

Farm Management Made Easier

# NMC-Junior Irrigation

## User Guide



# NMC-Junior Irrigation

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## 1. GENERAL

### 1.1 Keyboard

**Numeric**- To enter values, quantities. Act as shortcuts to selections.

**+/- Key**- Toggles between positive and negative values and marks check boxes option selection. In a History screen, use to toggle between quantities and time format.

**Arrows**- Scroll up, down, left, and right to select menus.

**MENU**- To main menu, also acts as "ESC" and "Back" keys.

**ENTER**- Enter menu, submenu, value, open window, confirm a value or change.

**HELP**- Access help screens and graphs.

**DELETE**- Erases typing mistake.



### 1.2 Hot Screens

Press MENU from Main Menu to see Read-Only overview running processes. Press MENU again to return to Main Menu.

7 Hot Screens/Keys:

0- Hot Key- Icon of active actions/processes

1- Main Screen/System Status

2- Irrigation Process

3- Irrigation Program Status

4- Water, EC/pH, Dosing

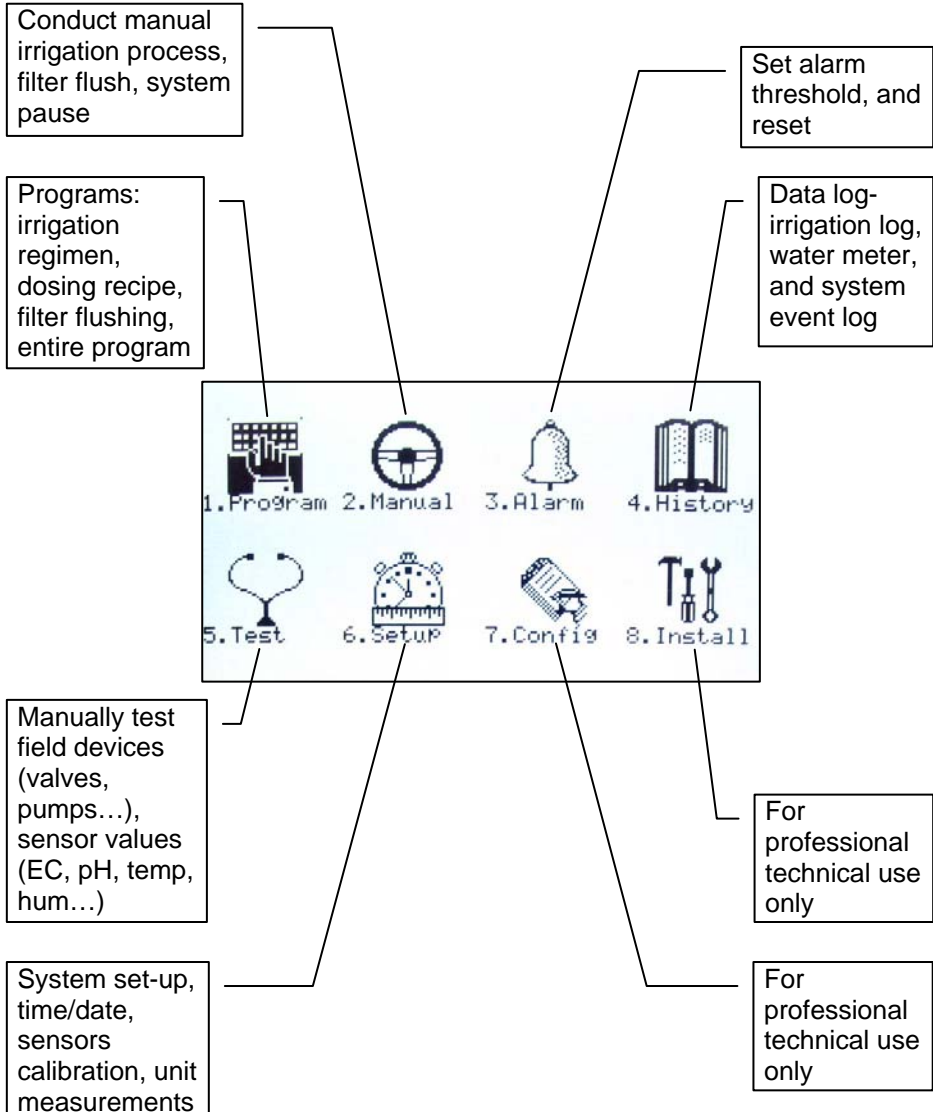
5- Filter Flushing Status

6- Temperature & Humidity measurement

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## 1.3 Main Menu Icons

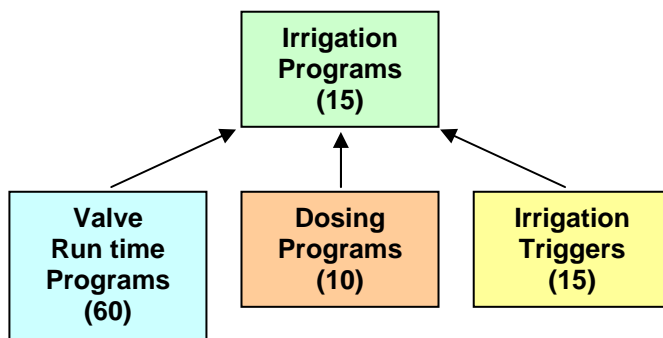


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## 1.4 Introduction

To set an irrigation program-regiment/strategy- the grower must select necessary valves and set Run Time and Dosing program. May define 1 or more programs for 1 or more valves.



### Run Time Programs-

- Based on Time or Quantity
- Set water *before* and *after* dosing process (fertilizer injection)

### Dosing Programs (fertilization)

- Up to 8 dosing channels per program
- Dosing method per channel (Time, Quantity, EC/pH)

### Irrigation Timing based on External Conditions

- Start/ Stop up to 2 Dry Contacts
- Start/End time for irrigation period
- Trigger Type

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## 2. PROGRAM

### 2.1 Run Time Program

For every irrigation program, define a Run Time recipe



2. Water Run Time



Based on Time/Qty:



Time/Qty.



WATER RUN TIME PROGRAM				
#	Method	Water	Before	After
1	QTV.	10.000	0.000	0.000
2	QTV.	25.000	0.000	0.000
3	QTV.	0	0.000	0.000
4	QTV.	0	0.000	0.000
5	QTV.	0	0.000	0.000
6	QTV.	0.000	0.000	0.000
7	QTV.	0.000	0.000	0.000
8	QTV.	0.000	0.000	0.000
9	QTV.	0.000	0.000	0.000
10	QTV.	0.000	0.000	0.000
11	QTV.	0.000	0.000	0.000



Define Time/Qty.



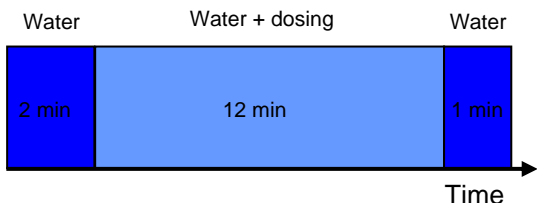
WATER RUN TIME PROGRAM				
#	Method	Water	Before	After
1	TIME	00:15:00	00:00:00	00:01:00
2	QTV.	25.000	0.000	0.000
3	QTV.	0.000	0.000	0.000
4	QTV.	0.000	0.000	0.000
5	QTV.	0.000	0.000	0.000
6	QTV.	0.000	0.000	0.000
7	QTV.	0.000	0.000	0.000
8	QTV.	0.000	0.000	0.000
9	QTV.	0.000	0.000	0.000
10	QTV.	0.000	0.000	0.000
11	QTV.	0.000	0.000	0.000



Define value for "before" and "after" time program

Water Before and After Dosing process:

WATER RUN TIME PROGRAM				
#	Method	Water	Before	After
1	TIME	00:15:00	00:02:00	00:01:00
2	QTV.	25.000	0.000	0.000
3	QTV.	0.000	0.000	0.000
4	QTV.	0.000	0.000	0.000
5	QTV.	0.000	0.000	0.000
6	QTV.	0.000	0.000	0.000
7	QTV.	0.000	0.000	0.000
8	QTV.	0.000	0.000	0.000
9	QTV.	0.000	0.000	0.000
10	QTV.	0.000	0.000	0.000
11	QTV.	0.000	0.000	0.000



**NOTE:** Define total Time/Qty. Before and after deducted from total Time/Qty.

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## 2.2 Dosing Program

For every irrigation program, define a Dosing recipe



3. Dosing



**Dosing Channel Definition (Channel mode pre-configured by technician):**



Channel

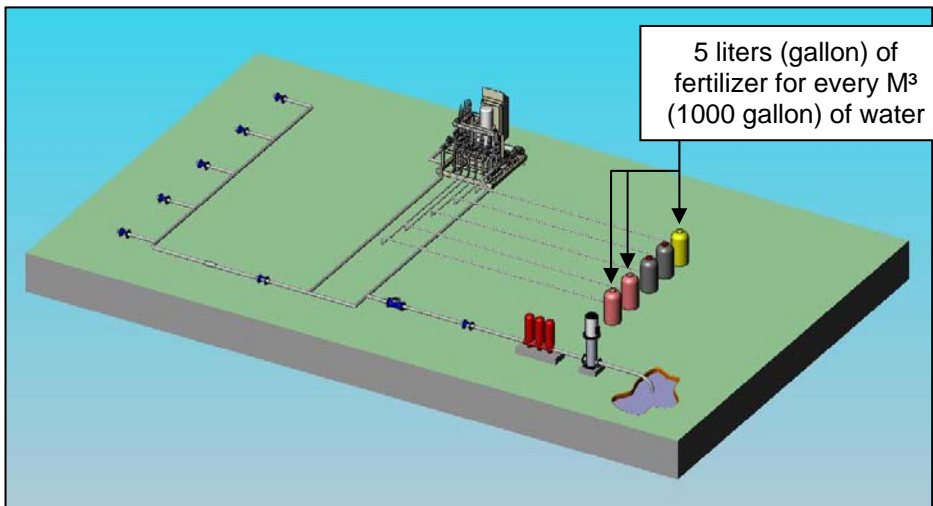
DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P. QTV	2.00	0.00	0.00
2	P. QTV	0.00	0.00	0.00
3	P. QTV	0.00	0.00	0.00
4	P. QTV	0.00	0.00	0.00
5	P. QTV	0.00	0.00	0.00
6	P. QTV	0.00	0.00	0.00
7	P. QTV	0.00	0.00	0.00
8	P. QTV	0.00	0.00	0.00
9	P. QTV	0.00	0.00	0.00
10	P. QTV	0.00	0.00	0.00

Define dosing method per program (USA: Qty.=gallon)

**Proportional Qty. (1/1000, Litre/m<sup>3</sup>, gallon/1000gallons):**



DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P. QTV	2.00	5.00	3.00
2	P. QTV	0.00	0.00	0.00
3	P. QTV	0.00	0.00	0.00
4	P. QTV	0.00	0.00	0.00
5	P. QTV	0.00	0.00	0.00
6	P. QTV	0.00	0.00	0.00
7	P. QTV	0.00	0.00	0.00
8	P. QTV	0.00	0.00	0.00
9	P. QTV	0.00	0.00	0.00
10	P. QTV	0.00	0.00	0.00



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## Proportional Time:



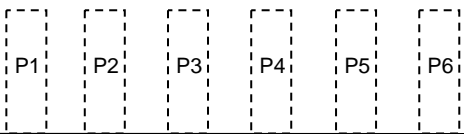
P. Time

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P. TIME	00:00		
2	P. OTV	0.00		
3	P. OTV	0.00		
4	P. OTV	0.00		
5	P. OTV	0.00		
6	P. OTV	0.00		
7	P. OTV	0.00		
8	P. OTV	0.00		
9	P. OTV	0.00		
10	P. OTV	0.00		

→ Define minimum dose for each channel

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P. TIME	00:10	00:10	00:05
2	P. OTV	0.00	0.00	0.00
3	P. OTV	0.00	0.00	0.00
4	P. OTV	0.00	0.00	0.00
5	P. OTV	0.00	0.00	0.00
6	P. OTV	0.00	0.00	0.00
7	P. OTV	0.00	0.00	0.00
8	P. OTV	0.00	0.00	0.00
9	P. OTV	0.00	0.00	0.00
10	P. OTV	0.00	0.00	0.00

← Irrigation →



Ex: Ch 1= P1+P2+P3...+Pn= 10 min.

Time in pulses for  
Channel 1 or 2

**NOTE:** Proportional Time= Take desired dosing time and spread out dose over irrigation program in open/close pulses per channel.

## Time:



Time

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	TIME	00:00		
2	P. OTV	0.00		
3	P. OTV	0.00		
4	P. OTV	0.00		
5	P. OTV	0.00		
6	P. OTV	0.00		
7	P. OTV	0.00		
8	P. OTV	0.00		
9	P. OTV	0.00		
10	P. OTV	0.00		

→ Define in 1 bulk: Open for a set time straight through, i.e. not spread out over a defined program.

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	TIME	00:15	00:10	00:05
2	P. OTV	0.00	0.00	0.00
3	P. OTV	0.00	0.00	0.00
4	P. OTV	0.00	0.00	0.00
5	P. OTV	0.00	0.00	0.00
6	P. OTV	0.00	0.00	0.00
7	P. OTV	0.00	0.00	0.00
8	P. OTV	0.00	0.00	0.00
9	P. OTV	0.00	0.00	0.00
10	P. OTV	0.00	0.00	0.00

← Irrigation →



Ex: Ch 3= P1= 5 min. (1 pulse)

Time in bulk  
Channel 3



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**Quantity:** (Example shows liters, in USA use gallons.)

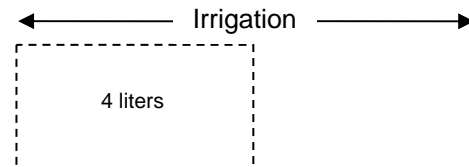


Qty.

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	QTV	0.0	P.QTV(1:1000)	0.0
	P.QTV	0.0	P.TIME(hh:mm)	0.0
	P.QTV	0.0	P.TIME(hh:mm)	0.0
	P.QTV	0.0	P.QTV(Liter)	0.0
	P.QTV	0.0	0.0	0.0
	P.QTV	0.0	0.0	0.0
	P.QTV	0.0	0.0	0.0
	P.QTV	0.0	0.0	0.0
	P.QTV	0.0	0.0	0.0
10	P.QTV	0.0	0.0	0.0

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	QTV	4.00	5.00	2.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
10	P.QTV	0.00	0.00	0.00

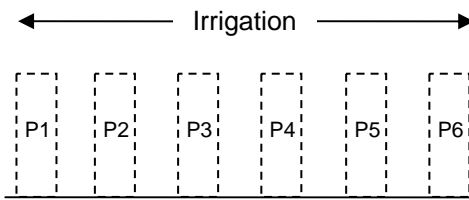
- **Option A-** In Bulk (Similar to Time above).



Ex: Ch 1= P1= 4 liters.  
(1 pulse)

Quantity in bulk Channel 1

- **Option B-** Spread Out (According to dosing configuration done by technician).



Ex: Ch 1= P1+P2+P3...  
+Pn= 4 litres.

Quantity in pulses



Main Menu



7. Dosing Configuration

DOSING CONFIGURATION	
EC Control	VECO
PH Control	VECO
Minimum On Time (sec)	1
Minimum Off Time (sec)	1
Coarse Tuning (0=Slow,10=Fast)	1
Fine Tuning (0=Slow,10=Fast)	1
Control Cycle (sec)	1
EC/PH Averaging(0=Low,20=H)	1
Dosing Boost, Off Delay(mm)	1
Dosing by QTV, Method	BULK SPREAD

Define according to  
Bulk or Spread

Back in Dosing Program menu,  
define Injection per Dosing  
Channel.

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	QTV	4.00	5.00	2.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
	P.QTV	0.00	0.00	0.00
10	P.QTV	0.00	0.00	0.00

# NMC-Junior Irrigation

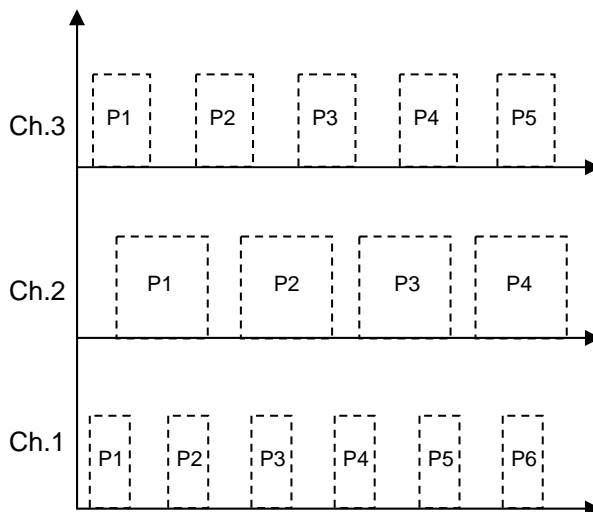
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## Common Dosing Program for Open Fields (example):

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	OTV	2.00	5.00	3.00
2	P. OTV	0.00	0.00	0.00
3	P. OTV	0.00	0.00	0.00
4	P. OTV	0.00	0.00	0.00
5	P. OTV	0.00	0.00	0.00
6	P. OTV	0.00	0.00	0.00
7	P. OTV	0.00	0.00	0.00
8	P. OTV	0.00	0.00	0.00
9	P. OTV	0.00	0.00	0.00
10	P. OTV	0.00	0.00	0.00

Fertilization (EC) amounts are fixed, no matter how much water goes through (channels 1, 2 & 3- Passive)

### Irrigation



Ch. 1 ⇒ Spread Qty. = 2 liters

Ch. 2 ⇒ Spread Qty. = 5 liters

Ch. 3 ⇒ Spread Qty. = 3 liters

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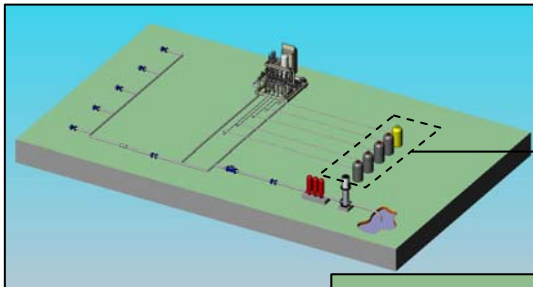
## Controlled EC/pH based on P.Qty. (example):

### Example -

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P.QTY	5.00	5.00	5.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
10	P.QTY	0.00	0.00	0.00

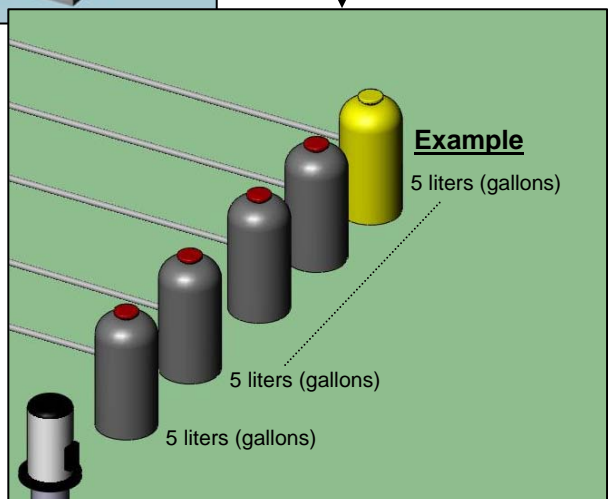
DOSING PROGRAM				
Prog	Method	-3-	-EC-	-pH-
1	P.QTY	5.00	1.50	5.50
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
	P.QTY	0.00	0.00	0.00
10	P.QTY	0.00	0.00	0.00

Define dosing program:  
Nutrient amount and  
desired EC/pH levels



### Controlled EC/pH Target

1.5 EC  
5.5 pH



### Example

5 liters (gallons)

5 liters (gallons)

5 liters (gallons)

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## 2.3 Irrigation Based on Time



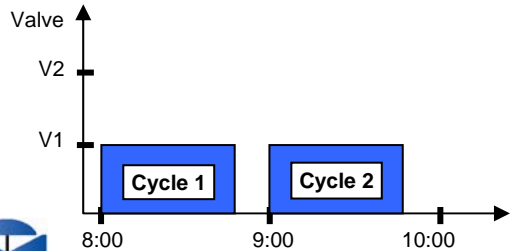
➔ 1. Irrigation ➔ Select program ➔



### Example 1

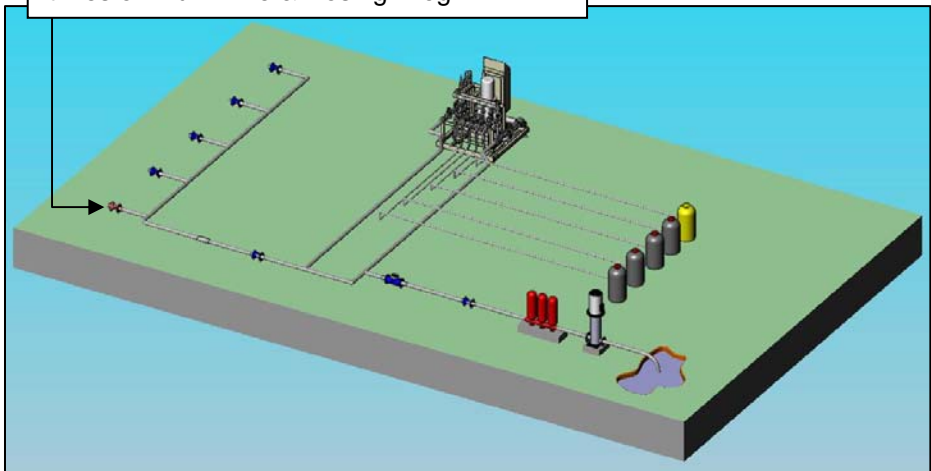
DATE : 29-Oct-07	TIME : 13:21:09
IRRIGATION PROGRAM	
Program: 1	Priority: -- Const. 0%
Start Time	08:00
Cycles	2
Delay (min)	60
Valve #	01
Run Time #	1
Dosing Prog	1
Day: 01/01	
Dose/Water	

Irrigation program for 1 valve



**NOTE:** Delay = Delay between cycles from start time to start time  
Cycles = Number of cycles

Valve 1- runs 2 cycles, 1 hour between start times on Run Time & Dosing Prog. 1



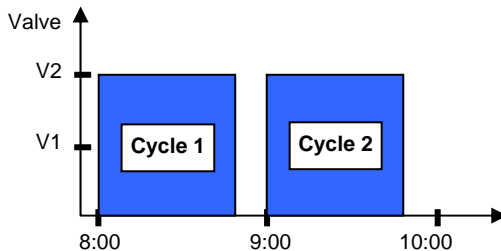
# NMC-Junior Irrigation

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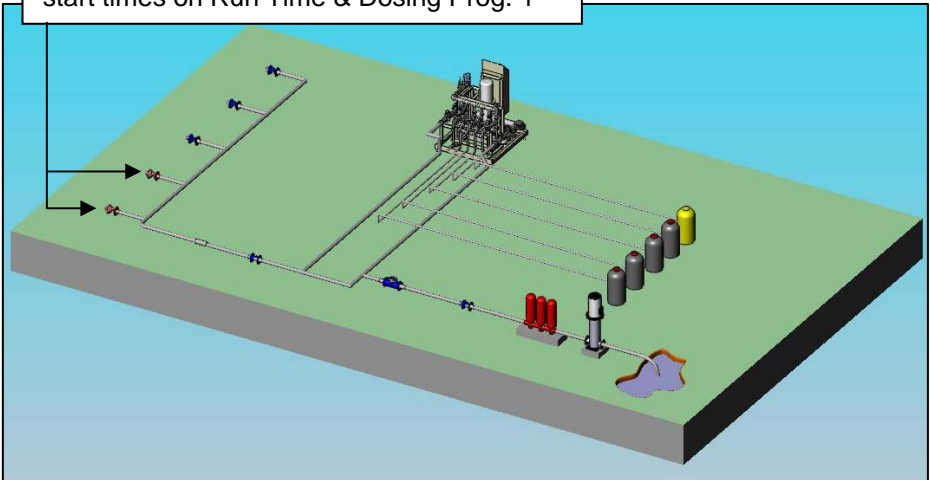
## Example 2

DATE : 29-Oct-07		TIME : 13:23:21	
IRRIGATION PROGRAM			
Program:	1	Priority: --	Const. 0%
Start Time	08:00		
Cycles	2		
Delay (min)	60		
Valve #	01+02		
Run Time #	1 1		
Dosing Prog	1 1		
Day: 01/01	<input checked="" type="checkbox"/> 1		
Dose/Water	<input type="checkbox"/> 1		

Irrigation program for a group of 2 valves



Valve 1 & 2- run 2 cycles, 1 hour between start times on Run Time & Dosing Prog. 1



**NOTE:** Delay = Delay between cycles from start to start  
Cycles = Number of cycles

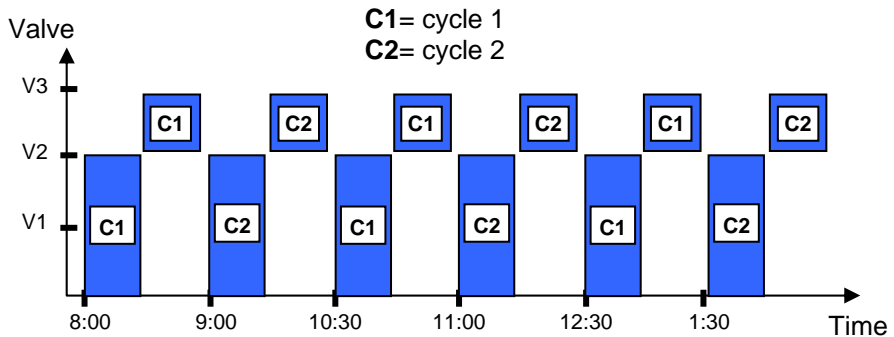
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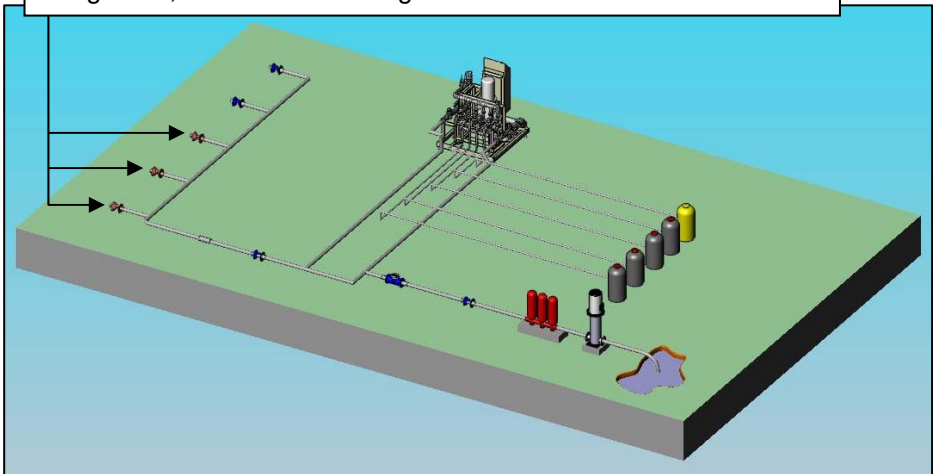
## Example 3

DATE : 29-Oct-07		TIME : 13:25:21	
IRRIGATION PROGRAM			
Program:	1	Priority: --	Const. 0%
Start Time	08:00	10:30	12:30
Cycles	2	2	2
Delay (min)	60	30	60
Valve #	01+02	03	
Run Time #	1	1	1
Dosing Prog	1	1	1
Day: 01/01			
Dose/Water	1		

Irrigation program for a group and individual valve



Valve 1 & 2- runs 6 cycles simultaneously on Run Time & Dosing Program 1, valve 3 runs after valves 1 & 2 on Run time & Dosing Program 2, different/interchangeable start times.



**NOTE:** Different/interchangeable delays (multiple start time) dividing the day into periods

**NOTE:** Delay= Delay between cycles from start to start  
Cycles= Number of cycles in every period (start time)

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**Depending on weather conditions, increase/decrease amount of water emitted from valves without changing the program.**

## Example 4

DATE : 29-Oct-07 TIME : 13:27:32  
IRRIGATION PROGRAM

Program:	Priority:	Daily	20%
Start Time	08:00	10:30	
Cycles	2	2	
Delay (min)	60	30	
Valve #	01+02	03	
Run Time #	1	1	2
Dosing Prog	1	1	2
Day: 01/03	2	3	
Dose/Water	D	W	-

If a lot of radiation, want to irrigate more, +20%  
(Regular 10min. runtime  $\Rightarrow$  12 min.)



**NOTE:** Daily = Current day only. Regular program will resume the following day.

## Example 5

DATE : 29-Oct-07 TIME : 13:28:06  
IRRIGATION PROGRAM

Program:	Priority:	Const.	-10%
Start Time	08:00	10:30	
Cycles	2	2	
Delay (min)	60	30	
Valve #	01+02	03	
Run Time #	1	1	2
Dosing Prog	1	1	2
Day: 01/01			
Dose/Water	D		

If there is bad weather, want to irrigate less, -10%  
(Regular 10min. runtime  $\Rightarrow$  9 min.)



**NOTE:** Const.= Constant running of program on daily basis. May increase/decrease amount of water in this mode according to weather conditions.

**Select water/dosing program by days of week**

## Example 6

DATE : 29-Oct-07 TIME : 13:28:56  
IRRIGATION PROGRAM

Program:	Priority:	Daily	20%
Start Time	08:00	10:30	
Cycles	2	2	
Delay (min)	60	30	
Valve #	01+02	03	
Run Time #	1	1	2
Dosing Prog	1	1	2
Day: 05/07	1	2	3
Dose/Water	D	D	D

Select program by days of week

S	M	T	W	TH	F	ST
X		X		X		X

OR

Choose cycle of days

DATE : 29-Oct-07 TIME : 13:30:16  
IRRIGATION PROGRAM

Program:	Priority:	Daily	20%
Start Time	08:00	10:30	
Cycles	2	2	
Delay (min)	60	30	
Valve #	0		
Run Time #			
Dosing Prog			
Day: 01/03			
Dose/Water	D	W	-



DATE : 29-Oct-07 TIME : 13:31:04  
IRRIGATION PROGRAM

Program:	Priority:	Daily	20%
Start Time	08:00	10:30	
Cycles	2	2	
Delay (min)	60	30	
Valve #	01+02	03	
Run Time #	1	1	2
Dosing Prog	1	1	2
Day: 01/03	2	3	
Dose/Water	D	W	-



D = Dosing + Water  
W = Just Water  
- = Nothing

S	M	T	W	TH	F	ST
D	W	-	D	W	-	D



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## 2.4 Irrigation Based on External Condition (Field)

To operate irrigation by peripheral equipment (i.e., filling a water tank according to level float switch)

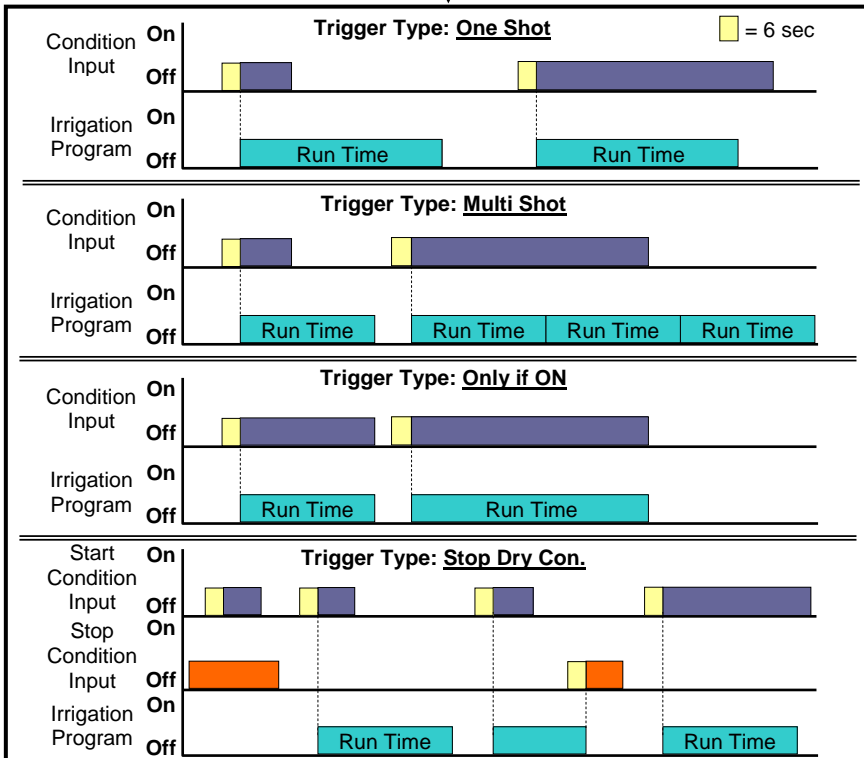


→ 4. Ext. Condition → Set start/end time

EXTERNAL CONDITION PROGRAM			
#	From hh:mm	To hh:mm	Start Dry Cont.
1	02:00	18:00	Dry Con 1
2	---	---	<NONE>
3	---	---	<NONE>
4	---	---	<NONE>
5	---	---	<NONE>
6	---	---	<NONE>
7	---	---	<NONE>
8	---	---	<NONE>
9	---	---	<NONE>
10	---	---	<NONE>

Select trigger type

EXTERNAL CONDITION PROGRAM			
#	Start Dry Cont.	Trigger Type	Stop Dry Cont.
1	Dry Con 1	One Shot	Dry Con 2
2	<NONE>	One shot	<NONE>
3	<NONE>	One shot	<NONE>
4	<NONE>	One shot	<NONE>
5	<NONE>	One shot	<NONE>
6	<NONE>	One shot	<NONE>
7	<NONE>	One shot	<NONE>
8	<NONE>	One shot	<NONE>
9	<NONE>	One shot	<NONE>
10	<NONE>	One shot	<NONE>





## Farm Management Made Easier

[illegible]

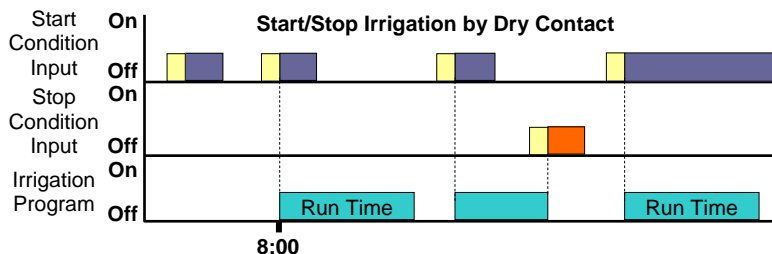
time. Program works according to the conditioned program above.



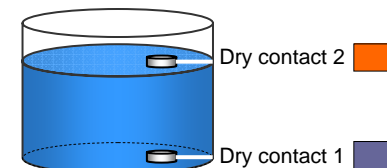
➡ 1. Irrigation ➡

DATE: 29-Oct-07 TIME: 13:03:01  
13:00:00 PROGRAM

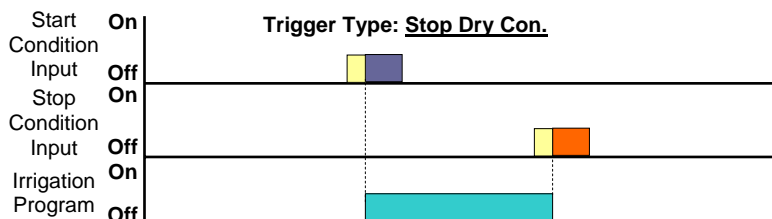
Program:	1	Priority: --	Cond.: 1
Start Time Cycles Delay (min)			
Valve #	04		
Run Time #	2		
Dosing Prog	2		
Day: 01/01	1		
Dose/Water	1		



Example of tank filling:



### Water Tank with Floats



# NMC-Junior Irrigation

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## 2.5 Agitator

To operate fertilizer tanks with mixing devices



→ 5. Agitator →



AGITATOR		
	On mm:ss	Off mm:ss
Dosing Active	--:--	--:--
Dosing Not Active	--:--	--:--

⇒ Define On/Off time during dosing and when system is idle

AGITATOR		
	On mm:ss	Off mm:ss
Dosing Active	01:00	05:00
Dosing Not Active	05:00	60:00

**NOTE:** When using more than 1 agitator, system operates automatically in parallel mode.

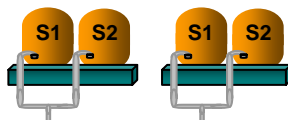
## 2.6 Selector

+1 fertilizer tank (with different fertilizers) attached to a single dosing channel



→ 6. Selector →

SELECTOR		
Dosing Prog.	S1	S2
1	✓	✓
2	✓	✓
3	✓	✓
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	✓
8	✓	✓
9	✓	✓
10	✓	✓



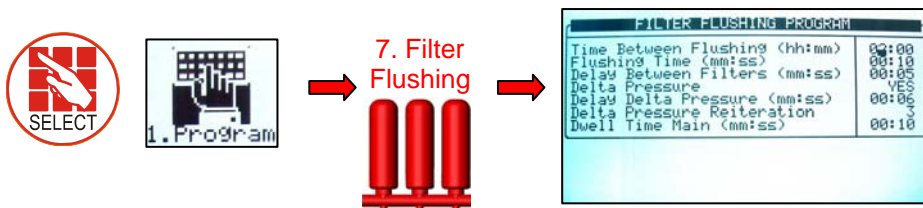
Dos. Chan. 1 / Dos. Chan. 2

# NMC-Junior Irrigation

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## 2.7 Filter Flushing

### Program filter flushing during irrigation process



**NOTE:** Filter flush process can start only after main water line is full.  
Default set at 1 min., see menu 3.3.

ALARM DEFINITION	
Water Fill Up (min)	1
Water Leak (m3)	1.000
Water Leak Period (hh:mm)	00:30
Dosing Channel Leak Delay(s)	3
Dosing Channel Leak (Pulse)	10
Delta EC Low	0.5
Delta EC High	0.5
Delta pH Low	0.5
Delta pH High	0.5
Missing Pulses For No Flow	10
Stop System Cons.Flow Alarms	--

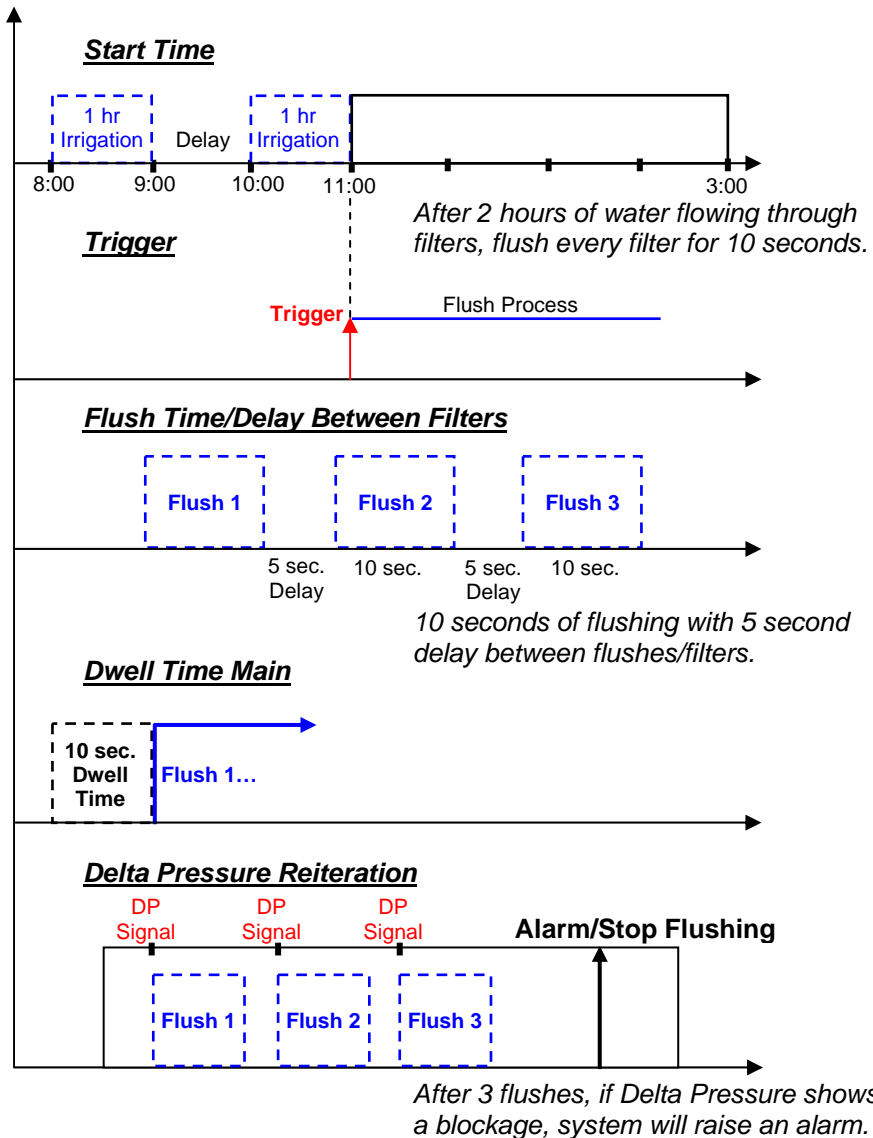
**NOTE:** See graph on next page for further information.

Item	Description
Time Between Flushing	Time between flushes accumulated during set irrigation time (one filter flush a time).
Flush Time	Flush time per filter.
Delay Between Filters	Set delay between flushes to build up pressure.
Delta Pressure	Set flush by pressure sensor. Pressure at filter inlet/outlet, if there is a significant difference, a filter may be blocked.
Delta Pressure Delay	Set delay to verify if there is a definite blockage.
Delta Pressure Reiteration	Set to give signal after XX flushes. If Delta Pressure still indicates a blockage, an alarm will be raised.
Dwell Time Main	Open main filter valve before flush to balance pressure for a reliable flushing process.

# NMC-Junior Irrigation

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Filter Flushing Program	
Time Between Flushing (hh:mm)	00:00
Flushing Time (mm:ss)	00:10
Delay Between Filters (mm:ss)	00:05
Delta Pressure	YES
Delay Delta Pressure (mm:ss)	00:05
Delta Pressure Reiteration	3
Dwell Time Main (mm:ss)	00:10



# NMC-Junior Irrigation

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## 2.8 Cooling

Set cooling program for cooling/humidification process in greenhouses. This program will operate according to temperature, humidity or time (to reduce temp, increase hum.)




8. Cooling → Set On/Off time and select sensors

Temp. Sens. 1  
Hum. Sens. 1

COOLING/HUMIDIFICATION PROGRAM				
Program: 1		Status: Cooling		
	Below RH	On	Off	
1	80	00:00:10	00:00:10	
2	---	---:---:---	---:---:---	
Cool# 1				
Temp. Sens.: 1		Hum. Sens.: 1		

OR

COOLING/HUMIDIFICATION PROGRAM				
Program: 1		Status: Cooling		
	Below RH	On	Off	
1	80	00:00:10	00:00:10	
2	--	--:--:--	--:--:--	
				
Cool#	1			
Temp. Sens.: 1 2		Hum. Sens.: 1		

Dynamic cooling: 2 temp.  
threshold, same Hum.

COOLING/HUMIDIFICATION PROGRAM				
Program: 1		Status: Cooling		
	From	To	Above t°	
1	08:00	16:00	25.0	
2	08:00	16:00	35.0	
Cool#	1 2			
Temp. Sens.:	1	Hum. Sens.:	1	



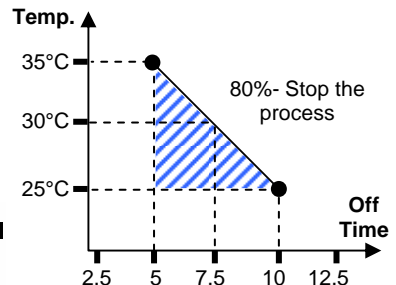
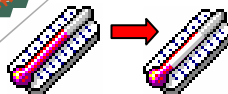
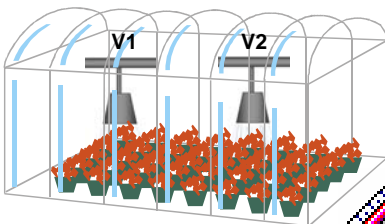
COOLING/HUMIDIFICATION PROGRAM				
Program: 1		Status: Cooling		
	Below RH	On	Off	
1	80	00:00:10	00:00:10	
2	80	00:00:10	00:00:05	
Cool#	1 2			
Temp. Sens.:	1	--	Hum. Sens.:	1

On time is set.

Off time can be controlled according to temp.

High temp.= less off time

Low temp.= more off time



# NMC-Junior Irrigation

Farm Management Made Easier

## 2.9 Misting

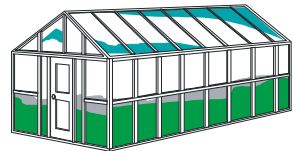
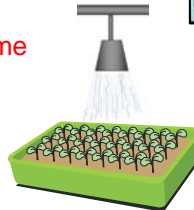
General program using a timer



→ 9. Misting →

MISTING PROGRAM				
#	Start hh:mm	End hh:mm	On hh:mm:ss	Off hh:mm:ss
1	08:00	16:00	00:00:10	00:00:05
2	---	---	---	---
3	---	---	---	---
4	---	---	---	---
5	---	---	---	---
6	---	---	---	---
7	---	---	---	---
8	---	---	---	---
9	---	---	---	---
10	---	---	---	---

- Define Start/End time  
→ Define misting On/Off time



## 2.10 Water Heating

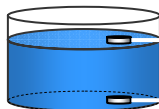
Heat water in cold areas/seasons



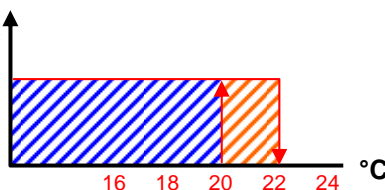
→ 10. Water Heating →

WATER HEATING	
From Time	08:00
To Time	16:00
Water Temperature	20.0
Difference	2.0
Temp. Sensor #1	1
Temp. Sensor #2	2

- Define Start/End time  
→ Define Water Temp. ± Difference (dead band) to stop  
→ Define sensors



ON↑ / OFF↓



Temperature

Cold

Hot

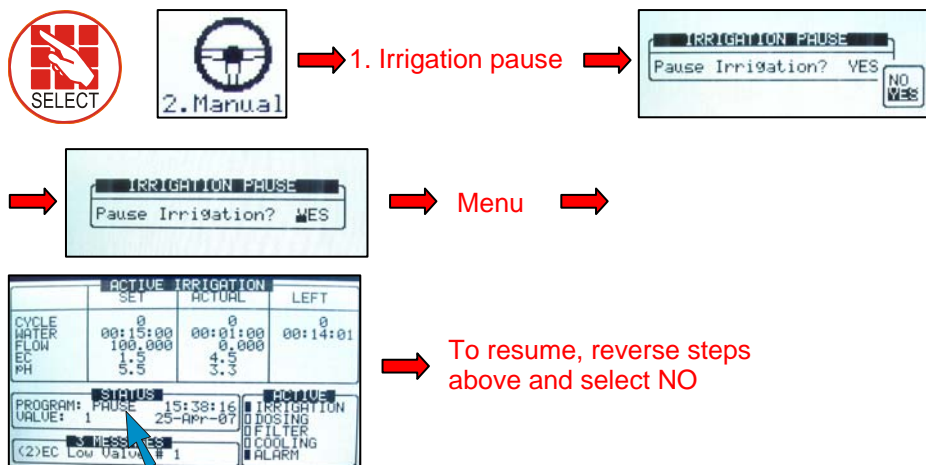
# NMC-Junior Irrigation

Farm Management Made Easier

## 3. MANUAL

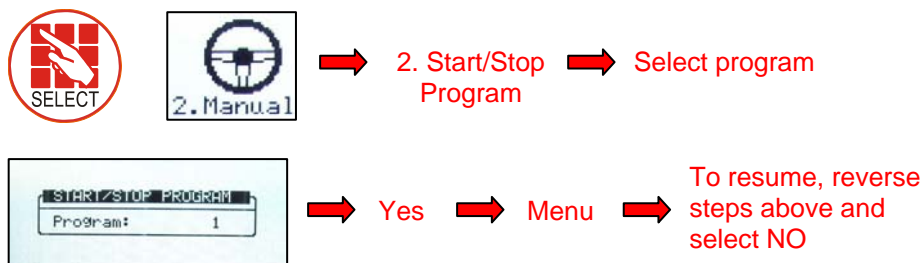
### 3.1 System Pause

Manually pause system during an irrigation program (EC/pH calibration, fix pipes...)



### 3.2 Start/Stop program

Manually start/stop a program



**NOTE:** Start 1 cycle only from program 1.

DATE: 29-Oct-07 TIME: 13:55:56			
IRRIGATION PROGRAM			
Program:	1	Priority:	-- Const. 0%
Start Time	08:00		
Cycles	2		
Delay (min)	60		
Valve #	01		
Run Time #	2		
Dosing Prog	2		
Day: 01/01			
Dose/Water	0		

# NMC-Junior Irrigation

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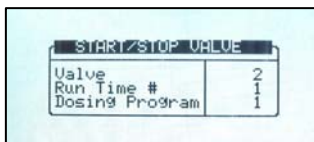
## 3.3 Start/Stop Valve

### Manually start/stop a valve



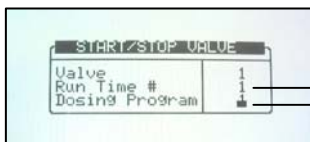
→ 3. Start/Stop Valve

→ Select Valve and corresponding Run Time/Dosing program



→ Menu → Yes →

To resume, reverse steps above and select NO



WATER RUN TIME PROGRAM				
#	Method	Water	Before	After
1	TIME	00:10:00	00:00:00	00:00:00
2	P.O.T.V.	0.000	0.000	0.000
3	P.O.T.V.	0.000	0.000	0.000
4	P.O.T.V.	0.000	0.000	0.000
5	P.O.T.V.	0.000	0.000	0.000
6	P.O.T.V.	0.000	0.000	0.000
7	P.O.T.V.	0.000	0.000	0.000
8	P.O.T.V.	0.000	0.000	0.000
9	P.O.T.V.	0.000	0.000	0.000
10	P.O.T.V.	0.000	0.000	0.000
11	P.O.T.V.	0.000	0.000	0.000

Run Time Program (1)

DOSING PROGRAM				
Prog	Method	-1-	-2-	-3-
1	P.O.T.V.	5.00	5.00	5.00
2	P.O.T.V.	0.00	0.00	0.00
3	P.O.T.V.	0.00	0.00	0.00
4	P.O.T.V.	0.00	0.00	0.00
5	P.O.T.V.	0.00	0.00	0.00
6	P.O.T.V.	0.00	0.00	0.00
7	P.O.T.V.	0.00	0.00	0.00
8	P.O.T.V.	0.00	0.00	0.00
9	P.O.T.V.	0.00	0.00	0.00
10	P.O.T.V.	0.00	0.00	0.00

Dosing Program (1)



# NMC-Junior Irrigation

Farm Management Made Easier

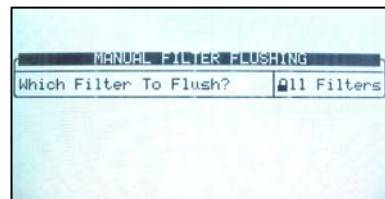
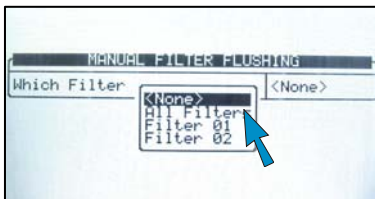
## 3.4 Manual Filter Flush

Manual filter flush only when system is irrigating

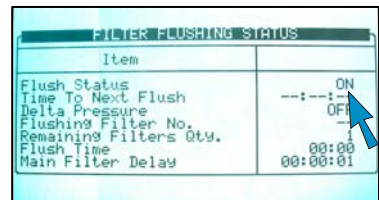


➡ 4. Filter Flush

➡ Select filters (usually all)

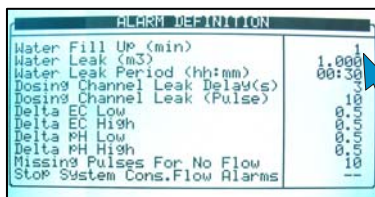


➡ Yes ➡ Menu ➡ Hot Screen 5 to view flushing status



**NOTE:** "All Filters" means all filter's but 1 at a time.  
No more than 1 filter may be flushed at a time.

**NOTE:** Filter flush process can start only after main water line is full.  
Default is 1min. as shown in picture below (See menu 3.3).



# NMC-Junior Irrigation

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## 4. ALARM

### 4.1 Reset

Reset alarm (in case of high flow, low flow, water leak, fertilizer leak...)



➔ 1. Alarm Reset ➔ Option A: Reset manually

ALARM RESET			
Reset Now?	24 h	NO	
Period Of Automatic Reset	24 h	YES	
Complete Irrig. On Reset?			
ACTIVE ALARMS			
No.	Message	Date	Time
1	High Flow Valve # 1	25/Apr	15:49

ALARM RESET			
Reset Now?	24 h	NO	
Period Of Automatic Reset	24 h	YES	
Complete Irrig. On Reset?			
ACTIVE ALARMS			
No.	Message	Date	Time

➔ Yes

Option B: Automatic reset to check itself every so often as desired:  
 ➔ Select how often system should reset itself

ALARM RESET			
Reset Now?	24 h	NO	
Period Of Automatic Reset	24 h	YES	
Complete Irrig. On Reset?			
ACTIVE ALARMS			
No.	Message	Date	Time

➔ "Complete Irrig. On Reset?"  
 Select Yes or No

ALARM RESET			
Reset Now?	24 h	NO	
Period Of Automatic Reset	24 h	YES	
Complete Irrig. On Reset?			
ACTIVE ALARMS			
No.	Message	Date	Time

### 4.2 Alarm History

View alarm history (Read-Only)



➔ 2. History

ALARM HISTORY			
No.	Message	Date	Time
112	EC Low Valve # 1	25/Apr	13:43
113	EC Low Valve # 1	25/Apr	13:44
114	High Flow Valve # 4	25/Apr	14:26
115	Emergency PH Low	25/Apr	14:44
116	Emergency EC High	25/Apr	14:44
117	High Flow Valve # 1	25/Apr	15:44
118	High Flow Valve # 1	25/Apr	15:55
119	High Flow Valve # 4	25/Apr	16:22
120	High Flow Valve # 1	25/Apr	16:22
121	High Flow Valve # 1	25/Apr	16:58

**NOTE:** Logs up to 250 alarms

# NMC-Junior Irrigation

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## 4.3 Alarm Definition

### Define system threshold



### 3. Alarm Definition



Define trigger: deviation from target pressure, flow...

ALARM DEFINITION	
Water Fill Up (min)	1
Water Leak (m3)	1.000
Water Leak Period (hh:mm)	00:30
Dosing Channel Leak Delay(s)	10
Dosing Channel Leak (Pulse)	10
Delta EC Low	0.0
Delta EC High	0.0
Delta PH Low	0.0
Delta PH High	0.0
Missing Pulses For No Flow	10
Stop System Cons.Flow Alarms	--

Item	Description
Water Fill Up (min)	Time of filling the main irrigation line. In that time, the system will ignore high flow alarm and won't implement a filter flushing process.
Water Leak (m3 or Gal)	Quantity of water leaking while the system is in idle.
Water Leak Period (hh:mm)	Time frame to measure the water leak quantity Example; 1m <sup>3</sup> was leaking in less than 30min.
Dosing Channel Leak Delay (s)	Delay between switching off a dosing channel and generating dosing leak alarm.
Dosing Channel Leak (Pulse)	Number of pulses (by dosing meter) during the delay above to generate an alarm. Example; 10 pulses in 3 seconds will generate alarm.

# NMC-Junior Irrigation

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Table continued...

Item	Description
Delta EC low	Maximum differences bellow EC targets.
Delta EC high	Maximum differences above EC targets.
Delta pH low	Maximum differences bellow pH targets.
Delta pH high	Maximum differences above pH targets.
Missing Pulses For No Flow	Number of missing pulses before the system will generate a No Flow alarm. The system calculates the expected time between pulses of water meter and if a certain time elapsed without receiving the desired number of pulses, then generate an alarm.
Stop System Consecutive Flow Alarms	Number of consecutive flow alarms of the same type (high flow, low flow etc') but different valves before the system is stopped. Example; High flow at valve 1 ->High flow at valve 2->High flow at valve 3 = 3 consecutive High flow, then system stops.

## 4.4 Alarm Setting

Set alarms and define action in event of an alarm



➔ 4. Alarm Setting

ALARM SETTING				
Description	Irri.	Dose	Delay mm:ss	Alarm Active
High Flow	STOP	STOP	01:00	YES
Low Flow	STOP	STOP	01:00	YES
No Flow	STOP	STOP	----	YES
D. Ch. Leak	STOP	STOP	30:00	YES
D. Ch. Fault	STOP	STOP	01:00	YES
Ext. Pause	PAUSE	IRRIG.	00:30	YES
EC High/Fail	STOP	STOP	01:00	YES
EC Low	STOP	STOP	01:00	YES
pH High	STOP	STOP	01:00	YES
pH Low/Fail	STOP	STOP	01:00	YES

➔ Define alarm action: automatically stop or continue.

➔ Delay before generating alarm.

➔ Alarm output activation: YES/NO (siren, light).

# NMC-Junior Irrigation

Farm Management Made Easier

## 5. HISTORY


### 5.1 System History

Read-Only screens of system's history (measurements, settings, processes, events, graphs...)






→ 10. Sensor Log →

SENSORS LOG				
Date	Time	Avg. Hum.	-EC-	-PH-
25/Apr	16:00	...	3.0	4.0
25/Apr	15:00	...	1.4	4.0
25/Apr	14:00	...	1.1	4.0
22/Apr	16:00	...	1.0	4.0
22/Apr	16:00	...	1.0	4.0
22/Apr	15:00	...	1.0	4.0
22/Apr	14:00	...	1.0	4.0
22/Apr	14:00	...	1.0	4.0
22/Apr	13:00	...	1.0	4.0



SENSORS LOG				
Date	Time	Avg. Hum.	-EC-	-PH-
25/Apr	16:00	...	3.0	4.0
25/Apr	15:00	...	1.4	4.0
25/Apr	14:00	...	1.1	4.0
22/Apr	16:00	...	1.0	4.0
22/Apr	16:00	...	1.0	4.0
22/Apr	15:00	...	1.0	4.0
22/Apr	14:00	...	1.0	4.0
22/Apr	14:00	...	1.0	4.0
22/Apr	13:00	...	1.0	4.0

 Help
  Graph

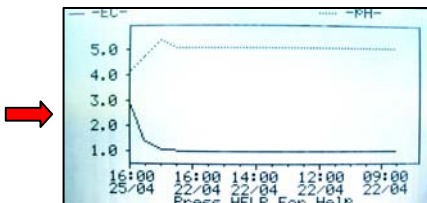


→ Select sensors using +/- key  
(no more than 3 per graph)

GRAPH SELECT	
Option	Yes/No
Avg. Temp	.
Avg. Hum.	.
-EC-	✓
-PH-	✓



Menu



**NOTE:** Use  $\uparrow\downarrow$  arrow keys to zoom in/out.  
Use  $\leftarrow\rightarrow$  arrow keys to scroll.

# NMC-Junior Irrigation

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The history menu provides extensive information regarding measurements and processes performed by the NMC-Pro.



## IRRIGATION LOG

The Irrigation Log table includes up to 200 rows of the last irrigations' data.

Each row includes information regarding a specific irrigation.

To view additional information, use the left/right arrow keys.

To switch between dosing quantities or time simply press the '+/-' key.

Date	Time	U1	Water	Duration
19/Jun	08:56	1	0.000	00:00:04
19/Jun	09:07	1	0.188	00:00:06
19/Jun	09:07	1	16.678	00:10:00
20/Jun	10:40	1	16.675	00:10:00
23/Oct	16:40	1	16.690	00:10:00
24/Oct	14:39	1	16.676	00:10:00
29/Oct	13:56	1	0.000	00:00:00
29/Oct	13:57	1	16.690	00:10:00

Date	Time	U1	Duration	Flow
23/Dec	17:21	255	00:10:00	22.000
23/Dec	17:52	254	00:10:00	5.000
23/Dec	17:42	217	00:10:00	24.000
23/Dec	17:52	115	00:10:00	13.000
23/Dec	18:02	219	00:10:00	5.000
24/Dec	4:45	55	00:10:00	2.000
24/Dec	15:00	254	00:10:00	5.000
24/Dec	15:10	217	00:10:02	24.000
24/Dec	15:20	115	00:10:00	13.000
24/Dec	15:30	219	00:10:00	5.000



Date	Time	U1	Chan. 1	Chan. 2
23/Dec	17:21	255	00:00:00	00:00:00
23/Dec	17:52	254	00:00:00	00:00:00
23/Dec	17:42	217	00:00:00	00:00:00
23/Dec	17:52	115	00:00:00	00:00:00
23/Dec	18:02	219	00:00:00	00:00:00
24/Dec	4:45	55	00:00:00	00:00:00
24/Dec	15:00	254	00:00:00	00:00:00
24/Dec	15:10	217	00:00:00	00:00:00
24/Dec	15:20	115	00:00:00	00:00:00
24/Dec	15:30	219	00:00:00	00:00:00

**NOTE:** Water quantity is measured in m<sup>3</sup> or gallons; duration is measured by time; flow is measured in m<sup>3</sup>/h or gallon/m; dosing quantity is measured in liters or gallons.

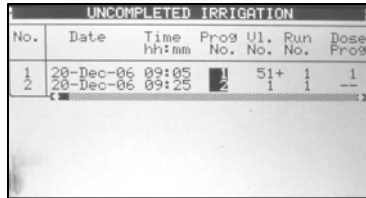
Item	Description
Date	Date in which the irrigation started.
Time	Time in which the irrigation started.
Valve	Leading valve; the first valve set for the group of valves
Water	Irrigation quantity (m <sup>3</sup> or gallon) or irrigation time.
Duration	Irrigation duration (hh:mm:ss).
Flow	Average flow throughout the irrigation cycle.
Chan. #	Dosing quantities per channel (liter or gallon) or dosing time.
EC Low	Lowest EC value recorded during irrigation.
EC Avg.	Average EC value recorded during irrigation.
EC High	Highest EC value recorded during irrigation.
pH Low	Lowest pH value recorded during irrigation.
pH Avg.	Average pH value recorded during irrigation.
pH High	Highest pH value recorded during irrigation.

# NMC-Junior Irrigation

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## UNCOMPLETED IRRIGATION

The Uncompleted Irrigation table provides information of irrigations that were started but could not be completed due to a failure. To understand why irrigation was not completed, it is advisable to cross-reference between this table and the Alarm HISTORY in section 4.2. The Uncompleted Irrigation table consists of up to 200 lines. Note that if the letter 'C' appears, it refers to a program that was triggered by condition program.



No.	Date	Time hh:mm	Prog No.	Vl. No.	Run No.	Dose Prog
1	20-Dec-06	09:05	1	51+	1	1
2	20-Dec-06	09:25	2	1	1	--

Each line includes information regarding when the irrigation was stopped and added to the uncompleted irrigations table.

Item	Description
Date	Date in which the current line was added to the uncompleted irrigation table.
Time	Time in which the current line was added to the uncompleted irrigation table
Prog. No.	92- The program that was added to the table was started manually. 93- The relevant irrigation was added to the uncompleted irrigations table for the second time (or more) consecutively.
Vl. No.	Indicates the associated valve. If a group of valves that is configured to irrigate together is stopped, only the first valve is written but a '+' sign is added next to it to indicate that more valves are associated.
The NMC-Pro will attempt to complete the irrigations from the current day (until end day time) upon manual or automatic alarm reset. The valve column of irrigations that are to be completed will be highlighted. The valve column of irrigations that are currently being completed will blink.	
Run No	Indicates the associated run time program.
Dose Prog.	Indicates the associated dosing program.
Prog. Qty.	Planned quantity according to the run time program.
Left Qty.	Uncompleted quantity.

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In order to manually stop an uncompleted irrigation you must go to the START/STOP VALVE in section 3.3 because the activation is according to single valves.

## UNCOMPLETED PROGRAMS

The Uncompleted Programs table provides information on programs that could not be completed. It is important to understand the difference between this table and the Uncompleted Irrigations table; this table consists only of irrigation cycles that haven't been started and could not be completed during the current day. This can happen due to wrong system setup (more tasks than could be completed), or because the system was not active for a long period of time, for example due to a power failure, and could not complete its tasks.

UNCOMPLETED PROGRAMS						
No.	Date	Time hh:mm	Prog No.	Start Time	Prog Cyc.	Left Cyc.
4	9/Aug	20:00	10	19:00	1	1
5	9/Aug	21:00	10	20:00	1	1
6	10/Aug	04:00	1	13:00	2	2
7	10/Aug	05:00	1	04:00	2	2
8	10/Aug	06:00	10	21:00	1	1
9	10/Aug	07:00	1	05:00	2	2
10	10/Aug	09:00	1	07:00	2	2
11	10/Aug	11:00	1	09:00	2	2
12	10/Aug	13:00	1	11:00	2	2
13	10/Aug	14:00	10	06:00	1	1

The uncompleted program table consists of 200 lines.

## DAILY IRRIGATION

This table allows you to view history of irrigation quantities or time per valve.

DAILY IRRIGATION

How Many Days Ago? 1 Day Ago

Example: 1 day ago means you would like to view yesterday's history, and Today means you would like to view the accumulated history since the last End Day.



To open the selection list



Relevant day using arrow keys



ENTER

Current date viewed at top of screen.

DATE : 29-Oct-07 TIME : 14:16:08			
DAILY IRRIGATION			
Valve	Water	Chan. 1	Chan. 2
1	16.690	0.00	0.00
2	0.000	0.00	0.00
3	0.000	0.00	0.00
4	0.000	0.00	0.00

Press +/- to Toggle Quantity/Time



Daily Irrigation table contains all water (m3 or gallon) and dosing (liter or gallon). To toggle the view between quantities and time, press the '+/-' key.



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## IRRIGATION ACCUMULATION

The Irrigation Accumulation table allows you to accumulate water and dosing quantities for the required periods. The accumulation of each valve can be reset separately in the ACCUMULATION RESET table.

DATE : 21-Dec-06

IRRIGATION ACCUMULATION

Valve	Date	Water	Chan. 1
214	20-Dec-06	0.000	0.00
215	20-Dec-06	70.800	211.36
216	20-Dec-06	1.400	25.93
217	20-Dec-06	19.100	15.23
218	20-Dec-06	7.200	15.23
219	20-Dec-06	16.800	29.65
220	20-Dec-06	0.000	0.00
221	20-Dec-06	0.000	0.00
222	20-Dec-06	0.000	0.00

Press +/- to Toggle Quantity/Time

To toggle the view between quantities and time, press the '+/-' key

DATE : 21-Dec-06

IRRIGATION ACCUMULATION

Valve	Chan. 1	Chan. 2	Chan. 3
214	0.00	0.00	0.00
215	211.36	211.37	211.37
216	25.93	25.94	25.94
217	15.23	15.23	15.23
218	15.23	15.23	15.23
219	29.65	29.65	29.65
220	0.00	0.00	0.00
221	0.00	0.00	0.00
222	0.00	0.00	0.00

Press +/- to Toggle Quantity/Time

Water quantity is measured in cubic meter or gallons; dosing quantity is measured in liters or gallons.

## AUX METER ACCUMULATION

The Auxiliary Meter Accumulation table allows you to accumulate quantities from meters that do not have designated software, for example, in order to measure the drain water quantity or to measure the cooling system's consumption.

AUX METER ACCUMULATION

Meter	Quantity	Date
00-1070146(R)-1	4.600	20-Dec-06
	500	20-Dec-06
	200	20-Dec-06
	500	20-Dec-06
	450	20-Dec-06
	500	20-Dec-06
	700	20-Dec-06
	200	20-Dec-06

The quantities displayed are in liters (gallons) up to 9999.999.

**NOTE:** Water meters are accumulators only and are not a part of the irrigation control.

To reset an auxiliary meter refer to the ACCUMULATION {XE "Reset Total Quantity"} table below.

# NMC-Junior Irrigation

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## ACCUMULATION RESET

ACCUMULATION RESET	
Reset Valve Quantity For?	<None>
Reset Aux. Meter For?	<None>



ENTER to reset accumulation of a specific valve or all valves



Desired option using arrow keys

ENTER

**NOTE:** When resetting a valve (or all valves), its history will be erased from the following tables:

- Daily Irrigation
- Irrigation Accumulation



ENTER to reset an individual auxiliary meter or all auxiliary meters



Desired option using arrow keys

ENTER

**NOTE:** When resetting an Aux meter (or all Aux meters), its history will be erased from the Aux Meter Accumulation table.

## FILTERS

The filters history table provides daily information of the number and cause of flushing.

Date	Delta P.	Time	Manual
10/Aug	0	44	0
9/Aug	0	0	0
8/Aug	0	0	0

## COOLING

Viewing the history of cooling activities or time per valve is allowed.

COOLING	
How Many Days Ago?	► 1 Day Ago



ENTER to open selection list



Relevant day using arrow keys

ENTER

DATE : 26-Dec-06 COOLING			
Prog. No.	From hh:mm	To hh:mm	Cycles
1	13:10	18:14	60
2	13:15	18:14	9
3	---	---	---
4	---	---	---
5	---	---	---
6	---	---	---
7	---	---	---
8	---	---	---
9	---	---	---
10	---	---	---
11	---	---	---
12	---	---	---
13	---	---	---
14	---	---	---
15	---	---	---
16	---	---	---
17	---	---	---
18	---	---	---
19	---	---	---
20	---	---	---
21	---	---	---
22	---	---	---
23	---	---	---
24	---	---	---
25	---	---	---
26	---	---	---
27	---	---	---
28	---	---	---
29	---	---	---
30	---	---	---

For example, 1 day ago means you would like to view yesterday's history, and Today means you would like to view the accumulated history since the last End Day.

# NMC-Junior Irrigation

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## SENSOR LOG

The sensors Log table includes history of average measurements of logged sensors. In order to define which sensor to log, the user should access menu 6.8 – Sensor Logging, and mark by +/- button the required sensor.

In order to define the measurement interval, the user should go to menu 6.2 and choose the required History resolution.

SENSORS LOG				
Date	Time	Avg. Temp	Temp-1	Temp-2
10/Aug	16:28	22.7	22.7	-----
10/Aug	16:27	22.7	22.7	-----
10/Aug	16:26	22.7	22.7	-----
10/Aug	16:25	22.7	22.7	-----
10/Aug	16:24	22.7	22.7	-----
10/Aug	16:23	22.7	22.7	-----
10/Aug	16:22	22.7	22.7	-----
10/Aug	16:21	22.7	22.7	-----
10/Aug	16:20	22.7	22.7	-----
10/Aug	16:19	22.7	22.7	-----

The sensors Log table contains up to 10,000 data fields. Date and time are 2 fields per line and every sensor is an additional field.

For example: logging of 2 sensors uses 4 data fields; 2 for time and date and 1 for each sensor. In this case, the table will consist of a maximum of 2,500 lines.

## EVENT LOG

The table provides information of all the processes performed by the NMC-Pro including their time and date.

EVENT LOG			
No.	Event	Date	Time
5	Water Leak # 4	20/Dec	09:01
6	Program # 1 Manual On	20/Dec	09:03
7	Valve #51 Manual Off	20/Dec	09:04
8	Program # 1 Man. Off	20/Dec	09:04
9	Program # 1 Manual On	20/Dec	09:04
10	Valve #51 Low Flow	20/Dec	09:05
11	Program # 1 Man. Off	20/Dec	09:05
12	Program # 2 Rad. On	20/Dec	09:21
13	Valve # 1 High Flow	20/Dec	09:23
14	Program # 2 Rad. Off	20/Dec	09:25

The table consists of the last 999 events.

## SYSTEM LOG

This table provides information of all the system changes.

SYSTEM LOG			
No.	Event	Date	Time
8	PC Irri. Prog #10 Ch.	9/Aug	10:16
9	Reset Alarm	10/Aug	00:00
10	PC Table #1.3 Change	10/Aug	13:49
11	PC Irri. Prog #1 Ch.	10/Aug	13:51
12	PC Irri. Prog #1 Ch.	10/Aug	13:51
13	Irri3. Prog #1 Ch.	10/Aug	14:51
14	Irri3. Prog #2 Ch.	10/Aug	14:57
15	Table #7.7 Change	10/Aug	14:57
16	Table #1.3 Change	10/Aug	14:58
17	Table #1.7 Change	10/Aug	15:00

The table consists of the last 999 events.

Examples of system changes are changes of triggered by the controller, the PC communication, a power off, etc.