cod.XXXXXXXX GB
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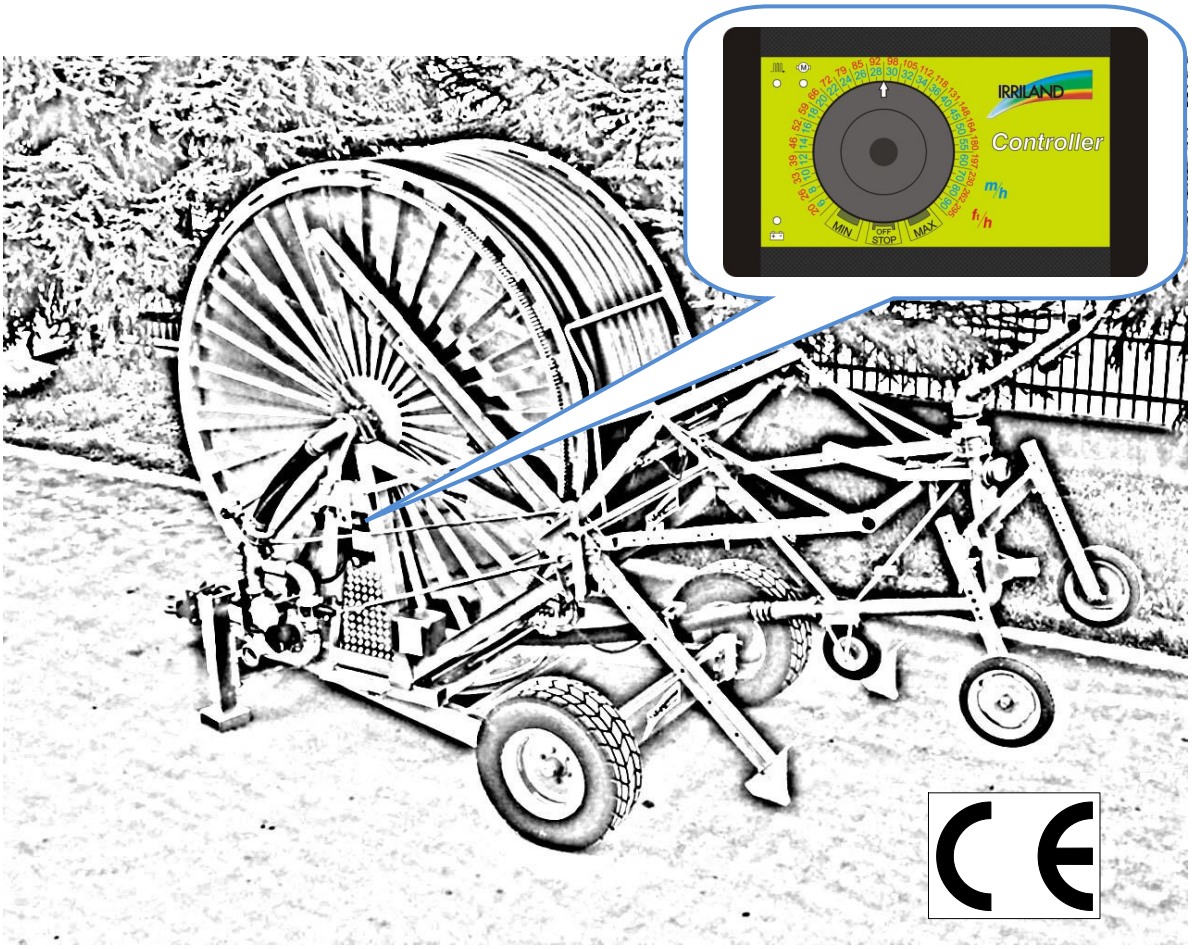
USER INSTRUCTIONS

Controller #1

(ELECTRONIC IRRIGATION CONTROL SYSTEM
ON SELF-PROPELLED IRRIGATORS)



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1 OVERVIEW

Controller is designed to control the irrigation trolley retraction for efficient irrigation.

Controller is composed by a control unit with a front panel that includes the adjustment scale, the adjustment knob and three Leds. The three Leds' lights can be green or yellow or red.

Controller works at 12 V DC power (usually connected to a battery).

The following devices can be connected to Controller:

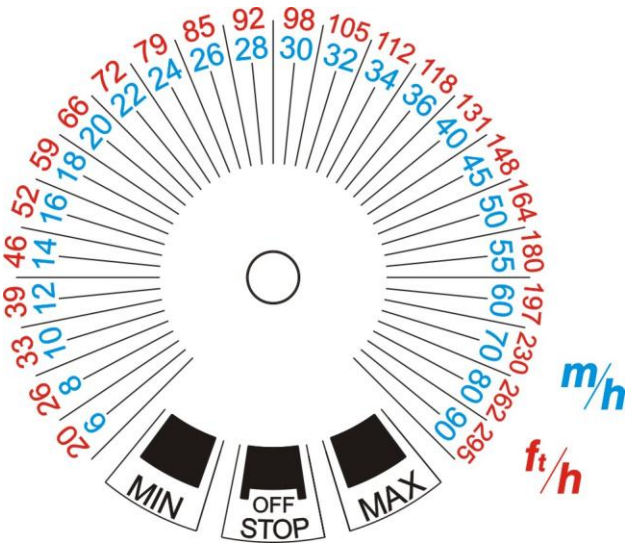
- Speed sensor, usually mounted on the "pipe-feeler" roll;
- Motor control for hose rewinding speed control.
- Solar panel for battery recharging

2 OPERATING FEATURES

Controller, applied on a self-propelled irrigator, is a very simple equipment, fit to set the irrigation speed, which is adjusted by the knob's rotation.
The control unit is switched on in all positions except on OFF.
When the knob is set on OFF position, after 30 sec. the control unit turns off.
It turns back on when the knob is set on a different position from OFF.

2.1 KNOB'S FUNCTIONING

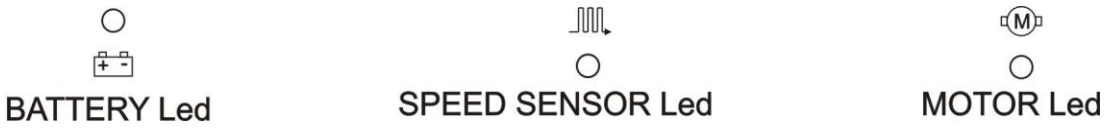
The front panel has a tachometer speed scale and three different zones: MIN; OFF/STOP: MAX



1) **Tachometer SCALE**.
   Setting of hose-rewinding speed (expressed in m/h and ft/h)
2) **MIN** minimum
   Continuous drive of adjustment motor to decrease speed. (in turbine irrigators, it goes to the maximum by-pass opening position).
3) **MAX** maximum
   Continuous drive of adjustment motor to increase speed. (in turbine irrigators, it goes to the maximum by-pass closing position).
4) **STOP**
   The drive of the adjustment motor is interrupted, and the motor stays in the same position. Motor's drive is cut off, but rewinding might continue. To stop rewinding, set the knob on MIN.
5) **OFF**
   After 30 seconds in this position, the control unit turns off.
   It turns back on automatically at a further knob's rotation.

2.2 *LEDS' FUNCTIONING*

Controller is equipped with three Leds, which normally indicate the battery level, the state of the speed sensor and of the adjustment valve's motor.
In particular conditions, as switch on phase, manual control and others, they give information about that particular condition.

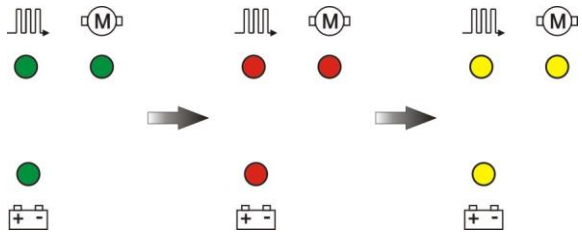


2.2.1 MEANING OF LEDS' COLOURS IN NORMAL CONDITIONS.

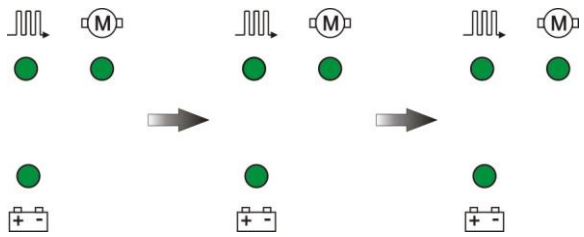
SWITCH ON PHASE

Every time the equipment is connected to power supply, or switched on turning the knob away from OFF area, the Leds blink according to the following sequence:

Leds' check:



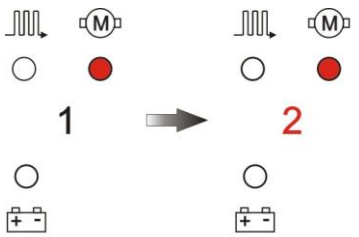
The control's end is confirmed by three simultaneous green lights blinks; if the three blinks are of yellow or red lights, they indicate a system anomaly.

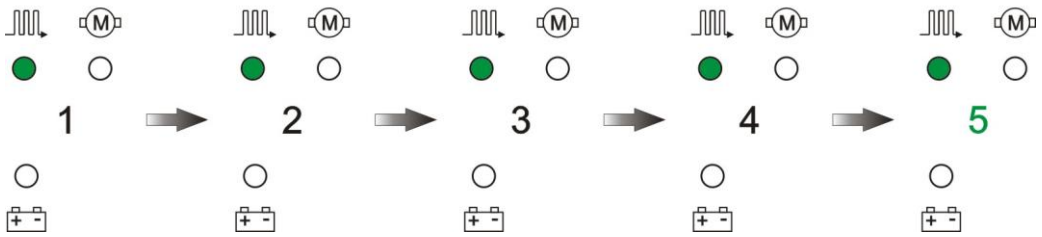


Check of knob's position:

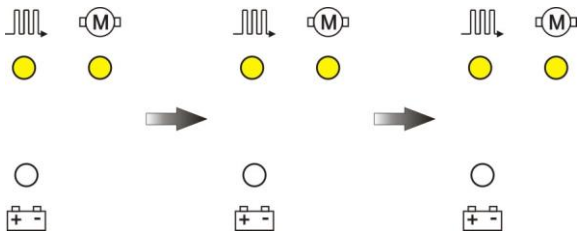
If the knob is on the tachometer scale, there is a red light blink of the Motor Led, for every ten of m/h and a green light blink for every unit of m/h.

Example:
The knob is on 25 m/h

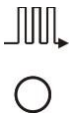




The control's end is confirmed by three simultaneous yellow light blinks on Speed and Motor Leds.



WORKING PHASE



Speed Led

COLOURS		PHASE	REMARKS
	1 pulse	rewinding	Speed is near to the programmed one
	1 pulse	rewinding	Speed is far from the programmed one
	Blinking	unrolling	Speed is over 0,5 km/h

The Speed Led blinks at each sensor's impulse.

Motor Led

COLOUR		PHASE	REMARKS
	1 pulse	rewinding	Motor is functioning to decrease speed
	3 short pulses		Motor reached end run (speed = minimum)
	1 pulse	rewinding	Motor is functioning to increase speed.
	3 short pulses		Motor reached end run (speed = maximum)

Battery Led

COLOUR		PHASE	REMARKS
	1 pulse each 10”	switched on	Power supply tension is between 11,5V and 20V
	1 pulse each 10”	switched on	Power supply tension is between 10V and 11,5V
	1 pulse each 10”	switched on	Power supply tension is under/below 10 V
	1 pulse each 1”	switched on	Power supply tension is over 20V

2.2.2 MEANING OF LEDS’ COLOURS IN PARTICULAR CONDITIONS

Motor Led

COLOUR		KNOB	REMARKS
	1 pulse each adjustment	MIN	The Led stays turned on during the whole time of motor drive. At end-run, it makes three short blinks.
	1 pulse each adjustment	MAX	The Led stays turned on during the whole time of motor functioning At end-run, it makes three short blinks.
	5 pulses	Any position	Motor overcurrent
	3 pulses	Any position	Exceeded maximum motor functioning time.
	3 pulses	OFF after 30”	It indicates the unit’s turning off

3 IRRIGATION CYCLE EXECUTION

The unwinding at speed over 0,5 Km/h is stated by Speed Led blinking in red, and the adjustment motor is not activated.
With the knob set between 5 and 95m/h the control unit drives the impulse adjustment motor to reach the programmed speed.

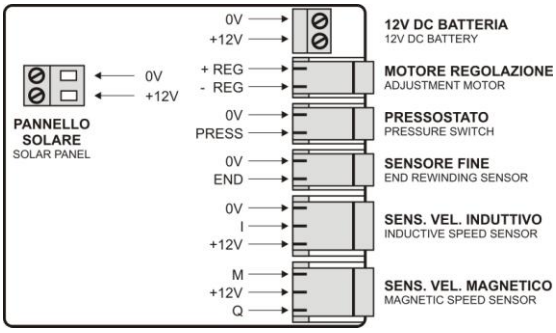
a) Without speed sensor impulses, the adjustment motor reaches slowly the maximum speed condition
b) With speed impulses, the motor is driven by impulses to increase or decrease the hose rewinding speed, until it reaches the programmed one on the knob.

We suggest to use MIN position to make pauses without rewinding and to open the by-pass before putting the pipe on pressure, and to use MAX position to increase starting speed or to rewind at maximum speed.
Furthermore, we suggest to set the knob on OFF position, during pauses, to turn the equipment off and reduce power consumption of the battery.

4 TECHNICAL FEATURES

4.1 Control Unit

Connections' scheme



Input power supply: 12Vdc
Minimum working power supply: 6Vdc (with this tension, the motor doesn't adjust)
Maximum power supply: 30Vdc – WARNING! Higher tension causes damages to the equipment
Maximum adjustment motor current: 4A
Maximum motor drive time: 40 sec.

Consumption with 12Vdc power supply:

UNIT'S STATUS	CONSUMPTION
Unit turned on	< 7 mA
Unit turned off After 30" with knob set on OFF position	< 1.4 mA

Working temperature:	min -10	max 70 °C
Stock temperature:	min -20	max 80 °C

12 dc Battery	equipment's power supply input
Adjustment motor	output for bi-directional pilotage of the adjustment motor
Pressure controller	digital pressure input. It can be connected to a pressure gauge with ON/OFF contact.
End sensor	End irrigation digital input. It can be connected to a sensor with ON/OFF contact.
Inductive speed sensor	Speed digital input. It can be connected to a proximity sensor. (type npn 10-30vdc) max frequency 1.5khz.
Magnetic speed sensor	Digital speed input. It can be connected to a sensor with reed contact. Max frequency 400hz. Digital input of quadrature acceleration (optional). It can be connected to a sensor with reed contact. Max frequency 400hz.
Solar panel	Solar panel digital input. It can be connected to a solar panel for battery recharge.

4.2 Knob

The tachometer scale has the following divisions:
The possible speed values coincide to the divisions printed on the front cover.
Middle alignment positions don't correspond to middle speed values, but to the speed nearest to the knob position.

- From 5 to 35 m/h 1 m/h for each division
- From 36 to 40 m/h 2 m/h for each division
- From 40 to 95 m/h 1 m/h for each division