

EL2



Technical Features

- › Electronic control units developed to control proportional valves PRL1 and PRL2
- › Compact units mounted on a strip 35/7.5 to DIN 50 022
- › Possibility of the internal connection
- › Enclosure type - IP20

Functional Description

The electronic control units were developed to control the proportional valves PRL1 and PRL2. The supply voltages are 12 and 24 V. The control units are built-in separately or mounted two of them into one box. Two built-in units are connected internally. The basic unit is the EL2-xxA (powerful output stage) which works as a voltage-current transformer. The other units, which adjust the command signal or enable the control of the measured variable, can be combined with the basic unit. For more complicated applications, more units can be used, these being connected externally. The connection of the units is realized by two wires or by one wire with the middle-point at one half of the supply voltage (Ucc/2). One half of the supply voltage uses the electronic control units as the basic signal voltage level.

Type Applications

	PRL1-06		PRL2-06
	12 V	24 V	24 V
EL2-12A	-	-	-
EL2-12CA	-	-	-
EL2-24A	-	-	-
EL2-24BA	-	-	-
EL2-24CA	-	-	-
EL2-24DA	-	-	-

Ordering Code

EL2 - 	
Electronic control unit	
Nominal supply voltage	
12 V DC	12
24 V DC	24
	A BA CA DA
	Electronic control unit with output stage for PRL1 Electronic control unit with spool-position controller for PRL2 Electronic control unit with ramp and output stage for PRL1 Electronic control unit with PID-controller and output stage for PRL1

EL2-12A ELECTRONIC CONTROL UNIT WITH OUTPUT

- › Output stage with impulse width modulation
- › Indication of the output stage function
- › Possibility of the internal connection with units of the type series EL2-12

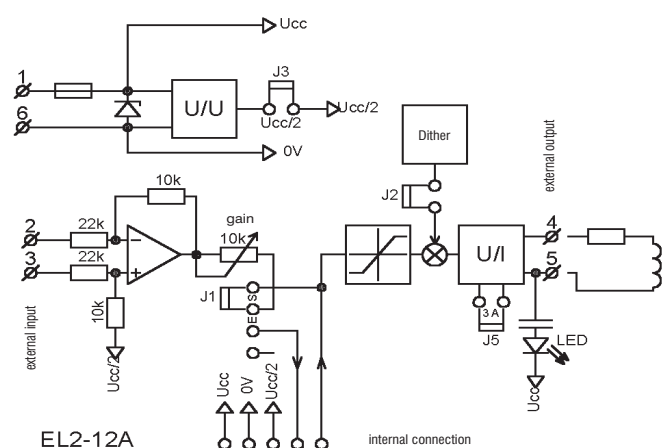
Functional Description

The electronic control unit EL2-12A was developed to control the proportional valve PRL1. The unit contains an output stage and works as a voltage-current transformer. The command signal is routed to the input of the differential amplifier (Fig.1). The unit EL2-12A can also be combined with another unit of the series EL2-12. Both these units are then assembled into one box.

Technical Data

Supply voltage U_{cc}	(clamps A1, A6)	V	11 ... 16
Command differential voltage U_w	(clamps A2, A3)	V	± 5
Supply current (max.)	(clamps A1, A6)	A	3
Dither frequency		Hz	cca 500
Output current limit	(clamps A4, A5)	A	3
Gain adjusted by manufacturer		A/V	2.4/5

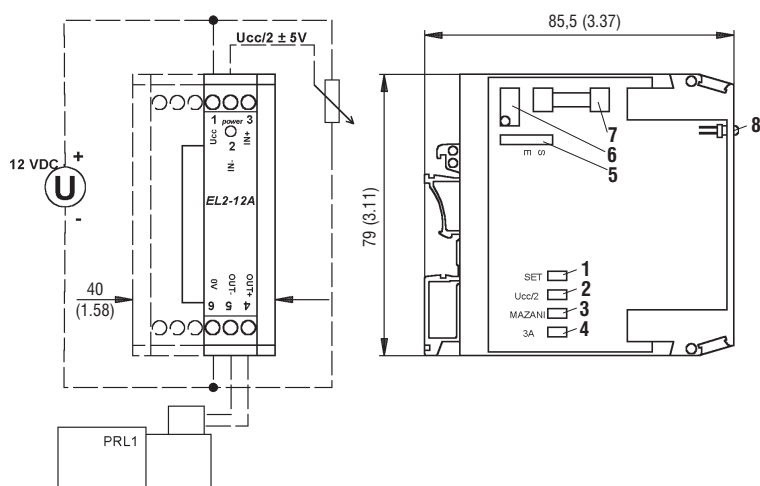
Connection Diagram



Internal switches of the EL2-12A

- J1 mode selection
 - S card works separately
 - E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

Connection and Adjustment Elements



- do not connect
- connects $U_{cc}/2$
- connects dither
- connection increases gain
- mode selection
 - S external control without signal adjustment
 - E external control - the signal passage is disconnected for the internal connection to the other card, adjusting the signal
- gain
- fuse 3A
- LED-indication

Connection of clamps

- A1 - supply voltage 12 V
- A2 - command - inverted input of the differential amplifier
- A3 - command - noninverted input of the differential amplifier
- A4 - output 1 for the linear motor of the PRL1
- A5 - output 2 for the linear motor of the PRL1
- A6 - supply voltage 0 V

EL2-12CA ELECTRONIC CONTROL UNIT WITH RAMP AND OUTPUT STAGE FOR PRL1

- › Quadruple ramp
- › Gain adjustment outside a small area around null

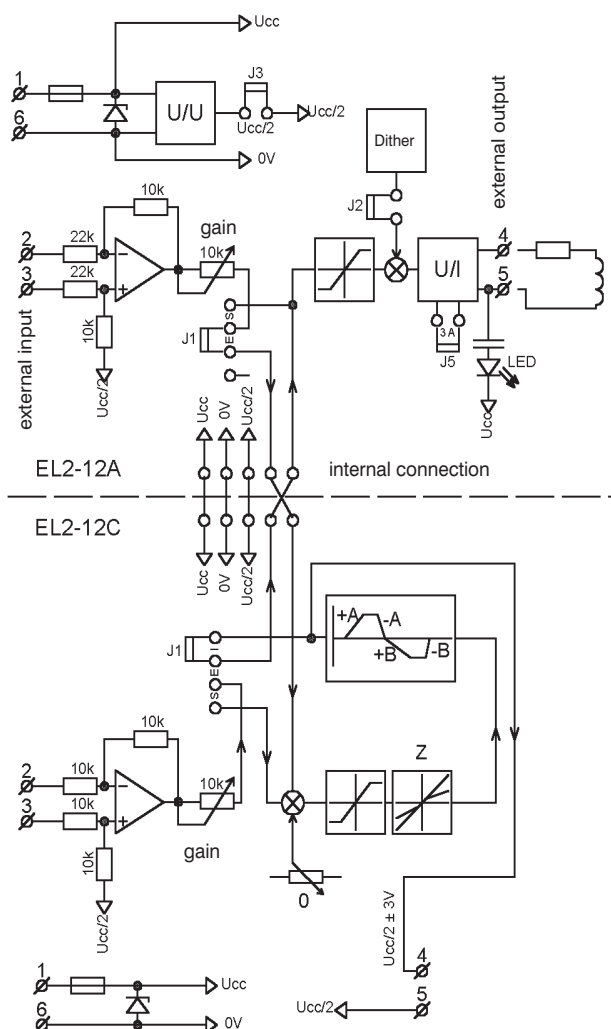
Functional Description

The electronic control unit EL2-12CA was developed to control the proportional directional valve PRL1. It consists of the units EL2-12C and EL2-12A. The command signal is routed to the differential amplifier of the unit EL2-12A where its level can be adjusted. The adjusted signal passes then through the mode selector J1 and further on to the unit EL2-12C. Here, it can be shifted by a D.C. voltage, adjustable by means of the trim 0, and with the exception of a small area around the null, attenuated. The signal level can also be limited. Then, the signal is formed by a ramp generator (trims +A, -A, +B, -B) and returns back to the unit EL2-12A. In this unit, the signal is eventually limited and transformed into current supplying the linear motor. The connection between the proportional valve PRL1 and the control unit EL2-12CA is made by a two-core cable.

Technical Data

Supply voltage U_{cc}	(clamps A1, A6)	V	11 ... 16
Command differential voltage U_w	(clamps A2, A3)	V	± 5
Supply current (max.)	(clamps A1, A6)	A	3
Output current limit	(clamps A4, A5)	A	3
Output of the ramp function	(clamps C4, C5)	V	± 3
Adjustable range of the ramp function, signal level 0 ... 100%		s	0.05 ... 2

Connection Diagram



Internal switches of the EL2-12A

- J1 mode selection
- S card works separately
- E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

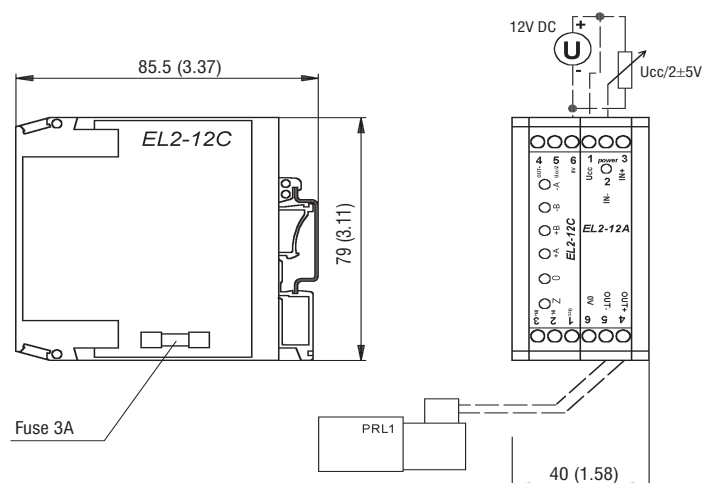
Internal switches of the EL2-12C

- J1 mode selection
- I card forms the signal for card EL2-12A

External adjustable trims

- 0 null
- Z gain
- +A ramp function in area +A
- +B ramp function in area +B
- A ramp function in area -A
- B ramp function in area -B

Connection and Adjustment Elements



Connection of clamps

- | | |
|--|----------------------------|
| A1 - supply voltage 12 V | C1 - (supply voltage 12 V) |
| A2 - command - inverted input of the differential amplifier | C2 - not connected |
| A3 - command - noninverted input of the differential amplifier | C3 - not connected |
| A4 - output 1 for the linear motor of the PRL1 | C4 - ramp function output |
| A5 - output 2 for the linear motor of the PRL1 | C5 - $U_{cc}/2$ |
| A6 - (supply voltage 0 V) | C6 - (supply voltage 0 V) |

EL2-24A ELECTRONIC CONTROL UNIT WITH OUTPUT STAGE FOR PRL1

- › Output stage with impulse width modulation
- › Indication of the output stage function
- › Possibility of the internal connection with units of the type series EL2-24

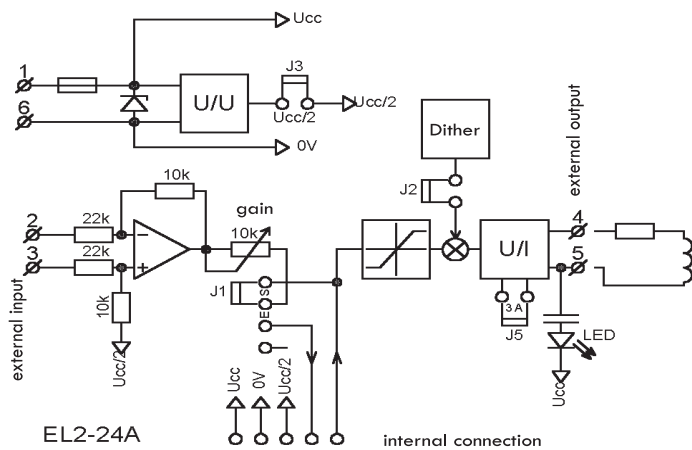
Functional Description

The electronic control unit EL2-24A was developed to control the proportional valve PRL1 and in connection with the unit EL2-24B to control the proportional valve PRL2. The unit contains an output stage and works as a voltage-current transformer. The command signal is routed to the input of the differential amplifier (Fig.1). The unit EL2-24A can also be combined with another unit of the series EL2-24. Both these unit are then assembled into one box.

Technical Data

Supply voltage U_{cc}	(clamps A1, A6)	V	22 ... 30
Command differential voltage U_w	(clamps A2, A3)	V	± 10
Supply current (max.)	(clamps A1, A6)	A	2.5
Dither frequency		Hz	cca 500
Output current limit	(clamps A4, A5)	A	2.1
Gain adjusted by manufacturer		A/V	2/10

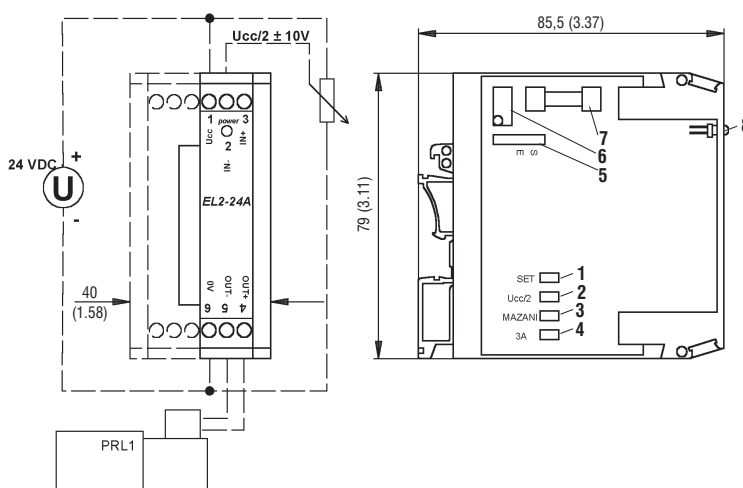
Connection Diagram



Internal switches of the EL2-24A

- J1 mode selection
 - S card works separately
 - E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

Connection and Adjustment Elements



1. do not connect
2. connects $U_{cc}/2$
3. connects dither
4. connection increases gain
5. mode selection
 - S external control without signal adjustment
 - E external control - the signal passage is disconnected for the internal connection to the other card, adjusting the signal
6. gain
7. fuse 3A
8. LED-indication

Connection of clamps

- A1 - supply voltage 24 V
- A2 - command - inverted input of the differential amplifier
- A3 - command - noninverted input of the differential amplifier
- A4 - output 1 for the linear motor of the PRL1
- A5 - output 2 for the linear motor of the PRL1
- A6 - supply voltage 0 V

EL2-24BA ELECTRONIC CONTROL UNIT WITH SPOOL-POSITION CONTROLLER FOR PRL2

- › PID-controller for spool-position control
- › Unit necessary for PRL2
- › Possibility of ordering a special connecting cable for PRL2

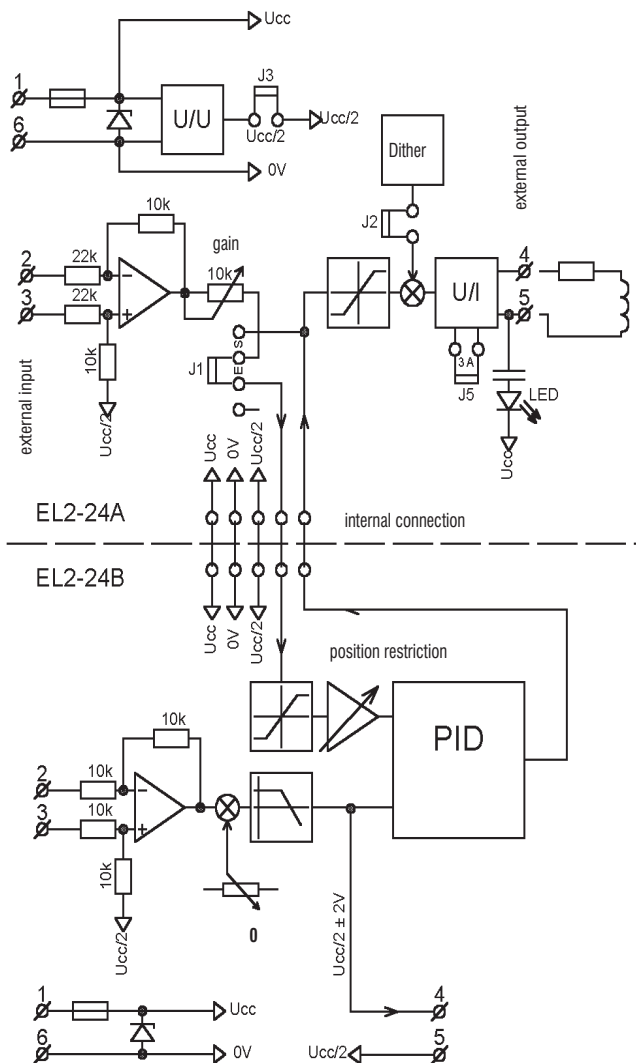
Functional Description

The electronic control unit EL2-24BA was developed to control the proportional directional valve PRL2. It consists of the units EL2-24A and EL2-24B which are internally connected in a box. The connection between the proportional valve PRL2 and the control unit EL2-24BA is made by a six-core cable. Two cores supply the linear motor and the other four connect the electronic control unit of the position transducer which is integrated directly in the valve PRL2. Two cores carry the information about the spool position. The corresponding signal is filtered and subtracted from the command signal which is routed from the control unit EL2-24A through an internal connection. The error signal is amplified in a PID-controller and returns then back through an internal connection to unit EL2-24A. In this unit, the signal is eventually limited and transformed into current.

Technical Data

Supply voltage U_{cc}	(clamps A1, B6)	V	22 ... 30
Command differential voltage UW	(clamps A2, A3)	V	± 10
Supply current (max.)	(clamps A1, B6)	A	2
Output current limit	(clamps A4, A5)	A	2,6
Output of the spool-position signal U_p	(clamps B4, B5)	V	± 2

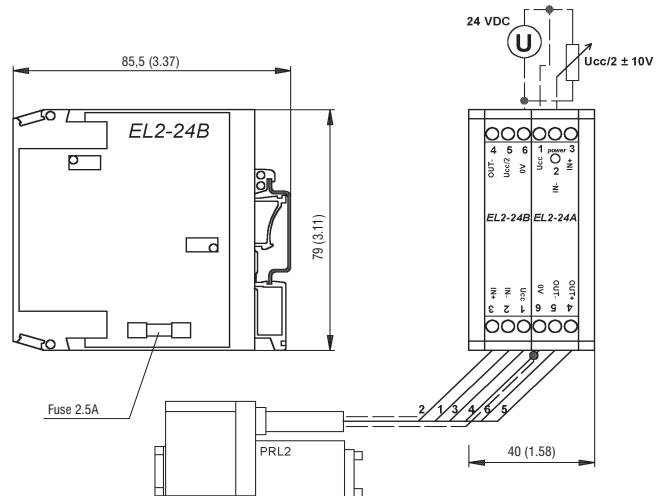
Connection Diagram



Internal switches of the EL2-24A

- J1 mode selection
- S card works separately
- E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

Connection and Adjustment Elements



Caution!

- › Special six-core cable for PRL2
- › The cable is delivered in the standard lengths of 2 m (6.56 ft.), 3 m (9.84 ft.), 5 m (16.404 ft.), 10 m (32.809 ft.) or 15 m (49.213 ft.). The required length is to be specified in the order.
- › The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

Connection of clamps

- A1 - supply voltage 24 V
- A2 - command - inverted input of the differential amplifier
- A3 - command - noninverted input of the differential amplifier
- A4 - output 1 for the linear motor of the PRL1
- A5 - output 2 for the linear motor of the PRL1
- A6 - supply voltage 0 V

- B1 - supply voltage 24 V
- B2 - inverted input of the position transducer amplifier
- B3 - noninverted input of the position transducer amplifier
- B4 - output of the spool-position signal
- B5 - $U_{cc}/2$ (for measuring of the spool-position only)
- B6 - supply voltage 0 V

EL2-24CA ELECTRONIC CONTROL UNIT WITH RAMP AND OUTPUT STAGE FOR PRL1

- › Quadruple ramp
- › Gain adjustment outside a small area around null

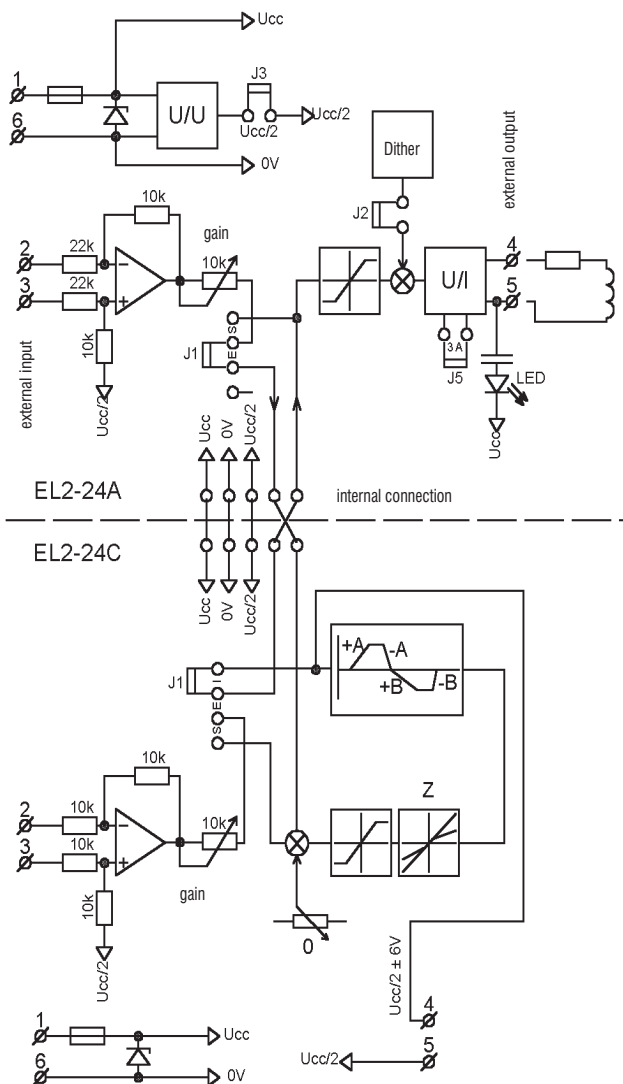
Functional Description

The electronic control unit EL2-12CA was developed to control the proportional directional valve PRL1. It consists of the units EL2-12C and EL2-12A. The command signal is routed to the differential amplifier of the unit EL2-12A where its level can be adjusted. The adjusted signal passes then through the mode selector J1 and further on to the unit EL2-12C. Here, it can be shifted by a D.C. voltage, adjustable by means of the trim 0, and with the exception of a small area around the null, attenuated. The signal level can also be limited. Then, the signal is formed by a ramp generator (trims +A, -A, +B, -B) and returns back to the unit EL2-12A. In this unit, the signal is eventually limited and transformed into current supplying the linear motor. The connection between the proportional valve PRL1 and the control unit EL2-12CA is made by a two-core cable.

Technical Data

Supply voltage U_{cc}	(clamps A1, A6)	V	11 ... 16
Command differential voltage U_w	(clamps A2, A3)	V	± 5
Supply current (max.)	(clamps A1, A6)	A	3
Output current limit	(clamps A4, A5)	A	3
Output of the ramp function	(clamps C4, C5)	V	± 3
Adjustable range of the ramp function, signal level 0 ... 100%		s	0.05 ... 2

Connection Diagram



Internal switches of the EL2-24A

- J1 mode selection
- S card works separately
- E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

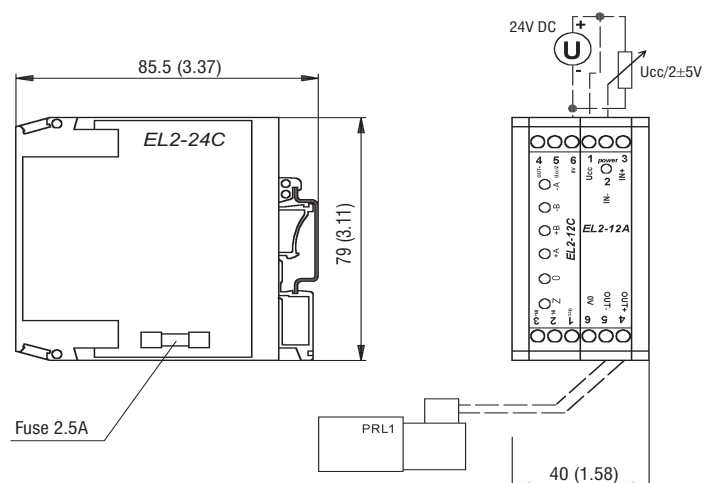
Internal switches of the EL2-24C

- J1 mode selection
- I card forms the signal for card EL2-24A

External adjustable trims

- 0 null
- Z gain
- +A ramp function in area +A
- +B ramp function in area +B
- A ramp function in area -A
- B ramp function in area -B

Connection and Adjustment Elements



Connection of clamps

- | | |
|--|----------------------------|
| A1 - supply voltage 12 V | C1 - (supply voltage 12 V) |
| A2 - command - inverted input of the differential amplifier | C2 - not connected |
| A3 - command - noninverted input of the differential amplifier | C3 - not connected |
| A4 - output 1 for the linear motor of the PRL1 | C4 - ramp function output |
| A5 - output 2 for the linear motor of the PRL1 | C5 - $U_{cc}/2$ |
| A6 - (supply voltage 0 V) | C6 - (supply voltage 0 V) |

EL2-24DA ELECTRONIC CONTROL UNIT WITH PID-CONTROLLER AND OUTPUT STAGE FOR PRL1

› PID-controller for an external control loop

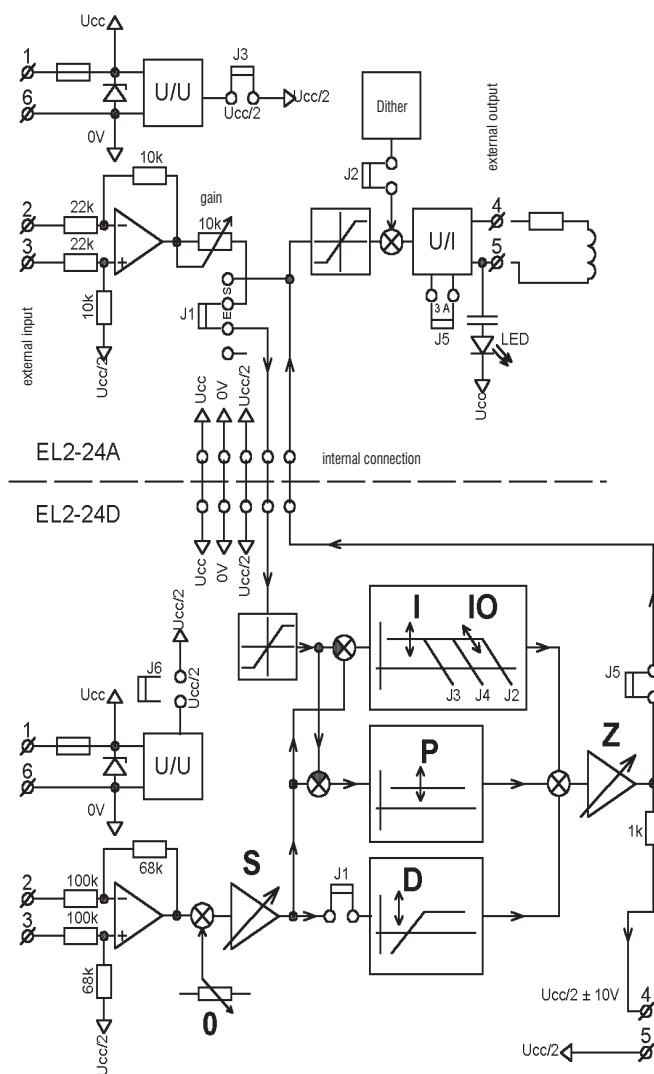
Functional Description

The electronic control unit EL2-24DA was developed to control the proportional directional valve PRL1. It consists of the units EL2-24D and EL2-24A. The command signal is routed to the differential amplifier of the unit EL2-24A, where its level can be adjusted. Then the adjusted signal passes through the mode selector J1 and further on to the unit EL2-24D. In this unit, the adjusted signal from the external transducer (its level S and shifting O is adjustable) is subtracted from the command signal. The resulting control error is routed to the PID-controller. Then the output signal of the controller returns back through an internal connection to the unit EL2-24A. In this unit, the signal is eventually limited and transformed into current. The connection between the proportional valve PRL1 and the control unit EL2-24DA is made by a two-core cable (which connects the control unit with the coil of the linear motor).

Technical Data

Supply voltage U_{cc}	(clamps A1, D6)	V	22 ... 30
Command differential voltage U_w	(clamps A2, A3)	V	± 10
Supply current (max.)	(clamps A1, D6)	A	2.5
Output current limit	(clamps A4, A5)	A	2,1
Output of the PID-controller	(clamps D4, D5)	V	$U_{cc}/2 \pm 10$

Connection Diagram



Internal switches of the EL2-24A

- J1 mode selection
- S card works separately
- E card works in cooperation with another card
- J2 connects dither
- J3 connects voltage level $U_{cc}/2$
- J5 step increase of the output stage gain

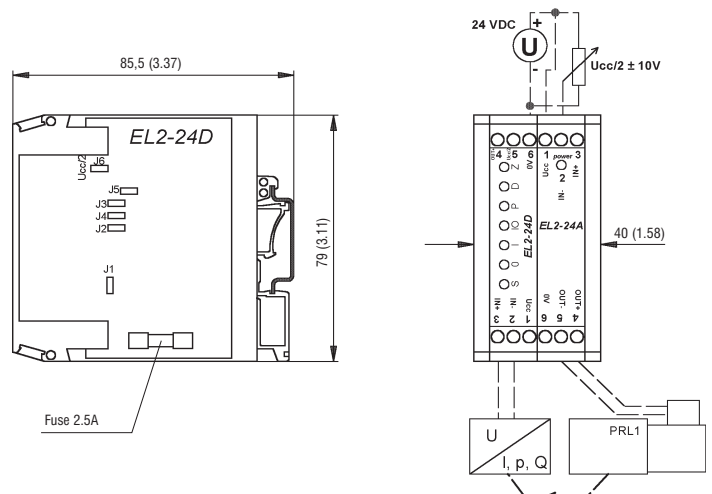
Internal switches of the EL2-24D

- J1 connects derivative component
- J2-J4 step increase of the time constant of the integral component
- J5 connects the internal output of the PID-controller
- J6 connects voltage level $U_{cc}/2$

External adjustable trims

- S adjustment of the transducer
- O shifting of the transducer signal
- I gain of the integral component
- IO limitation of the integral component
- P proportional component
- D derivative component
- Z total gain

Connection and Adjustment Elements



Connection of clamps

- A1 - supply voltage 24 V
- A2 - command - inverted input of the differential amplifier
- A3 - command - noninverted input of the differential amplifier
- A4 - output 1 for the linear motor of the PRL1
- A5 - output 2 for the linear motor of the PRL1
- A6 - (supply voltage 0 V)

- D1 - supply voltage 24 V
- D2 - transducer-inverted input of the differential amplifier
- D3 - transducer-noninverted input of the differential amplifier
- D4 - output of the PID-controller
- D5 - $U_{cc}/2$
- D6 - supply voltage 0 V

