RCRE-100 Wireless Remote Controller

User Guide

INPHTECH Ltd.

Table of Content

Safety Warnings

Warning: Product installation

This equipment must be installed and operated in accordance with the manufacturers instructions provided. Failure to do so could result in poor product performance, personal injury, and/or damage to your assets.

Warning: High voltage

This equipment contains high voltages. DO NOT remove the covers or access internal components unless instructed to do so within the product handbook. NEVER remove the equipment's cover when power is connected.

Warning: Power supply

Make sure the equipment’s power supply is set to OFF before starting to install this product. Unless stated otherwise only connect or disconnect this equipment with the power supply set to OFF.

Warning: Sources of ignition

This equipment MUST NOT be installed in hazardous or flammable atmospheres such as an engine room.

Warning: Batteries

Keep batteries out of the reach of small children. If swallowed, consult with a physician immediately.

Never try to recharge the battery supplied with the unit.

Never expose batteries to direct flame ir intense heat.

Warning: Sensor cable

Removing the sensor cable(s) from the unit while powered ON can cause sparks. Only remove a sensor cable after the unit has been powered OFF.

Warning: Operation

NEVER operate the equipment when general electric devices are in the range of irrigation.

Caution: Mounting the unit

Due to the weight of the unit, it must be mounted using the bolts supplied. DO NOT use self-tapping screws as these will not support the weight.

Warning: Medical usage

This product may not be used for medical purposes.

Warning: children abuse

This product is not a toy and has no place int he hand of children.

Caution: Service and Maintenance

This product contains no user serviceable parts.

Warning: Accidents regulation

In commercial and industrial facilities the regulations for the prevention of accidents as laid down by the professional trade association for electrical equipment and devices need to be observed.

Important Information

Dear User,

Congratulations on your purchase of a high quality Inphtech product. Your wireless remote control represents the state-of-the-art in high-tech engineering. Designed for wireless operation, this compact package is big on performance. It is a quality piece of electronic equipment, skillfully constructed with the finest components. Your wireless remote control is designed to give you reliable and trouble-free performance for years to come.

It is strongly recommended to thoroughly read this Guide BEFORE using the product to avoid failed operation or accident. Please keep this Guide for further reference, it contains important safety an operating information.

The product should be installed by a qualified professional or trained specialist to avoid electric shock or expensive damage.

High voltage parts should be properly covered to avoid unintended touch and electric shock.

Do not operate the product in healthcare (hospital) or in other environment threatening with explosion.

The product is not absolutely watertight, therefore it needs proper housing when used outdoor.

The product should not be disassembled or altered.

Rarely a short jamming may occur because the wireless communication uses public frequency ranges. Similarly the operation of the product may cause slight interference for other devices using the same ranges. For these disturbances the manufacturer does not bear any responsibility.

Introduction

This product consists of a general purpose wireless (radiowave) remote controller (RCTR 016) and a receiver unit (RCRE-100). Recommended applications are: home equipment switching, safety systems control, vehicle protection and control, industrial or agricultural equipment control etc.

The receiver unit switches on or off the control circuits of the controlled equipment according to the commands of the remote controller unit. Despite of being wireless the system is designed to be highly secure against external influences.

Before use the product is to be programmed optimally for the unique requirements of the actual application. A special PC software is provided for this purpose. An installed system may be extended to fit to changed requirements. In case of a lost or damaged controller unit it can be locked out from the corresponding receiver unit.

EMC conformance

All Inphtech equipment and accessories are designed to meet or exceed the best industry standards for use in the radiowave remote control market. The design and manufacture of Inphtech equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

Declaration of conformity

Inphtech Ltd. declares that the RCRE-100 is in compliance with the essential requirements of EMC Directive 2004/108/EC and the Part 15 of FCC Rules. The original Declaration of Conformity certificate may be viewed on the relevant product page at www.inphtech.com

WEEE Directive

The Waste Electrical and Electronic Equipment (WEEE) Directive


requires the recycling of waste electrical and electronic equipment. Whilst the WEEE Directive does not apply to some Inphtech products, we support its policy and ask you to be aware of how to dispose of this product.

The crossed out wheelie bin symbol, illustrated above, and found on our products, signifies that this product should not be disposed of in general waste or landfill. Please contact your local dealer, national distributor or Inphtech Technical Services for information on product disposal.

RoHS Directive

This product uses components that comply with the Restriction of the use of certain Hazardous Substances (RoHS) Directive 2002/95/EC.

Conventions

Within this handbook the following conventions are used:


this symbol indicates a hint or tip


this symbol indicates a note

Warranty

To register your Inphtech RCRE-100 ownership, please take a few minutes to fill out the warranty registration card found in the box, or visit www.inphtech.com and register on-line.

It is important that you register your product to receive full warranty benefits. Your unit package includes a barcode label indicating the serial number of the unit. You should stick this label to the warranty registration card.

Handbook

To the best of our knowledge, the information in this handbook was correct as it went to press. However, Inphtech cannot accept liability for any inaccuracies or omissions it may contain.

In addition, our policy of continuous product improvement may change specifications without notice. As a result, Inphtech cannot accept liability for any differences between the product and the handbook.

What Is in the Box?

Typ. No.	Product	Qty.
OE-RCRE 100	receiver unit	1
OE-RCTR 008	8 ch controller	1
OE-RCTR 016	16 ch controller	1
OE-RCPS 500	Power adapter 500mA	1
USB-B CABL	USB Cable	1
OE-RCPRG CD	A CD with software and manuals	1

General Features

- ✓ All these devices operate with two way wireless (radiowave) communication.
- ✓ Remote controller is able to issue complex code words.
- ✓ Connection is two way and state-of-the-art encrypted.
- ✓ Operation feedback is realized by LED-s on the controller.
- ✓ There is no limit in the number of controllers paired to a receiver.
- ✓ Multiple output modes are possible.
- ✓ Outputs are independent and are loadable up to 10 A.
- ✓ Devices can programmed and tested wireless by a PC and software.
- ✓ Devices contain non volatile memories and output states

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are kept on power off.

✓ Receivers are suitable for installation into standard C rail cabinets.

Technical Data

General	
Frequency	915 MHz (ISM range)
Operation type	two way
Output power	max. 1 mW ERP.
Range	10 - 50 m depending on environment
Encryption	more than 16 million variations
Operating temperature range	-10 - +40 °C (14 – 104 °F)
Storage temperature range	-20 - +50 °C (-4 – 122 °F)
Controller	
No. of buttons	
OE-RCTR 008	8
OE-RCTR 016	16
No. of commands	max 22
Length of command	1...5 keypresses
Battery	
OE-RCTR 008	CR2032 3,3 V Li battery 1 pc
OE-RCTR 016	CR2032 3,3 V Li battery 2 pcs
Dimensions	
OE-RCTR 008	60 x 32 x 8mm (”)
OE-RCTR 016	85 x 55 x 8mm (”)
Environmental protection	IP44
Receiver	**OE-RCRE-100**
No. of outputs	4
Load on outputs	max. 10 A continuous (230V AC)
Separation of outputs	more than 1 kV galvanic
Power supply	12V DC (min.10 – max.15V DC)
Dimensions	115 x 90 x 40 mm (inc)
Environmental protection	IP44

Installation

OE-RCRE 100 receiver unit: unpack the product and connect it to a PC running the special OE software for programming with the USB cable provided. See section „Programming”.

OE-RCTR 008 controller: the lower part of the back of the controller is the lid of the battery compartment. Insert the CR2032 type Li battery provided into the unit.

OE-RCTR 016 controller: there is an insulator sheet inserted at the lower part of the controller. Remove the insulator sheet from the battery compartment, and press together firmly the front and back half of the controller.

Changing batteries

When the range of the controller or the command performance

decreases, batteries need to be changed. Life span of the batteries is approx. one year by normal use (four operation cycle per day), and it depends on the radiowave characteristics of the actual environment.

General battery precautions are to be kept:

- do not insert used batteries
- do not use different batteries in a device
- thoroughly observe polarity when inserting new batteries.

It is recommended to ask for trained personnel to change batteries.

Operation

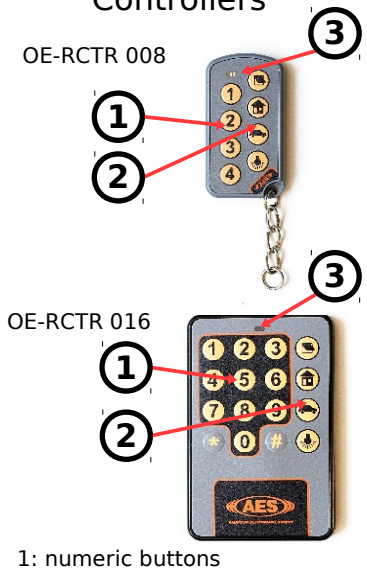
This system is designed to control safety devices as well, therefore its data communication is two way and encrypted. So the eavesdropping of the system is virtually impossible by known methods.

The controller's radio sends the command sequence to the receiver. The receiver accepts the command and responds to the controller with a key. The controller deciphers the key and automatically generates an answer key by a secret algorithm and sends to the receiver. If this three tier process is successful, the receiver sends back a signal to the controller which LED to be lit. The process is so fast that the user does not notice. The controller's positive feedback securely means that the receiver performed (not only accepted) the command.

Handling objects and connectors of the products are shown below.

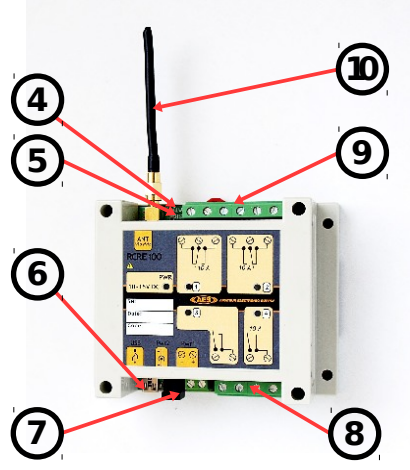
Devices should be programmed before use according to actual requirements.

Controllers



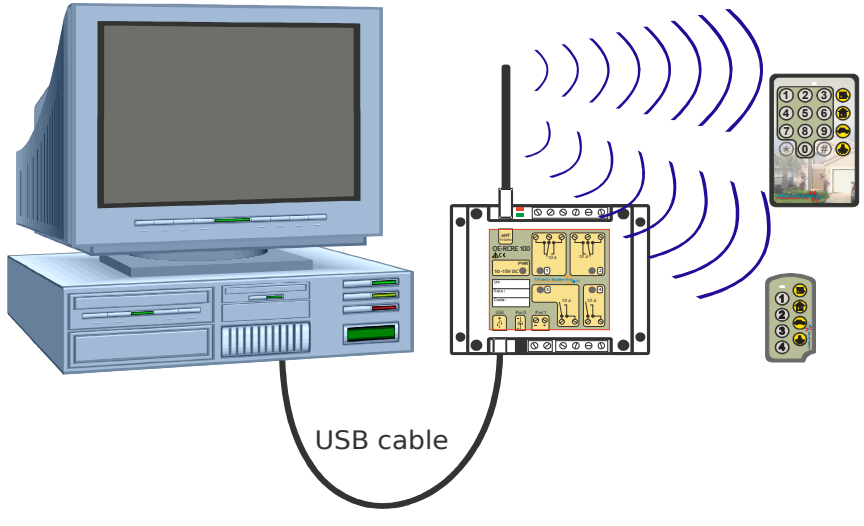
1: numeric buttons
2: graphic buttons
3: feedback LEDs

OE-RCRE 100 Receiver



4: data LED
5: USB LED
6: USB connector
7: power connectors
8: output terminals 3. and 4.
9: output terminals 1. and 2.
10: antenna

Configuration for Programming



Devices

Controller: there are two types of controllers, the **OE-RCTR 016** with 16 buttons and the **OE-RCTR 008** with 8 buttons. They both operate two way and totally identically by radiowave sense, but not all functions are available on the 8 button type due to absence of buttons.

ID Number: this number is the unique factory identification number of the controller shown on a ticker on the back of the device. If the sticker is damaged, the ID number may be read from the device by a write operation of the programming software.

This number is written into the device by the manufacturer ensuring that no identical devices exist. The ID number is used to lock out damaged or lost controllers from receivers to prevent unauthorized usage. The ID number is broadcast with every command by the controller and the receiver does not perform commands received with a locked out ID number. In the „black box" of the receiver the ID number identifies the controller issued the command. (See section „Black box")

Command: signal sequence beamed by the controller. The controller broadcasts radiowave just when buttons are pressed.
A command may consist up to 5 (five) keypresses. (Buttons pressed **within 2 secs** after the previous press belong to the same combination.) This feature allows for issuing more commands than buttons on a controller.

Button combinations make possible to program secret commands into a controller, which prevents unauthorized personnel to perform sensitive operations by the receiver. Eg. to disarm an alarm system, a five digit code number is advisable on the controller. Or a thief is not able to operate our equipment because he (she) does not know the key sequences.

A command may be a combination of number and graphic buttons. Eg: ④⑤②◔.

Combinations already existing can not be used as the beginning of an other combination. If there is a combination of ③④ keys, another combination of ③④①🚗 keys will not work because the ③④ sequence is already used.

The very same combination may be used to more receivers. In that case the controller issues the command to all corresponding receivers until one of them acknowledges the successful execution.

A controller can hold up to 22 different commands (combinations). Thus up to 22 different receivers may be commanded with a controller.

The ⊛ and # buttons of a 16 button controller can not be used in combinations.

Repeated broadcast: the controller beams the command signal sequence. If the receiver sensed and evaluated it there was no need to repeat. But the receiver may not decipher the message properly if the controller is far from the receiver almost beyond the range or an other device broadcasts at the same time, Then the receiver can not acknowledge the command receipt, therefore the controller repeats the command. Repeating continues until the receiver acknowledges the receipt or until the controller reaches the preset repeat number. Repeat number can be set to 1 ... 9 during programming.

If repeat number is set to say 5, the controller sends the

command and repeats it in case of failure. If receiver acknowledges the receipt successfully after the 3. repeat, the controller stops sending. This automatic repeat feature dramatically increases the reliability of the remote control system. It performs fast and is totally transparent for the user.

LEDs: there are 3 LEDs on the controller which signals the operation of the receiver.

Color	Meaning
green	the receiver performed the command query mode: the output is OFF
red	query mode only: the output is ON
yellow	failed transmission (no acknowledge from the receiver, controller is beyond range)

(Query mode: see section „Modes”)

Receiver: its type number is OE-RCRE 100, this is the device which performs the command sent by the controller. The receiver's outputs can switch on or off a reasonable amount of electric power directly or can operate power switches. The receiver operates as a two way radio too, and as a transmitter during programming.

Code: each receiver gets an unique 5 digit identification number in the factory. There is no two receivers with the same code. The code serves as identification for the controllers: the command must contain a valid code to determine which receiver should perform the command. The code is shown on a product plate of the receiver. If the plate is damaged, the code may be read from the device by a write operation of the programming software.

Lock out, release: lock out had realized to prevent usage of lost (theft) or damaged controllers. A receiver may be controlled by unlimited number of controllers, therefore receivers store only those controllers which should not operate them despite their programing would allow. Up to 50 controllers may be locked out. Lock out and release are to be performed via the OE-RCPRG software.

Outputs: receivers have 4 independent outputs. Both of them is able to switch considerable power. 1. and 2. outputs have change-over contacts, 3. and 4. outputs are normally open. The outputs state corresponds to the product plate by default. ON and OFF modes are described in the „Modes” section. (pg. n.)

Output states are stored in a non volatile memory. In case of power interrupt outputs get to default state, but when power returns, outputs return their state before interrupt.

Exception: if an output set to monostable mode (see section ”Modes”) is ON when on power interrupts, it goes OFF and stays so when power returns.

Black box: to make easy the examination of events, the receivers have a memory that stores the last 50 commands performed. If it fills up, the oldest event gets lost. The black box stores the controller ID Number and the time and date of the command receipt too. See section “Read Black Box”.

The receiver loses the content of the black box on power interrupt.

The content of the black box can be read only via radiowave connection by an other receiver and the OE-RCPRG software.

Modes

Outputs may be used independently from each other in different modes (see table). The actual operation mode is sent by the controller in the command sequence. An output may operate in different modes performing different commands.

Detailed Description of Modes

List item in software	Short description	Time
MONO	Monostable: ON until the time set in the software	1...255 secs
BISTAB	Bistable: command changes the state of the output.	unlimited
ONLY ON	Command sets output to ON	unlimited
ONLY OFF	Command set output to OFF	unlimited
FOLLOW	Command sets output to ON while button is pressed.	ON repeat interval
QUERY	State feedback	ignored

MONO: a.k.a. monostable. Receiver sets the output given in the command to ON until the time given in the command ends, then sets the output to OFF.

BISTAB: a.k.a. bistable. Receiver changes the state of the output given in the command. If output is OFF then changes to ON and stays so, if output is ON then changes to OFF and stays so.

ONLY ON: receiver sets the output given in the command ON. If output was ON then state has not change.

ONLY OFF: receiver sets the output given in the command OFF. If output was OFF then state has not change.

FOLLOW: receiver sets the output given in the command ON and keeps it ON while signals arrive from the controller. When signals stop the receiver sets the output OFF. The controller does not operate continuously, it sends signals with a set time interval (1 – 255 secs). When user releases the button on the controller it issues an ONLY OFF command making the output of the receiver to switch OFF.

QUERY: this command makes the receiver to send back the state of the output given in the command. It is displayed by the LEDs of the controller:

- if the **green** LED flashes, the output (given in the command) is **OFF,** i.e. the solenoid of the relay is NOT active);
- if the **red** LED flashes, the output (given in the command) is **ON,** i.e. the solenoid of the relay is active.

Time: it is the duration (in secs) while the output given in the command is in ON state in MONO mode. The time data has meaning in FOLLOW mode too, when it sets the interval of ON command repeat. Time may be 1 – 255 secs. In other modes time data is ignored.

Programming

All of our devices are preprogrammed by the manufacturer with simple data for operating check purposes. Programming for use means that the **OE-RCTR 008** 8 button controller and the **OE-RCTR 016** 16 button controller should be programmed with commands needed by the actual deployment.

Programming goes radiowave way. Every device is a two way radio. Programming is to be performed by the **OE-RCRE 100** receiver unit connected to a PC running the OE-RCPRG software by the USB-B CABL cable.

So for the programming is needed

- an OE-RCRE 100 receiver unit
- USB-B CABL cable (standard USB cable with B type connector)
- driver software for OE-RCRE
- OE-RCPRG software

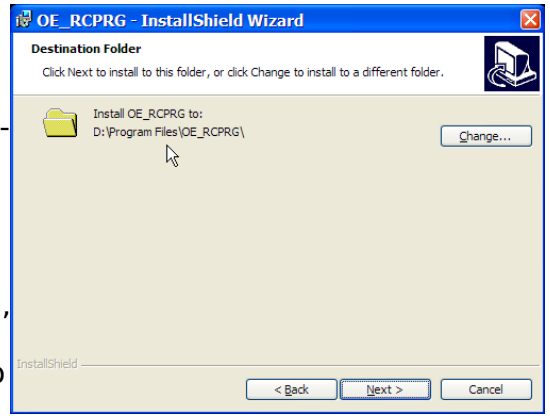
System requirements for using software:
- a PC running a 32 bit Windows operating system (2000, XP, Vista or newer)
- CD or DVD drive
- USB port

Installing software

- Insert OE-RCPRG CD into CD or DVD drive. Usually the PC automatically starts the installation. If not, start the SETUP.EXE program from the root directory of the OE-RCPRG CD.

- The setup panel appears. Usually user may click on the „Install” button, but there is an opportunity to exit.

A standard Windows install wizard starts which first asks for agreeing a license then provides opportunity to change the default install target directory of the OE-RCPRG application. The driver installs into Windows system as usual.

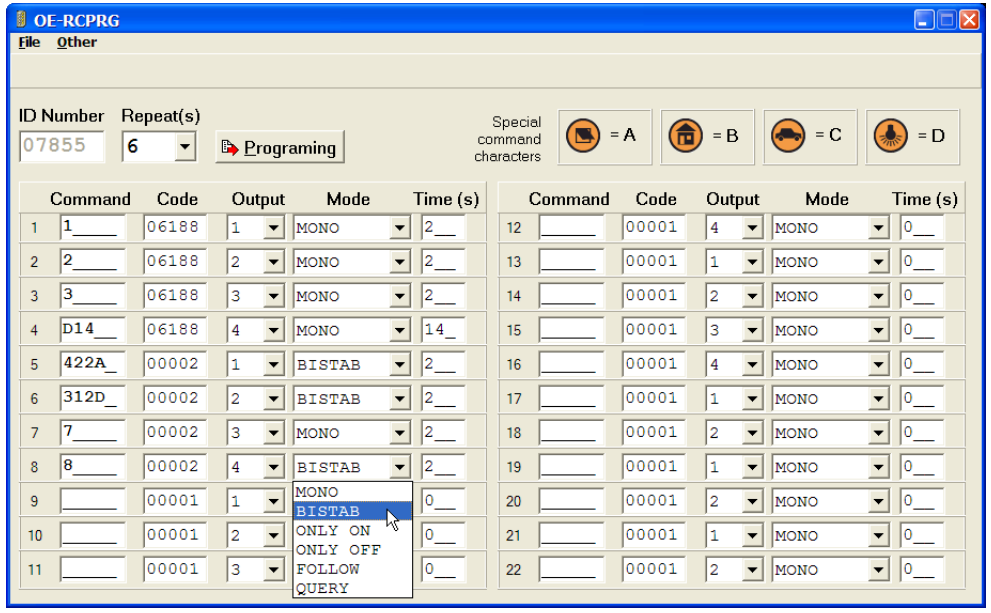


When install process ended, user can connect the OE-RCRE 100 receiver unit to a USB port with the USB-B CABL cable. After a few seconds the USB (green) led lits signaling the successful connection.

Composing commands

Start the OE-RCPRG application. The main program panel appears.

Commands may be composed or edited arbitrary in the „Command” field of the main OE-RCPRG panel. Commands may be typed in directly. Use A, B, C, D letters instead of graphic buttons. Drop down lists ease composing at other fields. Up to 22 different commands can be typed into the 16 button OE-RCTR 016 and the OE-RCTR 008 controllers.



Repeat(s): number of the controller broadcast repeats. It can be 1 – 9. Lower values are recommended for longer battery life, higher values increase reliability under disadvantageous environment. See section „Repeated broadcast”.

Command: keypress sequence which triggers the given task. See section „Commands”. When composing commands the A, B C, D letters are to be used for graphic buttons as seen on the program panel. (A: uppermost graphic button, B: button second from top, and so on.)

Code: unique 5 digit identification number of the receiver which has to perform the command.

Output: a dropdown list of numbers 1 – 4 which address an output of the receiver selected before. When programming a QUERY command (see „Modes”) the number addresses the queried output.

Mode: a dropdown list of names of possible output operation

modes. Available modes: MONO, BISTAB, ONLY ON, ONLY OFF, FOLLOW, QUERY. See „Modes”.

Time (s): it is the duration of the ON state of MONO mode. In FOLLOW mode it determines the interval between the ON commands of the controller. Time should be given in seconds, value must be between 1 – 255. In other modes the value is ignored. See „Modes”.

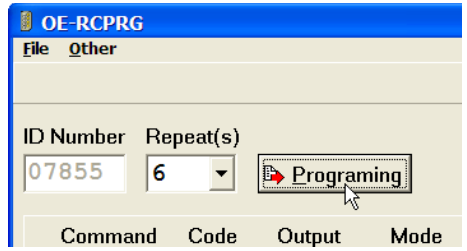
Do not type the 5, 6, 7, 8, 9, 0 digits when programming a 8 button controller. These buttons do not exist there.

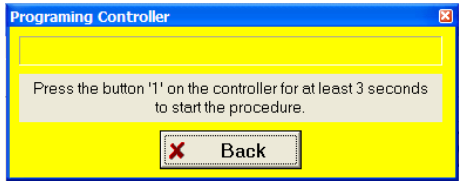
Storing Commands

Remember, the programming needs the OE-RCRE receiver being connected to a USB port. The receiver beams the data to the controller to be programmed.

Programming broadcast is low power, therefore the controller to be programmed should be within 1 m distance from the receiver.

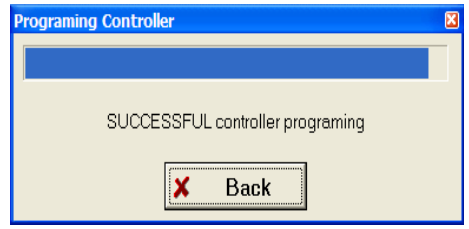
When composing commands is ready, click on the „Programing” button. The „Programing Controller” panel appears.





Press and keep pressed the ① button of the controller while the process bar starts on the panel. (Every controller has at least a ① button.) Then the button may be released, the programing (data writing) runs automatically.

When the process ends the „SUCCESSFUL controller programing” message appears.



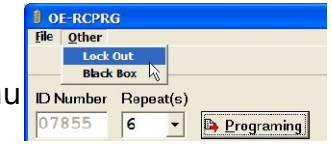
It is **strongly recommended to archive** each and every command set, because the programming is the only means to obtain the ID number of a controller. The ID number is necessary to lock out a lost (theft) controller – it is not available when lost. See „Managing command set files”.

Managing Command Set Files

There is a standard **„File -> Save”** menu item. A command set may be saved to a file with „.data” extension. The file name becomes the five digit ID number of the actual controller, but it can be renamed. The command set files are at the subdirectory named „Data” under the OE-RCPRG directory by default. (The standard save menu provides for saving data files to any drive/directory available from the actual PC.)

Saved data files can be loaded into the OE-RCPRG application by the standard **„File -> Load”** menu item. After loading the command set may be programmed into any type or number of OE-RCTR controllers.

Lock Out Controllers



Damaged or lost (theft) controllers can be locked out from receivers by their ID number. Under the **„Other”** dropdown menu is the **„Lock Out”** item which calls the lock out panel.

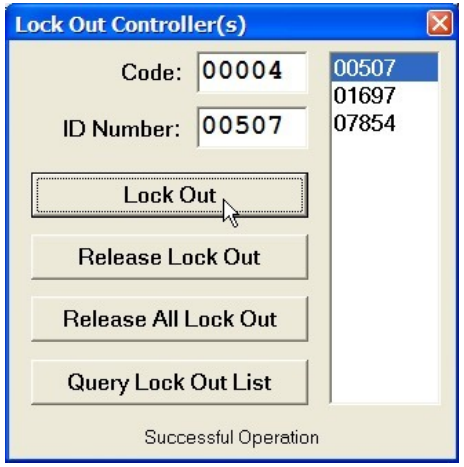
Two receivers are needed to perform lock out:
- one connected to the USB port acting as a **radiowave adapter**;
- the **active receiver** from which the controller is to be locked out. This needs power to operate. (Usually the active receiver is

built into some fixed structure, the adapter receiver is connected to a laptop.)

Type in the code of the active receiver into the „Code” field, and the ID number of the controller not to be used any more into the „ID Number” field, then press the „Lock Out” button.

The ID number of the locked out controller appears in the list.

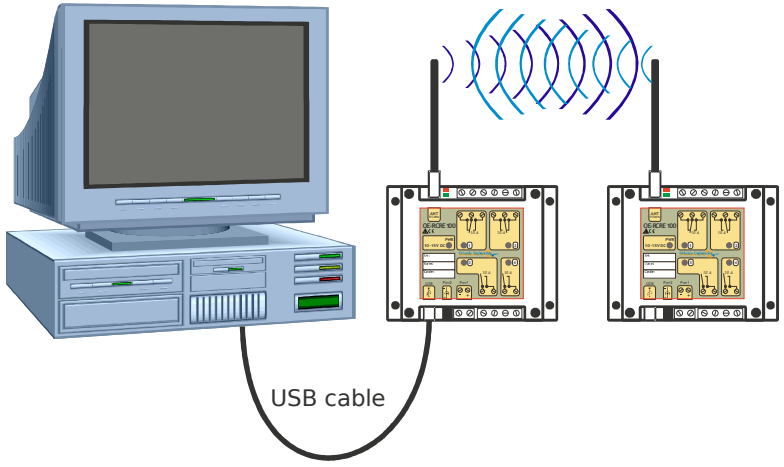
It is possible to query the list of already locked out controllers with the „Query Lock Out List” button.



Up to 50 controllers can be locked out form a receiver.

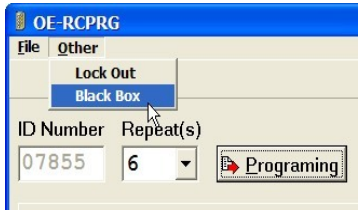
To release a locked out controller select its ID number on the list and click on the „Release Lock Out” button. The „Release All Lock Out” clears the entire list, releasing all locked out controllers.

Managing Receivers Setup

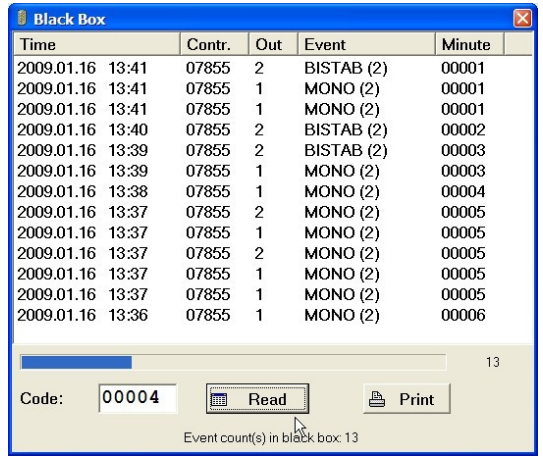


Read Black Box

Under the **„Other”** dropdown menu is the **„Black Box”** item which calls the read black box panel. (About black box feature see section Black Box”.)



The black box memory immediately clears on power interrupt. Therefore it is forbidden to switch off a receiver if its black box is to be read.



To read a receiver's black box a second receiver is needed acting as a radio-wave adapter connected to to a USB port, similarly as described earlier.

Type in the code of the receiver to be queried into the „Code” field, then click on the „Read” button.

The black box panel displays the last 50 commands performed along with the time and date of the events. In the „Contr.” column are the controller ID numbers, the „Out” column holds the output numbers which performed the command, and the „Event” column shows the output mode and the time (it has meaning only at MONO and FOLLOW modes)

Direct Programming of 16 Key Controllers

OE-RCTR 016 type controllers provide a special feature: its buttons can be locked with the ⊛ ⑦ key sequence. After typing this the controller does not issues any command, the controller is locked against unwanted and/or unauthorized keypresses.

To release press the ⊛ button and the four digit user code thereafter which is ⓪⓪⓪⓪ by default.

Change user code

Key in the ⊛ # # sequence. The green LED will flash slowly. Then key in the four digit user code.

The factory default is: ⓪⓪⓪⓪.

Every numeric keypress is acknowledged by a flash of the red LED.

Now press the # key to enter the menu mode indicated by the fast flash of the green LED.

The controller exits menu mode automatically after 10 secs time to save battery if no key pressed.

Signals of both LEDs are significant while programming. LEDs may

- flash once after a keypress (.)
- flash slowly (– – –)
- flash quickly (----)
- light continuously (====)

User code is necessary to lock the controller against unwanted and/or unauthorized keypresses, to unlock and to enter programming. User code should be 4 digit long. As a password, user code should not be too simple. It is not recommended to use codes with two or more repeating digits.

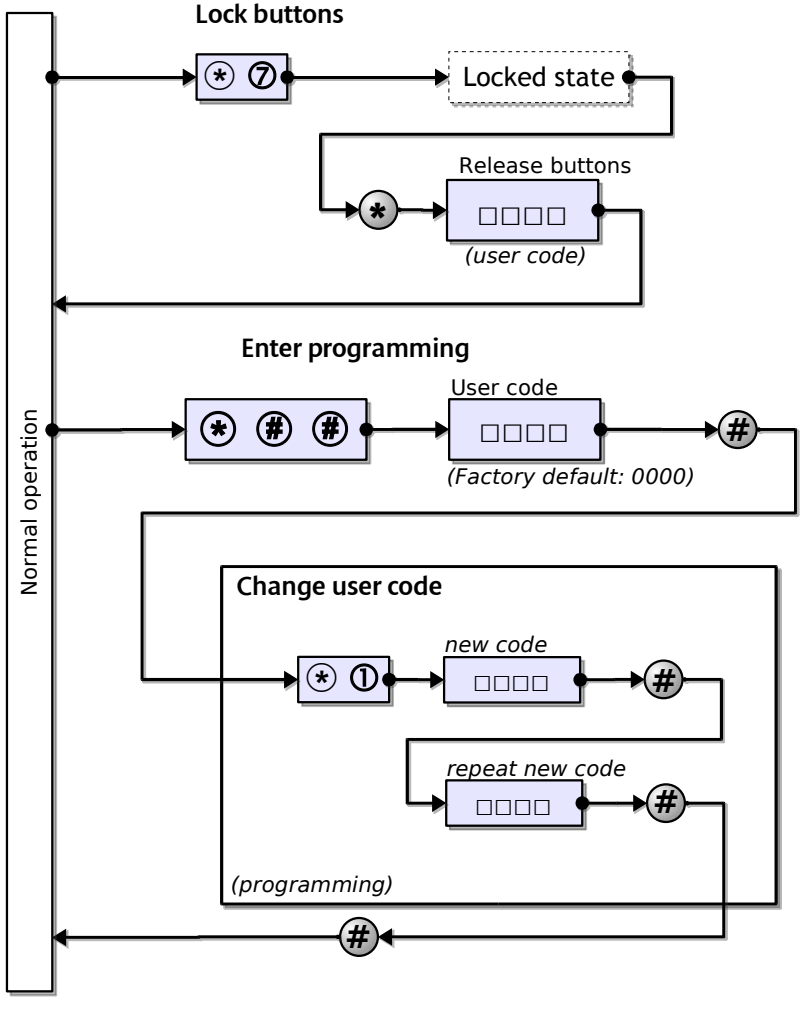
If user code gets forgotten or lost the controller can be reset only by the manufacturer or a professional trained by it.

Example: the factory default user code is „0000”, which may be changed to say „4231”, the process is detailed below:

Key sequence	LED	Description
⊛##		Enter programming, device waits for user code
⓪⓪⓪⓪	.... ----	If factory default was changed, that should be keyed in.
#	. ----	„Enter”
⊛①	.. ----	Select „Change user code” menu item
④②③①	.... ====	Key in new user code
#	. ----	„Enter”
④②③①	.... ====	Key in new user code again
	====	Programming delay: approx 2 secs
#	.	End menu item
#	.	End programming

At the next page there is a simplified diagram of the direct programming process.

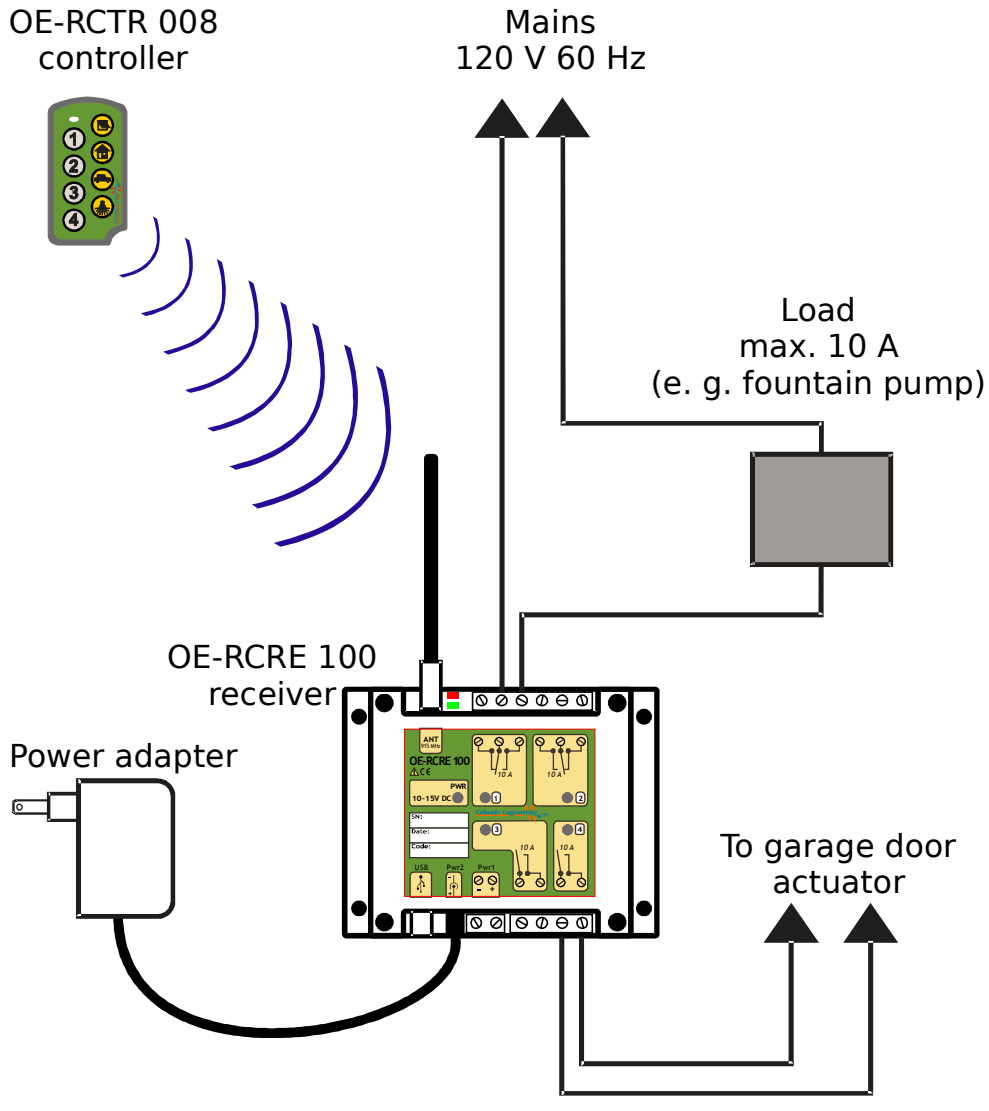
Programming
RCTR 016 type
remote controllers



Notes:

☐ : numeric digit 0 - 9

A Wiring Sample



Your System

Print this page and fill the form with your actual ID numbers and receiver codes for future reference.

Device	Serial No.	ID Number or Code