

COD-DECOD System

General Description

The COD-DECOD system is composed of a control unit (ICOD) and some decoders (simply called Decoder), one type for connection of the solenoid valves, one for the master valve (MV) and one for the pump control (CP).

Application of the COD-DECOD system brings many advantages for the irrigation of large areas of greenery such as parks, golf courses, municipal areas, farms, etc. allowing a saving in installation time, electric cable costs and labour.

The ICODE is connected to the terminal board of any irrigation control unit - with an output voltage of max. 24 VAC and min. 12 VAC or max. 24 VDC and min. 10 VDC - by means of one or more cables provided (depending on the number of stations) and to the watering system with a bipolar cable (tripolar if using the ground as per the regulations) which connects all the associated Decoders to the respective valves.

In order to use an MV or a CP the ICODE does not need to be connected to the corresponding terminal on the irrigation control unit, if present; just install the dedicated Decoder.

The system can work with a minimum of one module (8 inputs) up to a maximum of six modules (48 inputs), which can be replaced in the event of malfunctioning or added if wishing to expand the system. In the latter case, also the connection cable necessary for the number of additional inputs needs to be added.

Programming is done with the six keys on the ICODE and can be viewed on a 16x2 alphanumeric display. The settings made on the ICODE are automatically stored, NO key has to be pressed to confirm. At any stage during programming, after about 45 seconds of not using the keypad, the word **ICODE** appears on the display and the program active up to that time, is exited.

Each decoder is identified by a 6-digit code which is automatically read by the ICODE when installed or it can be entered manually.

This code is also printed on two adhesive labels, one of which is applied on the body of the Decoder and the other left in the box to be stuck on the table in the middle of this manual in order to easily keep track of system programming.

The ICODE has a sensor input (NC), an alarm output (NC-C-NA), and an RS232 port for connection to the PC through which some operating parameters can be modified using specific software (see paragraph SOFTWARE).

Language

The default language is English, but a different language can be selected from those available (Italian, French, Spanish, German) by simultaneously pressing the three bottom keys on the keypad (" " "← ") thus scrolling from one language to the next; when the desired language appears, release the three keys.

ICODE connections and programming

Connect the cable(s) supplied with the ICODE to the terminal board of the irrigation control unit following the colour coding as shown in the attached table. Connect a bi/tripolar cable from the OUT/GND terminal of the ICODE to the Decoders, taking care to make workmanlike connections, connect the sensor and/or alarm you might have prepared, and finally, insert the plug in the socket (230 VAC).

When switching on, **ICODE - FW REV. x.x** will appear on the ICODE display for about a second, where **x.x** indicates the machine revision number. This number serves to recognise any modifications made to the software over the years. Immediately afterwards, the number of configured inputs will appear for two seconds. For example, if a 16-input

system (2 modules) has been purchased, the message **ICOD - INPUTS FOUND:16** will appear. If Icod does not function, check the integrity of the fuse located near the power cable; if burned, replace it with one of equivalent value: 1 A 250 V delayed.

After these two seconds, the first time the ICOD is used, the message **NO DECODERS! - CONFIGURE SYSTEM** will appear on the display. If the words **SENSOR ON** will appear, check that there is a jumper on the corresponding terminal (sensor) or that the "NC" sensor has been properly connected (e.g. rain sensor). When fault has been corrected, you pass to the automatic search for the Decoders already installed in the field.

Automatic Search Start

WARNING! During the Decoder searching phase ABSOLUTELY do not operate on the system; there is a risk of damaging the ICOD.

To start the automatic search, hold the keys **Valve "+"** and **"-"** pressed down simultaneously for 3 seconds. At this point the ICOD will run the search, the message **DECODERS SEARCH** will appear on the display and the red *led* "IRRI-ON" will light up.

Wait for a short or longer time depending on the number of Decoders installed.

If several Decoders have been installed on the system, the search will probably fail on the first attempt (the capacitors of all the Decoders need to complete charging); repeat the operation up to two or three times.

E.g. If 16 Decoders have been installed, **FOUND 16** should be displayed under the message **DECODERS SEARCH** at the end of the search; after that this operation has been completed.

If, however, after a few seconds the message **DECODERS SEARCH - NOT FOUND!** appears, check proper connection of the two cables to the **OUT** terminal or proper connection of the system. When fault has been corrected, repeat the operation.

Zone Assignment

By repeatedly pressing the **Valve "+"** or **"-"** key, all the Decoders found by the ICOD are scrolled and the message **DECODER xxxxxx** (e.g. 00038F) - **ASSIGNED TO ---** will appear on the display. Press the **Zone "+"** or **"-"** key to assign the zone you have selected to each Decoder.

Step-by-step check that the serial numbers of the decoders found correspond to those installed and which you have recorded in the project or the table.

When the zone number has been assigned to all the Decoders, pass to the testing phase and start-up of the system. The machine is now ready for operation.

N.B. Up to a maximum of 4 Decoders can be assigned for each zone, and for more difficult cases you can act by changing some parameters via the special software (see paragraph SOFTWARE) by connecting to the computer via the RS232 serial port on the machine. Thus more than 4 Decoders can be activated for each zone. The system can support a maximum of 80 Decoders.

Manual entry of the decoder serial number

If you want to add a Decoder to the system operating with the COD-DECOD system, this can be done more quickly manually entering the corresponding serial number without having to rerun the automatic search. To enter the serial number and associate it with the zone number proceed as follows:

1. Simultaneously press the **Zone "+"** and **"-"** keys for 3 seconds. The message **DECODER xxxxxx - INDEX x/80** will appear on the display, where xxxxxx represents the code of an already installed Decoder and x/80 indicates the lowest order number among all the serial numbers of the corresponding Decoders found by the ICOD. With the **"+"** key of **VALVE** scroll until **DECODER FFFFFFFF - INDEX x/80** appears. Now enter the 6-digit serial number of the Decoder just installed. With the cursor keys **"▶"** or **"◀"** position the blinking cursor on the letter F to be modified. Then enter the number or the letter by pressing the **Zone "+"** or **"-"** keys. Repeat the operation for all the remaining codes to be modified.

2. Once the correct serial number has been entered, simultaneously press the two **Zone** keys for 3 seconds, thus exiting the serial number setting phase.
3. The display will show **DECODER xxxxxx – ASSIGNED TO ---**, where xxxxxx represents the serial number of the Decoder just entered (e.g. 00038F) and, as previously described, pressing one of the **Zone** keys, the desired zone number is associated with it.
4. Once the number has been selected, don't carry out any other operations. The machine has already stored the settings.
5. Should an already existing code be entered when assigning the zone, the message **THIS SERIAL NUM. - ALREADY EXISTS!** will appear on the display.

ICOD testing

A test can be done positioning the irrigation control unit cursor manually. Thus any zone can be activated, provided that it has been entered in the ICOD programming phase. For example, manually activate Zone 1: you will note that after 2 seconds the Decoder MV/CP (if connected) is activated and after a further 5 seconds (parameter changeable via software) the corresponding decoder. If however 2, 3 or max. 4 Decoders have been assigned to this same zone, the activation of each decoder will occur in sequence with a delay of one second between one and the next (parameter changeable via software).

Alarms

The ICOD system has four kinds of alarms:

- * *Open-circuit* (low absorption) associated with the message **ALARM: LINE OPEN - ZONE: x**;
- *Overload* (anomalous absorption) associated with the message **ALARM: OVERLOAD - ZONE: x**;
- * *Short-circuit* (high absorption) associated with the message **ALARM: LINE SHORT - ZONE: x**;
- *Generic* associated with the message **ALARM: LINE SHORT - ZONE: ???**, this alarm could rarely happen during the "DECODERS SERCH" phase, when a fault not attributable to the other cases occurs.

Should an alarm occur, the station involved will be "locked" and programming continues as set. For all four conditions above, an alarm relay will be activated simultaneously with the message on the display, to which a telephone dial, flash light, siren, etc. can be connected. Should an alarm be activated, press any key of the ICOD to deactivate the warning device connected.

By repeatedly pressing, also later, the **CURSOR** "→" key, you can establish if any and which other alarms have occurred during the irrigation phase; when the complete list of these alarms has been displayed, the message **NO MORE ALARMS - CLEAR ALARMS?** will appear. To delete the alarms stored, press the **CURSOR** "←" key and the word **ICOD** will reappear on the display.

* For this kind of alarm it could happen that the *open circuit /short-circuit* is not on the displayed zone but on electric line while the displayed zone is operating

Decoder: MV/CP installation, activation and deactivation

All the Decoders have five wires of which: two black for the connection to the ICOD line (OUT terminal), one yellow/green for the ground (GND terminal) and two red for the connection to the solenoid valve for the models EV and MC or grey for the model CP. The latter has an internal NO clean contact where a load can be applied (pump) with the following characteristics: 230VAC, 10A max.

As said before, the ICOD does not need to be connected to the MV control on the terminal board of the irrigation control unit (if present), since the ICOD already has it in memory. The MV control of the ICOD is enabled by default, therefore ON; this can be checked by simultaneously pressing the two **CURSOR** keys; the message **MASTER VALVE ENABLED (ON)** will appear. To change this condition, hold the same **CURSOR** keys pressed down simultaneously for 3 seconds, and the message **MASTER VALVE DISABLED (OFF)** will be displayed, and so forth. In this way, the Master Valve control can be deactivated and

reactivated and, consequently, the Decoder MV/CP, according to need without having to disconnect it from the system.

Remember that up to a max. of 4 Decoders can be activated with the same zone number. In this case, the activation of each Decoder will occur in sequence with a delay of one second between one and the next (parameter changeable to no. of seconds). If, however, max. 4 valves are connected to each Decoder, these will all be activated together.

Software

The ICOD is supplied with an RS232 port for connection to a PC so that the software can be upgraded if necessary, and to provide the possibility of changing some operating parameters of the ICOD (delay time between one Decoder and another, EV,MV/CP holding current, zone activation via PC, alarm list and deactivation, etc.) to make it more versatile and suited to your requirements.

System expansion and module replacement

If wishing to increase the number of ICOD inputs to a maximum of 48 (if not purchased in this configuration), this can be done by purchasing one or more modules later and simply adding them to the ICOD circuit.

It is very important that the ICOD is **not** powered each time this operation is carried out in order to prevent possible damage to or malfunctioning of the machine, apart from the fact that the module will not be recognized. The modules must be inserted in serial order following the silk-screen-printing on the card. If this condition is not respected, the system will recognize only the number of inputs inserted correctly.

To carry out this operation, pull the plug from the mains socket, lift the lower panel of the ICOD and add the module(s) with the yellow dot facing downward. Remember to insert the cable with the no. of wires (x 0.50 mm²) corresponding to the number of inputs inserted (one module = 8 wires) and make the connections respecting the colour-coding shown in the table if using a multi-coloured cable like the one supplied with the ICOD.

Wall Mounting:

On the back side of the box there are two brackets that turned outside, allowed to fix the ICOD to the wall. If a longer distance is needed (maximum 8 meters), replace the original cable with the longer one but with the same characteristics.

MODIFIABLE PARAMETERS

In order to enter the menu of the parameters to be changed, simultaneously press the three top keys on the keypad. You will be asked to enter the secret code made up of 4 digits (to obtain this code, contact your local dealer).

Once you have entered the secret code, you will be able to access the parameters listed below.

To scroll through all the parameters, press one of the VALVE keys “+” or “-“, and when you have selected the parameter to be modified, press one of the ZONE keys “+” or “-“ to change the set value. The new value will be stored automatically. To exit the menu, again press all three top keys simultaneously.

PULSE WIDTH ACK = MINIMUM VALUE (min. val.) 2 / SET VALUE (set val.) 150 / MAXIMUM VALUE (max. val.) 249

This parameter affects the result of the autosearch in the following way:

- Decreasing the set value, reduces the autosearch sensitivity; it is recommended to use this operation when you have a small system with distances of max. 500 metres and with a small number of decoders installed (about 20).
- Increasing the set value, enhances the autosearch sensitivity; it is recommended to use this operation when you have a large system with distances of min. 500 metres and a large number of decoders installed (more than 20).

TIME BETWEEN TWO ACTIVATIONS = Min.Val. 100 ms / Set Val. 280 ms / Max. Val. 500ms

This parameter ensures that the MV or PC is always active between one station change and the next; we recommended you act on this parameter only upon our advice.

- Increasing this parameter each time there is a station change, the consequent detachment and reattachment of the MV or PC will occur.
- Excessively decreasing this parameter, the change between one station and the next will not occur.

HOLDING CURRENT = Min. Val. 4.0V / Set Val. 5.8V / Max. Val 7.9V

With this parameter the voltage at the ends of the solenoid can be varied, allowing the use of solenoids with different technical characteristics.

- Excessively decreasing this parameter, the already low consumption on the line can considerably be reduced, but there is also a risk of activating the open-circuit alarm.
- Increasing this parameter, there will be greater absorption on the line, but it is one of the useful operations to prevent activating the open-circuit alarm (low absorption), especially for systems with short distances.

MV HOLDING CURRENT = Min.Val. 8V / Set Val. 11.0V / Max. Val. 12.9V

With this parameter the voltage at the ends of the solenoid on the MV and the relay on the PC can be varied.

- Decreasing the value of this parameter to a min. of 8.5 V and not more, the absorption of the MV is considerably varied; decreasing this value even further there is a risk of not activating the MV.
- If you install a PC in the place of the MV, this parameter can be varied only and solely for values higher than that set. Vice versa, the PC would not function, given that it is internally fitted with a 12 VDC relay.

EV PULSE WIDTH = Min. Val. 2 ms / Set Val. 20ms / Max. Val. 100 ms

This parameter affects the result of the autosearch in the following way:

- Increasing the set value, enhances the autosearch sensitivity.
- Decreasing the set value, reduces the autosearch sensitivity.

PULSE VOLTAGE ACK= Min. Val. 2.0V / Set Val. 15.0V / Max. Val. 15.9 V

This parameter affects the result of the autosearch in the following way:

- Increasing the set value, enhances the autosearch sensitivity.
- Decreasing the set value, reduces the autosearch sensitivity.

MINIMUM SEARCH CURRENT = Min. Val. 0mA / Set Val. 70mA / Max. Val. 100mA

This parameter affects the result of the autosearch in the following way:

- Decreasing the set value, enhances the autosearch sensitivity.
- Increasing the set value, reduces the autosearch sensitivity.

MAXIMUM CURRENT = Min.Val. 0.50 A / Set Val. 1.50 A / Max. Val. 2.45 A

This parameter acts on the overload current.

- Increasing the set value, increases the absorbed current value.
- Decreasing the set value, decreases the absorbed current value.

DELAY BETWEEN MV AND EV = Min. Val. 0 sec. / Set Val. 5 sec. / Max. Val 10 sec.

This parameter acts on the delay time between activation of the MV and the EV.

- Increasing the set value, increases the delay time between the MV and the EV.
- Decreasing the set value, decreases the delay time between the MV and the EV until it is completely cancelled out.

DELAY BETWEEN EV AND EV = Min. Val. 0 Sec. / Set Val. 1 sec. / Max. Val 5 sec.

This parameter acts on the delay time between activation of the EV and the next EV.

- Increasing the set value, increases the delay time between the EV and the next EV.
- Decreasing the set value, decreases the delay time between the EV and the next EV until it is completely cancelled out.

OPEN-CIRCUIT CURRENT = Min. Val. 0 mA / Set Val. 10 mA / Max. Val. 100 mA

This parameter acts on the open-circuit alarm.

- Increasing the set value, enhances the open-circuit alarm sensitivity.
- Decreasing the set value, reduces the open-circuit alarm sensitivity until it is completely cut out.

MASTER VALVE ENABLED - Set condition.

This parameter enables or disables the MV or PC.

TECHNICAL DATA

Container: PVC, indoor/outdoor use, removable cover with 4 screws, IP56, brackets for wall mounting

Dimensions: 190 x 240 x 125 mm (H x W x D)

Weight: about 4.3 kg

Inputs: 8, 16, 24, 32, 40, 48 depending on the installed modules

Connections: Power cable: 3 x 1 mm²
Input connection cable: 1 (max. 3) x 16 x 0.5 mm²
Common black cable (COM): 1 mm²
Connection cable to Decoders: from 1 to 6 mm² max.

Power supply: Input: primary 230 VAC (2 x 115 VAC) 50/60 Hz
Secondary A (from internal toroidal transformer) 7 VAC, 400 mA
Secondary B (from internal toroidal transformer) 35.5 VAC, 2.2 A
Output: two-wire 48 VDC, max. 2 A

Sensor input: NC switch

Alarm output: NC or NA relay, max. 230 VAC, max. 10 A

Terminal boards: Inputs (1, 2, 3,, 48) 1 mm²
Output (OUT) 6 mm² max.
RS232 port for connection to PC

Temperature: -5° C to +50° C

Voltages: Line voltage: output (OUT) 48 VDC
Holding current EV = 5.8 VDC*
Holding current CP/MV = 11 VDC*

Absorption: Decoder EV activated (without solenoid) = 18 mA ±10%
Decoder EV in *standby* = 1 mA ±10%
Decoder EV with solenoid** activated = 53 mA ±10%
Decoder MV = 170 mA ±10%
Decoder CP = 18 mA ±10%

** solenoid: IRRITROL - 24VAC, inrush 340 mA, hold 200 mA, 30.7 ohm.



IMAGES

Module "EXP8"

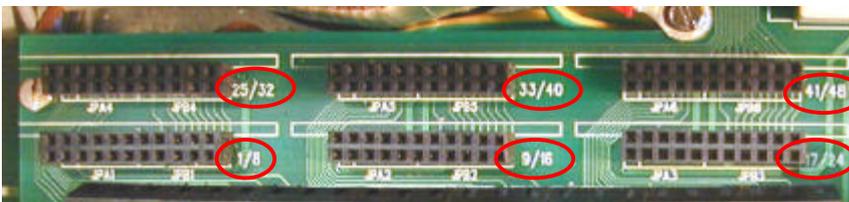


bottom view



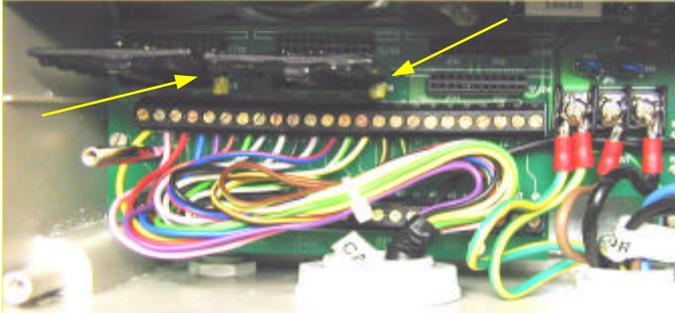
side view

Terminal board for Modules "EXP8"

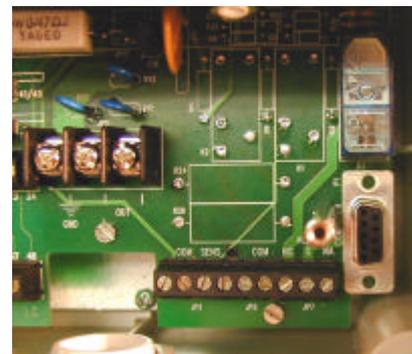


Insert the additional modules following the numbering order.

Correct installation for Modules (mod. ICOD16)



PC connection



RS232 port



Decoder EV and MV



Decoder EV



Decoder MV



Decoder CP