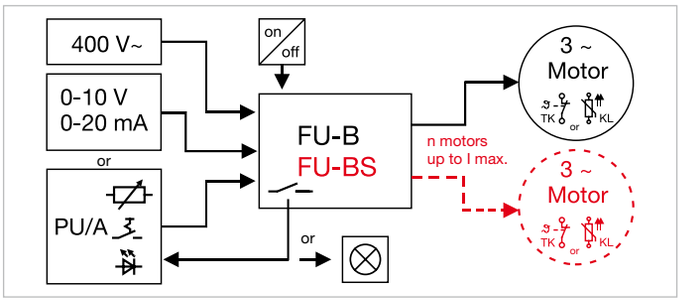
FU-B and FU-BS



Description FU-B “Basic”

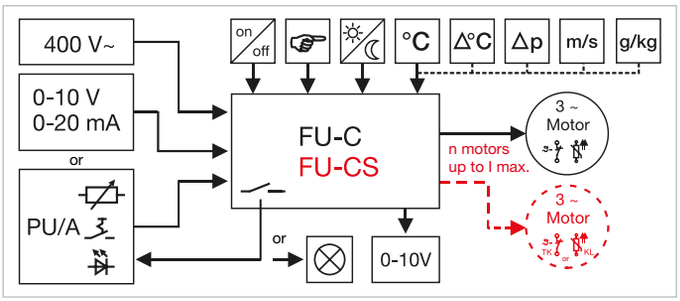
- Frequency inverter FU-B in basic design without sine filter for controlling the speed of an individual fan.
- Speed specification via 0–10 V control signal (e.g. PU/PA, AFS 0–10 V, accessories).
- Maximum cable length between FU-B and fan is 10 m with shielded cable.
- The fan must be designed for operation with frequency inverter (EMC suitable fan/motor, optional special design).
- The FU-B is fixed at its rated current.
- The frequency inverter compatibility must be specified when ordering fan for FU-B operation (without sine filter).

Description FU-BS “Basic-Sine”

- Frequency inverter FU-BS in basic design with integrated, all-pole effective sine filter.
- For controlling the speed of one or more fans. The permitted number of fans is calculated from the maximum FU current.
- Speed specification via 0–10 V control signal (e.g. PU/PA, AFS 0–10 V, accessories).
- Cable length between FU-BS and fan can be over 10 m.
- No additional EMC shielding of electrical cables required. The fans and motors do not require special EMC measures for frequency inverter operation.
- The FU-BS is fixed at its rated current.
- Conventional standard fans/ motors can be used when using the frequency inverter with integrated sine filter.

	FU-B and FU-BS
Analogue inputs	1 x 0–10 V, Ri 100 kOhm or 0–20 mA
Logic inputs	1 x digital 24 V, release
Analogue output	—
Relay output	1 x NOC 250 V / 2 A ind.
Module power supply	1 x 10 V DC, 10 mA, 1 x 24 V DC, 70 mA
Motor temperature monitoring	Thermal contact or PTC thermistor

FU-C and FU-CS



Description FU-C “Comfort”

- Frequency inverter FU-C in comfort design without sine filter for controlling the speed of an individual fan.
- Includes display and three operating buttons for adjusting the fan and control parameters.
- Parameterisation and control options via Modbus.
- With integrated, full control system for temperature, pressure and air velocity and absolute humidity difference. Required sensors LDF 500, LGF 10, LT.., AFS 0–10 V (access.) available.
- Speed specification via 0–10 V control signal (e.g. PU/PA, AFS 0–10 V, accessories) or via direct input on display.
- Cable length and fan suitability for operation with frequency inverter see FU-B.
- The frequency inverter compatibility must be specified when ordering fan for FU-C operation (without sine filter).
- With protection mode for use in smoke extraction systems, bridges internal protection device for max. operating duration.

Description FU-CS “Comfort-Sine”

- Frequency inverter FU-CS in comfort design with integrated, all-pole effective sine filter.
- For controlling the speed of one or more fans. The permitted number of fans is calculated from the maximum FU current.
- Includes display and three operating buttons for adjusting the fan and control parameters.
- Parameterisation and control options via Modbus.
- With integrated, full control system for temperature, pressure and air velocity and absolute humidity difference. Required sensors LDF 500, LGF 10, LT.., AFS 0–10 V (access.) available.
- Speed spec., cable length, EMC measures see FU-BS.
- Conventional standard fans/ motors can be used when using the frequency inverter with integrated sine filter.
- With protection mode for use in smoke extraction systems, bridges internal protection device for maximum operating duration.

	FU-C and FU-CS
Analogue inputs	2 x 0–10 V, Ri 100 kOhm or 0–20 mA, or KTY
Logic inputs	2 x digital 24 V, function can be parameterised
Analogue output	1 x 0–10 V DC, 10 mA
Relay output	2 x changeover contact 250 V / 2 A ind.
Module power supply	1 x 10 V DC, 10 mA (in analogue output), 1 x 24 V DC, 70 mA
Motor temperature monitoring	Thermal contact or PTC thermistor

General features

- Inverter especially optimised for HLK application.
- Energy-saving through continuously variable speed setting.
- Specially adapted to fan operation, i.e. minimal energy consumption and minimal noise generation in partial load range.
- Use of maintenance-free three-phase current asynchronous motors of all types and performances.
- No performance restriction when using standard motors.
- Operating signal via potential-free contact.
- Potentiometer power supply: 10 V DC/10 mA for potentiometer with e.g. 10 kOhm
- Analogue input for speed specification (0–10 V, 0(4)–20 mA).
- Short-circuit and earth fault proof.
- Integrated electronic motor protection via TK or PTC thermistor.
- Controller galvanically isolated.
- Overvoltage-proof
- Also suitable for switch cabinet installation.
- Power reduction at ambient temp. over 40 °C – 55 °C.

Type-specific features

Basic types:

- Additional power supply: 24 V DC/70 mA for wiring of digital inputs and additional external components.

Sine types:

- Includes internal, all-pole effective sine filter.
- For the simple retrospective extension of existing ventilation systems.

Comfort types:

- Free specification of acceleration and deceleration times to reduce start-up noises.
- Additional power supply: 24 V DC/120 mA for wiring of digital inputs and additional external components.
- Simple adjustment and control of values using display.
- Comprehensive diagnostic display in case of fault.
- Speed specification directly on unit via display.
- Serial interface RS 485 / Modbus-RTU.
- Parameterisable, performance adjustment as required.

Information

- **Internal, all-pole effective sine filter** (Types FU-..S)
  Filters the voltages between the individual phases as well as the phase voltage between phase and protective conductor. The output voltage of the frequency inverter is purely sinusoidal and corresponds to the quality of a standard mains voltage.
- **Earth leakage circuit breaker** (all types)
  When using FU in an environment where an earth leakage circuit breaker is required, it must be sensitive to universal currents, type B+, 300 mA.
- **EMC**
  All FU types comply with EMV Directive 2004/108/EC and the applicable standards, such as DIN EN 60335-1 and DIN EN 550011. Radio interference filters are integrated to comply with cl. B (living area). The cable between the fan and frequency inverter must be shielded for FU-B and -C with a max. length of 10 m. The motor power supply and temp. monitoring system must be installed separately.
- **Design Motor current / Frequency**
  When selecting a suitable frequency inverter, the maximum motor current must be taken into account. When operating multiple fans, the sum of the individual flows must be applied. In order to prevent faults and failures, a 10% reserve should be planned. A max. frequency of 50 Hz must not be exceeded for controlling the speed of a standard fan, otherwise the motor will be overloaded and destroyed. Operation at a higher frequency is only possible upon request.
- **Motor protection**
  Maximum motor protection is achieved by monitoring (thermal contact/PTC thermistor), whereby max. 6 PTC thermistors can be connected in series to a unit. The number of PTC thermistors can be increased by using monitoring units (Type MSA, accessories).

Type	Ref. no.	Maximum power		Cable cross sections from mains and to motor cable	Wiring diagram	Dimensions			Weight net aprx.
		Output current	Motor			Height	Width	Deep	
		A	kW	mm²	No.	mm	mm	mm	kg
Basic design without sine filter for three-phase current fans, 3~, 400 V, 50/60 Hz, protection category IP54									
FU-B 3.6	05453	3.6	1.5	4 x 1.5 [1]	1020	284	240	115	2.6
FU-B 5.0	05454	5.0	2.2	4 x 1.5 [1]	1020	302	250	196	4.6
FU-B 7.0	05455	7.0	3.0	4 x 1.5 [1]	1020	302	250	196	4.7
FU-B 8.5	05456	8.5	4.0	4 x 1.5 [1]	1020	302	250	196	5.6
FU-B 12	05457	12.0	5.5	4 x 1.5 [1]	1020	302	250	196	5.7
FU-B 17	05458	17.0	7.5	4 x 1.5 [1]	1020	302	250	196	5.9
Basic design with all-pole effective sine filter for three-phase current fans, 3~, 400 V, 50/60 Hz, protection category IP54									
FU-BS 2.5	05459	2.5	[2]	4 x 1.5	1028	284	240	115	2.7
FU-BS 5.0	05460	5.0	[2]	4 x 1.5	1028	302	250	196	5.2
FU-BS 8.0	05461	8.0	[2]	4 x 1.5	1028	302	250	196	6.3
FU-BS 10	05462	10.0	[2]	4 x 1.5	1028	302	250	196	6.8
FU-BS 16	05463	16.0	[2]	4 x 1.5	1028	302	250	196	6.9
Comfort design without sine filter for three-phase current fans, 3~, 400 V, 50/60 Hz, protection category IP54									
FU-C 4.2	05865	4.2	1.5	4 x 1.5 [1]	1030	302	250	195.5	6.4
FU-C 8.5	05868	8.5	4.0	4 x 1.5 [1]	1030	302	250	195.5	7.3
FU-C 12	05869	12.0	5.5	4 x 1.5 [1]	1030	302	250	195.5	7.5
FU-C 17	05870	17.0	7.5	4 x 2.5 [1]	1030	302	250	195.5	7.5
FU-C 25	05464	25.0	11	4 x 4.0 [1]	1030	355	280	239	12.5
FU-C 32	05465	32.0	15	4 x 6.0 [1]	1030	524	386	283	24.5
FU-C 39	05466	39.0	18.5	4 x 10.0 [1]	1030	524	386	283	26.3
FU-C 46	05467	46.0	22	4 x 10.0 [1]	1030	524	386	283	26.3
FU-C 62	05468	62.0	30	4 x 16.0 [1]	1030	524	386	283	26.3
Comfort design with all-pole effective sine filter for three-phase current fans, 3~, 400 V, 50/60 Hz, protection category IP54									
FU-CS 2.5	05871	2.5	[2]	4 x 1.5	1032	284	240	115	3.3
FU-CS 8	05873	8.0	[2]	4 x 1.5	1032	302	250	195.5	7.9
FU-CS 10	05874	10.0	[2]	4 x 1.5	1032	302	250	195.5	8.2
FU-CS 14	05875	14.0	[2]	4 x 1.5	1032	302	250	195.5	8.7
FU-CS 18	05469	18.0	[2]	4 x 2.5	1032	302	250	196	9.1
FU-CS 22	05470	22.0	[2]	5 x 4.0	1032	355	280	239	14.5
FU-CS 32	05471	32.0	[2]	4 x 6.0	1032	525	386	283	29.6
FU-CS 40	05472	40.0	[2]	4 x 10.0	1032	525	386	283	29.6
FU-CS 50	05473	50.0	[2]	4 x 16.0	1032	525	386	283	32.8

[1] Max. 10 m shielded, Motor power supply and protection installed separately.
[2] The max. current for all connected fans is decisive for the design.

Accessories

PU 24/PA 24 No. 01736/01737
Speed potentiometer, flush/surface, LED 24 V, poti 10 V/1.3–10 V.

SU-3 10/SA-3 10 No. 04266/04267
Three-step speed switch, flush/surface-mounted, 10 V/1.7–10 V.

SA-5 10 Ref. no. 40229
Five-step speed switch, surface-mounted, IP54, 10 V/2–10 V.

WSUP Ref. no. 09990
Weekly timer with LCD display, potential-free contact.

WSUP-S Ref. no. 09577
Weekly timer potential-free contact, for DIN top hat rails.

EDR Ref. no. 01437
Elec. differential pressure controller 0–1000 Pa, 10–24 V / 0–10 V.

ETR Ref. no. 01438
Electronic temperature controller (sensor see accessories ETR).

LDF 500 Ref. no. 01322
Differential air pressure sensor, measurement range 0 to 500 Pa.

LGF 10 Ref. no. 01325
Air velocity sensor, measurement range 0 to 10 m/s.

LTA 40 Ref. no. 01336
External temperature sensor, measurement range –20 °C to +60 °C, protection category IP54.

LTK 40 Ref. no. 01324
Temperature sensor for rectangular duct installation, measurement range 0 °C to +40 °C.

LTR 40 Ref. no. 01323
Room temperature sensor, measurement range +0.5 °C to +40 °C.

AFS 0–10 V Ref. no. 06532
Absolute humidity sensor, with 0–10 V control output.

AFS set 0–10 V Ref. no. 07376
Set consisting of 2 sensors.

General technical data

Mains voltage	3~, 208 – 480 V
Mains frequency	50/60 Hz
Output voltage	95 % of U_{mains}
Output frequency	50 Hz
Protection category	IP54
Ambient temperature (–20 °C not current-free)	0 to +40 °C