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JUMO
MEASUREMENT AND CONTROL

JUMO ILPF100 and JUMO ILPF200 3-channel Profile Controller for cooking, smoking and ripening installations

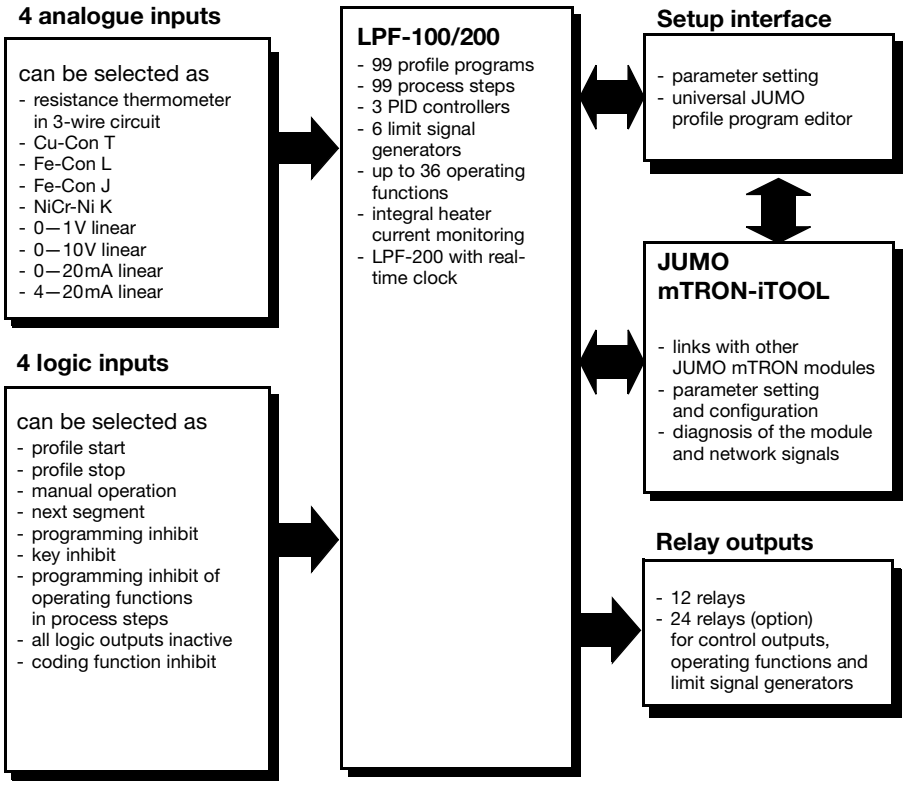
Brief description

The JUMO LPF-100/200 is a 3-channel profile controller for meat processing which is supplied in several variants. A setup programm is available for convenient configuration via a PC. All settings can also be made on the controller itself. The memory can hold up to 99 profile programs which are segment-oriented and can be altered as required. A segment consists of a processing step, setpoints for chamber and core temperature, humidity, delta cooking, C or F value, and operating functions. The profile programs are entered from the membrane keys or through a PC. The actual values of chamber and core temperature, humidity, and a further, freely selected variable are measured through four analogue inputs. Four logic inputs are available for profile start, profile stop, external manual operation, and additional functions; they are operated by floating contacts.
12 output relays are available, with extension to 24 (or to 36 using the JUMO mTRON automation system). Extension with analogue outputs is available via an additional module (option). A communication module provides access to the supervisory level through Jbus or MODbus protocol. A DDE server can be used to process the LPF data in Windows programs. All input keys, together with process value and setpoint displays, are clearly arranged behind a front membrane which offers protection against water spray and provides acid resistance to DIN 42 115 Part 2. The electrical connection is made through push-on screw terminals.

Type 700105/...

Type 700106/...

Block structure



Standard accessories

- 1 Operating Manual B 70.0105 (75.0105)
- 4 mounting brackets and seal
- Combicon push-on connectors with screw terminals 3-way, 8-way, 12-way for electrical connection

Accessories

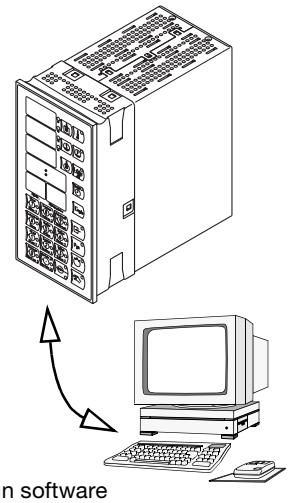
- PC interface with TTL/RS 232 converter Sales No. 70/00301315
- Project design software JUMO mTRON-iTOOL for configuration and linking with mTRON modules
- Universal JUMO profile program editor EdiProg
- JUMO mTRON automation system
- Membrane key arrangement to customer specification (colour, Company logo)

1. See description of the JUMO mTRON automation system on page 4/11

Compact controller

LPF-100

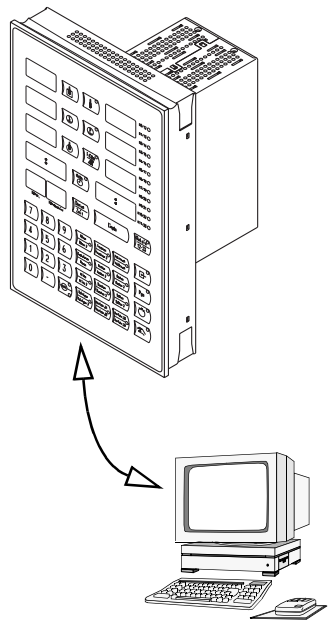
Type: 700105/1



- Project design software JUMO mTRON-iTOOL for configuration
- Universal JUMO profile program editor for input, read-out and transfer of application programs

LPF-200

Type: 700106/1

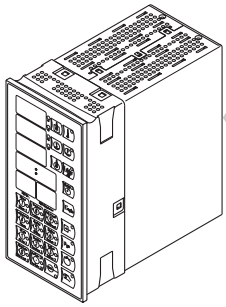


- Project design software JUMO mTRON-iTOOL for configuration
- Universal JUMO profile program editor for input, read-out and transfer of application programs

Compact controller with LON[1] interface

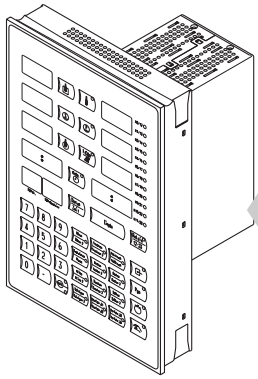
LPF-100

Type: 700105/2

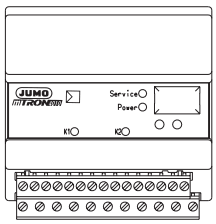


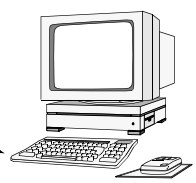
LPF-200

Type: 700106/2



Module of JUMO mTRON automation system



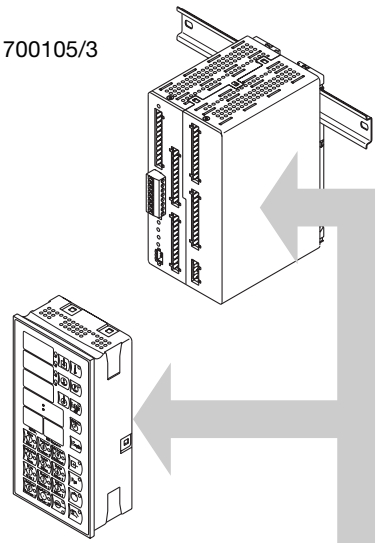


- Project design software JUMO mTRON-iTOOL for configuration and linking with mTRON modules
- Universal JUMO program editor for input, read-out and transfer for application programs

Operating unit separate from process unit with LON[1] interface

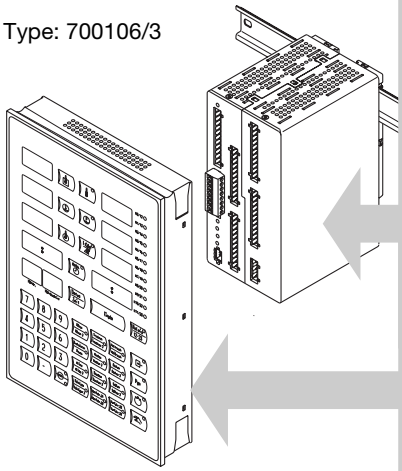
LPF-100

Type: 700105/3

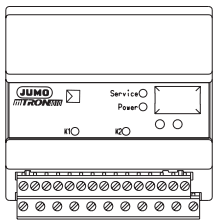


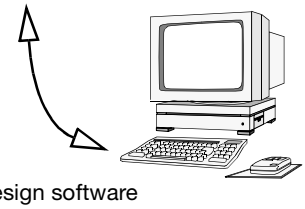
LPF-200

Type: 700106/3



Module of JUMO mTRON automation system





- Project design software JUMO mTRON-iTOOL for configuration and linking with mTRON modules
- Universal JUMO profile program editor for input, read-out and transfer of application programs

LON[1]

1. Fieldbus concept LON
Local **O**perating **N**etwork

Technical data Process unit

Analogue inputs

4 signal inputs as selected:
- Pt100 resistance thermometer in 3-wire circuit
- thermocouples, or
- standard signals

Resistance thermometers

Process value transducer	Display range Measurement range
Chamber temperature Pt 100	0 +200°C -199 +850°C
Wet temperature Pt 100	0 +100°C -199 +850°C
Core temperature Pt 100	0 +200°C -199 +850°C

Measurement accuracy
± 0.05 %
Temperature drift
0.025% max. per 10°C
Resolution
better than 15 bit
Class accuracy
0.1%

Thermocouples

Transducer	Display range Measurement range
Fe-Con L	0 +200°C -199 +900°C
Fe-Con J	0 +200°C -199 +999°C
NiCr-Ni K	0 +200°C -199 +999°C
Cu-Con T	0 +200°C -199 +400°C

Measurement accuracy
± 0.25 %
Temperature drift
≤ 0.1 % max. per 10°C
Resolution
better than 15 bit
Class accuracy
0.5 %
Lead resistance
less than 30 Ω

Standard signals (linear)

Signal inputs 2,4	Internal resistance R_i
0 — 10V linear	1 MΩ
0 — 1V linear	1 MΩ
0 — 20mA linear	3.6 Ω
4 — 20mA linear	3.6 Ω

Heater current monitoring

0 — 20mA ±1 %, 50 — 60Hz AC
for connection to current transformer
Measurement accuracy
± 0.05 %
Temperature drift
0.1% max. per 10°C
Resolution
better than 15 bit
Class accuracy
0.1%

Signal circuit monitoring

The action on overrange and underrange can be configured through the setup program. Combination relay (relay 12) is activated.

Transducer	Probe break	Probe short-circuit
Resistance thermometers	X	X
Thermocouples	X	-
0 — 1 V	X	-
0 — 10 V	-	-
0 — 20 mA	-	-
4 — 20 mA	X	X

X = recognised
- = not recognised

Logic inputs

4 logic inputs can be operated by floating contacts, e. g. for profile start.

Relay outputs

Relay with contact protection circuit
Rating: 3 A 230V (resistive load)
Contact life: 10^6 operations at rated load

Controller structures

Controller types	Controller structures
Single-setpoint controller	P, I, PI, PD, PID
Double-setpoint controller	P, PI, PD, PID
Modulating controller	PI, PID

Limit signal generators

Up to 6 limit signal generators with different switching functions are availalbe. They can respond to any process values and setpoints as selected.

Action on supply failure

Can be configured through setup program. Hold, continue, and continue at X% can be selected.

Environmental conditions

Operating and ambient temperature
0 to +50 °C

Permitted storage temperature
-20 to +70 °C

Relative humidity
not exceeding 80%, no condensation

Contamination
Degree 2 to EN 61010 / VDE 0411

Overvoltages
Category II to EN 61010 / VDE 0411

Housing

Material
polycarbonate, metal-coated inside, with bezel insulated to the outside

Flammability Class
UL 94 VO

Protection
IP 20 to EN 60529

Mounting
process unit on standard rail

Weight
1100 g approx.

Supply
93 — 262V AC 48 — 63Hz

Power consumption
22VA max.

Technical Data Operating unit

Display LPF-100

14 mm red LED display for process values, segment time, profile program number, segment number and setpoints

LEDs in the keys indicate the active operating mode of coding functions, programming, automatic operation, process steps and manual operation.

Display LPF-200

14 mm red LED display for process values, clock time, segment time, profile program number, segment number, green LED display for setpoints

LEDs in the keys indicate the active operating mode of coding functions, programming, automatic operation, process steps and manual operation.

Indicating range

-199 to +999
linear, °C or °F

Membrane keys

Keys with tactile feedback for

- program functions such as programming, manual and automatic operation
- switching the key designation
- special functions such aus F and C value, delta cooking, clock time, switching between setpoints and process values
- on LPF-200: separate keys for numbers and process steps, date/time

Profile programs

99 profile programs can be input, stored and readily altered at any time. They are built up from chamber temperature, core temperature, humidity, one additional temperature, and various cooking processes (process steps). Each profile program can consist of up to 99 segments. A total of 2600 segments for all profile programs can be stored in the memory.

Segments

A segment consists of a process step, 4 setpoints and the segment time. Various step-on conditions determine the segment change. Segments can be altered approx. 2500 times.

Process steps

A process step is preset with various system states for smoking, cooking etc. which are usually input by the equipment manufacturer. The user need only select the process and can input the setpoints for it. The LPF-100 has 22 process steps, the LPF-200 24 process steps, all preset on function keys. 99 process steps can be stored and altered approx. 2500 times.

Step-on conditions

The process steps on to the next segment when:

... the segment time has been completed
... the core temperature setpoint has been reached
... the segment time has been completed or the core temperature setpoint has been reached
... the programmed F-value has been reached
... the programmed C-value has been reached
... a logic input configured for step-on has been activated
... the programmed C-value and the programmed core temperature setpoint have been reached.

Cooking processes

The process can be controlled by delta-cooking, by F-value or by C-value cooking.

Profile end signal
through combination alarm relay (relay 12)

Operating functions
24 of the total of 36 possible operating outputs can be provided with a pulsing action. Relative to the segment change, they can be configured ON-advanced, OFF-advanced, ON-delayed or OFF-delayed. The delay and advance times can be set separately.
The remaining operating outputs can be either active or inactive for the duration of a segment.

Environmental conditions

Operating and ambient temperature
0 to +50 °C

Permitted storage temperature
-20 to +70 °C

Relative humidity
not exceeding 80%, no condensation

Contamination
Degree 2 to EN 61010 / VDE 0411

Overvoltage
Category II to EN 61010 / VDE 0411

Housing

Material
ABS plastic-metal composite

Flammability class
UL 94 VO

Protection
front: IP66 to DIN 42 115 Part 2
proof against water spray and acid resistant, can be washed with unpressurised water up to 70°C.
rear: IP00 to EN 60 529

Mounting
operating unit or compact unit in panel

Weight
operating unit LPF-100: 380 g approx.
operating unit LPF-200: 850 g approx.

Power consumption
12 VA max.

Supply
93—263 V AC 48—63 Hz

Compact controller power consumption
34 VA max.

The JUMO-mTRON automation system

The JUMO mTRON automation system consists of autonomous modules to which defined functions are assigned.
The module housing has the dimensions 91.5 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail; it is made from electrically conducting plastic. Connections to sensors and actuators are made by push-on screw terminals.
Each unit has a network connection for communication and for data interchange. A large number of process and status signals can be exchanged with other units via the network. A screened twisted pair is used as the transmission cable. A setup interface is provided for parameter setting and configuration.

JUMO mTRON modules

Controller module
Data Sheet 70.4010

Relay module
Data Sheet 70.4015

Analogue input module
Data Sheet 70.4020

Analogue output module
Data Sheet 70.4025

Logic module
Data Sheet 70.4030

Operating unit
Data Sheet 70.4035

Communication module
Data Sheet 70.4040

Controller operating unit
Data Sheet 70.4045

Project design software JUMO mTRON-iTOOL
Data Sheet 70.4090

Type designation

	(1)		(2)		(3)		(4)		(5)		(6)		(7)
7001	. .	/	.	-	. . .	-	. . .	-	. . .	-	01	-	. . .

(1) Basic type		Code
LPF-100	7001	05
LPF-200	7001	06

(2) Basic type extension	Code
Compact unit	1
Compact unit with LON interface	2
External operating unit with LON interface	3

(3) Analogue inputs	Code
Stock version	888
Customized configuration	999

(4) Logic inputs	Code
Stock version	888
Customized configuration	999

(5) Number of relays	Code
12 relays	012
24 relays[1]	024

(6) Supply	Code
93—263V AC 48—63Hz	01

(7) Controller type/ limit signal generator	Code
Stock version to table	888
Customized configuration	999

(3) Analogue inputs	Signal input 1	2	3	4
inactive				✘
Resistance thermometer Pt 100 in 3-wire circuit	✘	✘	✘	
Cu-Con T				
Fe-Con L				
Fe-Con J				
NiCr-Ni K				
0—20 mA, linear				
4—20 mA, linear				
0—1V, linear				
0—10V, linear				
0—20 mA AC (heater current)				

(4) Logic inputs	Input 1	2	3	4
Profile start	✘			
Profile stop		✘		
Manual operation			✘	
Next segment				✘
Programming inhibit				
Key inhibit				
Programming inhibit for operating functions on process steps				
All logic ouputs OFF				
Coding functions inhibit				

1. Relay 13—24 are available as option. If more than 24 relays are required, Types 7001../2 and 7001../3 can be expanded up to 36 relays using mTRON relay modules.

■ factory setting

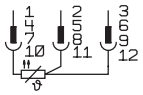
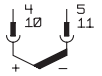
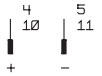
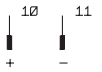
(7) Controller type, limit signal generator and operating functions

Controller 1 chamber	Controller 2 humidity	Controller 3	Relay for limit signal generator						12 relays[1]	24 relays[2]
									for operating functions	
Single-setpoint controller relay 1	Single-setpoint controller relay 2	no controller	no limit signal generator						relays 3—12	relays 13—24
Single-setpoint controller relay 1	Single-setpoint controller relay 2	Single-setpoint controller relay 3	no limit-signal generator						relays 4—12	relays 13—24
			4						relays 5—12	relays 13—24
			4	5					relays 6—12	relays 13—24
			4	5	6				relays 7—12	relays 13—24
			4	5	6	7			relays 8—12	relays 13—24
			4	5	6	7	8		relays 9—12	relays 13—24
			4	5	6	7	8	9	relays 10—12	relays 13—24
Double-setpoint controller relay 1,2	Single-setpoint controller relay 3	Single-setpoint controller relay 4	no limit-signal generator						relays 5—12	relays 13—24
			5						relays 6—12	relays 13—24
			5	6					relays 7—12	relays 13—24
			5	6	7				relays 8—12	relays 13—24
			5	6	7	8			relays 9—12	relays 13—24
			5	6	7	8	9		relays 10—12	relays 13—24
			5	6	7	8	9	10	relays 11—12	relays 13—24
Double-setpoint controller relay 1,2	Double-setpoint controller relay 3,4	Single-setpoint controller relay 5	no limit-signal generator						relays 6—12	relays 13—24
			6						relays 7—12	relays 13—24
			6	7					relays 8—12	relays 13—24
			6	7	8				relays 9—12	relays 13—24
			6	7	8	9			relays 10—12	relays 13—24
			6	7	8	9	10		relays 11—12	relays 13—24
			6	7	8	9	10	11	relays 12—12	relays 13—24
Double-setpoint controller relay 1, 2	Double-setpoint controller relay 3, 4	Double-setpoint controller relay 5, 6	no limit-signal generator						relays 7—12	relays 13—24
			7						relays 8—12	relays 13—24
			7	8					relays 9—12	relays 13—24
			7	8	9				relays 10—12	relays 13—24
			7	8	9	10			relays 11—12	relays 13—24
			7	8	9	10	11		relay 12	relays 13—24
			7	8	9	10	11	12[1]	-	relays 13—24

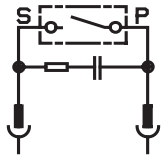
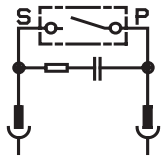
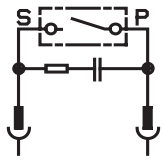
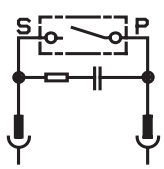
1. Relay 12 is always the combination alarm relay
2. The unit is able to operate up to 36 operating functions. If more then 24 relays are required, Types 7001../2 and 7001../3 can be extended using mTRON relay modules to Data Sheet 70.4015.

■ factory setting

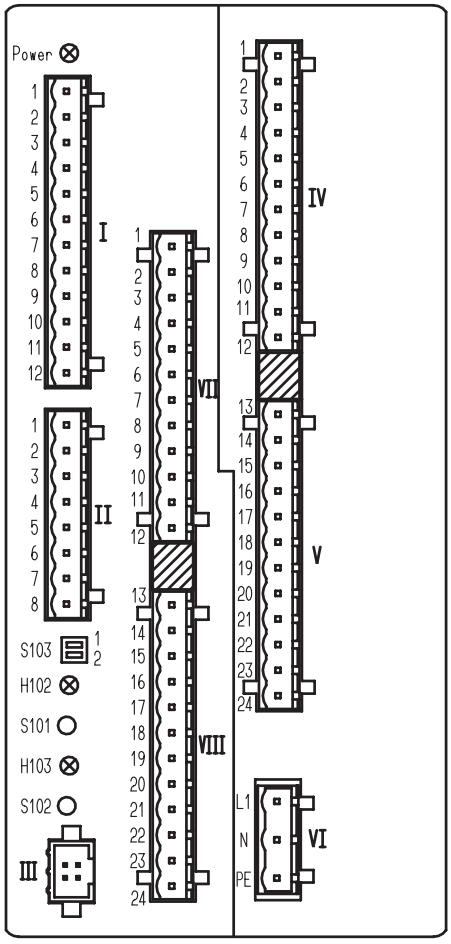
Connection table

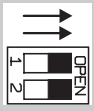
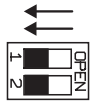
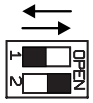
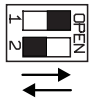
Connection for	**Terminal field I**					
		Signal inputs				
		chamber temperature	relative humidity	core temperature	temperature	
						
Resistance thermometer in 3-wire circuit		I 1 I 2 I 3	I 4 I 5 I 6	I 7 I 8 I 9	I 10 I 11 I 12	
Thermocouple input			I 4 I 5		I 10 I 11	
Standard signals 0—1 V, 0—10 V 0(4)—20 mA			I 4 I 5		I 10 I 11	
0—20 mA AC (heater current)					I 10 I 11	
Connection for	**Terminal field II**					
Technical earth	II 1	To discharge interference potentials, connect the shield to the PE connection of the supply.				
Logic input 1	II 2 II 6	floating contact GND		ext. start[1] pulse 1 sec min.		
Logic input 2	II 3 II 6	floating contact GND		ext. stop[1] pulse 1 sec min.		
Logic input 3	II 4 II 6	floating contact GND		ext. manual operation [1] pulse 1 sec min.		
Logic input 4	II 5 II 6	floating contact GND		step on to the next segment[1] pulse 1 sec min.		
additional functions of the logic inputs[1]		- programming inhibit - key inhibit - programming inhibit of operating functions at process steps - all logic outputs OFF - coding function inhibit				continuous contact
LON interface	II 7 II 8	twisted pair cable	only onTypes 7001../2,.. 7001../3,..			
Connection for		**Terminal field III**				
Interface for JUMO mTRON-iTOOL		PC interface with TTL/RS 232 converter Sales No. 70/00301315 (Types 7001.../1 and /2 only)				

1. Functions can be altered and re-assigned through coding functions 90—99

Connection for relay outputs				
Contact life: 10^6 operations at rated load Rating: 3A 230 V resistive load Connections must not be made while live	**Terminal field IV**			
	relay 1	IV 1 IV 2	(P) common (S) n.o. (make)	 RC protection circuit (metal film resistor 56R 0.5W, metal-plastic capacitor 22nF 1000V)
	relay 2	IV 3 IV 4	(P) common (S) n.o. (make)	
	relay 3	IV 5 IV 6	(P) common (S) n.o. (make)	
	relay 4	IV 7 IV 8	(P) common (S) n.o. (make)	
	relay 5	IV 9 IV 10	(P) common (S) n.o. (make)	
	relay 6	IV 11 IV 12	(P) common (S) n.o. (make)	
	Terminal field V			
	relay 7	V 13 V 14	(P) common (S) n.o. (make)	 RC protection circuit (metal film resistor 56R 0.5W, metal-plastic capacitor 22nF 1000V)
	relay 8	V 15 V 16	P) common (S) n.o. (make)	
	relay 9	V 17 V 18	P) common (S) n.o. (make)	
	relay 10	V 19 V 20	P) common (S) n.o. (make)	
	relay 11	V 21 V 22	P) common (S) n.o. (make)	
	relay 12	V 23 V 24	P) common (S) n.o. (make)	
	Terminal field VII			
	relay 13	VII 1 VII 2	(P) common (S) n.o. (make)	 RC protection circuit (metal film resistor 56R 0.5W, metal-plastic capacitor 22nF 1000V)
	relay 14	VII 3 VII 4	(P) common (S) n.o. (make)	
	relay 15	VII 5 VII 6	(P) common (S) n.o. (make)	
	relay 16	VII 7 VII 8	(P) common (S) n.o. (make)	
	relay 17	VII 9 VII 10	(P) common (S) n.o. (make)	
	relay 18	VII 11 VII 12	(P) common (S) n.o. (make)	
	Terminal field VIII			
	relay 19	VIII 13 VIII 14	(P) common (S) n.o. (make)	 RC protection circuit (metal film resistor 56R 0.5W, metal-plastic capacitor 22nF 1000V)
	relay 20	VIII 15 VIII 16	P) common (S) n.o. (make)	
	relay 21	VIII 17 VIII 18	P) common (S) n.o. (make)	
	relay 22	VIII 19 VIII 20	P) common (S) n.o. (make)	
	relay 23	VIII 21 VIII 22	P) common (S) n.o. (make)	
	relay 24	VIII 23 VIII 24	P) common (S) n.o. (make)	

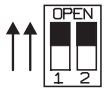
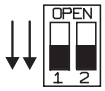
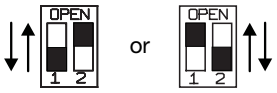
Process unit

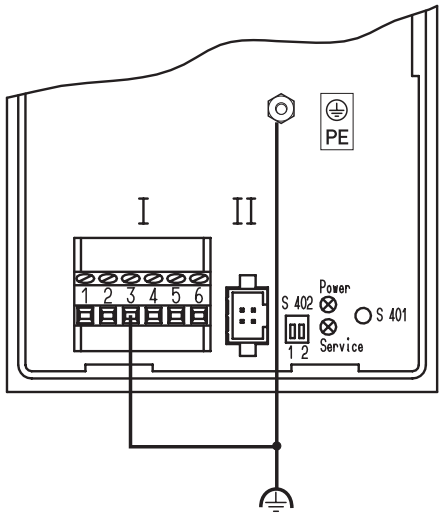


Switch S 103 Termination resistor	Setting
open, no bus termination	
50Ohm	
100Ohm	 or 

■ factory setting

Operating unit

Connection for	**Terminal field I**		
Supply	1 2	line neutral	
Technical earth	3	PE	
	4	not used	
LON interface	5 6	twisted pair cable	only on Types 7001../2,.. and 7001../3,..
Switch S402	1 2	open, no bus termination	
		50 Ohm	
		100 Ohm	
Key S401		service	
Connection for	**Terminal field II**		
Interface for JUMO mTRON-iTOOL		PC interface with TTL/RS 232 converter Sales No. 70/00301315 (only on Types 7001../1.. and 7001../2..)	



■ factory setting

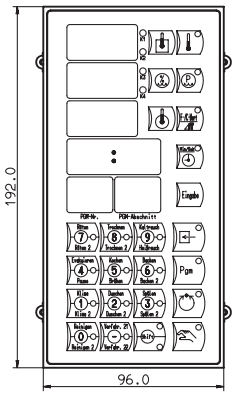
Dimensions: LPF-100

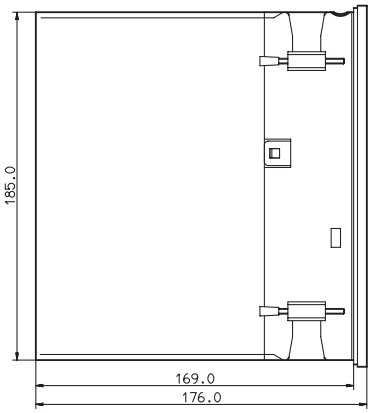
Compact unit

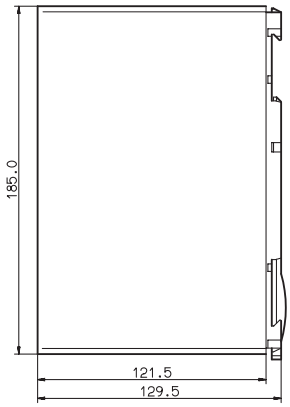
Process unit

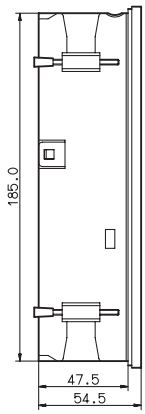
Provide 35 mm spacing upwards for removal!

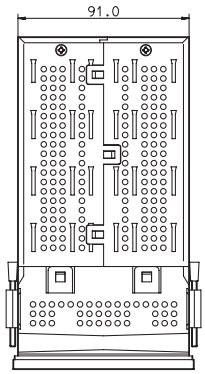
Operating unit



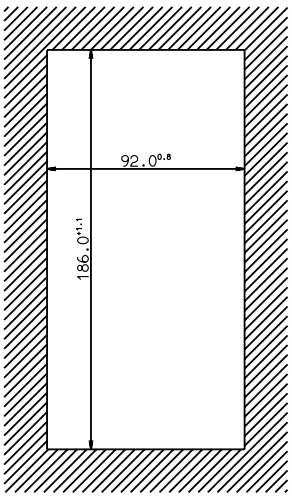








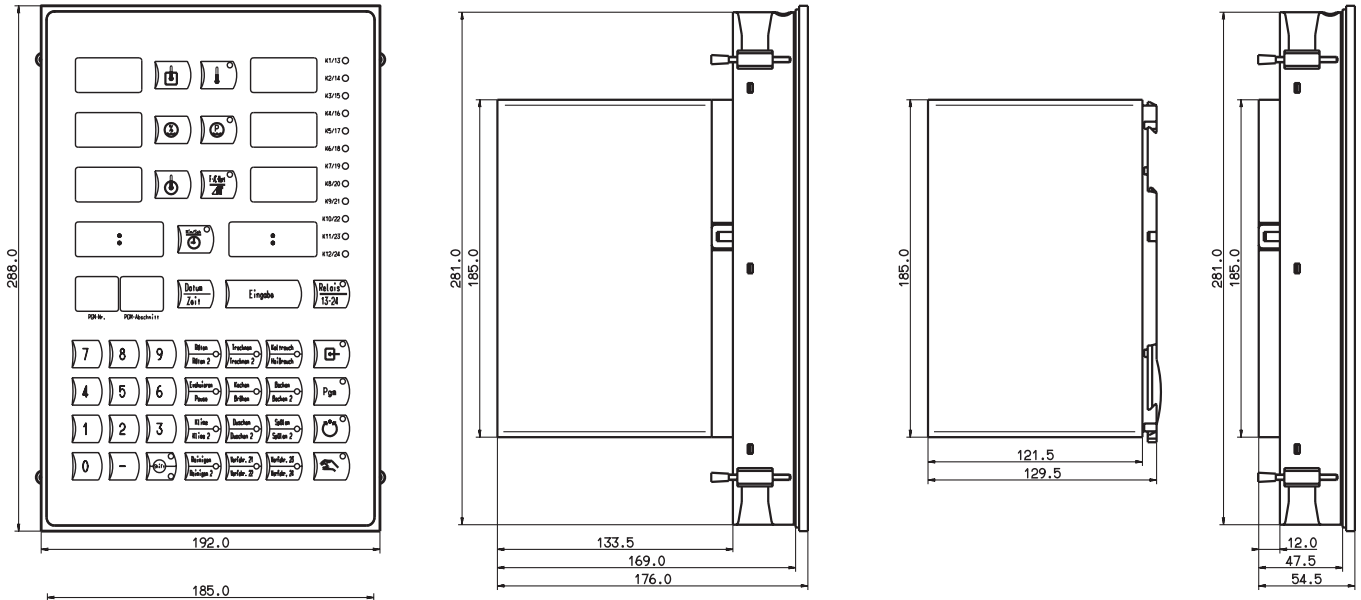
Panel cut-out to DIN 43 700



LPF-200

Compact unit **Process unit** **Operating unit**

Provide 35 mm spacing
upwards for removal!



Panel cut-out to DIN 43 700