

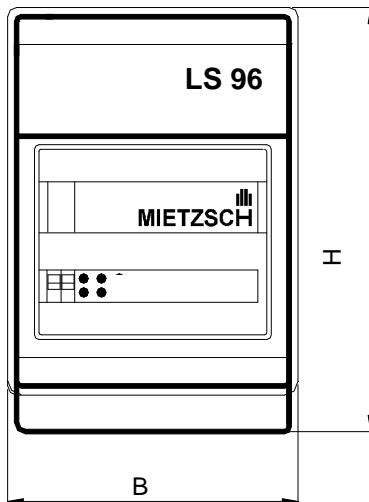
The Fan control LS 96 offered by our company is a compact solution for controlling fans with three-phase motors. The elegant control cabinet of plastic material contains all switching and operating elements, operational signal lamps and a complete motor protection with trouble signalling. This requires the fan to be ordered as special design TS (with thermal winding protection). Depending on the design version, up to three fans can be connected and separately activated.

Fitting is very easy. Connections to the mains and to the fan are the only actions required to bring the unit into service.

The design version LSU 96 has an additional timer with daily and weekly programs. This means that activation can be controlled as a function of time.

Design versions

	for 1 fan	for 2 fans	for 3 fans
basic variant	LS 96 / 1 / 16 A	LS 96 / 2 / 16 A	LS 96 / 3 / 16 A
with timer	LSU 96 / 1 / 16 A	LSU 96 / 2 / 16 A	LSU 96 / 3 / 16 A
B x H x T	295 x 458 x 129 mm	403 x 458 x 129 mm	403 x 603 x 129 mm
weight	4 kg	5,5 kg	8 kg



In addition, the LS 96 and corresponding external supplementary devices permit various basic control and regulation tasks to be solved very easily:

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

Combinations of different functions are possible.

Technical data

nominal voltage	3 x 400 V, 50 Hz (230V for single-phase motors)
nominal current	16 A (higher currents on request)
motor protection	thermal winding protection (PTC resistor)
housing	plastic material, IP 54
	dimensions see table
	with snap lock
cable inlet	top/bottom
weight	see table

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

The fan control has modular layout. In cases of several fans the modules are identical and functioning independently of one another. Coupling is possible, e.g. by the connections for remote control switches.

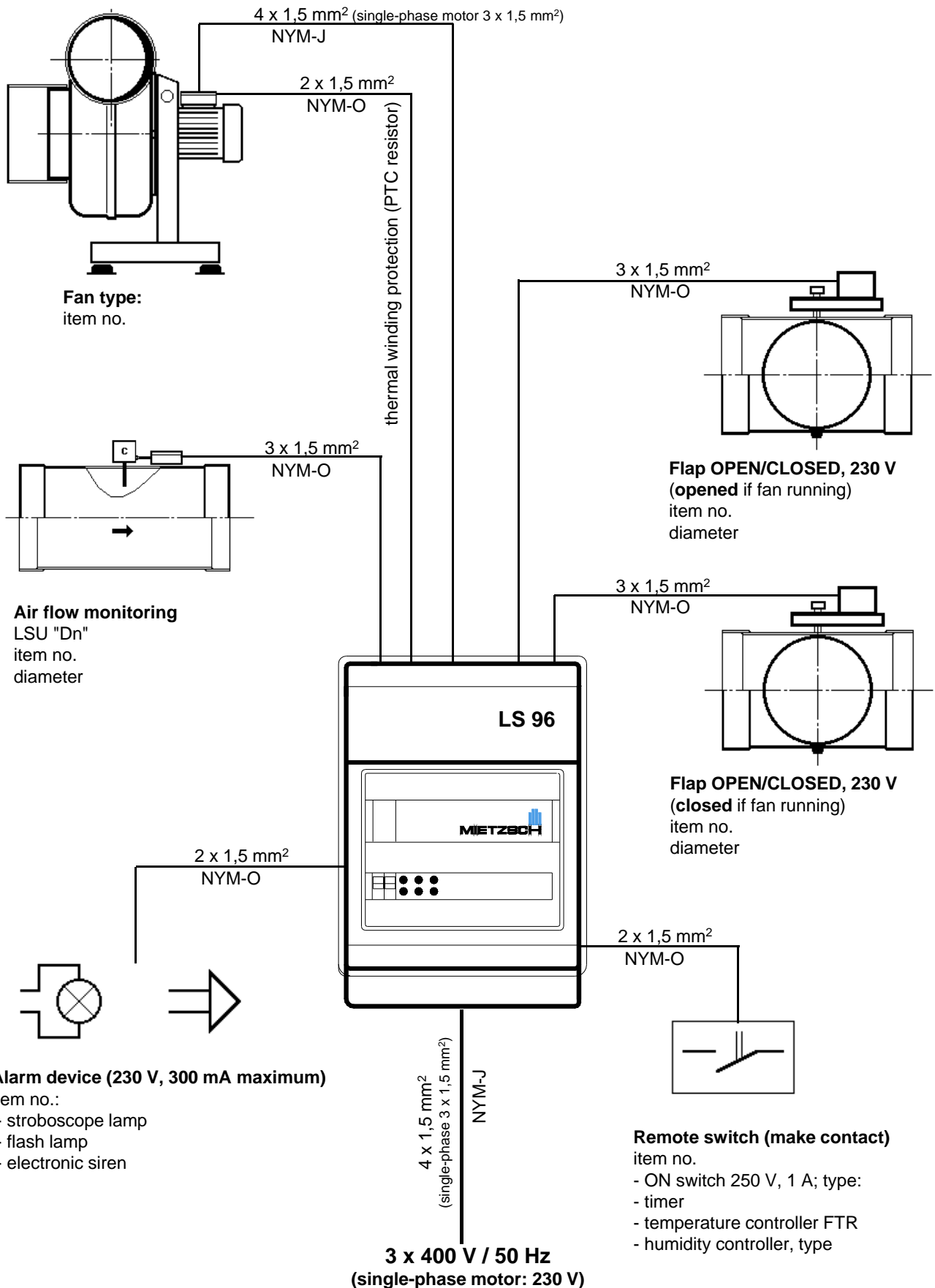
Connection facilities specified in the operating instructions apply to all terminal strips X 1, X 2, X 3.

It is also possible to operate up to six fans in **group regime** from one module with consideration of maximum amperage (16 A). The positive temperature coefficient resistors of the single motor have then to be arranged in series.

Connection scheme for LS 96 / ...

Terminal strip: -X1 / -X2 / -X3

Objekt / Order no.:



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 LS 96).

Pole Changer PS 90

Mounting, installation and operation

The Pole Changer PS 90 offered by our company is a compact solution for speed changing of fans with pole-changeable motors.

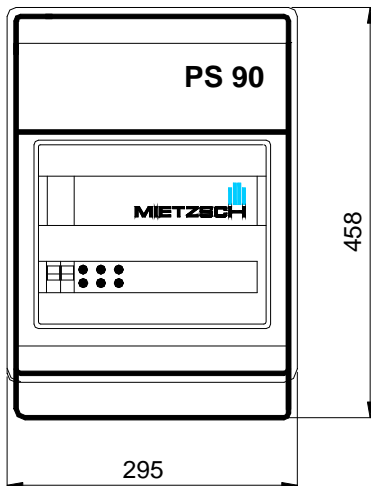
The elegant control cabinet of synthetic material contains all switching and operating elements, operation signal lamps and an overall motor protection device with trouble signalling. This means that the fan has to be ordered with special design TS (with thermal winding protection, positive temperature coefficient resistor).

Mounting and installation are very simple. Bringing into service merely requires the mains connection and connection to the fan.

Design version PSU 90 is additionally equipped with a quartz-controlled timer with daily and weekly programs. This means that operating states

- off
- lower speed rate
- upper speed rate

can be controlled as functions of 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

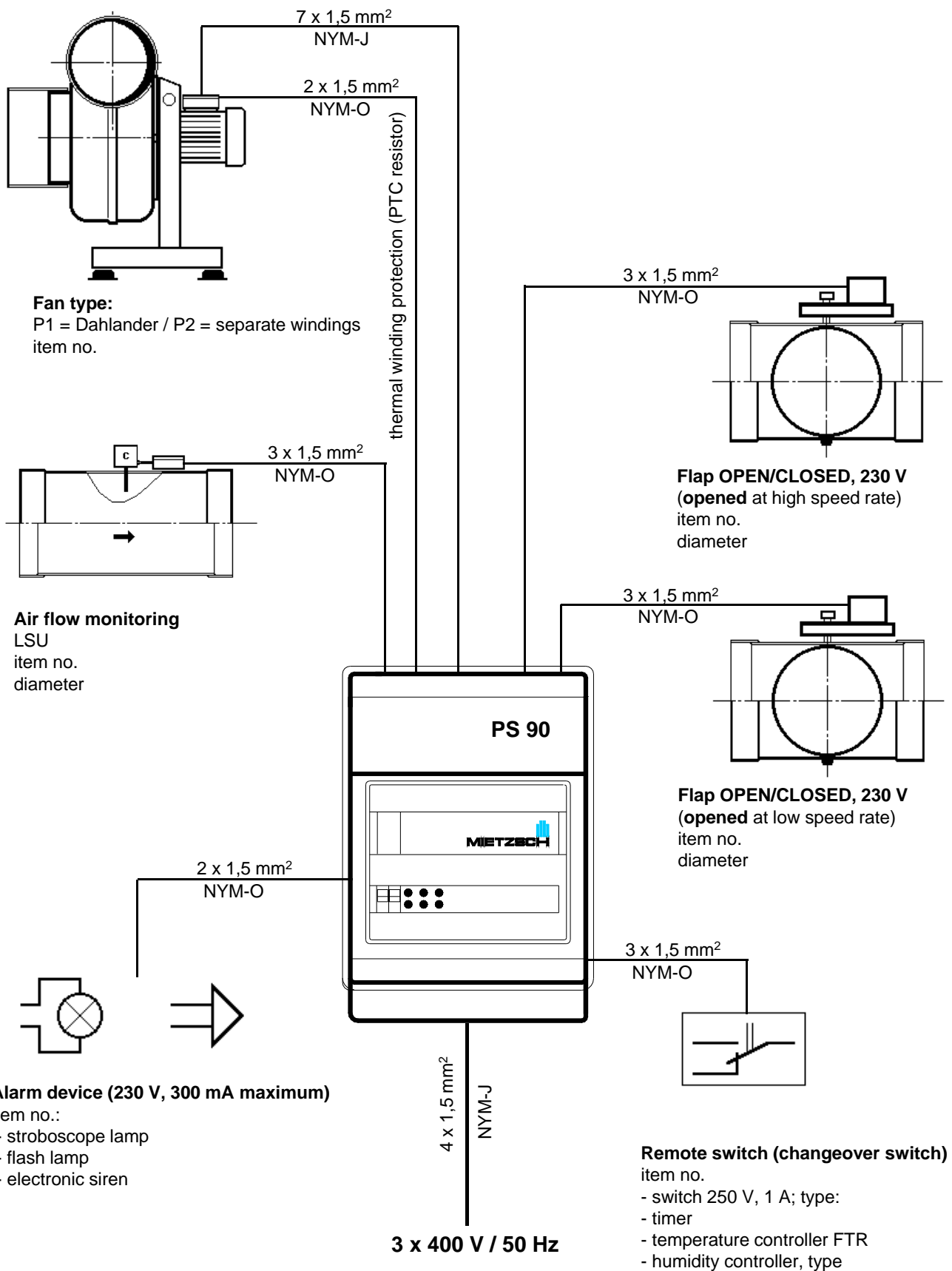
nominal voltage	3 x 400 V, 50 Hz
nominal current	16 A (higher currents on request)
motor protection	thermal winding protection (PTC resistor)
housing	plastic material, IP 54
	295 mm x 458 mm x 129 mm
	with snap lock
cable inlet	top/bottom
weight	4 kg

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



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).

Der PS 90 dient zur Steuerung von Ventilatoren mit polumschaltbaren Motoren. Je nach Stellung des Betriebsarten-schalters erfolgt die Drehzahlumschaltung am PS 90 (Betriebsart HAND) oder über externe Schaltkontakte (Betriebsart AUTO). Die Kontakte müssen potentialfrei und mit 250V / 1 A belastbar sein.

In der Standardausführung des PS 90 wird extern ein Wechselschalter (Umschalter) benötigt, wie er bei vielen Reglern für Druck Temperatur und Feuchtigkeit und auch Schaltuhren zur Verfügung steht. Es können mehrere Schalter und Geräte parallel oder in Reihe geschaltet werden. Dadurch ergeben sich vielfältige Anwendungen.

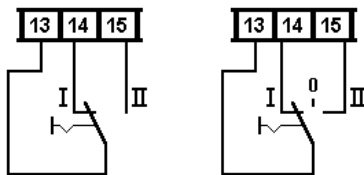
Insbesondere für den Anschluß an Laborabzüge, deren zugehörige Steuerung nicht immer einen Wechselkontakt für Lüfteransteuerung bereitstellt, gibt es einige **PS 90 - Sonderausführungen**, die im folgenden beschrieben werden.

Zusatzfunktionen wie Klappenansteuerung, Anschluß Luftstromüberwachung usw. bleiben erhalten. Alle Ausführungen gibt es als PS 90/1 und PS 90/2.

Um Fehler und Schäden durch falschen Anschluß zu vermeiden, sind die "Schnittstellen" schon bei der Planung sorgfältig abzustimmen. Entscheidend ist dabei welche Art der Schaltkontakte **direkt** an den PS 90 angeschlossen werden sollen.

Es wird dringend davor gewarnt, durch Eingriffe in den PS 90, die erforderlichen Anpassungen bauseits vorzunehmen.

Steuerung über Wechselschalter (PS 90/1 und PS 90/2)



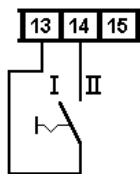
Bei der **Standardvariante** stellt die Lüfteransteuerung ausgangsseitig einen Wechselkontakt oder einen Wechsler mit 0-Stellung zur Verfügung.

Funktion:

- keine Verbindung --> Ventilator aus
- Verbindung 13 und 14 --> untere Drehzahl
- Verbindung 13 und 15 --> obere Drehzahl

Die Klemmen 13, 14 und 15 dürfen nicht gleichzeitig verbunden sein!

Steuerung über Schließer (PS 90/1 - 06 und PS 90/2 - 06)



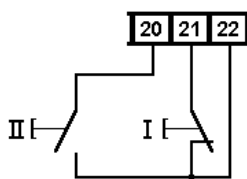
Die Lüfteransteuerung stellt ausgangsseitig einen Schließer zur Verfügung.

Funktion:

- keine Verbindung --> untere Drehzahl
- Verbindung 13 und 14 --> obere Drehzahl

Es können nur Klappenantriebe mit 1-Draht-Steuerung angeschlossen werden.

Steuerung über 2 Taster (PS 90/1 - 2T und PS 90/2 - 2T)

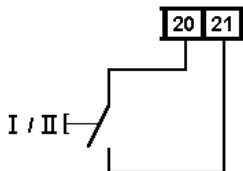


Die Lüfteransteuerung stellt **zwei Taster** zur Verfügung, die direkt an den PS 90 -2T angeschlossen werden.

Funktion:

- Öffner I drücken --> untere Drehzahl
- Schließer II drücken --> obere Drehzahl

Steuerung über 1 Taster (PS 90/1 - 1T und PS 90/2 - 1T)



Die Lüfteransteuerung stellt **einen Taster** (Schließer) zur Verfügung, der direkt an den PS 90 -1T angeschlossen wird.

Funktion:

- wiederholtes drücken --> Wechsel zwischen oberer und unterer Drehzahl

Bemerkungen