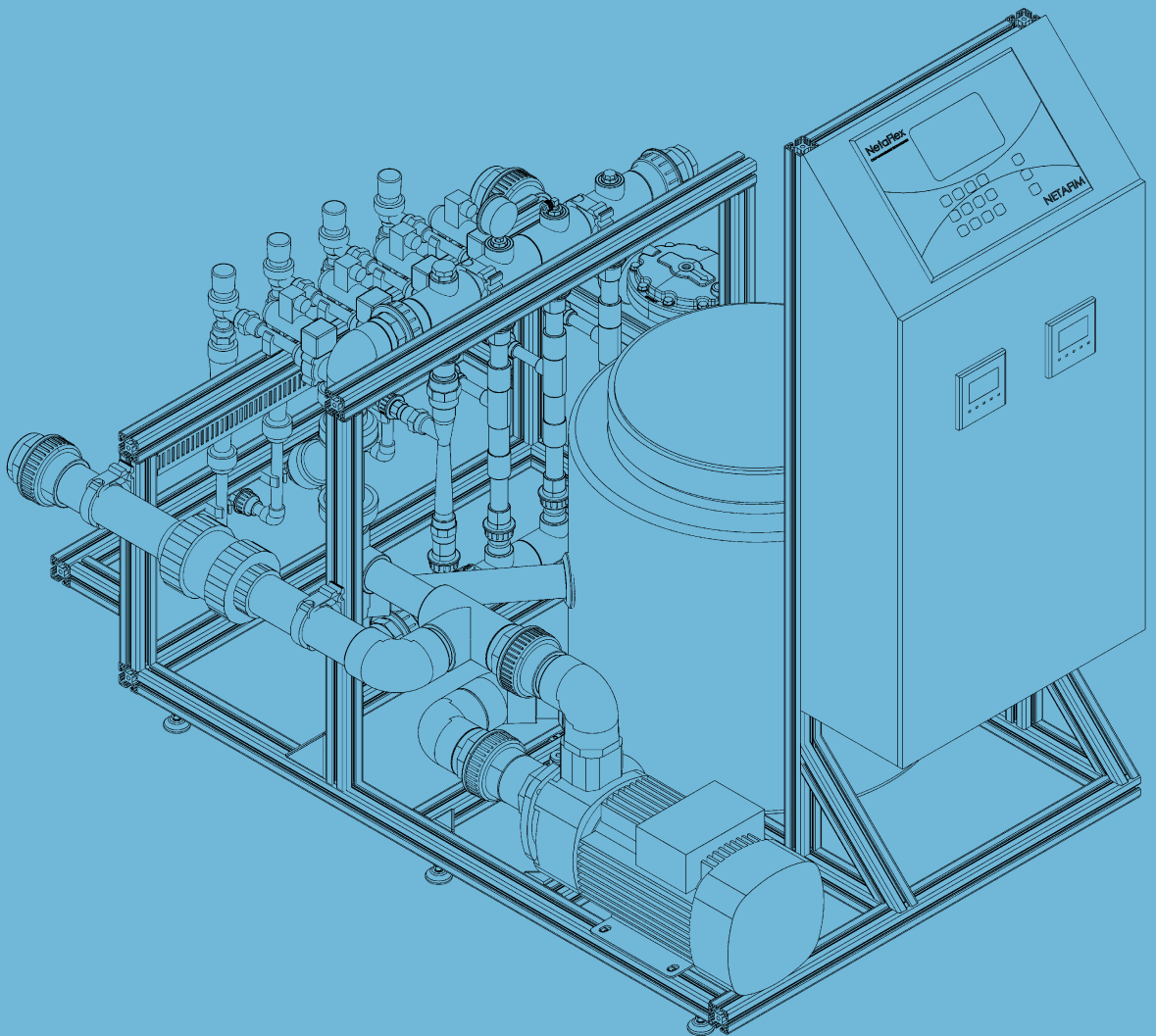


NETAFLEX™ 3G

USER MANUAL



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FOREIGN LANGUAGES

In the event that you are reading this manual in a language other than the English language, you acknowledge and agree that the English language version shall prevail in case of inconsistency or contradiction in interpretation or translation.

CONTENTS

Use of symbols	5
Safety	
Safety instructions	6
When using acid/chemicals	7
Description	
Introduction	8
Highlights	8
Advantages	8
Specifications	9
Add-ons	9
Typical installation overview	10
Schematic diagram	11
Dimensions	12
Weights	12
Operation, maintenance and winterization	
Operation	13
Maintenance	14
Winterization	15
Troubleshooting	
Symptoms regarding more than one single dosing channel	16
Symptoms regarding a single dosing channel	17
Symptoms while idle	19
The NetaFlex™ 3G is not running	20
Warranty	21
Appendices	
Appendix 1 - Calibration:	
1. Calculation of dosing channels opening percentage	22
2. Simulation with a 10 liter (2 US gal) bucket of water	22
3. Calibration of the NetaFlex™ 3G while irrigating	24

USE OF SYMBOLS

The symbols used in this manual refer to the following:



WARNING

The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the NetaFlex™ 3G and/or the infrastructure.



CAUTION

The following text contains instructions aimed at preventing unwanted system operation, installation or conditions that, if not followed, might void the warranty.



ATTENTION

The following text contains instructions aimed at enhancing the efficiency of usage of the instructions in the manual.



NOTE

The following text contains instructions aimed at emphasizing certain aspect of the operation of the system or installation.



ACID HAZARD

The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the product and/or the infrastructure in the presence of acid.



ELECTRICAL HAZARD

The following text contains instructions aimed at preventing bodily injury or direct damage to the NetaFlex™ 3G and/or the infrastructure in the presence of electricity.



SAFETY FOOTWEAR

The following text contains instructions aimed at preventing foot injury.



PROTECTIVE EQUIPMENT

The following text contains instructions aimed at preventing damage to health or bodily injury in the presence of fertilizers, acid or other chemicals.



EXAMPLE

The following text provides an example to clarify the operation of the settings, method of operation or installation.

The values used in the examples are hypothetical. Do not apply these values to your own situation.



TIP

The following text provides clarification, tips or useful information.

SAFETY

Safety instructions

- All safety regulations must be applied.
- Ensure that the installation is carried out in a manner that prevents leaks from the NetaFlex™ 3G, the fertilizer/acid tanks and lines, the peripherals and the accessories, contaminating the environment, soil or ambient area.
- Electrical installation must be performed by an authorized electrician only.
- The electrical installation must comply with the local safety standards and regulations.
- Installation must be performed by authorized technicians only.
- Protection provided by the equipment can be impaired if the equipment is used in a manner other than that specified by the manufacturer.



WARNING

In agricultural environment - always wear protective footwear.



WARNING

Measures must be taken to prevent fertilizer infiltration of the water source, to avoid water pollution.



CAUTION

When opening or closing any manual valve, always do it gradually, to prevent damage to the system by water hammer.



NOTE

The maximum sound level produced by the equipment does not exceed 70dB.

SAFETY

When using acid/chemicals



ACID HAZARD

When using acid - always observe the acid manufacturer's safety instructions.



WARNING

Always use protective equipment, gloves and goggles when handling fertilizers, acid and other chemicals!



ATTENTION

Table 2 - When dosing acid, respect the concentration of the acid used*:

Diaphragm and O-rings	For pH correction			For maintenance of drippers		
	Nitric (HNO ₃)	Phosphoric (H ₃ PO ₄)	Sulfuric (H ₂ SO ₄)	Hydrochloric (HCl)	Hydrogen peroxide (H ₂ O ₂)	Chlorine (as hypochloride)
Viton	<40%	<85%	<90%	<33%	<50%	<10%

% is by weight at 21°C (70°F)

* The table indicates the resistance of the dosing channel components to acid, and is not a recommendation to use the acids mentioned.



WARNING

Exceeding the recommended acid concentrations will damage the dosing channels.



WARNING

Substances such as chemicals for pest/disease control might be corrosive and damage the NetaFlex™ 3G. When using any substance other than fertilizers or acids not exceeding the concentrations in table 1 above, always observe the manufacturer's instructions for corrosivity. In case of any doubt, consult your local Netafim™ representative.

DESCRIPTION

Introduction

The NetaFlex™ 3G is a reliable open-tank dosing system.

The NetaFlex™ 3G ensures very precise and homogeneous nutrient dosing for greenhouse crops.

The NetaFlex™ 3G is a modular CE-compliant dosing system that easily integrates with multiple Netafim™ and third-party control and monitoring systems.

The NetaFlex™ 3G always injects a uniform quantity of nutrients while performing perfect EC and pH control.

The NetaFlex™ 3G can accommodate a wide variety of dosing channels for fertilizer and concentrated/diluted acid. Up to 6 dosing channels of various types, from 50 l/hr (13 GPH) each, up to 600 l/hr (158 GPH) each, in many mixed configurations.

The NetaFlex™ 3G accommodates a wide variety of system pumps, peripherals and accessories to meet a vast range of applications and infrastructure constraints.

Highlights

- Wide range of soil/substrate applications
- Built around a standard platform
- Minimal investment requirement
- Efficient water, fertilizer and energy consumption
- Very large range of irrigation water capacities
- Quantitative or proportional Nutrigation capabilities
- Precise EC and pH control
- Almost completely maintenance-free Venturi operations - no moving parts
- Highly accurate dosing channels equipped with quick action dosing valves
- Fast and efficient Nutrigation recipe adjustments
- Easy integration into existing irrigation systems, Netafim's NMC, and third-party controllers
- Multilingual system
- Wide range of integrated accessories and peripherals
- High-quality components and PVC
- Aluminum, corrosion-resistant frame with adjustable legs
- Made by Netafim™

Advantages

- Easy to install and maintain system
- Highly profitable price/performance ratio
- Requires minimal investment with rapid ROI
- **Productive:** Employing precise EC and pH control assists in delivering a high quality product with outstanding yields (single or dual EC and pH control sets are available).
- **Uniform:** Delivers a consistent quantity or ratio of nutrients in a homogenous solution thanks to an open mixing tank design.
- **Flexible:** Works with a wide range of dosing channel flow rates up to 6 units of 50-600 l/hr (13-158 GPH). Each dosing channel is fitted with a multipurpose dosing valve for the dosing of fertilizer or acid, at any dosing rate up to 600 l/hr (158 GPH). Compatible with 50/60 Hz electricity frequency.
- **Scalable:** System flow rates from 3 m³/h (13 GPM) to 64 m³/h (282 GPM).
- **Focused:** Made for soil/soilless greenhouse applications.

DESCRIPTION

Specifications

Output flow rate and pressure

The NetaFlex™ 3G ensures a satisfactory mixture in a vast range of system performances. Flow rate from 3 m³/h (13 GPM) to 64 m³/h (282 GPM) at a wide range of output pressure according to the selected system pump. A single NetaFlex™ 3G will accommodate from a 0.1 Ha (0.25 Acres) to a 10 Ha (25 Acres) nursery. For output pressure lower than 3.0 bar (44 PSI) consult your local Netafim™ representative.

Fertilizer dosing capacity

The NetaFlex™ 3G accommodates up to 6 dosing channels of various types in many mixed configuration:

- 50 l/hr (13 GPH)
- 150 l/hr (40 GPH)
- 400 l/hr (105 GPH)
- 600 l/hr (158 GPH)

* For applications requiring more than 6 dosing channels - consult your local Netafim™ representative.

Add-ons

You can extend the functionality of your NetaFlex™ 3G by means of the many add-ons offering a wide variety of useful functions. All the add-ons are easy to connect to the NetaFlex™ 3G - here are a few examples:

Fertilizer meter with electric output

Enables continuous reading of fertilizer dosing. Useful in applications where the customer wants a broader indication on fertilizer flow on top of the EC and pH readings.

Stock selection

Enables the dosing of multiple fertilizers through a single dosing channel (in cases where simultaneous dosing is not required). Available in a wide variety of configurations, from a single channel with 2 fertilizers to as many channels and fertilizers as required.

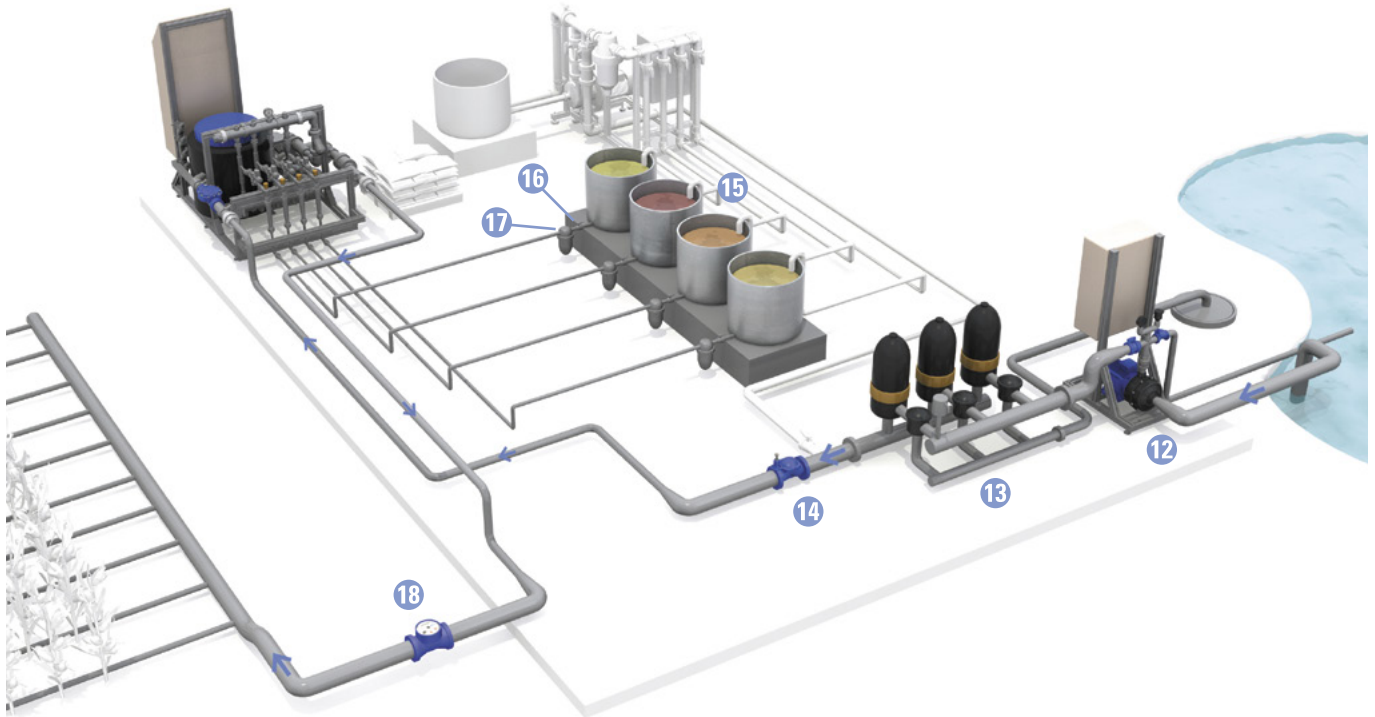
For further information on the NetaFlex™ 3G add-ons, consult your local Netafim™ representative.

DESCRIPTION

Typical installation overview

The drawing below represents a typical NetaFlex™ 3G infrastructure.

NetaFlex™ 3G



12 Filling pump

13 Filling line filter

14 Pressure reducing valve

15 Fertilizer/acid stock tank

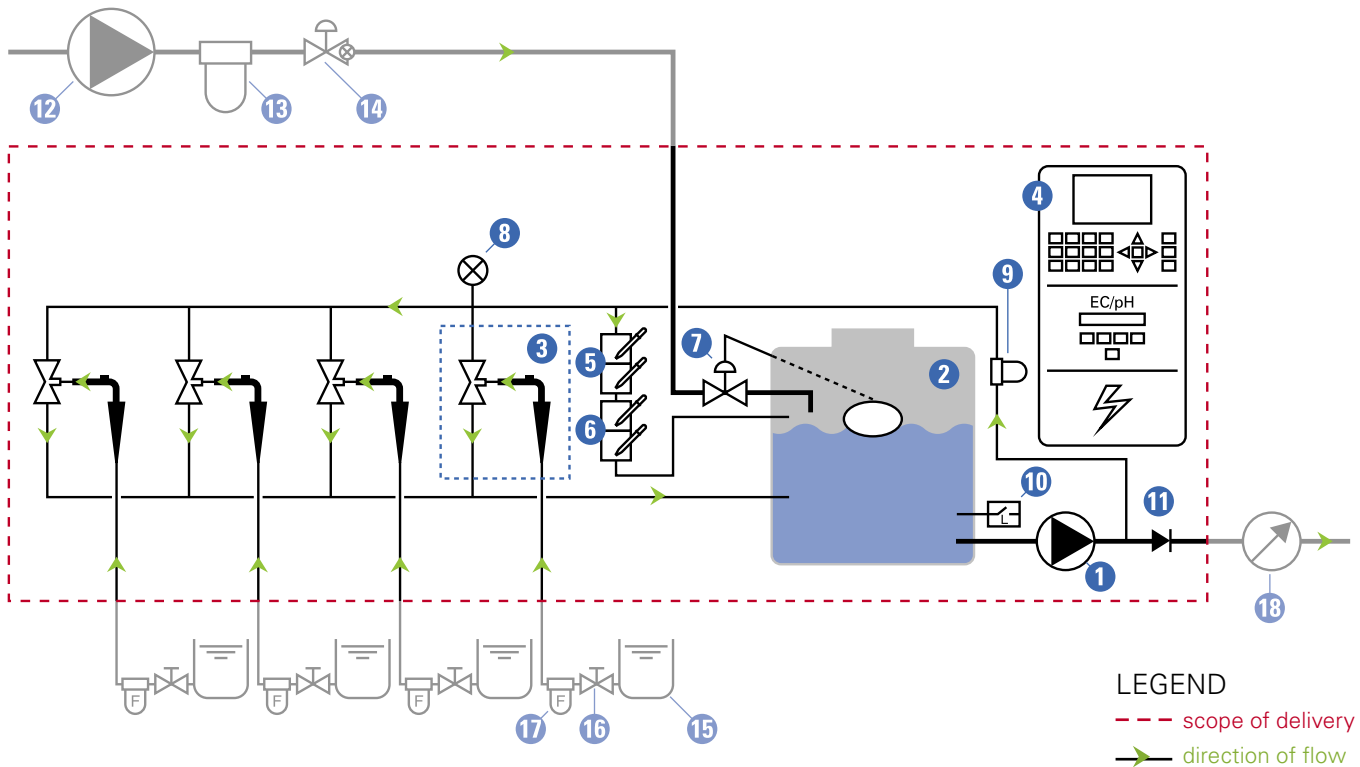
16 Manual valve (fertilizer)

17 Fertilizer/acid filter

18 Water meter

DESCRIPTION

Schematic diagram



1 System pump

2 Tank

3 Dosing channel + Venturi

4 Control panel, including:
Controller, EC/pH transducer,
electric switchboard.

5 EC sensors (2)

6 pH sensors (2)

7 Float valve

8 Pressure gauge

9 Upper manifold filter

10 Low level switch

11 Non-return valve

12 Filling pump

13 Filling line filter

14 Pressure reducing valve

15 Fertilizer/acid stock tank

16 Manual valve (fertilizer)

17 Fertilizer/acid filter

18 Water meter

LEGEND

--- scope of delivery

→ direction of flow

DESCRIPTION

Dimensions

Extrenal dimensions

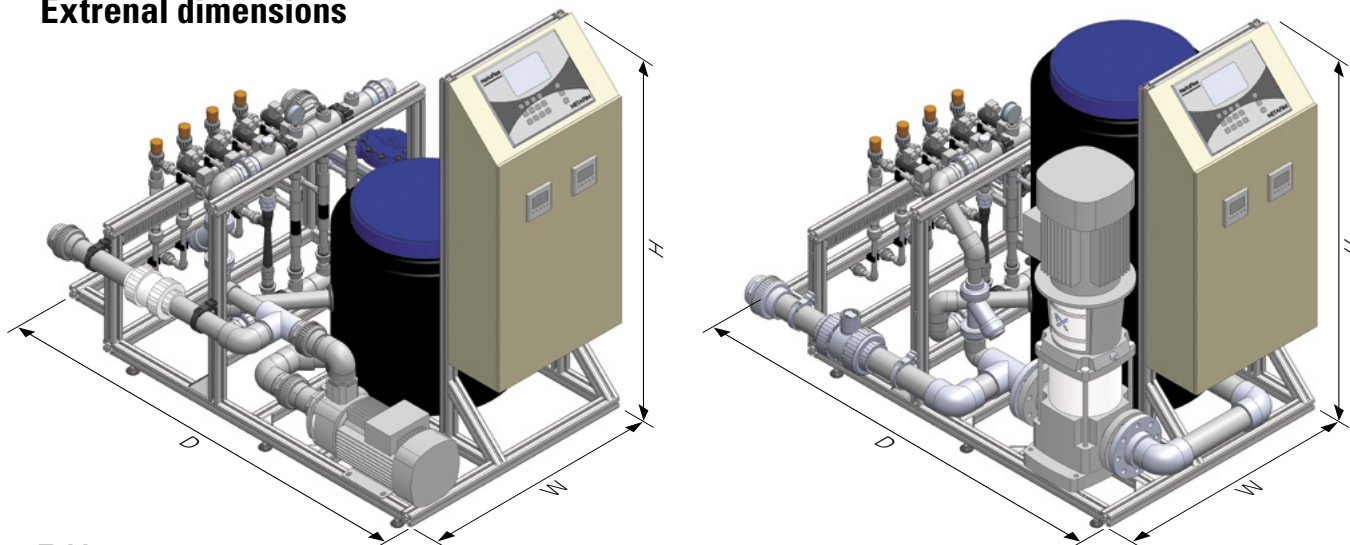


Table 6

NetaFlex™ 3G external dimensions (W/D/H*)	Package dimensions (W/D/H**)
109/148/133.5 cm (43/58.3/52.5")	131/166/159 cm (51.5/65.5/62.5")

*The height varies by ± 1 cm (± 0.5 ") according to the adjustment of the legs.

**The package height includes the pallet height of 15 cm (6").



NOTE

Allow 20 cm (8") around the NetaFlex™ 3G for inlet, outlet and fertilizer pipes connections.

Weights°

The weight of the NetaFlex™ 3G varies according to the selected system pump.

Table 7

50Hz			60Hz		
System pump	Net weight°	Packed weight°	System pump	Net weight°	Packed weight°
CM10-3	156 kg. (344 lbs.)	286 kg. (631 lbs.)	CM10-2	158 kg. (348 lbs.)	288 kg. (635 lbs.)
CM10-4	159 kg. (351 lbs.)	289 kg. (637 lbs.)	CM10-3	161 kg. (355 lbs.)	291 kg. (642 lbs.)
CM15-4	175 kg. (386 lbs.)	305 kg. (673 lbs.)	CM15-2	160 kg. (353 lbs.)	290 kg. (639 lbs.)
CM25-2	153 kg. (337 lbs.)	283 kg. (624 lbs.)	CM25-2	172 kg. (379 lbs.)	302 kg. (665 lbs.)
CM25-3	176 kg. (388 lbs.)	306 kg. (675 lbs.)	CR32-2-2	214 kg. (472 lbs.)	344 kg. (758 lbs.)
CR32-3-2	217 kg. (478 lbs.)	347 kg. (765 lbs.)	CR32-2	226 kg. (498 lbs.)	356 kg. (785 lbs.)
CR32-3	217 kg. (478 lbs.)	347 kg. (765 lbs.)	CR45-2-2	280 kg. (617 lbs.)	410 kg. (904 lbs.)
CR45-2	237 kg. (522 lbs.)	367 kg. (809 lbs.)	CR45-1	233 kg. (514 lbs.)	363 kg. (800 lbs.)
CR45-3-2	284 kg. (626 lbs.)	414 kg. (913 lbs.)	CR64-1	279 kg. (615 lbs.)	409 kg. (902 lbs.)
CR64-2-1	283 kg. (624 lbs.)	413 kg. (911 lbs.)	CR64-2-2	296 kg. (653 lbs.)	426 kg. (939 lbs.)
CR64-2	240 kg. (529 lbs.)	370 kg. (816 lbs.)			

°Order of magnitude only - final weights are issued with the product order.

OPERATION AND MAINTENANCE

Operation

The routine operation of the NetaFlex™ 3G is almost totally automatic, controlled by the controller (for the operation of the controller, see the [Controller Manual](#)).

Necessary conditions for the proper operation of the NetaFlex™ 3G:

- Electricity is supplied to the NetaFlex™ 3G.
- Source water should enter the NetaFlex™ 3G at a flow rate equal to the maximum flow rate required for the field.

If the flow rate at the inlet of the NetaFlex™ 3G is insufficient, the low level switch will be activated and the NetaFlex™ 3G operation will be stopped.

- The water entering the NetaFlex™ 3G should be within a pressure range of 2 to 4.5 bar (29 PSI to 65 PSI).
- The water entering the NetaFlex™ 3G should be within a temperature range of 10°C to 35°C (50°F to 95°F).
- The source water to the NetaFlex™ 3G should be of a satisfactory chemical quality. If water pre-treatment is required, apply chemical conditioning before the water reaches the NetaFlex™ 3G.

Dual dosing channel

If more than 4 dosing channels are required (up to 6), the dual dosing channel option is installed.

- Up to 2 dual dosing channels can be installed on the NetaFlex™ 3G, at the farthest manifold positions (1 and 4).

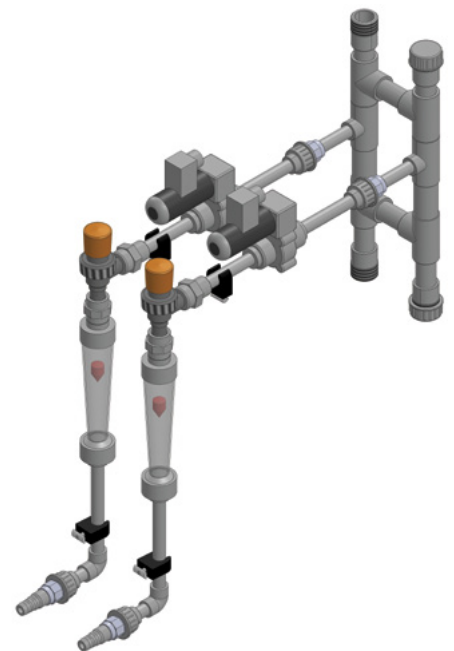


CAUTION

There are fertilizer combinations that should never be used in the dual dosing channel as they will induce crystallization and cause clogging of the pipes.

- Calcium Nitrate + Ammonium Sulfate => Calcium Sulfate
- Calcium Nitrate + Potassium Sulfate => Calcium Sulfate
- MKP + Calcium Nitrate => Calcium Phosphate
- MAP + Calcium Nitrate => Calcium Phosphate
- Phosphoric acid + Calcium Nitrate => Calcium Phosphate

In case of doubt regarding the use of any combination of fertilizers in the dual dosing channel, consult your local Netafim™ representative.



OPERATION AND MAINTENANCE

Maintenance



WARNING

Never perform maintenance/repair of the NetaFlex™ 3G when the system is under pressure.

Before performing maintenance/repair of the NetaFlex™ 3G, always set the controller to PAUSE.

After completing the maintenance/repair activity always set the controller out of the PAUSE setting back to its previous setting.



CAUTION

When opening or closing any manual valve, always do it gradually, to prevent damage to the system by water hammer.

To prevent failures and extend the life cycle of the NetaFlex™ 3G, the user must carry out regular maintenance.

- Keep the NetaFlex™ 3G dosing unit and its immediate environment clean and dry.



CAUTION

Before calibrating the EC and pH sensors, make sure there is no pressure in the system.

- The NetaFlex™ 3G dosing unit and the supply water and irrigation system must be inspected regularly.

Table 5 - Regular inspection

Description	How often	Instructions
Rinsing of fertilizer filters*	Once a day	
Rinsing of supply water filters*	Once a day	
Rinsing of upper manifold filter	Every 4 weeks	
Water and fertilizer leak inspection	Once a week	Visual inspection
Calibration of the pH sensor	Every 2-4 weeks	See the EC/pH Transducer Manual
Calibration of the EC sensor	Every 4 weeks	

* Manual filters only.

OPERATION AND MAINTENANCE

Check the NetaFlex™ 3G hydraulic conditions every 4 weeks

Check the pressure gauge and the Rotameters of the dosing channels and compare the data to the initial settings in the controller (**NMC Pro - screen 7.6**). Make sure that no significant changes occurred to the hydraulic conditions of the NetaFlex™ 3G.

When verifying the flow rate for each dosing channel, make sure the cursors on all the Rotameters are adjusted.



NOTE

The Rotameter's scale is calibrated by the manufacturer for measurement of the flow rate of water (H₂O). Certain inaccuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.



ATTENTION

Once a month, read the measured flow rates of the dosing channels and compare them with the flow rates defined in the controller, to check whether any changes have occurred.



Winterization



CAUTION

When opening or closing any manual valve, always do it gradually, to prevent damage to the system by water hammer.

If the NetaFlex™ 3G is located in an unheated space where the temperature might drop below 5°C (41°F), if the system is not required for irrigation during the winter, perform the following procedure to avoid damage caused by freezing when the NetaFlex™ 3G is idle for the winter period:

At the beginning of winter:



CAUTION

Before removing the EC and pH sensors, make sure there is no pressure in the system.

- Remove EC and pH sensors and store the pH sensor immersed in KCL solution (supplied with the sensor) or in calibration buffer 4 at temperature 18-25°C (64-77°F). The pH sensor must never be dry (see [EC/pH Transducer Manual](#)).
- Empty the NetaFlex™ 3G of water.

At the end of winter:



NOTE

It is recommended to install new EC and pH sensors at the beginning of a new season.

- Reinstall the EC and pH sensors and calibrate them (see [EC/pH Transducer Manual](#)).
- Restore the pressure in the system.

TROUBLESHOOTING

This chapter is a systematic guide to the actions to be taken in the case of a malfunction of the NetaFlex™ 3G.



WARNING

Never perform maintenance/repair of the NetaFlex™ 3G when the system is under pressure.

Before performing maintenance/repair of the NetaFlex™ 3G, always set the controller to PAUSE.

After completing the maintenance/repair activity always set the controller out of the PAUSE setting back to its previous setting.



ATTENTION

Before proceeding to troubleshoot any malfunction, make sure that:

- The controller settings regarding the dosing channels are correct and match the dosing channels of the NetaFlex™ 3G (see the [Controller Manual](#)).
- The controller settings regarding the field valves are correct (see the [Controller Manual](#)).

Perform the actions in their order of appearance until the malfunction is fixed.

If you identify faulty parts - consult your local Netafim™ representative.



CAUTION

Only qualified electricians are permitted to perform electrical installations and repairs!



CAUTION

If isolation valves have been installed on the system, ensure that they are in closed position before troubleshooting any hydraulic malfunction.



ATTENTION

If fertilizers from a different manufacturer have been recently in use and changes in EC and pH are recorded, perform calibration of the system before assuming a malfunction of the NetaFlex™ 3G (see [Appendix 1 - Calibration](#), page 22).

Symptoms regarding more than one single dosing channel

If one or more of the following symptoms occur regarding more than one single dosing channel, perform the actions listed below:

Controller warnings

- Low EC
- High pH
- Low fertilizer/acid flow rate

Rotameter reading

- Low fertilizer/acid flow rate

Action

- 1) For controller warnings only - check and calibrate the EC and pH sensors (see the [EC/pH Transducer Manual](#)).
- 2) Have a qualified electrician check that electricity is being supplied to the NetaFlex™ 3G and that all the electrical components are properly connected (see the Switchboard documentation).

TROUBLESHOOTING

- 3) Compare the readings of the pressure gauge and the Rotameters of the dosing channels to the readings before the malfunction started and check whether changes occurred to the hydraulic conditions.

If YES, restore the original hydraulic conditions.

If NO or if the malfunction is still not fixed after restoring the original hydraulic conditions, have a qualified electrician check the system pump:

Does it function? Does it rotate in the correct direction?

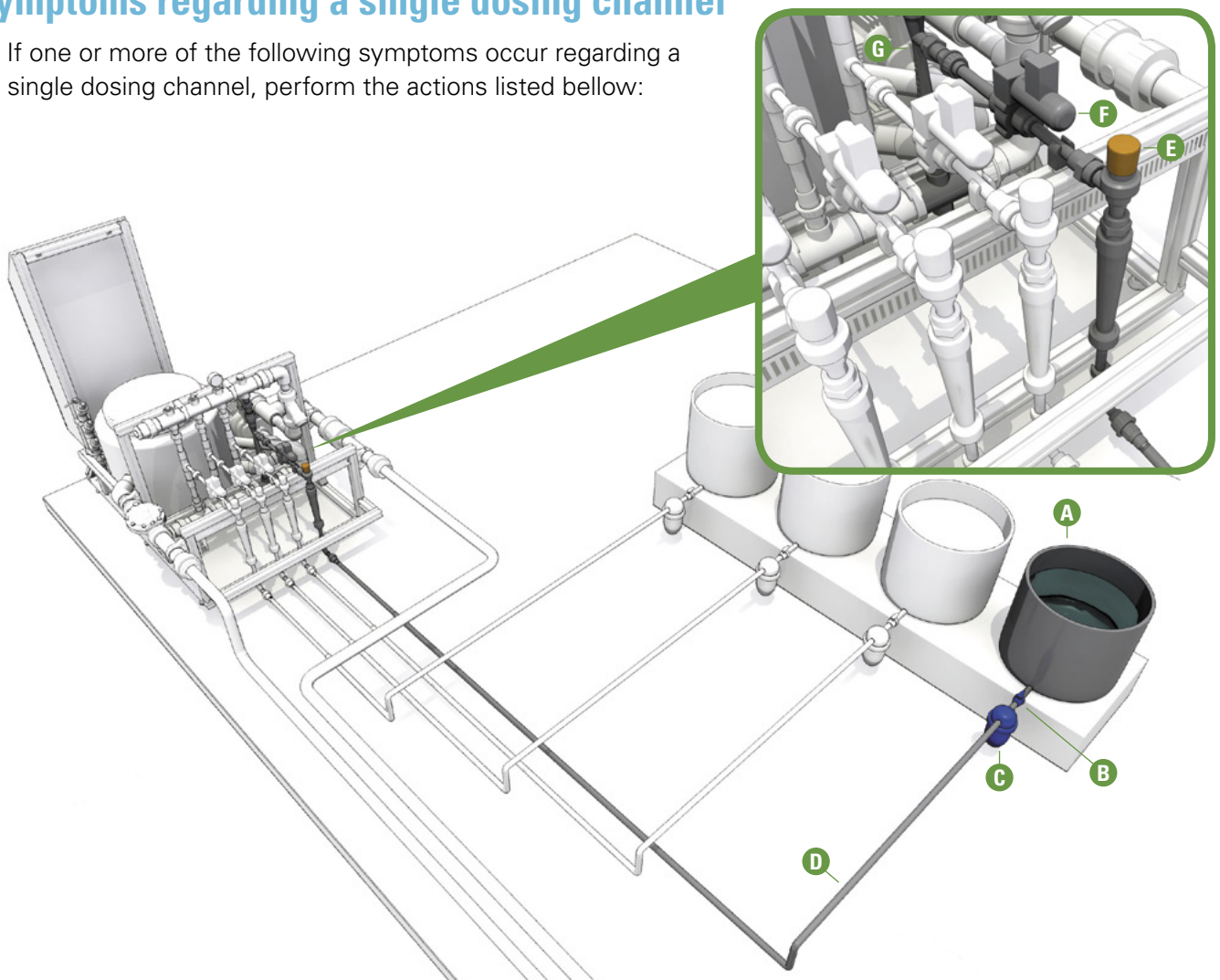
If the pump does not rotate in the correct direction - the electrician should swap between phases L1 and L3 (see the system pump Manual).

- 4) Make sure there is no air pocket in the system pump impeller chamber:
Loosen the dosing system pump's bleeding screw and wait until a stable flow, free of air-bubbles, is obtained, then retighten the bleeding screw (act according to the instructions in the system pump Manual).
- 5) Check the system pump's impeller chamber for clogging:
If it is clogged - it should be dismantled and thoroughly cleaned (act according to the instructions in the system pump Manual).

If after implementing all the above steps the malfunction is still not fixed - consult your local Netafim™ representative.

Symptoms regarding a single dosing channel

If one or more of the following symptoms occur regarding a single dosing channel, perform the actions listed below:



TROUBLESHOOTING

Controller warnings

- Low EC
- High pH
- Low fertilizer/acid flow rate

Rotameter reading

- Low fertilizer/acid flow rate

Action

- 1) Check that there is fertilizer/acid solution in the stock tank **A**.
- 2) Check that the stock tank manual valve **B** is in the OPEN position.
- 3) Check that the fertilizer/acid filter **C** is clean - If not, it should be dismantled and thoroughly cleaned.
- 4) Check the fertilizer/acid line **D** (from the stock tank to the dosing channel) for leaks and breaches and make sure all the connectors are tightened.
- 5) Make sure the dosing channel's needle valve **E** is open according to the the initial setting.
- 6) Visually check the needle valve **E** for chemical damage (internal deformation).
If internal deformation is present - replace the needle valve.
- 7) Visually check the needle valve **E** for clogging.
If clogging is present - thoroughly clean the needle valve.
- 8) Check that the dosing valve **F** is functioning:

With the controller in MANUAL mode, set the dosing valve **F** to ON (see the [Controller Manual](#)).
The LED on the dosing valve should be lit.

If it is not - have a qualified electrician check the dosing valve's cable for electrical continuity.

If the cable is in working order - check the controller (see the [Controller Manual](#)).

If the controller and the cable are in working order - toggle the dosing valve **F** to OFF and again to ON in the controller (see the [Controller Manual](#)). A "Click" should be heard from the dosing valve with each toggle - If a "Click" is not heard, replace the dosing valve (consult your local Netafim™ representative).

If a "Click" is heard and the dosing valve **F** still does not open - disconnect the dosing valve from the dosing channel and with the dosing valve set to ON in the controller (see the [Controller Manual](#)), check for clogging by injecting water at low pressure through the dosing valve.

If there is clogging - thoroughly clean the dosing valve **F** with running water.

If there is no clogging and the dosing valve **F** still does not open - replace it (consult your local Netafim™ representative).

If after implementing all the above steps the malfunction is still not fixed -

- 9) Disconnect the Venturi **G** from the manifolds and from the dosing channel and check it for clogging, visually and by injecting water at low pressure through it.

If there is clogging - thoroughly clean the Venturi **G** with running water.

- 10) Visually check the Venturi **G** for chemical damage (internal deformation).
If internal deformation is present - replace the Venturi (consult your local Netafim™ representative).

If after implementing all the above steps the malfunction is still not fixed - consult your local Netafim™ representative.

TROUBLESHOOTING

Symptoms while idle

If the following symptoms occur while the NetaFlex™ 3G is idle, perform the actions listed below:

Controller warnings

- High EC
- Low pH
- While idle - Uncontrolled fertilizer/acid flow rate or a fertilizer/acid leak or breach

Action



NOTE

Make sure the dosing valve selector is in the CLOSED position.

Check if the dosing valves leak when closed:

- 1) Close all the manual valves **B** for fertilizers and acid.
- 2) Make sure the level of the solution in all the the stock tanks is higher than the dosing valves.
- 3) With the controller in MANUAL mode, set all the dosing valves to OFF (see the [Controller Manual](#)).
- 4) Disconnect one of the the dosing valves from the Venturi (downstream from the dosing valve).
- 5) Open the fertilizer manual valve **B**.
If a leak from the dosing valve is visible - disconnect the dosing valve from the dosing channel.
- 6) With the controller in MANUAL mode, set the dosing valve to ON (see the [Controller Manual](#)).
- 7) Thoroughly clean the dosing valve with running water.
- 8) Repeat steps 4-7 for each fertilizer and acid dosing channel.
- 9) After completing the procedure, open all the manual valves **B** for fertilizers and acid.
- 10) If the malfunction is still not fixed - replace the dosing valve.

If after implementing all the above steps the malfunction is still not fixed - consult your local Netafim™ representative.



TROUBLESHOOTING

The NetaFlex™ 3G is not running

If the following symptom occurs during operation, perform the actions listed below:

Controller warning

- NO FLOW.

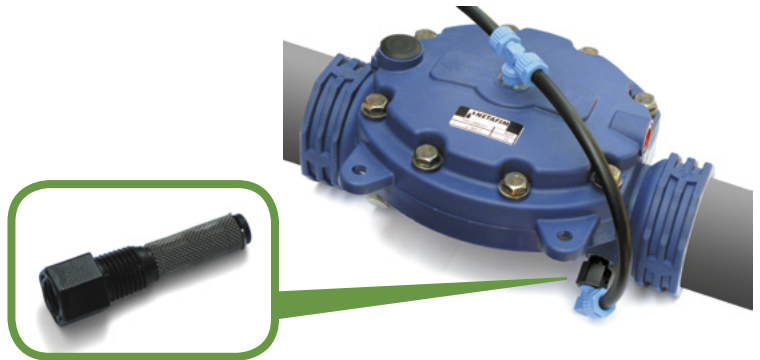
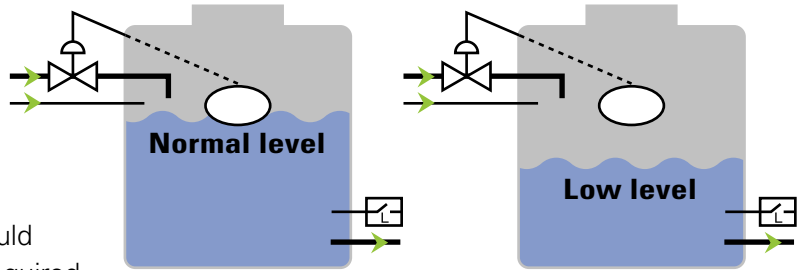
Action

- 1) Check if the water in the tank reaches the float.

Check the water supply at the inlet of the NetaFlex™ 3G. The flow rate should be equal to the maximum flow rate required

for the field and the pressure should be between 2 bar and 4.5 bar (29 PSI and 65 PSI) according to the system requirements. If it is not, restore the original water supply conditions.

- 2) Make sure the filters on the main line upstream from the NetaFlex™ 3G are clean and free of clogging.
- 3) Check the finger filter of the float valve's command loop for clogging. If it is clogged - dismantle it and clean it thoroughly with running water.

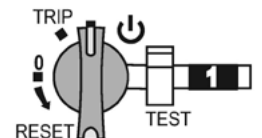


CAUTION

Only qualified electricians are permitted to perform electrical installations and repairs!

- 3) Have a qualified electrician check the overload protection breaker (see the Switchboard documentation):
If it is not on the ON position, turn it to ON.

If it is on the ON position, toggle it once to OFF and to ON again
(do not repeat this action).



If the overload protection breaker trips (turns to OFF or to TRIP) again, the electrician will check if the system pump is in working order (see the system pump Manual) and check if there are irregularities in the electricity voltage supplied to the NetaFlex™ 3G.

If after implementing all the above steps the malfunction is still not fixed - consult your local Netafim™ representative.

WARRANTY

Netafim™ warrants all the components of the NetaFlex™ 3G to be free of defects in material and workmanship for 1 (one) year from the date of installation, provided the installation has been reported to Netafim™ within 30 days of installation.

If the installation was not reported or was reported later than 30 days from the date of installation, Netafim™ will warrant the NetaFlex™ 3G for a period of 18 months from the date of production, according to its serial number.

If a defect is discovered during the applicable warranty period, Netafim™ will repair or replace, at its discretion, the product or the defective part.

The above does not apply to EC and pH sensors, since they are wearable. Netafim™ will warrant these items to be free of defects in material and workmanship for 3 months from the date of installation, provided the installation has been reported to Netafim™ within 30 days, or 6 months from date of production if installation was not reported or was reported later than 30 days from the date of installation.



CAUTION

When not installed, the pH sensor must be immersed in KCL solution (supplied with the sensor) or in calibration buffer 4 at temperature 18-25°C (64-77°F), protected from freezing and not be exposed to pressure greater than 6 bars (87 PSI).

Damage due to these causes is not covered by warranty.

This warranty does not extend to repairs, adjustments or replacements of a NetaFlex™ 3G or part that results from misuse, negligence, alteration, force majeure, lightning, power surge, improper installation or improper maintenance.

If a defect arises in your Netafim™ product during the warranty period, contact your local Netafim™ representative.

Limited warranty

This warranty is subject to the conditions in Netafim's official warranty statement.

(For the full text of Netafim's official warranty statement, please contact your local Netafim™ representative).

APPENDIX 1 - CALIBRATION

The process of calibrating the NetaFlex™ 3G is carried out in three stages:

1. Calculation of dosing channels opening percentage

To finely calibrate the NetaFlex™ 3G in order to achieve homogeneous and stable dosing, perform the following calculation for each dosing channel (fertilizers and acid) to determine the amount of suction reduction needed to attain the required fertilizer/acid flow rate.

Metric units

Flow rate of the largest irrigation shift m³/hr
 X
 Dosing ratio of a single fertilizer/acid l/m³
 =
 Result: a single fertilizer/acid flow rate l/hr
 X 1.25 =
 Result: target Rotameter reading l/hr

EXAMPLE

<input type="text" value="30"/>	m ³ /hr
X	
<input type="text" value="8"/>	l/m ³
=	
<input type="text" value="240"/>	l/hr
X 1.25 =	
<input type="text" value="300"/>	l/hr

DEFINITION

Dosing ratio = $\frac{\text{The quantity of fertilizer/acid (l)}}{1 \text{ m}^3 \text{ irrigation water}}$

US units

Flow rate of the largest irrigation shift GPM
 X
 Dosing ratio of a single fertilizer/acid US gal/1000 US gal
 X 0.06 =
 Result: a single fertilizer/acid flow rate GPH
 X 1.25 =
 Result: target Rotameter reading GPH

EXAMPLE

<input type="text" value="130"/>	GPM
X	
<input type="text" value="8"/>	US gal/1000 US gal
X 0.06 =	
<input type="text" value="62"/>	GPH
X 1.25 =	
<input type="text" value="78"/>	GPH

DEFINITION

Dosing ratio = $\frac{\text{The quantity of fertilizer/acid (US gal)}}{1 \text{ THG (1000 US gal) irrigation water}}$



NOTE

The Rotameter's scale is calibrated by the manufacturer for measurement of the flow rate of water (H₂O). Certain inaccuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.

2. Simulation test with a 10 liter (2 US gal) bucket of water

Instruments needed

- Good-quality portable EC and pH sensors, finely calibrated
- Calibration solutions for EC and pH
- Bucket with a scale for up to 10 liters (2 US gallons)
- Measuring tube or syringe with a scale for up to 100 cc (1 oz)
- Clean (preferably distilled) water for cleaning sensors during calibration
- Blotting paper for cleaning and drying

The client prepares the fertilizer solutions and the acid solution (if required) in the stock tanks according to the recipe advised by the agronomist/consultant.



ATTENTION

Ensure the fertilizers and acid solutions in the stock tanks have been thoroughly agitated before starting the simulation.

APPENDIX 1 - CALIBRATION

Note the required dosing ratio of each fertilizer solution and the dosing ratio of the acid solution (if used).

Fill a bucket with 10 liters (2 US gallons) of the client's supply water (without fertilizer or acid).

Measure the EC and the pH levels of the water in the bucket using calibrated portable sensors.

EXAMPLE

	EC	pH
Supply water (without fertilizer or acid)	0.3	7.8

Using a measuring tube or a syringe, take a dose from each fertilizer solution and from the acid solution (if used) according to the proportions determined by the dosing ratio (see example below) and **mix thoroughly** with the water in the bucket.

EXAMPLE

Metric units

For a fertilizers dosing ratio of 10 l/m³ each and an acid dosing ratio of 2 l/m³ the quantities for 10 liters of water in the Bucket-simulation-test will be 100 cc of each fertilizer solution and 20 cc of the acid solution

US units

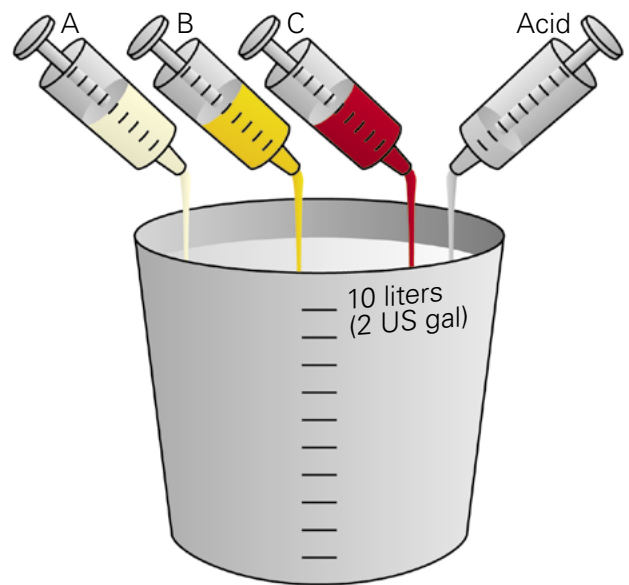
For a fertilizers dosing ratio of 3.0 US gal/THG each and an acid dosing ratio of 1.1 US gal/THG the quantities for 2 US gallons of water in the Bucket-simulation-test will be 0.76 oz* of each fertilizer solution and 0.28 oz** of the acid solution

DEFINITIONS

1 US gal = 128 oz

$$* \frac{3.0 \times 2}{1000} = 0.006 \text{ US gal} = 0.768 \text{ oz}$$

$$** \frac{1.1 \times 2}{1000} = 0.0022 \text{ US gal} = 0.28 \text{ oz}$$



Measure the EC and the pH levels of the mixture in the bucket using calibrated portable sensors.

Compare the measured EC and pH values to the target values set by the agronomist/consultant.

EXAMPLE

	EC	pH
After adding the fertilizers and acid	1.6	5.5
Target values	1.8	5.8
Deviation from target value	11%	5%



APPENDIX 1 - CALIBRATION

With the controller set to operate according to EC/pH values - if the EC and pH values measured in the bucket are within a range of $\pm 30\%$ deviation from the target values, the system will be able to correct them automatically.

If the values are out of the $\pm 30\%$ range, check the data and consult the agronomist/consultant.

3. Calibration of the NetaFlex™ 3G while irrigating



WARNING

Extreme EC or pH values may damage the crop.

Perform the following procedure only after completing stage 2 above (Simulation test with a 10 liter or 2 US gallon bucket of water) with satisfactory results.



NOTE

The following steps explain the operations to be performed, regardless of the type of controller used. For the operation of your controller's interface, consult the [Controller Manual](#).

However, since the NMC Pro controller is widely used - its interface screens for the execution of each step are noted.



NOTE

Before the calibration, confirm that the EC and the pH sensors of the NetaFlex™ 3G have been calibrated according to the instructions in the [EC/pH Installation Manual](#).

Define the dosing configuration, while the EC and pH controls are in the OFF position (**NMC Pro - screen 7.7**).

In the EC and pH alarm definitions, set the EC and pH alarm to the OFF position (deactivated) (**NMC Pro - screen 3.6**).

Enter the data for the irrigation valves, and the dosing ratio for each dosing channel (**NMC Pro - screens 1.1-1.2-1.3**).

Run the program (**NMC Pro - screen 2.2**).

Allow a few minutes for the pipes to fill up and the flow rate to stabilize.

Reduce the suction of the dosing channels by adjusting the manual needle valve of each dosing channel until the "target Rotameter reading" calculated in stage 1 (page 24) is attained.



NOTE

The Rotameter's scale is calibrated by the manufacturer for measurement of the flow rate of water (H₂O). Certain inaccuracies may be observed when the flow rate of liquids with different densities, such as fertilizers and acids, is measured.

Check the appropriate controller screen for the measured EC and pH values (**NMC Pro - hot screen 4**).

If the desired values have been reached, check opening percentages of the dosing valves.

The EC and pH target values should be attained with the dosing valves opened to 50% - 80% of their capacity.

If the EC and pH target values are attained with the dosing valves opened less than 50%, reduce the dosing channel suction rate, until the EC and pH target values are reached.



NOTE

Every change in the flow rate of the needle valve must be updated afterwards in the controller (**NMC Pro - screen 7.6**).

APPENDIX 1 - CALIBRATION

If the EC and pH target values cannot be attained, and the dosing valves are opened more than 85%, measures should be taken to increase the dosing ratio - if feasible, slightly increase the concentration of the fertilizer solution and/or reduce the water flow rate to the field during irrigation.

If not - consult the agronomist/consultant.

In a field where the flow rate changes significantly from one irrigation shift to the next, try to be at a minimum of 50% dosing valve opening for the low flow rate shift, and a maximum of 80% for the high flow rate shift.

When the calibration process is completed, return to the EC and pH control screen in the controller, define the deviation in EC and pH values for the channels and switch the EC and pH control to ON

(NMC Pro - screen 7.7-7.6).

In the EC and pH alarm definitions, define the EC and pH deviation from the target values that, if attained, will trigger the alarm and set the EC and pH alarm to the ON position (activated) **(NMC Pro - screen 3.5-3.6).**



NOTE

EC and pH values must not exceed a $\pm 30\%$ deviation from the target values.



ATTENTION

Once a month, read the measured flow rates of the dosing channels and compare them with the flow rates defined in the controller, in order to check whether changes have occurred

(NMC Pro - screen 7.6).

After completing the calibration process, write down the data as reference for calibration of the NetaFlex™ 3G in the future.

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