



SKV 3400-3

3 Way Feedwater Control Valve

Installation, Operating and Maintenance Instructions



Safety Notes

General Information

Installation

Wiring

Maintenance

Spare Parts

Technical Assistance

Local regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change
the specification without notice.

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EN
ENGLISH

1. Safety Notes

1.1 Intended Use

The Vira SKV 3400-3 Three-way Valve in combination with an electrical actuator, is designed as a diverting valve for use in process engineering and industrial applications. The valve with its actuator is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the control valve is only used in operating conditions that meet the specifications used for sizing the valve at the ordering stage. In case operators intended to use the control valve in other applications or conditions than specified, contact Vira does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

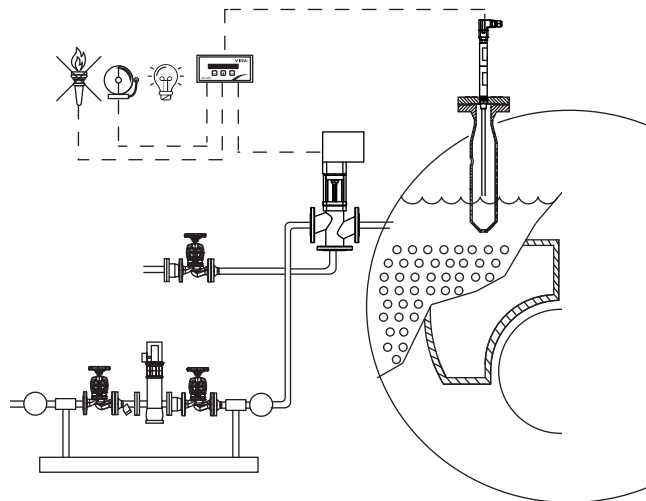


Figure 1 : 3 Way Control Valve System Application
(3 Step Motor with 0-1000 Ohm Potentiometer Feedback)

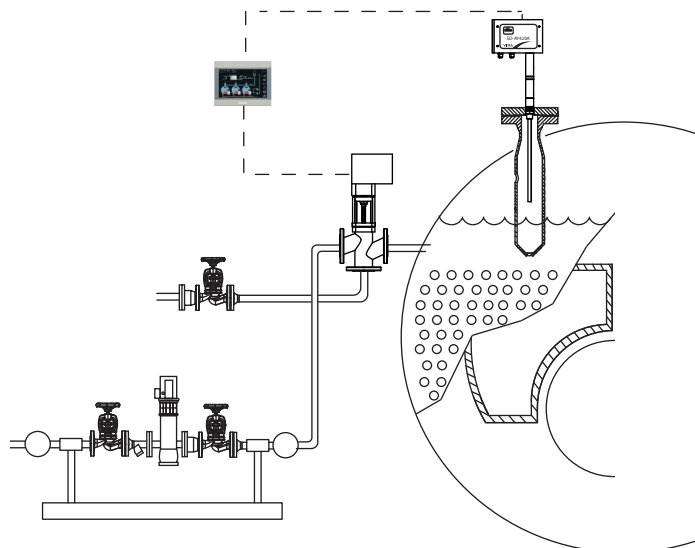


Figure 2 : 3 Way Control Valve System Application with
4-20 mA Control Signal and Feedback



Danger!

Risk of bursting in pressure equipment.

Valves and pipelines are pressure equipment. Impermissible pressure or improper opening can lead to valve components bursting.

- Observe the maximum permissible pressure for valve and plant.
- Before starting any work on the control valve, depressurize all plant sections affected as well as the valve.
- Drain the process medium from all the plant sections concerned as well as the valve.



Tools

Before starting work, make sure that you have suitable tools and consumables available. Use only genuine Vira replacement parts.



Temperature

After isolation, let the temperature to cool down to avoid danger of burns.



Freezing

Required precautions must be taken to protect products in environments where they may be exposed to temperatures below freezing point.



Pressure

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Do not assume that the system has depressurized even when the pressure gauge indicates zero. exposed to temperatures below freezing point.



Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.



Residual Hazards

The external surface of the product may be very hot. Take essential care when removing the product from an installation.



Hazardous Environment

Plant rooms are explosion-risk areas. There may be a lack of oxygen, dangerous gases, extremes of temperature, hot surfaces, fire hazards excessive noise, and moving machinery.



Protective Clothing

In order to be protected against the hazards of chemicals, high temperature, radiation, noise, falling objects, and dangers to eyes and face, anyone around requires protective clothing suitable in the plant room.



Supervision

All work must be carried out or supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Operation Instructions.



Disposal

Unless otherwise stated in the Installation and Operation Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.



Returning Products

When returning products to “Vira Isı ve Endüstriyel Ürünler A.Ş” the customers must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

Diverting service

Flow control $Q = 0$ to 100 %

Heating with diverting valve (FA) or cooling with diverting valve (FE)

Installation in return flow pipe

Installation in flow pipe

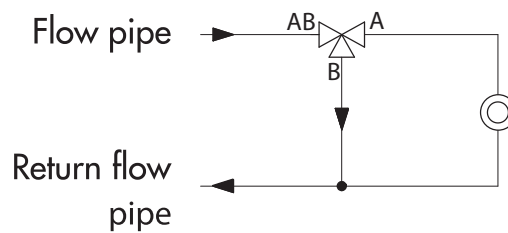
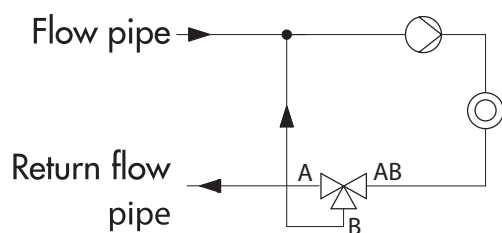
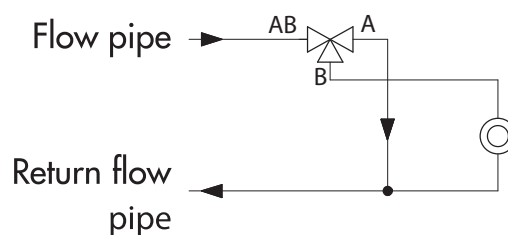
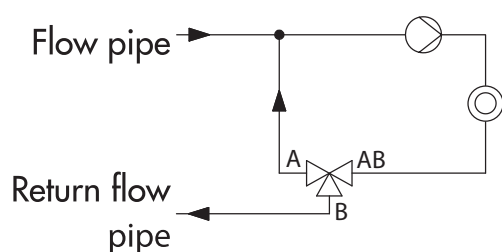


Table 1 : Typical installations

Warning!

Risk of personal injury through incorrect operation, use or installation as a result of information on the valve being illegible.

Over time, markings, labels and nameplates on the valve may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed.

There is a risk of personal injury.

- ➔ Keep all relevant markings and inscriptions on the device in a constantly legible state.
- ➔ Immediately renew damaged, missing or incorrect nameplates or labels.

NOTICE

Risk of valve damage due to contamination (e.g. solid particles) in the pipeline.

The plant operator is responsible for cleaning the pipelines in the plant.

- ➔ Flush the pipelines before start-up.

Risk of valve damage due to unsuitable medium properties.

The valve is designed for a process medium with defined properties.

- ➔ Only use the process medium specified for sizing.

Risk of leakage and valve damage due to excessively high or low tightening torques.

Observe the specified torques when tightening control valve components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

2. Markings on the device

2.1 Valve nameplate

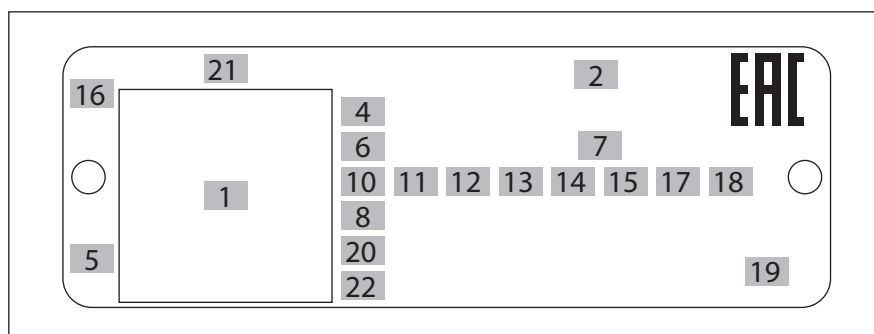


Figure 3 : Inscriptions on the valve nameplate

Item	Inscription meaning	Item	Inscription meaning
1	Data matrix code	19	CE marking
2	Type Designation	20	ID of the notified body
4	Material		PED: Pressure Equipment Directive
5	Month and year of manufacture		G1/G2: gases and vapors Fluid group 1 = hazardous Fluid group 2 = other
6	Valve size: DIN: DN . ANSI: NPS . JIS: DN		L1: liquids Fluid group 1 = hazardous Fluid group 2 = other
7	Pressure rating: DIN: PN . ANSI: CL . JIS: K		I/II/III/ : Category 1 to 3
8	Order number/item	21	Serial number
10	Flow coefficient: DIN: KVS . ANSI: CV	22	NE 53 (NAMUR Recommendation)
11	Characteristic: LN: linear. NO/NC: on/off service		
12	Seat-plug seal: ME: Metal seal . ST: Metal base material with Stellite facing. PT: PTFE soft seal. PK: PEEK soft seal		
13	Seat code (trim material): on request		
14	Pressure balancing: DIN: D . ANSI/JIS: B Version: M: mixing valve. V: flow-diverting valve		
15	Not assigned		
16	Country of origin		
17	Not assigned		
18	Not assigned		

Table 2: Inscriptions on the valve nameplate

2.2 Actuator Nameplate

2.2.1 3 Step Motor Actuator Nameplate

The nameplate shown was up to date at the time of publication of this document.
The name plate on the device may differ from the one shown.

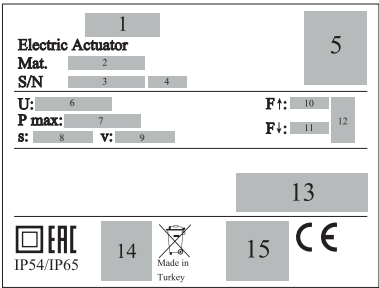


Figure 4 : 3 step motor nameplate

- 1 Type designation

2 Meterial number

3 Serial number

4 Data of manufacture

5 Data matrix code

6 Supply voltage; power line frequency

7 Power consumption

8 Rated travel

9 Stroking speed

10 Thrust (actuator stem retracts)

11 Thrust (actuator stem extends)

12 Fail-safe action
- 13 Additional electrical equipment

14 Testing according to DIN EN 14597

15 Other mark of conformity
- Retracts

or

Extends

2.2.2 Actuator with Positioner Nameplate

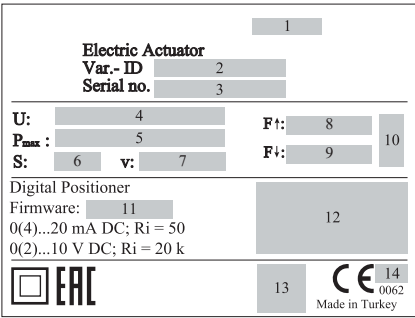


Figure 5 : Nameplate of Actuator with Posiitoner

- 1 Type

2 Cnfiguration ID

3 Serial number

4 Supply voltage; power line frequency

5 Power consumption

6 Rated travel

7 Stroking speed

8 Thrust (actuator stem retracts)

9 Thrust (stem extends)

10 Fail-safe action

11 Firmware version
- 12 Limit contacts

13 Testing according to DIN EN 14597

14 Year
- Mechanical limit contacts

Electronic limit contacts
- Retracts

or

Extends

3. Design and principle of operation

3.1 Design and Principle of Operation of SKV 3400-3 Diverting Valve

Vira SKV 3400 is a three-way diverting valve used as mostly feedwater control valve. The SKV-3400-3 three-way valve is combined with electrical actuators. It can also be combined with different actuators.

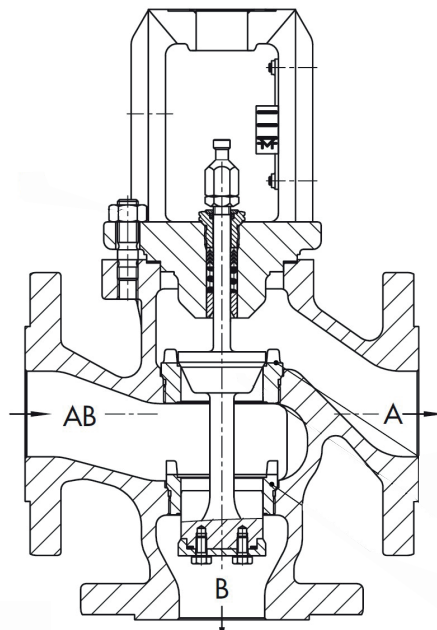


Figure 6 : 3-way Control Valve (Diverting Type)

3.2 Design and Principle of Operation of Electrical Actuator with 3 Step Signal

The Electric Actuator is used in industrial plants as well as in heating, ventilation and air-conditioning systems. The actuator is a linear actuator which is controlled by a three-step signal. It is suitable for form-fit attachment to various ViRA valve series, depending on the version with or without fail-safe action.

3.3 Design and Principle of Operation of Electrical Actuator with 4-20 mA Positioner

The Electric Actuator is used in industrial plants as well as in heating, ventilation and air-conditioning systems. The actuator is a linear actuator. It is suitable for form-fit attachment to various ViRA valve series, depending on the version with or without fail-safe action. The Actuator is optionally available with either integrated yoke or using an M30x1.5 ring nut including the necessary stem connecting parts.



Figure 7 : Construction with integrated yoke



Figure 8 :Construction for mounting with ring nut

3.1 Versions

With insulating section/bellows seal

The modular design allows an insulating section or bellows seal to be fitted to the standard valve version.

3.2 Additional fittings

Strainers

We recommend installing a strainer upstream of the valve. It prevents solid particles in the process medium from damaging the valve. We recommend installing a shutoff valve both upstream of the strainer and downstream of the valve and installing a bypass line. The bypass ensures that the plant does not need to be shut down for service and repair work on the valve.

Test connection

Versions with bellows seal fitted with a test connection (G 1/8) at the top flange allow the sealing ability of the bellows to be monitored. Particularly for liquids and vapors, we recommend installing a suitable leakage indicator (e.g. a contact pressure gauge, an outlet to an open vessel or an inspection glass).

Safety guard

For operating conditions that require increased safety (e.g. in cases where the valve is freely accessible to untrained staff), a safety guard must be installed to rule out a crush hazard arising from moving parts (actuator and plug stem). Plant operators are responsible for deciding whether a guard is to be used. The decision is based on the risk posed by the plant and its operating conditions.

3.4 Technical Data of SKV 3400-3 Diverting Valve

The nameplates on the valve and actuator provide information on the control valve version.

See the 'Markings on the device' section

Conformity

The Type SKV 3400-3 valve bears the CE, UKCA and EAC mark of conformity



Temperature range

Depending on the version, the control valve is designed for a temperature range from -10 to $+220$ °C (14 to 428 °F). The use of an insulating section or bellows seal can extend the temperature range from -196 to $+450$ °C (-325 to $+842$ °F) depending on the properties of the materials used.

Dimensions and weights

Table 3 to Table 6 provide an overview of the dimensions and weights of the standard version of SKV 3400-3 Valve as well as the version with insulating section or bellows seal. The lengths and heights in the dimensional drawings are shown on page 12-13.

Valve	DN	15	20	25	32	40	50	65	80	100	125	150
L	mm	130	150	160	180	200	230	290	310	350	400	480
H1	mm	235						270		360	375	
H2	mm	70	80	85	100	105	120	130	140	150	200	210

Table 3 : Dimensions of the standard version of SKV 3400-3 Valve (DIN version)

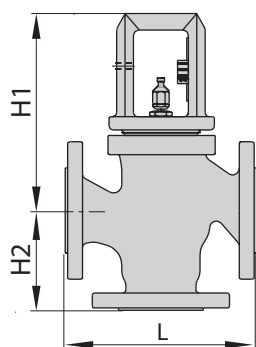
Valve	DN	15	20	25	40	50	65	80	100	150	
	NPS	½	¾	1	1½	2	2½	3	4	6	
L	Class 150	mm	184	184	184	222	254	276	298	352	451
		in	7.25	7.25	7.25	8.75	10.00	10.88	11.75	13.88	17.75
	Class 300	mm	190	194	197	235	267	292	318	368	473
		in	7.50	7.62	7.75	9.25	10.50	11.50	12.50	14.50	18.62
H1	mm	235						270		360	375
	in	9.25						10.63		14.17	14.76
H2	Class 150	mm	92	92	92	111	127	138	149	176	225.50
		in	3.62	3.62	3.62	4.37	5.00	5.43	5.87	6.93	8.88
	Class 300	mm	95	97	98.50	117.50	133.50	146	159	184	236.50
		in	3.76	3.82	3.88	4.63	5.26	5.75	6.26	7.24	9.31

Table 4 : Dimensions of the standard version of SKV 3400-3 Valve (ANSI version)

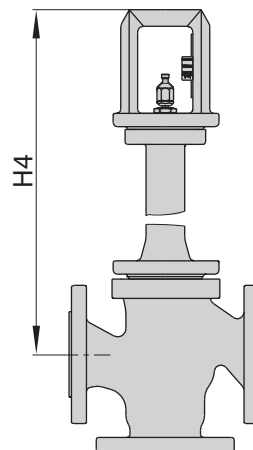
Table 5 : Dimensions for version with insulating section or bellows seal

Valve	DN	15	20	25	32	40	50	65	80	100	125	150
	NPS	½	¾	1	–	1½	2	2½	3	4	–	6
H4	Ins. section or bellows seal	mm	420						455	645	655	
		in	16.54						17.91	25.39	25.79	
	Long ins. section or bellows seal	mm	725						760	895	900	
		in	28.54						29.92	35.24	35.43	

Dimensional drawings



Standard version



With insulation section or bellows seal

Table 6 : Weights of SKV 3400-3 Valve without actuator

Valve		DN	15	20	25	32	40	50	65	80	100	125	150
		NPS	½	¾	1	–	1½	2	2½	3	4	–	6
Standard version		kg	6	7	8	13	15	17	31	37	49	95	135
		lbs	13	15.5	17.5	28.7	33	37.5	68	82	108	210	298
Ver- sion with	Ins. sec- tion or b. seal	kg	9	10	11	19	21	23	40	45	68	120	165
		lbs	20	22	24	42	46.3	50.7	88	99	150	265	364
	Long ins. section or b. seal	kg	13	14	15	23	25	27	44	49	76	128	173
		lbs	28.7	30.9	33	50.7	55	59.5	97	108	168	282	382

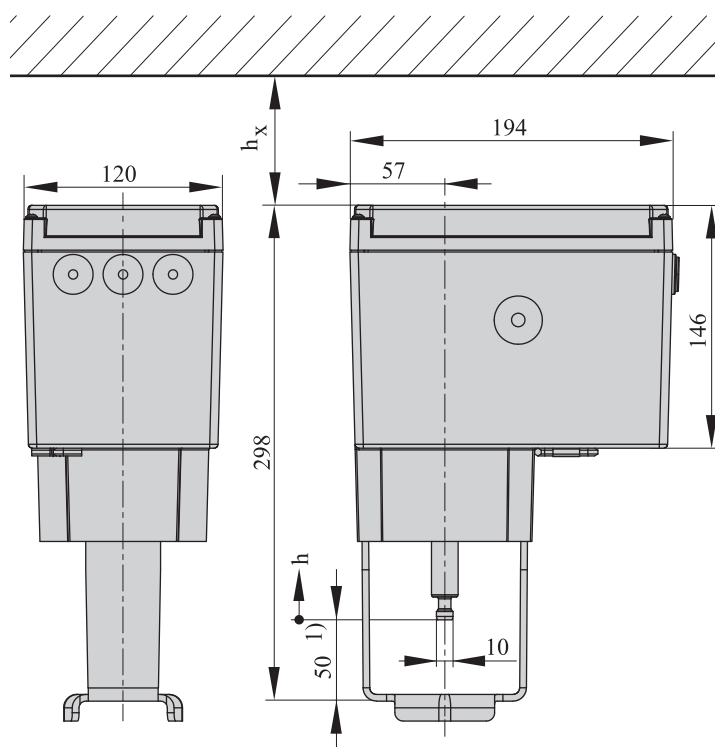
3.5 Technical Data of Electrical Actuator with 3 Step Motor

		-10	-11	-15	-17	-21	-26	-31	-36
Version with		Yoke		Ring nut		Yoke	Ring nut	Yoke	Ring nut
Fail-safe action		Without				Extends		Retracts	
Testing according to DIN EN 14597		-				.		-	
Rated travel	mm	30	15	30		15			
Stroking speed									
Standard	mm/s	0.125			0.1	0.125			
Fast	mm/s	0.25			-	0.25			
In the event of fail-safe action	mm/s	-				1.25			
Transit time for rated travel									
Standard	s	240	120	240	300	120	120	120	120
Fast	s	120	60	120	-	60	60	60	60
In the event of fail-safe action	s	-	-	-	-	12	12	12	12
Thrust	Retracts	2.5 kN			5 kN	0.5 kN			
	Extends	2.5 kN			5 kN	2 kN			
Manual override		With hex wrench				With hex wrench only possible when supply voltage is connected(see the 'Operation' section). Adjustment not possible after fail-safe action has been triggered.			
Motor switch-off		Torque switches							
Duty type		S1 - 100 % according to EN 60034-1							
Electrical connection									
Supply voltage	V	230, ±10 % ¹⁾ 24, ±10% ¹⁾							

Table 7 : Technical Data of 3 Step Motor

		-10	-11	-15	-17	-21	-26	-31	-36
Power line frequency	Hz	50 or 60			50	50 or 60			
Power consumption	VA	7.5/13 ²⁾			13	10.5/16 ²⁾			
Permissible temperature ranges ³⁾									
Temperature ranges ²⁾	Ambient	5 to 60 °C							
	Storage	-25 to +70 °C							
Materials		Housing and cover: Plastic (glass-fiber reinforced PPO)							
Weight									
kg (approx.)		3.2	3.2	3.3	3.3	3.9	4.0	3.5	3.6
Safety									
Degree of protection		IP 54 acc. to EN 60529, (IP 65 with three cable glands ⁴⁾) Suspended mounting position not approved							
Class of protection		II according to EN 61140							
Device safety		According to EN 61010-1							
Noise immunity		According to EN 61000-6-2 and EN 61326-1							
Noise emission		According to EN 61000-6-3 and EN 61326-1							
Conformity		CE · UK · EAC							
Additional equipment									
Limit contacts		Two adjustable limit contacts with changeover switches; 230 V/1 A · Without contact protection							
Resistance transmitters		Two resistance transmitters; 0 to 1000 Ω ± 15 %, max. 200 mW usable range approx. 0 to 900 Ω							

Table 8 : Technical Data of 3 Step Motor Cont.



1) When the actuator stem is fully extended

	Dimension h	Dimension h_x
-10	30	≥ 60
-11	15	
-21	15	
-31	15	

Figure 9 : Dimensions in mm. Version with integrated yoke

i Note

The dimension h_x indicates the minimum clearance required to be able to operate the actuator

Sufficient clearance must be available to facilitate wiring and operation. We recommend a minimum clearance of 600 mm.

3.6 Technical Data of Electrical Actuator with 4-20 mA Positioner

		-10	-11	-15	-17
Type of connection		With yoke ¹⁾		With ring nut ²⁾	
Rated travel	mm	30	15	30	
Limited travel range		Between 10 and 100 % of the rated travel			
Manual override		4 mm hex wrench or electric Handwheel as special version on request			
Electrical connection					
Supply voltage		24 V (±15 %), 47 to 63 Hz and 24 V DC (±15 %) 85 to 264 V, 47 to 63 Hz			
Duty type		S1 - 100 % according to EN 60034-1			
Power consumption		Speed level: Normal · Fast			
24 V	AC	12,5 VA · 16.5 VA			19 VA · (–)
	DC	7.5 W · 11 W			13 A · (–)
85 to 264 V	AC	13.8 to 20 VA			22 VA · (–)
Transit time in s for rated travel · Stroking speed in mm/s					
Standard version	Normal ³⁾	120 · 0.25	60 · 0.25	120 · 0.25	240 · 0.125
	Fast ⁴⁾	60 · 0.5	30 · 0.5	60 · 0.5	120 · 0.25
Actuator with faster motor	Normal ³⁾	60 · 0.5	30 · 0.5	60 · 0.5	–
	Fast ⁴⁾	30 · 1.0	15 · 1.0	30 · 1.0	–
Thrust in kN (standard version · Version with faster motor)					
Extends		2.5 · 1.25	2.5 · 1.25	2.5 · 1.25	5 · (–)
Retracts		2.5 · 1.25	2.5 · 1.25	2.5 · 1.25	5 · (–)
Weight [kg]					
Approx.		3.5	3.5	3.6	3.6

Table 9 : Technical Data of Electrical Actuator with 4-20 mA Positioner

	-21	-26	-31	-36	
Fail-safe action	Extends		Retracts		
Type of connection	With yoke ¹⁾	With ring nut ²⁾	With yoke ¹⁾	With ring nut ²⁾	
Rated travel mm	15		15		
Limited travel range	Between 10 and 100 % of the rated travel				
Manual override	Electric				
Electrical connection					
Supply voltage	24 V (±15 %), 47 to 63 Hz and 24 V DC (±15 %) 85 to 264 V, 47 to 63 Hz				
Duty type	S1 - 100 % according to EN 60034-1				
Power consumption	Speed level: Normal · Fast				
24 V	AC	18 VA · 23 VA			
	DC	11.5 W · 15 W			
85 to 264 V	AC	19.8 to 26 VA			
Transit time in s for rated travel · Stroking speed in mm/s					
	Normal ³⁾	60 · 0.25	60 · 0.25	60 · 0.25	60 · 0.25
	Fast ⁴⁾	30 · 0.5	30 · 0.5	30 · 0.5	30 · 0.5
Upon fail-safe action	12 · 1.25	12 · 1.25	12 · 1.25	12 · 1.25	12 · 1.25
Thrust in kN					
	Extends	2	2	2	2
	Retracts	0.5	0.5	0.5	0.5
Nominal thrust of safety spring	2	2	0.5	0.5	
Weight [kg]					
Approx.	4.2	4.3	3.8	3.9	

Table 10 : Technical Data of Electrical Actuator with 4-20 mA Positioner Cont.

Digital positioner		
Input signal	Current input	0/4 to 20 mA, adjustable · $R_i = 50 \Omega$
	Voltage input	0/2 to 10 V, adjustable · $R_i = 20 k\Omega$
	Pt 1000 input ¹⁾	Measuring range: -50 to 150 °C, 300 μ A
	Binary input ²⁾	By jumpering the terminals, not galvanically isolated
Position feedback	Current	0/4 to 20 mA, adjustable · Error message 24 mA
	Resolution	1000 steps or 0.02 mA
	Load	Max. 200 Ω
	Voltage	0/2 to 10 V, adjustable · Error message 12 V
	Resolution	1000 steps or 0.01 V
	Load	Min. 5 k Ω
Binary input		Open-circuit voltage: 10 V; short-circuit current: 5 mA By jumpering the terminals, not galvanically isolated
Binary output		Floating, max. 230 V AC/1 A
Applications	Positioner	The travel follows the input signal
	PID controller	Fixed set point control
	Two-step mode	Two-step mode, floating binary input for actuation
	Three-step mode	Three-step mode, floating binary input for actuation
	Temperature closed-loop control upon input signal failure	The integrated PID controller uses a fixed set point for closed-loop control when the input signal is missing.
Display		Icons for functions, codes and text field with backlight
Rotary pushbutton		Operating control for on-site operation to select and confirm codes and values
Interface	Standard	RS-232 · For point-to-point connection to communication participants or for memory pen · Permanently installed · Connection: RJ-12 connector socket

Table 11 : Digital Positioner Technical Data


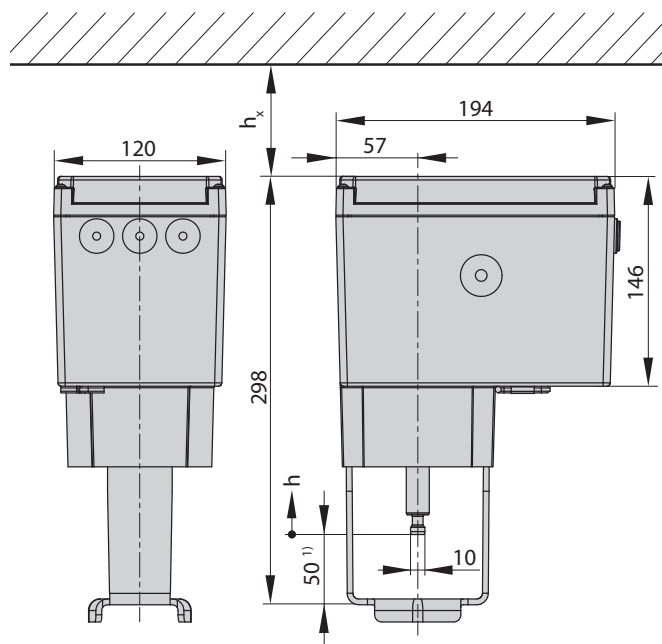
Device safety		
Degree of protection acc. to EN 60529	IP 54 with cable ducts IP 65 with cable glands (can be retrofitted) ¹⁾ Suspended mounting not permitted according to EN 60664	
Class of protection	II according to EN 61140	
Device safety	II according to EN 61010-1	
Noise immunity	According to EN 61000-6-2 and EN 61326-1	
Noise emission	According to EN 61000-6-3 and EN 61326-1	
Conformity		
Permissible temperatures ²⁾		
Ambient	5 to 60 °C	
Storage	-25 to +70 °C	
Ambient conditions		
Humidity	5 to 95 % relative humidity, no dew formation	
Additional equipment		
Limit contacts	Mechanical	Two adjustable limit contacts with changeover switches; 230 V AC/1 A · Without contact protection
	Electronic	Two adjustable limit contacts with relay and changeover switches; 230 V AC/1 A · Without contact protection
RS-485 module (order no. 1402-1522)		Module for Modbus RTU communication
Other information		
Motor switch-off		By torque-dependent limit switches

Table 12 : Safety Device Technical Data



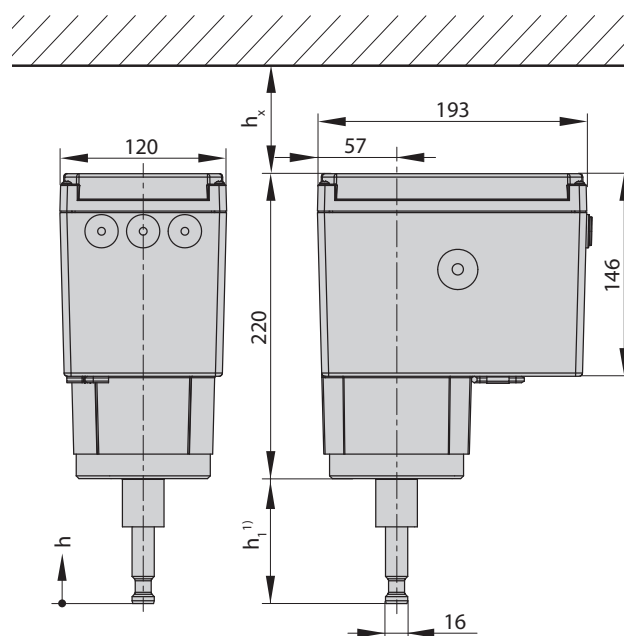
¹⁾ When the actuator stem is fully extended

	Dimension h	Dimension h_x
-10	30	≥ 60
-11	15	
-21	15	
-31	15	

Figure 10 : Dimensions (in mm.) Construction with integrated yoke

i Note

The dimension h_x specifies the required minimum distance at which the actuator can be operated. To facilitate connection and operation, select a larger distance. We recommend a minimum distance of 600 mm.



¹⁾ When the actuator stem is fully extended

	Dimension h	Dimension h ₁	Dimension h _x
-15	30	90	≥100
-17			
-26	15	75	
-36			

Figure 11 : Dimensions (in mm.) Construction with ring nut

4. Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Check that the specifications on the valve nameplate match the specifications in the delivery note. See the 'Markings on the device' section for nameplate details.
2. Check the shipment for transportation damage. Report any damage to Vira and the forwarding agent.
3. Determine the weight and dimensions of the units to be lifted and transported in order to select the appropriate lifting equipment and lifting accessories.

4.2 Removing the packaging from the valve

Observe the following sequence:

- ➔ Do not open or remove the packaging until immediately before lifting to install the valve into the pipeline
- ➔ Leave the control valve in its transport container or on the pallet to transport it on site.
- ➔ Do not remove the protective caps from the inlet and outlet until immediately before installing the valve into the pipeline. They prevent foreign particles from entering the valve.
- ➔ Dispose and recycle the packaging in accordance with the local regulations

4.3 Transporting and lifting the valve



Danger!

Danger due to suspended loads falling.

- ➔ Stay clear of suspended or moving loads.
- ➔ Close off and secure the transport paths.

Warning!

Risk of lifting equipment tipping over and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

- ➔ Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator and packaging, if applicable).

Note

Contact our aftersales service for the transportation temperatures of other valve versions.

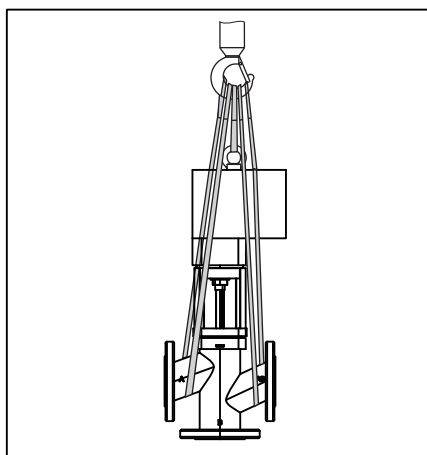


Figure 12: Lifting points on the control valve

4.3.2 Lifting the valve

Lifting instructions

- Use a hook with safety latch to secure the slings from slipping off the hook during lifting and transporting.
 - Secure slings against slipping.
 - Make sure the slings can be removed from the valve once it has been installed into the pipeline.
 - Prevent the control valve from tilting or tipping over.
 - Do not leave loads suspended when interrupting work for longer periods of time.
 - Make sure that the axis of the pipeline is always horizontal during lifting and the axis of the plug stem is always vertical.
 - Make sure that the additional sling between the lashing point on the actuator and rigging equipment (hook, shackle etc.) does not bear any load when lifting valves larger than NPS 6. The sling only protects the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling. Lifting the control valve
1. Attach one sling to each flange of the body and to the rigging equipment. To install a large valve into the pipeline, use lifting equipment (e.g. crane or forklift) to lift it. hook) of the crane or forklift.
 2. If necessary, attach others sling to the lashing point on the actuator and to the rigging equipment.
 3. Carefully lift the control valve. Check whether the lifting equipment and accessories can bear the weight.
 4. Move the control valve at an even pace to the site of installation.
 5. Install the valve into the pipeline
 6. After installation in the pipeline, check whether the flanges are bolted tight and the valve in the pipeline holds.
 7. Remove slings.

4.4 Storing the valve

NOTICE

Risk of valve damage due to improper storage.

- ➔ Observe the storage instructions.
- ➔ Avoid long storage times.
- ➔ Contact Vira in case of different storage conditions or longer storage times.

Note

We recommend regularly checking the control valve and the prevailing storage conditions during long storage periods.

Storage instructions

- Protect the control valve against external influences (e.g. impact)
- Secure the valve in the stored position against slipping or tipping over.
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the control valve against moisture and dirt. Store it at a relative humidity of less than 75 %. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of standard control valves is –20 to +65 °C (–4 to +149 °F). Contact our aftersales service for the storage temperatures of other valve versions.
- Do not place any objects on the control valve.
- For storage periods longer than 4 months, we recommend storing the control valves in valve sizes DN 150/NPS 6 or larger upright with the actuator on top.

5. Installation

Electrical Actuator

The work described in this section is only to be performed by personnel appropriately qualified to carry out such task.

5.1 Installation conditions

Work position

If not described otherwise in the valve documentation, the work position for the control valve is the front view looking onto the operating controls.

Mounting orientation

The control valve can be installed in the pipeline in any desired position. However, a suspended mounting position of the actuator is not permissible.

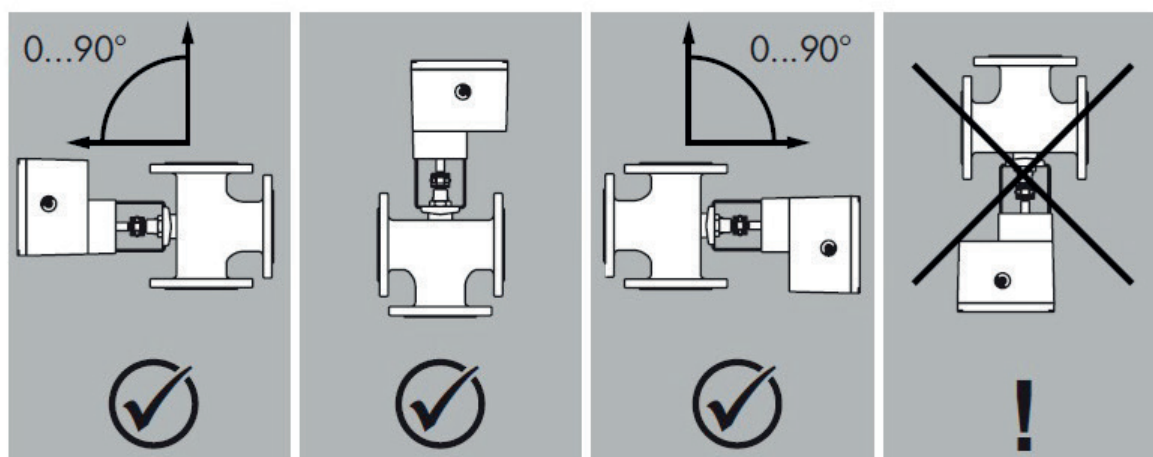


Figure 13: Installation positions

Mechanical Installation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

The work position for the control valve is the front view looking onto the operating controls (including valve accessories).

Plant operators must ensure that, after installation of the device, the operating personnel can perform all necessary work safely and easily access the device from the work position.

Pipeline routing

The inlet and outlet lengths vary depending on several variables and process conditions and are intended as recommendations. Contact Vira if the lengths are significantly shorter than the recommended lengths.

To ensure that the valve functions properly, proceed as follows:

Observe the inlet and outlet lengths. Contact Vira if the valve conditions or states of the medium process deviate.

Install the valve free of stress and with the least amount of vibrations as possible. Read information under 'Mounting position.'

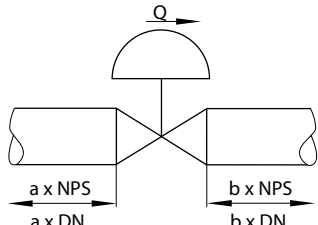
 <div style="margin-left: 20px;"> <p>Q Flow rate</p> <p>a Inlet length</p> <p>b Outlet length</p> </div>			
State of process medium	Valve conditions	Inlet length a	Outlet length b
Gas	$Ma \leq 0.3$	2	4
Vapor	$Ma \leq 0.3^{1)}$	2	4
Liquid	Free of cavitation/ $w < 10$ m/s	2	4
	Cavitation producing noise/ $w \leq 3$ m/s	2	4
	Cavitation producing noise/ $3 < w < 5$ m/s	2	10

Table 13 : Intel and outlet lengths

→ Install the valve allowing sufficient space to remove the actuator and valve or to perform service work on them.

→ In heating or cooling applications, the valve can be installed in the flow pipe or return flow pipe

Generally, we recommend installing the valve with the actuator upright and on top of the valve.

In the following versions, the valve must be

installed with the actuator on top:

–Valves in DN 100/NPS 4 and larger

–Valves with insulating section for low temperatures below -10°C (14°F)

Contact Vira if the mounting position is not as specified above.

→

Valve accessories

→ During connection of valve accessories, make sure that they are easily accessible and can be operated safely from the work position.

Vent plugs

→ Vent plugs are screwed into the exhaust air ports of pneumatic and electropneumatic devices. They ensure that any exhaust air that forms can be vented to the atmosphere (to avoid excess pressure in the device).

Furthermore, the vent plugs allow air intake to prevent a vacuum from forming in the device. Locate the vent plug on the opposite side to the work position of operating personnel.

Note

The plant engineering company is responsible for selecting and implementing a suitable support or suspension of the installed control valve and the pipeline. Depending on the valve version and mounting position, the valve, actuator and pipeline must be supported or suspended. Valves, which are not installed in the pipeline in the upright position with the actuator on top, must be supported or suspended

5.2 Preparation for installation

Before installation, make sure the following conditions are met:

- The valve is clean.
- The valve and all valve accessories (including piping) are not damaged.
- The valve data on the nameplate (type designation, valve size, material, pressure rating and temperature range) match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.) See the 'Markings on the device' section for nameplate details.
- The requested or required additional pipe fittings (see the 'Additional fittings' section) have been installed or prepared as necessary before installing the valve

NOTICE

Risk of control valve damage due to incorrect insulation.

- ➔ Only insulate control valves with insulating section or bellows seal up to the bonnet flange of the valve body for medium temperatures below 0 °C (32 °F) and
For steam applications, dry the pipelines. Moisture will damage the inside of the valve.
Check any mounted pressure gauges to make sure they function properly.
When the valve and actuator are already assembled, check the tightening torques of the bolted joints
Components may loosen during transport.section is insulated, it will not function properly.
- ➔ Do not insulate valves mounted to comply with NACE MR0175 requirements and which have nuts and bolts that are not suitable for sour gas environments

Proceed as follows:

- ➔ Lay out the necessary material and tools to have them ready during installation work.
- ➔ Flush the pipelines.

Note

The plant operator is responsible for cleaning the pipelines in the plant.

For steam applications, dry the pipelines. Moisture will damage the inside of the valve.

- ➔ Check any mounted pressure gauges to make sure they function properly.
- ➔ When the valve and actuator are already assembled, check the tightening torques of the bolted joints.
Components may loosen during transport.

5.3 Mounting the device

The activities listed below are necessary to install the valve and before it can be started up.

NOTICE

Risk of valve damage due to excessively high or low tightening torques.

Observe the specified torques when tightening control valve components. Excessive tightening torques lead to parts wearing out more quickly. Parts that are too loose may cause leakage.

- ➔ Observe the specified tightening torques (► AB 0100).

5.3.1 Mounting the actuator onto the valve

Risk of personal injury due to preloaded springs.

Actuators with preloaded springs are under tension. They can be identified by the long bolts protruding from the bottom of the actuator.

- ➔ Before starting any work on the actuator, relieve the compression from the preloaded springs (see associated actuator documentation).

Depending on the version, Vira control valves are either delivered with the actuator already mounted on the valve or the valve and actuator are delivered separately. When delivered separately, the valve and actuator must be assembled together on site.

- ➔ Before mounting the actuator, determine which V-shaped port is uncovered first when the plug is lifted out of the seat.
- ➔ On mounting the actuator, make sure that the V-shaped port uncovered first faces toward the valve outlet (AB) at the side.
- ➔ To mount the actuator, proceed as described in the associated actuator documentation.

5.4 Installing the valve into the pipeline

Premature wear and leakage due to insufficient support or suspension.

- ➔ Support or suspend the valve sufficiently at suitable points.

1. Close the shutoff valves in the pipeline at the inlet and outlet of the plant section while the valve is being installed.
2. Prepare the relevant section of the pipeline for installing the valve.
3. Remove the protective caps from the valve ports before installing the valve.
4. Lift the valve using suitable lifting equipment to the site of installation (see the Lifting the valve' section). Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
5. Make sure that the correct flange gaskets are used.
6. Bolt the pipe to the valve free of stress.
7. Attach a support or suspension on the valve, if necessary.

5.5 Testing the installed valve



Risk of bursting due to incorrect opening of pressurized equipment or components. Valves and pipelines are pressure equipment that may burst when handled incorrectly.

Flying projectile fragments or the release of process medium under pressure can cause serious injury or even death.

Before working on the control valve:

- ➔ Depressurize all plant sections affected and the valve (including the actuator). Release any stored energy.
- ➔ Drain the process medium from all the plant sections concerned as well as the valve.

Warning!

Risk of personal injury due to pressurized components and process medium being discharged.

- ➔ Do not loosen the screw of the test connection while the valve is pressurized

Warning!

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noisereducing fittings. Both can damage hearing.

- ➔ Wear hearing protection when working near the valve.

Warning!

Crush hazard arising from actuator and plug stem moving.

- ➔ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ➔ Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ➔ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

Warning!

Risk of personal injury due to exhaust air being vented.

While the valve is operating, air is vented from the actuator, for example, during closedloop operation or when the valve opens or closes.

- ➔ Wear eye protection when working in close proximity to the control valve

Warning!

Risk of personal injury due to preloaded springs. Actuators with preloaded springs are under tension.

They can be identified by the long.

bolts protruding from the bottom of the actuator.

- ➔ Before starting any work on the actuator, relieve the compression from the preloaded springs (see associated actuator documentation).

To test the valve functioning before startup or putting back the valve into operation, perform the following tests.

5.5.1 Leak test

The plant operator is responsible for performing the leak test and selecting the test method. The leak test must comply with the requirements of the national and international standards that apply at the site of installation.

Tip

Our aftersales service can support you to plan and perform a leak test for your plant.

1. Slowly apply the test medium to the valve until the test pressure is reached. Avoid sudden surges in pressure since the resulting high velocities may damage the valve.
2. Check the valve for leakage to the atmosphere.
3. Depressurize the pipeline section and valve.
4. Rework any parts that leak and repeat the leak test.

Adjusting the packing

A label on the flange indicates whether an adjustable packing is installed (see the 'Markings on the device' section).

Impaired valve functioning due to increased friction as a result of the threaded bushing being tightened too far.

➔ Make sure that the plug stem can still move smoothly after the threaded bushing has been tightened.

1. Tighten the threaded bushing gradually (by turning it clockwise) until the packing seals the valve.
2. Open and close the valve several times.
3. Check the valve for leakage to the atmosphere.
4. Repeat steps 1 and 2 until the packing completely seals the valve.

➔ If the adjustable packing does not seal properly, contact our aftersales service

5.5.2 Travel motion

The movement of the actuator stem must be linear and smooth.

- ➔ Apply the maximum and minimum control signals to check the end positions of the valve while observing the movement of the actuator stem.
- ➔ Check the travel reading at the travel indicator scale.

5.5.3 Pressure test

The plant operator is responsible for performing the pressure test.

Tip

Our aftersales service can support you to plan and perform a pressure test for your plant.

During the pressure test, make sure the following conditions are met:

- Move the plug to the midposition to open the valve.
- Observe the maximum permissible pressure for both the valve and plant

6. Wiring

6.1 Wiring of 3 Step Actuator

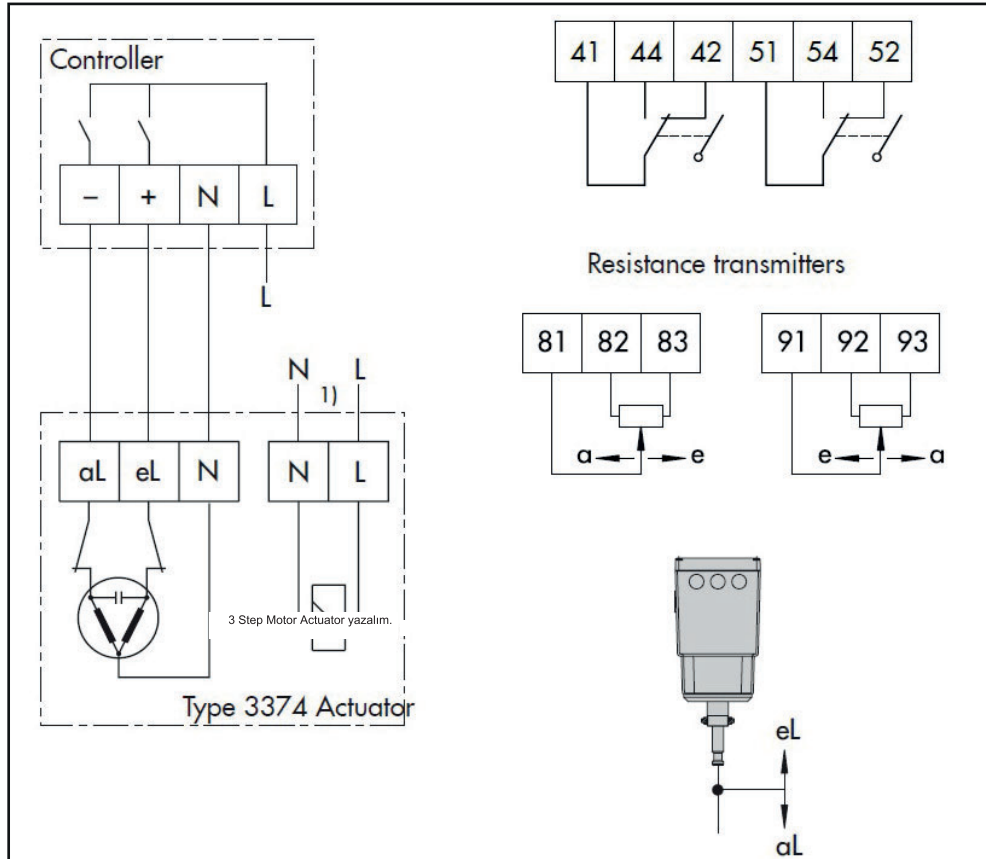


Figure 14: Wiring of 3 Step Motor

6.2 Wiring Between SK 3400 Controller and 3 Step Motor with Potentiometer Feedback

6.2.1 Wiring with PS Automation Actuator

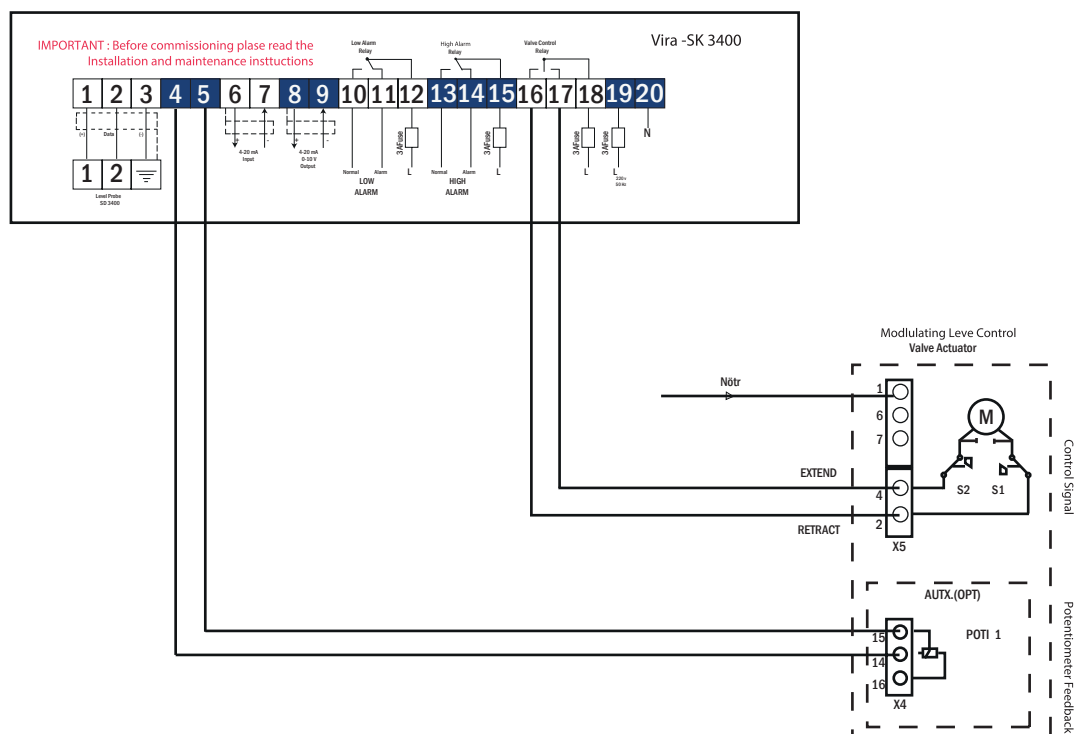


Figure 15: Wiring Between SK 3400 and 3 Step Motor (with Potentiometer Option)

6.2.2 Wiring with Samson Actuator

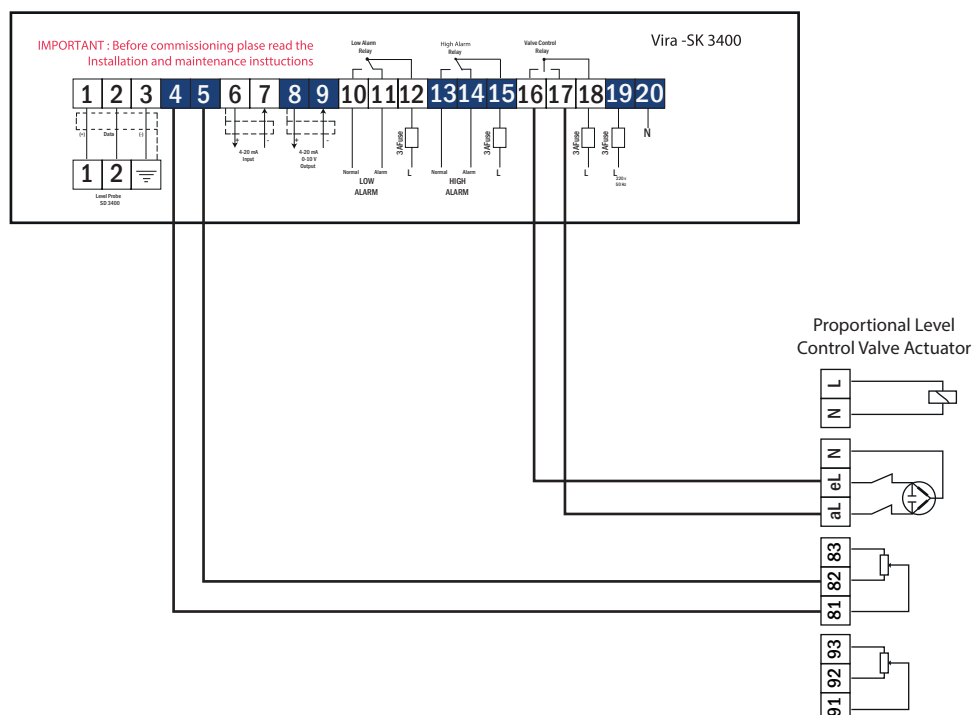


Figure 16: Wiring Between SK 3400 and 3 Step Motor (with Potentiometer Option)

6.3 Wiring of Actuator with Positioner

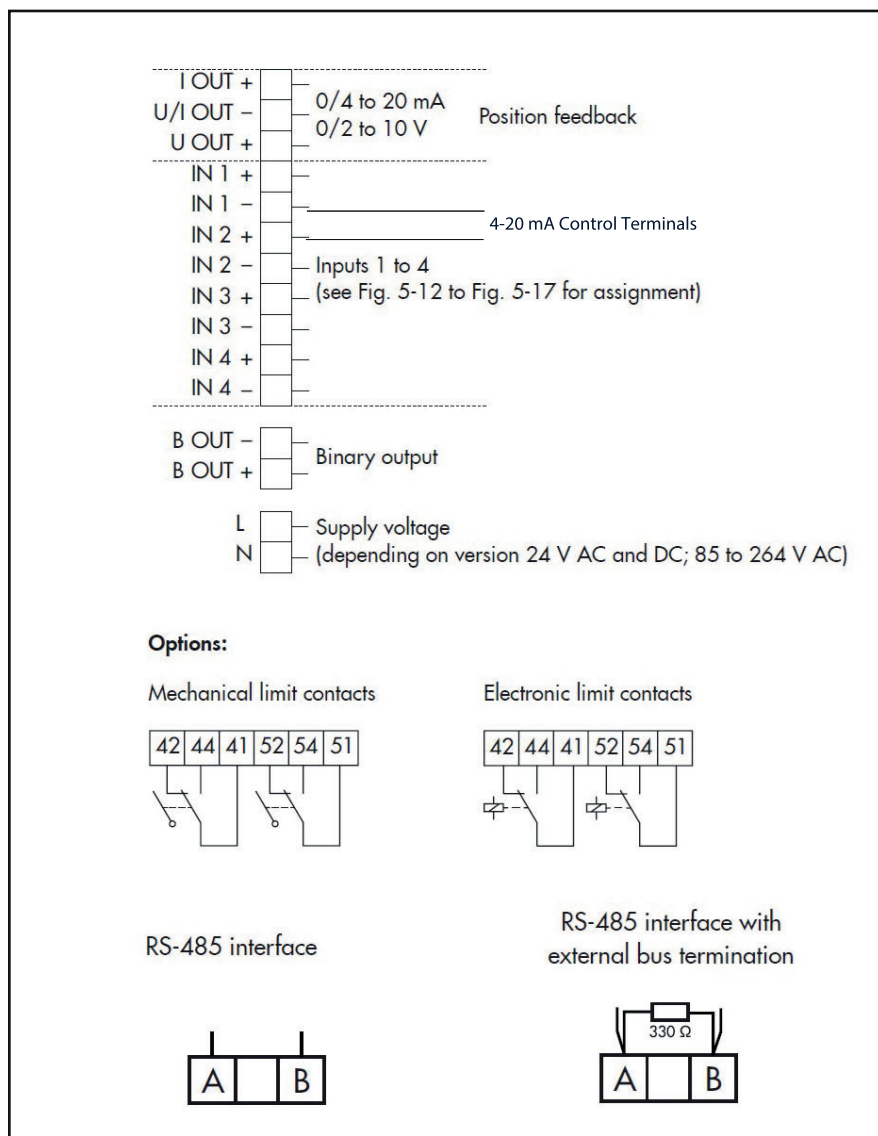


Figure 17: Wiring of Actuator with Positioner

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Warning!

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

Warning!

Risk of personal injury due to pressurized components and process medium being discharged.

- Do not loosen the screw of the test connection while the valve is pressurized

Warning!

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a brief loud noise may occur through the sudden venting of the pneumatic actuator (see 'Fail-safe position') or pneumatic valve accessories not fitted with noisereducing fittings. Both can damage hearing.

- Wear hearing protection when working near the valve

Warning!

Crush hazard arising from actuator and plug stem moving.

- Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

Warning!

Risk of personal injury due to exhaust air being vented.

While the valve is operating, air is vented from the actuator, for example, during closedloop operation or when the valve opens or closes.

- Wear eye protection when working in close proximity to the control valve.

Before startup or putting the valve back into service, make sure the following conditions are met:

- The valve is properly installed into the pipeline.
- The leak and function tests have been completed successfully.
- The prevailing conditions in the plant section concerned meet the valve sizing requirements (see information under 'Intended use' in the 'Safety instructions and measures' section).

Start-up/putting the device back into operation

- 1.Allow the valve to cool down or warm up to reach ambient temperature before startup when the ambient temperature and process medium temperature differ greatly or the medium properties require such a measure.
- 2.Slowly open the shutoff valves in the pipeline. Slowly opening these valves prevents a sudden surge in pressure and high flow velocities which can damage the valve.
- 3.Check the valve to ensure it functions properly.

7. Operation

Immediately after completing start-up or putting the valve back into operation, the valve is ready for use.

Warning!

Risk of burn injuries due to hot or cold components and pipeline.

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

- ➔ Allow components and pipelines to cool down or warm up to the ambient temperature.
- ➔ Wear protective clothing and safety gloves.

Warning!

Risk of personal injury due to pressurized components and process medium being discharged.

- ➔ Do not loosen the screw of the test connection while the valve is pressurized

Warning!

Risk of hearing loss or deafness due to loud noise.

Noise emission (e.g. cavitation or flashing) may occur during operation caused by the process medium and the operating conditions. Additionally, a loud noise may briefly occur through the sudden venting of the pneumatic actuator or pneumatic valve accessories not fitted with noisereducing fittings. Both can damage hearing.

Warning!

Crush hazard arising from actuator and plug stem moving.

- ➔ Do not insert hands or finger into the yoke while the air supply is connected to the actuator.
- ➔ Before working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.
- ➔ Before unblocking the actuator and plug stem after they have become blocked (e.g. due to seizing up after remaining in the same position for a long time), release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.

Warning!

Risk of personal injury due to exhaust air being vented.

While the valve is operating, air is vented from the actuator, for example, during closed loop operation or when the valve opens or closes.

- ➔ Wear eye protection when working in close proximity to the control valve

8. Malfunctions

Read hazard statements, warnings and caution notes in the 'Safety instructions and measures' section.

Malfunction	Possible reasons	Recommended action
Actuator and plug stem does not move on demand.	Actuator is blocked.	Check attachment. Remove the blockage. WARNING! A blocked actuator or plug stem (e.g. due to seizing up after remaining in the same position for a long time) can suddenly start to move uncontrollably. Injury to hands or fingers is possible if they are inserted into the actuator or valve. Before trying to unblock the actuator or plug stem, disconnect and lock the pneumatic air supply as well as the control signal. Before unblocking the actuator, release any stored energy in the actuator (e.g. spring compression). See associated actuator documentation.
	Diaphragm in the actuator defective	See associated actuator documentation.
	Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
Jolting movement of the actuator and plug stem	Version with adjustable packing ¹⁾ : packing not tightened correctly	Tighten the packing correctly (see information under 'Adjusting the packing' in the 'Testing the installed valve' section).
Actuator and plug stem does not stroke through the entire range.	Signal pressure too low	Check the signal pressure. Check the signal pressure line for leakage.
	Travel stop active	See associated actuator documentation.
	Incorrect setting of valve accessories	Check the settings of the valve accessories.
Increased flow through closed valve (seat leakage)	Dirt or other foreign particles deposited between the seat and plug.	Shut off the section of the pipeline and flush the valve.
	Valve trim is worn out.	Contact our after-sales service.

Table 14 :Malfunctions

Malfunction	Possible reasons	Recommended action
The valve leaks to the atmosphere (fugitive emissions).	Defective packing	Replace packing (see the 'Servicing' section) or contact our after-sales service.
	Version with adjustable packing ¹⁾ : packing not tightened correctly	Adjust the packing (see information under 'Adjusting the packing' in the 'Testing the installed valve' section). Contact our after-sales service when it continues to leak.
	Version with bellows seal: the bellows seal is defective.	Contact our after-sales service.
	Flange joint loose or gasket worn out	Check the flange joint. Replace gasket at the flanged joint (see the 'Servicing' section) or contact our after-sales service.

Table 15 :Malfunctions cont

Note

Contact our aftersales service for malfunctions not listed in the table.

8.2 Emergency action

Plant operators are responsible for emergency action to be taken in the plant. In the event of a valve malfunction:

1. Close the shutoff valves upstream and downstream of the control valve to stop the process medium from flowing through the valve.
2. Perform troubleshooting.
3. Rectify those malfunctions that can be remedied based on the instructions provided here. Contact our after-sales service in all other cases.

9. Technical Assistance

For technical assistance or service requests, please directly contact Vira service center by making a phone call or sending an e-mail to **servis@viraisi.com**.

Return faulty or service items to Vira itself or authorized agency in your area. Ensure all items are suitably packed for transit (preferably in the original cartons).

Please provide the following information with any equipment being returned:

- Your name, company name, address and telephone number, order number and invoice and return delivery address.
- Description and the serial number of equipment.
- Full description of the fault or repair required.
- If the equipment is being returned under warranty, please indicate the date of purchase.

The manufacturer reserves the right to make change without prior notification.

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