RELEXBOX4/8/8I

4/8CH. SMART RELAY MODULE

Key Features;

- ➢ 4/8 Channels, up to 16 Amperes, 220V Relay Inputs,
- ➢ Rail type, ergonomic design,
- ➢ IP address and relay status indicators on internal LCD display,
- ➢ Transmit and receive commands via RS-232 (-RS labeled) or TCP/IP (-IP labeled) protocols,
- ➢ Independent configuration from a web browser with internal processor,
- ➢ Internal test buttons,
- ➢ 8 independent control inputs, (8I Model),
- ➢ 4 relay group controls,
- ➢ 4 relay preset memory,
- ➢ 3 on boot relay behaviors,
  - o Remember last state,
  - o OFF on boot,
  - o ON on boot.
- ➢ Timer function,
- ➢ 4 mutually exclusive relay groups (for up – down motor modes),
- ➢ Fully compatible with the automation systems.

Overview;

Relexbox is an automation relay module which is in industry standards-compliant, easily mountable in electrical panels and rack cabinets and controllable via TCP/IP or RS-232 protocols.

Relexbox is commonly preferred for relevant applications at homes, offices, hotel rooms, training rooms, classrooms, meeting and conference rooms which requires remotely or automated controls on electrical systems such as motorized screens, plugs, lightings and electronic devices.

RELEXBOX * - **

*- 4, 8, 8I. specifies amount of relay channels. 8I has 8 control input ports.

**- RS, IP. Specifies RS-232 or TCP/IP control protocols.

RelexBox 8I – IP; 8 channels with 8 control input ports, TCP/IP controlled relay module.
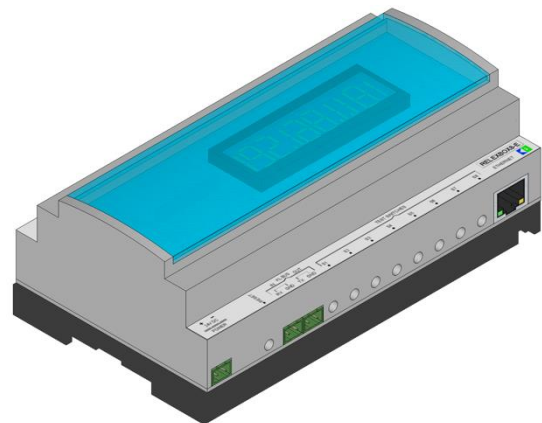
Specifications;

Relay Channels	8 / 4
Max. Load per Relay Ch.	10A – Incandescent Light 5A – Fluorescent Light 10A – Inductive Load 16A – Resistive Load ½HP – 240V AC Motor 5A – 30V DC Voltage
Load Types for Relay Ch.	Incandescent, Magnetic Low Voltage, Electronic Low Voltage, Neon/Cold Cathode Fluorescent, Motors
Control	8 / 4 Test Buttons, 8 Control Input (8I), RS-232(-RS), TCP/IP(-IP), Direct IP control with internal interface via web browser. (-IP), Reset Button.
Indicator	On-Off LED, IP, module name, MAC address and relay status on 16x2 LCD display.
Connectors	4 / 8 Relays, KL BUS In & Out RS-232, 8 Control Input (8I), Ethernet (RJ-45) (-IP), DC Power IN
Power Requirements	24V DC 1.2A
Dimensions	H = 6cm W = 15.7cm D = 8.9cm
Mounting	Rail Type mounting.
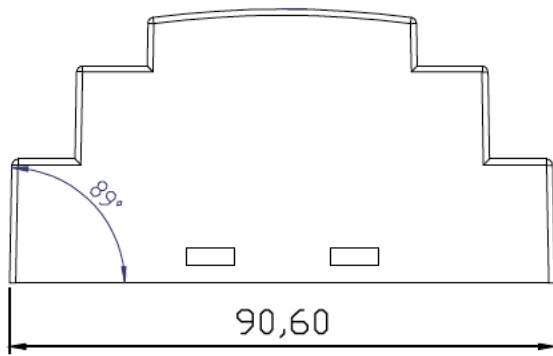
FIGURE 1 – SIDE SECTION

89°

90,60

FIGURE 2 – TOP VIEW

158,00

45,50

FIGURE 3 – BASE SIDE SECTION

15,00
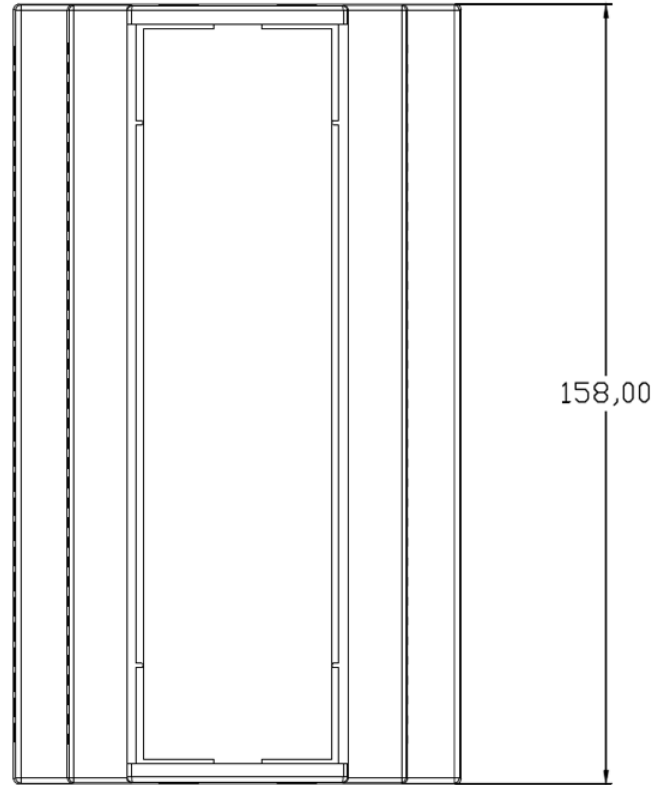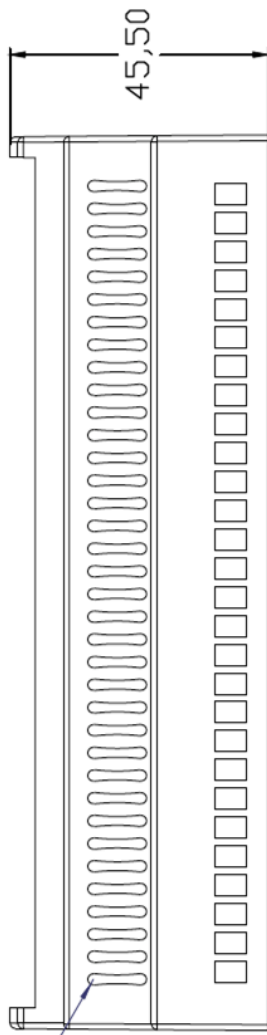
FIGURE 4 – FRONT SECTION

FIGURE 5 - ISOMETRIC

RELEXBOX SMART RELAY MODULE
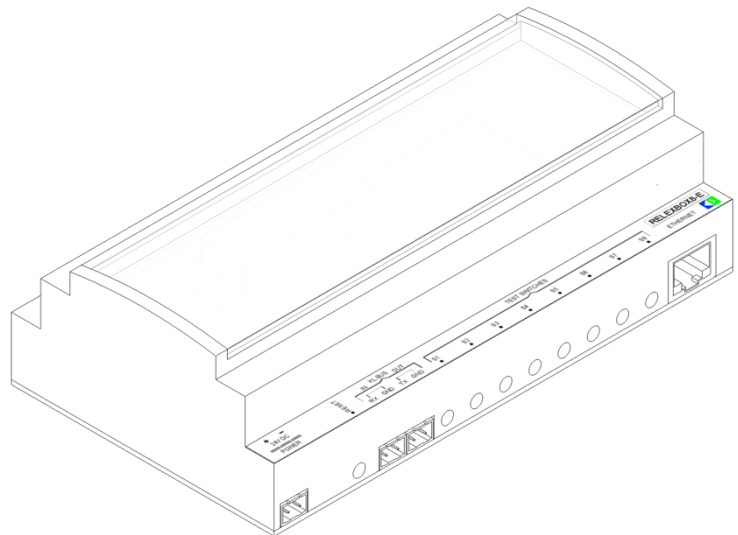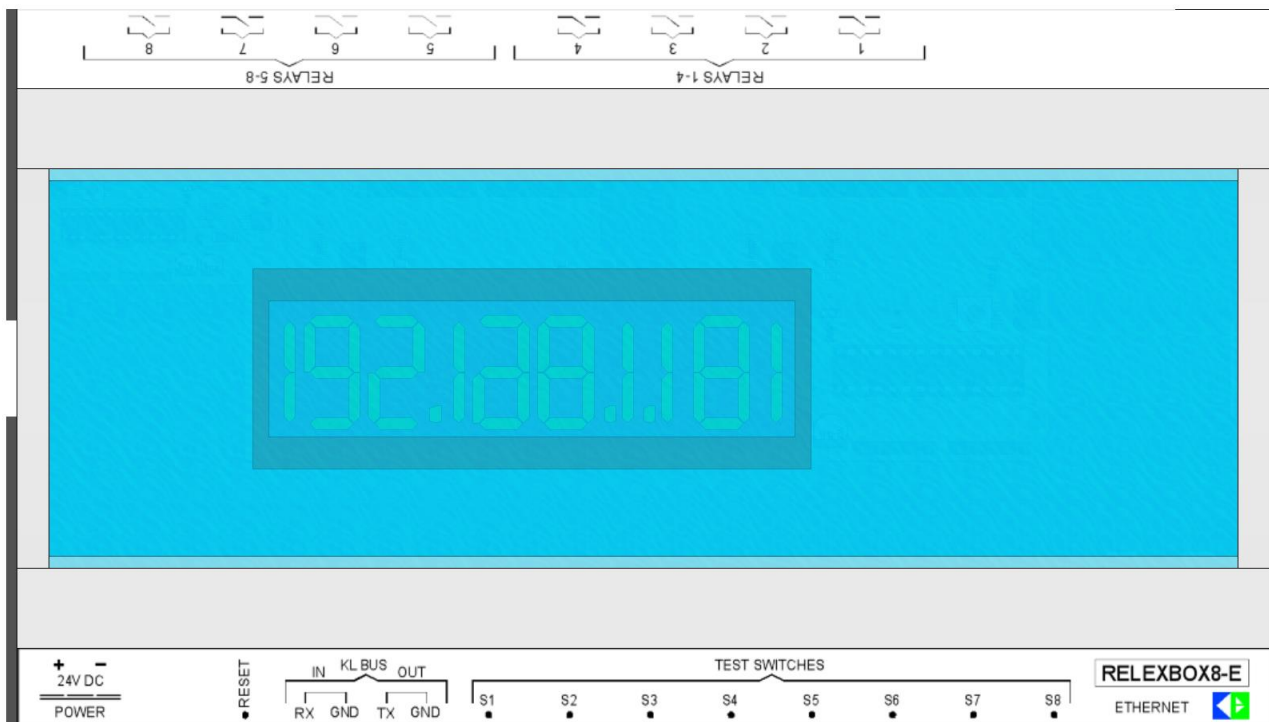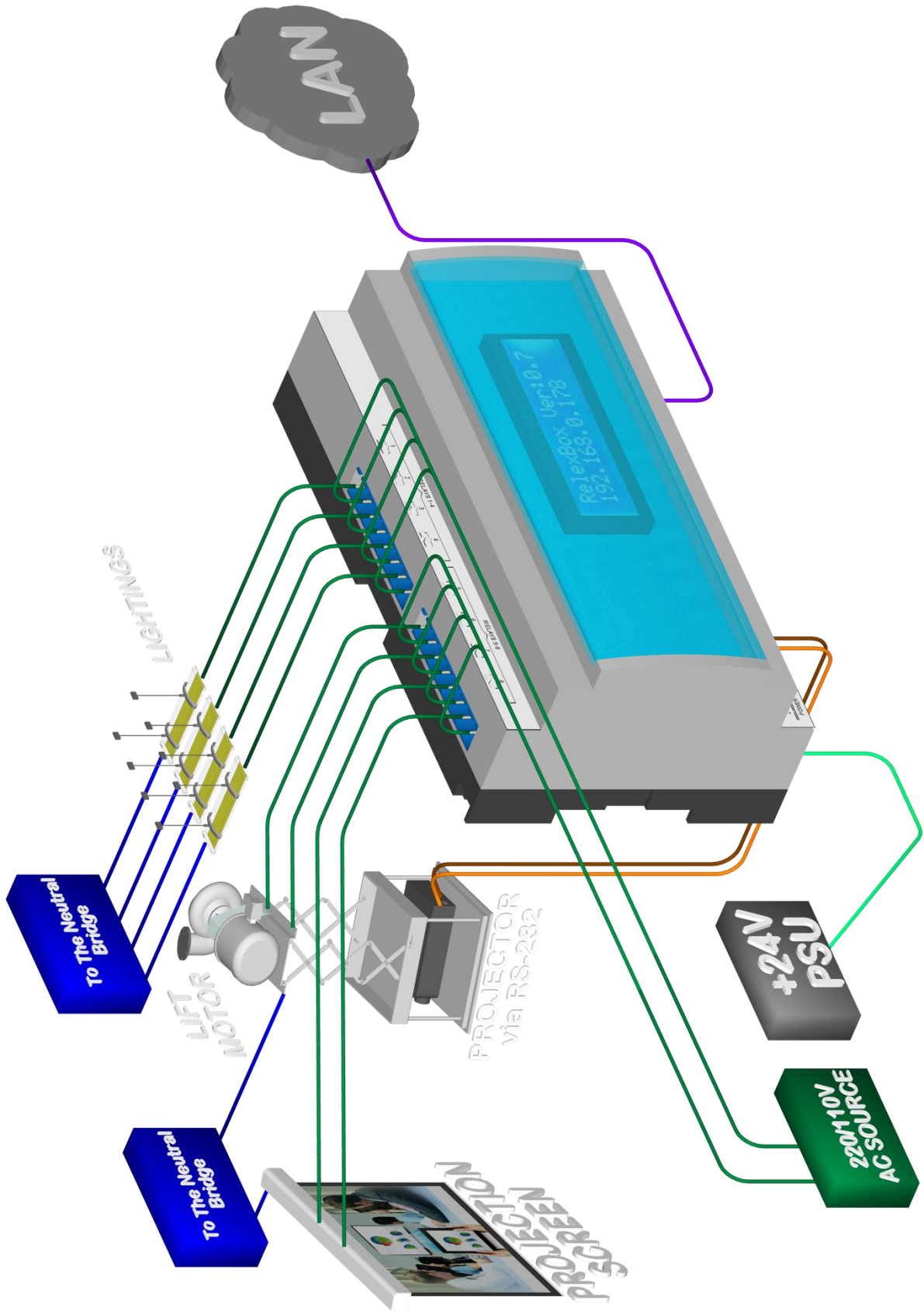
SCOPE OF APPLICATIONS

Relexbox is used for turning power on /off of lightings, motorized systems, AC plugs or other systems which are activated with power and external systems which are controlled with trigger actions. Therewithal, in –IP models Relexbox is able to control one RS-232 controlled device via it's KL-BUS port. In this way Relexbox is capable of control all automated systems in a basic meeting room just by itself.

It is fully compatible and easily controllable with all open-configuration automation systems which use RS-232 or TCP/IP such as Crestron, AMX & Control 4 etc..

As it is seen on application diagram, in a basic meeting room, just a single RelexBox 8I-IP can control **a motorized projection screen (2 relay ch.), a projector (RS-232), motorized curtains (2 relay ch.), and 4 different lines of lighting controls via an iOS IPAD.**

In TCP/IP controlled –IP models, commands can be sent over a single CAT5 and through KL-BUS link connected up to 250 devices. In this way, you can control up to 2000 relay channels with IPAD, Android device or a smart phone over a one single network line or just a single Wireless Access Point.

Scope of Applications   Kontrolojik Elektronik LTD.   3

OPERATION MANUAL

RelexBox Ver:1.3
192.168.0.178
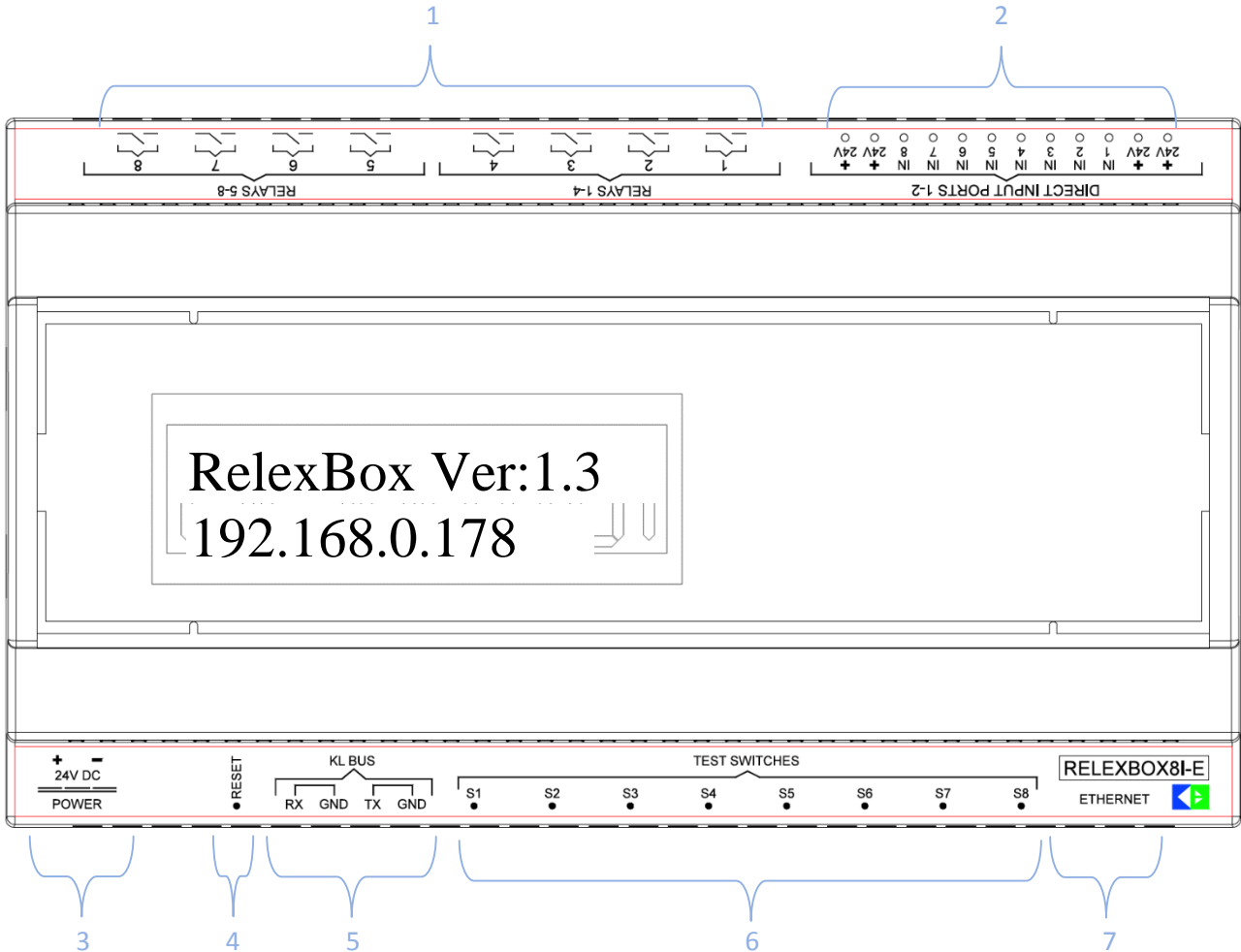
1- **Relay Channels;** Relay lines in/out connectors.
2- **Control Inputs;** Fulfil the tasks they associated with if an internal or external +24V connected to inputs.
3- **24V DC Power IN;** 24V Power Supply Connection.
4- **Reset Button;** Turn the device back to the factory settings and restart.
5- **KL BUS Link, RS-232 TX and RX;** RS-232 Connection. An external RS232 controlled device can be controlled via TX output or an interconnection can be obtained with KL-BUS link up to 250 devices.
6- **Test Buttons;** are used for testing the tasks associated to the relays or relay groups.
7- **RJ-45 LAN IN;** Network line connection.

-RS models can easily be controlled with devices which can send RS-232 commands with the related strings at the Control Protocol pages.
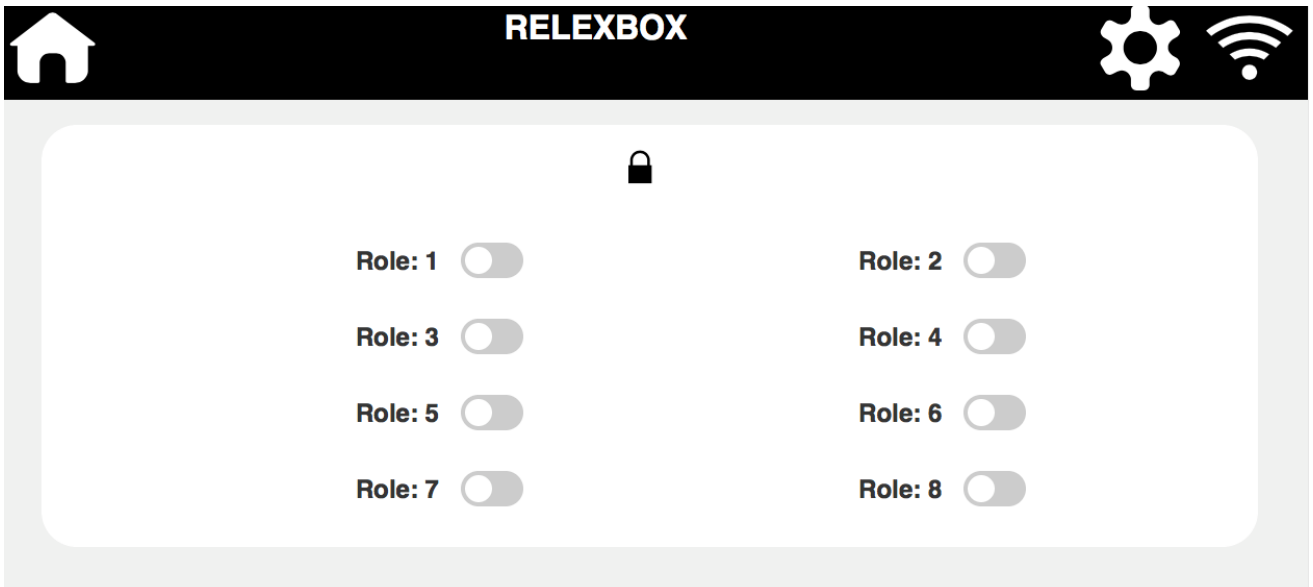
WEB BROWSER INTERFACE

1. Go to the interface:
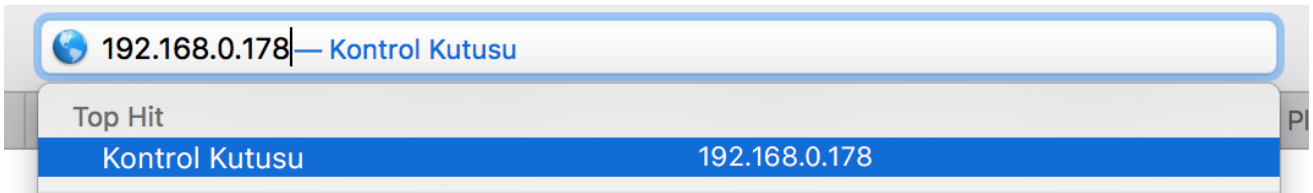
Write down the IP Address on the screen of the device to the address bar of the browser. Your browser will ask you the username and the password that will be supplied by your dealer. Once you enter the username and the password your browser should remember the login information.

2. Relay Control Page:

Relay control page is the Home Page of the interface. Relay status can be controlled, presets can be set or called and timer function can turn on or off at the Home Page

In order to control the functions, click the lock icon at the top and unlock the control parameters. Once the lock is unlocked this screen will be shown;
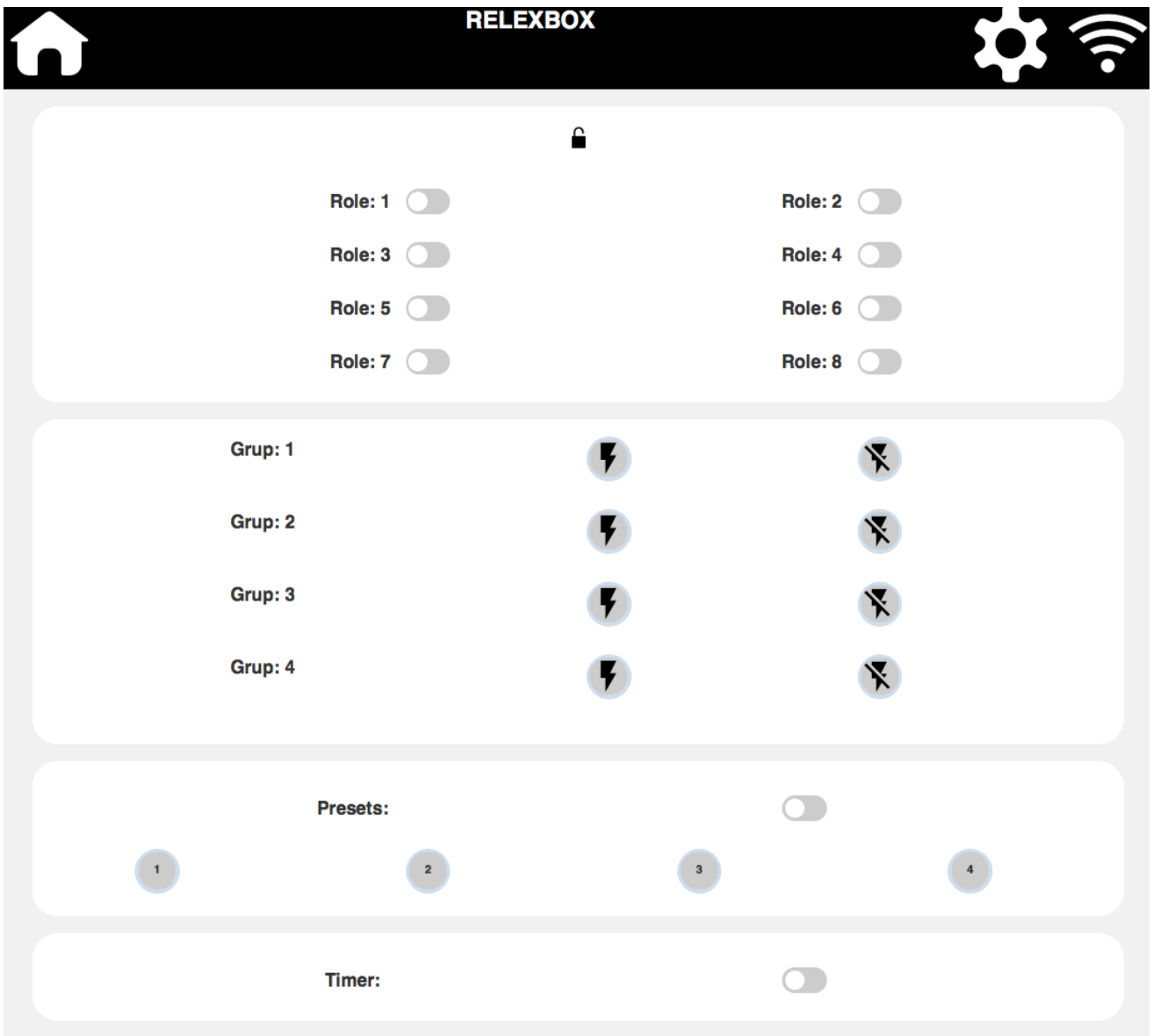
3. Preset Function:
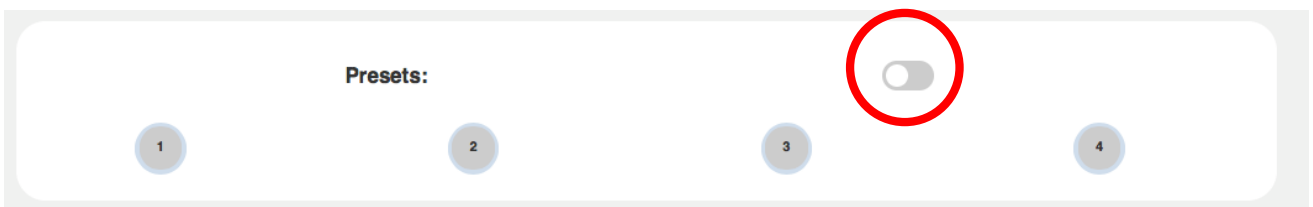
Button in the red circle is the trigger or save switch. If it is off, you can trigger one of the four presets. If it's on, you can save the current relay states onto the one of the four presets. After saving, switch should be turned off again.
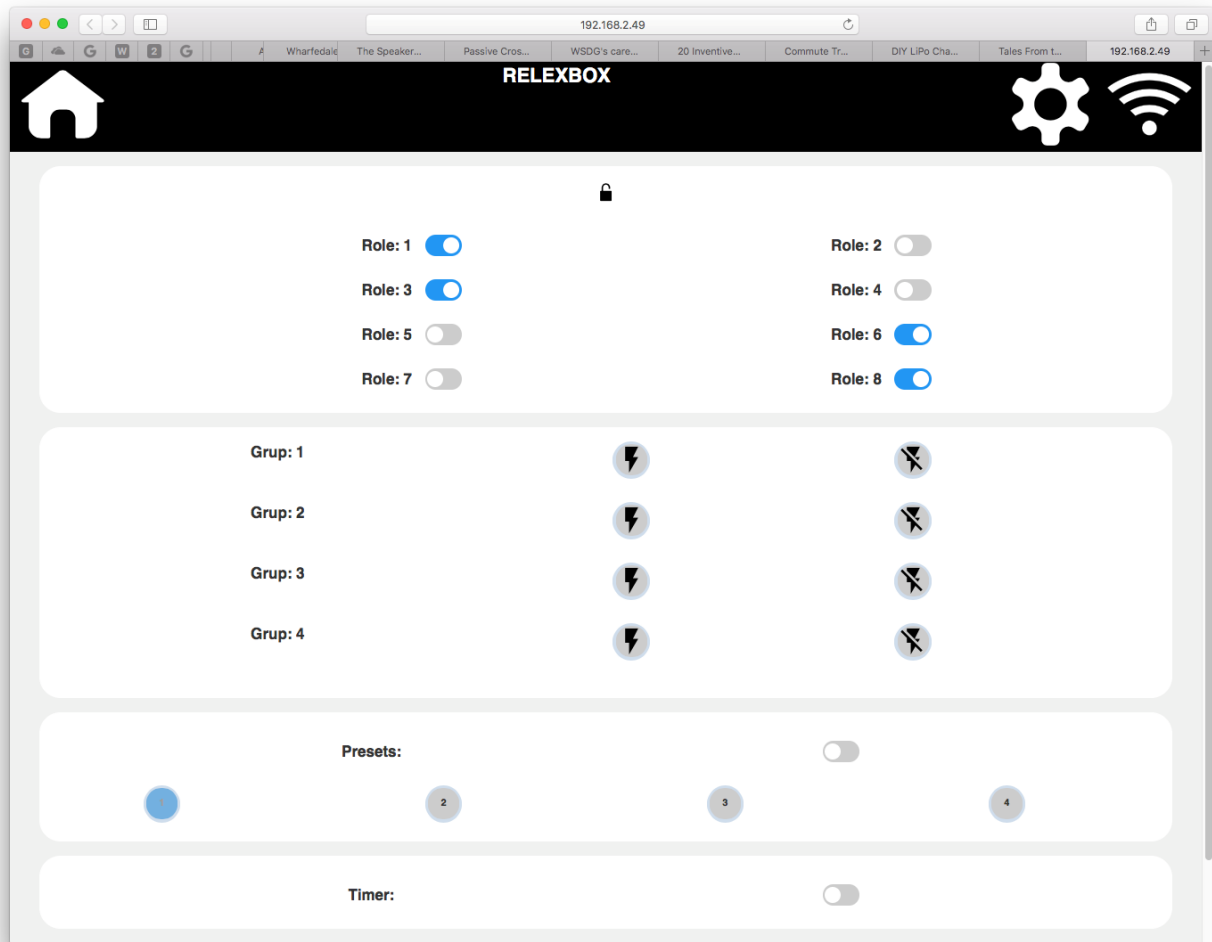
4. Network Configuration:

Network configuration screen can be accessed with the clicking to the network button (📶) .

Device name and static IP setting can be configurable from this window. Also you can see the firmware version and the serial no of the product.

After the necessary changes, click the "Save" button. When major changes have been done in the software, device will reboot itself. After rebooting is done, re-enter the new IP to the browser and login with the required information.

5. Settings Window:

Main configurations will be done here. You can access the settings page by clicking the gear (⚙) button.
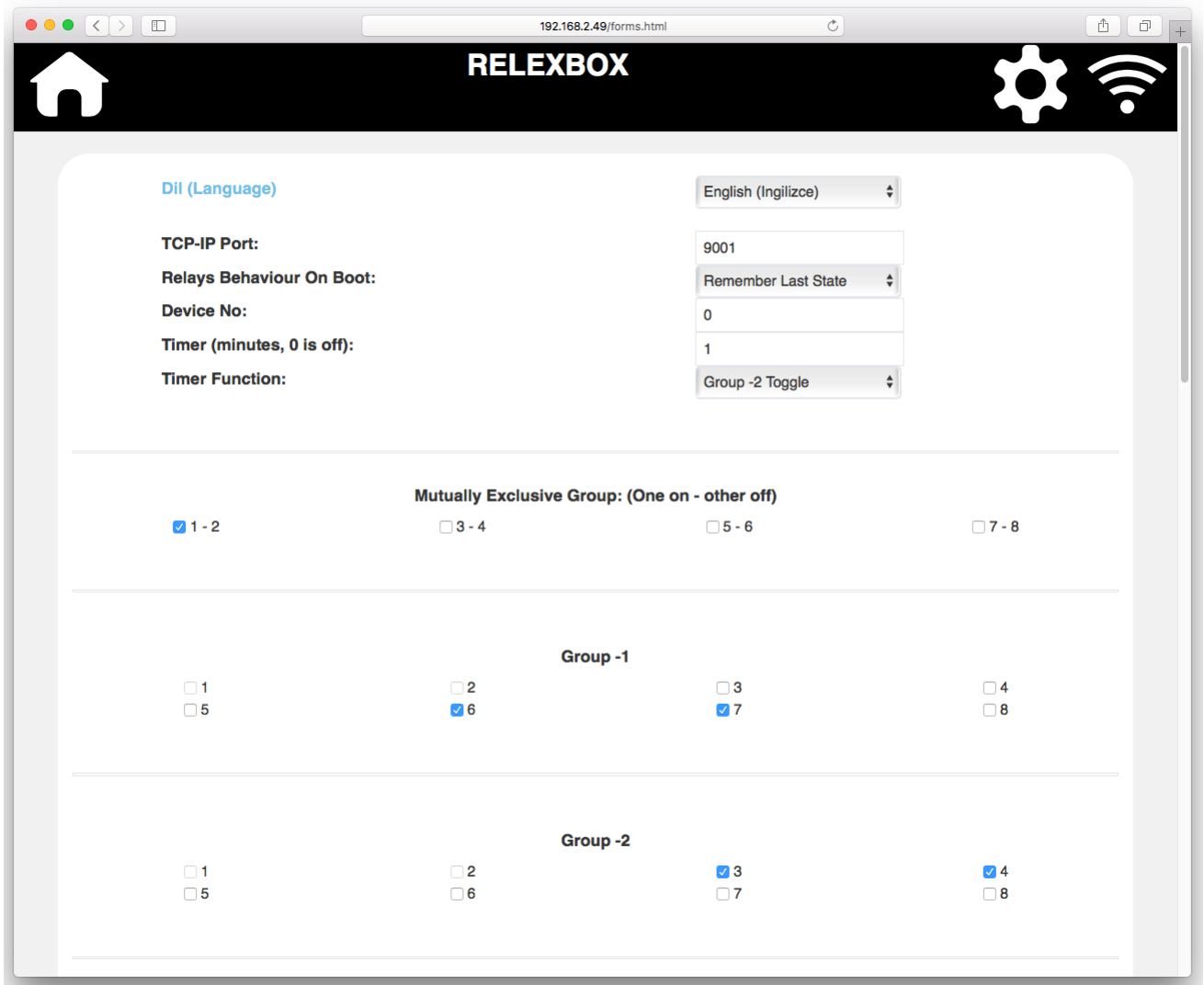
Language, TCP-IP port, on boot behavior, device no and timer parameters can be set at the first section.

Timer can be switched on from home screen. Timer's time delay and task is set from settings window. Time delay should be integer (multiples of 1) and defines the minute that timer will be in action. If 0 (zero) is set, timer will be off. There are 3 main tasks for each Groups. On, Off and Toggle. Also **Do Not Care** option is available to do nothing when timer is activated.
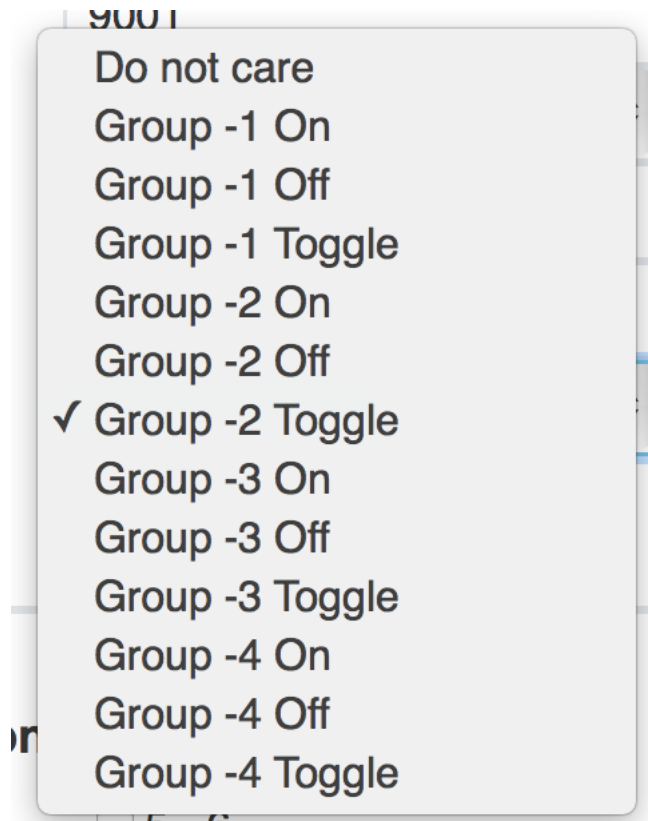
Mutually Exclusive Groups are for ensuring the security of the systems that will not be turned on at the same time such as up/down motors. In the example below, relay channels 1 and 2 is selected for the mutual exclusive group. If it's considered as 1st relay is connected to "Down" of motorized system and 2nd is connected to "UP"; both are ON situation will most probably burn the motors of the system. Therefore, when these relay channels are assigned to mutually exclusive groups, system will never allow you to turn both channels ON.

When relay channels are assigned to Mutually Exclusive Groups, they can not be assigned to the Groups at the same time.

Groups work as presets which you can assign each relay required to each group to make a simple control configuration. Presets are for remember and call the required states and Groups are for control multiple relays together.

Group -1

☐ 1   ☐ 2   ☐ 3   ☐ 4
☐ 5   ☑ 6   ☑ 7   ☐ 8

Group -2

☐ 1   ☐ 2   ☑ 3   ☑ 4
☐ 5   ☐ 6   ☐ 7   ☐ 8

Group -3

☐ 1   ☐ 2   ☑ 3   ☐ 4
☐ 5   ☑ 6   ☐ 7   ☐ 8

Group -4

☐ 1   ☐ 2   ☐ 3   ☐ 4
☐ 5   ☐ 6   ☐ 7   ☐ 8

Save

Control Inputs' tasks can be set from the setting window. Each input is related to one relay or group (group option is just for first 4 inputs). There are 3 main options for the input tasks. **Related to Relay/Group X** means; if input is triggered relay or group will be activated and when trigger is off it will be deactivated. **Related to Relay/Group X – Not Mode** is; if input is triggered, relay or group will be deactivated and when trigger is off it will be activated again. **Toggle Relay/Group X On Pulse** is to toggle the state of the relay or group when a trigger pulses. Additionally, there is a **Switch On Relays On Pulse** option which turns all relays on when a trigger pulses. If input will not be used, select **Free Mode.**

Input - 1	Related to Group 1 ⇕
Input - 2	Related to Group 2 - Not M ⇕
Input - 3	Toggle Group 3 On Pulse ⇕
Input - 4	Related to Relay 4 ⇕
Input - 5	Related to Relay 5 - Not M ⇕
Input - 6	Toggle Relay 6 On Pulse ⇕
Input - 7	Switch On Relays On Puls⟨ ⇕
Input - 8	Free Mode ⇕

Save

Password of web browser interface can be changed from this settings window. Users can rename all relays and groups. After all changes are done, click the save button.

Password:	KontrolBox
Relay -1	Sc. DOWN
Relay -2	Sc. UP
Relay -3	MainLght
Relay -4	SideLght
Relay -5	AirCond.
Relay -6	Plug-1
Relay -7	Plug-2
Relay -8	DoorLock
Group -1	Grup: 1
Group -2	Grup: 2
Group -3	Grup: 3
Group -4	Grup: 4

Save

CONTROL PROTOCOLS-1 (TCP-IP)

COMMANDS								
TCP Port	Command	Parameter Description	Description	Examples	Example Explanation	Feedback	Feedback Examples	Feedback Explanation
RELAY	::CMDRESET		Resets the device.					
RELAY	::CMDRL[port]OF	port 1-12 (10=A,11=B,12=C)	Makes related relay's status: OFF.	::CMDRL1OF	Relay 1: OFF	##RELAY[port]: 0	##RELAY1: 0	
RELAY	::CMDRL[port]TG	port 1-12 (10=A,11=B,12=C)	TOGGLEs Related Relays. 1 to 0, 0 to 1.	::CMDRL1TG	Relay 1: TOGGLE	##RELAY[port]:[0-1]	##RELAY1: 1 or ##RELAY1: 0	
RELAY	::CMD??_		Asks Status.			##STATUS[input s],[relays]	##STATUS0 10,1011	input 2=1, Relay 1,2 and 4 = 1
RELAY	::CMDvsn		Asks serial number and the firmware version.			##VERSER[serial no],[version]	##VERSER0 A12224C5 D6E,v1.0	
RELAY	::CMDCLR_E	Clear Eeprom	Factory Settings applies to the Eeprom with restart.					
RELAY	::CMDRTMAC		Reads MAC address from the Eeprom.			[MAC ADDRESS]	FA0034223 344	
RELAY	::CMDRTEPP		Reads Eeprom and sends Eeprom's content.			[Eeprom Content]	…..	
RELAY	::CMDRam_T		Tests RAM and informs the steps in received answers.					

RELAY	::CMDCHECK		Gives the inner structure size.			sNVM:[size], sAPPc:[size], sAPPs:[size]	sNVM:012, sAPPc:064, sAPPs:122	
RELAY	::CMDY[address] [value]	address 1 byte hex value, value ascii 3 byte	Writes 3 bytes of information from an address of Eeprom.	Hercule Example ::CMDY$12abc	Writes a to address $12 (18); b to the 19 and c to the 20.			

CONTROL PROTOCOLS - 2 / KLBUS (RS-232)

1. Type : RS-232 (Commands can be send and feedback can be received with the same protocol via TCP connection of the device.) Three bytes of ":::_" information (ASCII Characters) is added as prefix of the message and one byte of "0x0D" value is added as suffix of the message in TCP communication. Therefore, **TCP message is 20 Bytes.**

TCP MESSAGE:

0x3A	0x3A	0x5F	KONTROL BUS MESSAGE (16 BYTE)	0x0D
":"	":"	"_"		"\r"

2. Connector : IN and OUT connectors.

In case of communicating with single RS-232 device, RX, TX and GND pins of RS-232 connection of this device are used. TX and GND pins of the external device will be connected to KLBus IN and RX and GND pins will be connected to KLBus OUT connector. If a single RS-232 device will communicate with multiple KLBus product, a loop must be created.

3. RS-232 : 9600, N, 8, 1, Stop Bit.

4. ID Information : ID information of KLBus device at the very first boot is 0 (zero).

ID can be set through the web browser interface and all KLBus devices in a link must have unique ID. 0 and 251 – 255 is reserved. Therefore, maximum 250 devices can exist in a single KLBus link.

5. NOTE (!) : Same commands can be transmitted through the TCP/IP.

If command belongs to a different ID, device will transmit the received command to related device. Likewise, device will inform the feedback information of another device in the same KLBus link over the TCP/IP. If there is a problem receiving the message, device will inform KLBus Error on the LCD screen.

6. Protocol : It is limited to a total of 16 bytes. Consists of Header, Data and Checksum sections.

Header is a two bytes of information which includes K and L ASCII characters. CHKSUM BYTE is XOR function of all data bytes. Data has two parts; Data Header (5 Bytes) and Data Bytes (8 Bytes). Data Header consists of Type, Sender_ID, Receiver_ID and 2 bytes of command. If the Type Byte is 0x00, it is a transmitted command and if the type byte is 0xFF; it's a feedback message.

HEADER		DATA													CHKSUM
0x4B	0x4C	DATA HEADER (5 BYTEs)					DATA BYTES (8 BYTEs)								XOR function of all Data
"K"	"L"	TYPE	SENDER_ID	RECEIVER_ID	CMD-A	CMD-B	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	13 BYTE XOR value

DATA HEADER		
TYPE	0x00	Whole message is a command information.
	0xFF	Whole message is a feedback information.
SENDER_ID		ID of the device which send the message for the first time.
RECEIVER_ID		ID of the related device for the message.
		IF a device hasn't create the message by itself and the receiver id is not the device's own id, message will directly send to the BUS.
		If the message is for device's own Idi feedback will be transmitted to the Sender ID.
RESERVED IDs	0x00	Factory (default) ID. If there is a device with this ID on the BUS, device do nothing and send the received information back to the BUS. *See Assign ID command.*
	0xFF	Broadcast ID. Receiver ID can be 255. In this case message is transmitted through the BUS until the sender device receive it back. All devices fulfill the related function.
	0xFE	Broadcast Web ID. Receiver ID can be 254. In this case message is transmitted through the BUS until it reaches to a device which has an active TCP connection and it will be sent through TCP.

COMMANDS	EXPLANATION	TYPE	SENDER_ID	RECEIVER_ID	CMD-A	CMD-B	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
			DATA HEADER (5 BYTE)				DATA BYTES (8 BYTE)							
RELAY ON	RELAY is the number of relay channel	0x00	SENDER_ID	RECEIVER_ID	0x01	RELAY	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x01
RELAY OFF	RELAY is the number of relay channel	0x00	SENDER_ID	RECEIVER_ID	0x01	RELAY	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
TOGGLE RELAY	RELAY is the number of relay channel	0x00	SENDER_ID	RECEIVER_ID	0x01	RELAY	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x02
GROUP ON	GROUP is the number of group	0x00	SENDER_ID	RECEIVER_ID	0x02	GROUP	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x01
GOUP OFF	GROUP is the number of group	0x00	SENDER_ID	RECEIVER_ID	0x02	GROUP	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
TOGGLE GROUP	GROUP is the number of group	0x00	SENDER_ID	RECEIVER_ID	0x02	GROUP	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x02
CHANGE STRUCTURE OF RELAY	Changes Mutually Exclusive Relay and on boot relay behavior on the related device	0x00	SENDER_ID	RECEIVER_ID	0x03	0x01	0x00	0x00	0x00	0x00	0x00	0x00	MUEX	RELBOOT
	MUEX Mutually Exclusive Relay Groups. If the related bits of 8 bits of information below would change to 1, those relays act as mutually exclusive. Bit7:RL7-8, Bit6:0, Bit5:RL6-5, Bit4:0, Bit3:RL4-3, Bit2:0, Bit1:RL2-1, Bit0:0 **RELBOOT** Relay behavior on boot. Modes depended of bytes are below;													
0	Remember last state													
1	Relay are OFF on boot													
2	Relay are ON on boot													
3	Do nothing.													

Command	Description													
ASK RELAY STRUCTURE	Asks the related device about mutually exclusive relays and on boot behavior	0x00	SENDER_ID	RECEIVER_ID	0x03	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
ANSWER TO THE RELAY STRUCTURE	Informs the asking device to MUEX and RELBOOT.	0xFF	SENDER_ID	RECEIVER_ID	0x03	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	MUEX	RELBOOT
GROUP CONFIGURATION	Configuration of each group..	0x00	SENDER_ID	RECEIVER_ID	0x04	0x01	0x00	0x00	0x00	0x00	GRUP-4	GRUP-3	GRUP-2	GRUP-1
	If the related bits of 8 bits of information below are 1, those relays will be related to the group. Bit7:RL8, Bit6:RL7, Bit5:RL6, Bit4:RL5, Bit3:RL4, Bit2:RL3, Bit1:RL2, Bit0:RL1													
ASK GROUP STRUCTURE	Asks related device about group structure.	0x00	SENDER_ID	RECEIVER_ID	0x04	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
ASNWER TO THE GROUP STRUCTURE	Informs the asking device to group structure	0xFF	SENDER_ID	RECEIVER_ID	0x04	0xFF	0x00	0x00	0x00	0x00	GRUP-4	GRUP-3	GRUP-2	GRUP-1
ASK RELAY STATUS	Asks relay status to the related device.	0x00	SENDER_ID	RECEIVER_ID	0x05	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
ANSWER TO RELAY STAUTS	Informs the relay status to the sender.	0xFF	SENDER_ID	RECEIVER_ID	0x05	0xFF	RELAY-8	RELAY-7	RELAY-6	RELAY-5	RELAY-4	RELAY-3	RELAY-2	RELAY-1
ASK INPUT STATUS	Asks input status of related device	0x00	SENDER_ID	RECEIVER_ID	0x06	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
ANSWER TO INPUT STATUS	Informs the status of inputs to the sender.	0xFF	SENDER_ID	RECEIVER_ID	0x06	0xFF	0x00	0x00	0x00	0x00	0x00	0x00	INPUT 9-16	INPUT 1-8
	For RelexBox 8I, bits of the first data byte signify the input status. For 16 input devices, bits of the second data byte signify input status.													
CHANGE INPUT BEHAVIOR	Changes the behavior of related input. VALUE can get the following values;	0x00	SENDER_ID	RECEIVER_ID	0x07	INPUT	0x00	0x00	0x00	0x00	0x00	0x00	0x00	VALUE

0	Independent													
1	Related to Relay X. X value is the same as INPUT value.													
2	Related to Group X. X value is the same as INPUT value.													
3	Related to Relay X, not mode. X value is the same as INPUT value.													
4	Related to Group X, not mode. X value is the same as INPUT value.													
5	Toggle Relay X. X value is the same as INPUT value.													
6	Toggle Group X. X value is the same as INPUT value.													
ASK INPUT BEHAVIOR	Asks behavior of related input at the INPUT variable.	0x00	SENDER_ID	RECEIVER_ID	0x08	INPUT	0x00	0x00	0x00	0x00	0x00	0x00	0x00	VALUE
ANSWER TO INPUT BEHAVIOR	Answers behavior of related input at the INPUT variable.	0xFF	SENDER_ID	RECEIVER_ID	0x08	INPUT	0x00	0x00	0x00	0x00	0x00	0x00	0x00	VALUE
INPUT FEEDBACK	Informs the changing at the input status to the BUS.	0xFF	SENDER_ID	0xFF	0x09	INPUT	0x00	0x00	0x00	0x00	0x00	0x00	0x00	STATE
	INPUT is the Input channel number. If STATE is 1, input is active and if STATE is 0, input is not triggered.													

Command	Description													
ASSIGN ID TO A DEVICE	If RECEIVER_ID is 0xFF; in case of ID of the device which first received the message is "0", this command makes the device ID the value at the DB0. Message will not be transmitted to the BUS again. If the first received device ID is not "0", message will be transmitter to the BUS. If message returns to SENDER_ID, message will not be repeated. If the RECEIVER_ID is different than "0" and it's the ID of the device, the device's ID will be changed as NEWID.	0x00	SENDER_ID	RECEIVER_ID	0xFF	0xFD	0x00	0x00	0x00	0x00	0x00	0x00	0x00	NEWID
Changes Device ID: 2 to device ID 1	KL00FF02FFFD00$00$00$00$00$00$01$FE													
Changes Device ID: 2 to device ID 5	KL00FF02FFFD00$00$00$00$00$00$05$FA													
Changes Device ID: 1 to device ID 5	KL00FF01FFFD00$00$00$00$00$00$05$F9													
ASK DEVICE SETTINGS	Asks settings of the device	0x00	SENDER_ID	RECEIVER_ID	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0xFF
ANSWER TO DEVICE SETTINGS	Answers to sender of settings of the device.	0xFF	SENDER_ID	RECEIVER_ID	0x00	0x00	GRUP-4	GRUP-3	GRUP-2	GRUP-1	MUEX	RELBOOT	STATUS	DEV_ID
DEVICE ON BOOT FEEDBACK	NOTE: This feedback is not repeated on the BUS, goes to the next device and ends.	0x10	SENDER_ID	0x00	0x00	0x00	GRUP-4	GRUP-3	GRUP-2	GRUP-1	MUEX	RELBOOT	STATUS	DEV_ID