



Installation & Operating Manual



ART 202 & AL202 / AL202 SR Pressure Independent Control Valve and Control Actuator

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Contents

1. Introduction
2. Technical Data
3. Valve Features
4. Valve Installation
5. Flow Rates
6. Setting and Flow
7. AL202 Actuator Settings, Connections, and Wiring Diagrams
 - 7.1 AL202 (DN50-200) Technical Information
 - 7.2 AL202 (DN50-200) Actuator Settings and Connections
 - 7.3 AL202 (DN250-300) Technical Information
 - 7.4 AL202 (DN250-300) Actuator Settings and Connections
 - 7.5 AL202 Wiring Examples
8. AL202 Spring Return (SR) Actuator Settings, Connections, and Wiring Diagrams
 - 8.1 AL202 SR (DN50-125) Technical Information
 - 8.2 AL202 SR (DN50-125) Actuator Settings and Connections
 - 8.3 AL202 SR (DN150-300) Technical Information
 - 8.4 AL202 SR (DN150-300) Actuator Settings and Connections
9. Approvals Classification
10. Troubleshooting
11. Warranty

1. Introduction

Albion Valves (UK) Ltd ART 202 is a Pressure Independent Control Valve (PICV) which can be used to control the amount of fluid flowing through it whilst regulating the pressure differential.

Thanks to their unique design, PICV's can perform flow regulation, differential pressure control and modulation for comfort control and if required isolation.

Flow Regulation

When an electric actuator is not present or the plastic cap has been removed, the valve is normally open. But if the plastic cap is screwed on, or an electric actuator is installed, the spring forces the valve to close.

To achieve the design flow rate, the simple pre-setting scale on top of the valve is rotated to the required set point, which can be determined by using the flow tables below.

This pre-setting function has no impact on the stroke; the valve has full stroke modulation at all times.

The inlet water passes through a modulating control component whose geometry can be modified by turning the pre-setting dial to obtain the required flow rate for the branch of the system where the valve is installed.

Differential Pressure Control PICV maintains steady flow rate even when there are pressure fluctuations.

Modulation

When fitted with the ART AL202, the actuator performs the modulating function changing the section of flow passage.

It provides modulating control with 'full authority' regardless of any fluctuations in the differential pressure within the system the system.

When continuous modulation is carried out, the temperature is kept under control. ART 202 / AL202 keeps the same obturator stroke, regardless of the presetting dial position.

With continuous modulation, control is excellent even with small flow openings and this eliminates the on/off effect.

The ART 202 valve design with 3 P/T plugs, allows for both flow measurement and verification of minimum differential pressure across the total valve for aiding optimal pump energy saving.

Constant flow is obtained through the valve, despite pressure fluctuations.

By simply measuring differential pressure across the valve, the flow through the cartridge is obtained as follows;

- If measured differential pressure is above $\Delta p_{\min}$ (start-up pressure), the flow rate is the same as the one stated on the valve table (function) of the pre-set;
- If measured differential pressure is below minimum Δp stated on valve table, flow rate is calculated using the following formula:

$$Q = Kvs \frac{\sqrt{\Delta p}}{r}$$

Where:

Q is the flow rate in m³/h,

R is the relative density,

Δp is the pressure drop across the valve;

Kvs – Kv across the valve when it is fully open

The constant differential pressure across the modulating control component guarantees the 100% authority, within the range up to a maximum differential pressure of 800 kPa.



2. Technical Data

Valve Type	Size Range	Connection Type	Temperature Rating	Pressure Rating (Max)
ART 202 PN16	DN50 to DN300	EN 1092-2	0 °C to 120 °C	PN16

Size	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300
*Δp Range kPa	20 - 800	25 - 800	25 - 800	35 - 800	35 - 800	35 - 800	32 - 800	35 - 800	35 - 800
Low Flow Range (l/s)	0.689 - 4.17	1.22 - 6.95	1.48 - 9.45	3.37 - 18.90	5.14 - 30.60	7.11 - 41.10	26.40 - 58.30	52.80 - 132.0	52.8 - 132.0
Kvs	39.6	54.0	75.2	168	221	271	404	699	697
*Δp Range kPa	50 - 800	55 - 800	50 - 800	75 - 800	53 - 800	65 - 800	78 - 800	70 - 800	70 - 800
High Flow Range (l/s)	1.09 - 6.67	1.65 - 9.72	1.95 - 12.00	4.10 - 25.00	6.39 - 37.5	8.89 - 54.20	36.10 - 77.80	68.1 - 167.0	68.1 - 167.0
kvs	39.1	54.3	75.4	178	223	277	409	748	746

*Δp Range kPa when fully open (Pre-set 4.0)

Albion ART 202 has been tested in accordance with the BSRIA document BTS.1 'Test Method for Pressure Independent Control Valves'.

The valve is capable of closing against a maximum differential pressure of 800 kPa (8 bar) with a leakage rate at maximum 0.01 % of max rated volumetric flow and comply to EN1349 Class IV.

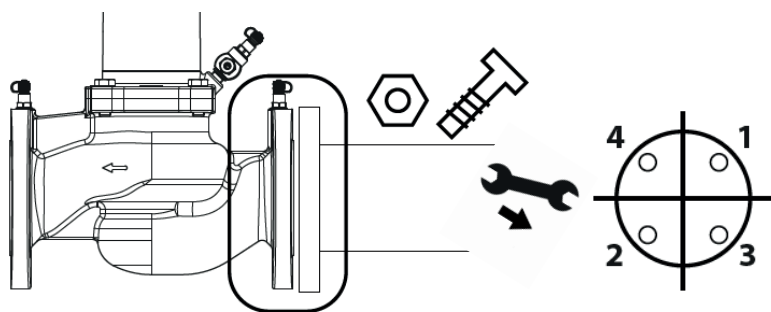
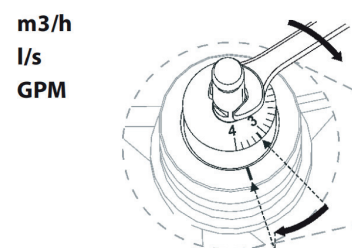
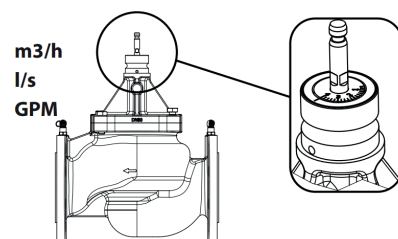
The KV-values accuracy follows the BS 7350 standard for flow measurement devices for heating and chilled water systems.

3. Valve Features

- The ART 202 valve design with 3 P/T plugs allows for both flow measurement and verification of minimum differential pressure across the total valve.
- Measurement of flow and minimum differential pressure due to valve design with 3 P/T plugs.
- The constant differential pressure across the modulating control component guarantees 100% authority.
- Differential pressure operating range up to 800kPa.
- Higher presetting precision due to stepless analogue scale.

4. Valve Installation

- No minimum straight pipe lengths required before or after the valve.
- The ART 202 can be flushed and commissioned before the actuator is installed.
- The presetting of the dial is user-friendly requiring only a simple flow vs. presetting table.
- Once the flow is set, the actuator can be mounted and the valve ready to operate.
- The arrow on the valve dictates the direction of flow.
- Can be mounted on both flow and return lines.
- Do not mount upside down.
- Please also refer to Albion's Bolt Tightening Sequence document prior to install.



Close off Pressure

The ART 202 is capable of closing against the following differential pressure to EN 1349 Class IV:

DN50 to DN125: 800 kPa - based on 800N actuator force

DN150 to DN200: 800 kPa - based on 1100 N actuator force

DN250 to DN300: 800 kPa - based on 2000 N actuator force

Flow measurement

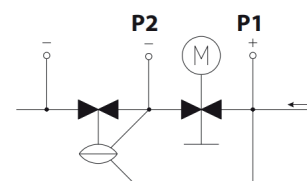
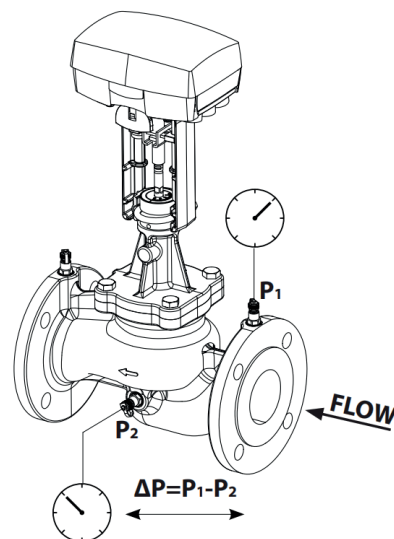
To measure the flow, insert the needles from a manometer in the red P/T plug (P1) and in the blue P/T plug (P2) placed at the middle of the valve body.

Now the manometer measures the differential pressure (P1-P2) across the KV presetting and the flow can be calculated by the formulas below.

Please use the KV-signal values detailed later in this document.

Flow Calculation

$Q = K_v \cdot \sqrt{\Delta p}$	$Q = \text{m}^3/\text{h}$ $\Delta p = \text{Bar}$
$Q = K_v \cdot 100 \cdot \sqrt{\Delta p}$	$Q = \text{l/h}$ $\Delta p = \text{kPa}$
$Q = \frac{K_v}{36} \cdot \sqrt{\Delta p}$	$Q = \text{l/s}$ $\Delta p = \text{kPa}$

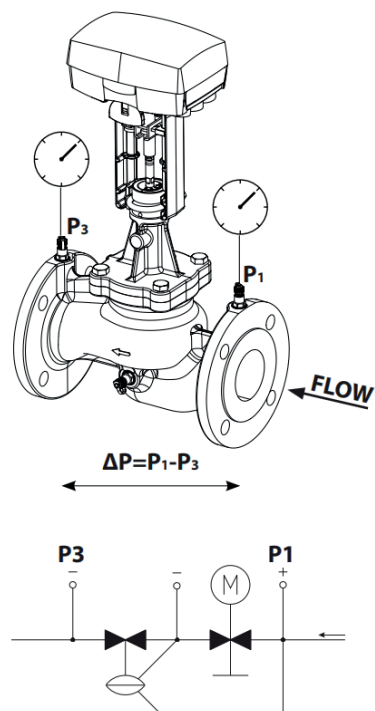


Minimum ΔP measurement

To measure the minimum differential pressure, insert the needles from a manometer in the red P/T plug (P1) and in the blue P/T plug (P3) placed at the outlet flange.

Now the manometer measures the differential pressure (P1-P3) across the total valve and the pump pressure can be optimised for pump energy saving.

Please use the required minimum differential pressure for the nominal flow detailed later in this document.



5. Flow Rates

DN	Series	Type	Flow (m ³ /h)
DN50	Standard	Low Flow	2.5 - 15.0
		High Flow	3.9 - 24.0
DN65	Standard	Low Flow	4.4 - 25.0
		High Flow	5.9 - 35.0
DN80	Standard	Low Flow	5.3 - 34.0
		High Flow	7.0 - 43.0
DN100	Standard	Low Flow	12.1 - 68.0
		High Flow	14.8 - 90.0
DN125	Standard	Low Flow	18.5 - 110
		High Flow	23.0 - 135
DN150	Standard	Low Flow	25.6 - 148
		High Flow	32.0 - 195
DN200	Standard	Low Flow	95.0 - 210
		High Flow	130 - 280
DN250	Standard	Low Flow	190 - 475
		High Flow	245 - 600
DN300	Standard	Low Flow	190 - 475
		High Flow	245 - 600



6. Setting and Flow

Series	Standard									
DN	DN50 LF					DN50 HF				
Pre-Set	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	2.50	0.689	10.9	7	9.19	3.90	1.09	17.3	19	9.68
0.8	3.20	0.887	14.1	7	11.7	5.10	1.41	22.3	19	11.9
1.0	3.90	1.07	17.0	7	13.9	6.20	1.71	27.2	19	14.1
1.2	4.50	1.25	19.8	7	15.9	7.20	2.00	31.8	19	16.2
1.4	5.10	1.42	22.5	7	17.7	8.20	2.29	36.2	19	18.2
1.6	5.70	1.59	25.1	7	19.5	9.20	2.56	40.6	20	20.1
1.8	6.30	1.75	27.7	8	21.1	10.2	2.83	44.9	20	22.0
2.0	6.90	1.92	30.4	8	22.8	11.2	3.11	49.2	21	23.9
2.2	7.50	2.08	33.0	9	24.5	12.2	3.39	53.7	22	25.7
2.4	8.10	2.26	35.8	9	26.2	13.2	3.67	58.2	24	27.6
2.6	8.80	2.44	38.7	10	27.9	14.3	3.97	62.9	25	29.3
2.8	9.50	2.64	41.8	11	29.6	15.4	4.28	67.9	27	31.0
3.0	10.2	2.84	45.0	12	31.4	16.6	4.61	73.1	30	32.7
3.2	11.0	3.07	48.6	13	33.2	17.9	4.97	78.7	33	34.3
3.4	11.9	3.31	52.4	15	34.9	19.2	5.35	84.7	36	35.7
3.6	12.8	3.57	56.6	16	36.6	20.7	5.75	91.2	40	37.0
3.8	13.9	3.86	61.1	18	38.2	22.3	6.19	98.1	45	38.2
4.0	15.0	4.17	66.0	20	39.6	24.0	6.67	106	50	39.1

Series	Standard									
DN	DN65 LF					DN65 HF				
Pre-Set	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	4.40	1.22	19.3	15	11.6	6.00	1.65	26.2	30	10.9
0.8	5.60	1.54	24.5	15	14.8	7.60	2.11	33.4	30	13.6
1.0	6.60	1.85	29.3	15	17.5	9.10	2.53	40.1	30	16.0
1.2	7.70	2.13	33.7	16	19.9	10.5	2.93	46.4	31	18.2
1.4	8.60	2.40	38.0	17	22.1	11.9	3.31	52.5	32	20.4
1.6	9.60	2.66	42.2	17	24.3	13.3	3.69	58.5	32	22.6
1.8	10.5	2.93	46.4	18	26.4	14.7	4.07	64.5	32	24.9
2.0	11.5	3.20	50.6	18	28.6	16.0	4.46	70.7	32	27.3
2.2	12.5	3.47	55.0	18	30.9	17.5	4.86	77.0	32	29.9
2.4	13.5	3.76	59.6	19	33.3	19.0	5.28	83.6	32	32.6
2.6	14.7	4.07	64.5	19	35.9	20.6	5.72	90.6	33	35.5
2.8	15.8	4.40	69.7	19	38.6	22.3	6.19	98.1	34	38.5
3.0	17.1	4.75	75.3	20	41.4	24.1	6.69	106	35	41.5
3.2	18.5	5.13	81.3	21	44.2	26.0	7.22	114	37	44.5
3.4	19.9	5.54	87.8	21	47.0	28.0	7.79	123	40	47.4
3.6	21.5	5.98	94.7	22	49.6	30.2	8.40	133	44	50.1
3.8	23.2	6.45	102	24	52.0	32.5	9.04	143	49	52.5
4.0	25.0	6.95	110	25	54.0	35.0	9.72	154	55	54.3



Series	Standard									
DN	DN80 LF					DN80 HF				
Pre-Set	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	5.30	1.48	23.5	16	14.9	7.00	1.95	30.9	23	15.0
0.8	6.90	1.91	30.2	16	18.8	9.00	2.51	39.8	23	19.9
1.0	8.30	2.30	36.5	16	22.4	11.0	3.04	48.2	23	24.0
1.2	9.60	2.68	42.4	17	25.8	12.8	3.55	56.2	24	27.5
1.4	10.9	3.04	48.2	17	29.1	14.5	4.03	63.9	24	30.6
1.6	12.2	3.40	53.8	17	32.5	16.2	4.51	71.5	24	33.7
1.8	13.5	3.75	59.5	18	35.8	18.0	4.98	79.0	25	36.7
2.0	14.8	4.11	65.2	18	39.2	19.6	5.46	86.5	25	39.9
2.2	16.2	4.49	71.1	18	42.7	21.4	5.94	94.2	25	43.3
2.4	17.6	4.88	77.3	19	46.3	23.2	6.45	102	26	46.9
2.6	19.1	5.30	83.9	19	50.0	25.1	6.97	111	27	50.8
2.8	20.7	5.74	91.0	19	53.9	27.1	7.53	119	28	54.9
3.0	22.4	6.23	98.7	20	57.7	29.3	8.13	129	30	59.1
3.2	24.3	6.76	107	21	61.5	31.6	8.78	139	33	63.2
3.4	26.4	7.34	116	21	65.3	34.1	9.47	150	36	67.2
3.6	28.7	7.98	126	22	68.9	36.8	10.2	162	40	70.7
3.8	31.2	8.68	138	24	72.2	39.8	11.1	175	44	73.5
4.0	34.0	9.45	150	25	75.2	43.0	12.0	189	50	75.4

Series	Standard									
DN	DN100 LF					DN100 HF				
Pre-Set	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	12.1	3.37	53.4	19	35.2	14.8	4.10	65.0	29	35.0
0.8	15.3	4.25	67.3	20	43.4	18.9	5.25	83.2	29	43.0
1.0	18.1	5.04	79.9	20	50.2	22.6	6.28	99.5	30	49.6
1.2	20.8	5.76	91.4	20	56.1	26.0	7.22	114	31	55.3
1.4	23.2	6.44	102	21	61.4	29.1	8.09	128	32	60.8
1.6	25.5	7.08	112	21	66.5	32.1	8.92	141	33	66.3
1.8	27.8	7.71	122	22	71.7	35.1	9.74	154	34	72.2
2.0	30.0	8.35	132	22	77.1	38.1	10.6	168	35	78.8
2.2	32.4	9.00	143	22	83.0	41.2	11.4	181	36	86.3
2.4	34.9	9.70	154	23	89.6	44.5	12.4	196	38	94.6
2.6	37.6	10.5	166	23	96.9	48.2	13.4	212	40	104
2.8	40.6	11.3	179	24	105	52.2	14.5	230	42	114
3.0	44.0	12.2	194	25	114	56.7	15.8	250	45	125
3.2	47.7	13.3	210	26	124	61.9	17.2	272	49	136
3.4	51.9	14.4	229	27	134	67.7	18.8	298	53	148
3.6	56.7	15.7	249	29	145	74.2	20.6	327	59	159
3.8	62.0	17.2	273	32	156	81.7	22.7	360	66	169
4.0	68.0	18.9	299	35	168	90.0	25.0	396	75	178



Series	Standard									
DN	DN125 LF					DN125 HF				
Pre-Set	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	18.5	5.14	81.5	16	43.6	23.0	6.39	101	27	45.4
0.8	23.6	6.54	104	16	54.3	29.9	8.31	132	27	56.7
1.0	28.5	7.92	125	16	64.4	36.5	10.1	161	27	67.4
1.2	33.3	9.26	147	17	74.2	42.8	11.9	188	28	77.7
1.4	38.0	10.6	167	17	83.8	48.7	13.5	215	28	87.7
1.6	42.6	11.8	188	17	93.4	54.5	15.1	240	28	97.7
1.8	47.1	13.1	207	18	103	60.0	16.7	264	29	108
2.0	51.5	14.3	227	18	113	65.5	18.2	288	29	118
2.2	55.9	15.5	246	18	123	70.9	19.7	312	29	128
2.4	60.4	16.8	266	19	133	76.4	21.2	336	30	139
2.6	65.0	18.1	286	19	144	82.0	22.8	361	31	150
2.8	69.8	19.4	308	20	155	87.8	24.4	387	32	161
3.0	75.0	20.8	330	21	166	94.0	26.1	414	33	172
3.2	80.6	22.4	355	22	177	101	28.0	443	35	183
3.4	86.7	24.1	382	24	188	108	30.0	475	37	194
3.6	93.6	26.0	412	26	200	116	32.2	511	41	204
3.8	101	28.1	446	30	211	125	34.7	550	46	214
4.0	110	30.6	484	35	221	135	37.5	594	53	223

Series	Standard									
DN	DN150 LF					DN150 HF				
Pre-Set	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m³/h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
0.6	25.6	7.11	113	21	60.8	32.0	8.89	141	33	59.8
0.8	32.6	9.05	143	21	77.0	41.3	11.5	182	33	76.1
1.0	39.2	10.9	173	21	92.3	50.0	13.9	220	33	91.6
1.2	45.6	12.7	201	21	107	58.2	16.2	256	33	106
1.4	51.8	14.4	228	21	121	66.0	18.3	291	33	121
1.6	58.0	16.1	255	21	134	73.7	20.5	324	33	134
1.8	64.1	17.8	282	21	147	81.3	22.6	358	33	148
2.0	70.4	19.6	310	22	160	89.0	24.7	392	34	161
2.2	76.8	21.3	338	23	173	96.9	26.9	427	36	174
2.4	83.4	23.2	367	25	185	105	29.2	463	38	186
2.6	90.3	25.1	398	27	197	114	31.6	501	40	199
2.8	97.5	27.1	429	28	209	123	34.2	542	43	211
3.0	105	29.2	462	30	221	133	36.9	586	46	223
3.2	113	31.3	497	32	232	144	39.9	632	49	235
3.4	121	33.6	533	33	243	155	43.1	683	53	246
3.6	130	36.0	571	34	253	167	46.5	737	57	257
3.8	139	38.5	610	35	263	181	50.2	796	61	267
4.0	148	41.1	652	35	271	195	54.2	859	65	277



Series	Standard									
DN	DN200 LF					DN200 HF				
Pre-Set	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
1.0	95	26.4	418	11	243	130	36.1	572	31	245
1.2	100	27.8	440	12	261	137	38.1	604	32	265
1.4	105	29.3	464	12	276	145	40.2	638	33	280
1.6	112	31.0	491	13	287	153	42.4	673	35	291
1.8	118	32.8	520	15	295	161	44.8	710	38	299
2.0	125	34.7	550	16	301	170	47.2	748	41	305
2.2	132	36.8	583	17	306	179	49.8	789	45	310
2.4	140	38.9	617	19	310	189	52.4	831	49	313
2.6	148	41.1	652	21	314	199	55.2	875	53	317
2.8	156	43.5	689	22	320	209	58.1	921	57	322
3.0	165	45.8	726	24	326	220	61.1	969	61	328
3.2	174	48.3	765	26	335	231	64.2	1018	65	337
3.4	183	50.7	804	27	346	243	67.4	1069	69	348
3.6	192	53.3	844	29	361	255	70.8	1122	72	364
3.8	201	55.8	884	31	380	267	74.2	1176	75	384
4.0	210	58.3	925	32	404	280	77.8	1233	78	409
3.8	101	28.1	446	30	211	125	34.7	550	46	214
4.0	110	30.6	484	35	221	135	37.5	594	53	223

Series	Standard									
DN	DN250 LF					DN250 HF				
Pre-Set	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
1.0	190	52.8	837	10	408	245	68.1	1079	15	428
1.2	205	57.0	904	10	418	256	71.2	1129	16	442
1.4	220	61.0	967	11	432	270	75.1	1190	17	456
1.6	233	64.8	1027	12	448	286	79.6	1261	20	470
1.8	247	68.5	1086	13	468	305	84.7	1342	22	484
2.0	260	72.2	1145	15	490	325	90.3	1431	25	498
2.2	274	76.0	1205	17	513	347	96.4	1528	28	533
2.4	288	80.1	1269	19	538	371	103	1632	32	567
2.6	304	84.4	1338	21	563	396	110	1743	36	597
2.8	321	89.2	1413	23	587	422	117	1860	40	626
3.0	340	94.4	1497	25	611	450	125	1981	45	652
3.2	361	100	1590	27	634	479	133	2107	50	676
3.4	385	107	1695	29	654	508	141	2237	55	697
3.6	412	114	1812	31	672	538	150	2370	60	717
3.8	441	123	1944	33	687	569	158	2505	65	733
4.0	475	132	2091	35	699	600	167	2642	70	748
3.8	139	38.5	610	35	263	181	50.2	796	61	267
4.0	148	41.1	652	35	271	195	54.2	859	65	277



Series	Standard									
DN	DN300 LF					DN300 HF				
Pre-Set	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal	Flow m ³ /h	Flow l/s	Flow gpm	Min.Δ kPa	Kv Signal
1.0	190	52.8	837	10	387	245	68.1	1079	15	397
1.2	205	57.0	904	10	419	256	71.2	1129	16	429
1.4	220	61.0	967	11	447	270	75.1	1190	17	457
1.6	233	64.8	1027	12	469	286	79.6	1261	20	481
1.8	247	68.5	1086	13	489	305	84.7	1342	22	502
2.0	260	72.2	1145	15	505	325	90.3	1431	25	521
2.2	274	76.0	1205	17	519	347	96.4	1528	28	538
2.4	288	80.1	1269	19	533	371	103	1632	32	554
2.6	304	84.4	1338	21	546	396	110	1743	36	571
2.8	321	89.2	1413	23	559	422	117	1860	40	588
3.0	340	94.4	1497	25	574	450	125	1981	45	606
3.2	361	100	1590	27	591	479	133	2107	50	627
3.4	385	107	1695	29	611	508	141	2237	55	650
3.6	412	114	1812	31	635	538	150	2370	60	677
3.8	441	123	1944	33	663	569	158	2505	65	709
4.0	475	132	2091	35	697	600	167	2642	70	746
3.8	101	28.1	446	30	211	125	34.7	550	46	214
4.0	110	30.6	484	35	221	135	37.5	594	53	223

7. AL202 Actuator Settings, Connections, and Wiring Diagrams

7.1 AL202 (DN50-200) Technical Information

Valve Dimension	Technical Code	Function	Supply Voltage	Power Consumption
DN50-DN125	AELAAL20224VAC/DC2	0-10 V / 3-pos	24V AC +/-25% 24V DC +/-10%	15 VA (*50VA)
DN150-DN200	AELAAL20224VAC/DC3	0-10 V / 3-pos	24V AC +/-25% 24V DC +/-10%	24 VA (*50VA)

*Max Consumption for transformer sizing

7.2 AL202 (DN50-200) Actuator Settings and Connections

		Function in the		Description
		"OFF" pos.	"ON" position	
IN		1 Retracts	Extends	Valve closing direction
MOD		2 Modulating	3-pos. floating	Control (not at Sequence)
---		3 -	Sequence	Sequence control
0-10		4 0-10 V	2-10 V	Voltage range
0-5, 2-6		5 0-5 V, 2-6 V	5-10 V, 6-10 V	Part of voltage range
60 s / 0%*		6 60 s, 0% *	300 s, 50% *	Running time (Security function*)
NORM		7 Normal	Inverted	Direction of movement
LIN		8 Linear	EQ%	Valve characteristic
OP		9 Operation	Calibration	Operation/End position calibration

* DN40-50 actuator versions only

There are nine switches in a row on the circuit board. On delivery ('Factory'), all switches are pre-set as above.

1 Valve Closing Direction — IN / OUT

IN direction of movement is used when the screw of the actuator moves inwards to close the valve. OUT direction of movement is used when the screw of the actuator moves outwards to close the valve.

For ART 202 valves, ensure this switch is always 'ON'

2 Control signal — MOD / INC

Actuator can either be controlled by a variable direct voltage, known as a modulating signal (MOD), or by a 3-pos. floating signal (INC).

3 Sequence or parallel control — — — / SEQ

With sequence (or parallel) control (SEQ), two actuators/valves can be controlled by only one control signal.

For each of these you can choose which part of the voltage range to use, the upper one, 5-10 V (6-10 V) or the lower one, 0-5 V (2-6 V).

If the switch NORM / INV is in the NORM position, the higher voltage corresponds to 100% flow and the lower one to 0%. With NORM / INV in the INV position you will get the opposite function.

Note! If sequence or parallel control is not used, the switch — — — / SEQ must be in the OFF position, as the

switch MOD / INC is not valid during sequence or parallel control.

4 Voltage range — 0-10 / 2-10

You can choose whether to use the control signal voltage range 0-10 V or 2-10 V.

5 Part of voltage range — 0-5, 2-6 / 5-10. 6-10

You can choose which part of a voltage range to use, the lower one 0-5 V (2-6 V) or the upper one 5-10 V (6-10 V).

If the switch is in the NORM position, the higher voltage corresponds to 100% flow and the lower one to 0%. To achieve the opposite function, the switch should be put in its INV position.

6a Running time — 60 s / 300 s

With 3-point floating control, you can choose a running time between 60 s or 300 s.

With modulating control, the running time is always 15 s / 20 s / 30 s (or 60 s, for DN40-50 actuator versions only).

6b Security function 0% / 50% (DN40-50 actuator versions only)

At 2–10 V control signal you can select which security function you want the actuator to have.

If the actuator is used for heating control and switch 6 is ON (50%), the actuator will open the valve halfway if the control signal disappears, e.g. if the X1 connection is unplugged.

If, instead, you want the valve closed, set switch 6 to OFF (0%).

Note! The direction of movement is also significant. See the following description.

7 Direction of movement — NORM / INV

Actuators direction of movement according to the control signal. In normal 'NORM' mode the actuator directly follows the control signal and closes the valve downwards against a 0V control signal.

In inverse 'INV' mode, the actuator reverses the direction of travel against the control signal and will open the valve upwards against a 0V control signal.

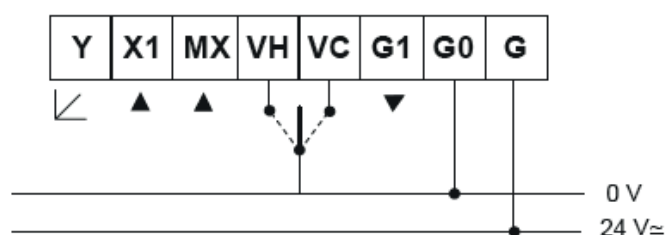
8 Linearization — LIN / EQ%

The total valve characteristics can be modified from linear to EQ%.

9 End position adjustment — OP / ADJ

This switch is only used to calibrate the end positions when the actuator is commissioned. Momentarily put the switch in the ON position. The actuator will automatically find the end positions of the valve. For normal operation the switch must be OFF

G, G0 = Max 100 m 1.5 mm² (AWG 15)
X1, MX, Y, VH, VC = Max 200 m 0,5 mm² (AWG 20)



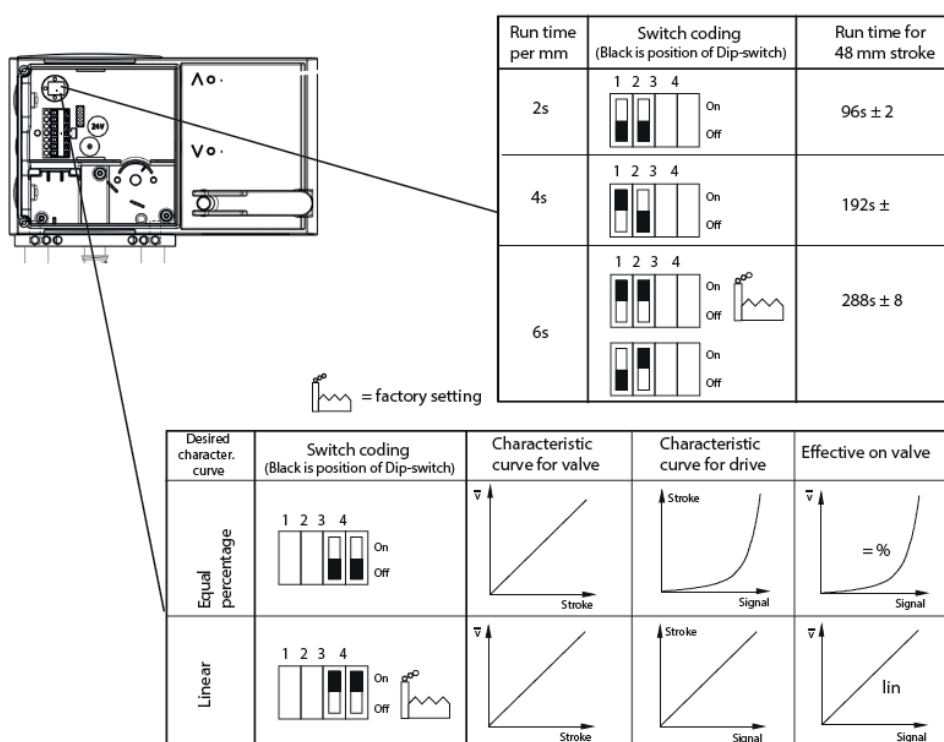
Terminal	Function
Y	Feedback signal 0-100% (2-10V)
X1	Input signal 0-10V
MX	Neutral
VH	Increase (3-pos. control)
VC	Decrease (3-pos. control)
G1	Short circuit-safe supply 16±0.3 VDC, 25mA
G0	System neutral 0 V
G	System potential 24 V AC/DC

7.3 AL202 (DN250-300) Technical Information

Valve Dimension	Technical Code	Control Signal	Function	Actuator Force	Supply Voltage	Power Consumption
DN250-DN300	AELAAL-20224VAC/DC10	0-10V/4-20mA 2/3 point	Standard	2500N	24V AC +/-20% 24V DC +/-15%	10 W (*18VA)

*Design transformer for this value

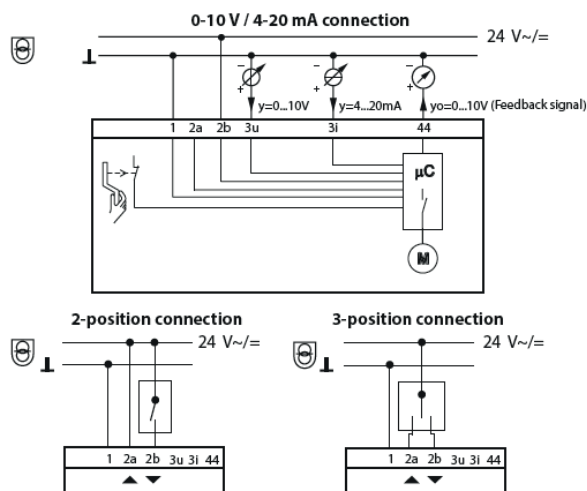
7.4 AL202 (DN250-300) Actuator Settings and Connections



AL202 Connection Diagrams (DN250-300)

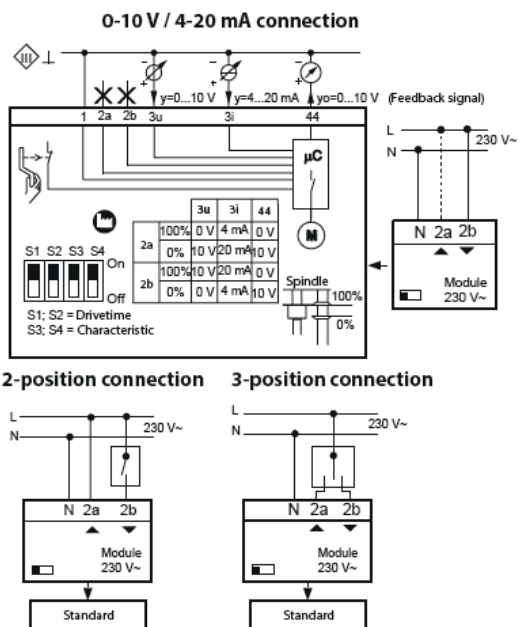
24 V AC/DC

Standard Actuator



Standard Actuator

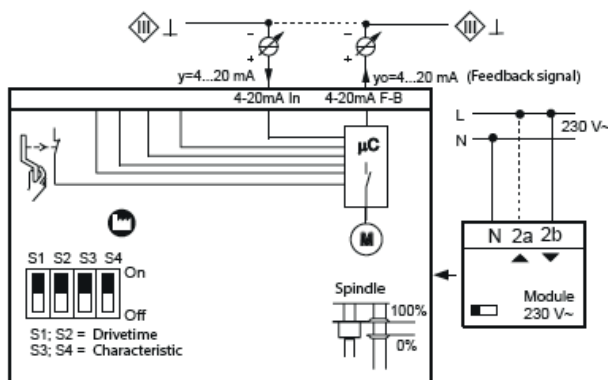
With 230 V
Accessory Module



Standard Actuator

230 V AC

4-20 mA connection - Please note: The 4-20 mA control and feedback signal must have power supply



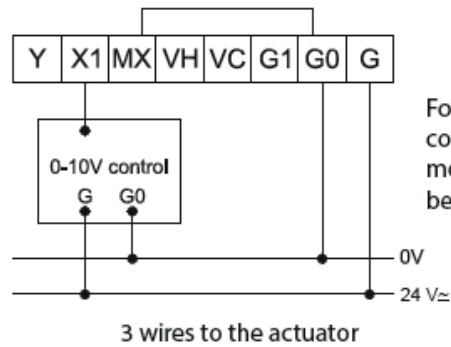
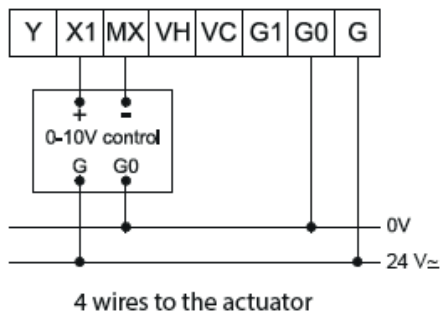
The feedback signal is calibrated from factory. But if necessary, the feedback signal can be fine tuned by the potentiometers on the feedback Module.

It is recommend to start with open valve and adjust the 4 mA-value by the **GAIN**-potentiometer.

Then the valve can be closed and the 20 mA-value can be adjusted by the **OFFSET**-potentiometer.

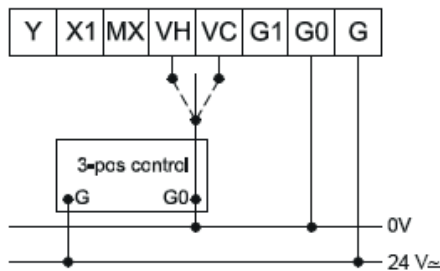
7.5 AL202 Wiring Examples (DN50-200)

0-10V, 2-10V control signal

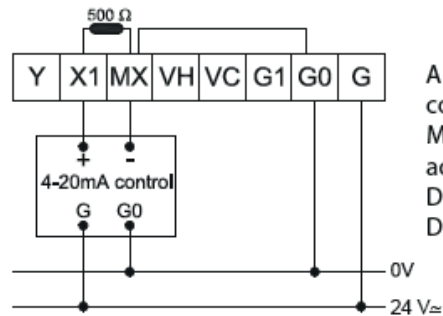


For 0-10V control with 3 wire connection, it is needed to mount an internal wiring between MX and G0

3-pos control signal

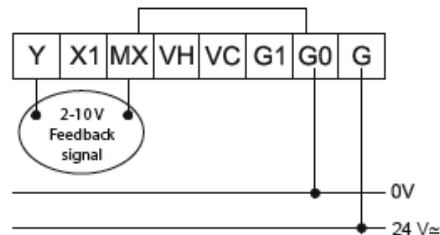


4-20 mA control signal



A 500 Ω resistor must be connected between X1 and MX. (Not delivered with the actuator)
Dip switch 2 must be OFF and
Dip switch 4 must be ON

Feedback signal (2-10V)



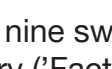
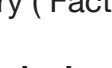
8. AL202 Spring Return (SR) Actuator Settings, Connections, and Wiring Diagrams

8.1 AL202 SR (DN50-125) Technical Information

Valve Dimension	Technical Code	Function	Supply Voltage	Power Consumption
DN50-DN125	AELAAL202SRFO 24VAC/DC06	0-10 V / 3-pos Stem up	24V AC +/-20% 50-60Hz 24V DC +/-20%	30 VA (*50VA)
DN50-DN125	AELAAL202SRFC 24VAC/DC07	0-10 V / 3-pos Stem down	24V AC +/-20% 50-60Hz 24V DC +/-20%	30 VA (*50VA)

*Max Consumption for transformer sizing

8.2 AL202 SR (DN50-125) Actuator Settings and Connections

		Function in the		Description
		"OFF" pos.	"ON" position	
2-10 Vdc		0-5 Vdc	1 2-10 Vdc	Feed back signal
PROP		FLOAT	2 Proportional	Control mode
---		SEQ	3 -	Sequence control
0-10		2-10	4 0-10 V	Input voltage range
0-5, 2-6		5-10, 6-10	5 0-5 V, 2-6 V	Part of voltage range
60 s		300 s	6 60 s	Running time (Floating control only)
NORM		INV	7 Normal	Direction of movement
LIN		EQ%	8 Linear	Valve characteristic
OP		ADJ	9 Operation	Operation/End position calibration

There are nine switches in a row on the circuit board.
On delivery ('Factory'), all switches are in OFF" position.

1 Feedback signal

Select between 2-10V and 0-5V feedback voltage output .

2 Control signal — PROP/FLOAT

Actuator can either be controlled by a variable direct voltage, known as a proportional modulating signal (PROP), or by a 3-point floating signal (FLOAT).

3 Sequence or parallel control — — — / SEQ

With sequence (or parallel) control (SEQ), two actuators/valves can be controlled by only one control signal.

For each of these you can choose which part of the voltage range to use, the upper one, 5-10 V (6-10 V) or the lower one, 0-5 V (2-6 V).

If the switch NORM / INV is in the NORM position, the higher voltage corresponds to 100% flow and the lower one to 0%. With NORM / INV in the INV position you will get the opposite function. Note! If sequence or parallel control is not used, the switch — — — / SEQ must be in the OFF position, as the switch MOD / INC is not valid during sequence or parallel control.

4 Voltage range — 0-10 / 2-10

You can choose whether to use the control signal voltage range 0-10 V or 2-10 V.

5 Part of voltage range — 0-5, 2-6 / 5-10. 6-10

You can choose which part of a voltage range to use, the lower one 0-5 V (2-6 V) or the upper one 5-10 V (6-10 V).

If the switch is in the NORM position, the higher voltage corresponds to 100% flow and the lower one to 0%. To achieve the opposite function, the switch should be put in its INV position.

6a Running time — 60 s / 300 s

With 3-point floating control, you can choose a running time between 60 s or 300 s.

With modulating control, the running time is 20 s.

7 Direction of movement — NORM / INV

Actuators direction of movement according to the control signal. In normal 'NORM' mode the actuator directly follows the control signal and closes the valve downwards against a 0V control signal.

In inverse 'INV' mode, the actuator reverses the direction of travel against the control signal and will open the valve upwards against a 0V control signal.

8 Linearization — LIN /EQ%

The total valve characteristics can be modified from linear to EQ%.

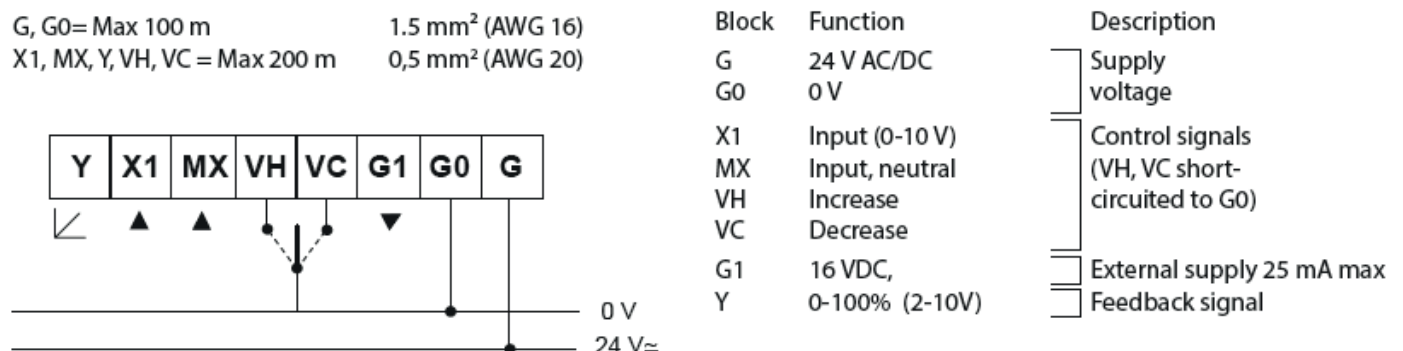
9 End position adjustment — OP / ADJ

This switch is only used to adjust the end positions when the actuator is commissioned.

Momentarily put the switch in the ON position. The actuator will automatically find the end positions of the valve.

Stroke calibration will only be initiated once power is applied to the actuator and the user has triggered this switch.

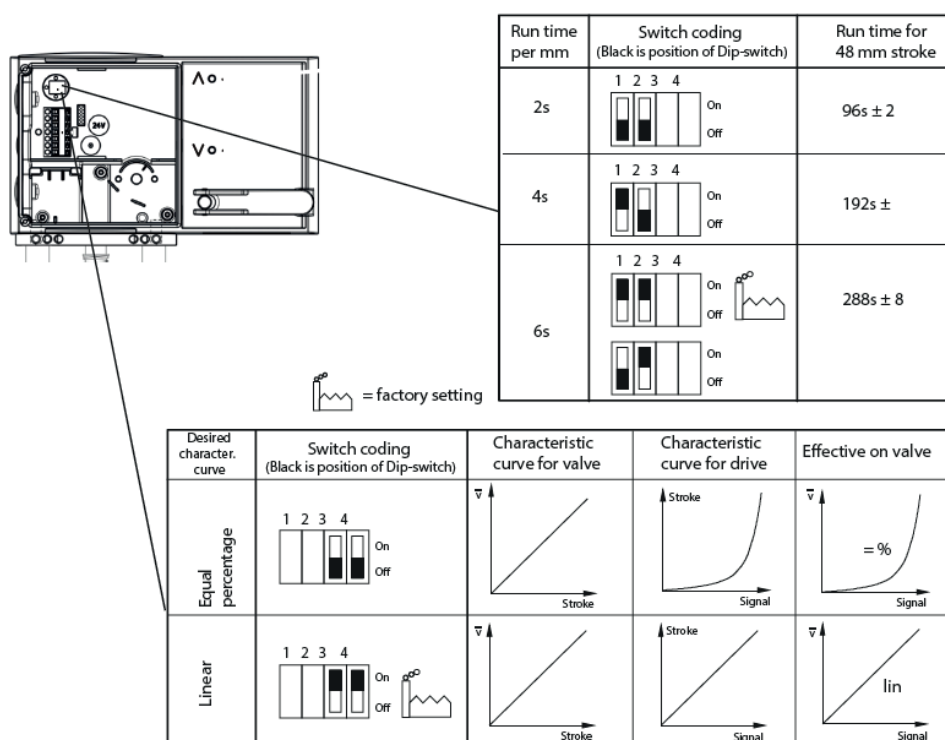
AL202 SR Connection Diagrams (DN50-125)



8.3 AL202 SR (DN150-300) Technical Information

Valve Dimension	Technical Code	Control Signal	Function	Actuator Force	Supply Voltage	Power Consumption
DN150-DN200	AELAAL202SRFO 24VAC/DC08	0-10V/4-20mA 2/3 point	Spring Return Stem up	1100N	24V AC +/-20% 24V DC +/-15%	10 W (*20VA)
DN150-DN200	AELAAL202SRFC 24VAC/DC09	0-10V/4-20mA 2/3 point	Spring Return Stem down	1100N	24V AC +/-20% 24V DC +/-15%	10 W (*20VA)
DN250-DN300	AELAAL202SRFO 24VAC/DC11	0-10V/4-20mA 2/3 point	Spring Return Stem up	2000N	24V AC +/-20% 24V DC +/-15%	10 W (*20VA)
DN250-DN300	AELAAL202SRFC 24VAC/DC12	0-10V/4-20mA 2/3 point	Spring Return Stem down	2000N	24V AC +/-20% 24V DC +/-15%	10 W (*20VA)

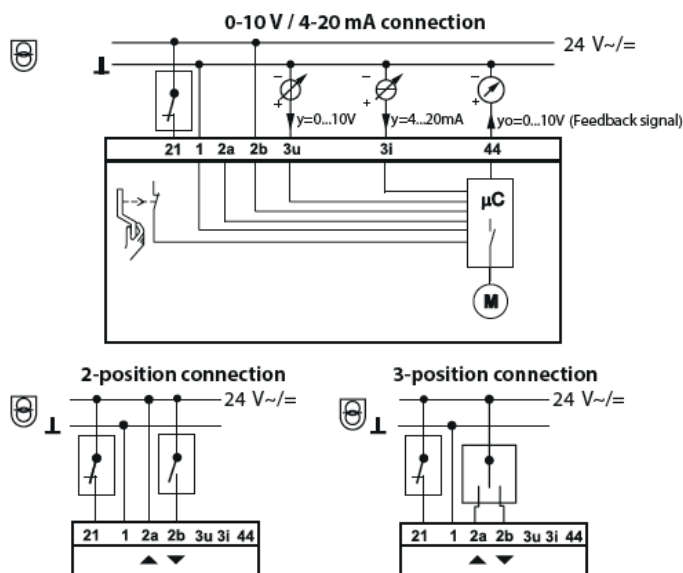
8.4 AL202 SR (DN150-300) Actuator Settings and Connections



AL202 SR Connection Diagrams (DN150-300)

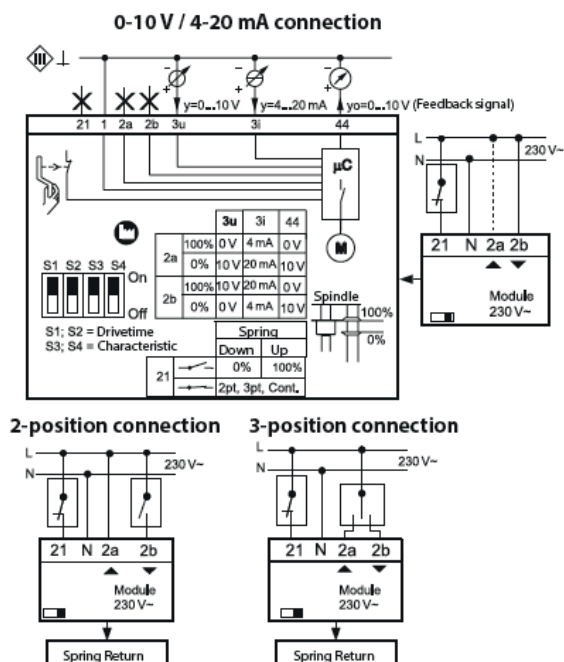
Spring Return

24 V AC/DC



Spring Return

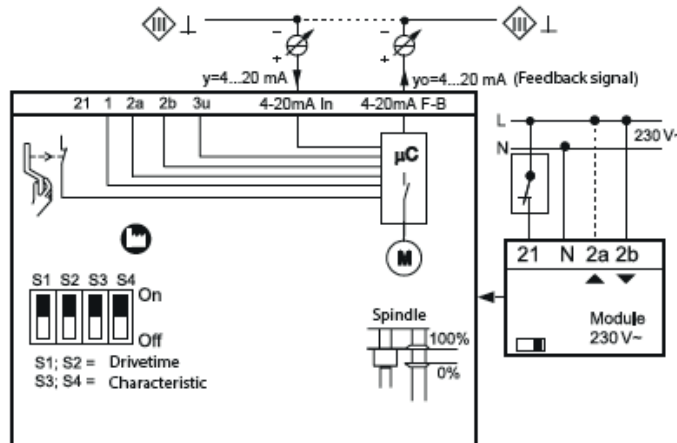
With 230 V
Accessory Module



Spring Return

230 V AC

4-20 mA connection - Please note: The 4-20 mA control and feedback signal must have power supply



The feedback signal is calibrated from factory. But if necessary, the feedback signal can be fine tuned by the potentiometers on the feedback Module.

It is recommend to start with open valve and adjust the 4 mA-value by the **GAIN**-potentiometer.

Then the valve can be closed and the 20 mA-value can be adjusted by the **OFFSET**-potentiometer.

9. Approvals Classification

- The valve is classified in accordance with PED 2014/68/EU as Sound Engineering Practice (SEP), EMC (Electro Magnetic Compatibility) Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.

10. Troubleshooting

- If any maintenance is to be undertaken on the valve it is the responsibility of the installer to ensure the system is adequately drained and depressurized.
- A full risk assessment should be undertaken prior to any works taking place.

11. Warranty

- For further details of Albion Valves (UK) Ltd warranty period, please refer to Albion Valves (UK) Ltd 'Conditions of Sale' available on our website.



About Albion Valves (UK) Ltd

Albion has been supplying valves and fittings to the building services and industrial markets for the past 40 years.

Albion was created with the sole purpose of providing quality products at an affordable price. With a growing reputation for quality and reliability, Albion is now an established brand providing the industry with a trusted alternative to premium-priced products.

Our commitment to setting the highest standards in all areas of our business means, if you're looking for quality, service, delivery and choice — you'll find it's all at Albion.

Quality

Whatever you need, you can rest assured that if it comes from Albion it has been designed and manufactured to deliver optimum performance and is accredited with the necessary approvals. Our in-house quality department are always on hand too!

Service

We pride ourselves on our customer service – we have even won awards for it! Our cradle to grave approach means you will never be on your own!

Delivery

We know that time is money, and when a priority project depends on a part you can trust Albion to deliver – next day for all orders placed before 4:00PM.

Choice

We may have started out with a single brass ball valve, but our range has grown substantially since and we now consider ourselves to be a 'One Stop Shop' with our comprehensive range. It is becoming more and more apparent to the industry, that it really is all at Albion.