BLIND CONTROLLER FOR AC MOTORS
UNIV 3.7.0.x

1. Features

- 3 channel blind controller for blinds with AC motors 230V 200VA.
- The blind must have built-in limit switches and motor overload protection
- Motor running direction is defined by driven winding (forward or reverse)
- The way the module must be connected to motor, makes impossible to drive two windings at the same time.
- Motor nominal voltage 230V
- Maximum motor power 200VA
- Bus voltage 16-24V
- Maximum current consumption from the bus 120mA
- For DIN rail mounting.
- Dimensions 90x106x53 mm (6 mod)
- Operating of module depends on firmware uploaded into it.
- Schematic and PCB design can be downloaded from hapcan.com site

2. Application version

UNIV 3 . 7 . 0 . x

- x – firmware version
- 0 – application version (blind controller for AC motors)
- 7 – application type (blind controller)
- 3 – processor version
- UNIV – universal processor

3. Technical data

Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	U_S	16-24V	V
Current consumption	I_S	12	mA
Maximum current consumption (when all relays are on)	I_{SMAX}	120	mA
Bus connector type	2x RJ45		

Relay side

Parameter	Symbol	Value	Unit
Nominal contacts current	I_N	5	A
Maximum inrush current	I_{INRUSH}	5	A
Nominal motor voltage.	U_N	230	V AC
Maximum load per channel.	S_{MAX}	200	VA
Relay connector type	Terminal Blocks (solid wire 4mm^2, stranded 2,5mm^2)		

4. Hardware

4.1. Schematic

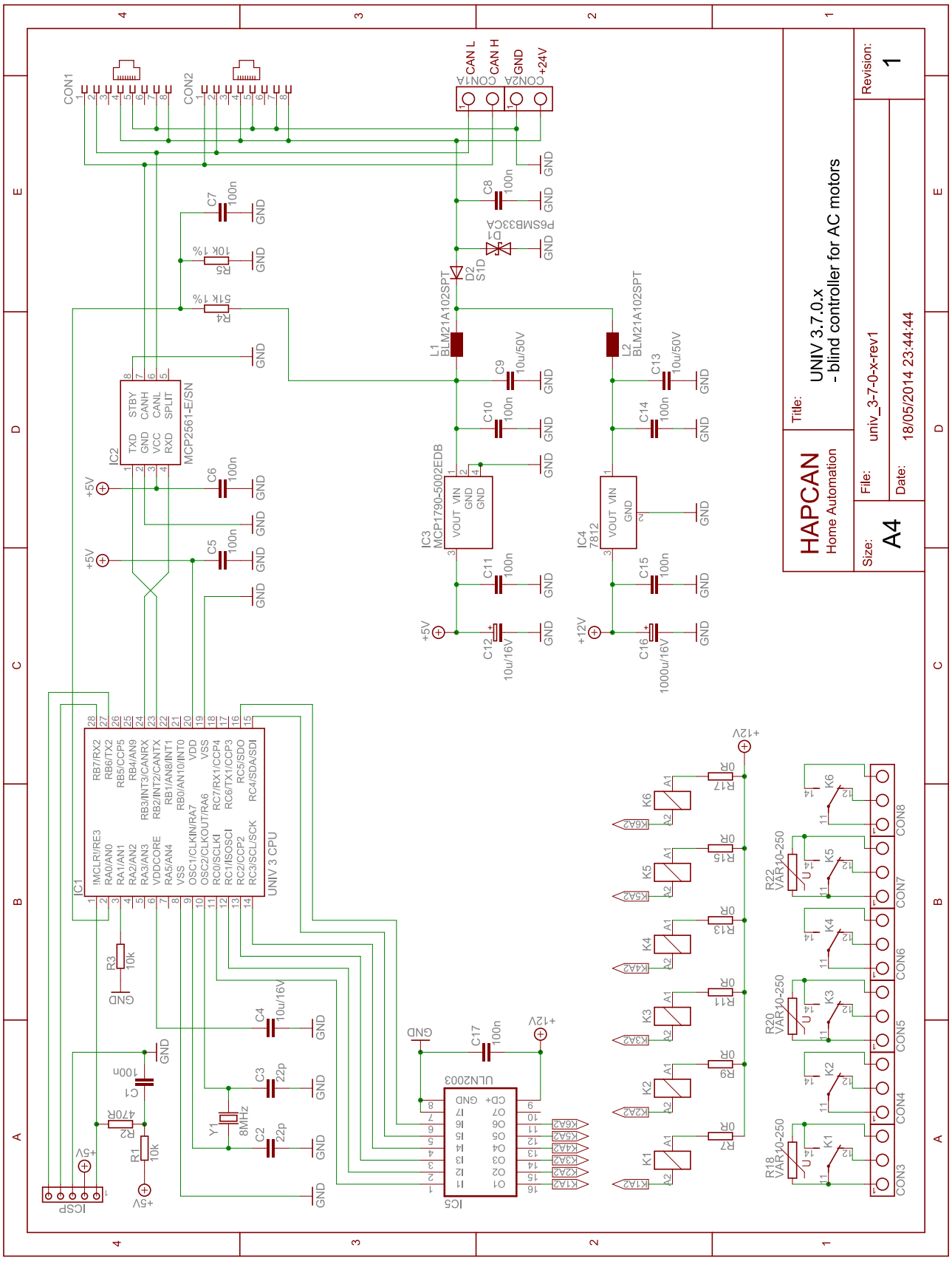


Figure 1. Schematic of blind controller UNIV 3.7.0.x

4.2. Wiring

⚠ WARNING. This module must be connected only to **one phase** of mains.
⚠ WARNING. Only **one motor** is allowed per channel.

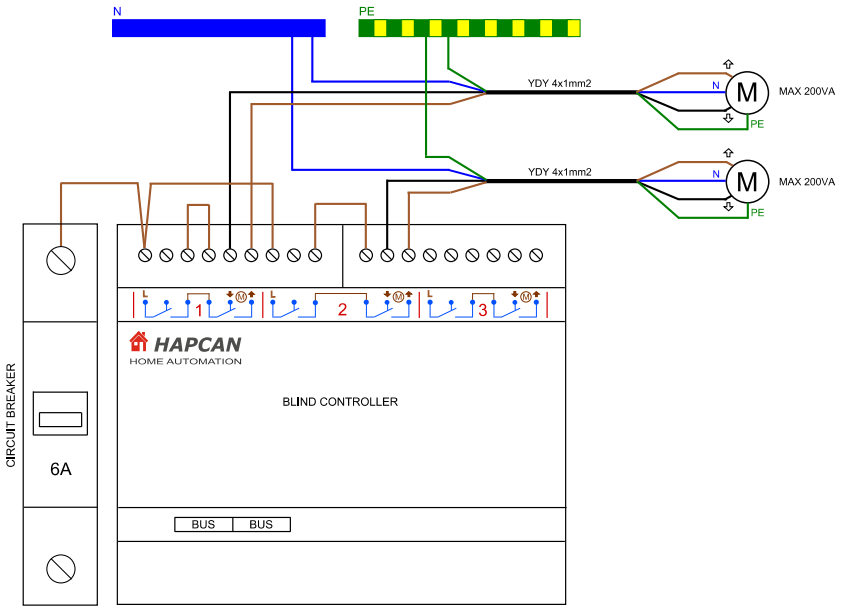
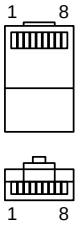


Figure 2. Relay wiring.



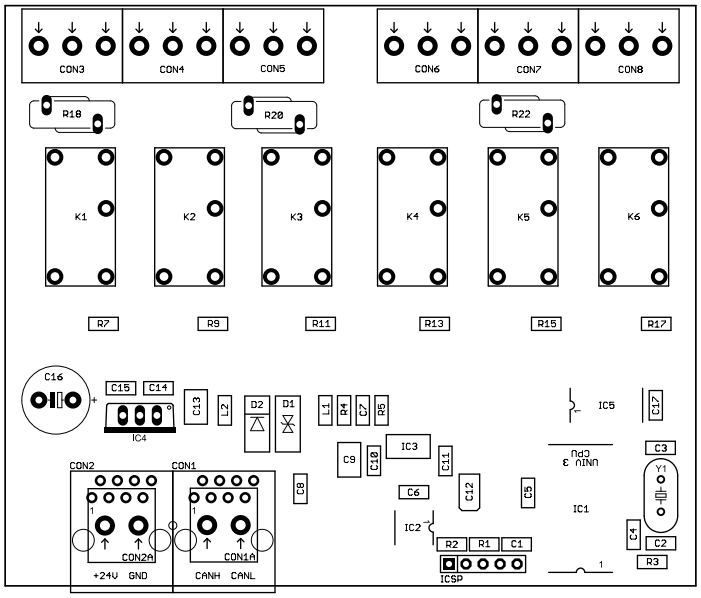
1 – white/orange - **CAN H**
2 – orange - **CAN L**
3 – white/green - NC
4 – blue – **CAN V+**
5 – white/blue – **CAN GND**
6 – green - NC
7 – white/brown – **CAN GND**
8 – brown – **CAN V+**

Note that if module is first or last on the bus, the terminator (resistor 120 Ohm) must be plugged into one of BUS ports.

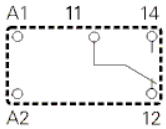
Figure 3. RJ45 bus connector wiring.

4.3. PCB assembly schematic

- Printed circuit board *PCB UNIV 3.2.(1-2).x* for UNIV 3.7.0.x module
- PCB dimensions: 103mm x 86.5mm

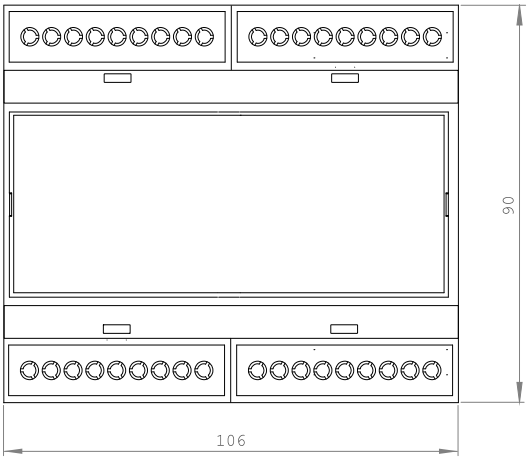


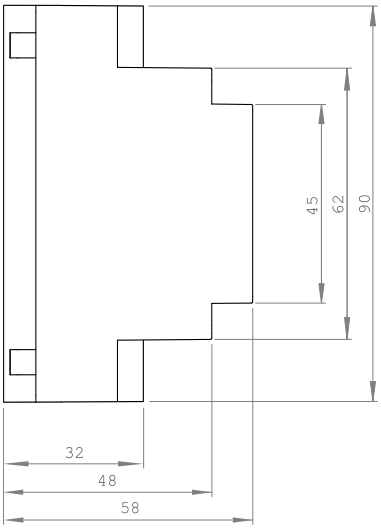
4.4. Components

Designator	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11, C14, C15, C17	100nF/50V	0805	Capacitor
C2, C3	22pF/50V	0805	Capacitor
C4	10uF/16V (X5R)	0805	Capacitor
C9, C13	10uF/50V	1210	Capacitor
C12	10uF/16V	SMA, SMB	Tantalum capacitor
C16	1000uF/16V	5/10	Electrolytic Capacitor
R1, R3	10k	0805	Resistor
R2	470 Ohm	0805	Resistor
R4	51k 1%	0805	Resistor
R5	10k 1%	0805	Resistor
R7, R9, R11, R13, R15, R17	0 Ohm	0805	Resistor
R18, R20, R22	VAR10-250	raster 10mm	Varistor (WARNING – do not put R19, R21, R23 varistors)
L1, L2	BLM21A102SPT	0805	Choke
Y1	8MHz	HC49-S	Quartz crystal
D1	P6SMB33CA	DO-214	Quartz crystal
D2	S1D	DO-214	Rectifying diode
IC1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	MCP2561-E/SN	SOIC-8	CAN Transceiver
IC3	MCP1790-5002EDB	SOT-223	Voltage regulator
IC4	LM7812	TO-220	Voltage regulator 
IC5	ULN2003A	SOIC-16N	Darlington transistors arrays
CON1, CON2	RJ45	L18xW15xH11	Connector
CON3, CON4, CON5, CON6, CON7, CON8	ARK3	L15xW10.5xH19 raster 5mm	Terminal block
K1, K2, K3, K4, K5, K6	PE014012 SCHRACK Contacts 5A/250V Coil 12V/17mA	L20xW10xH10	Monostable relay 

4.5. Enclosure

- Gainta D6MG enclosure (6 modules wide)
- Dimensions: 90mm x 58mm x 106mm

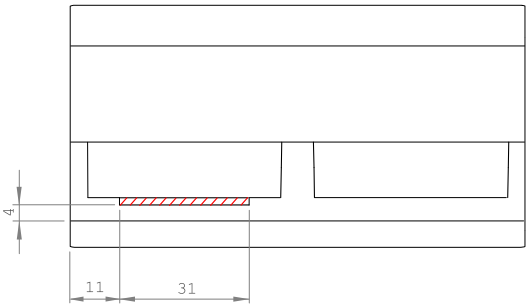




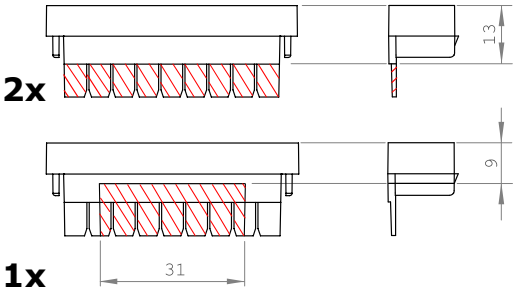
4.6. Mechanical processing

Striped parts must be removed.

BODY

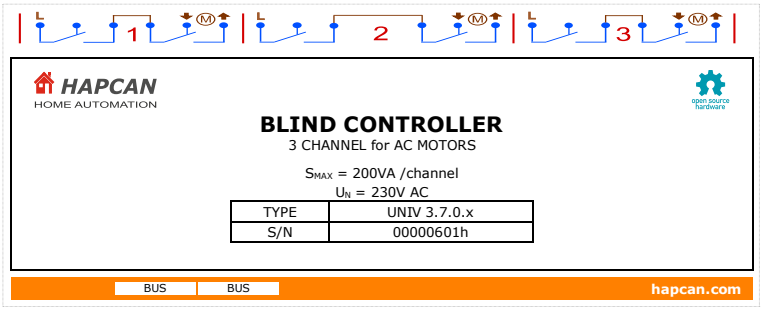


TERMINAL GUARDS



4.7. Label

Editable label version is available at hapcan.com website.



5. Commissioning

5.1. CPU voltage measurement

After verifying the correctness and quality of the soldering, the bus voltage should be connected while measuring the processor voltage. To do this, connect a voltmeter to pins 2 and 3 of the ICSP connector. Processor supply voltage should be about 5V.

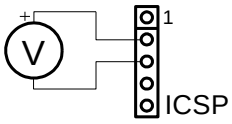


Figure 4. CPU voltage measurement

5.2. Checking the CPU clock

Proper operation of the CPU can be checked by temporarily connecting the LED to pins 3 and 5 of the ICSP connector. When device is powered, the LED should light up four times in the sequence 1 second on - 1 second off - 1 second on. The LED lights up only once for 50ms, if the processor is in programming mode.

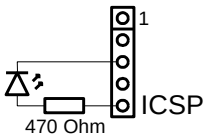


Figure 5. Checking the CPU clock

5.3. Firmware uploading

The device requires a firmware uploading for proper operation. It can be done with HAPCAN Programmer software. Both, firmware and HAPCAN Programmer can be downloaded from hapcan.com website.

6. License

7. Document version

File	Description	Date
univ_3-7-0-x_a.pdf	Original version	April 2014
univ_3-7-0-x_b.pdf	Schematic correction	May 2014