | 0.18 | 0.37 | 0.80 | 1.00 | --- | --- |
| 65 | | 63.0 | 40.0 | 25.0 | --- | 0.15 | 0.07 | 0.22 | 0.45 | 0.60 | --- | --- |
| 80 | 40 | 100.0 | 63.0 | 40.0 | --- | --- | --- | --- | --- | --- | 0.25 | 0.40 |
| 100 | | 160.0 | 100.0 | 63.0 | --- | --- | --- | --- | --- | --- | 0.16 | 0.25 |
| 125 | | 250.0 | 160.0 | 100.0 | --- | --- | --- | --- | --- | --- | 0.08 | 0.15 |
| 150 | | 360.0 | 250.0 | 160.0 | --- | --- | --- | --- | --- | --- | 0.05 | 0.10 |

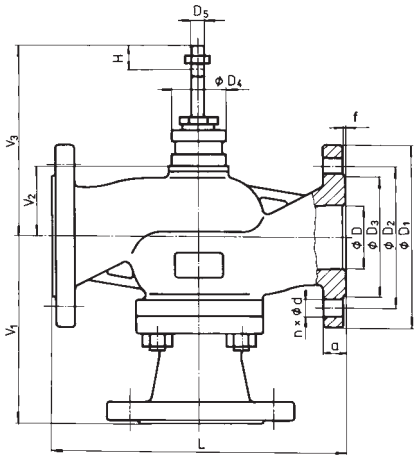
1) parabolic plug in straight way, V-ported plug in angle way
2) V-ported plug in angle way, in straight way for linear characteristic V-ported plug and for equal-percentage characteristic parabolic plug.

metal - version with metal - metal seat sealing
PTFE - version with metal - PTFE seat sealing (does not apply to contoured plugs)

Max. differential pressures specified in table apply to PTFE and O-ring packing. $\Delta p_{max}$ for bellows must be consulted with the producer.
Bellows packing can be used with V-ported plug only.
Max. differential pressure $\Delta p$ for valves PN 16 must be 1.6 MPa.

## Dimensions and weights for the type RV 2x5

| | PN 16 | | | | | PN 40 | | | | | PN 16, PN 40 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | $D_1$ | $D_2$ | $D_3$ | d | n | $D_1$ | $D_2$ | $D_3$ | d | n | D | f | $D_4$ | $D_5$ | L | $V_1$ | $V_2$ | #$V_2$ | $V_3$ | #$V_3$ | a | $m_1$ | $m_2$ | #$m_v$ |
| | mm | mm | mm | mm | | mm | mm | mm | mm | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | kg | kg | kg |
| 15 | 95 | 65 | 45 | 14 | 4 | 95 | 65 | 45 | 14 | 4 | 15 | 2 | 44 | 10 | 130 | 110 | 47 | --- | 143 | --- | 16 | 5.5 | 6 | --- |
| 20 | 105 | 75 | 58 | | | 105 | 75 | 58 | | | 20 | | | | 150 | 115 | 47 | --- | 143 | --- | 18 | 6.5 | 7 | --- |
| 25 | 115 | 85 | 68 | | | 115 | 85 | 68 | | | 25 | | | | 160 | 130 | 52 | 250 | 148 | 346 | 18 | 8.3 | 9.5 | 3.5 |
| 32 | 140 | 100 | 78 | 18 | | 140 | 100 | 78 | 18 | | 32 | | | | 180 | 135 | 52 | 250 | 148 | 346 | 20 | 10.5 | 12 | 3.5 |
| 40 | 150 | 110 | 88 | | | 150 | 110 | 88 | | | 40 | | | | 200 | 140 | 52 | 250 | 148 | 346 | 20 | 12 | 13.5 | 3.5 |
| 50 | 165 | 125 | 102 | | | 165 | 125 | 102 | | | 50 | | | | 230 | 175 | 72 | 270 | 168 | 366 | 20 | 17 | 24 | 3.5 |
| 65 | 185 | 145 | 122 | | 4 [1] | 185 | 145 | 122 | | 8 | 65 | | | | 290 | 180 | 72 | 270 | 168 | 366 | 22 | 22 | 31 | 3.5 |
| 80 | 200 | 160 | 138 | | 8 | 200 | 160 | 138 | | | 80 | | | 14 | 310 | 220 | 106 | 452 | 222 | 568 | 24 | 31 | 43 | 4.5 |
| 100 | 220 | 180 | 158 | | | 235 | 190 | 162 | 22 | | 100 | | | | 350 | 230 | 106 | 452 | 222 | 568 | 24 | 44 | 55 | 4.5 |
| 125 | 250 | 210 | 188 | | | 270 | 220 | 188 | 26 | | 125 | | | | 400 | 260 | 134 | 480 | 250 | 596 | 26 | 65 | 90 | 5 |
| 150 | 285 | 240 | 212 | 22 | | 300 | 250 | 218 | | | 150 | | | | 480 | 290 | 134 | 480 | 250 | 596 | 28 | 94 | 120 | 5 |




[1] with regard of the standard previously in force, there is an option to have the number of connection bolts as stipulated in ČSN-EN 1092-1
[#] - for valve with bellows packing
$m_v$ - weight to be added to weight of valve equipped with bellows packing
$m_1$ - for valves RV 215
$m_2$ - for valves RV 225 and RV 235

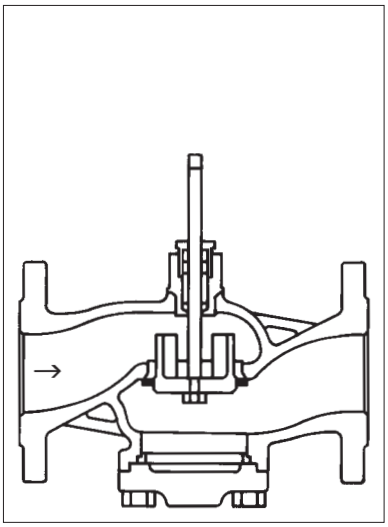
# Valve complete specification No. for ordering RV / HU 2x1, RV / HU 2x3, RV 2x5

| | | XX | X X X | X X X | X X X X | X X | - | XX | / | XXX | - | XXX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Valve | Control valve | RV | | | | | | | | | | |
| | Fail-safe action valve | HU | | | | | | | | | | |
| 2. Series | Valves made of sph. cast iron EN-JS 1025 | | 2 1 | | | | | | | | | |
| | Valves made of cast steel 1.0619, 1.7357 | | 2 2 | | | | | | | | | |
| | Valves made of stainless steel 1.4581 | | 2 3 | | | | | | | | | |
| | Reverse valve | | 1 | | | | | | | | | |
| | Pressure-balanced, reverse valve | | 3 | | | | | | | | | |
| | Mixing (diverting), reverse valve | | 5 | | | | | | | | | |
| 3. Actuating | Electric actuator | | | E | | | | | | | | |
| [1] *Fail-safe action actuators* | Electrohydraulic actuator | | | H | | | | | | | | |
| | SQX 32.00, SQX 32.03, SQX 82.00, SQX 82.03 | | | E L A | | | | | | | | |
| | SQX 62 | | | E L B | | | | | | | | |
| | SKD 32.50, SKD 82.50, SKD 82.8, SKD 62.9 | | | H L A | | | | | | | | |
| | SKD 32.51, SKD 32.21, SKD 82.51 [1] | | | H L B | | | | | | | | |
| | SKD 62, SKD 62U [1] | | | H L C | | | | | | | | |
| | SKB 32.50, SKB 82.50, SKB 62.9 | | | H L D | | | | | | | | |
| | SKB 32.51, SKB 82.51 [1] | | | H L E | | | | | | | | |
| | SKB 62, SKB 62U [1] | | | H L F | | | | | | | | |
| | SKC 32.60, SKC 82.60, SKC 62.9 | | | H L G | | | | | | | | |
| | SKC 32.61, SKC 82.61 [1] | | | H L H | | | | | | | | |
| | SKC 62, SKC 62U [1] | | | H L I | | | | | | | | |
| | | | | | | | | | | | | |
| 4. Connection | Raised flange | | | | 1 | | | | | | | |
| | Female flange | | | | 2 | | | | | | | |
| 5. Body material | Cast steel 1.0619 (-20 to 400°C) | | | | 1 | | | | | | | |
| | Sphr. cast iron EN-JS 1025 (-20 to 300°C) | | | | 4 | | | | | | | |
| | CrMo steel 1.7357 (-20 to 500°C) | | | | 7 | | | | | | | |
| *(Operating temperature ranges* | Stainless steel 1.4581 (-20 to 400°C) | | | | 8 | | | | | | | |
| *are specified in parentheses)* | Other material on request | | | | 9 | | | | | | | |
| 6. Seat sealing | Metal - metal | | | | 1 | | | | | | | |
| [3] *From DN 25; $t_{max}$ = 260°C* | Soft sealing (metal - PTFE) in straight way [2] | | | | 2 | | | | | | | |
| | Hard metal overlay on sealing surfaces | | | | 3 | | | | | | | |
| 7. Packing | O - ring EPDM | | | | 1 | | | | | | | |
| | DRSpack® (PTFE) | | | | 3 | | | | | | | |
| | Bellows | | | | 7 | | | | | | | |
| | Bellows with safety PTFE packing | | | | 8 | | | | | | | |
| 8. Flow characteristic | Linear | | | | | L | | | | | | |
| [4] *Not applicable to RV 2x5* | Equal-percentage in straight way | | | | | R | | | | | | |
| | LDMspline® [3] | | | | | S | | | | | | |
| | Parabolic [3] | | | | | P | | | | | | |
| | Linear - perforated plug [3] | | | | | D | | | | | | |
| | Equal-percentage - perforated plug [3] | | | | | Q | | | | | | |
| | Parabolic - perforated plug [3] | | | | | Z | | | | | | |
| 9. Kvs | Column No. acc. to Kvs values table | | | | | X | | | | | | |
| 10. Nominal pressure PN | PN 16 | | | | | | | 16 | | | | |
| | PN 40 | | | | | | | 40 | | | | |
| 11. Max. operating temp. °C | O - ring EPDM | | | | | | | | | 140 | | |
| [5] *Not applicable to RV / HU 2x3* | DRSpack® (PTFE), bellows | | | | | | | | | 220 | | |
| | DRSpack® (PTFE), bellows | | | | | | | | | 260 | | |
| | Bellows [4] | | | | | | | | | 300 | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 12. Nominal size DN | DN | | | | | | | | | | | XXX |

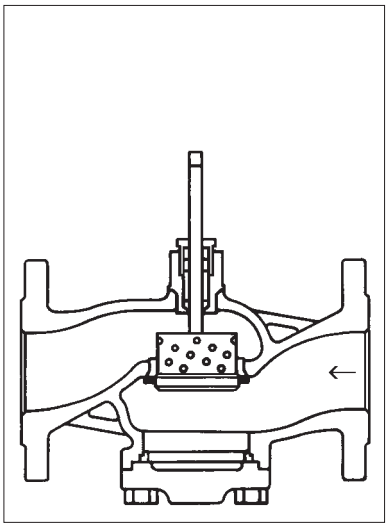
**Ordering example:** Two-way control valve DN 65, PN 40, with Siemens actuator (Landis & Staefa) SKB 32.50, body material: spheroidal cast iron, flange with raised face, metal-metal seat sealing, PTFE packing, linear characteristic, Kvs = 63 $m^3$/hour is specified as follows: **RV 211 HLD 1413 L1 40/220-65**

## Valves RV / HU 2x1

Section of valve with V-ported plug

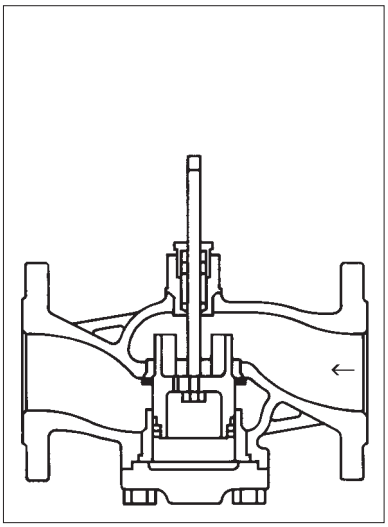


Section of valve with perforated plug

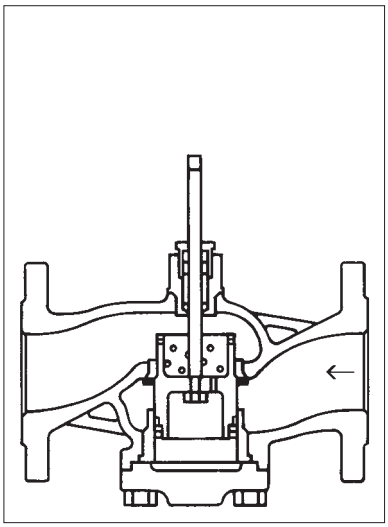


## Valves RV / HU 2x3

Section of pressure-balanced valve with V-ported plug

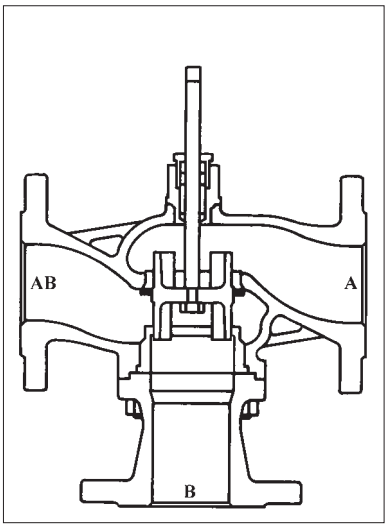


Section of pressure-balanced valve with perforated plug



## Valves RV 2x5

Section of three-way valve with V-ported plug




# ELA

## Electric actuators
## SQX 32..., SQX 82...
## Siemens (Landis & Staefa)

## Technical data

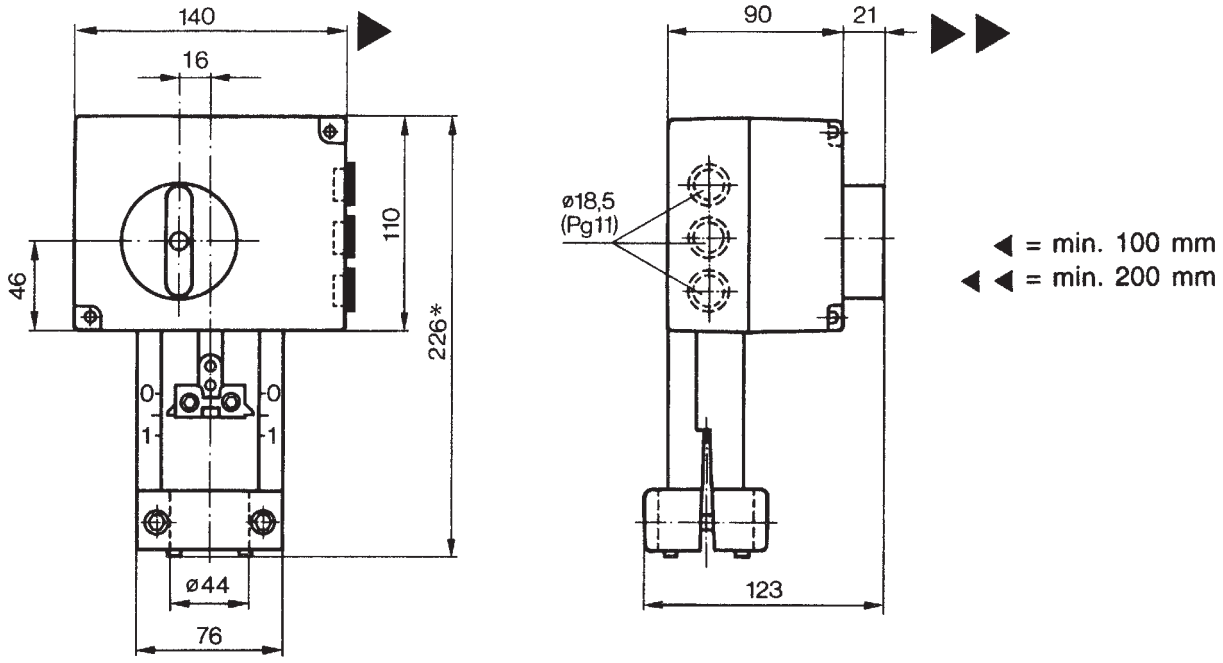
| | | | | |
|---|---|---|---|---|
| | SQX 32.00 | SQX 32.03 | SQX 82.00 | SQX 82.03 |
| | ELA | | | |
| | 230 V | | 24 V | |
| | 50...60 Hz | | | |
| | 3 VA | 6,5 VA | 3 VA | 6,5 VA |
| | 3 - position control | | | |
| | 150 s | 35 s | 150 s | 35 s |
| | 700 N | | | |
| | 20 mm | | | |
| | IP 54 | | | |
| | 140°C (180°C when bellows or cooler is used) | | | |
| | -15 to 50°C | | | |
| | 5 to 95 % | | | |
| | 1,5 kg | | | |

## Accessories

| | |
|---|---|
| 1 potentiometer and 1 auxiliary switch ASZ7.4 | 0...1000 Ω |
| 1 pair of auxiliary switches ASC9.4 | |
| 1 auxiliary switch ASC9.5 | |

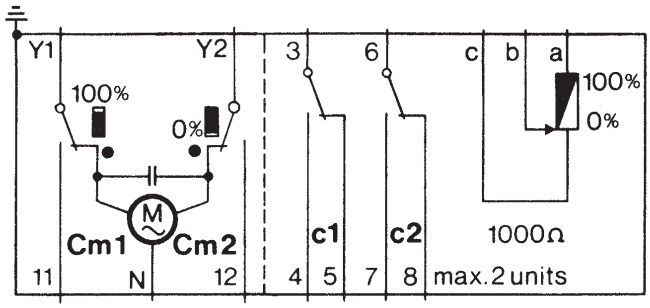
*Note : 1 piece of accessory can be installed in actuator only. With nominal stroke of actuator of 20 mm, the real range of potentiometer can be lower by even 25 %.*

## Dimensions of actuator

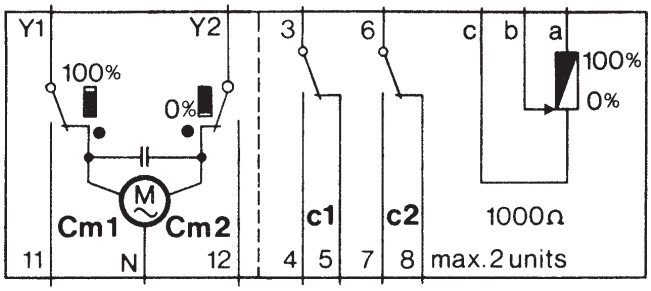


## Wiring diagrams of actuators

SQX 32...




SQX 82...




| | |
|---|---|
| Cm1 | end switch |
| Cm2 | end switch |
| c1 | auxiliary switch ASC9.5 |
| c1,c2 | pair of auxiliary switches ASC9.4 |
| c1,1000 Ω | auxiliary switch and potentiometer as a set ASZ7.4 |

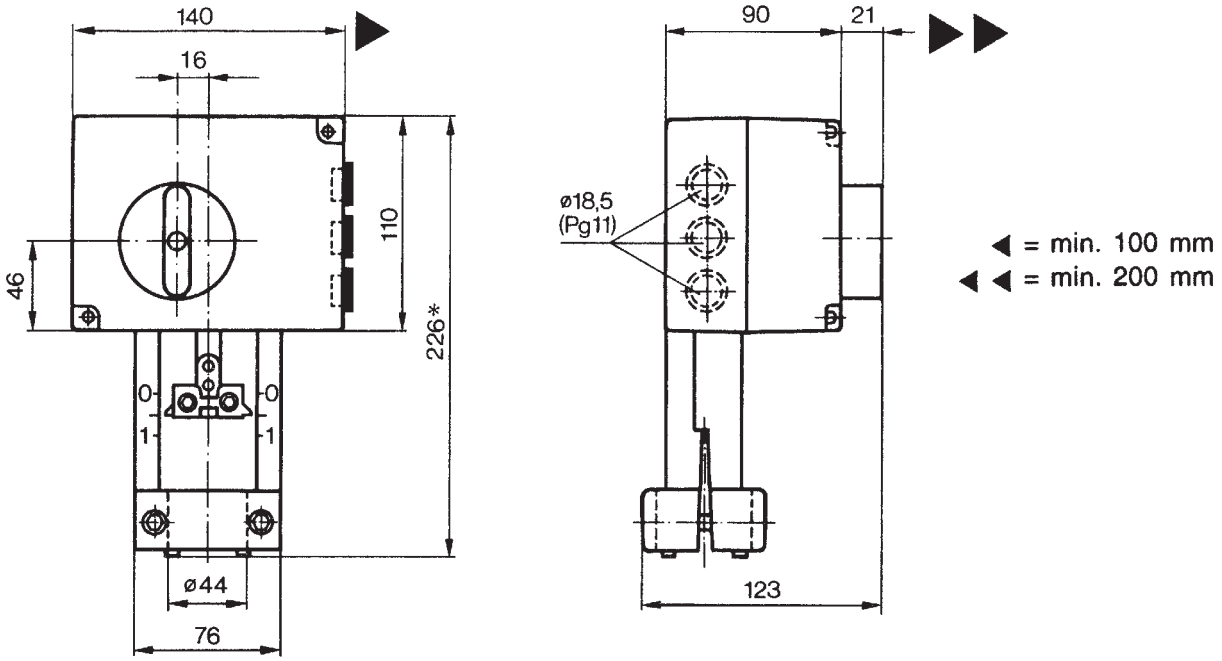
# ELB


**Electric actuators**
**SQX 62**
**Siemens (Landis & Staefa)**

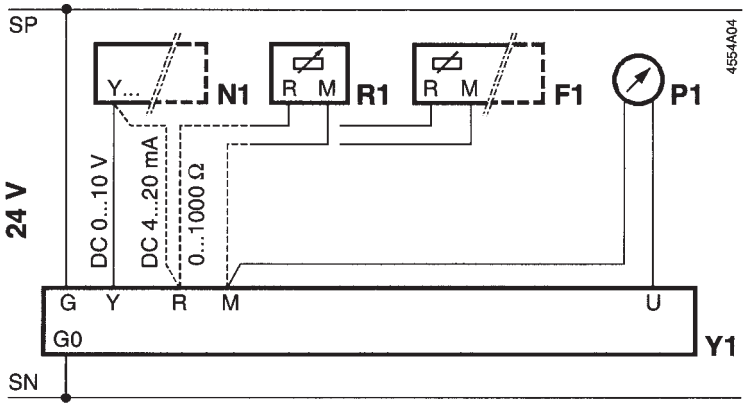
## Technical data

| | |
|---|---|
| Type | SQX 62 |
| Mark in valve spec. No. | ELB |
| Voltage | 24 V |
| Frequency | 50...60 Hz |
| Power consumption | 6,5 VA |
| Control | 0...10 V; 4 - 20 mA |
| Open-close running time | 35 s |
| Nominal force | 700 N |
| Travel | 20 mm |
| Enclosure | IP 54 |
| Process medium max. temperature | 140℃ (180˚C when bellows or cooler is used) |
| Ambient temp. range | -15 to 50℃ |
| Ambient humidity limit | 0 to 95 % of relative humidity |
| Weight | 1,6 kg |

## Dimensions of actuator

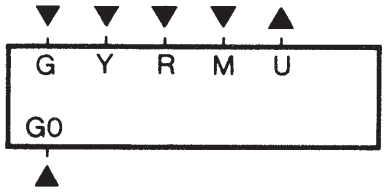


## Wiring diagram of actuator SQX 62




Y1 actuator SQX62...
N1 positioner
F1 anti-frost thermostat with feedback of 0...1000Ω (switch DIL No.2 switched to “1000Ω” position)
P1 position indicator
R1 position transmitter with feedback of 0...1000Ω (switch DIL No.2 switched to “1000Ω” position)

Terminal on terminal board




G, G0 AC 24 V feeding voltage
G - system potential (SP)
G0 - system neutral (SN)
Y control input signal DC 0...10 V
R control input signal DC 4...20 mA or 0...1000 Ω (type of signal is selected by switch DIL No.2)
M measuring neutral
U feedback DC 0...10 V if there is DC 0...10 V or R = 0...1000Ω on Y terminal (maximum availability from both signals), or feedback DC 4...20 mA if there is DC 4...20 mA on R terminal

# HLA
# HLB

## Electrohydraulic actuators SKD 32..., SKD 82... Siemens (Landis & Staefa)

## Technical data

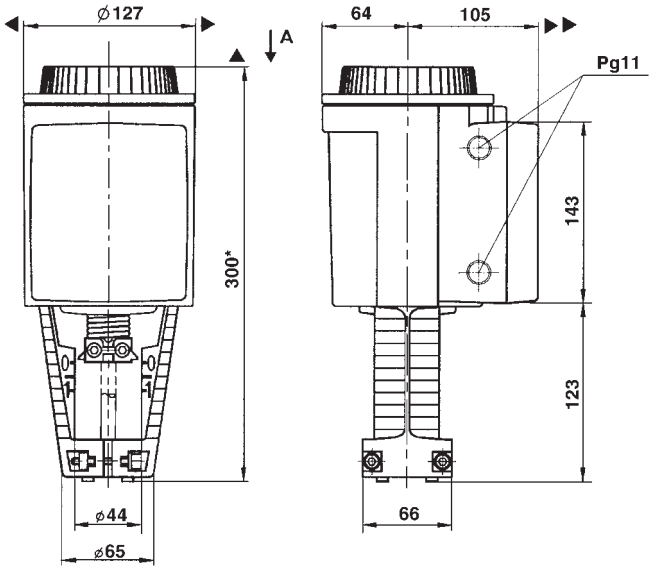
| Type | SKD 32.50 | SKD 82.50 | SKD 32.51 | SKD 32.21 | SKD 82.51 |
|---|---|---|---|---|---|
| Mark in valve spec. No. | HLA | | HLB | | |
| Voltage | 230 V | 24 V | 230 V | | 24 V |
| Frequency | 50...60 Hz | | | | |
| Power consumption | 10 VA | | 15 VA | | |
| Control | 3 - position | | 3 - position | | |
| Running time open | 120 s | | 120 s | 30 s | 120 s |
| closed | 120 s | | 120 s | 10 s | 120 s |
| Fail-safe action time | --- | | 8 s | | |
| Nominal force | 1000 N | | | | |
| Travel | 20 mm | | | | |
| Enclosure | IP 54 | | | | |
| Process medium max. t. | 140°C (180°C when bellows or cooler is used) | | | | |
| Ambient and actuator´s surface temp. limit | -15 to 50°C | | | | |
| Ambient humidity limit | 5 - 95 % of relative humidity | | | | |
| Weight | 3,6 kg | | | | |

## Accessories

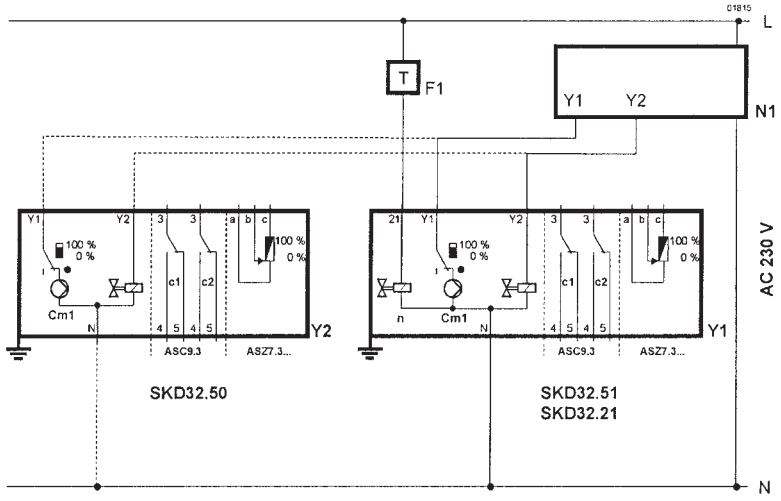
| |
|---|
| Pair of auxiliary switches ASC9.3 |
| Potentiometer 1000 Ω ASZ7.3 *) |
| Potentiometer 135 Ω ASZ7.31 *) |
| Potentiometer 200 Ω ASZ7.32 *) |

*) *1 potentiometer can be used for 1 actuator only*

## Dimensions of actuator

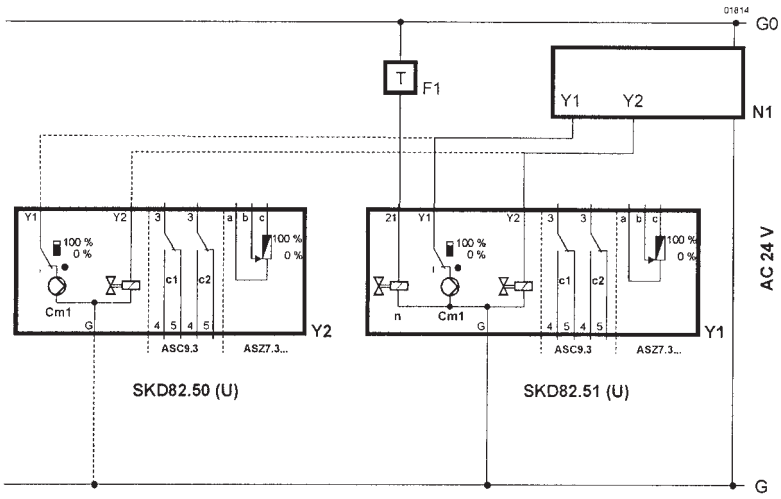


## Wiring diagram of actuator SKD 32...




| | |
|---|---|
| F1 | safety thermostat |
| N1 | regulator |
| Y1/2 | actuators |
| C1/2 | switches |
| Cm1 | end switch |
| ASC9.3 | double auxiliary switch |
| ASZ7.3... | potentiometer |
| L | phaseGsystem potential (SP) |
| G0 | system neutral (SN) |
| N | zero |
| Y1 | opening of control valve |
| Y2 | closing of control valve |
| 21 | fail-safe function |

## Wiring diagram of actuator SKD 82...




| | |
|---|---|
| F1 | safety thermostat |
| N1 | regulator |
| Y1/2 | actuators |
| C1/2 | switches |
| Cm1 | end switch |
| ASC9.3 | double auxiliary switch |
| ASZ7.3... | potentiometer |
| G | system potential (SP) |
| G0 | system neutral (SN) |
| N | zero |
| Y1 | opening of control valve |
| Y2 | closing of control valve |
| 21 | fail-safe function |

# HLA
# HLC

## Electrohydraulic actuators SKD 60 and SKD 62... Siemens (Landis & Staefa)

## Technical data

| Type | SKD 60 | SKD 62 | SKD 62UA *) |
|---|---|---|---|
| Mark in valve spec. No. | HLA | HLC | |
| Voltage | 24 V | | |
| Freqency | 50...60 Hz | | |
| Power consumption | 17 VA / 12 VA | | |
| Control | 0 - 10 V, 4 - 20 mA, 0 - 1000Ω | | |
| Running time open | 30 s | | |
| closed | 15 s | | |
| Fail-safe action time | --- | 15 s | |
| Nominal force | 1000 N | | |
| Travel | 20 mm | | |
| Enclosure | IP 54 | | |
| Process medium max. t. | 140°C (180°C when bellows or cooler is used) | | |
| | -15 to 50°C | | |
| | | | |
| Weight | 3,6 kg | 3,85 kg | 3,6 kg |

*) *UA... version with improved electronics*

## Accessories

Auxiliary switch 24 V ASC1.6

## Description

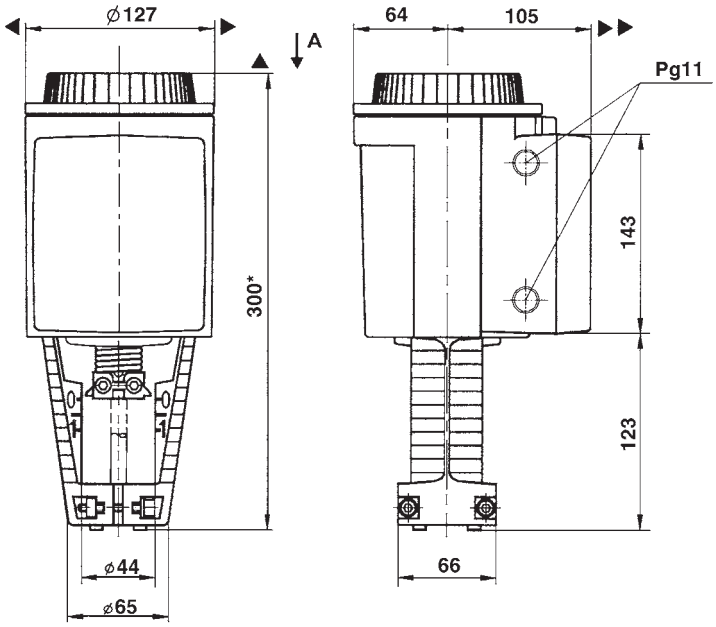
Each actuator with continuous control signal is equipped with ACT control technology enabling the following features as standard:

- stroke range calibration
- state indication via LED
- flow characteristic selection (log / lin)
- selection of control signal at Y terminal
- feedback signal at U terminal corresponding to control signal at Y terminal
- forced control at Z terminal

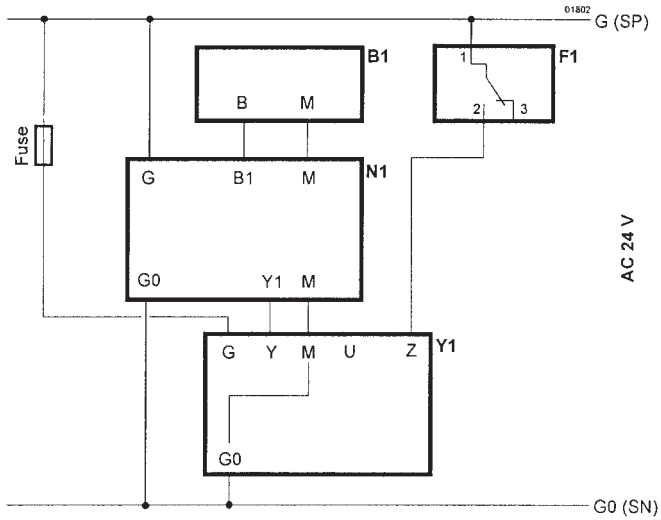
Version with improved electronics (UA) further enables:

- inversion of control signal
- sequence control
- stroke limiting

## Dimensions of actuator

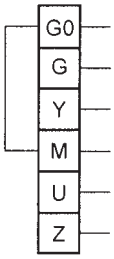


## Wiring diagram of actuators



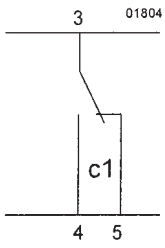

| | |
|---|---|
| B1 | sensor |
| F1 | safety thermostat |
| N1 | regulator |
| Y1 | actuator |

Connection terminals




- Voltage AC 24 V: System neutral (SN)
- Voltage AC 24 V: System potential (SP)
- Control input DC 0...10 (30) V or DC 4...20 mA
- Measuring neutral (=G0)
- Output for measuring voltage DC 0...10 V or DC 4...20 mA
- Input for forced control

Auxiliary contact ASC1.6



# HLD, HLE
# HLG, HLH

## Electrohydraulic actuators
## SKB 32..., SKB 82...
## SKC 32..., SKC 82...
## Siemens (Landis & Staefa)

## Technical data

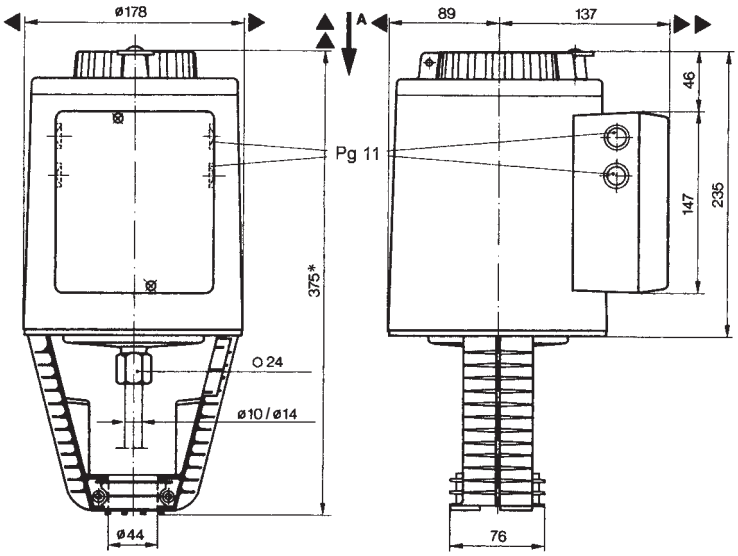
| Type | SKB 32.50 | SKB 82.50 | SKB 32.51 | SKB 82.51 | SKC 32.60 | SKC 82.60 | SKC 32.61 | SKC 82.61 |
|---|---|---|---|---|---|---|---|---|
| Mark in valve spec. No. | HLD | | HLE | | HLG | | HLH | |
| Voltage | 230 V | 24 V | 230 V | 24 V | 230 V | 24 V | 230 V | 24 V |
| Frequency | 50...60 Hz | | | | | | | |
| Power consumption | 10 VA | | 15 VA | | 19 VA | | 24 VA | |
| Control | 3 - position | | | | | | | |
| Running time open | 120 s | | 120 s | | 120 s | | 120 s | |
| closed | 120 s | | 120 s | | 120 s | | 120 s | |
| Fail-safe action time | --- | | 10 s | | --- | | 18 s | |
| Nominal force | 2800 N | | | | | | | |
| Travel | 20 mm | | | | 40 mm | | | |
| Enclosure | IP 54 | | | | | | | |
| Process medium max.t. | 220°C (higher temperature with Bellows only) | | | | | | | |
| Ambient and actuator´s surface temperature range | -15 to 50°C | | | | | | | |
| Ambient humidity range | 0 - 95 % relative humidity | | | | | | | |
| Weight | 8,4 kg | | 8,9 kg | | 10 kg | | 10,5 kg | |

## Accessories

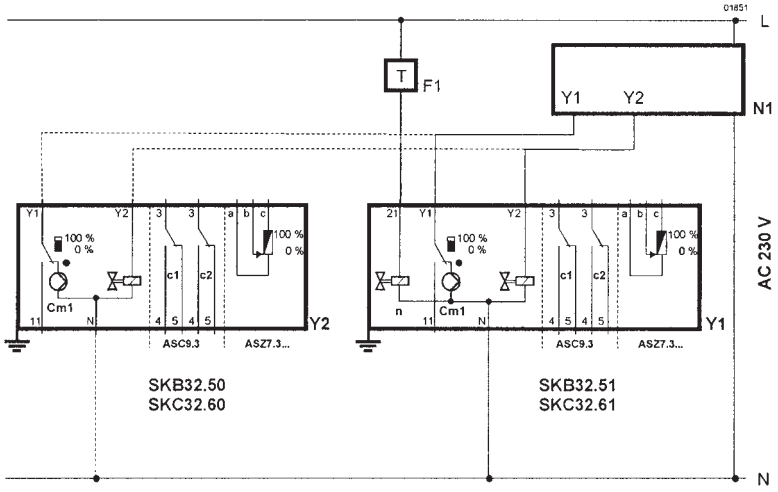
| |
|---|
| Pair of auxiliary switches ASC9.3 |
| Potentiometer 1000 Ω ASZ7.3 *) |
| Potentiometer 135 Ω ASZ7.31 *) |
| Potentiometer 200 Ω ASZ7.32 *) |

*) *1 potentiometer can be used for 1 actuator only*

## Dimensions of actuator

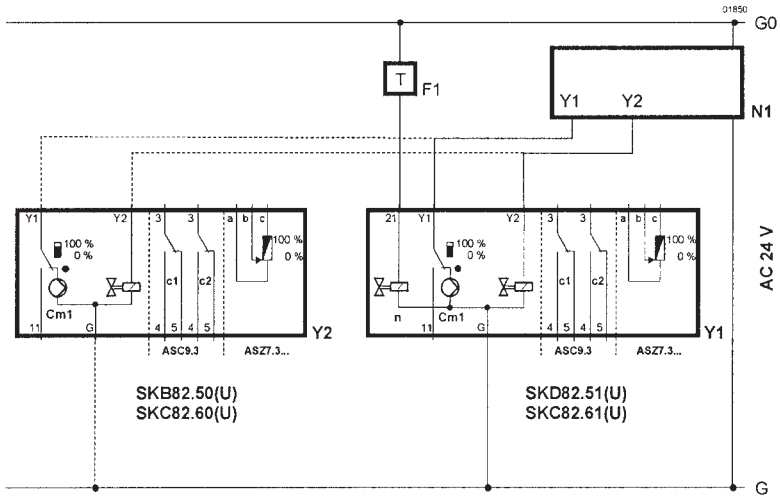


## Wiring diagram of actuators SKB 32..., SKC 32...




| | |
|---|---|
| F1 | safety thermostat |
| N1 | regulator |
| Y1/2 | actuators |
| C1/2 | switches |
| Cm1 | end switch |
| ASC9.3 | double auxiliary switch |
| ASZ7.3... | potentiometer |
| L | phaseGsystem potential (SP) |
| G0 | system neutral (SN) |
| N | zero |
| Y1 | opening of control valve |
| Y2 | closing of control valve |
| 11 | control signal of sequence |
| 21 | fail-safe function |

## Wiring diagram of actuators SKB 82..., SKC 82...




| | |
|---|---|
| F1 | safety thermostat |
| N1 | regulator |
| Y1/2 | actuators |
| C1/2 | switches |
| Cm1 | end switch |
| ASC9.3 | double auxiliary switch |
| ASZ7.3... | potentiometer |
| G | system potential (SP) |
| G0 | system neutral (SN) |
| N | zero |
| Y1 | opening of control valve |
| Y2 | closing of control valve |
| 11 | control signal of sequence |
| 21 | fail-safe function |

# HLD, HLF
# HLG, HLI

## Electrohydraulic actuators
## SKB 60 and SKB 62...
## SKC 60 and SKC 62...
## Siemens (Landis & Staefa)

## Technical data

| Type | SKB 60 | SKB 62 | SKB 62UA *) | SKC 60 | SKC 62 | SKC 62UA *) |
|---|---|---|---|---|---|---|
| Mark in valve spec. No. | HLD | HLF | | HLG | HLI | |
| Voltage | 24 V | | | | | |
| Frequency | 50...60 Hz | | | | | |
| Power consumption | 13 VA | 17 VA | | 24 VA | 28 VA | |
| Control | 0 - 10 V, 4 - 20 mA, 0 - 1000Ω | | | | | |
| Running time open | 120 s | | | 120 s | | |
| closed | 15 s | | | 20 s | | |
| Fail-safe action time | --- | 15 s | | --- | 20 s | |
| Nominal force | 2800 N | | | | | |
| Travel | 20 mm | | | 40 mm | | |
| Enclosure | IP 54 | | | | | |
| Process medium max.t. | 220°C (higher temperature with Bellows only) | | | | | |
| Ambient and actuator´s surface temperature range | -15 to 55°C | | | | | |
| Ambient humidity range | 0 - 95 % relative humidity | | | | | |
| Weight | 8,6 kg | | | 10 kg | | |

*) *UA ... version with improved electronics*

## Accessories

Auxiliary switch 24 V ASC1.6

## Description

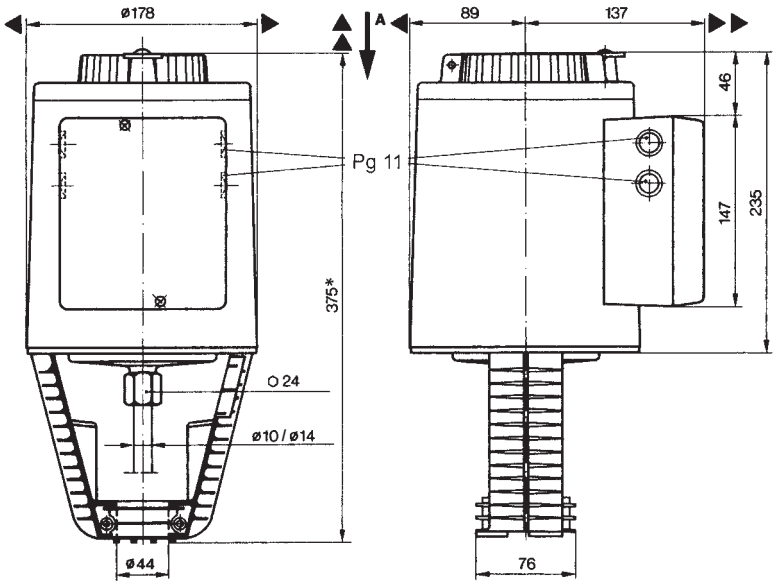
Each actuator with continuous control signal is equipped with ACT control technology enabling the following features as standard:

- stroke range calibration
- state indication via LED
- flow characteristic selection (log / lin)
- selection of control signal at Y terminal
- feedback signal at U terminal corresponding to control signal at Y terminal
- forced control at Z terminal

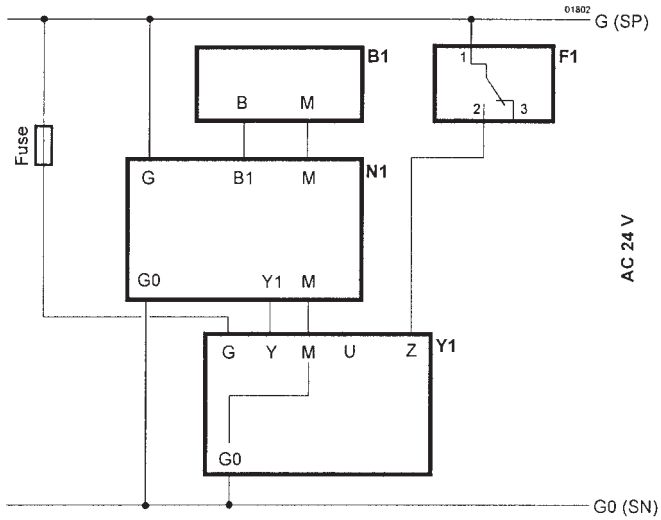
Version with improved electronics (UA) further enables:

- inversion of control signal
- sequence control
- stroke limiting

## Dimensions of actuator

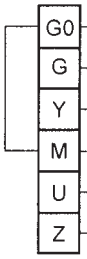


## Wiring diagram of actuators



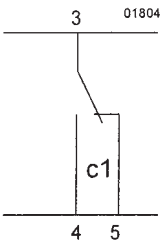

| | |
|---|---|
| B1 | sensor |
| F1 | safety thermostat |
| N1 | regulator |
| Y1 | actuator |

Connection terminals




- Voltage AC 24 V: System neutral (SN)
- Voltage AC 24 V: System potential (SP)
- Control input DC 0...10 (30) V or DC 4...20 mA
- Measuring neutral (=G0)
- Output for measuring voltage DC 0...10 V or DC 4...20 mA
- Input for forced control

Auxiliary contact ASC1.6



## Maximal permissible operating pressures [MPa]

| Material | PN | Temperature [ °C ] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 120 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 525 | 550 |
| Brass | 16 | 1,60 | 1,14 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 42 3135 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Grey cast iron EN-JL 1040 | 16 | 1,60 | 1,44 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (EN-GJL-250) | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Spher.cast iron EN-JS 1025 | 16 | 1,50 | 1,40 | 1,40 | 1,30 | 1,10 | --- | --- | --- | --- | --- | --- |
| (EN-GJS-400-18-LT) | 40 | 4,00 | 3,88 | 3,60 | 3,48 | 3,20 | --- | --- | --- | --- | --- | --- |
| Cast steel 1.0619 | 16 | 1,60 | 1,50 | 1,40 | 1,30 | 1,10 | 1,00 | 0,80 | --- | --- | --- | --- |
| (GP240GH) | 40 | 4,00 | 4,00 | 3,90 | 3,60 | 3,20 | 2,70 | 1,90 | --- | --- | --- | --- |
| Chrommolybden steel | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.7357 (G17CrMo5-5) | 40 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 3,90 | 3,10 | 1,80 | --- | --- |
| Stainless steel 1.4581 | 16 | 1,60 | 1,50 | 1,40 | 1,30 | 1,30 | 1,20 | 1,20 | --- | --- | --- | --- |
| (GX5CrNiMoNb19-11-2) | 40 | 4,00 | 3,80 | 3,50 | 3,40 | 3,30 | 3,10 | 3,00 | --- | --- | --- | --- |