

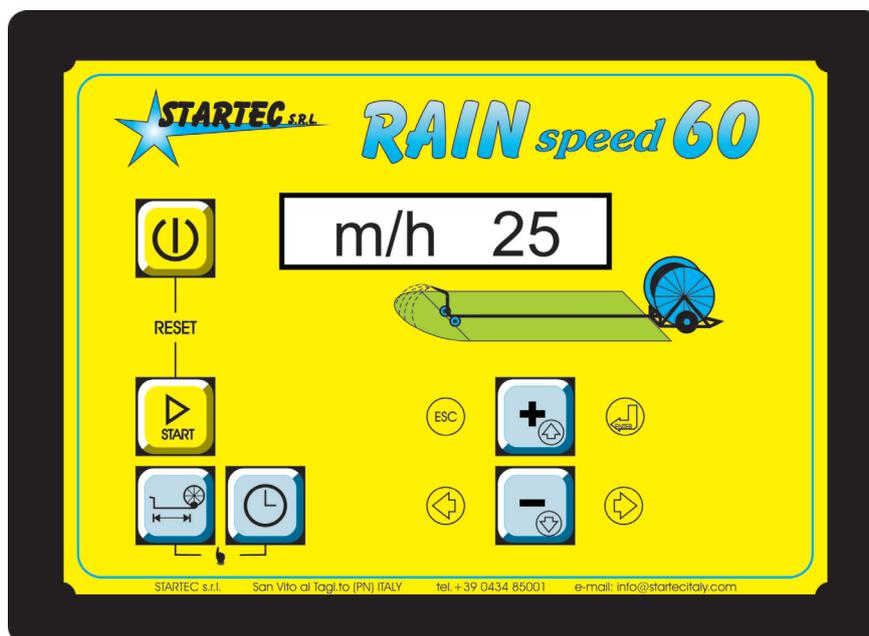


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USER INSTRUCTIONS *RAIN SPEED 060*

(EQUIPMENT FOR THE MEASUREMENT OF THE REWINDING SPEED AND OTHER DATA
ON SELF-PROPELLING IRRIGATORS)



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INDEX

Index.....	1
1. General features	2
2. Operating features	3
2.1. Keys functions	3
2.2. Regulation of display's contrast	6
2.3. Programming	7
2.3.1. Irrigation parameters	7
3. Irrigation cycle	8
3.1. Switch on of the Rain 060 control unit.....	8
3.2. Unrolling of the pipe	8
3.2.1. Manual change or enter the amount of unrolled metres	8
3.3. Programming the Winding Speed	9
3.4. Programming the Irrigation Time.....	9
3.5. Start of the irrigation cycle.....	10
3.5.1. Displays during irrigation.....	10
3.5.2. Possible anomalies during the irrigation cycle	10
3.6. End of Irrigation Cycle	11
4. Test procedure	12
4.1. Test of battery voltage and sensors	12
5. Connections	13

1. GENERAL FEATURES

Rain 060 is designed to measure the speed of the trolley retraction, calculate the duration or the time of irrigation after having measured the metres of unrolled pipe.

Rain 060 is composed by a control unit with a 10-key keypad and a back-lighted 8-large-character display.

Rain 060 works at 12V DC power (usually connected to a battery).

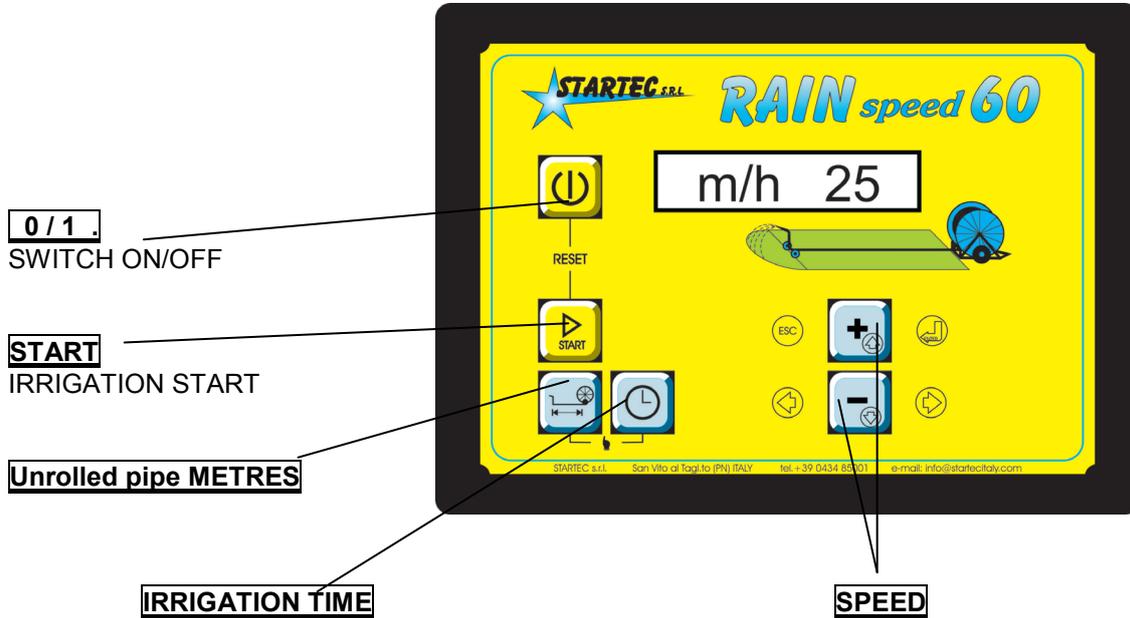
The average consumption during irrigation is about 7mA.

The following devices can be connected to Rain 060:

- Speed sensor, generally mounted on the gear or on the “pipe-feeler” roll;
- Pressure switch for pressure control in the pipe (optional).

2. OPERATING FEATURES

Rain 060 can operate using both the metric system and the in/ft system.



2.1. Keys functions

Rain 160 is equipped with a 10-key keypad enabling the use of the device.

Except for the ON/OFF key all other keys serve several functions depending on the intensity of the pressure exerted: SHORT, LONG and CONTINUOUS.

A SHORT pressure enables displaying the key function or the single datum variation.

A LONG pressure (1 second) enables programming the corresponding feature.

A CONTINUOUS pressure enables a continuous and rapid increase or decrease of the feature value.

At every key pressure the display is back-lighted and remains active for about 8 seconds from the last key pressure.

ON/OFF key



- Switch on/off of the Rain 060 control unit.

START key



- SHORT pressure	- Displays current datum - Exits TEST mode
- LONG pressure	- Starts irrigation cycle.
- Pressure at SWITCH ON	- RESET to start a new cycle dropping the uncompleted one

METRES unrolled pipe key



- SHORT pressure	- Displays the amount of metres of unrolled pipe.
- LONG pressure	- Enables programming the metres of unrolled pipe (the symbol * on the left side of the display shows the beginning of the programming process). To introduce changes use Speed keys  or  . - At switch on, it allows setting up the clock.
- Simultaneous pressure of the IRRIGATION TIME key	- Enters TEST mode (MANUALLY)

NOTE: in this manual it is referred to by using the symbol 

IRRIGATION TIME key



- SHORT pressure	- Displays irrigation time expressed in hh:mm (hours and minutes), or, if the clock is set up in: day of the week, hours and minutes.
- LONG pressure	- Enables programming the irrigation time (the symbol * on the left side of the display shows the beginning of the programming process). - To introduce changes use Speed keys (>)  or 
- Simultaneous pressure of the METRES unrolled pipe key:	- Accesses TEST mode. (MANUALLY)

NOTE: in this manual it is referred to by using the symbol 

SPEED key +

|| > ||



- SHORT pressure	- Displays the programmed SPEED expressed in metres/hour (m/h). - In SPEED programming mode, single m/h increase. - In METRES unrolled pipe programming mode, single metre increase. - In IRRIGATION TIME programming mode, time increase. Useful to know the retraction speed to at which the irrigator should work to finish at a programmed hour.
- LONG pressure	- Enables programming the SPEED at which irrigation is programmed (the symbol * on the left side of the display shows the beginning of the programming process).
- CONTINUOUS pressure	- In SPEED programming mode, fast m/h increase. - In METRES programming mode, fast metre increase. - In IRRIGATION TIME programming mode, fast time increase.

SPEED key -

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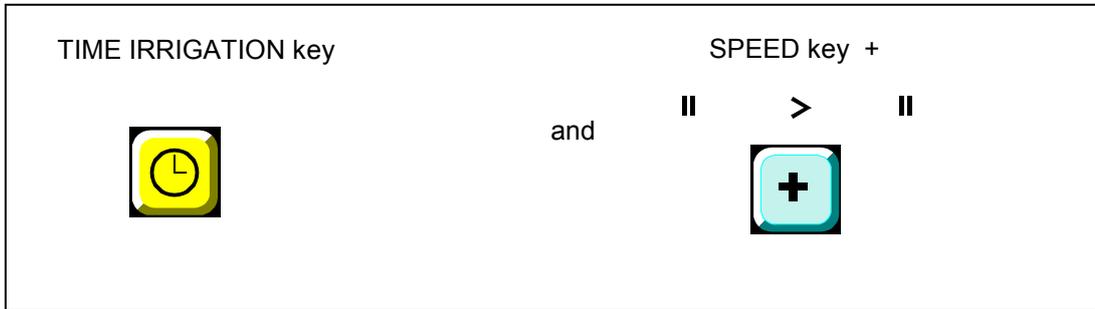
- SHORT pressure	<ul style="list-style-type: none"> - Before the irrigation phase (unrolling) displays the programmed SPEED expressed in metres/hour (m/h). - During irrigation displays the instantaneous speed (im/h). - In SPEED programming mode, single m/h decrease. - In METRES unrolled pipe programming mode, single metre decrease. - In IRRIGATION TIME programming mode, single minute time decrease.
- LONG pressure	- Enables programming the SPEED (the symbol * on the left side of the display shows the beginning of the programming process).
- CONTINUOUS pressure	<ul style="list-style-type: none"> - In SPEED programming mode, fast m/h decrease. - In METRES programming mode, fast metre decrease. - In IRRIGATION TIME programming mode, fast time decrease.

Note: the display is back-lighted at every key pressure and remains lighted for about 8 seconds.

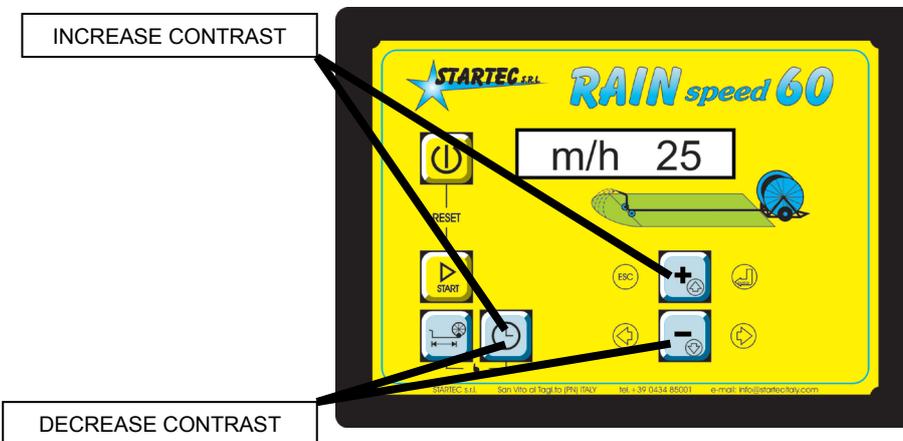
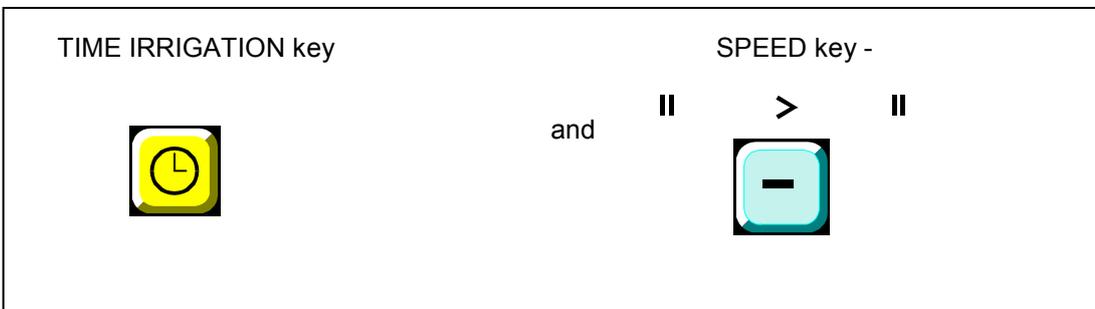
2.2. Regulation of display's contrast

To facilitate the adjustment of the contrast, it was added a direct control from the keyboard.

To increase the contrast, keep contemporarily pressed for some seconds these two keys:



To decrease the contrast, keep contemporarily pressed for some seconds the two keys:



The new contrast is automatically saved.

2.3. Programming

To start programming Rain 060 press the key of the feature to be programmed for at least one second until the symbol * appears: it enables programming the desired feature using the corresponding + and – keys.

2.3.1. Irrigation parameters

The irrigation parameters can be displayed or modified at any time.

To access the irrigation parameters press the corresponding key. If no key is pressed for 8 seconds, the controls return to the normal irrigation procedure.

It is possible to display the following parameters:

- METRES of unrolled pipe: enables manual setting and adjustment of metres of unrolled pipe between 0 and 999 m with 1-m steps by using  and  SPEED keys. The display shows [*m xxx].
- Irrigation SPEED: enables setting the irrigation speed and so the pipe winding speed ranging between 5 and 999 m/h. The display shows [m/h xxx].
- Irrigation TIME: enables setting the irrigation time. The variation of the irrigation time automatically changes the rewinding speed. The time can be set between 0 and 99h59'. With the clock set, the time ranges from the 00:00 of Sunday to the 23:59 of the following Saturday, with variations of one or more minutes, consistently with metres of unrolled pipe.

3. IRRIGATION CYCLE

For a correct irrigation procedure, respect the following phase sequence:

PHASE	DESCRIPTION
1	- Switch on the control unit
2	- Unroll the pipe. Metres of unrolled pipe are displayed.
3	- Program the rewinding speed as desired.
4	- Start irrigation cycle pressing the START key.
5	- End of irrigation cycle. - Switch off the control unit.

3.1. Switch on of the Rain 060 control unit

Press **ON/OFF** key to switch on the control unit.

The display is lighted and the following information appears in sequence:

DISPLAY	MEANING	BACKLIGHTING STATUS
[STARTEC]	Control unit brand name	(ON)
[R. 060]	Rain 060 model	(ON)
[Ver. X.XX]	Program version	(ON)
[<- m 0]	Unrolled metres	(OFF)

With this operation the switch-on phase ends and Rain 060 remains waiting for the pipe to be unrolled. Otherwise, if the irrigation cycle was not terminated, it displays [NON TERM] and continues the interrupted cycle.

If the previous cycle was interrupted and you would like to begin a new cycle instead of resuming the interrupted one, you need to press and keep pressed the **START** key during switch-on until ' RESET ' is displayed. This indicates that the interrupted cycle has been abandoned and a new cycle begins.

3.2. Unrolling of the pipe

The pipe must be unrolled after the switch-on phase and before pressing the **START** key.

During the unrolling process, the control units will measure the amount of metres of unrolled pipe.

On the screen the amount of unrolled pipe is displayed, e.g. [<-m 358].

IMPORTANT

Check that the displayed amount is correct.

If it is not, manually change the displayed value.

If the pipe is unrolled without having switched the Rain 060 on, you need to manually enter the amount of unrolled metres to obtain the correct number of remaining metres and of the irrigation time.

3.2.1. Manual change or enter the amount of unrolled metres

To enter or change the amount of unrolled metres, do the following operations in the following order:

Phase	Operation	Display	Notes
0	Situation after switch on	[<-m 0]	- Backlighting off
1	Press m key for at least 1 second	[* m 0]	- The symbol * appears - Backlighting on
2	Press + or - keys to change the amount of metres as desired. e.g. m 352	[* m 352]	- Backlighting on
	+1 > +	[* m 345]	- continuous pressure
	+1 > +	[* m 352]	- single pressures - If the number of pressures is not correct, use - key to make adjustments

3	Press another key to confirm and pass to another feature (e.g. irrigation TIME key h), or wait 8 secs to go back to irrigation frame.	[h hh:mm]	- Backlighting on
		[<-m 352]	- Backlighting off

NOTES:

3. In programming mode, if no key is pressed for 8 seconds, the display goes back to the irrigation frame and the last displayed datum is confirmed.
4. The amount of unrolled metres can be modified also during irrigation.
5. The smallest unit you can change is metre.

3.3. Programming the Winding Speed

The winding speed should be programmed after the switch-on phase is finished and before pressing the **START** key.

The rewinding speed can be modified also during the irrigation phase.

To program or change the winding speed do the following operations in the following order:

Phase	Operation	Display	Notes
1	> Press + key (short pressure)	[Pm/h 30]	- Last programmed speed - Backlighting on
2	> Press + key (1 sec.) or - key to enable the change	[*m/h 30]	- The symbol * on the left enables the change - Backlighting on
3	Keep + or - key pressed until the desired speed e.g. m/h 35. Use + or - key to make adjustments, exerting short or continuous pressures	[*m/h 35]	
4	Press another key to confirm and pass to another feature (e.g. irrigation TIME key h), Or wait 8 secs to go back to irrigation frame	[h hh:mm]	- Backlighting on
		[<-m 352]	- Backlighting off

NOTES:

1. In programming mode, if no key is pressed for 8 seconds, the display goes back to the irrigation frame.
2. The programmed speed can be changed also during irrigation.

3.4. Programming the Irrigation Time

After the pipe has been unrolled and metres have been programmed, it is possible to program the Irrigation Length. In this case Rain 060 automatically calculates the trolley retraction speed depending on the amount of metres of unrolled pipe.

This programming process can be carried out also during the Irrigation Cycle.

To program the Irrigation Time do the following operations in the following order:

Phase	Operation	Display	Notes
1	Press h key (1 sec.)	[*h 12:05]	- Calculated time. - The symbol * enables the change - Backlighting on
2	> Press + key to increase the time or press - to decrease the time	[*h 12: 30]	- The symbol * on the left enables the change
		[*h 11: 20]	- Backlighting on

3	Press h key (or another key), or wait for the backlight to go out (8 secs).	[h 12: 30] [<-m 358]	- The symbol * disappears - Backlighting on - Irrigation frame - Backlighting off
4	Press + key to check speed variation	[Pm/h 45]	- Backlighting on

NOTES:

1. In programming mode, if no key is pressed for 8 seconds, the display goes back to the irrigation frame.
2. The remaining irrigation time can be modified also during irrigation.

3.5. Start of the irrigation cycle

Press **START** for at least 1 second to start the irrigation cycle. The display shows [START].

If [ERR m = 0] is displayed when you press the **START** key, it means that the unrolled metres are 0 or negative. Irrigation does not start or starts but the time and metres are not correct. Program the metres of unrolled pipe and press **START** again.

3.5.1. Displays during irrigation

During the Irrigation Cycle, there shall be the following displays:

At the start, in absence of impulse	[m/h ____]
After the first impulse from the speed sensor	[m/h 0]
With the following impulses	[im/h 12]
Instantaneous measured speed	[im/h 35]
Steady-state measured speed	[m/h 32]

During irrigation, the display shows the retraction speed.

During the irrigation phase in which speed is stable, small adjustments carried out by the motor are displayed with a + or – symbol before the speed value, e.g. [+ m/h 32] o [- m/h 32].

When a **+** key is pressed, the corresponding programmed features is displayed.

e.g. [Pm/h 30] for the Speed

while pressing the **-** key, the instantaneous speed is displayed.

e.g. [im/h 52] the symbol “i” means instantaneous.

3.5.2. Possible anomalies during the irrigation cycle

List of displays with the possible messages that can appear during the irrigation cycle due to particular or non-correct working conditions:

[ERR m = 0]

Is displayed the **START** key is pressed with an amount of unrolled metres equal to 0 or to a negative value. Program the amount of metres of unrolled pipe.

[m/h ____] (i.e. SPEED ERROR = 0)

Is displayed when no impulse reaches the speed sensor over a certain period of time (this time depends on the programmed speed).

3.6. End of Irrigation Cycle

Rain 060 can be programmed to stop winding the pipe in case the winding is set up to stop (m/h = 0) when the metres are lower than the programmed parameter (default = 10m), after a while it displays [<- m 0] . Now it is ready for a new unrolling and irrigation.

To start a new irrigation cycle, switch off and then restart the Rain Star 060 control unit.

4. TEST PROCEDURE

The test procedure allows to perform tests on the gear motors connected to Rain 060, on the battery voltage, on the relay, on the sensors, and other possible compatible connections.

To enter this procedure you need to press simultaneously the keys METRES **m** and IRRIGATION TIME **h** at any time while the equipment is on. Once entered this function, the display [MANUALE].

4.1. Test of battery voltage and sensors

Pressing repeatedly the METRES **m** key, the display shows in turn the screens that enable to check the actual status and possibly run a test on the sensors, the relay, the input and output extra sources.

The sequence of the screens is the following:

Phase	Display	Notes
0	[MANUALE]	Initial screen. Indicates entering the "test" mode.
1	[12.4V 0.0A]	Indicates battery supply voltage (V) and current (A) used by the motors
2	[VELOC OF]	Indicates the status of the speed sensor: Open contact = switched off sensor. The display shows [VELOC OF]. Closed contact = switched on sensor. The display shows [VELOC ON].
3	[PRESS OF]	Indicates the status of the pressure sensor: Open contact = pressure is present. The display shows [PRESS OF]. Closed contact = pressure is absent. The display shows [PRESS ON].
4	[C nnnn]	Counter which indicates the impulses of the speed sensor. It is reset at every switch off of the equipment.
5	[MANUALE]	Back to initial screen.

To quit the TEST mode press the **START** key or wait 3 minutes after which it quits automatically if no key is pressed.

Note: some of these screens may not appear if not foreseen.

5. CONNECTIONS

There are the following connectors used for connecting external peripheral devices:

2-pin screw connecting terminal for 12 V DC (Red=+, Black=-)

3-pin Seal-type connector for inductive speed sensor IN. It is also possible to connect a reed-type magnetic sensor (Brown=+12V; Blue=0V; Yellow/Green=impulses)

2-parallel-pin Fast on-type for the adjustment valve control.

It can be foreseen a connector for the pressure switch.