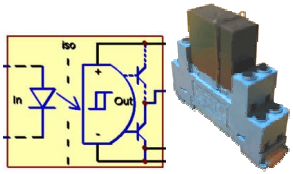
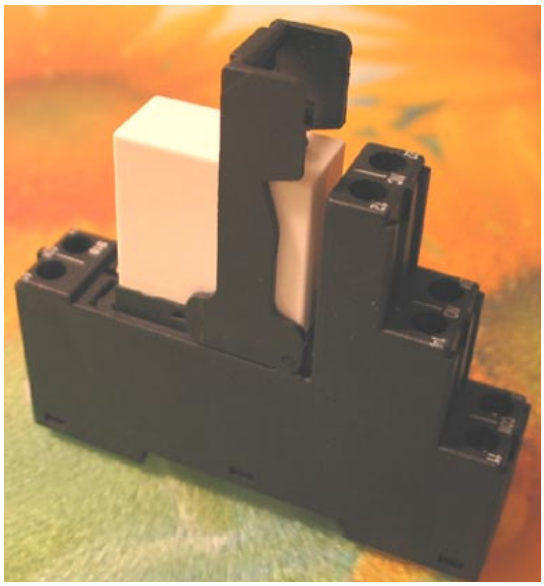
Electrobrains

Innovative Products





Electrobrick® the flexible electronic building block

Featured Products:

Current input Optocoupler

Industrial Optocouplers

Super fast Optocoupler

Dual Optocouplers

Fuse module

PT100, 1000 Converters

Current - voltage converter

440 Industrial Drive
North Wales, PA 19454

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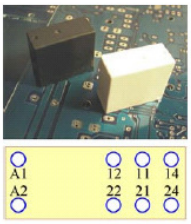
Electrobrick – the flexible electronic module

Current Input Optocouplers

Optocoupler on a Din rail socket



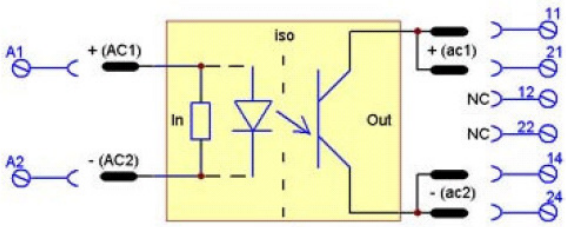
Modules without sockets (bottom view)

Features

- A range of current input optocouplers in ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact, flexible and easily exchanged. Delivered with a DIN rail socket, with quality screw terminals
- Standard socket with plastic clip, low-cost version with metal clip.
- Available without socket, for direct PCB mounting or for customer's choice of socket.
- With high isolation voltage and distance.
- Higher input currents on request (with external shunt resistor)
- On request: other specifications, very high power version (10A), time delay etc.

Available accessories

- All sockets: jumpers
  Standard sockets: labels and LED modules



Block diagram

Technical data (Ta = 25°C)	**AC/DC In, low power**	**AC/DC In, high volt.**
Output	**100mA DC output**	**0.5A AC/DC output**
Max. switching voltage	60VDC	250VAC/350VDC
Max. continuos current (I_{out})	100mA	0.5A (** 0.2A)
Max. transient current	0.5A/ 10ms	12A/ 0.1ms
Voltage drop (at 0.5x Imax)	~0.3V	<1V
Rise time (off to on)	to be defined	~100ms
Fall time (on to off)	to be defined	~150ms
Input		
Control current tolerance (sure on state)	Ic±25%	Ic±25% (** Ic–25% / +75%)
Control current off state (sure off state)	<10% of Ic	<10% of Ic
	do not operate the input continuously in the not specified area (10%..75% of Ic)!	
Max. voltage drop (at Ic)	<1.6V	<1.6V
Max. switching freq. (res. load)	to be defined	2Hz
AC input frequency	50Hz-10kHz	50Hz-10kHz (** 30kHz)

General data

Input / output dielectric strength	2.5kV, 3mm
Operating temperature range	-10°C to +45°C
Max. wire cross section	6mm^2 (AWG10)
Socket max. size L x W x H	Standard ver.: 16 x 82.5 x 72mm, Low-cost ver.: 16 x 68.5 x 50.5mm
Module max. size LxWxH (w/o pins)	29x12.8x25.5mm
Module pins	gold plated, length ~5mm, 0-3A ver.: 0.64x0.64mm, 5-10A ver.: power pins=0.6x1.5mm
PCB hole size	all versions: 1.1mm, 5-10A versions: 1.6mm for the 4 power pins

Order numbers

Control current Ic		
0.5A AC/DC	**O10-0.5AAD**	**O12-0.5AAD**

O10M..= only module without socket
** Tested special condition for O12-0.5AAD: Ic<875mA, Iout<200mA, f<30kHz,

Sockets can be purchased separately: P/N: 45740S

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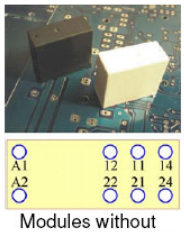
Electrobrick – the flexible electronic module

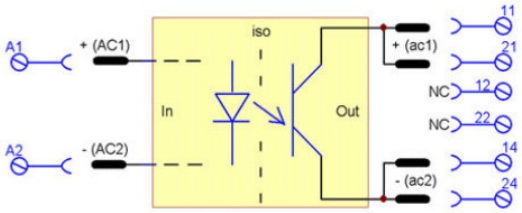
Optocouplers O1, O3



Modules without sockets (bottom view) **

Features

- A range of optocouplers in ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact, flexible and easily exchanged. Delivered with a DIN rail socket, with screw terminals
- Standard socket with plastic clip, Available without socket, for direct PCB mounting or for customer's choice of socket.
- Industrial standard in- and output voltages.
- Special voltages on request, without extra cost (min. 25 pieces)
- With high isolation voltage and distance
- High current ver. with over voltage absorption
- With input LED
- Very high power version available (i.e. 10Amps. - Please call)
- Very fast version available
- On request: other specifications, built-in filters, time delay etc.



Block diagram **

Technical data (Ta = 25°C)	**AC/DC In, low power**	**AC/DC In, high power**
Output	**100mA DC output**	**5A DC output**
Switching voltage	0 (DC ver. 0.7)-60VDC	0-55VDC
Max. continuos current	100mA	5A
Max. transient current DC version	0.15A/ 0.1ms	25A/ 0.1ms
Max. transient current AC/DC version	0.5A/ 10ms	25A/ 0.1ms
Voltage drop (at 0.5x Imax) DC version	~0.7V	<0.2V
Voltage drop (at 0.5x Imax) AC/DC ver.	~0.1V	<0.2V
Input		
Control voltage tolerance	Uc±20%	Uc±20% (115,230V:15%)
Max. input current at Uc 3-48V versions	15mA	15mA
Max. input current at Uc 115-230V ver.	3mA	3mA
Sure on level	80% of Uc	80% of Uc
Sure off level	10% of Uc	10% of Uc
Max. switching freq (res. load) DC ver.	~600Hz ***	~10Hz (110V ver. 5Hz) ***
Max. switching freq. (res. load) AC/DC ver.	~5Hz ***	~5Hz ***
AC input frequency	50-400Hz	50-400Hz
General data		
Input / output dielectric strength	2.5kV, 3mm	
Operating temperature range	-20°C to +50°C ***	
Max. wire cross section	6mm^2 (AWG10)	
Socket max. size L x W x H	16 x 82.5 x 72mm	
Module max. size LxWxH (w/o pins)	29x12.8x25.5mm	
Module pins	gold plated, length ~5mm, 0-3A ver.: 0.64x0.64mm, 5-10A ver.: power pins=0.6x1.5mm	
PCB hole size	1.1mm, 5-10A versions: 1.6mm for the 4 power pins	

Control voltage Uc

Order numbers		
5VDC	O1-5VDL	O3-5VDL
12VDC	O1-12VDL	O3-12VDL
24VDC	O1-24VDL	O3-24VDL
48VDC	O1-48VDL	O3-48VDL
110VDC	O1-110VDL	O3-110VDL
3VAC/DC	O1-3VADL	O3-3VADL
24VAC/DC	O1-24VADL	O3-24VADL
115VAC/DC	O1-115VADL	O3-115VADL
230VAC/DC	O1-230VADL	O3-230VADL

O1M-..= only module without socket
***higher values possible with derating of other entities
Sockets can be sold separately: P/N: 45740S

Electrobrains Elektronics

Electrobrick – the flexible electronic module

Super fast Optocouplers

Features

- A range of super fast active optocouplers in ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact, flexible and easily exchanged. Delivered with a DIN rail socket, with quality screw terminals (standard or low-cost).
- Available without socket, for direct PCB mounting or for customer's choice of socket.
- For data transmission, pulse isolation, level shifting
- As amplifier, sine/square wave converter, driver for capacitive loads (eg. MOSFET / IGBT)
- For prox. switches: PNP/NPN booster or inverter
- Special input voltages on request, without extra cost (min. 25 pieces)
- With high isolation voltage and distance.
- Well suited for switching inductice loads. The outputs are overvoltage protected (within the energy limits) and catch the inductive spikes.
- On request: other control voltage (eg. 110V), lower supply voltage (eg. Un=5V, 12V), for open collector version: high voltage output switch, etc.

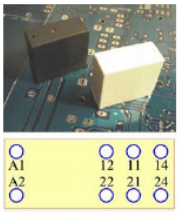
Available accessories

- All sockets: jumpers
  Standard sockets: labels and LED modules

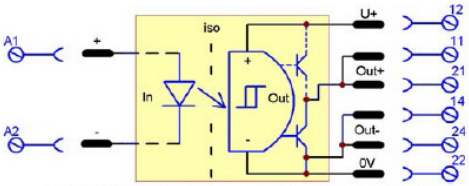
standard version

low-cost version

Optocoupler modules fixed on DIN rail sockets



Modules without sockets (bottom view)



Block diagram (O6... include dashed diagram)

Technical data (Ta = 25°C)	**low power**	**mid. power**	**high power**	**very high power**
Output	**100mA DC output**	**1A DC output**	**5A DC output**	**10A DC output**
Output type	Push-Pull, non inv.	Open Collector, inv.	Open Collector, inv.	Open Collector, inv.
Max. switching voltage	30VDC	to be defined	30VDC	to be defined
Max. switching current (res.load)	100mA	-	5A	-
Max. transient current	0.5A/ 0.1ms	-	40A/ 0.1ms	-
Output voltage drop (w/o socket)	"0"<0.3V, "1">U+ -2V	-	<0.2V	-
Overvoltage voltage protection	push-pull to U+ / 0V	-	yes (~40V)	-
Max. energy of single overvoltage spike	-	-	130mJ	-
Max. switching frequency (fmax) *	2.0 MHz	-	200kHz	-
* resistive load, I=Imax/2, DC=50%				
Max. rise / fall time (ton / toff)	15ns / 30ns	-	50ns / 110ns	-
Input				
Polarity protection	yes		yes	
Control voltage tolerance	Un±20%	-	Un±20%	-
Max. control input current (at Uc)	10mA	-	10mA	-
Sure on level	80% of Uc	-	80% of Uc	-
Sure off level	10% of Uc	-	10% of Uc	-
Supply (U+ / 0V)				
Sup. voltage / max. current (Un=24V)	15-30VDC/ 15mA	-	15-30VDC/ 15mA	-
General data				
Propagation delay input / output (typical)	300ns	-	400ns	-
Input / output dielectric strength	3.75kV rms, 3mm			
Operating temperature range	-20°C to +50°C			
Max. wire cross section (socket)	6mm^2 (AWG10)			
Socket max. size L x W x H	Standard ver.: 16 x 82.5 x 72mm, Low-cost ver.: 16 x 68.5 x 50.5mm			
Module max. size LxWxH (w/o pins)	29x12.8x25.5mm			
Module pins	gold plated, length ~5mm, 0-1A ver.: 0.64x0.64mm, 5-10A ver.: power pins=0.6x1.5mm			
PCB hole size	all versions: 1.1mm, 5-10A versions: 1.6mm for the 4 power pins			

	Control voltage (Uc)				
Order numbers**:	5VDC (TTL)	EB-O6-5VDC	to be defined	EB-O8-5VDC	to be defined
	12VDC	EB-O6-12VDC		EB-O8-12VDC	
	24VDC	EB-O6-24VDC		EB-O8-24VDC	
	48VDC	EB-O6-48VDC		EB-O8-48VDC	

** **Sockets: O1..**= on standard DIN rail socket, **O1E..**= with low-cost socket included, **O1M..**= only module without socket

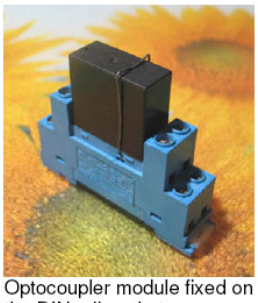
Electrobrick Solution

Electronics

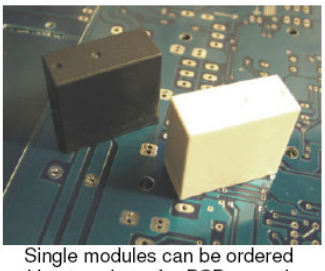
Electrobrick – the flexible electronic module

Preliminary Information

Dual Optocouplers



Optocoupler module fixed on the DIN rail socket



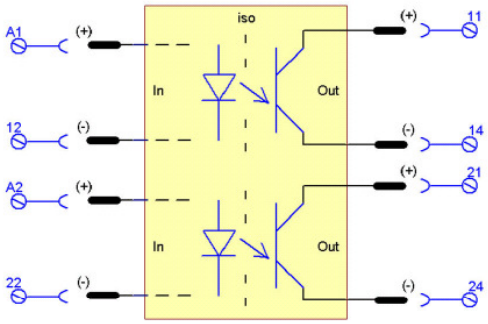
Single modules can be ordered without sockets, for PCB mounting

Features

- A range of dual optocouplers in ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact (8mm/optocoupler), flexible and easily exchanged.
- Delivered with a low-cost DIN rail socket, with quality screw terminals and a metal clip.
- Wide range in- and output voltage.
- Available with or without LEDs
- Special voltages on request, without extra cost (min. 25 pieces)
- With high isolation voltage and distance.
- Other versions available: high power version, fast version, other specifications, built-in filters, time delay etc.

Available accessories

- Jumpers



Block diagram

Technical data (Ta = 25°C)	**DC In, low power**	**DC In, mid. power**
Output	**100mA DC output**	**1A DC output**
Switching voltage	1-35VDC	to be defined
Max. continuous current	100mA	-
Max. transient current DC version	0.15A	-
Voltage drop (at 0.5x Imax) DC version	~0.7V	-
Input		
Operating voltage	See below	-
Input current	ca. 2-15mA	-
Sure on level	See below	-
Sure off level	4V	-
Max. switching freq (res. load) DC ver.	~400Hz	-
General data		
Input / output dielectric strength	2.5kV, 3mm	2.5kV, 3mm
Operating temperature range	-20°C to +50°C	-20°C to +50°C
Max. wire cross section	6mm^2 (AWG10)	6mm^2 (AWG10)
Socket max. Size L x W x H	16 x 68.5 x 50.5mm	16 x 68.5 x 50.5mm
Module max. size LxWxH (w/o pins)	29x12.8x25.5mm	29x12.8x25.5mm
Module pin size	0.64x0.64mm, length approx. 5mm	0.64x0.64mm, length approx. 5mm
PCB hole size	1.1mm	1.1mm

	Control voltage		
Order numbers*:	11-55VDC, w/o LEDs	EB-O30E-24VD	to be defined
	11-55VDC, with LEDs	EB-O30E-24VDL	to be defined

* **O30M..**= only module without socket

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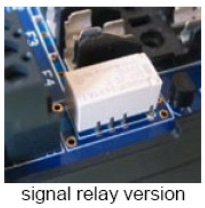
Electrokick –a team of goal-making modules on the rail

4 fuses with supervision and alarm output

standard fuse module

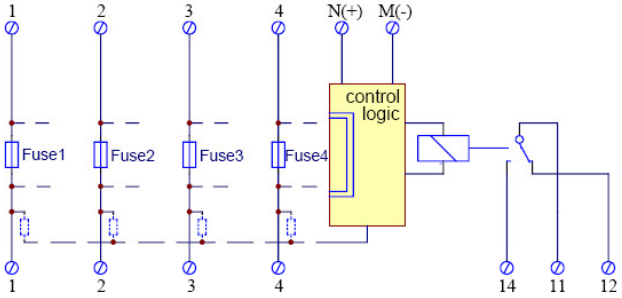
fuse cover **FC1-B**



signal relay version

Features

- Four 10A* solid fuse holders on a compact, DIN rail (15 and 35mm) mountable module, with quality screw terminals
- Combined fuse holders for 5x20mm and / or 6.3x32mm fuses
- Fuses isolated from each other and supply
- Fuse states are shown with LEDs
- A common alarm relay is activated when a fuse is blown
- Power relay or signal relay contacts available
- Version with integrated load resisors available (when supervision of fuses is necessary without connected loads)
- Low leakage current
- Wide supply and fuse voltage ranges
- Supply and fuse voltage can be DC and / or AC (can well be used in a 24VAC only, power supply free application)
- Fuse protection covers when high voltage
- Can also be used (without fuses) as an isolated **LOGICAL OR UNIT** with LED indication and isolated output contacts
- **On request:**
  -other supply or fuse voltage (eg. 5V, 12V)
  -other temp. range (eg. from –40°C)
  -low-cost version (only for DC)
  -fast version (eg. for switching on a redundant power supply if fuse of main supply blows)



Block diagram

Technical data (Ta = 23°C)	**Standard voltage version**	**High voltage version**
Fuses		
Required voltage over broken fuse for detection	6-60V AC/DC	70-250V AC/DC
Leakage resistance over broken fuse	min. 15kOhm	min. 400kOhm
Max. fuse current	10A*	10A*

* Fuse holders are VDE approved for 10A and UL/CSA approved for 16A (standards: IEC60127-6, UL512, CSA C22.2)
* Max. power acceptance of fuse holder (Current * Voltage over fuse): **4W** (10A) @ Ta=23°C, derated to **1.3W** @ Ta=55°C
* If high current is used, good air circulation and no fuse covers are recommended.

"R"-version: Load resistors (dotted in the block diagram)	min. 20kOhm	min. 200kOhm
Isolation fuse-fuse / fuse-supply (M,N)	1mm creepage distance (max. 250V between not touchable conductors)	

Supply, Relay		
Supply voltage (M,N), low supply voltage version	18-30VAC/DC	18-30VAC/DC
Supply voltage (M,N), high supply voltage version	-	in development
Supply current when relay active (M,N=24V)	typically <10mA	typically <10mA
Supply current when relay active (M,N=230VAC)	-	in development
Power C relay contacts	**min**. 10V / 5mA, **max**. AC1: 1.5kVA= 6A/250VAC, DC1: 3A/30VDC, 0.2A/220VDC	
Signal C relay contacts	**min**. 10mV / 10µA, **max**. 62.6VA (0.5A/125VAC res. load), 60W (2A/30VDC res. load)	
Isolation relay contacts / fuses, supply	3mm creepage distance, test voltage= 4kV (power relay), 2kV (signal relay)	

General data		
Module operating temperature range	-20°C to +55°C	-20°C to +55°C
Operating enviroment	dry, clean, enclosed place, without reach of electrically non competent persons	
Max. wire cross section	4mm^2 (AWG12)	4mm^2 (AWG12)
Module size L x W x H (from rail)	approx. 63x93 x46mm	approx. 63x93 x46mm

Order numbers:			
	power relay version	**FM1C-4-24-6-60**	**FM1C-4-24-70-250**
	power relay + load resistors	**FM1CR-4-24-6-60**	**FM1CR-4-24-70-250**
	signal relay version	**FM1CL-4-24-6-60**	**FM1CL-4-24-70-250**
	signal relay + load resistors	**FM1CLR-4-24-6-60**	**FM1CLR-4-24-70-250**
	Fuse cover, black (4 needed/ module)	**FC1-B**	

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Electrobrick – the flexible electronic module

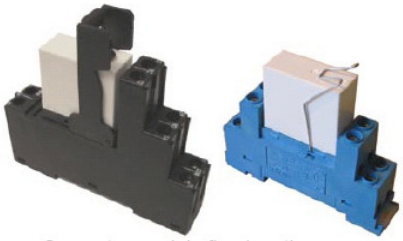
Pt100, Pt1000, Ni100, Ni200, Ni1000 Converter

Features

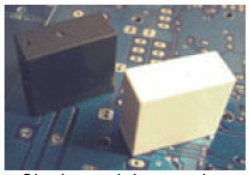
- Converter for 2 or 3-wire Pt100, Pt1000, Ni100, Ni200 or Ni1000 temperature sensors in ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact, flexible and easily exchanged. Delivered on a DIN rail socket with quality screw terminals.
- Industrial standard outputs: 0-20mA, 4-20mA or 0-10V.
- With low pass filter for suppression of 50-60 Hz and other noise.
- Current present (CP) diagnostic output (4-20mA version).
- Small sensor current minimizes self heating.
- Wide supply voltage range.
- If a 2-wire sensor is used, then just connect inputs R2 and R3 together.
- On request: converters for other sensor types (eg. Pt500), higher accuracy, other output voltage, low-cost sensors for the converters
- The temperature range is specified in the order number.

Available accessories

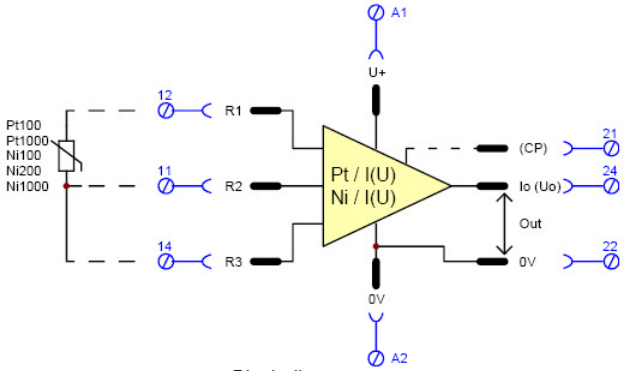
- Labels, jumpers, LED modules



Converter module fixed on the DIN rail socket (standard, low-cost)



Single modules can be ordered without sockets, for mounting on PCB



Block diagram

Technical data (Ta = 25°C)	**0-10V output**	**0-20mA output**	**4-20mA output**
Supply			
Power supply range	12-30VDC	12-30VDC	12-30VDC
Supply current (sensor connected)	max. 25 mA (U+=24 V)	max. 45 mA (U+=24 V)	max. 45 mA (U+=24 V)
Converter			
Temperature range	see below		
Approx. sensor current	Pt100, Ni100: 1 mA, Ni200: 0.8mA, Pt1000, Ni1000: 0.5mA		
Conversion error (small temp. span gives larger error)	<0.5% (50mV) (typically <0.2%)	<0.5% (100µA) (typically <0.2%)	<0.5% (100µA) (typically <0.2%)
Output load for voltage output version	min. 1 kΩ	-	-
Output load at U+=24V for current output	-	max. 750Ω	max. 750Ω
Output load at U+=12V for current output	-	max. 180Ω	max. 180Ω
Low pass filter cut frequency	approx. 15Hz	approx. 15Hz	approx. 15Hz
Output "current present" (CP) detection	-	Closes to ground (0V) when output current is more than approx. 1mA	
Max. voltage/ min. load resistance at CP output	-	30V/ 1kΩ	30V/ 1kΩ
General data			
Module operating temperature range	0°C to +50°C	0°C to +50°C	0°C to +50°C
Max. wire cross section	6mm^2 (AWG10)	6mm^2 (AWG10)	6mm^2 (AWG10)
Socket max. size L x B x H	16 x 82.5 x 72mm	16 x 82.5 x 72mm	16 x 82.5 x 72mm
Module max. size L x B x H (without pins)	29x12.8x25.5mm	29x12.8x25.5mm	29x12.8x25.5mm
Module pin size, PCB hole size:	0.64x0.64mm, length approx. 5mm, PCB hole size: 1.1mm		

Order number: **C3***-**X**-**Y**-**Z** **where**

X= sensor type: **PT100, PT1000, NI100, NI200 or NI1000**
Y= output range: **0-10V, 0-20MA or 4-20MA**
Z= temperature range, with **M=minus, P=plus, C=Centigrade, F=Farenheit**: eg. **M50P250C = -50..+250°C**

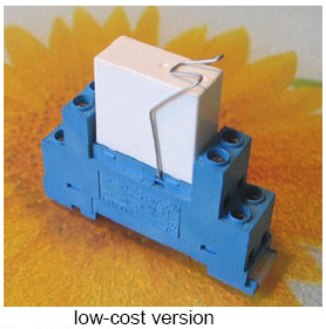
* **C3**= on standard DIN rail socket, **C3E**= with low-cost socket included, **C3M**= only module without socket
Example 1: C3-PT100-4-20mA-M50P250C (Pt100 / 4-20mA, -50°C..+250°C, on standard socket)
Example 2: C3M-NI100-0-10V-0P100C (Ni100 / 0-10V, 0°C..+100°C, only module without socket)

Electrobrains

Electrobrick – the flexible electronic module

Current / Voltage Converter

standard version

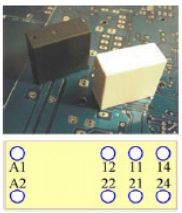


low-cost version

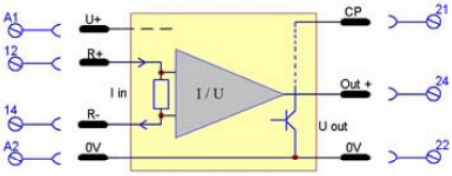
Optocoupler modules fixed on DIN rail sockets

Features

- Non isolated, well priced converters for industrial standard current 0..20mA or 4..20mA. Converts to 0..10V
- In ***Electrobrick*** plug-and-play enclosures (same shape as the common industrial relays).
- Compact, flexible and easily exchanged. Delivered on a DIN rail socket with quality screw terminals (standard or low-cost).
- Available without socket, for direct PCB mounting or for customer's choice of socket.
- With instrumentation amplifier for "floating input" (end side does not need to be tied to 0V, good if several inputs or instruments are put in serie)
- With low pass filter for suppression of 50-60 Hz and other noise.
- Current present (CP) diagnostic output (4-20mA version).
- Wide supply voltage range.
- On request: Input with allowance to exceed supply voltage (good for high compliance voltage transmitters)
- On request: converters for other input current, for voltage input, higher accuracy, other output voltage



Modules without sockets (bottom view)



Block diagram

Available accessories

Technical data (Ta = 25°C)	**0-20mA input**	**4-20mA input**
Supply		
Power supply range	12-30VDC	12-30VDC
Supply current (unloaded)	max. 10 mA (U+=24 V)	max. 10 mA (U+=24 V)
Converter		
Input resistance	100 Ω	100 Ω
Input voltage range (potential of R-)	0V to supply voltage (U+) minus 5V	
Conversion error	<0.5% (50mV) (typically <0.2%)	<0.5% (50mV) (typically <0.2%)
Output load	> 1 kΩ	> 1 kΩ
Low pass filter cut frequency	approx. 15Hz	approx. 15Hz
Output "current present" (CP) detection	-	Closes to ground (0V) when output current is more than approx. 1mA
Max. voltage/ min. load resistance at CP output	-	30V/ 1kΩ
General data		
Module operating temperature range	0°C to +50°C	
Max. wire cross section	6mm^2 (AWG10)	
Socket max. size L x B x H	Standard ver.: 16 x 82.5 x 72mm, Low-cost ver.: 16 x 68.5 x 50.5mm	
Module max. size L x B x H (without pins)	29x12.8x25.5mm	
Module pins	gold plated, length ~5mm	
PCB hole size	1.1mm	
Order numbers*:	**EB-C5-0-20mA-0-10V**	**EB-C5-4-20mA-0-10V**

* **Sockets: O5..**= on standard DIN rail socket, **O5E..**= with low-cost socket included, **O5M..**= only module without socket
Example: EB-C5-4-20mA-0-10V (4-20mA to 0-10V converter with low-cost socket)