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 module makes impossible to drive two motor windings at the same time.
- Motor nominal voltage 230V
- Maximum motor power 200VA
- Bus voltage 16-24V
- Maximum current consumption from the bus 83mA@16V
- For DIN rail mounting.
- Dimensions 90x58x53 mm (3 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	16-24	V DC
Current consumption	I_S	8@16V 6@24V	mA
Maximum current consumption (when all relays are on – 3 blinds go up)	I_{SMAX}	83@16V 56@24V	mA
Bus connector type	2x RJ45		

Relay side

Parameter	Symbol	Value	Unit
Coil voltage	U_{COIL}	12	V DC
Coil resistance	R_{COIL}	840	Ω
Nominal contacts current	I_N	6	A
Maximum inrush current	I_{INRUSH}	10	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

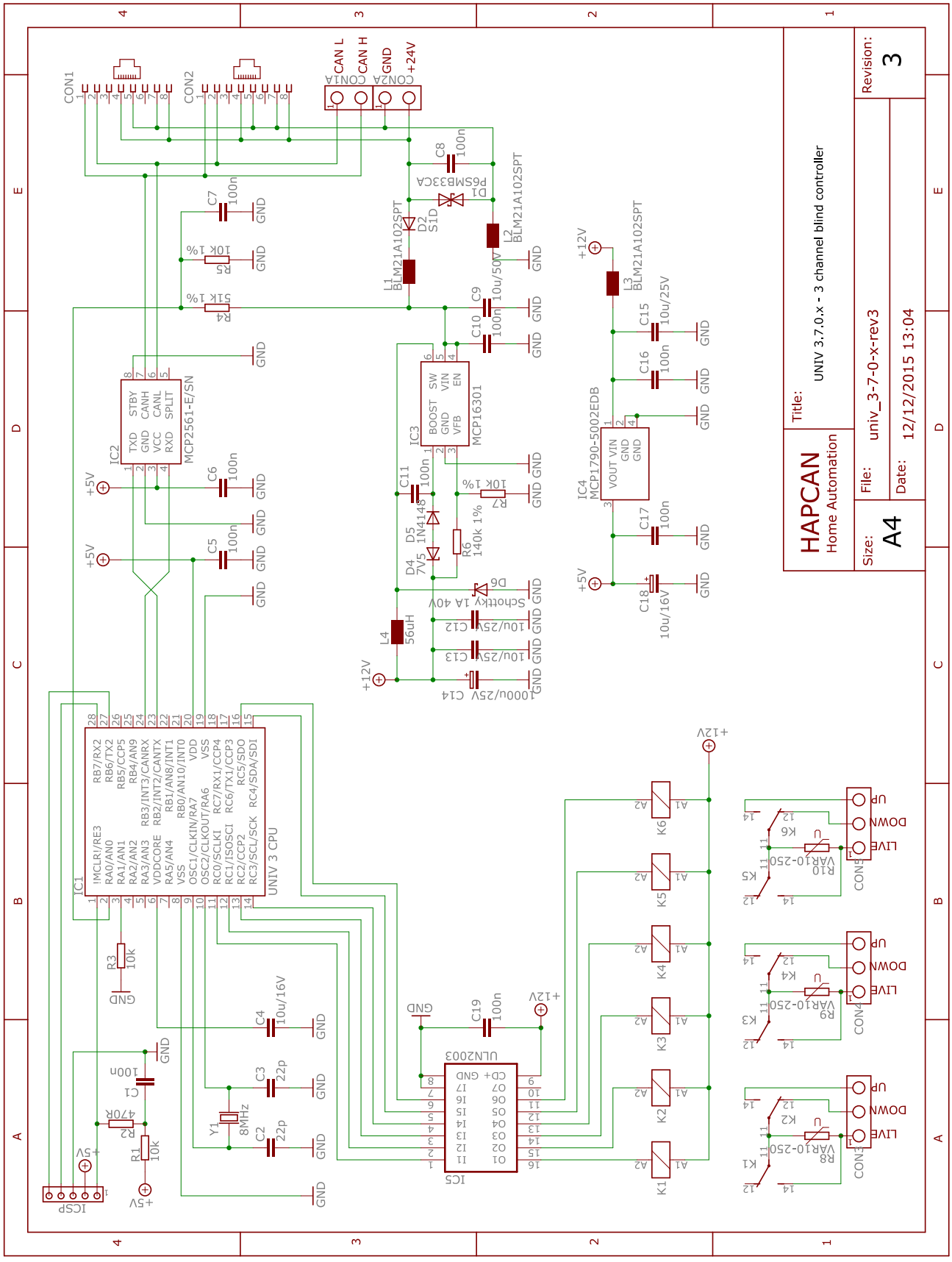


Figure 1. Schematic of blind controller UNIV 3.7.0.x

4.2. Wiring

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

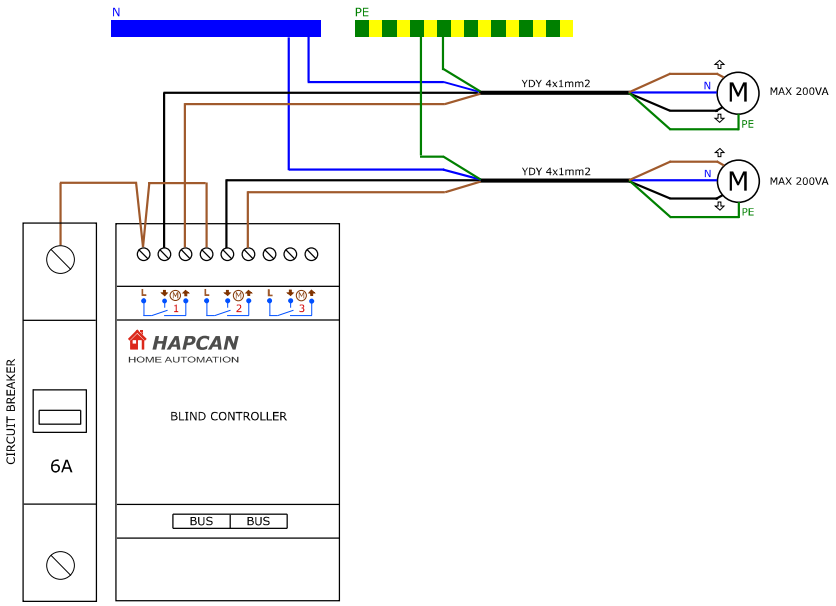
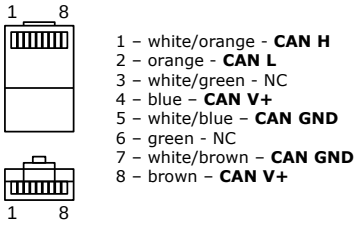


Figure 2. Relay wiring.



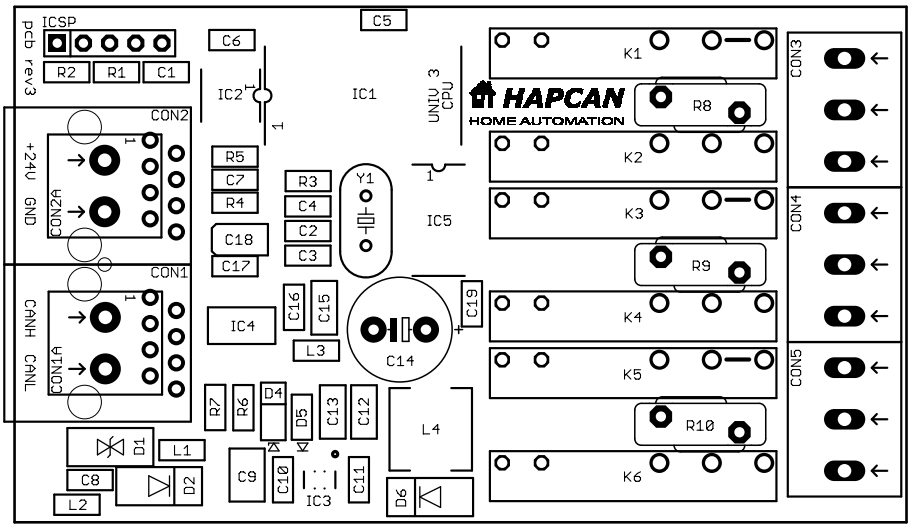
1 – white/orange - **CAN H**
2 – orange - **CAN L**
3 – white/green - NC
4 – blue – **CAN V+**
5 – white/blue – **CAN GND**
6 – green - NC
7 – white/brown – **CAN GND**
8 – brown – **CAN V+**

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.(2-7).(5-0).x* for UNIV 3.7.0.x module
- PCB dimensions: 50mm x 86.5mm

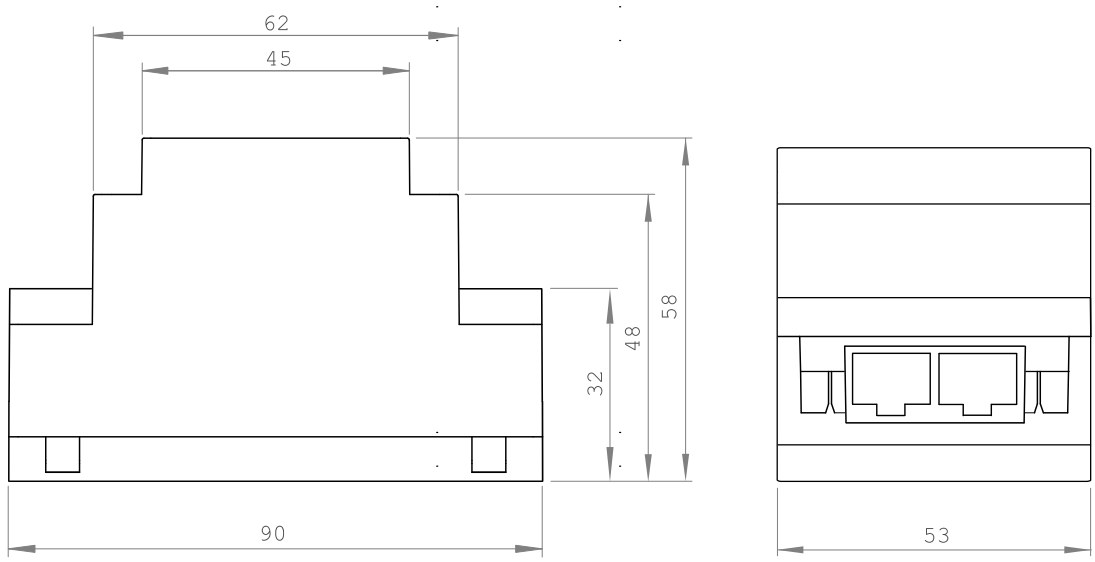


4.4. Components

Designator	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11, C16, C17, C19	100nF/50V ±10%	0805	Capacitor
C2, C3	22pF/50V ±10%	0805	Capacitor
C4	10uF/16V ±10% X5R	0805	Capacitor
C9	10uF/50V ±10%	1206, 1210	Capacitor
C12, C13, C15	10uF/25V ±10%	1206	Capacitor
C14	1000uF/25V	ø10, raster 5mm	Electrolytic Capacitor tht
C18	10uF/16V ±10%	SMA, SMB	Tantalum capacitor
R1, R3	10k	0805	Resistor
R2	470 Ohm	0805	Resistor
R4	51k 1%	0805	Resistor
R5, R7	10k 1%	0805	Resistor
R6	140k 1%	0805	Resistor
R8, R9, R10	VAR10-250	ø10, raster 7.5mm	Varistor
L1, L2, L3	BLM21A102SPT	0805	Choke Murata
L4	DER0705-56	7.6mm x7.6mm	Choke Ferrocore
Y1	8MHz	HC49-S	Quartz crystal
D1	P6SMB33CA	DO-214	Transil diode
D2	S1D	DO-214	Rectifying diode
D4	Zenera 7V5 0.5W	MiniMELF	Zener diode
D5	1N4148	0805	Rectifying diode
D6	MBRS140T3G	DO-214	Shottky diode
IC1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	MCP2561-E/SN	SOIC-8	CAN transceiver Microchip
IC3	MCP16301T-I/CHY	SOT-23-6	DC/DC converter Microchip
IC4	MCP1790-5002EDB	SOT-223	Voltage regulator Microchip
IC5	ULN2003	SOIC-16	Darlington transistors arrays
CON1, CON2	95501-2881	8pin RJ45	Connector RJ45 Molex
CON3, CON4, CON5	AK700/3-5.0-V-GREEN-BR	raster 7.5mm	Terminal block PTR Messtechnik
K1, K2, K3, K4, K5, K6	34.51.7.012.0010 contact 6A/250V AC coil 12V/14.2mA DC	L28xW5xH15	Finder relay

4.5. Enclosure

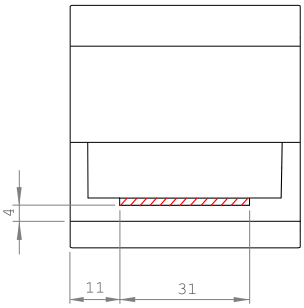
- Gainta D3MG enclosure (3 module wide)
- Dimensions: 90mm x 58mm x 53mm



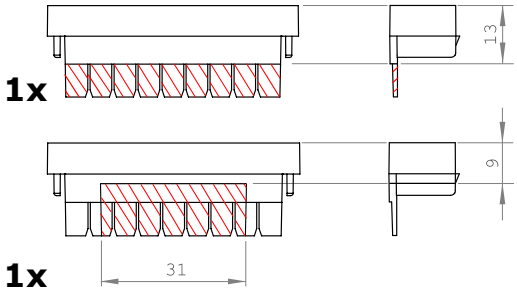
4.6. Mechanical processing

Striped parts must be removed.

BODY

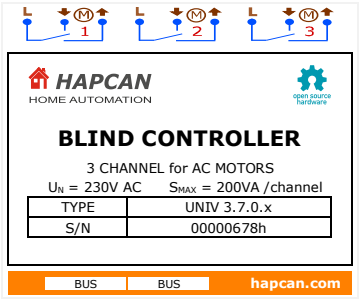


TERMINAL GUARDS



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.

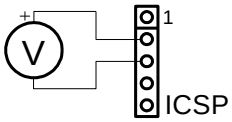


Figure 4. CPU voltage measurement

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.

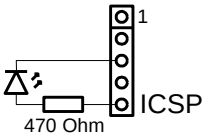


Figure 5. Checking the CPU clock

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	Hardware Revision	Description	Date
univ_3-7-0-x_a.pdf	rev1	Original version	April 2014
univ_3-7-0-x_b.pdf	rev1	Schematic correction	May 2014
univ_3-7-0-x_c.pdf	rev3	PCB and enclosure change	December 2015