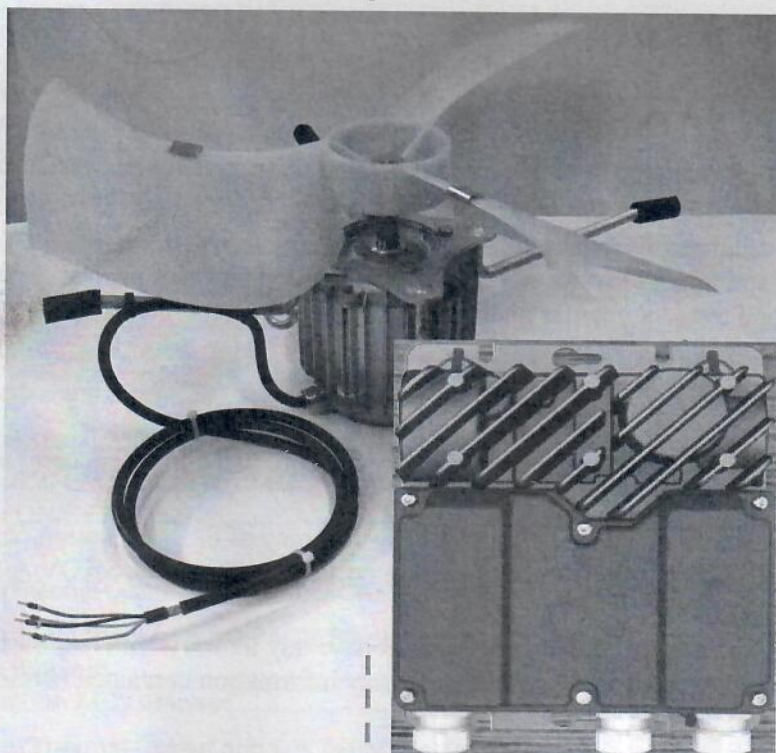


DA 600 LPC-2

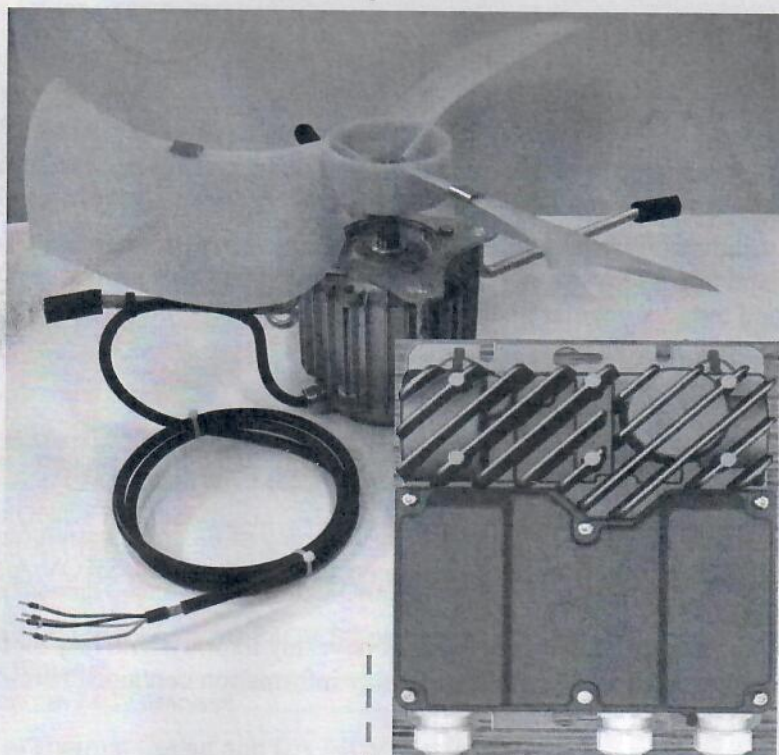
Technical User Guide



For other language variants of this document we refer to your local dealer or <http://docs.skov.com/1051>.

DA 600 LPC-2

Technical User Guide



For other language variants of this document we refer to your local dealer or <http://docs.skov.com/1051>.

1	Product Description.....	5
1.1	Parts for DA 600 LPC-2	5
2	General Information.....	6
2.1	Recommended Tools.....	6
2.2	Warnings and Symbols.....	6
3	Mounting Guide	7
3.1	Positioning of Fan in the DA 600 Exhaust Unit.....	7
3.2	Safety Distance	7
3.3	Mounting the Motor Control	8
3.3.1	Position of Motor Controller.....	8
3.3.2	Ensure access and cooling of Motor Controller	8
3.3.3	Motor Control with Distance Pieces	8
3.3.4	Positioning of Motor Controller.....	9
4	Installation Guide.....	10
4.1	Electrical Connection	10
4.1.1	Cabling in the Exhaust Unit.....	10
4.1.2	Cabling into the Motor Controller	10
4.2	Connection in the Motor Controller	11
4.2.1	Terminals for Power Supply	11
4.2.2	Terminals for Power Supply of Fan.....	11
4.2.3	Signal Terminals.....	12
4.2.4	Terminals on Relay Module (accessories).....	12
4.3	DA 600 LPC-2 Fan	13
4.3.1	Wiring Diagram.....	13
4.3.2	Circuit Diagram.....	14
4.3.2.1	DA 600 LPC-2	14
4.3.2.2	DA 600 LPC-2 w/Thermal Cutout	15
4.4	Dynamic MultiStep.....	16
4.4.1	Cable chart DA 600 LPC-2 with DA 74CO ON/OFF	16
4.4.2	Circuit Diagram ON/OFF	17
4.4.2.1	DA 600 LPC-2 with DA 74CO ON/OFF	17
4.4.2.2	DA 600 LPC-2 w/Thermal Cutout and DA 74CO ON/OFF	18
4.4.3	Cable Chart DA 600 LPC-2 with DA 74CV Stepless	19
4.4.4	Circuit diagram Stepless	20
4.4.4.1	DA 600 LPC-2 with DA 74CV Stepless	20
4.4.5	DA 600 LPC-2 w/Thermal Cutout and DA 74CV Stepless.....	21
4.4.6	Cable Chart DA 600 LPC-2/DA 74CV with Reverse or Alarm Relay	22
4.4.7	Circuit diagram Reverse or Alarm	23
4.4.8	DA 600 LPC-2/DA 74CV with Reverse	23
4.4.9	DA 600 LPC-2/DA 74CV with Alarm	24
4.5	Replacement of DA 600 LPC with DA 600 LPC-2	24
5	Setting Fan Voltage In House Computer	25
5.1	DOL 234 and DOL 234F before Version 7.2.....	25
5.2	DOL 234F Version 7.2	25
5.3	DOL 539 and DOL 534.....	25

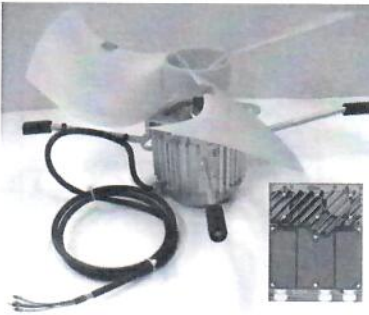
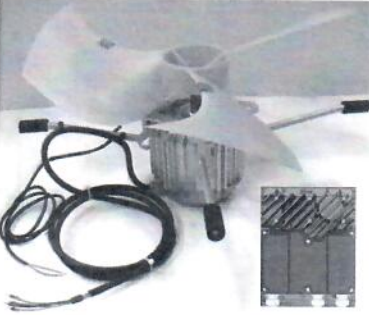
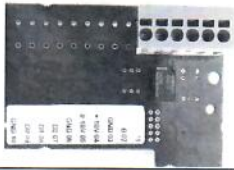
5.4	DOL 34	25
6	Maintenance Instructions.....	26
6.1	Cleaning.....	26
6.1.1	Fan	26
6.1.2	Motor Controller.....	26
6.2	Removal for Recycling/Disposal.....	26
7	Troubleshooting Guide	27
7.1	LED indications.....	Error! Bookmark not defined.
8	Technical Data	28
8.1	ErP/Ecodesign.....	29
8.2	Dimensioned Sketch.....	29
8.2.1	Motor Controller.....	29
8.2.2	Fan	29
8.3	RPM in relation to 10-0 V / 0-10 V Input Terminal.....	30
EU - Declaration of Conformity		31

1 Product Description

DA 600 LPC-2 is an energy-efficient fan which includes a motor control. For LPC-2 (Low Power Consumption) and Dynamic MultiStep systems.

The fan is designed for mounting in DA 600 exhaust units in houses where ventilation is operated in low-pressure ranges, i.e. in LPV and diffuse livestock houses.

1.1 Parts for DA 600 LPC-2

Figure	Description
	445070 DA 600 LPC-11-2 fan 230V 50/60 Hz 445071 DA 600 LPC-12-2 fan 230V 50/60 Hz 445072 DA 600 LPC-13-2 fan 230V 50/60 Hz
	Motor controller Motor 0.75 kW 1300 RPM Fan blade Fan suspension and screws 2 m shielded motor cable
	445073 DA 600 LPC-11-2 fan w/ thermal cutout 445074 DA 600 LPC-12-2 fan w/ thermal cutout 445075 DA 600 LPC-13-2 fan w/ thermal cutout
	Motor controller Motor 0.75 kW 1300 RPM Fan blade Fan suspension and screws 2 m shielded motor cable 2 m cable for thermal cutout Please note if a contactor kit/thermal overload relay is required, cf. item number 409123 and subsequently 409145.
Accessories	
Figure	Description
	409123 Engagement contactor for Fan 230V 409145 Thermal overload relay for Fan 230V with alarm contact For the protection of a DA 600 LPC-2 fan with thermal cutout.
	445927 DA 600 LPC cable set 5M Used as a replacement of the two 2 m cables included.
	445076 LPC-2 relay module Used if an alarm output or reversing of the fan is required. 1 x potential free output relay 1 A, 30 V DC/24 V AC. 1 x digital input.

2 General Information

2.1 Recommended Tools

The following or similar tools are required to service the DA 600 LPC-2. The tools are not supplied by SKOV A/S.

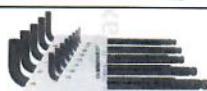
Item	Description
	Multimeter
	Screwdriver set*
	Allen key kit
	Side cutting pliers
	Long-nose pliers
	Knife
	Cordless drill
	Screwdriver bits
	Drill bits, various sizes
	Ladder

Table 1: The most necessary tools for servicing the DA 600 LPC-2.

*Open the lid on the motor controller with:

Torx = T20

or

Allen key = H3

Straight slot screwdriver = SL 3,5

2.2 Warnings and Symbols

This manual uses the following symbols:



Warns of general dangers

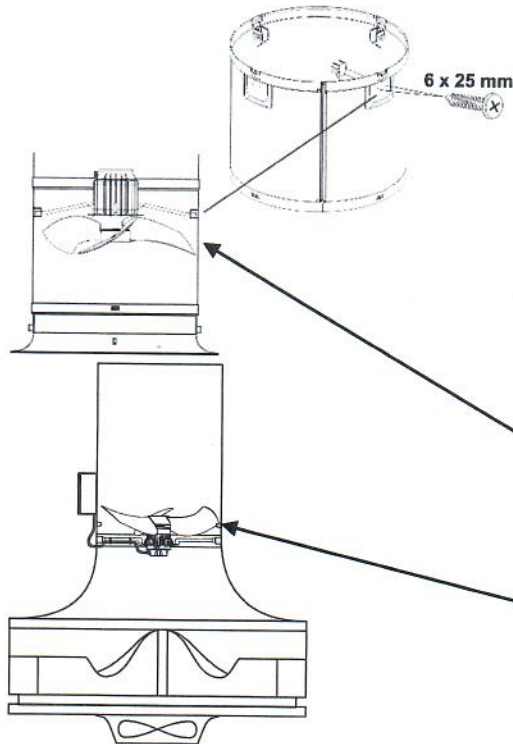
3 Mounting Guide

3.1 Positioning of Fan in the DA 600 Exhaust Unit



The wires to the fan must be short-circuited to avoid the fan rotating (driven by the air) as this can lead to voltage in the wires.

The fan weighs around 8.5 kg.



Mount the four included fan suspension units in the exhaust unit duct.

Position the legs of the fan in the four fan suspension units. The fan is positioned in the fan suspension units of the exhaust unit duct secured only by its own weight and it must therefore be fastened in all four legs using split pins, strips or similar.

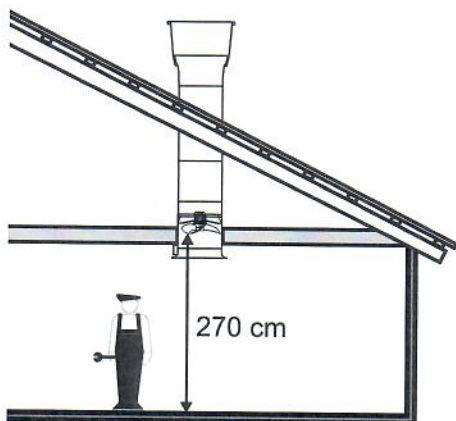
Important!

Check that the fan is correctly positioned in relation to the direction of the air.

For air outlets, the fan blade must be at the bottom and the motor at the top.

For air inlets, the motor must be at the bottom and the fan blade at the top.

3.2 Safety Distance



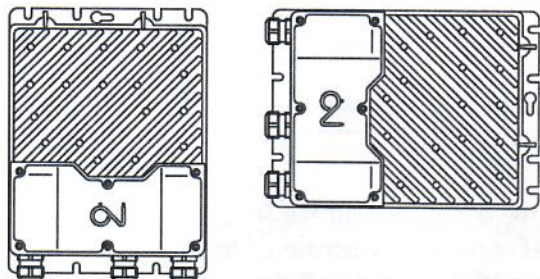
If the distance from the floor to the fan blade is less than 270 cm, a safety net 434091 must be mounted in the bell mouth.

3.3 Mounting the Motor Control



Incorrect mechanical mounting can result in overheating and reduced performance.

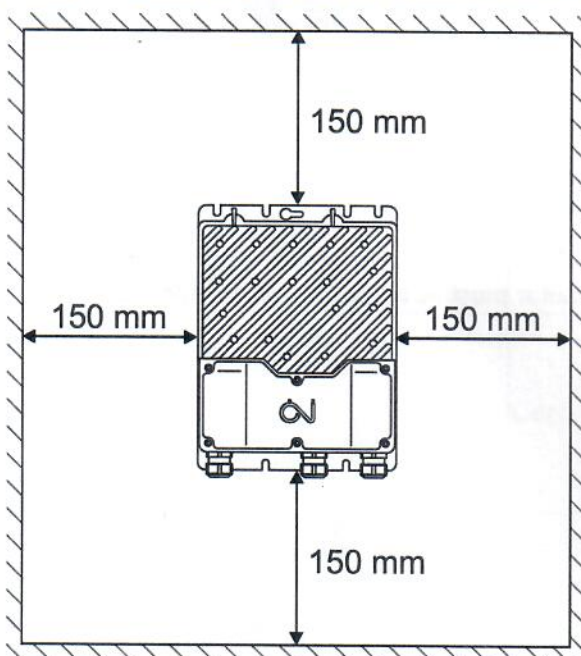
3.3.1 Position of Motor Controller



Motor controller must not be built-in or covered and must be mounted on a solid, level surface.

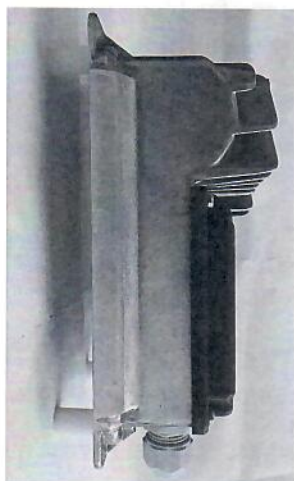
In order to uphold protection classifications, access and cooling, the motor control must be positioned as shown in 3.3.1.

3.3.2 Ensure access and cooling of Motor Controller



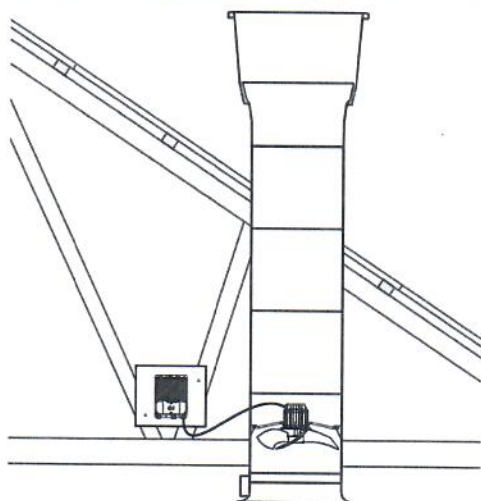
In order to ensure access and cooling of the motor controller, the distances to the surroundings of 150 mm must be adhered to.

3.3.3 Motor Control with Distance Pieces



Mount the motor control with distance pieces.

3.3.4 Positioning of Motor Controller.

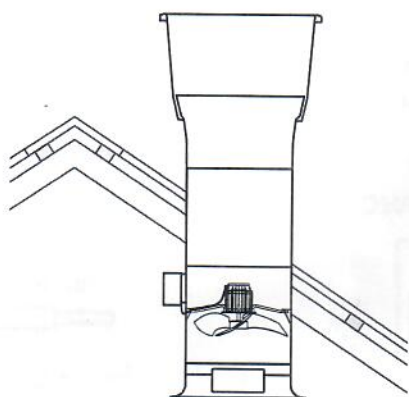


The motor controller is positioned so that the ambient temperature is between -40°C and $+50^{\circ}\text{C}$.

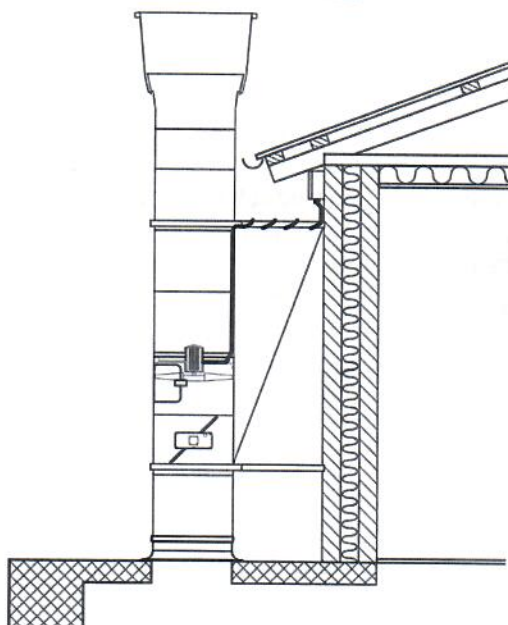
Mount the motor controller as close to the fan as possible.

The 2 m cable included must not be extended.

445927 DA 600 LPC cable kit 5m can be ordered, if 2m is insufficient.



Mount the controller on a wooden plate fastened to a rafter on the ceiling or directly on the chimney.



Install the controller under the eaves protected from driving rain and in shade protected from direct solar radiation.

4 Installation Guide

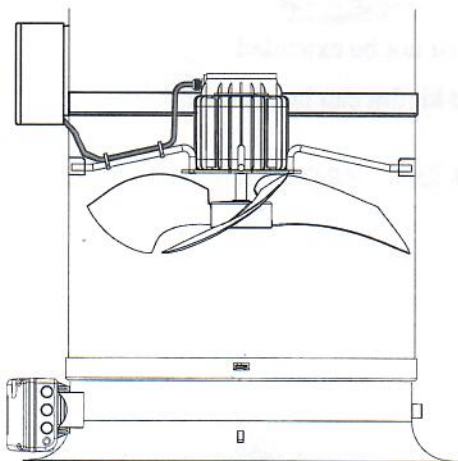
4.1 Electrical Connection



Installation, service and troubleshooting of electrical equipment must be carried out by expert staff in compliance with applicable national regulations – in Europe this would be the EN 60204-1 or other current EU regulations.

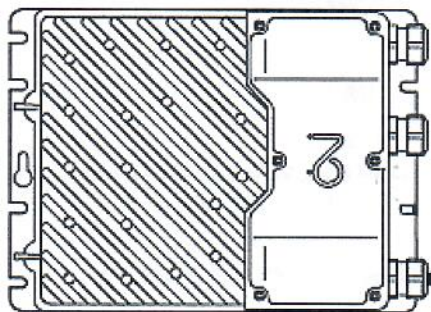
The installation of a power supply isolator is required for each motor and power supply to facilitate voltage-free work on the electrical equipment. Power supply separator is not supplied by SKOV A/S.

4.1.1 Cabling in the Exhaust Unit



Drill a hole in the exhaust unit duct for the fan cable and pull it along a leg to the same side as the motor controller.

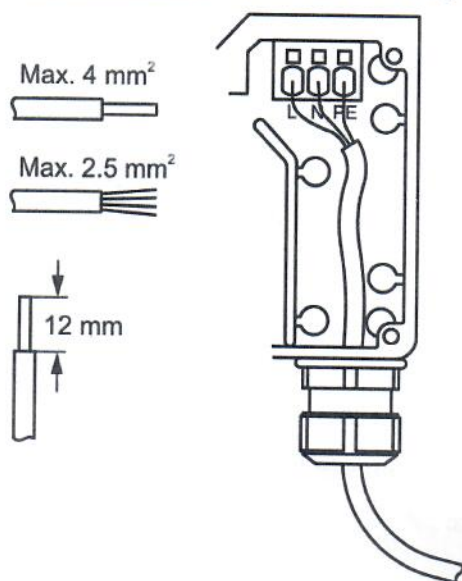
4.1.2 Cabling into the Motor Controller



In order to prevent water from running into the motor controller via cables and screwed connections, the cabling must be carried out so that it can stand water around the cable in the gasket of the screwed connection.

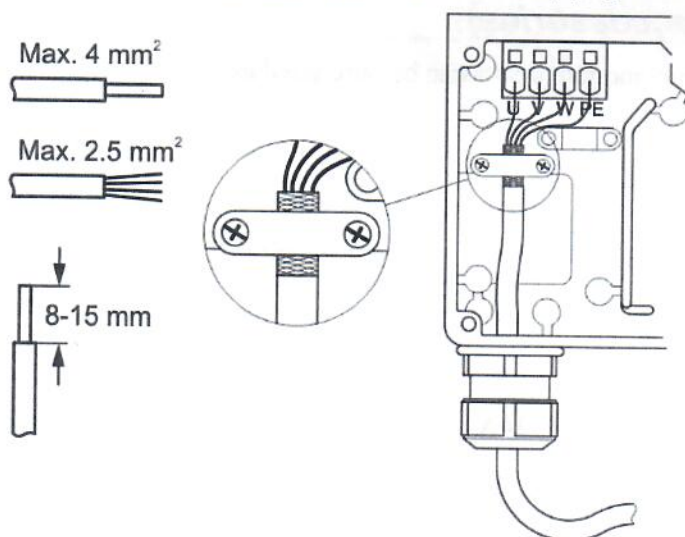
4.2 Connection in the Motor Controller

4.2.1 Terminals for Power Supply



Power supply 1 x 230 V

4.2.2 Terminals for Power Supply of Fan



Remember to strip the cable so that the protective shield from the fan can be connected to the motor controller during mounting under the rail.

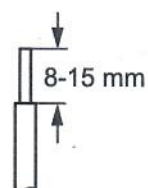
Power supply 3 x 230 V from motor controller to fan motor.

4.2.3 Signal Terminals

Max. 4 mm²



Max. 2.5 mm²



A	1		Not in use
B	2		Not in use
GND	3		Ground
+10V	4		Not in use
0-10V	5		Signal from climate computer
GND	6		Ground
D2	7		10-0 V = open 0-10 V = GND (Jumper between terminal 7 and GND)
D1	8		Stop = open Start = GND (Jumper between terminal 8 and GND)
DO	9		Not in use
GND	10		Ground

4.2.4 Terminals on Relay Module (accessories)

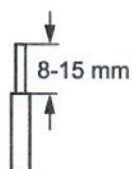
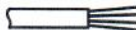
Relay module 445076 can be purchased as accessories.

	11	GND	Ground
	12	DI3	Normal = open Reverse = GND (Jumper between terminal 12 and GND)
	13		Not in use
	14	R1_NO	Alarm NO
	15	R1_C	Max. 30 V DC/24 V AC, 1A
	16	R1_NC	Alarm NC

Max. 4 mm²

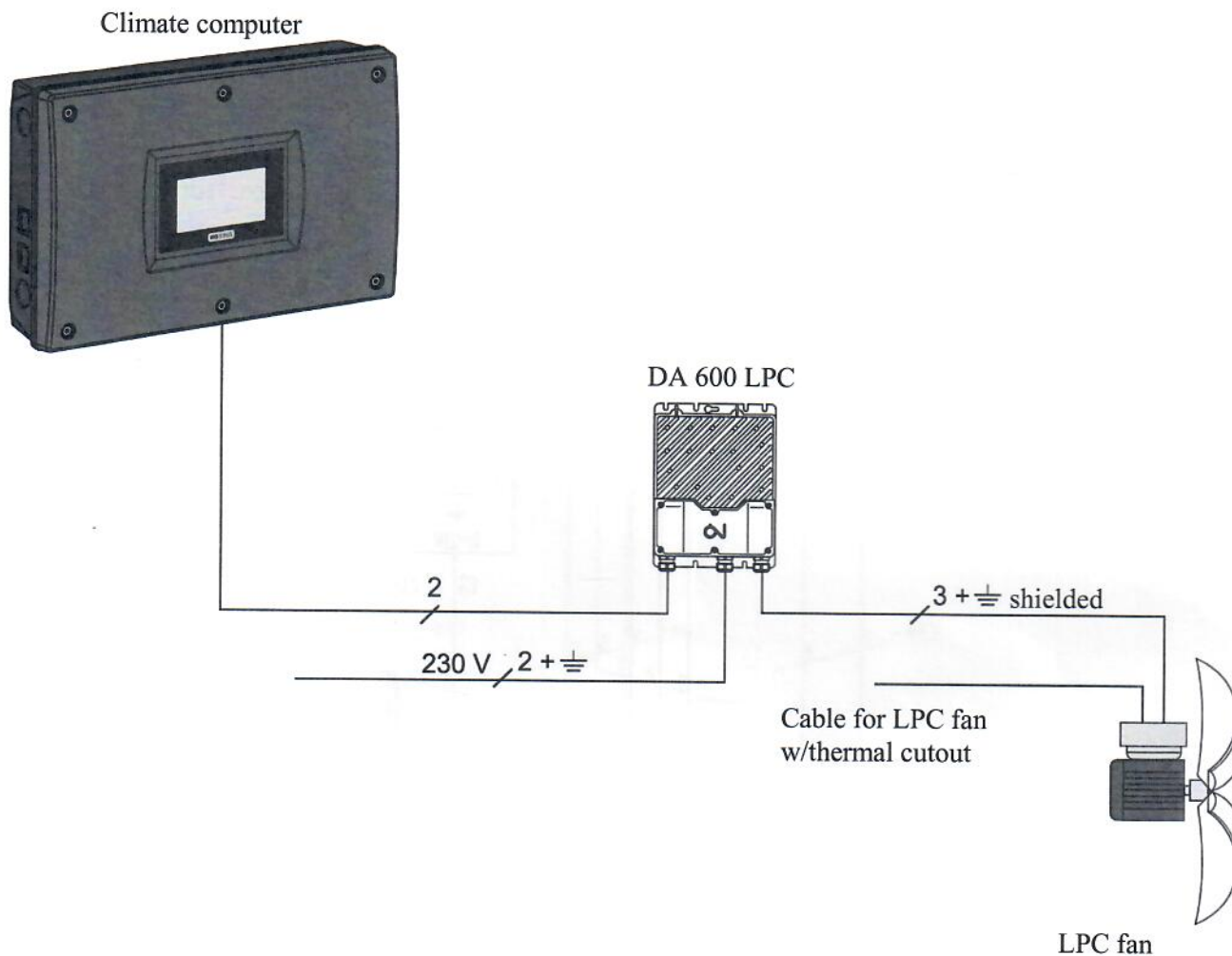


Max. 2.5 mm²



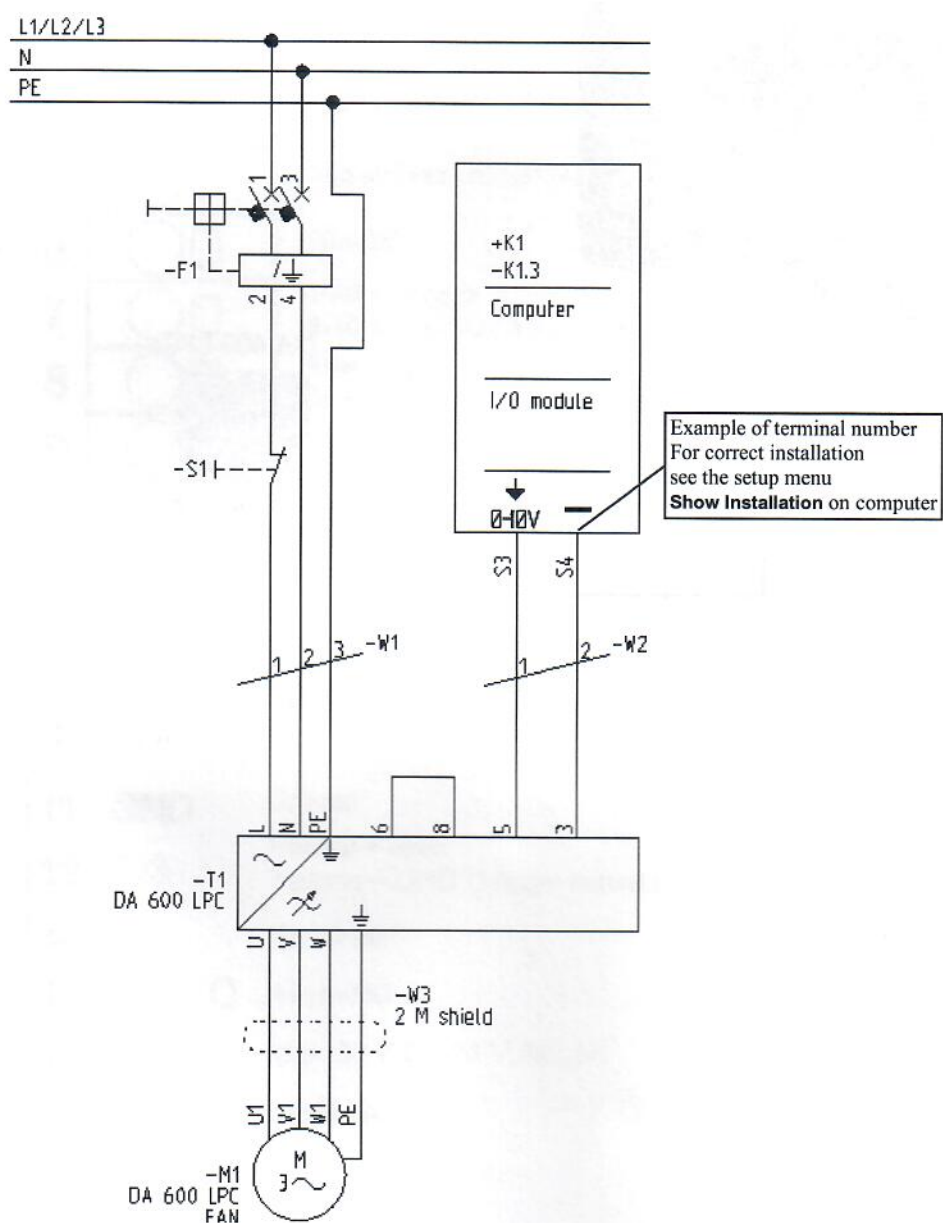
4.3 DA 600 LPC-2 Fan

4.3.1 Wiring Diagram

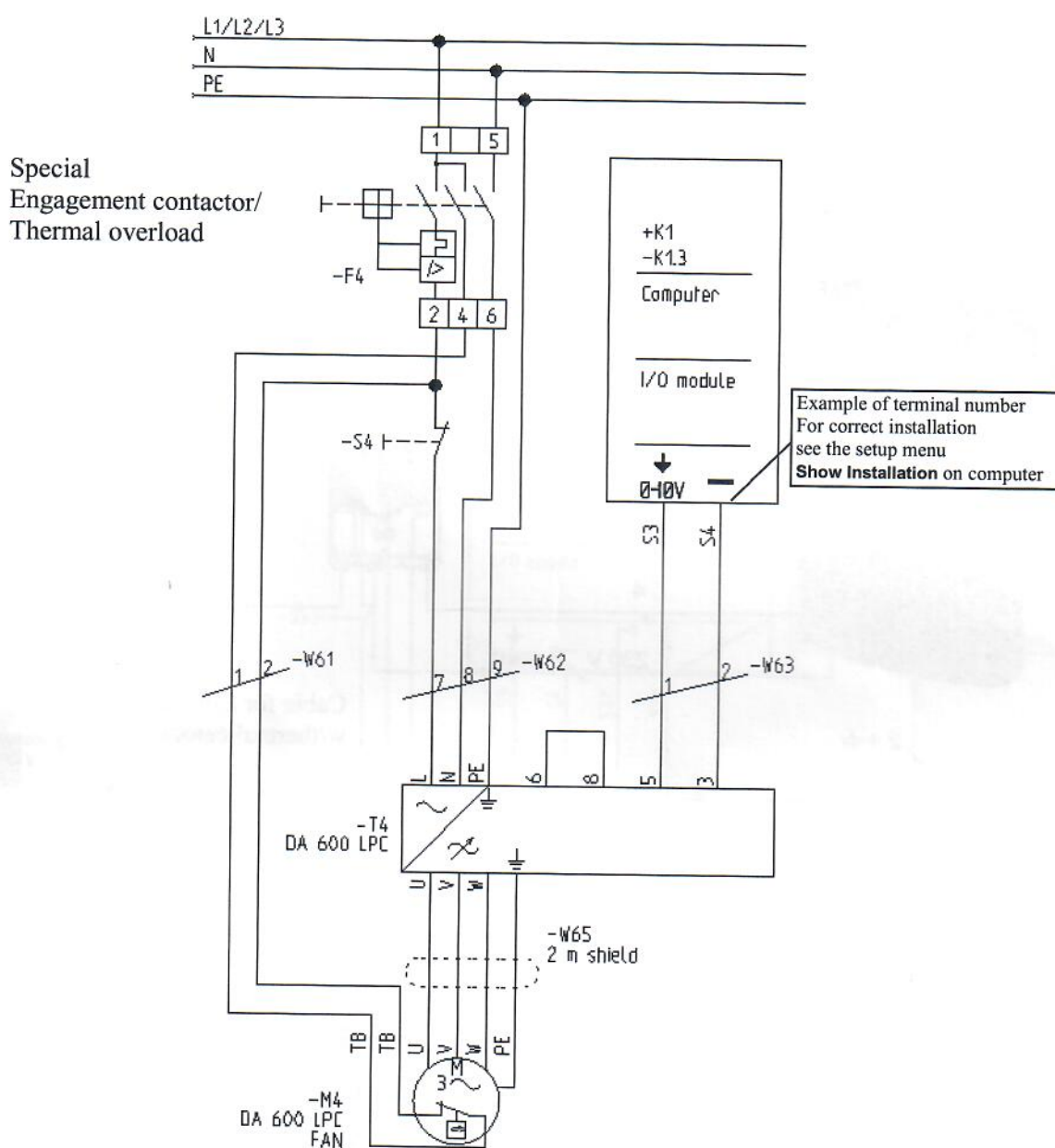


4.3.2 Circuit Diagram

4.3.2.1 DA 600 LPC-2



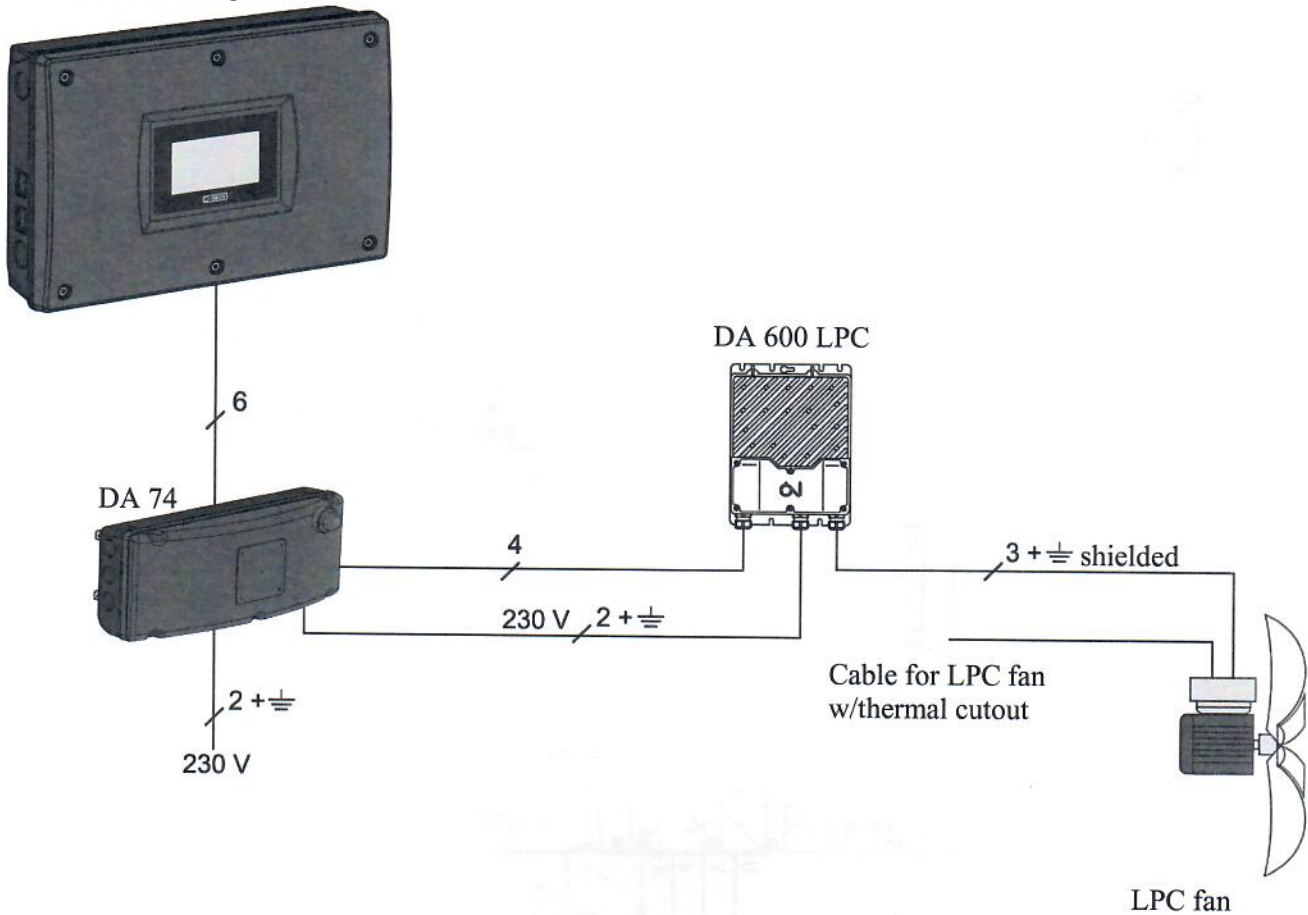
4.3.2.2 DA 600 LPC-2 w/Thermal Cutout



4.4 Dynamic MultiStep

4.4.1 Cable chart DA 600 LPC-2 with DA 74CO ON/OFF

Climate computer



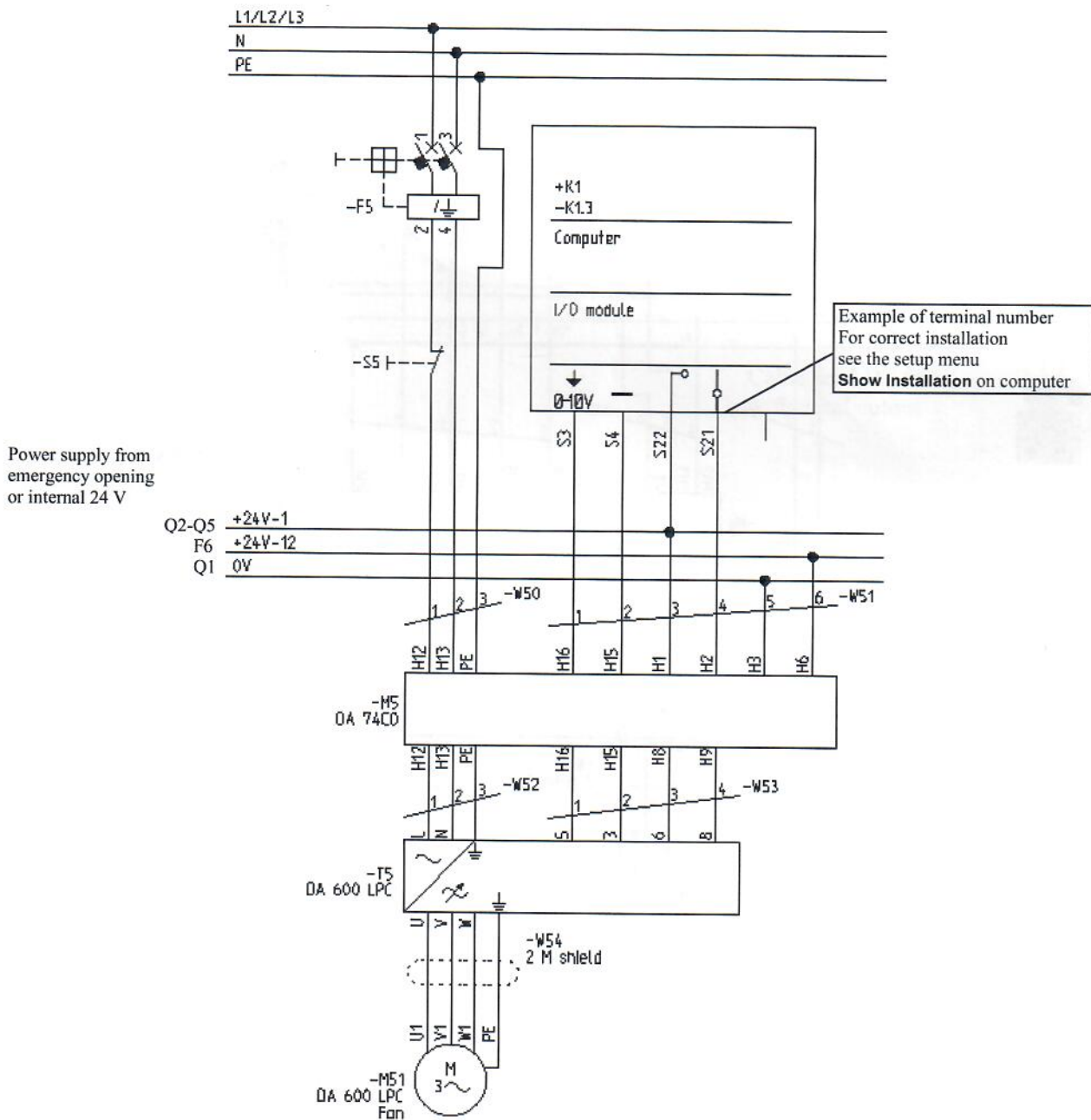
4.4.2 Circuit Diagram ON/OFF

Power supply from emergency opening 0V-1 = Q1 terminal in Computer.

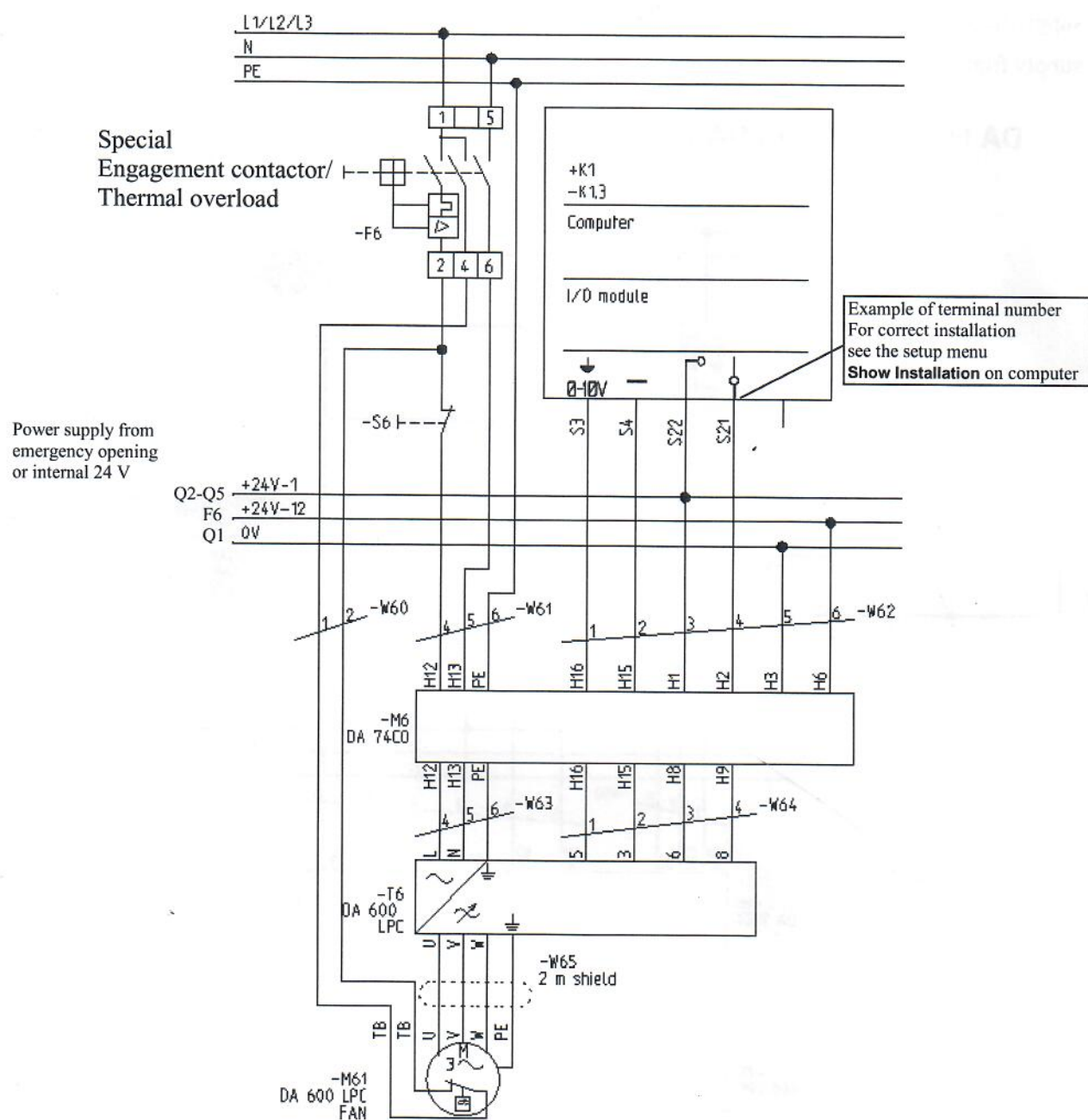
Power supply from emergency opening 24V-1 = Q2, Q3, Q4 and Q5 terminal in Computer.

Power supply from emergency opening 24V-12 = F6 terminal in emergency opening.

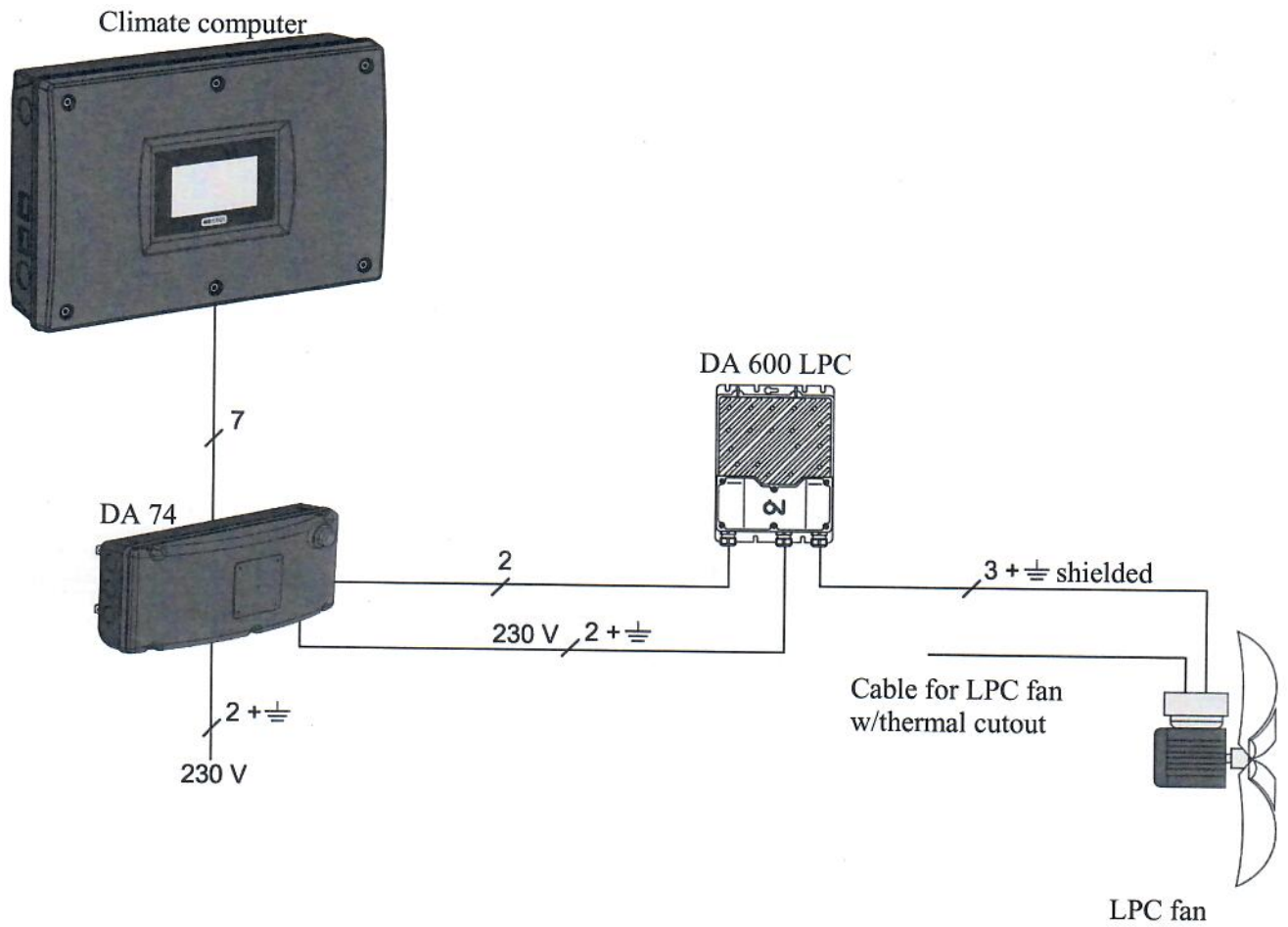
4.4.2.1 DA 600 LPC-2 with DA 74CO ON/OFF



4.4.2.2 DA 600 LPC-2 w/Thermal Cutout and DA 74CO ON/OFF



4.4.3 Cable Chart DA 600 LPC-2 with DA 74CV Stepless



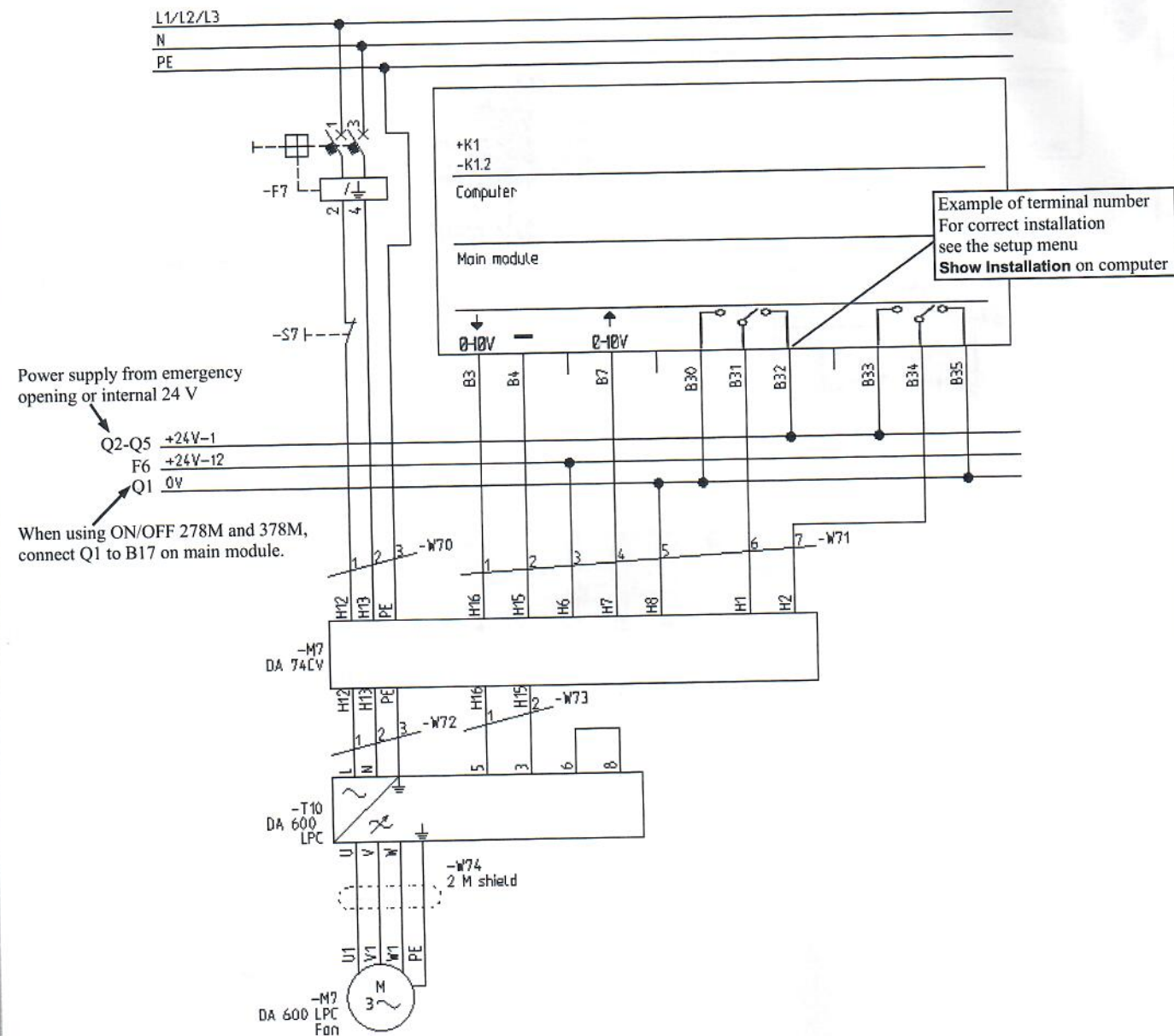
4.4.4 Circuit diagram Stepless

Power supply from emergency opening 0V-1 = Q1 terminal in Computer.

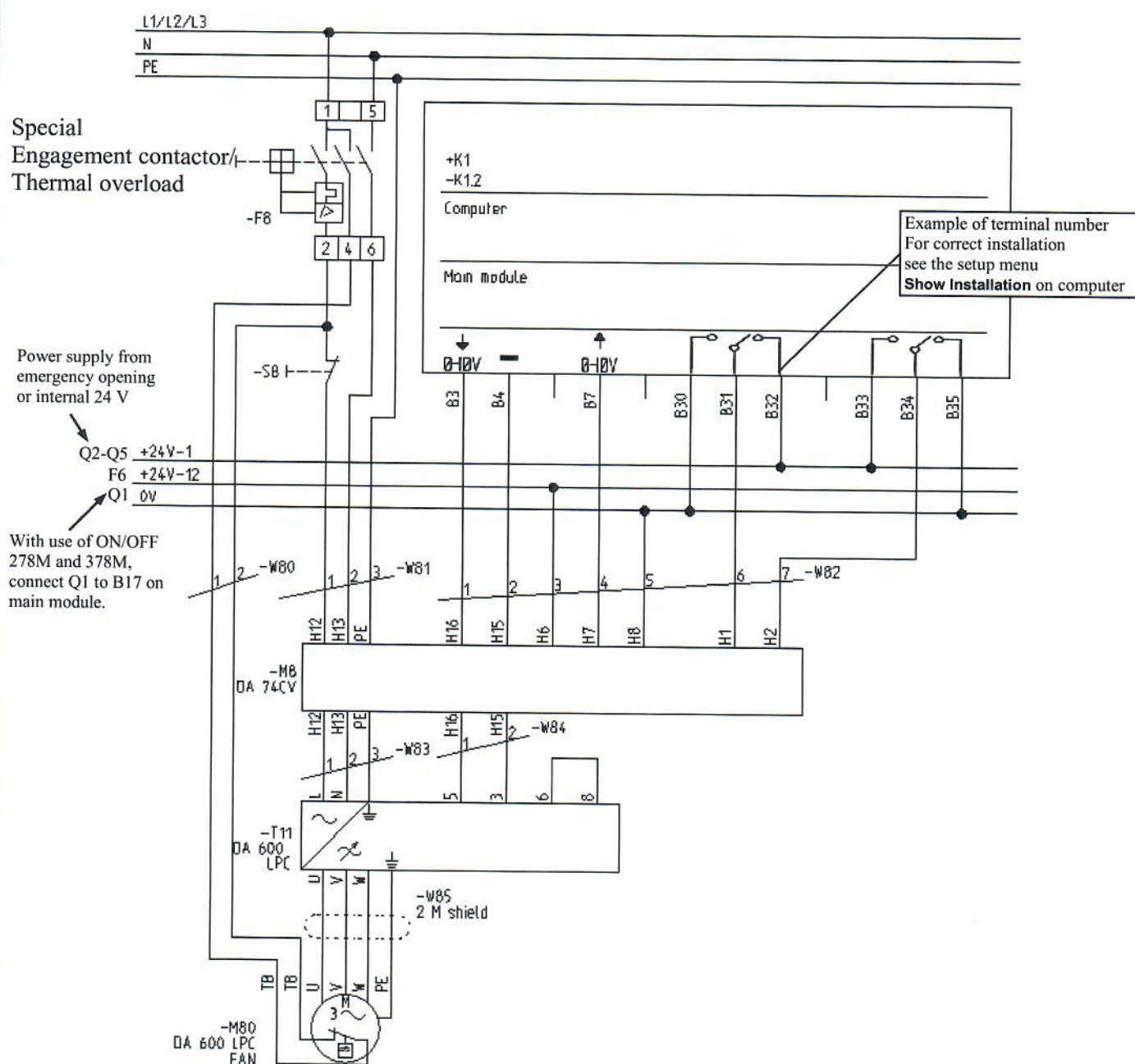
Power supply from emergency opening 24V-1 = Q2, Q3, Q4 and Q5 terminal in Computer.

Power supply from emergency opening 24V-12 = F6 terminal in emergency opening.

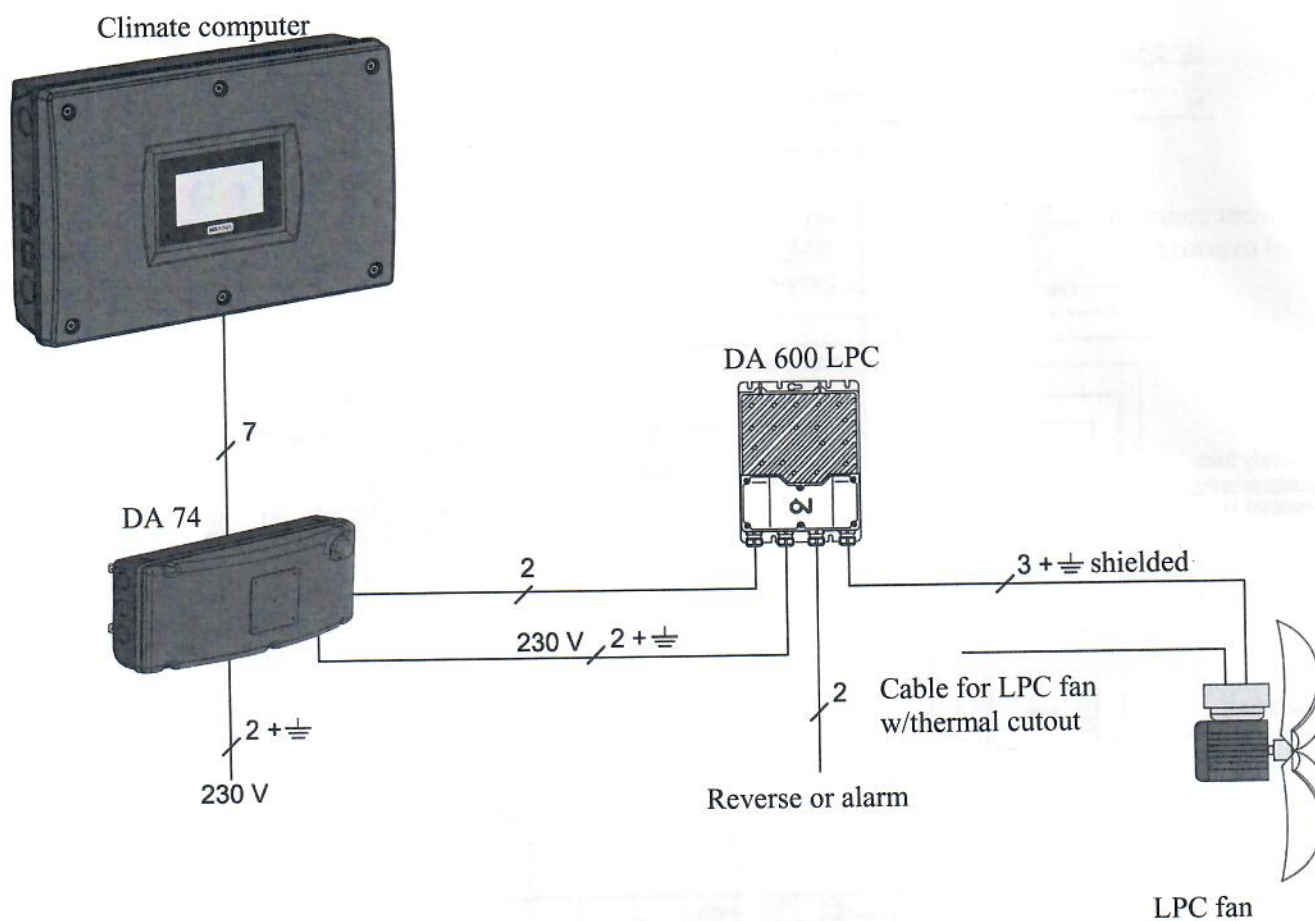
4.4.4.1 DA 600 LPC-2 with DA 74CV Stepless



4.4.5 DA 600 LPC-2 w/Thermal Cutout and DA 74CV Stepless



4.4.6 Cable Chart DA 600 LPC-2/DA 74CV with Reverse or Alarm Relay



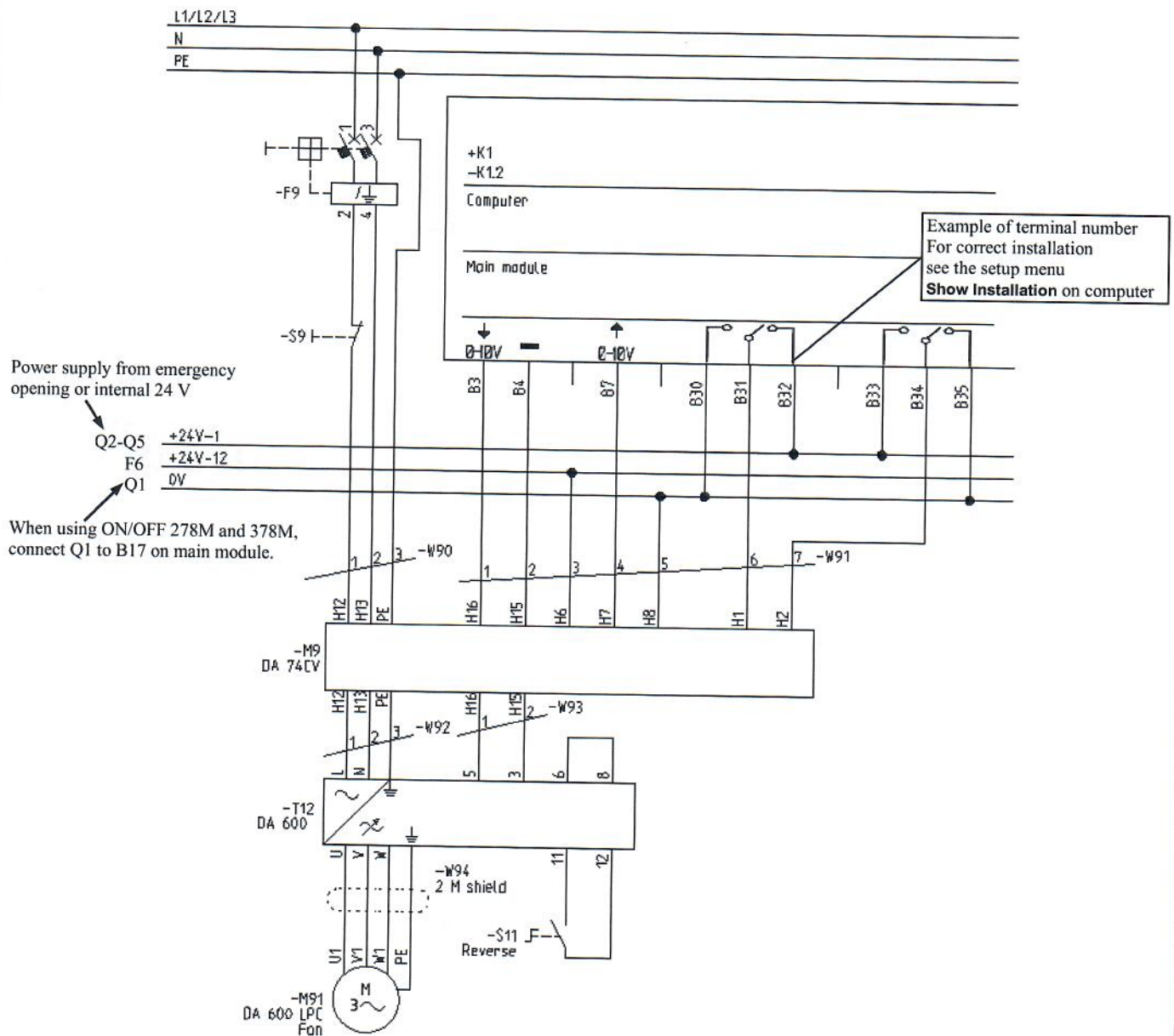
4.4.7 Circuit diagram Reverse or Alarm

Power supply from emergency opening 0V-1 = Q1 terminal in Computer.

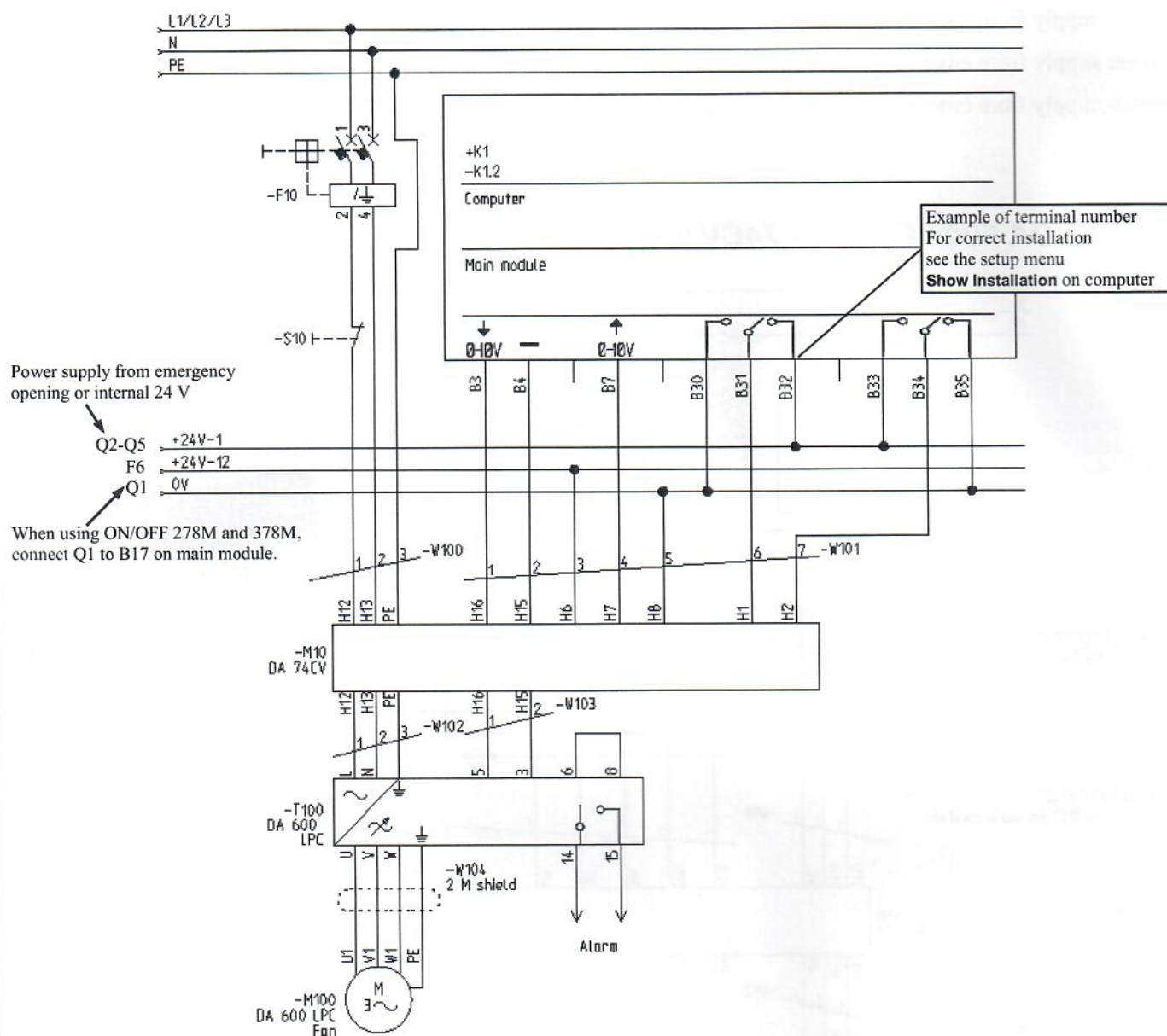
Power supply from emergency opening 24V-1 = Q2, Q3, Q4 and Q5 terminal in Computer.

Power supply from emergency opening 24V-12 = F6 terminal in emergency opening.

4.4.8 DA 600 LPC-2/DA 74CV with Reverse



4.4.9 DA 600 LPC-2/DA 74CV with Alarm



4.5 Replacement of DA 600 LPC with DA 600 LPC-2



Remove the converter PBC in DA 74.

Remove the Modbus cable between DA 74 and LPC-2.

Mount DA 600 LPC-2, see sections 3.3.

DA 600 LPC-2 with DA 74CO ON/OFF, see sections 4.4.1 and 4.4.2.

DA 600 LPC-2 with DA 74CV stepless, see sections 4.4.3 and 4.4.4.

5 Setting Fan Voltage In House Computer

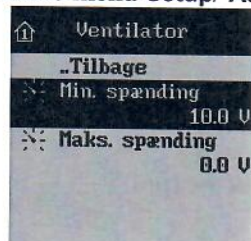
In the house computer, set the voltage corresponding to minimum and maximum voltage.

Please note that the LPC-2 fan is 10-0 V controlled.

Set fan voltage in the following menu:

5.1 DOL 234 and DOL 234F before Version 7.2

In the menu **Setup/ Adjustment/ Fan**



Set **Minimum voltage** to 10 V and **Maximum voltage** to 0 V.

5.2 DOL 234F Version 7.2

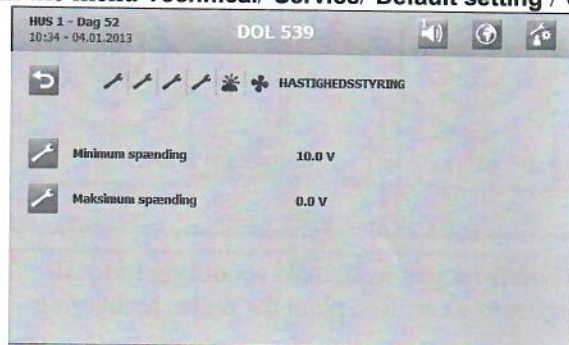
In the menu **Setup/ Installation/ Air outlet/ Continuously variable**



Set **Stop fan** to 10 V and **Full speed** to 0 V.

5.3 DOL 539 and DOL 534

In the menu **Technical/ Service/ Default setting / Climate/ Ventilation/ Speed control menu**



Set **Minimum voltage** to 10 V and **Maximum voltage** to 0 V.

5.4 DOL 34

The control voltage coming from a DOL 34 house computer is 0-10 V, which is why a short-circuit connection must be mounted between terminal 7 and terminal 10 on the signal terminal, see 4.2.3 Signal Terminals

6 Maintenance Instructions

1. Check for intact blades and suspension units at least once a year.
Call service in case of abnormal noise and vibration.
2. Only authorised personnel may carry out repairs.

6.1 Cleaning

6.1.1 Fan

Clean the fan at regular intervals so that cooling and air can pass unimpededly.

1. Set the computer to the in-between function **Wash**.
2. Wash the duct and chimney from below using a long flushing pipe, or from above via the roof.
Remember that fans cannot withstand high-pressure cleaning.
3. It is recommended that the fan runs at 100% for one hour after cleaning, in order to dry off any moisture in the fan.



The fan must not be stopped by placing hard objects between the fan blades, as they will then be damaged.

Do not subject the fan suspension to higher loads than its own weight (8.5 kg).

6.1.2 Motor Controller

To ensure sufficient cooling, keep the cooling ribs on the controller dust-free, e.g. by means of compressed air.



Never flush the motor controller with water.

Clean using a limited amount of water (water spraying), a brush and a cloth.

6.2 Removal for Recycling/Disposal



SKOV A/S products which are suitable for recycling are marked with a pictogram showing a refuse bin that is crossed over. See the picture.

Customers can dispose of SKOV A/S products at local collecting points/recycling stations according to local directions. The recycling station will then arrange for further transport to a certified plant for reuse, recovering and recycling.

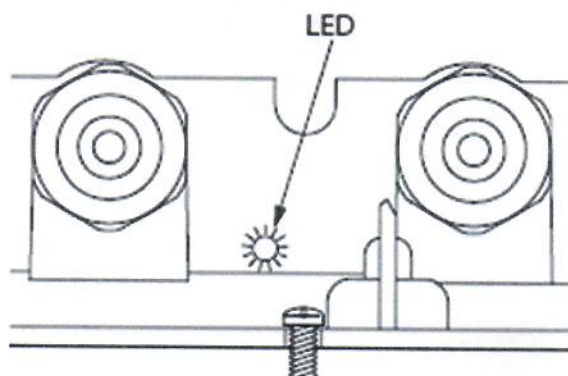
7 Troubleshooting Guide

Always disconnect the power securely before servicing the fan.

When the control voltage has been disconnected, wait for 3 minutes before removing the lid of the motor controller or touching the motor cables.

Symptom	Solution
The fan does not start.	Check that there is voltage between terminals L and N. Check the control voltage to the motor controller. Set the computer to manual control and try to start the fan via the Auto/Manual menu. Disconnect the supply voltage for 60 sec. to restart the motor controller after a fault has occurred. Control error: - too high temperature - too high output current - short-circuiting of output/short-circuit to earth - voltage too high/low (power supply) - connection to power supply interrupted
Abnormal fan noise. Bearing noise. Vibrating fan.	Check for broken or dirty fan blades.
Difficult to start or irregular running.	Contact authorised personnel for replacement.

7.1 LED indications



The motor controller is equipped with a two-colour LED which indicates operating status.

The LED is located on the underside of the motor controller beside the entry for the mains cable.

- Lights constantly green when mains voltage is connected.
- Lights constantly red when at least one critical alarm is active.
- Flashes red when at least one non-critical alarm is active.

8 Technical Data

Electrical Setup

Voltage [V]	230 V AC -10% / +15%
	Always use RCCB 30 mA (type A) in front of climate computer or possibly max. two motor supply units.
RCD	PFI 300 mA (type B) is only used in front of the power supply to LPC-2 regulated fans.
Frequency [Hz]	50/60
Leakage current to ground [mA]	Max. 12 Pay attention to other leak current sources in the house.
Max. Initial fuse [A]	16
Max. Shaft power [W]	750
Motor current (rated) [A]	4.4
Efficiency motor controller	94%
Output frequency [Hz]	0 - 400
Max. Output voltage [V AC]	3 x 230
Max. Output current [A]	3 x 5.1

Interface

Inputs	10-0 / 0-10
Analogue in [V DC]	
Digital in	2
Digital in accessories	1
Digital out	1A; 30 V DC/24 V AC

Mechanical

Cable length [m] protective shield	2
Cable length accessories [m] protective shield	5
Min. pipe diameter [mm]	650
Control type, motor controller	Sensorless back EMF

Fan output	DA 600 LPC-11	DA 600 LPC-12	DA 600 LPC-13
RPM (rated current)	300-1,100	300-1,200	300-1,300
Air output m ³ /hour (at -10 Pa)	13,600	14,700	15,800
Air output m ³ /hour (at -20 Pa)	13,200	14,500	15,500
Air output m ³ /hour (at -30 Pa)	12,900	14,100	15,200
Air output m ³ /hour (at -40 Pa)	12,500	13,900	14,900
Specific output m ³ /kWh (at -10 Pa)	30,500	26,500	23,000
Pressure stability, change from 0 to -20 Pa [%]	4	3	3

Environment	DA 600 LPC-11	DA 600 LPC-12	DA 600 LPC-13
Operating temperature [°C]	- 40 to +40		
Start temperature [°C]	- 40 to +50		
Storage temperature [°C]	- 40 to +70		
Relative humidity, operation [%] RH	10-95		
Corrosion-resistant	EN/ISO12944-2:1998 category C4		
Protection class	Motor controller: IP 65 Fan motor: IP 55		
Encapsulation material	Aluminium (EN AB-44300)		
Bottom	Aluminium 5052		
Top	Polypropylene (PP)		
Fan noise, outside (2 m, 45 degrees) [dB(A)]	68	70	73

Consignment

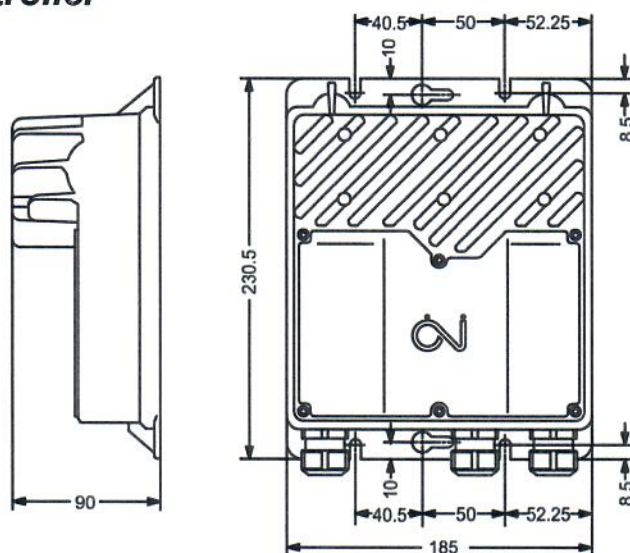
Motor controller, dimensions H x W x D [mm]	185 x 231 x 90
Fan dimensions H x W x D [mm]	310 x 636 x 636
Dimensions packed H x W x D [mm]	375 x 660 x 660
Motor controller weight [g]	2100
Fan weight [g]	10500
Shipping weight [g]	16500

8.1 ErP/Ecodesign

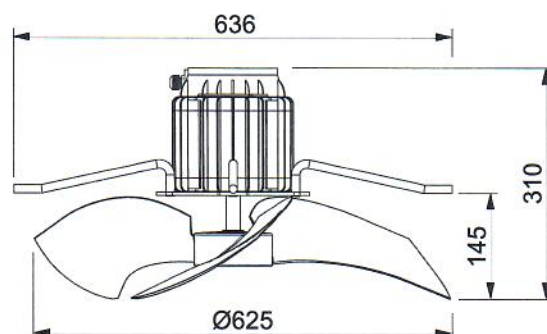
Fan type	DA 600 LPC-11-2	DA 600 LPC-11-2 w/thermal cutout	DA 600 LPC-12-2	DA 600 LPC-12-2 w/thermal cutout	DA 600 LPC-13-2	DA 600 LPC-13-2 w/thermal cutout
Ecodesign	ErP 2015	ErP 2015	ErP 2015	ErP 2015	ErP 2015	ErP 2015
Efficiency classification [N]	58	58	58	58	58	58
Efficiency (η) [%]	61.4	61.4	60.4	60.4	59.6	59.6
Measurements set-up	D	D	D	D	D	D
Fan efficiency	Total	Total	Total	Total	Total	Total
Optimal efficiency [%]	68.0	68.0	66.5	66.5	65.2	65.2
VSD required	X	X	X	X	X	X
Year of manufacture	2012	2012	2012	2012	2012	2012
The manufacture name	SKOV A/S	SKOV A/S	SKOV A/S	SKOV A/S	SKOV A/S	SKOV A/S
Item number	445091	445092	445086	445087	445088	445089
Motor power input [kW]	0.509	0.509	0.643	0.643	0.788	0.788
Volume flow rate [m ³ /s]	3.5	3.5	3.8	3.8	4	4.0
Optimum pressure [Pa]	40	40	50	50	60	60
Total pressure [Pa]	82	82	89	89	114	114
Rotations per minute (RPM)	1120	1120	1225	1225	1325	1325
Pressure conditions	1.0	1.0	1.0	1.0	1.0	1.0
Recycling/Disposal	The product is designed to be recycled and customers will be able to deliver their used products to SKOV A/S or their local collection points/recycling centres in accordance with local instructions.					
Environmental impact	-	-	-	-	-	-
Components used for identifying the energy efficiency of the fan	Bell mouth, flap, air direction baffle, 0.5 m DA 600 duct and outlet cone.					

8.2 Dimensioned Sketch

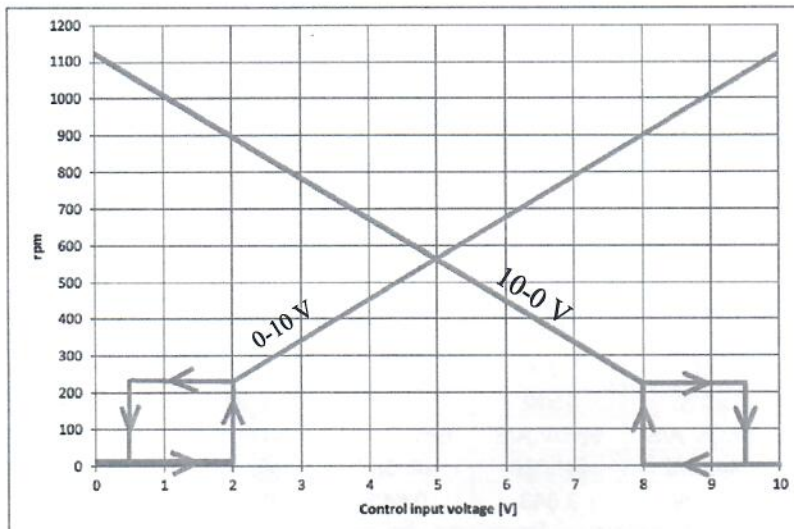
8.2.1 Motor Controller



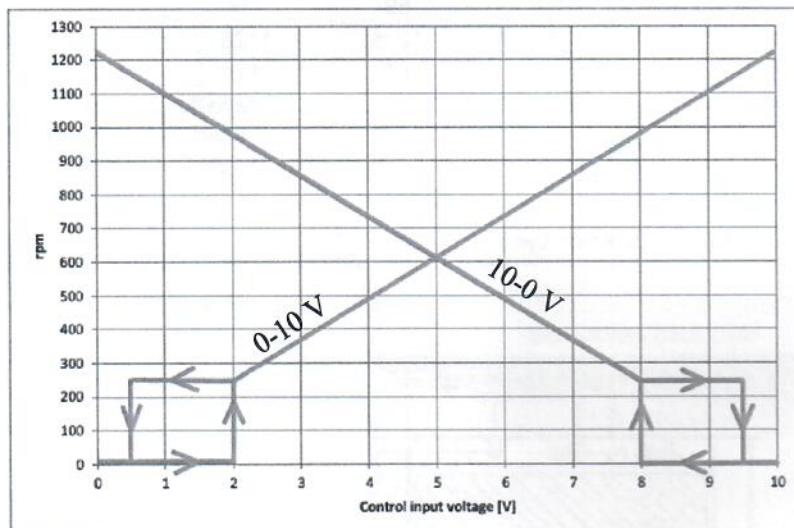
8.2.2 Fan



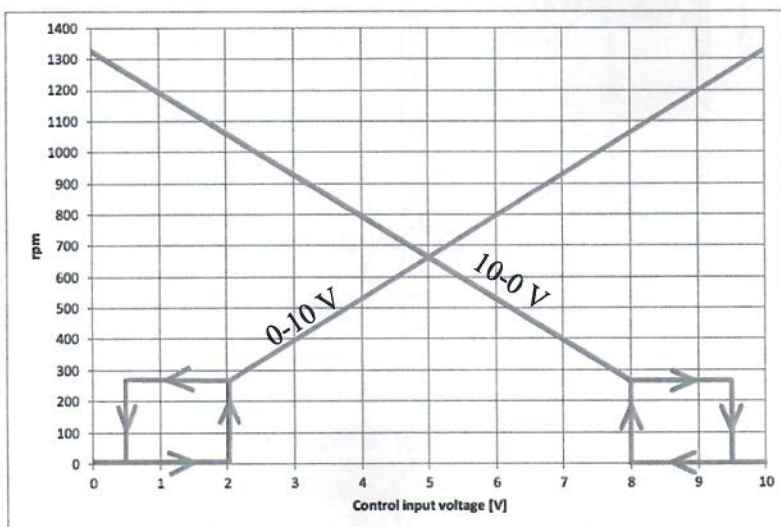
8.3 RPM in relation to 10-0 V / 0-10 V Input Terminal



DA 600 LPC-11-2



DA 600 LPC-12-2



DA 600 LPC-13-2