

- Electronic cam switch unit
- LED indicator, red
- Adding/subtracting
- Up to 24 outputs



Additional features

- Storage of up to 10 programs
- 24 tracks with a max. 512 cams
- Shock resistance in accordance with DIN EN 60068-2-27
- Vibration resistance in accordance with DIN EN 60068-2-6

Operating principle

The function of the FC-21-V Electronic cam switch unit corresponds to that of a mechanical cam switch unit. The current position of the machine that is being controlled is read in by an absolute value rotary encoder.

Up to 512 cams can be programmed on each of the 24 cam tracks, depending on the resolution of the rotary encoder. The cams switch the electronic outputs on and off, depending on the position that has been read in. The actuating components on the machine (Solenoid valves, relays, etc.) are initiated with the outputs of the FC-21-V, in accordance with the operating cycle. These outputs are also used to establish the coupling to the higher order control systems (PLC, etc.).

The FC-21-C electronic cam switch unit is suited to the requirements of a flexible production system, in that up to 10 different programs can be stored in the user memory (EEPROM) and selected externally.

For the purposes of data security, the programs can be stored using a cassette recorder and normal commercially available cassettes.

The FC-21-V Electronic cam switch unit operates with absolute value rotary encoders in the series TRD-AK...-GC, which encode 360, 512, 720 or 1024 positions per revolution. This enables the operating cycle of the machine to be controlled to be resolved into 1°, 0.7°, 0.5° or 0.35° increments.



Technical data

General data

Counting range	0 ... 9999
Data storage	EEPROM

Controls and indicators

Switch point indicator	24 LEDs
Program and position indicator	4 digit LED indicator
Digit height	8 mm

Inputs

Start Input	1
Program selection inputs	4
Input, absolute encoder	Gray-Code (10 bit)
Resolution	360, 512, 720 or 1024 positions (adjustable with toggle switches 2 and 3)

Outputs

Number	16 or 24 (adjustable with toggle switch 4)
RUN output	output 24 can be used as the RUN output (adjustable with toggle switch 5)
Number of switch points	max. resolution/2 per output

Electrical data

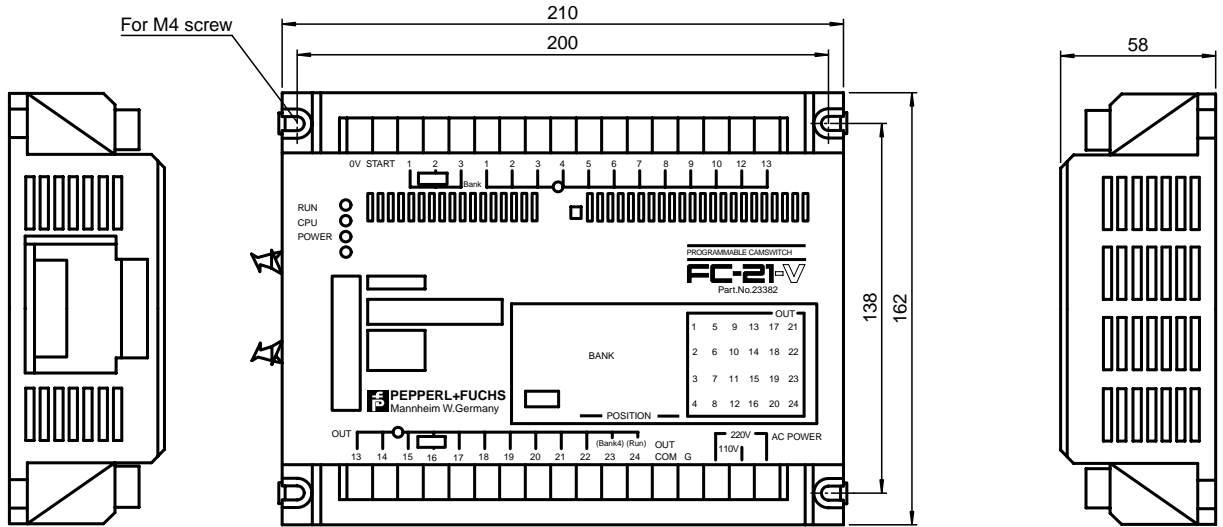
Voltage	93 ... 126/195 ... 264 V AC, 50 ... 60 Hz
Power consumption	30 VA
Power supply to the outputs	24 V DC
Power supply for encoder	24 V DC ± 15 %, 100 mA, ripple ≤ 3 %
Test voltage	2 kV, 1 minute

Ambient conditions

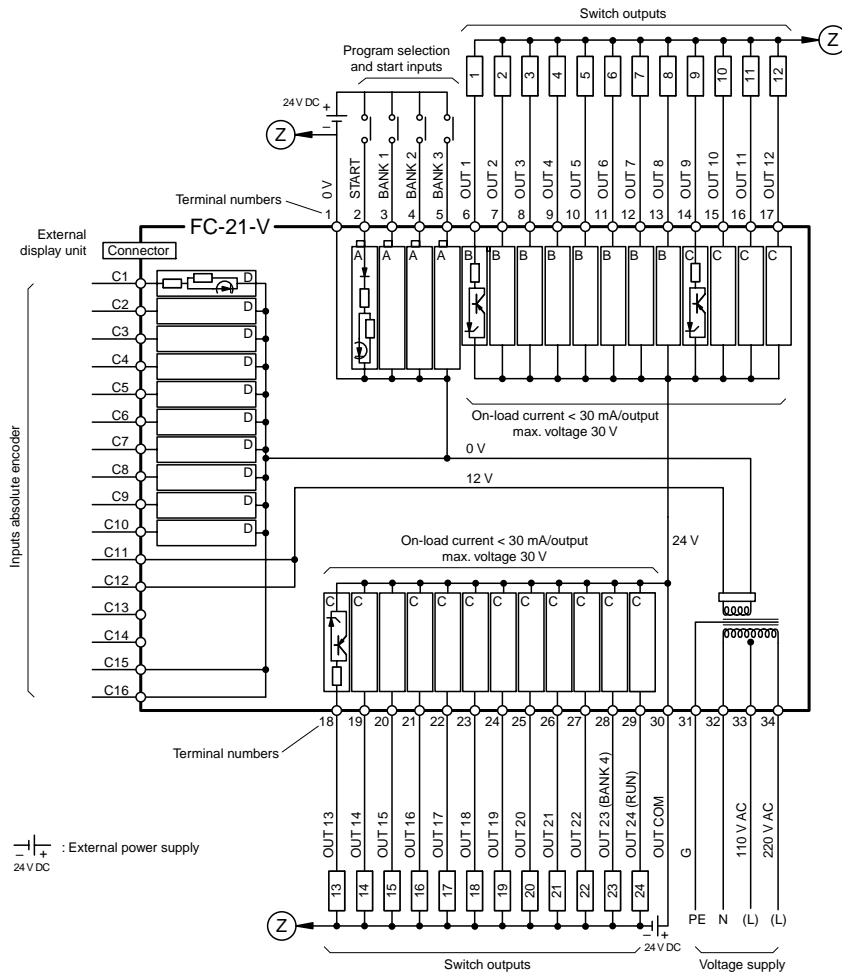
Ambient temperature	0 ... 50 °C
Storage temperature	-20 ... 70 °C
Relative air humidity	45 ... 85 % (non-condensing)

Mechanical data

Weight	2000 g
Dimensions (L x H x D)	210 x 162 x 58 mm
Connection accessory (in delivery package)	Connector MR-16L for connection of the encoder
Connection	plug-in screw terminals
Maximum permissible core cross-section	0.34 ... 1.5 mm ²

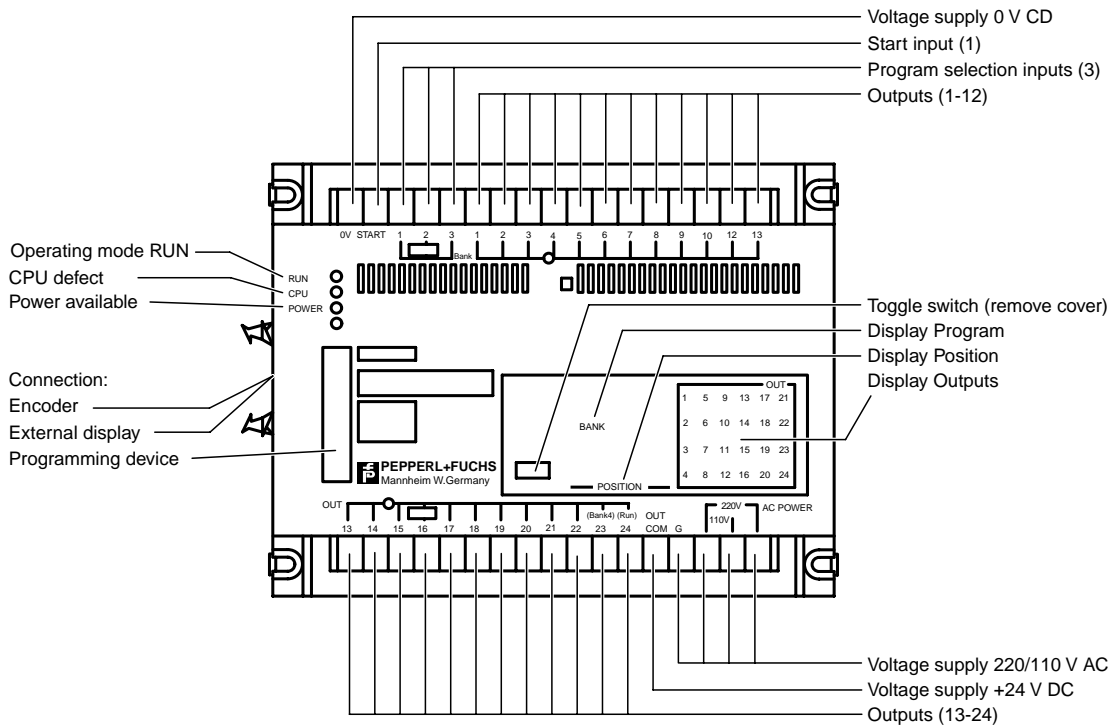


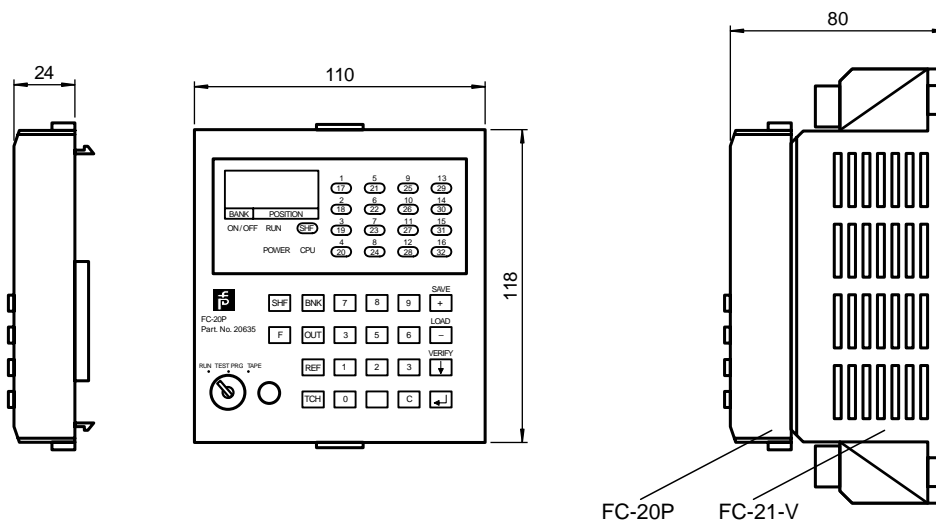
Electrical connection



Maximum rpm	Min. switchpoint separation	Resolution per revolution			
		360	512	720	1024
	> 3° of the interval	3600	2520	1800	1260
	> 2° of the interval	2400	1680	1200	840
Maximum possible program	Number of programs	Resolution	Number of outputs		
		360	16		
		360	24		
		512	16		
		512	24		
		720	16		
		720	24		
1024	16				
1024	24				
Switching direction (clockwise/anti-clockwise)	Clockwise: Increase in the instantaneous value by rotation of the shaft in the clockwise direction (shaft viewed from above). Anti-clockwise: Increase in the instantaneous value by rotation of the shaft in the anti-clockwise direction (shaft viewed from above). (adjustable with toggle switch 1)				
Write protection	ON: Write, correct and delete from program, is blocked (adjustable with toggle switch 6)				
Correction of the reference point	Correction over the whole range: 0 ... (Resolution - 1)				

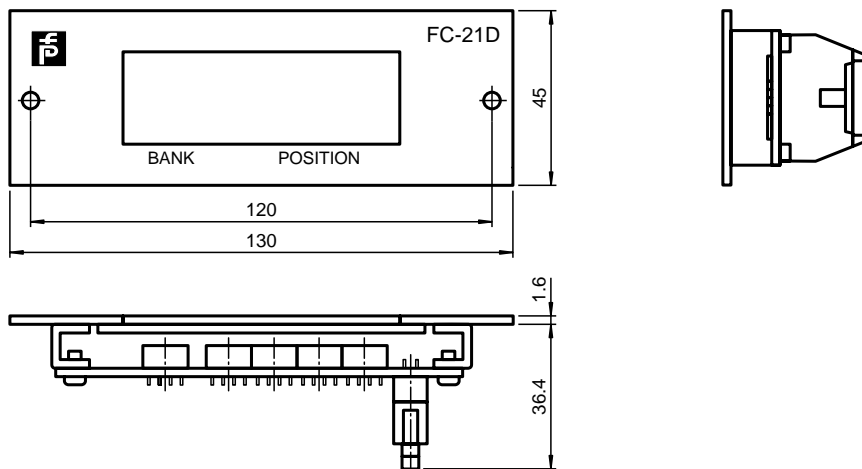
Controls and indicators





Accessories (Delivery package): Cassette recorder connector cable C-08J, 2 keys for program selector switch

FC-21D External indicator unit

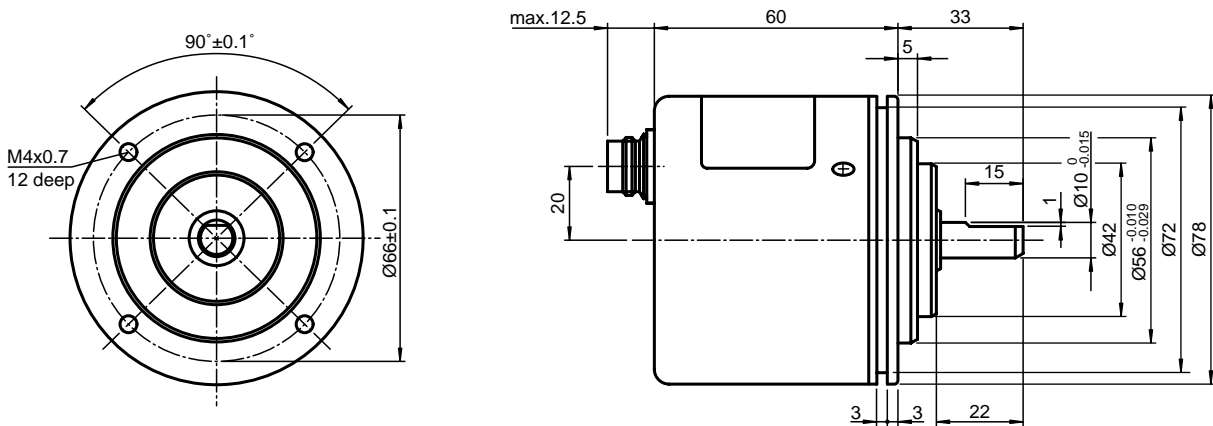


Technical data	
General data	
Function	Program, position and rpm indication (min ⁻¹)
Indicator	
Type	red LED
Digit height	14.2 mm
Ambient conditions	
Ambient temperature	0 ... 50 °C
Storage temperature	-10 ... 70 °C
Relative air humidity	45 ... 85 % (non-condensing)
Mechanical data	
Shock resistance	10 G in 3 axis directions
Vibration resistance	A = 0.3 mm, f _{max} = 10 ... 55 Hz in 3 axis directions
Weight	200 g

A normal commercial cassette data recorder for PC with controllable recording level can be used. Radio recorders are usually unsuitable, since the recording level is not compatible.

Technical data	
Recording connection	Microphone input
Play-back connection	Ear phone > 300 mW at 4 ... 16 Ω
Frequency range	300 ... 4000 Hz ± 6 dB
Transfer rate	830 Baud
Modulation method	FSK "1": 2 kHz, FSK "0": 1 kHz
Head marker/end marker	2 kHz
File numbers	0 ... 999

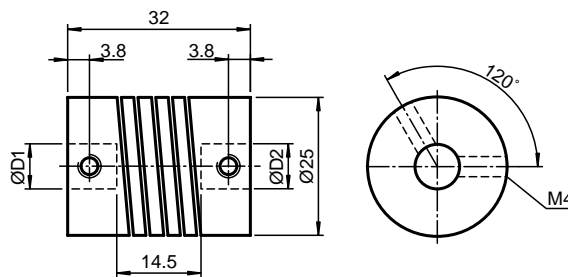
Absolute value rotary encoder



For additional data see Sensors 4 Catalogue

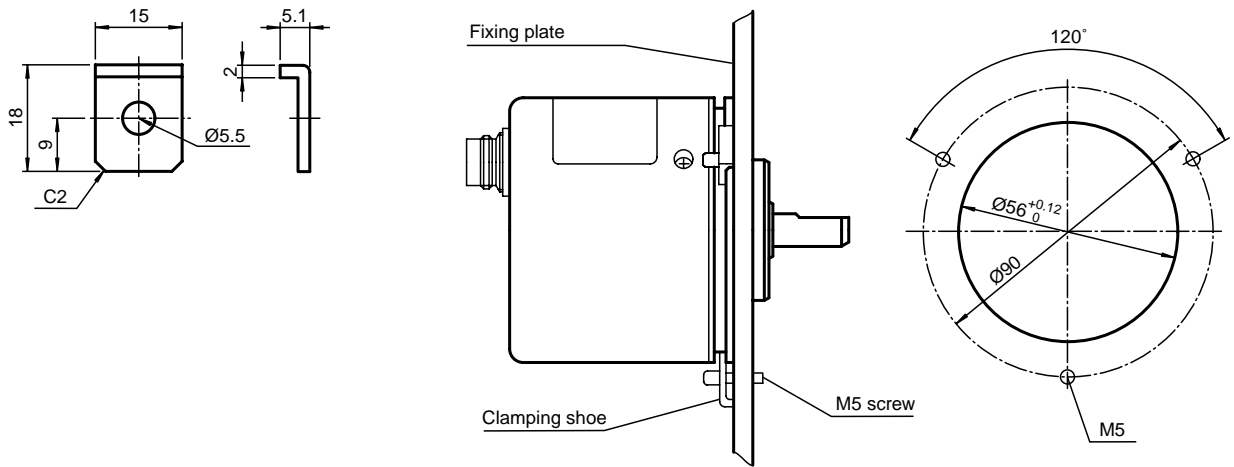
Technical data	TRD-AK360-GC	TRD-AK512-GC	TRD-AK720-GC	TRD-AK1024-GC
Resolution	360 positions per revolution	512 positions per revolution	720 positions per revolution	1024 positions per revolution

Coupling KW-.../...

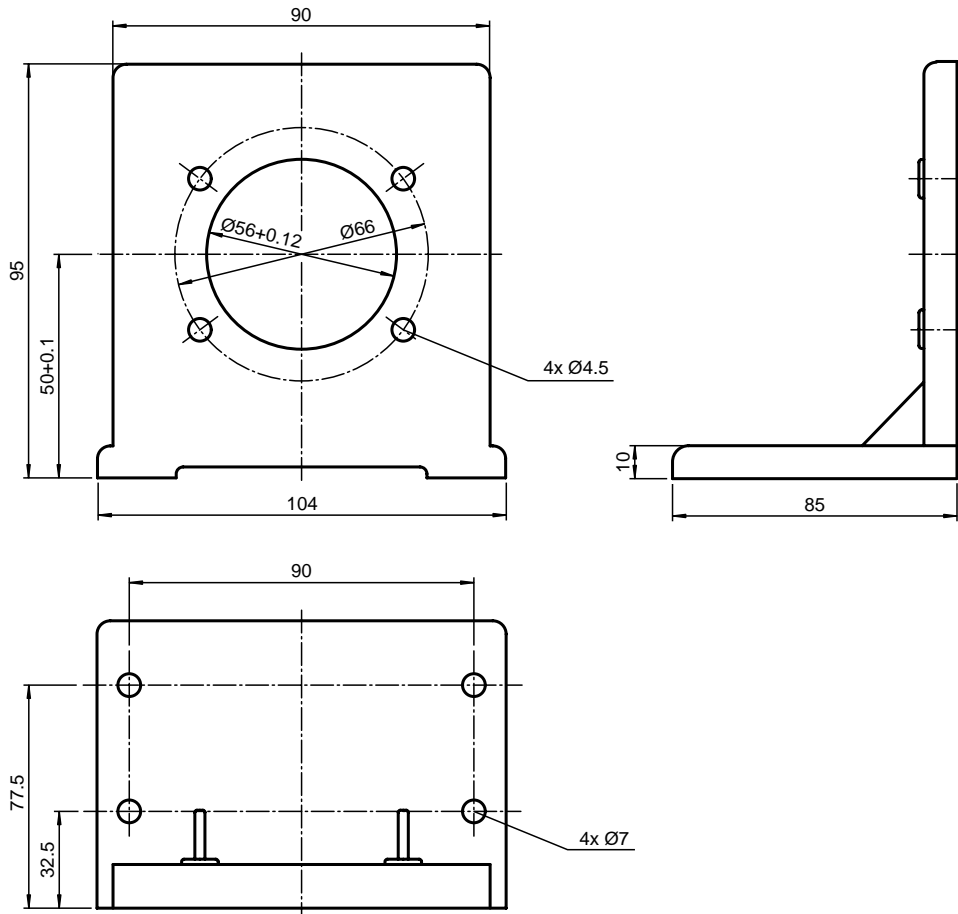


For additional data see Sensors 4 Catalogue

Technical data	KW-6/10	KW-8/10	KW-10/10
Diameter D1	6	8	10
Diameter D2	10	10	10

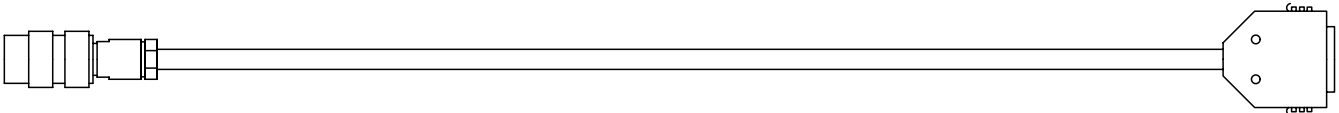


RT-11 Right angled mounting bracket



TRD-AK..

FC-21-V



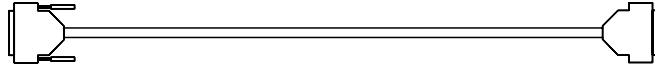
Binder-Series 723, 12-pin connector (straight or angled), 12-core cable + screen, maximum length 30 m, 0.25 mm² cross-section.

Connection	Function	Core colours
A	+12 V DC	red
B	2 ⁰	brown
C	2 ¹	orange
D	2 ²	yellow
E	2 ³	green
F	2 ⁴	dark blue
G	2 ⁵	violet
H	2 ⁶	grey
J	2 ⁷	white
K	2 ⁸	pink
L	2 ⁹	light blue
M	0 V DC	black

Screen not connected.

The binder connector and the cable must be ordered separately. The MRL-16L connector is supplied (separately) as an accessory for the FC-21-V. 5 m and 10 m pre-assembled connection cables can be supplied to order.

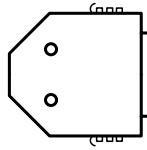
Connection	Function	Core colours
1	2 ⁵	violet
2	2 ⁴	dark blue
3	2 ³	green
4	2 ²	yellow
5	2 ¹	orange
6	2 ⁰	brown
7	2 ⁹	light blue
8	2 ⁸	pink
9	2 ⁷	white
10	2 ⁶	grey
11	free	–
12	+12 V DC	red
13	free	–
14	free	–
15	0 V DC	black
16	Screen	–



Length 1.5 m

For servicing work on awkwardly installed units, we recommend the use of this connection cable. The programming unit can then be operated from a more convenient position.

Connector MR-16L



Connector for connection cable between the FC-21-V main unit and the absolute value rotary encoder