

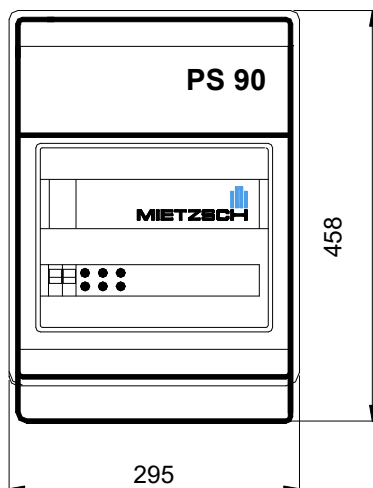
With the PS 90 pole-changing switch, we offer a compact solution for switching the speed of fans with pole-changing motors. The attractively designed plastic control cabinet contains all switching and operating elements, operating indicator lights and a full motor protection device with fault signalling. The fan must therefore be ordered in the special TS version (with thermal winding protection - PTC thermistor). Installation is very simple, only the mains connection and the connection to the fan need to be realised for commissioning.

The **PSU 90** version also includes a quartz-controlled timer with daily and weekly programme and automatic summer/winter time changeover.

The operating states: off,
 lower speed,
 upper speed
 can thus be switched depending on the time.

Design versions

	Dahlander-winding (P1)	2 separate windings (P2)
basic variant	PS 90 / 1 / 16 A	PS 90 / 2 / 16 A
with timer	PSU 90 / 1 / 16 A	PSU 90 / 2 / 16 A



In addition, the PS 90 and corresponding external supplementary devices permit several simple control and regulation problems to be solved in a very easy way:

- ◆ Control via external switch (changeover switch)
- ◆ Activation of flaps with OPEN/CLOSE actuators 230V
- ◆ Connection of an air flow controller with trouble signalling
- ◆ Time control
- ◆ Temperature control and regulation
- ◆ Humidity control and regulation
- ◆ Connection for operation signal lamps and trouble signalling

Several function can be combined.

Technical data

nominal voltage	3 x 400 V, 50 Hz
nominal current	16 A (higher currents on request)
motor protection	thermal winding protection (PTC resistor)
housing	plastic material, IP 54
	295 mm x 458 mm x 129 mm
	with snap lock
cable inlet	top/bottom
weight	4 kg

Supplementary devices (special accessories)

- Vapour-proof temperature controller FTR (-15 ... +30 °C)
- Humidity controller (hygrostat)
- Difference pressure controller for 1,000 Pa maximum
- Air flow controller LSU
- Alarm devices / Trouble signal lamps

Special design versions

- Control via external key(s) (special version 1 T or 2 T)
- Remote control of flaps with modulating actuators
- Other special versions on request

1) Connecting motor and bringing into service

The electrical connection has to be done by an expert on the basis of the circuit diagram for the pole changer and motor (circuit scheme in terminal box) and in consideration of valid standards and regulations. Check that the pole changer and motor winding are of the same type.

PS 90 / 1	--> Motor P1 = speed halving (Dahlander)	1450 P1 = 1450 / 710 rpm 2900 P1 = 2900 / 1450 rpm
PS 90 / 2	--> Motor P2 = change to next smaller speed (2 separate windings)	1450 P2 = 1450 / 950 rpm 950 P2 = 950 / 710 rpm

The direction of fan rotation has to be checked by short activation. It has to be the same as indicated by the direction arrow on the fan.

Note: If the direction of rotation is wrong in spite of correct wiring of the motor with the switchbox, the phase order of mains supply L1, L2, L3 does not correspond to standards. In this case exchange two connections of the mains supply line.

After starting check current taken by the motor.

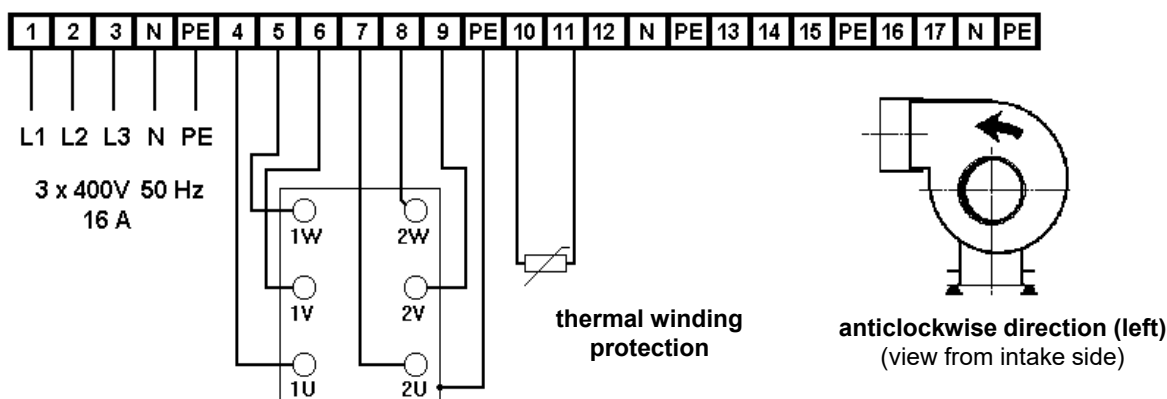
The pole changer is switched on via the master switch. The red signal lamp indicates readiness for operation. Speed change in MANUAL operation mode is on the switchbox. Intermediate actuation of the OFF key is required in any case.

Speed change in position AUTO is by any potential-free contacts (such as changeover switch, timer etc.). Switching elements in the control cabinet will then be ineffective (see Section 2).

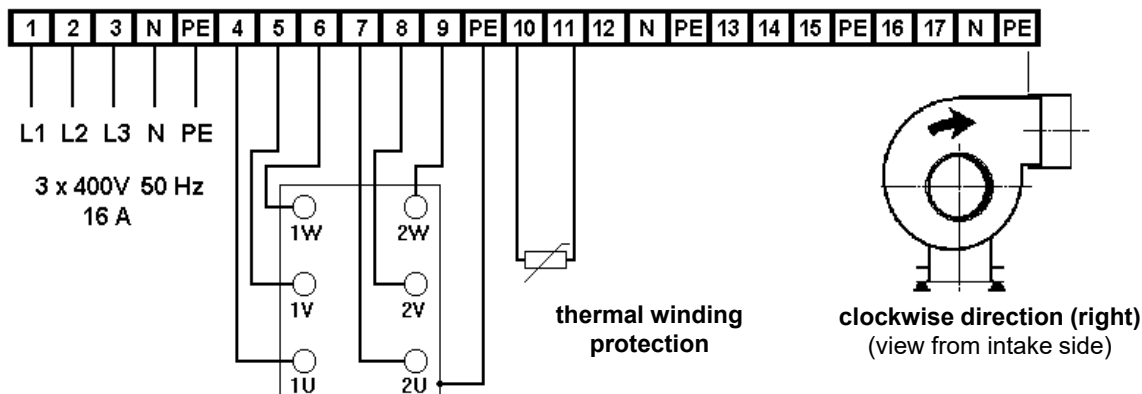
A thermal winding protection (special design TS) protects the motor against impermissible overload and heating. A red LED signals troubles. The motor cannot be activated again before the RESET button has been pressed. In any case of trouble signalling the fan has to be inspected visually. The trouble can also be indicated externally (see Section 4).

It has to be considered that also a fault of the sensor line (cable break or short circuit) is interpreted as an error and leads to triggering.

Anticlockwise direction of rotation (left)



Clockwise direction of rotation (right)



2) Control by external switches

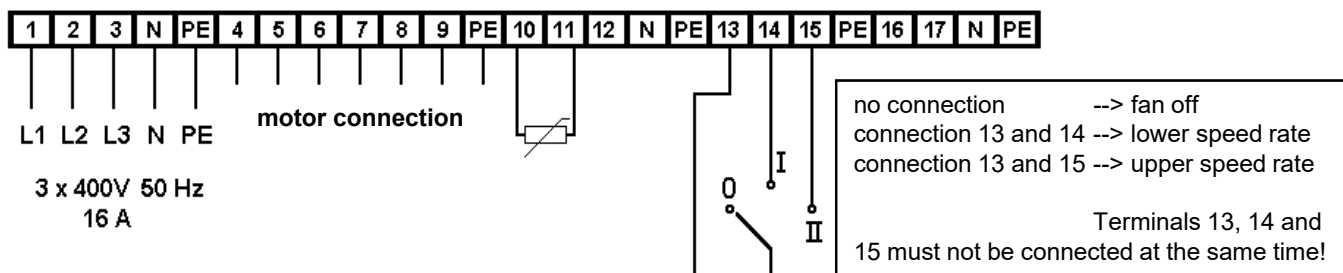
Speed changeover in position AUTO is by any potential-free **changeover contacts**. The contacts must be able to withstand 250 V and 1 A. Connection is to terminals 13, 14 and 15.

Changeover to a lower speed rate depends on time, temperature, pressure and humidity or is actuated by a hand-operated changeover switch. Several switches or devices can be arranged in parallel or series connection. This permits many and diverse applications.

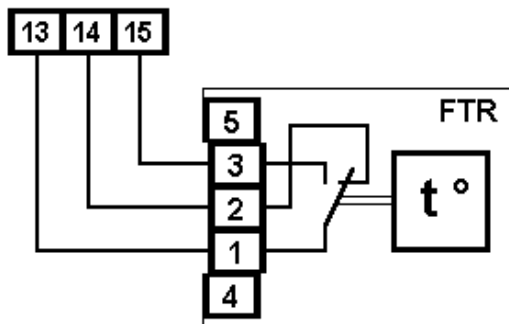
Switching states in which terminals 13, 14 and 15 are connected with one another at the same time must urgently be excluded.

Switching elements on the control cabinet are ineffective in position AUTO.

Connection of an external switch

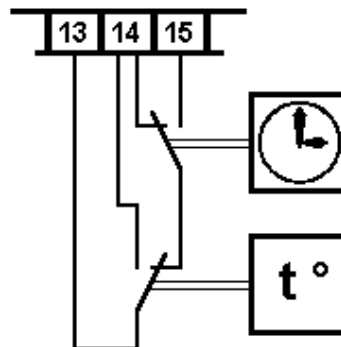


Examples of application



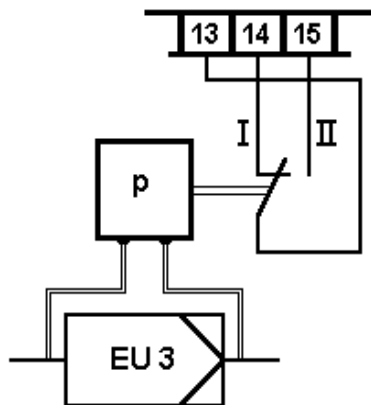
Temperature regulation with FTR

The vapour-proof temperature controller increases or decreases the volume flow as a function of temperature (speed is increased above the temperature set).



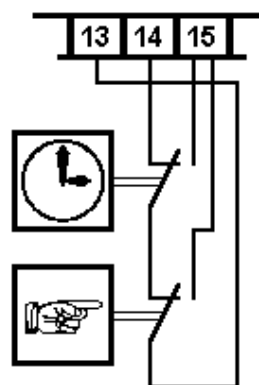
Time and temperature control

Changeover from basic ventilation to ventilation on demand is by means of a timer such as for day/night regime. Basic ventilation is running all day at certain outdoor temperature, e.g. below -5 °C.



Compensation of filter soiling

A filter is monitored by a difference pressure monitor. The system switches to higher speed if a limit value is exceeded and the preset volume flow thus fallen below.



Time/Manual control

Changeover from basic ventilation to ventilation on demand is automatic by means of a timer with a preset time regime. If needed, changeover to higher speed is initiated by a hand-operated switch.

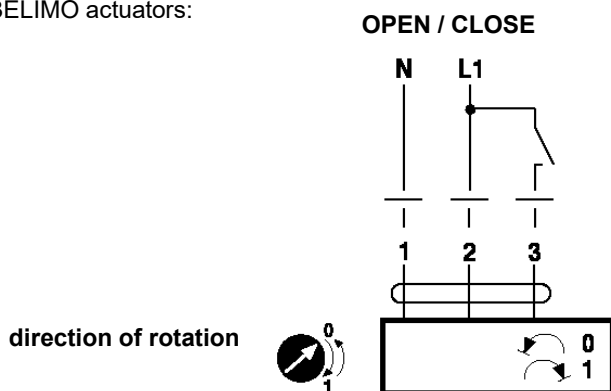
3) Connection of flaps with OPEN/CLOSED actuators

The Pole Changer PS 90 permits MIETZSCH-made flaps with electrical OPEN/ CLOSED actuators to be actuated along with fan speed changeover.

Several flaps (with identical actuators) can be connected in parallel arrangement. The direction of rotation can be selected on the actuators so that, for instance, one flap can be opened while another one is closing.

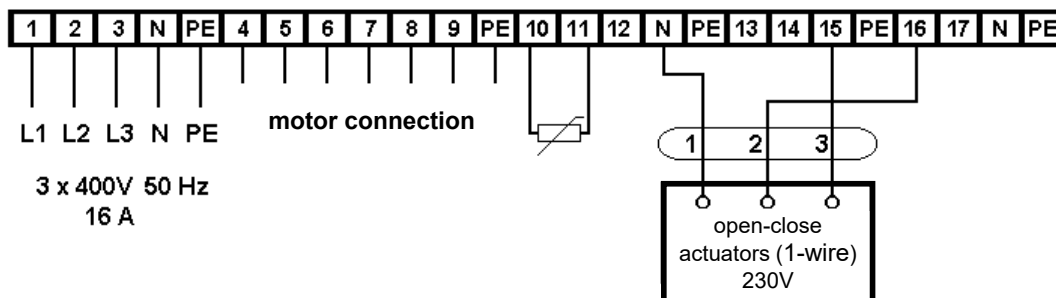
The electrical connection depends on the actuators used or on the mode of control (1-wire is preferred).

Example of BELIMO actuators:



The manufacturers should be consulted if the planned flaps have other or different actuators.

Actuator with 1 - wire - control

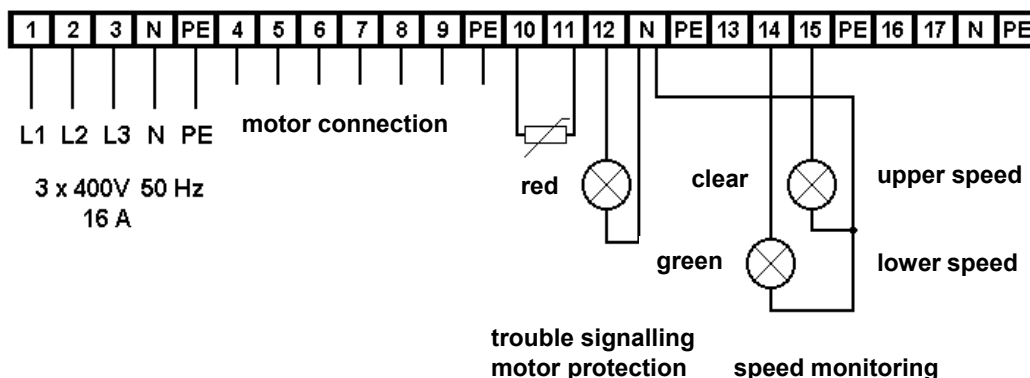


4) Connecting external signal lamps

An external trouble signalling device for the thermal winding protection can be connected to terminals 12 and N. Signalling of speed stages can be connected to terminals 14 and N for lower speed or, respectively, to terminals 15 and N for higher speed.

Lamps for 230 V with 3 W have to be used.

Remote switches and setting motors have no influence on the function of signal lamps.



5) Connecting air flow monitoring

If the fan in the ventilation system fails (motor damage, belt breakage, etc.) or if the volume flow is severely undercut due to any obstruction (e.g. defective flap, foreign object), this fault can be signalled with an air flow monitor.

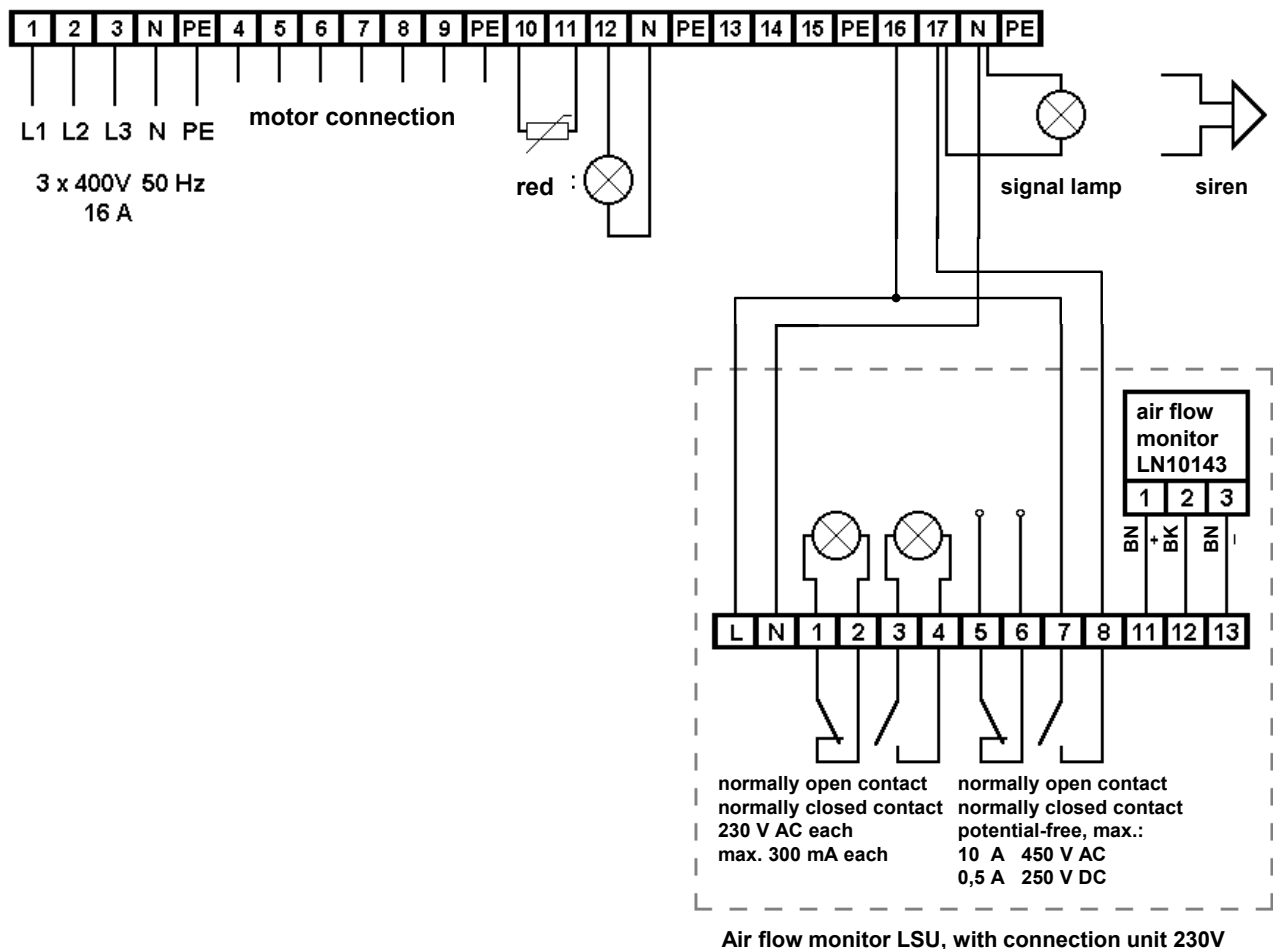
There is a flow sensor in a pipe or a fan, which triggers a signalling device when the speed falls below approx. 3 m/s. The flow sensor with **normally closed contact** (type LN10143) is generally used. This closes a contact in the event of an accident and switches on the signalling device. With the flow sensor with **normally open contact** (type LN520GSP), a signalling device (e.g. operating indicator light) is switched off in the event of an emergency.

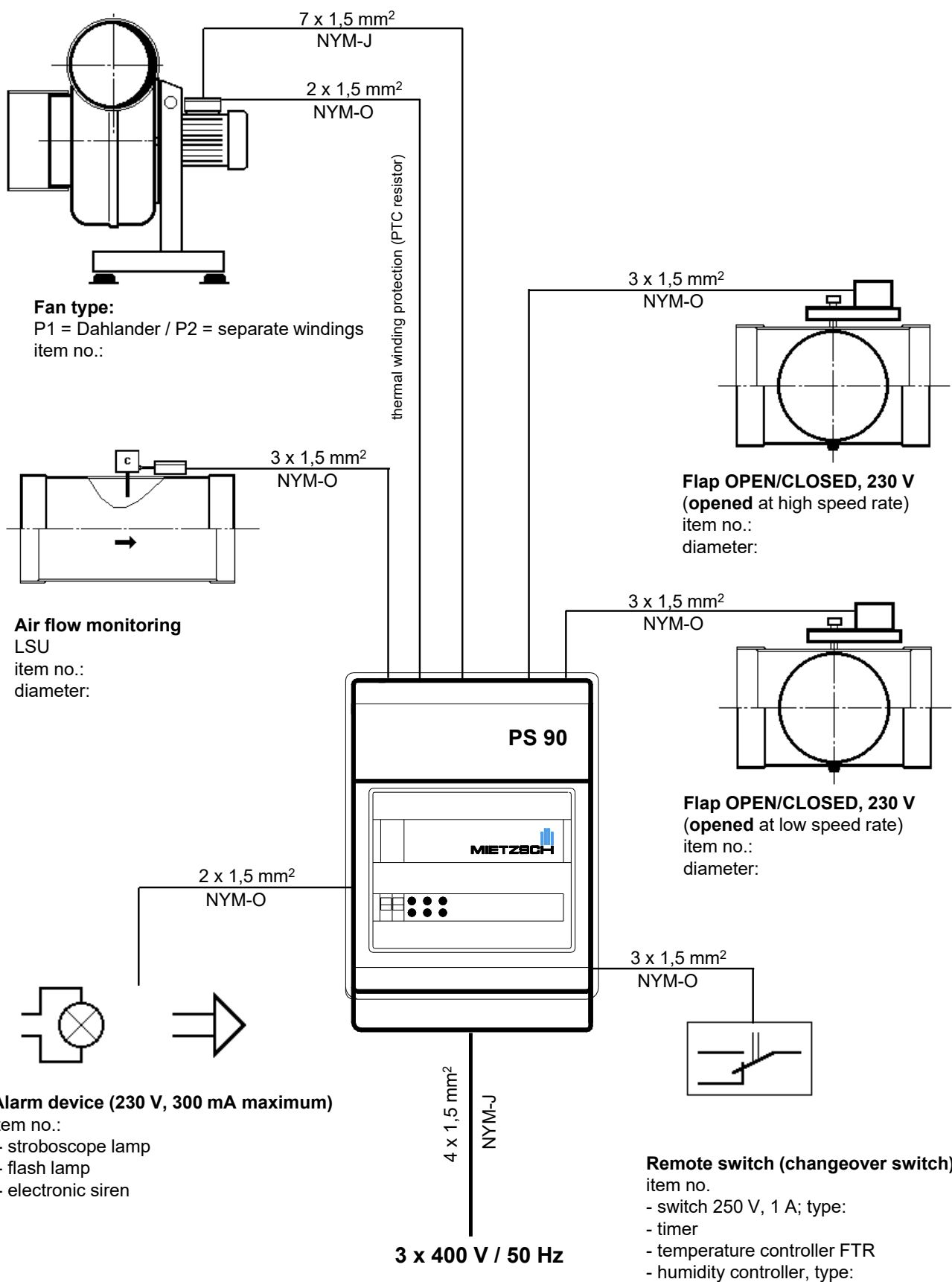
The air flow monitor and signalling device are connected to terminals 16, 17 and N. Optionally, signalling devices can also be connected to the connection unit of the air flow monitor.

Indicator lights or sirens with 230 V and max. 300 mA are used as signalling devices.

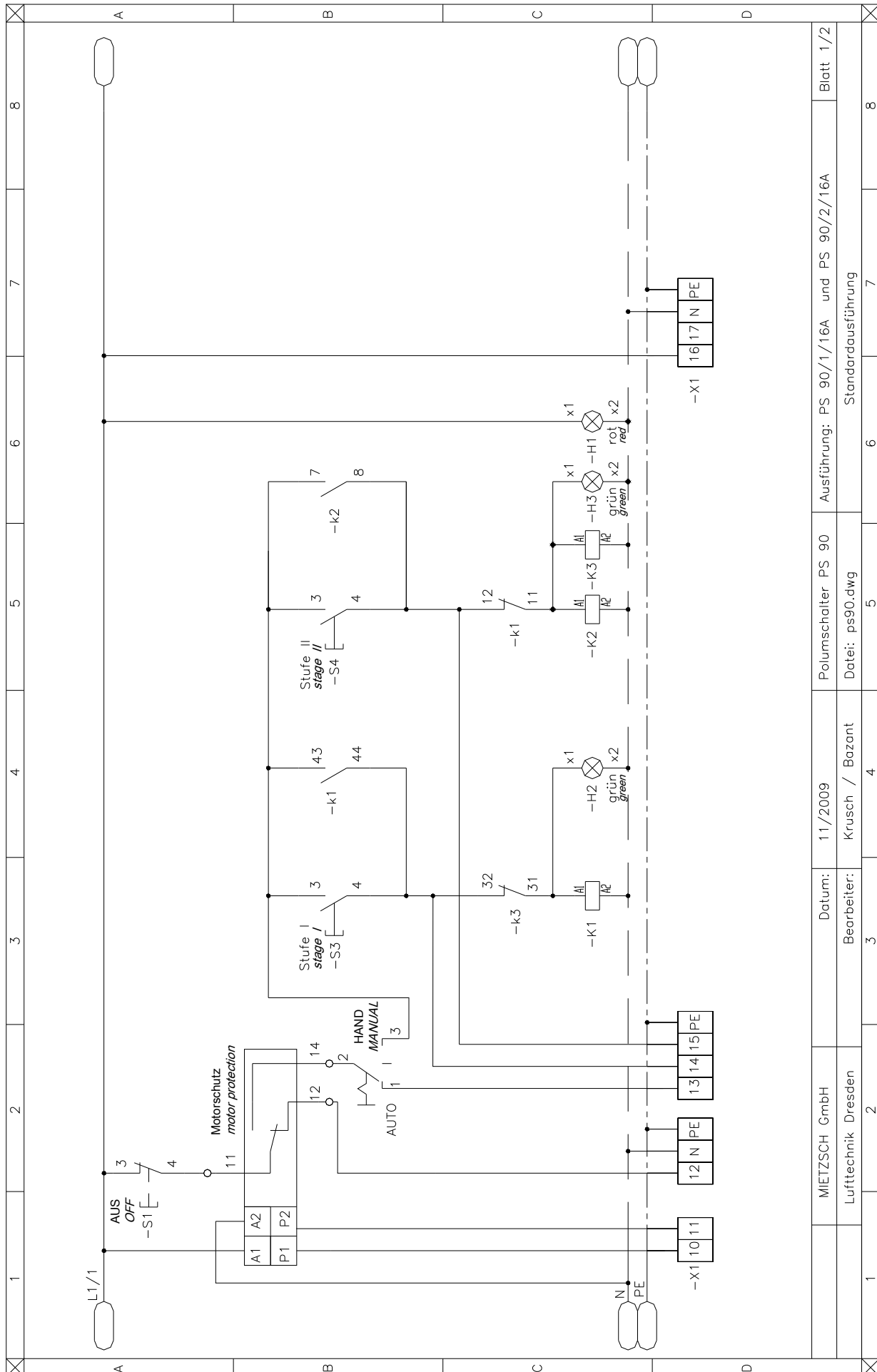
The airflow monitor is switched on with the main switch S1. A corresponding delay of the sensor allows sufficient time for the fan to switch on.

The power supply to the fan and the other devices connected to the LS 96 is not affected by the air flow monitoring.

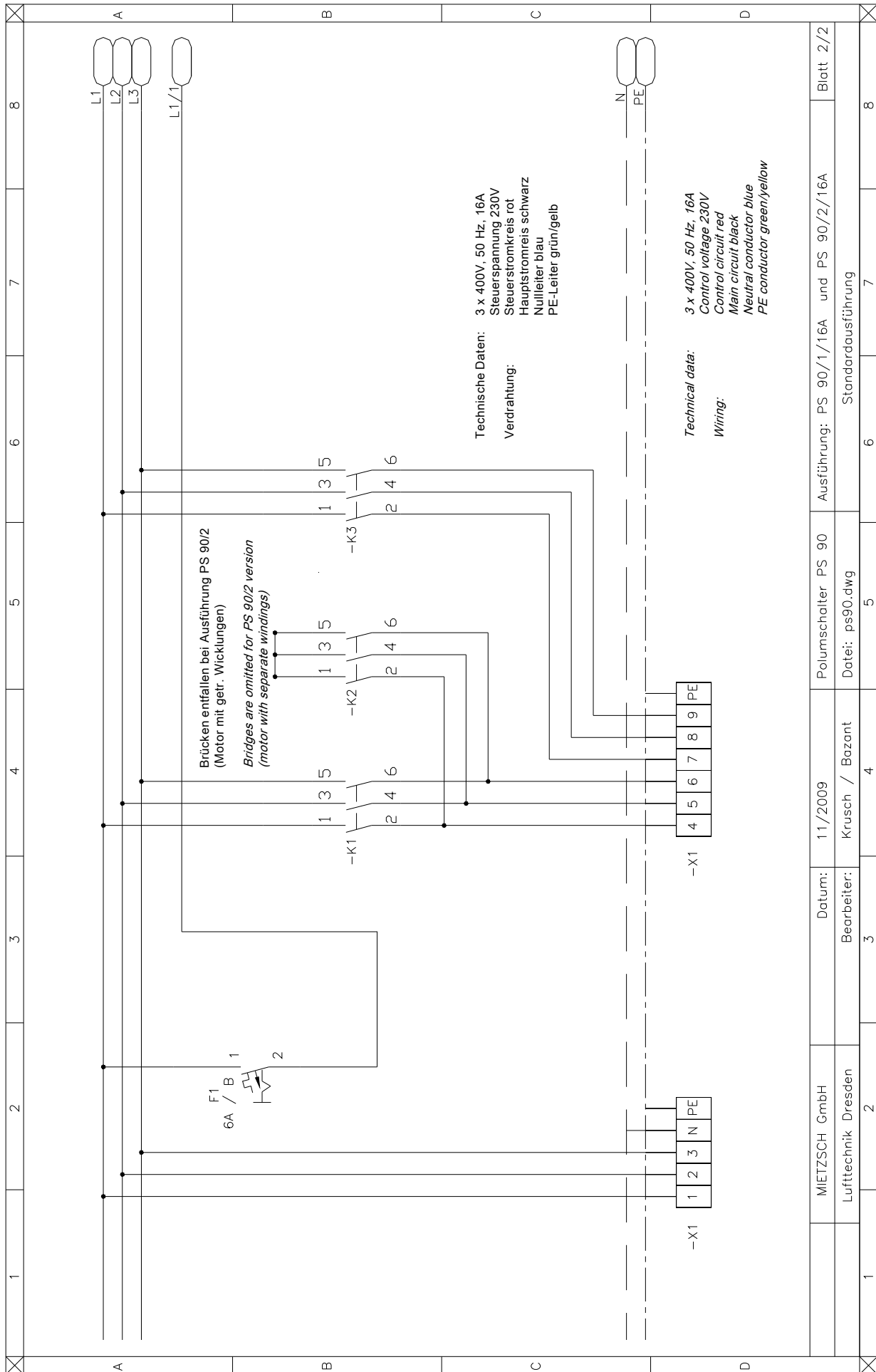




The cable type NYM specified above should be regarded as a proposal only. The devices have to be connected according to the relevant connection schemes enclosed to the devices (in particular instruction manual for PS 90).



1	2	3	4	5	6	7	8
MIETZSCH GmbH		Datum: 11/2009		Polumschalter PS 90		Ausführung: PS 90/1/16A und PS 90/2/16A	
Lufttechnik Dresden		Bearbeiter: Krusch / Bazant		Datei: ps90.dwg		Standardausführung	
1	2	3	4	5	6	7	8
Blatt 1/2							



1	2	3	4	5	6	7	8
MIETZSCH GmbH		Datum: 11/2009		Polumschalter PS 90		Ausführung: PS 90/1/16A und PS 90/2/16A	
Lufttechnik Dresden		Bearbeiter: Krusch / Bozant		Datei: ps90.dwg		Blatt 2/2	
				Ständerausführung			