

Technical documentation

LE4-40

231517
as of Version 1.0

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1 Technical data

1.1 General

The LE4-40 is a power output stage for 2-phase stepping motors. It operates on the bipolar constant current principle. The advantages of this method are low-noise motor operation, combined with high efficiency in the output stage. The opto-decoupled input signals are optimally prepared for adaptation to various controllers.

- Up to 4.0A phase current
- Bipolar constant current chopper
- Digital current adjustment (rotary switch)
- Short-circuit resistant
- Fault display
- Stand-by display
- Temperature monitoring (cut-out threshold 80°C at the heat sink)
- Step angle adjustable (200, 400, 500, 800, 1000, 1600)
- Opto-decoupled input signals
- Floating stand-by contact
- Clocking frequency up to 40KHz

1.2 Electrical data

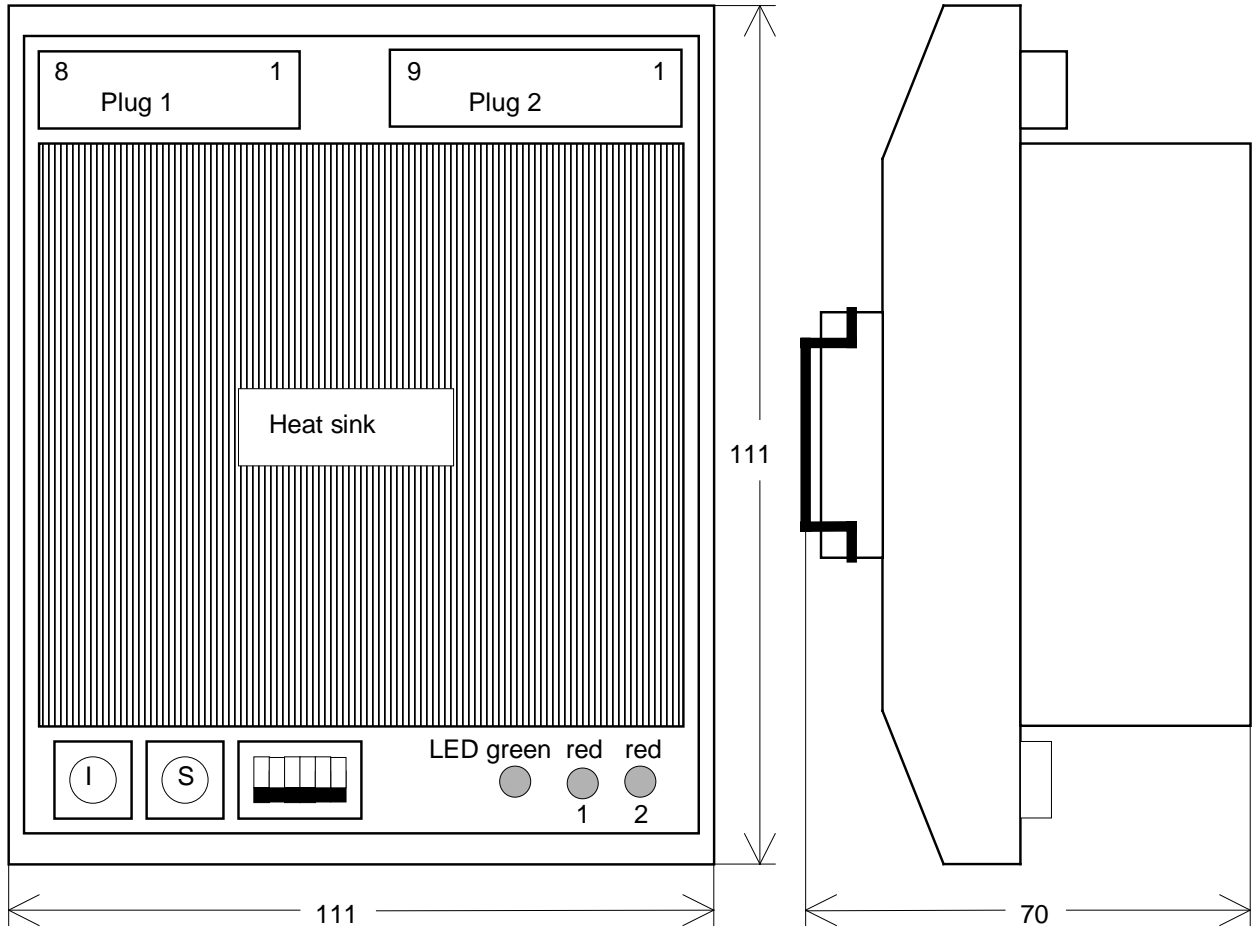
Operating voltage	12 ... 35VDC
Limit values min. / max.	10VDC /40VDC
Residual ripple	< 10% operating voltage
Phase current	adjustable: 0.9A to 4.0A
Automatic current reduction	adjustable: I_N , $I_N \times 0.75$; $I_N \times 0.5$; $I_N \times 0.25$
F_{max}	40kHz
Pulse width	min. 10 μ s
Rise time	$\leq 1\mu$ s (10..90%)
Fall time	$\leq 1\mu$ s (10..90%)
Operating temperature	0 ^o C to 40 ^o C
Storage temperature	0 ^o C to 70 ^o C
Input signals electrically isolated	
Input signal level	5V / 24V (via solder jumpers 1 to 3)
Input signal current	typ. 15mA
Relay contact output (NO contact)	36VDC / 30VAC max. rupturing capacity: 10W max. switching current: 0.5A

Please note:

The input signal level is prepared for 5V (see chapter 6.6 Signal level adjustment and 6.7 Standard setting).

1.3 External dimensions

The output stage modul is intended for mounting on cover mounting rails.

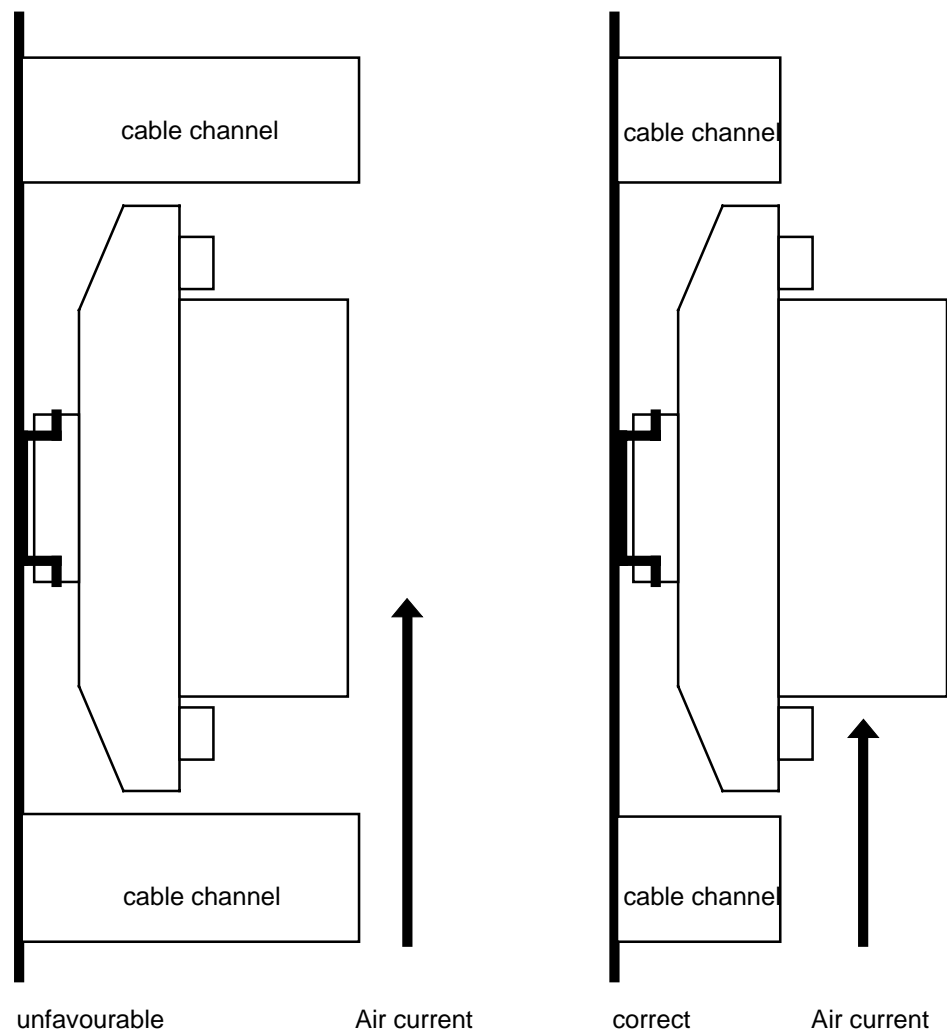


1.4 Ventilation

The power output stage LE4-40 can be operated with a max. phase current of 3A and a maximum operating temperature of 40° C without external ventilation.

If the stated maximum values are exceeded, external ventilation is absolutely essential to dissipate the power loss.

The power output stage is switched off if the heat sink temperature exceeds 80° C.



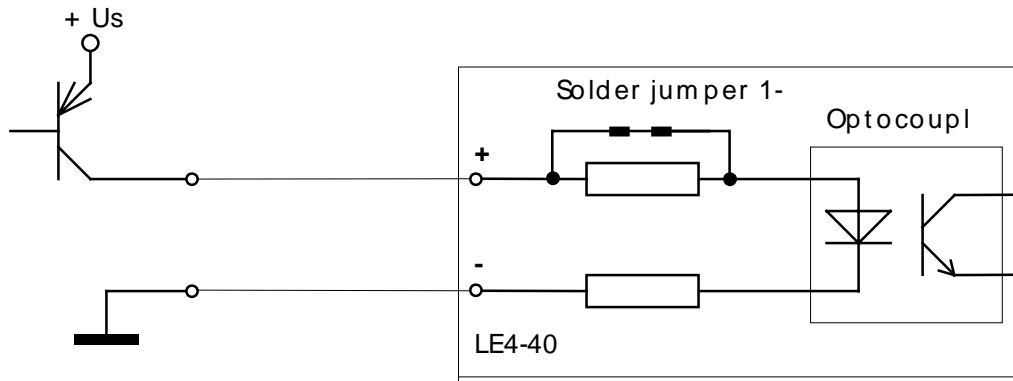
Please note:

Ensure that the air can circulate unhindered

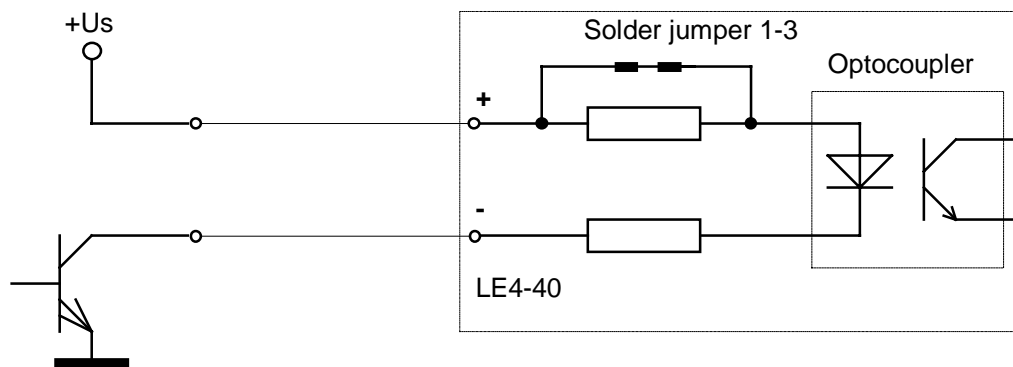
2 Control inputs

The control inputs of the power output stage LE4-40 was provided with optpcouplers. The input signal level can turned-in with the solder jumper 1-3. The power output stage is prepared for 5V signal level.

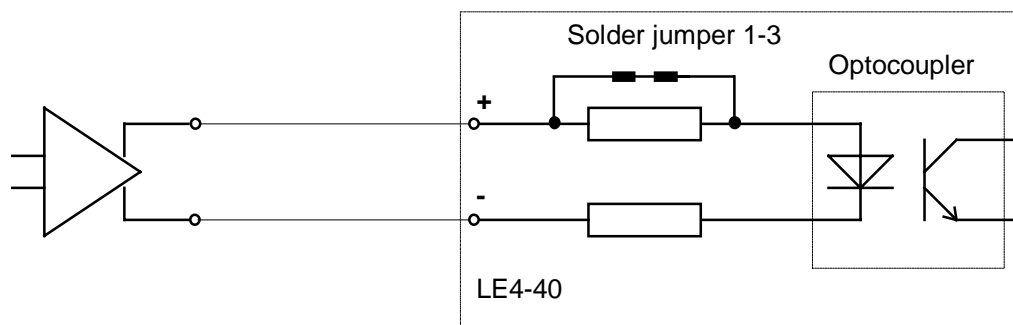
2.1 PNP control



2.2 NPN control



2.3 Push-pull control



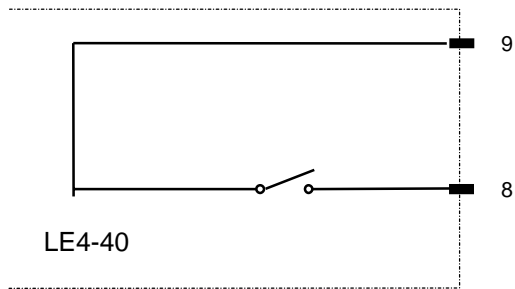
Solder jumpers 1 to 3 open

: 24V signal level

Solder jumpers 1 to 3 closed : 5V signal level

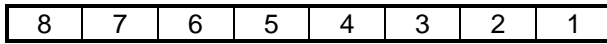
3 Output circuit

Relay contact output 36 VDC / 36VAC



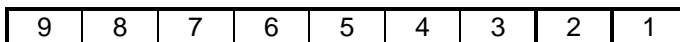
4 Terminal assignment

4.1 Connector 1



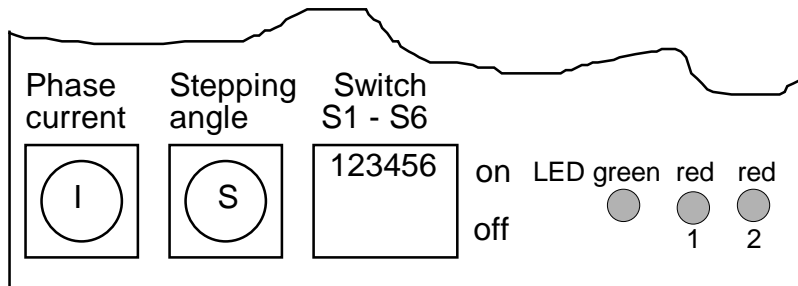
- 1 Protective conductor
- 2 Protective conductor
- 3 Motor winding 2 end
- 4 Motor winding 2 start
- 5 Motor winding 1 end
- 6 Motor winding 1 start
- 7 + operating voltage
- 8 (Gnd) operating voltage

4.2 Connector 2



- 1 Protective conductor (shielding)
- 2 + pulse
- 3 - pulse
- 4 + direction
- 5 - direction
- 6 + selector input
- 7 - selector input
- 8 Ready
- 9 Ready

5 Displays and programming switches



6 Adjustments

Important:

The switch settings are transferred to the system only once after the operating voltage is applied

6.1 Stepping angle adjustment (S)

Stepping angle	200	400	500	800	1000	1600				
Switch position	0	1	2	3	4	5	6	7	8	9

6.2 Phase current adjustment (I)

Phase current

Phase current (A)	0	0	0,9	1,1	1,3	1,6	1,8	2,0
Switch position	0	1	2	3	4	5	6	7

Phase current (A)	2,25	2,5	2,75	3,0	3,25	3,5	3,75	4,0
Switch position	8	9	A	B	C	D	E	F

6.3 Current reduction (S1, S2)

Current reduction

S1	S2	Current reduction (active at pulse frequency < 10Hz)
OFF	OFF	No current reduction ($I = I_N$)
ON	OFF	Current reduction ($I = I_N \times 0,75$)
OFF	ON	Current reduction ($I = I_N \times 0,5$)
ON	ON	Current reduction ($I = I_N \times 0,25$)

6.4 Rotation direction (S3)

S3	ON	Rotation direction clockwise for input direction not energized
	OFF	Rotation direction counterclockwise for input direction not energized

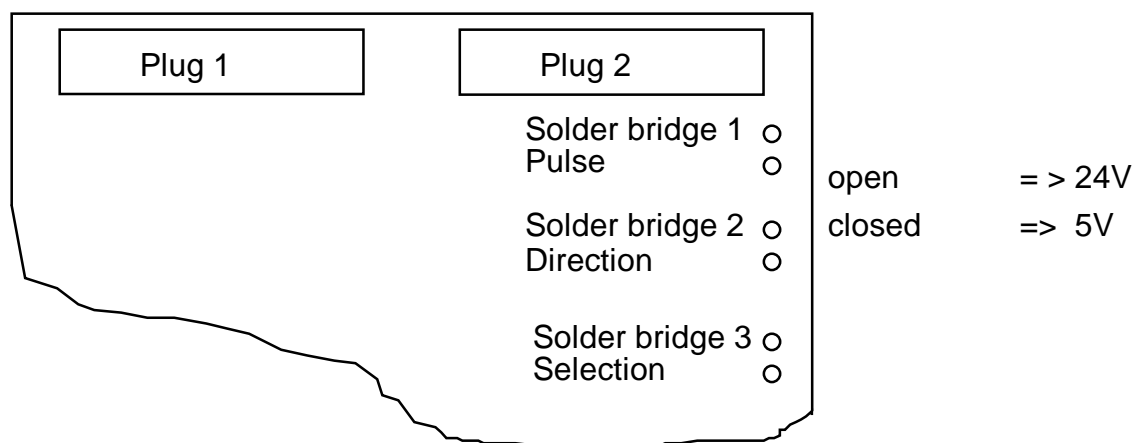
S4		No function
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6.5 Selector input function (S5, S6)

S5	ON	Reset when select input is energized
	OFF	
S6	ON	De-excite when selector input is energized
	OFF	

6.6 Signal level adjustment

The adjustment of the signal level to ensure about to open and closed the soldering bridge 1 bis 3.



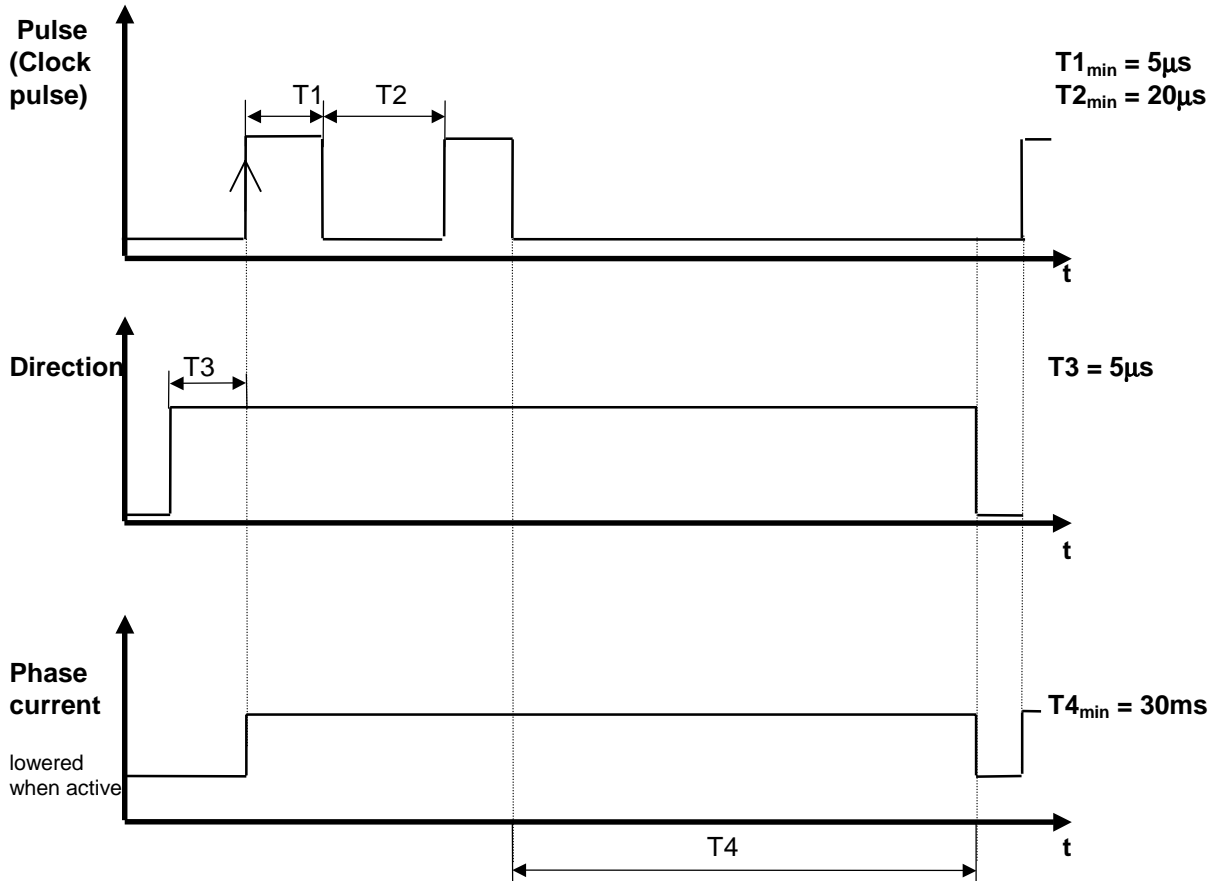
6.7 Standard settings

Standard settings on delivery

Stepping angle : Switch position 1 => 400
Phase current : Switch position 0 => 0A
Current reduction : S1 and S2 OFF
Rotation direction : S3 and S4 OFF
Function selectinput : S5 and S6 OFF

Input signal level : 5V

7 Signal allocation



Switching edge definition:

- Rise time \leq $1\mu\text{s}$ (10% ... 90%)
- Fall time \leq $1\mu\text{s}$
- Pulse width \geq $10\mu\text{s}$

8 Putting into operation

Please note:

The LE12-140 and LE12-140-MO boards may only be plugged in and removed when deenergized.

Procedure:

- Wiring in accordance with the stated assignments (see Section 5 "Connector assignment")
- Make the adjustments for the step angle and phase current and also for the rotation direction and current reduction
- Switch on the operating voltage
- Check the function

9 Diagnosis

Relay contact	LED green	LED 1 red	LED 2 red	Operating state
closed	on	off	off	Output stage ready
open	off	off	on	Short-circuit
open	off	on	on	Overtemperature

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