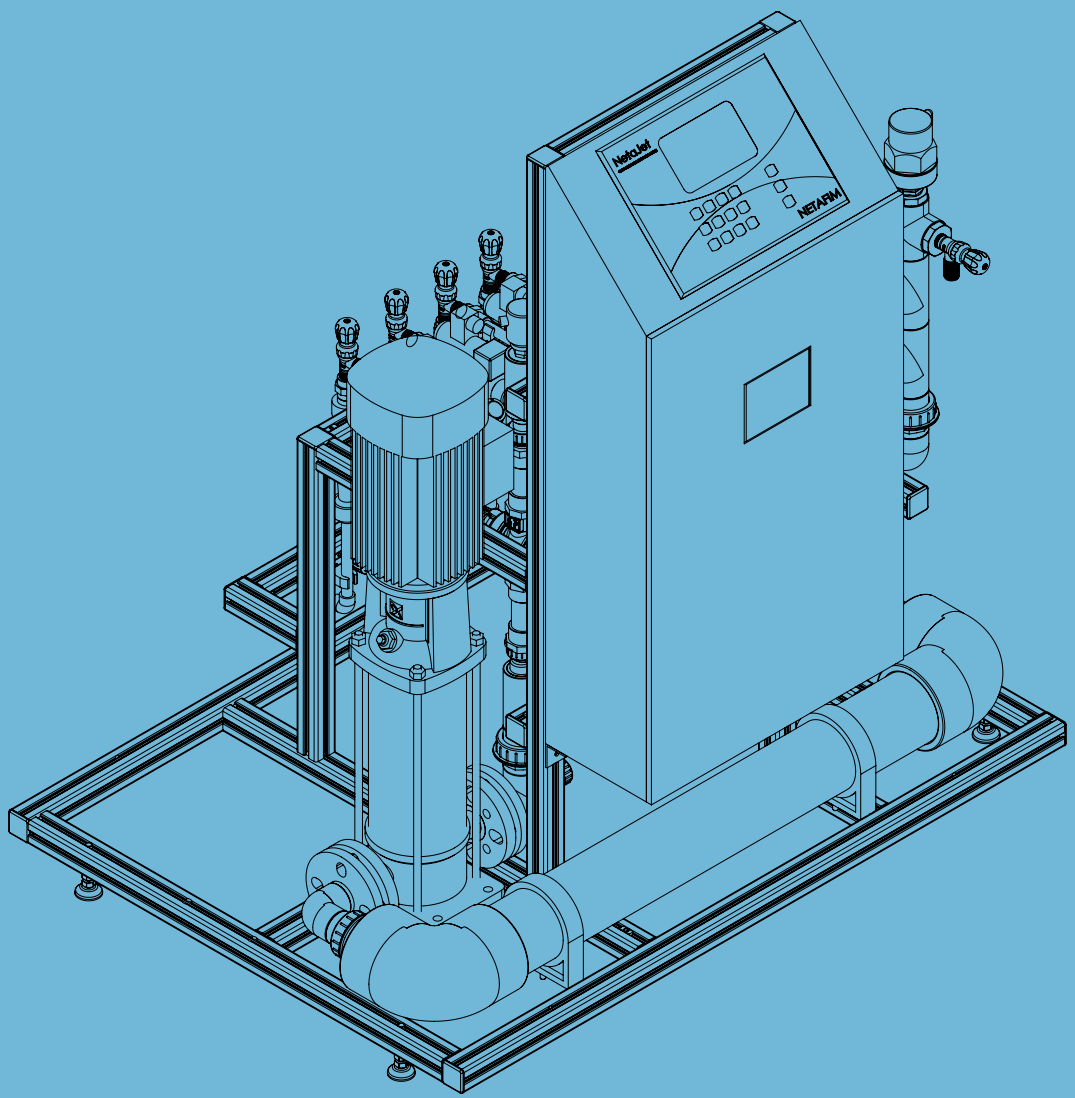
NETAJET™ 4G

SALES DOCUMENTATION



V 001.02 - JULY 2017

NETAFIM™
GROW MORE WITH LESS

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 product 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 aspects 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.

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.

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

THE NETAJET™ 4G

Features

- The NetaJet™ 4G realizes Netafim's "grow more with less" concept. Based on Netafim's unique Nutrigation™ technology, it controls the amount of water and fertilizers used, optimizing resource utilization for each specific crop and soil/substrate type.
- The NetaJet™ 4G is extremely accurate and reliable, preventing water and fertilizer waste while reducing environmental pollution.
- The NetaJet™ 4G ensures very precise and homogeneous nutrient dosing for greenhouse crops.
- The NetaJet™ 4G is a modular CE-compliant dosing system that easily integrates with multiple Netafim™ and third-party control and monitoring systems.
- The NetaJet™ 4G always injects a uniform quantity of nutrients while performing perfect EC and pH control.
- The NetaJet™ 4G can accommodate a wide variety of dosing channels for fertilizer and concentrated/diluted acid.
- The NetaJet™ 4G accommodates a wide variety of system pumps, peripherals and accessories to meet a vast range of applications and infrastructure constraints.

Highlights

- Equipped with Netafim's unique innovative analog dosing channels for very accurate and reliable EC/pH control.
- Provides fast and accurate fertilizer and acid control.
- State-of-the-art technology with unique static mixing chamber
- Short control cycle
- Efficient water, fertilizer and energy consumption
- Guaranteed EC and pH control
- Almost completely maintenance-free Venturi operations – no moving parts
- Highly accurate dosing channels
- Fast and efficient Nutrigation™ recipe adjustments
- Multi-lingual capabilities
- Made by Netafim™

Advantages

- Easy system installation and maintenance
- In-house developed offering
- Versatile flow capacity
- Covers all applications ranging from greenhouse in soil, to very intensive soilless media
- Requires minimal investment with rapid ROI

Operating principle

The NetaJet™ 4G doses the various fertilizers and acids into a homogeneous solution in its unique HidroMix static mixing chamber and injects it into the irrigation water main line.

The suction of the fertilizers and acid in the dosing channels is based on the Venturi principle. This requires a pressure differentiation - available on the main line or supplied by the main line pump or the NetaJet's dosing booster.

Main components

- HydroMix static mixing chamber
- A compensation channel with a pressure regulator
- Factory-installed PRV at the inlet and a PSV at the outlet
- Selectable analog dosing channels
- Dual EC/pH monitoring and control
- Quick-action dosing valves
- Wide range of integrated accessories and peripherals
- High-quality components and PVC piping
- Aluminum, corrosion-resistant frame with adjustable legs

Analog dosing channel

The NetaJet™ 4G is the first fertilizer-dosing system equipped with Netafim's unique innovative analog dosing channel.

The analog dosing channel is the long-awaited solution for very accurate and reliable EC/pH control for Nutrigation™ of high-value greenhouse crops.

The analog dosing channel is equipped with a servo motor capable of continuous variable opening from 0 to 100%. This unique feature allows unprecedented precise and seamless Nutrigation™.

Advantages

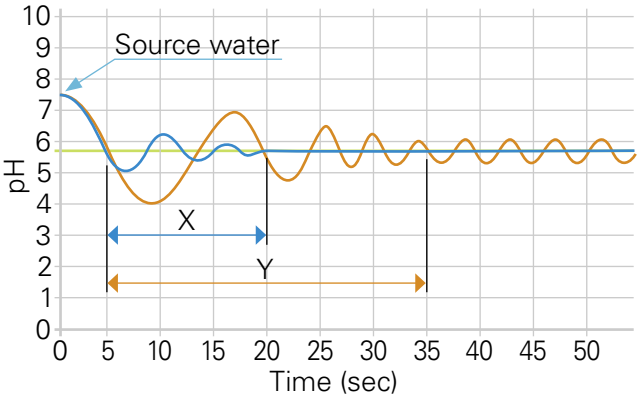
- Ultra-high precision
- Smooth and stable hydraulic operation
- No fluctuations
- Fast EC/pH set-point reaching
- Short stabilization time
- Enables short Nutrigation™ cycles
- No risk of cavitation damage to the booster

Stabilization time

The analog dosing channel offers the benefit of a significantly shorter stabilization time compared with the digital (pulsating) dosing channel (up to 50%). This is particularly beneficial when performing short Nutrigation™ cycles typical of greenhouse crops.

- X = Analog (continuous-variable) dosing channel
- Y = Digital (pulsating) dosing channel

Digital (ON/OFF) vs. analog dosing channel performances



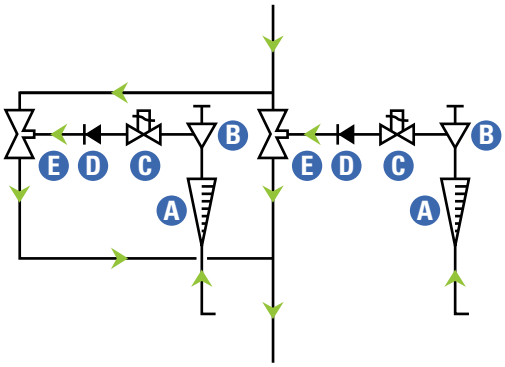
Analog (continuous-variable) dosing channel
Digital (pulsating) dosing channel
pH set point

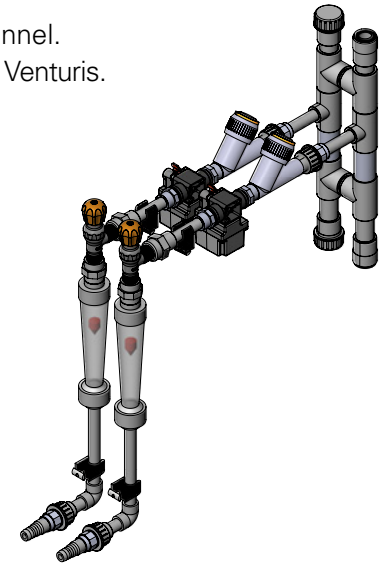
Dual dosing channel

The NetaJet™ 4G Octa mode (8 dosing channels) includes 3 dual dosing channel.
The dual dosing channel is applicable with 50 l/h (13 GPH) and 600 l/h (158 GPH) Venturis.

Dual dosing channel schematic diagram

A Rotameter
B Needle valve
C Dosing valve
D Check valve
E Venturi





CAUTION

There are fertilizer combinations that should **never** be used in any concentration in the dual dosing channel! (see CAUTION, page 20)

THE NETAJET™ 4G

Capabilities

NetaJet™ 4G modes fed by a pressurised main line are suitable for a vast range of main line pressures

- Standard: 2.5 - 5.8 bar (36.5 - 84.0 PSI)
- High pressure: 5.8 - 7.5 bar (84.0 - 108.5 PSI)

For main line pressures lower than 2.5 bar (36.5 PSI), consult Netafim™.

NetaJet™ 4G modes fed by a storage tank

The water level in the storage tank should not be higher than 5 meters (16.4 feet) above the NetaJet™ 4G inlet.

Various dosing channel configuration options

- Most modes: Up to 5 highly accurate dosing channels of various types, from 50 l/hr (13 GPH) up to 600 l/hr (158 GPH) each.
- Octa mode: Up to 8 highly accurate dosing channels of various types, from 50 l/hr (13 GPH) up to 600 l/hr (158 GPH) each.
- High-flow mode: Up to 5 highly accurate dosing channels of various types, from 50 l/hr (13 GPH) up to 1000 l/hr (264 GPH) each.

Service

The NetaJet™ 4G utilizes modular construction, making servicing a simple and quick process.
The dealer keeps a small quantity of interchangeable components on hand, for replacement on site within a few minutes.

Maintenance

To prevent failures and extend the life cycle of the NetaJet™ 4G, regular maintenance must be carried out by the user, such as periodic rinsing of filters and calibration of the EC and pH sensors.
Regular maintenance of the NetaJet™ 4G is a time- and cost-efficient process requiring no special tools or skills.

Add-ons

You can extend the functionality of your NetaJet™ 4G by means of the the wide variety of useful add-ons. All the add-ons are easy to connect to the NetaJet™ 4G - here are a few examples:

Fertilizer meter with electric output

Enables continuous reading of fertilizer dosing. Useful in applications where the costumer wants a broader indication of fertilizer flow in addition to the EC and pH readings. Installed externally, controlled and monitored by the NetaJet™ 4G NMC Pro controller.

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. Installed externally, controlled and monitored by the NetaJet™ 4G NMC Pro controller.

For further information on the NetaJet™ 4G add-ons, consult Netafim™.

SELECTING A NETAJET™ 4G MODE

Modes

- **BP PL**: Bypass system for pressurized-line water source; 5 dosing channels (see page 8)
- **BP ST**: Bypass system for storage-tank water source; 5 dosing channels (see page 10)
- **High-flow**: High-flow bypass system for pressurized-line water source; 5 dosing channels (see page 12)
- **Octa - 8-channel**: Bypass system for pressurized-line water source; 6-8 dosing channels (see page 14)
- **IL PL**: Inline system for pressurized-line water source; 5 dosing channels (see page 16)
- **IL ST**: Inline system for storage-tank water source; 5 dosing channels (see page 18)

Legend:

BP	Bypass
IL	Inline
PL	Pressurized line
ST	Storage tank

Main parts of the NetaJet™ 4G and its infrastructure

The list below presents the main parts of the NetaJet™ 4G and the parts of the infrastructure required for the operation of the NetaJet™ 4G various modes.

1. Dosing channel + Venturi
2. Dual dosing channel + Venturis
3. Inlet pressure gauge
4. Outlet pressure gauge
5. Lower manifold pressure gauge
6. Main line pressure gauge
7. Sampling outlet
8. Controller
9. EC/pH transducer
10. Dosing booster switchbox
11. pH sensor
12. EC sensor
13. Dosing booster
14. Check valve
15. Pressure switch
16. Pressure sustaining valve (PSV)
17. Pressure reducing valve (PRV)
18. Air release valve
19. Mixing chamber
20. Compensation channel
21. Onboard main line pump
22. Upper manifold filter
23. Main line pump
24. Main line filter
25. Main line water meter
26. Main line pressure sustaining valve (PSV)
27. Manual valve (isolation)
28. Irrigation valve
29. Fertilizer/acid filter
30. Manual valve (fertilizer)
31. Fertilizer/acid stock tank

Color code: Supplied (part of the NetaJet™ 4G) Not supplied (part of infrastructure).

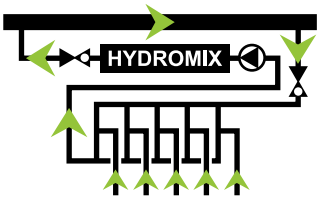
Select your NetaJet™ 4G according to the required flow rate of the largest irrigation shift.

ATTENTION
Make sure that the selected system pump fits the electricity voltage, phases and frequency on site.

ATTENTION
Calculations are either in metric or in US units - consistency in the type of units used is essential.

SELECTING A NETAJET™ 4G MODE

BP PL mode



Bypass system for pressurized-line water source.

Operating principle:
The pressure differential required to generate fertilizer suction via the Venturis is produced by a booster pump integrated in the NetaJet™ 4G. This mode of operation, where the lower manifold is under low pressure (around 0 bar/PSI), permits the use of high-efficiency Venturis with high suction capacity and low motive flow consumption.

Suitable for main line flow rate:
20-120 m³/h (90-500 GPM)
Flow limitation depends on the fertilizer injection rate and the size of the Venturis.

Suitable for main line pressure:
Standard: 2.5-5.8 bar (36.5-84.0 PSI)
High pressure: 5.8-7.5 bar (84.0-108.5 PSI)
For main line pressures lower than 2.5 bar (36.5 PSI), consult Netafim™.

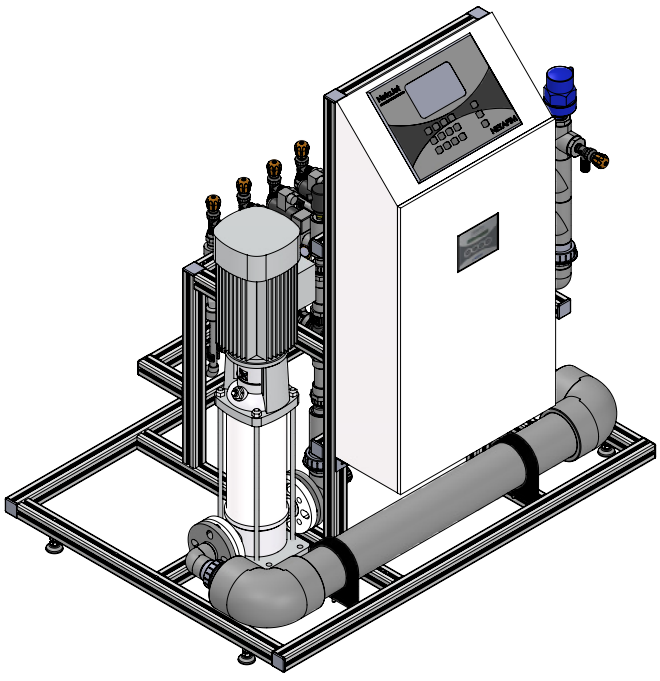
Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 5 dosing channels of various types, from 50 l/hr (13 GPH) up to 600 l/hr (158 GPH) each.
- Optional - Concentrated acid channel, 50 l/h (13 GPH).

Total fertilizer/acid suction capacity - up to 3000 l/h (792 GPH).

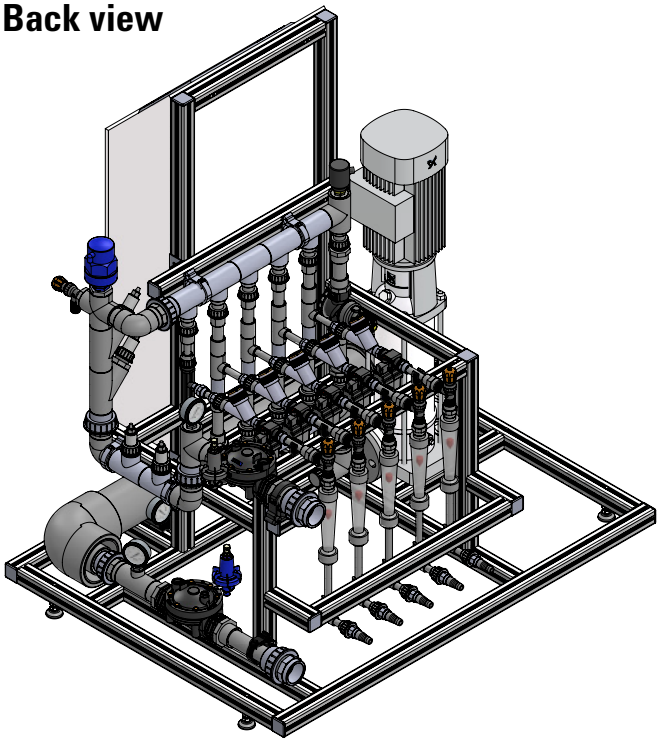
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

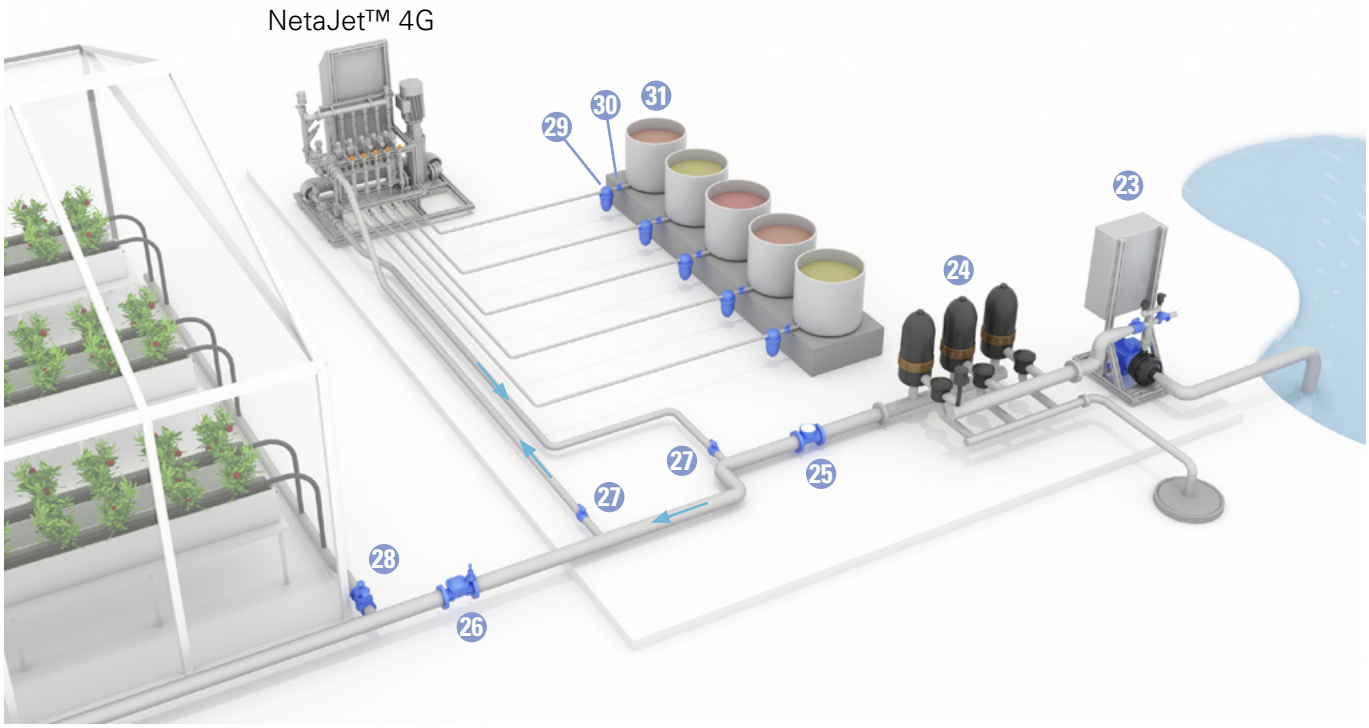


Back view

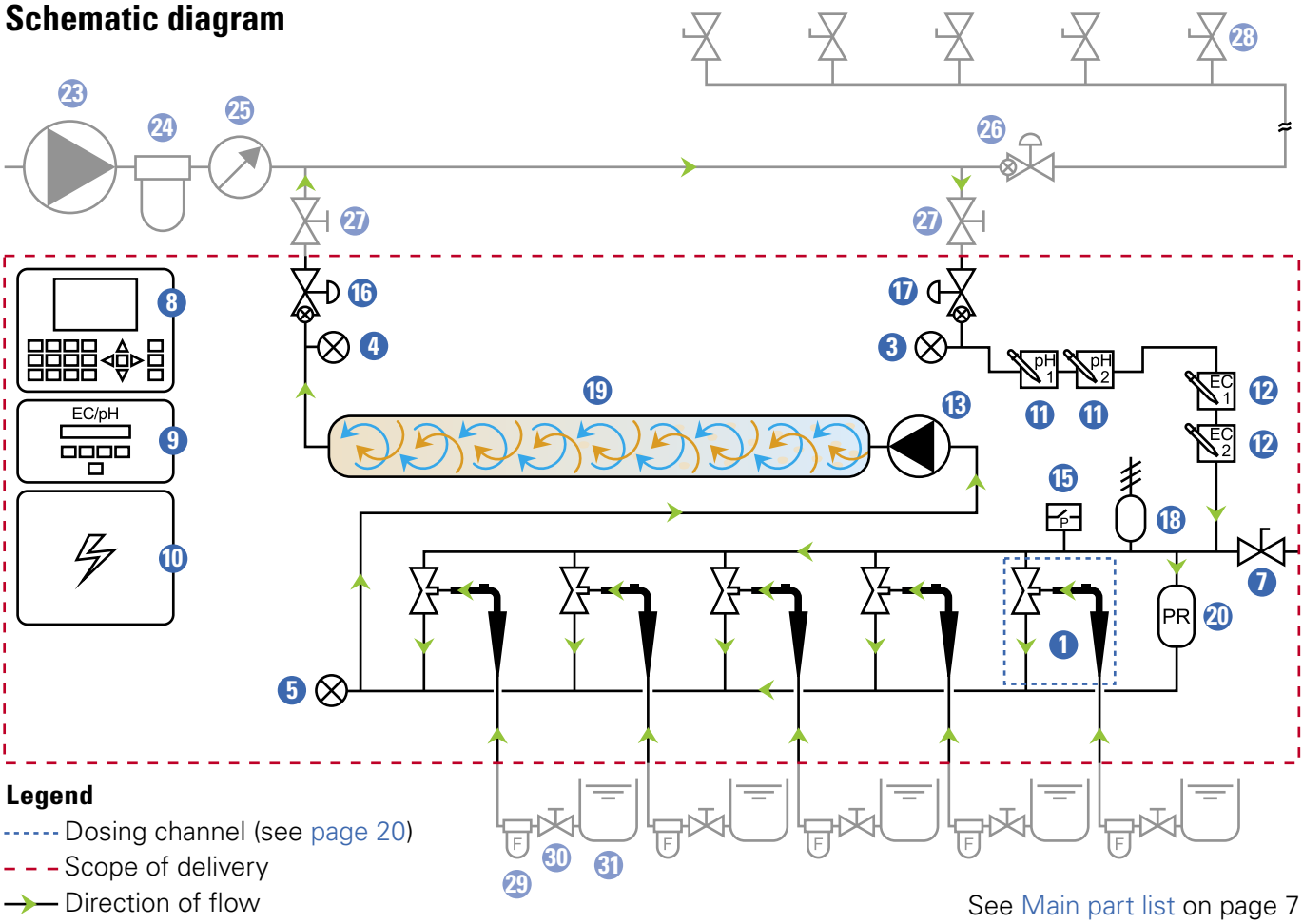


SELECTING A NETAJET™ 4G MODE

BP PL mode - typical setup



Schematic diagram



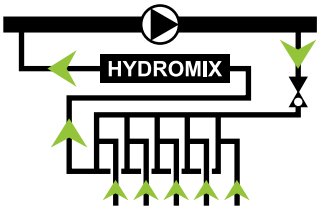
Legend

- Dosing channel (see page 20)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING A NETAJET™ 4G MODE

BP ST mode



Bypass system for storage-tank water source.

Operating principle:
For systems operating at low pressure - from an on-ground reservoir or a storage tank [max. height: 6 meters (20 feet)].
The main line pump also serves as dosing booster pump.

Suitable for main line flow rate:
15-100 m³/h (66-440 GPM)
Flow limitation depends on the fertilizer injection rate and the size of the Venturis.

Suitable for main line pressure:
The water level in the storage tank should not be higher than 5 meters (16.4 feet) above the NetaJet™ 4G inlet.

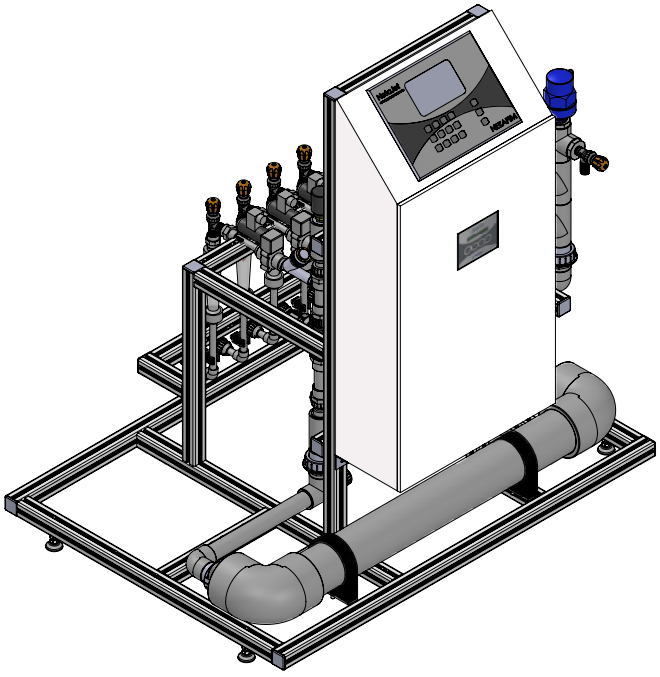
Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 5 x 50-600 l/hr (13-158 GPH)
- Optional - Concentrated acid channel, 50 l/h (13 GPH)

Total fertilizer/acid suction capacity - up to 3000 l/h (792 GPH).

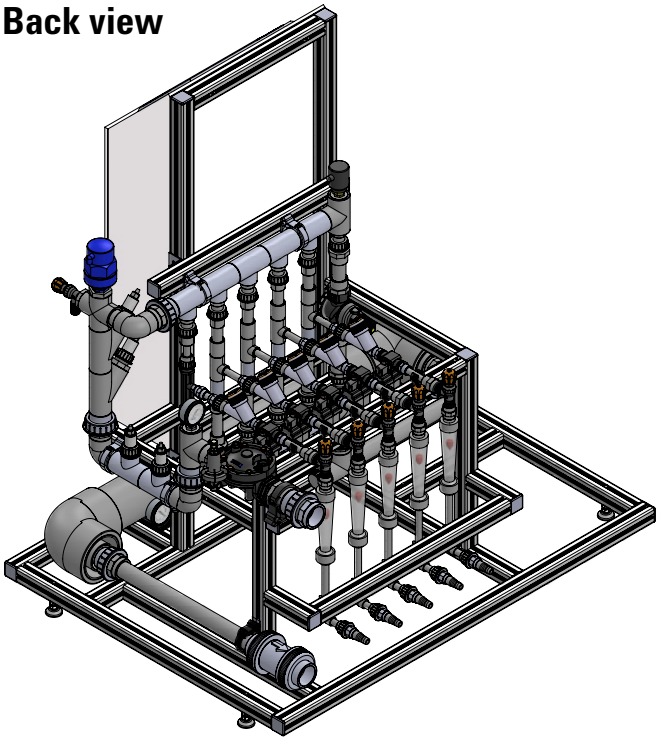
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

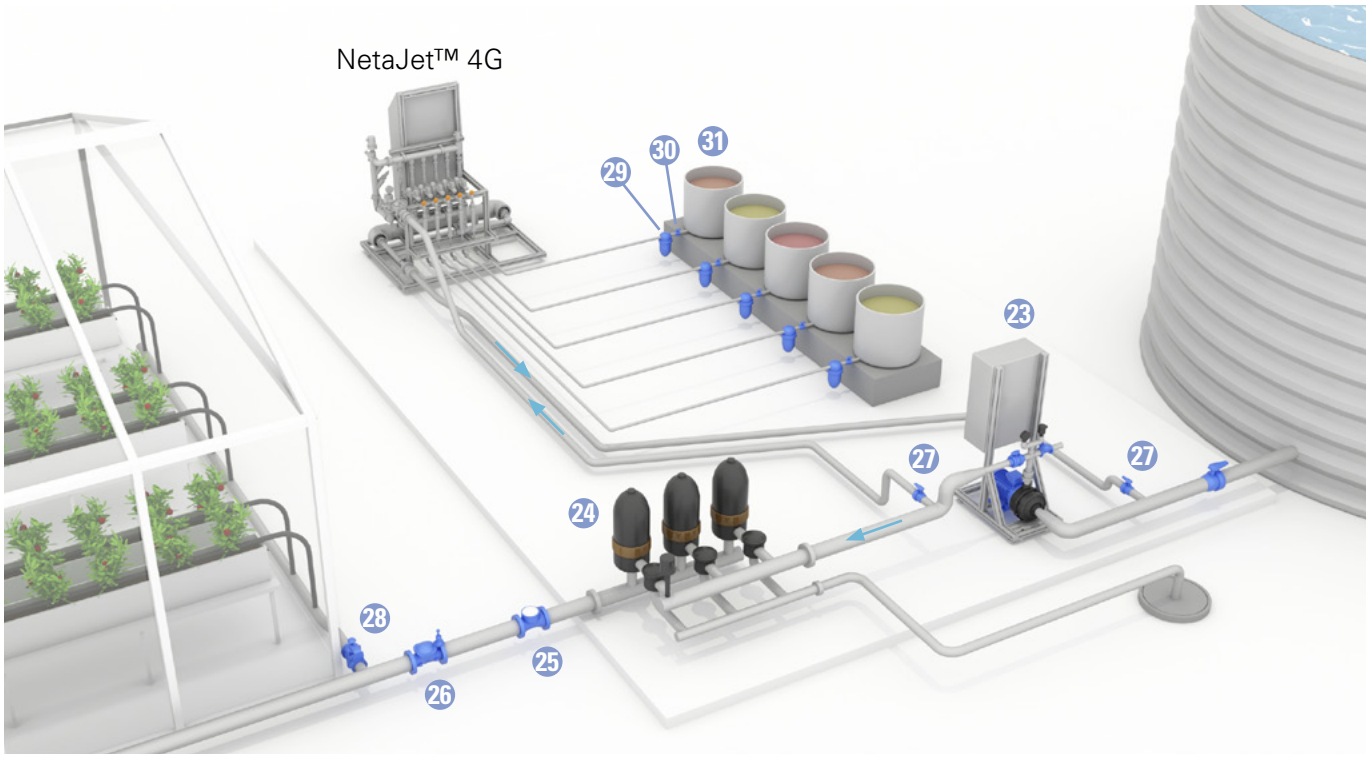


Back view

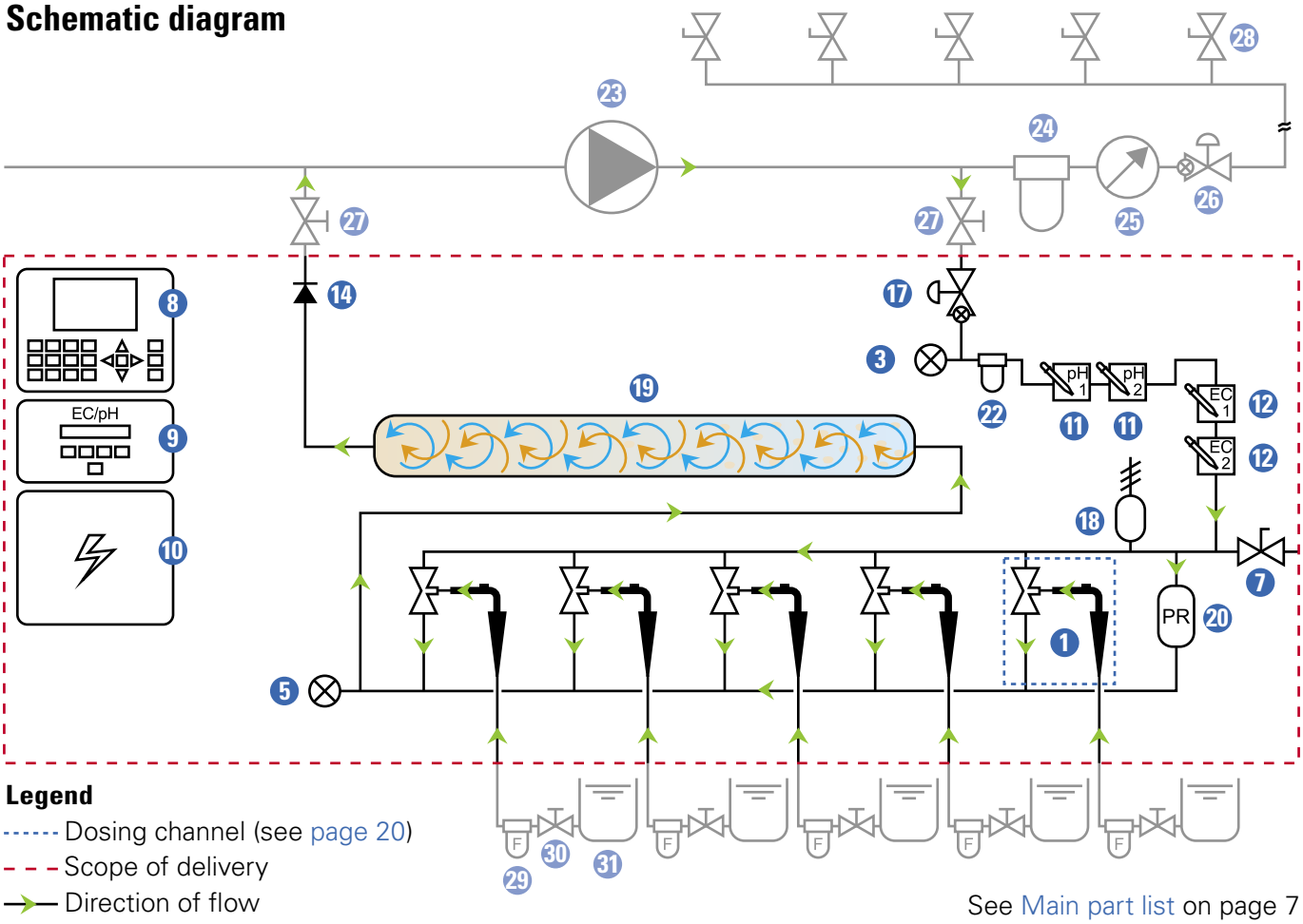


SELECTING A NETAJET™ 4G MODE

BP ST mode - typical setup



Schematic diagram



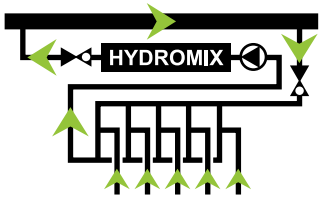
Legend

- Dosing channel (see page 20)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING A NETAJET™ 4G MODE

High-flow mode



High-flow bypass system for pressurized-line water source

Operating principle:
The pressure differential required to generate fertilizer suction via the Venturis is produced by a booster pump integrated in the NetaJet™ 4G. This mode of operation, where the lower manifold is under low pressure (around 0 bar/PSI), permits the use of high-efficiency Venturis with high suction capacity and low motive flow consumption.

Suitable for main line flow rate:
80-400 m³/h (350-1760 GPM)
Flow limitation depends on the fertilizer injection rate and the size of the Venturis.

Suitable for main line pressure:
Standard: 2.5-5.8 bar (36.5-84.0 PSI)
High pressure: 5.8-7.5 bar (84.0-108.5 PSI)

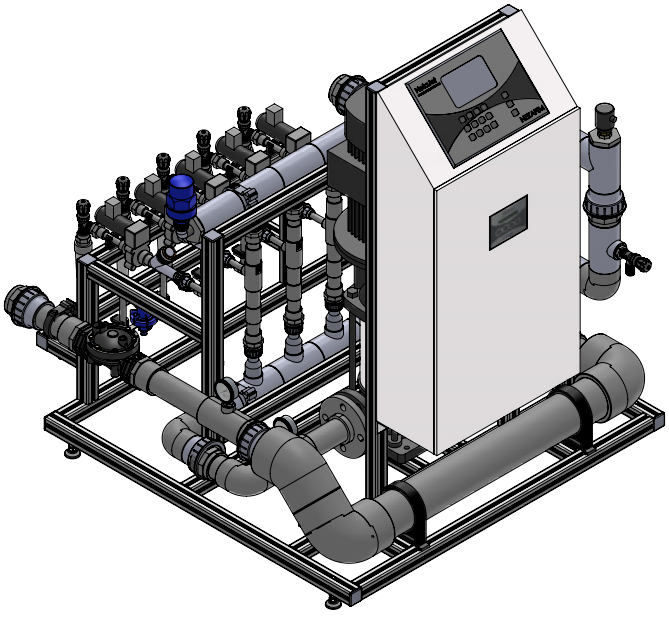
Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 5 x 50-1000 l/h (13-265 GPH)
- Optional - Concentrated acid channel, 50 l/h (13 GPH)

Total fertilizer/acid suction capacity - up to 5000 l/h (1320 GPH).

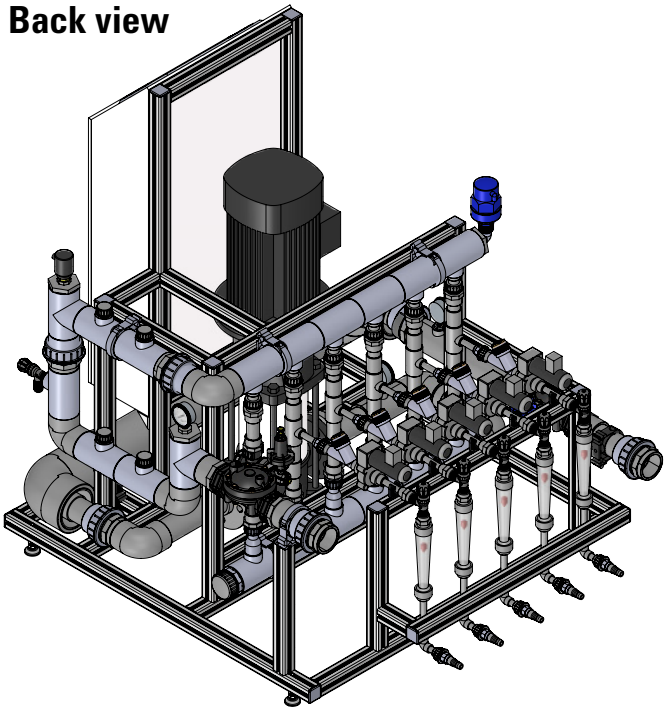
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

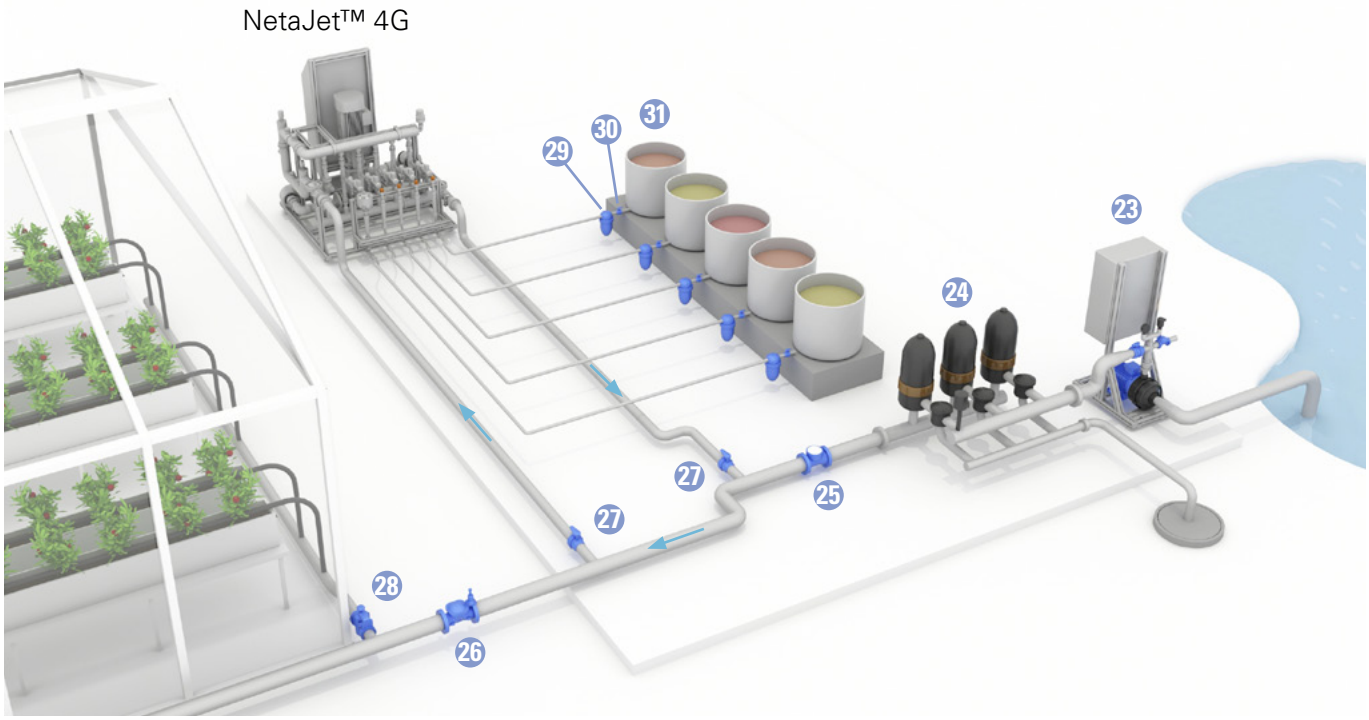


Back view

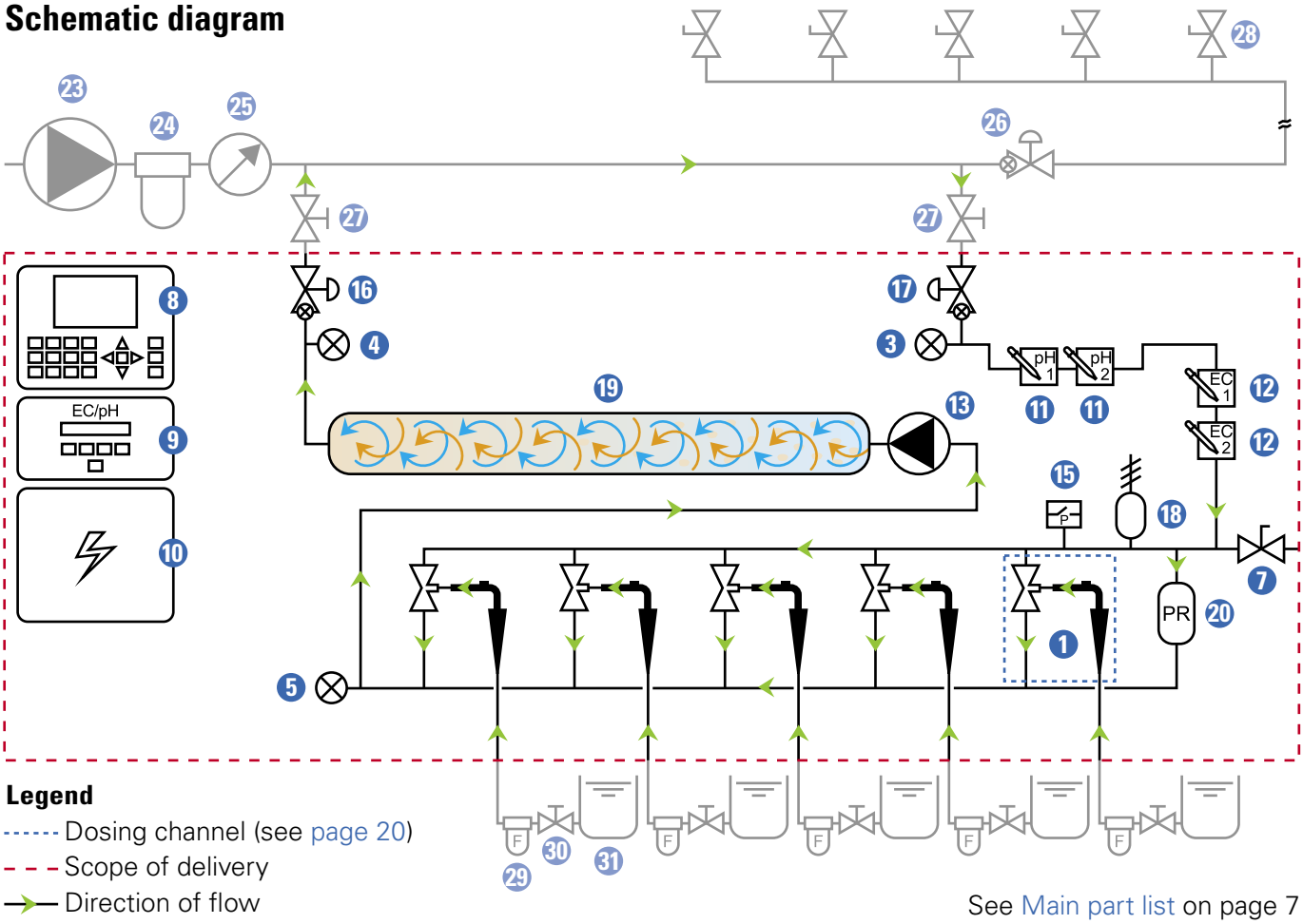


SELECTING A NETAJET™ 4G MODE

High-flow mode - typical setup



Schematic diagram



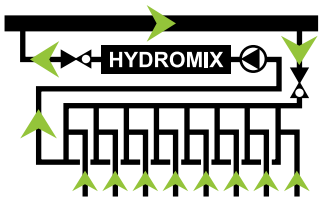
Legend

- Dosing channel (see page 20)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING A NETAJET™ 4G MODE

Octa - 8-channel mode



Bypass system for pressurized-line water source, with 8 dosing channels.

Operating principle:
The pressure differential required to generate fertilizer suction via the Venturis is produced by a booster pump integrated in the NetaJet™ 4G. This mode of operation, where the lower manifold is under low pressure (around 0 bar/PSI), permits the use of high-efficiency Venturis with high suction capacity and low motive flow consumption.

Suitable for main line flow rate:
20-120 m³/h (90-500 GPM). Flow limitation depends on the fertilizer injection rate and the size of the Venturis.

Suitable for main line pressure:
Standard: 2.5-5.8 bar (36.5-84.0 PSI)
High pressure: 5.8-7.5 bar (84.0-108.5 PSI)

Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 8 x 50-600 l/h (13-158 GPH)
- Optional - Concentrated acid channel, 50 l/h (13 GPH)

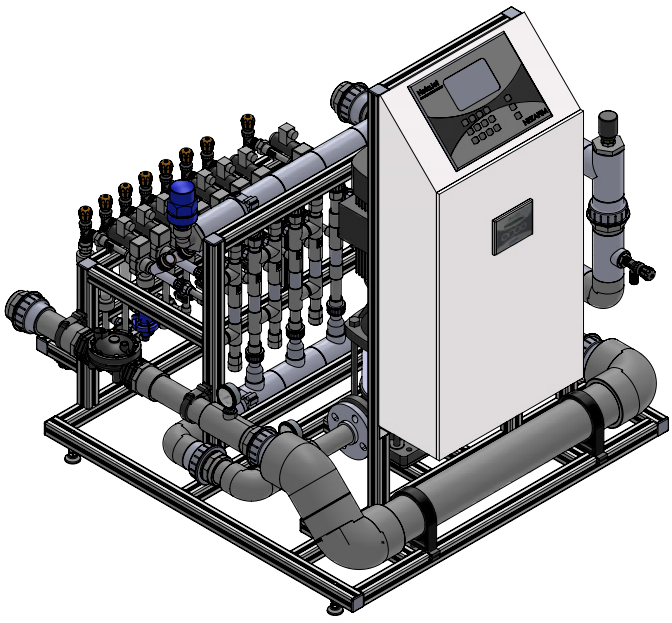
Total fertilizer/acid suction capacity - up to 4800 l/h (1268 GPH).

CAUTION
The Octa mode (8 dosing channels) includes 3 dual dosing channels. There are fertilizer combinations that should **never** be used in any concentration in the dual dosing channel! (see CAUTION, page 20)

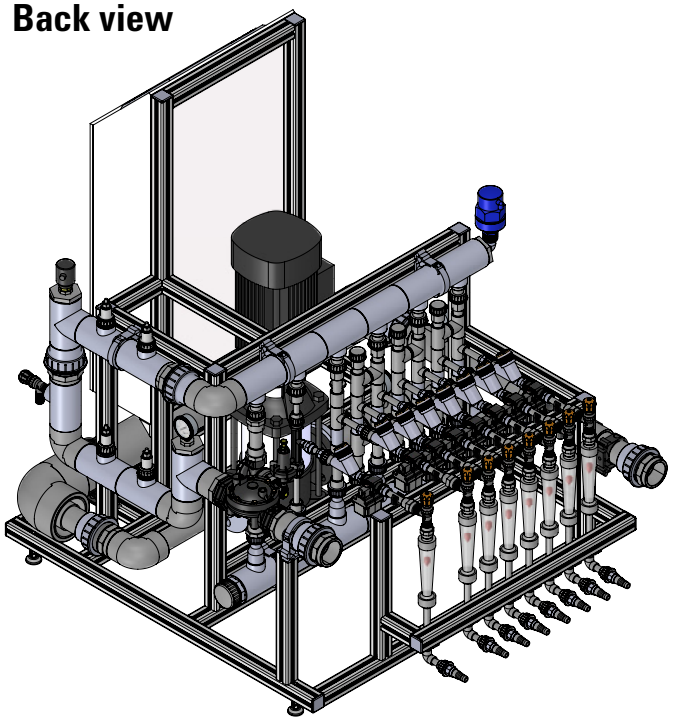
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

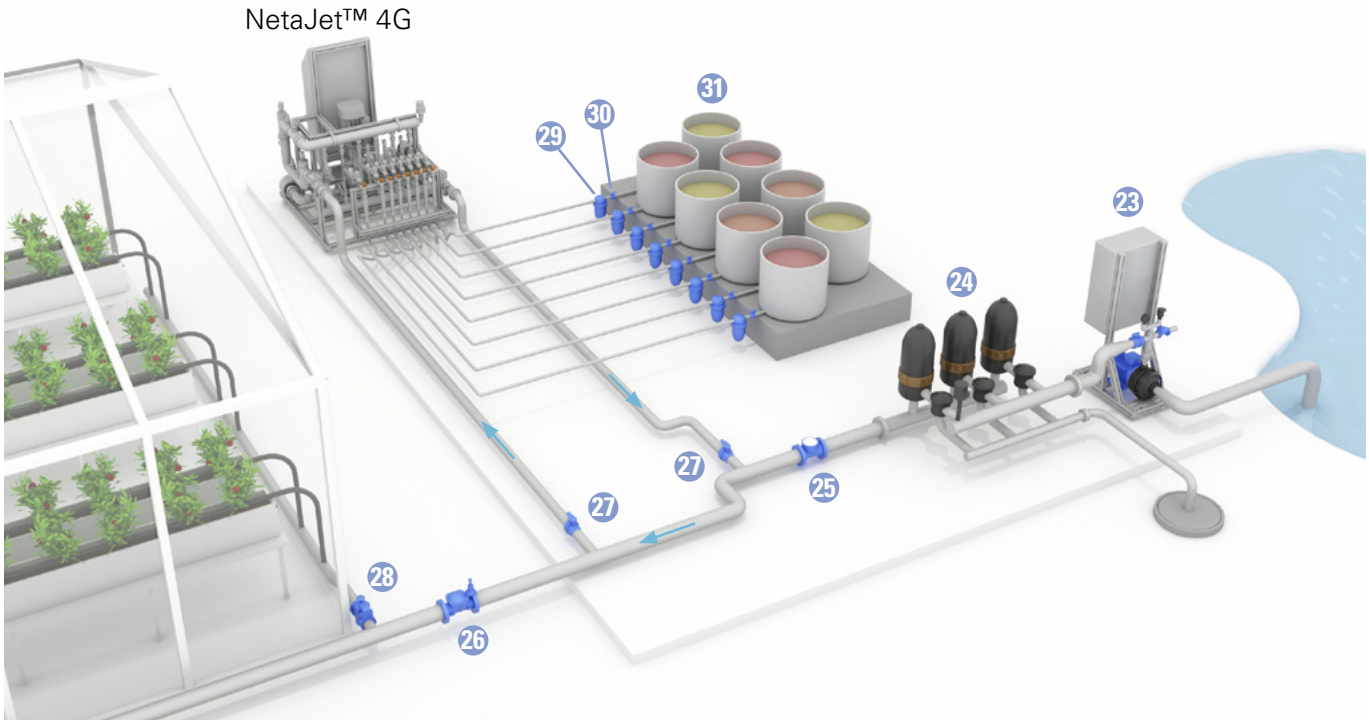


Back view

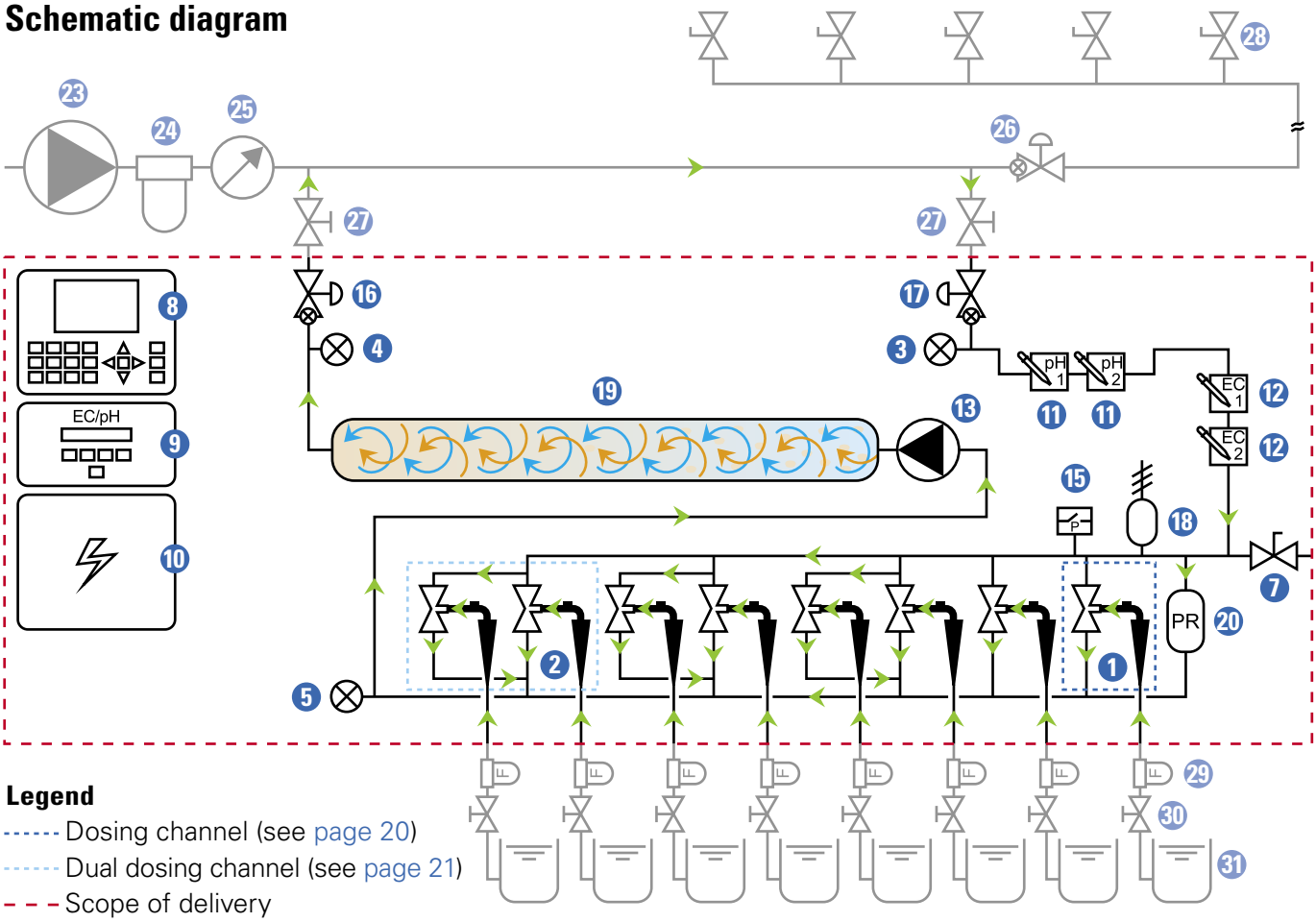


SELECTING A NETAJET™ 4G MODE

Octa - 8-channel mode - typical setup



Schematic diagram



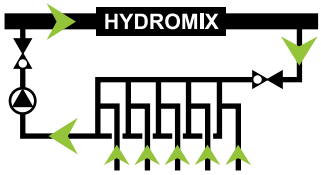
Legend

- Dosing channel (see page 20)
- Dual dosing channel (see page 21)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING A NETAJET™ 4G MODE

IL PL mode



Inline system for pressurized line water source

Operating principle:
The pressure differential required to generate fertilizer suction via the Venturis is produced by a booster pump integrated in the NetaJet™ 4G. This mode of operation, where the lower manifold is at low pressure (around 0 bar/psi), allows the use of high-efficiency Venturis with high suction capacity and low motive flow consumption.
Since all the main line water flows through the system, slight pressure losses at the NetaJet™ 4G outlet should be considered (see the table below).

Suitable for main line flow rate:
Up to 20 m³/h (90 GPM)

Suitable for main line pressure:
Standard: 2.5-5.8 bar (36.5-84.0 PSI)
High pressure: 5.8-7.5 bar (84.0-108.5 PSI)

Pressure losses

Flow rate m³/h (GPM)	Pressure loss bar (PSI)
5 (22)	0.3 (4.35)
10 -20 (44-88)	0.4 (5.8)

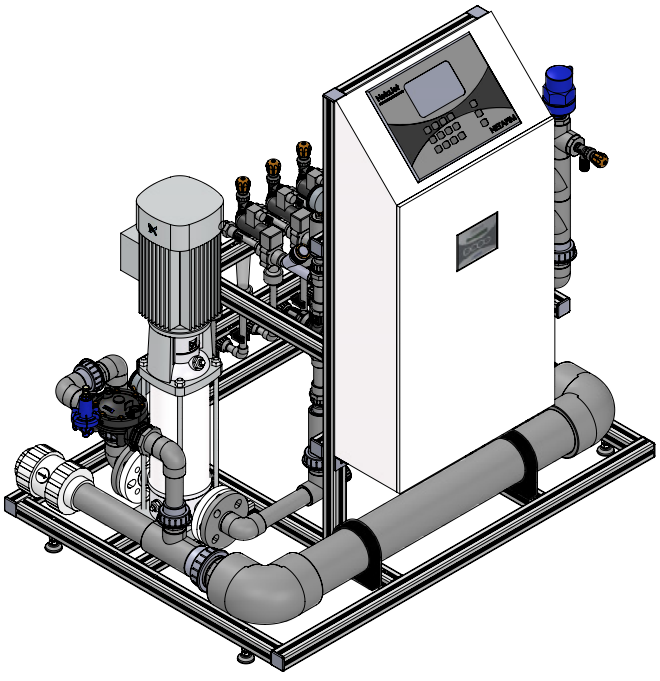
Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 5 x 50-400 l/hr (13-105.5 GPH)
- Optional - Concentrated acid channel, 50 l/h (13 GPH)

Total fertilizer/acid suction capacity - up to 2000 l/h (528 GPH).

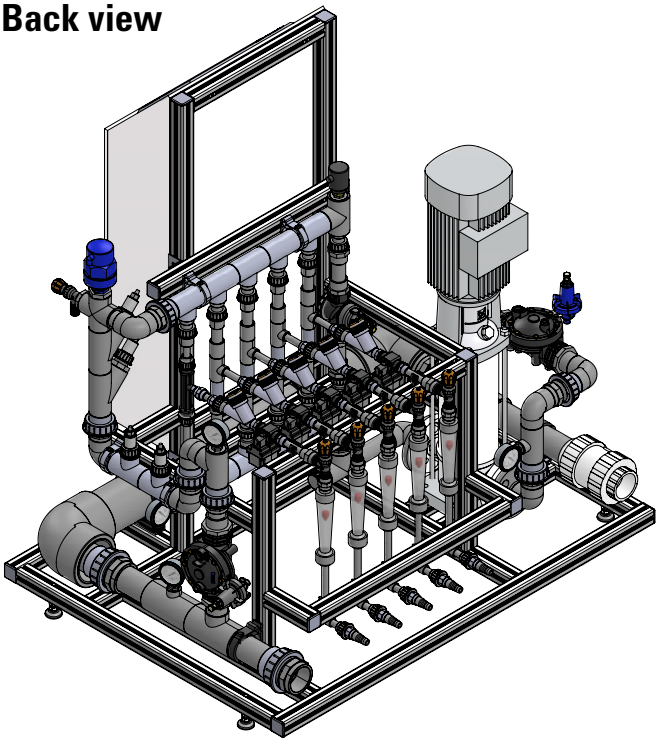
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

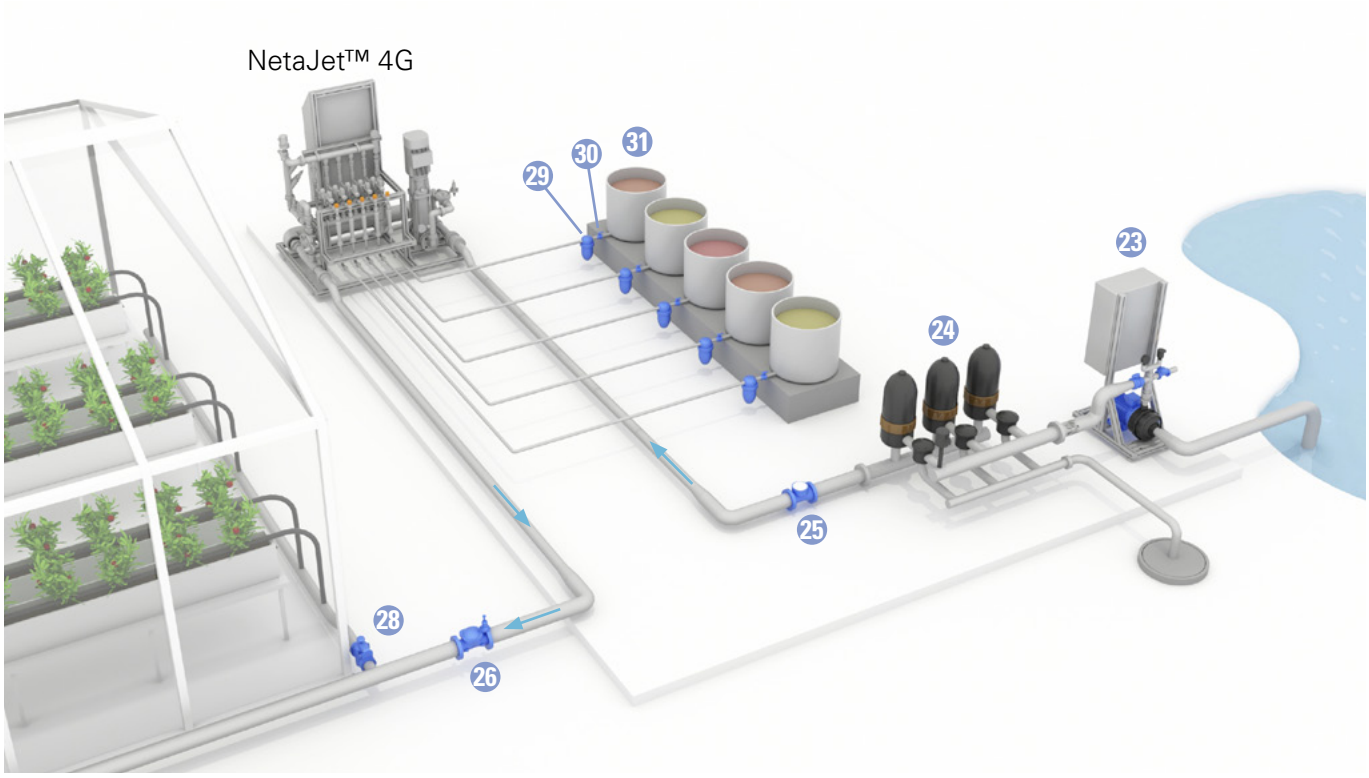


Back view

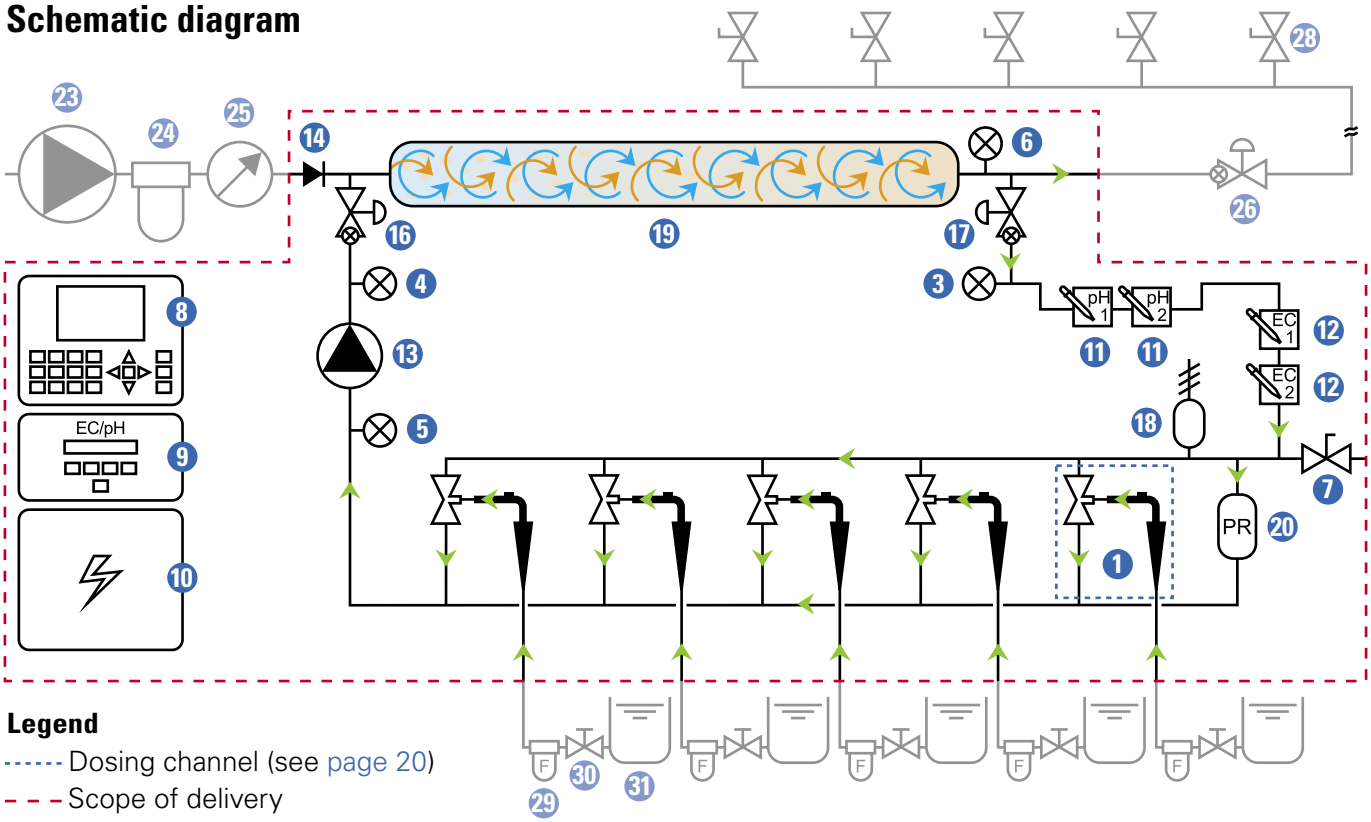


SELECTING A NETAJET™ 4G MODE

IL PL mode - typical setup



Schematic diagram



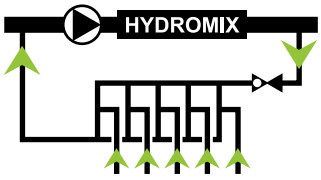
Legend

- Dosing channel (see page 20)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING A NETAJET™ 4G MODE

IL ST mode



Inline system for storage-tank water source

Operating principle:
The pressure differential required to generate fertilizer suction via the Venturis is produced by a booster pump integrated in the NetaJet™ 4G. This mode of operation, where the lower manifold is at low pressure (around 0 bar/psi), allows the use of high-efficiency Venturis with high suction capacity and low motive flow consumption.
Since all the main line water flows through the system, slight pressure losses at the NetaJet™ 4G outlet should be considered (see the table below).

Suitable for main line flow rate:
Up to 20 m³/h (90 GPM)

Suitable for main line pressure:
The water level in the storage tank should not be higher than 5 meters (16.4 feet) above the NetaJet™ 4G inlet.

Pressure losses

Flow rate m³/h (GPM)	Pressure loss bar (PSI)
5 (22)	0.8 (11.6)
10 (44)	0.9 (13.05)
15-20 (66-88)	1.0 (14.5)

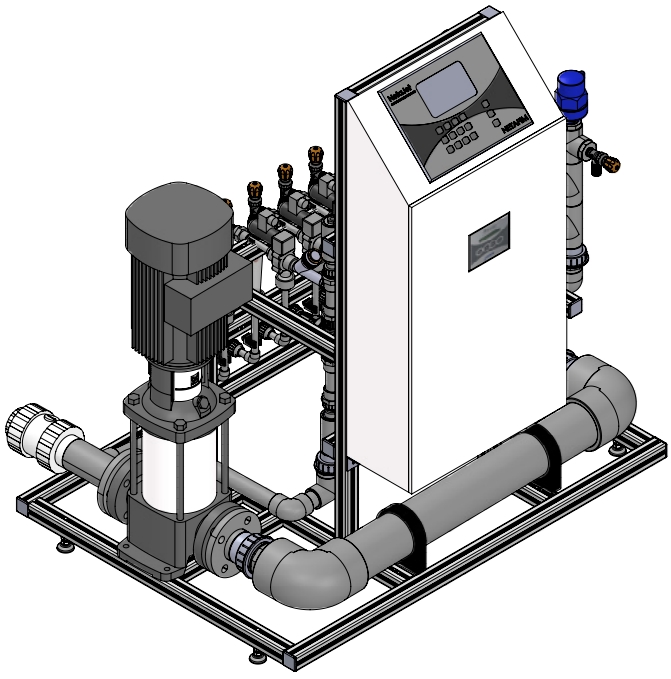
Dosing channels:
Accommodates a wide variety of highly accurate dosing channels for fertilizer and concentrated/diluted acid:
- Up to 5 x 50-400 l/hr (13-105.5 GPH)
- Optional - Concentrated acid channel, 50 l/h (13 GPH)

Total fertilizer/acid suction capacity - up to 2000 l/h (528 GPH).

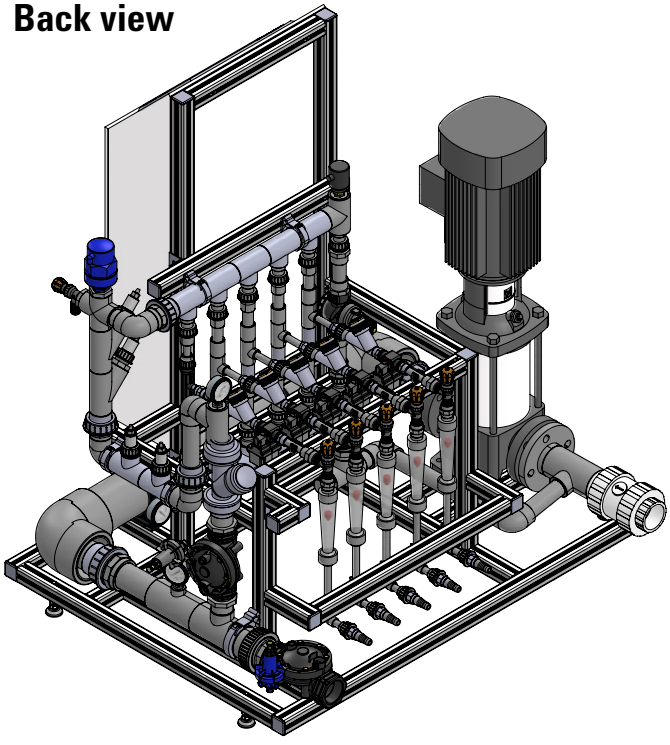
Controller:
NMC-Pro (Operation with third-party controllers is optional. Consult Netafim™.)

EC/pH:
Dual (single is optional), monitoring and control.

Front view

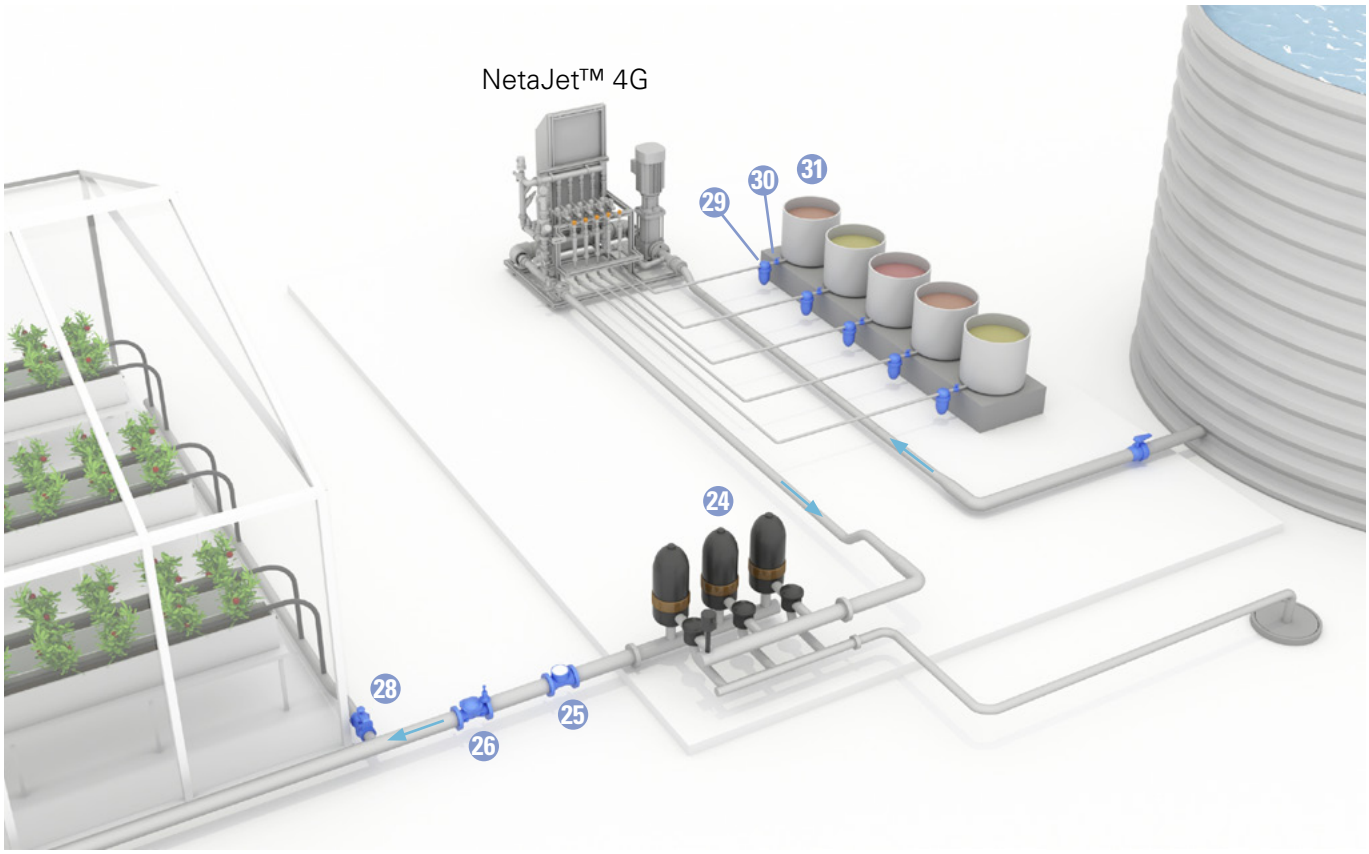


Back view

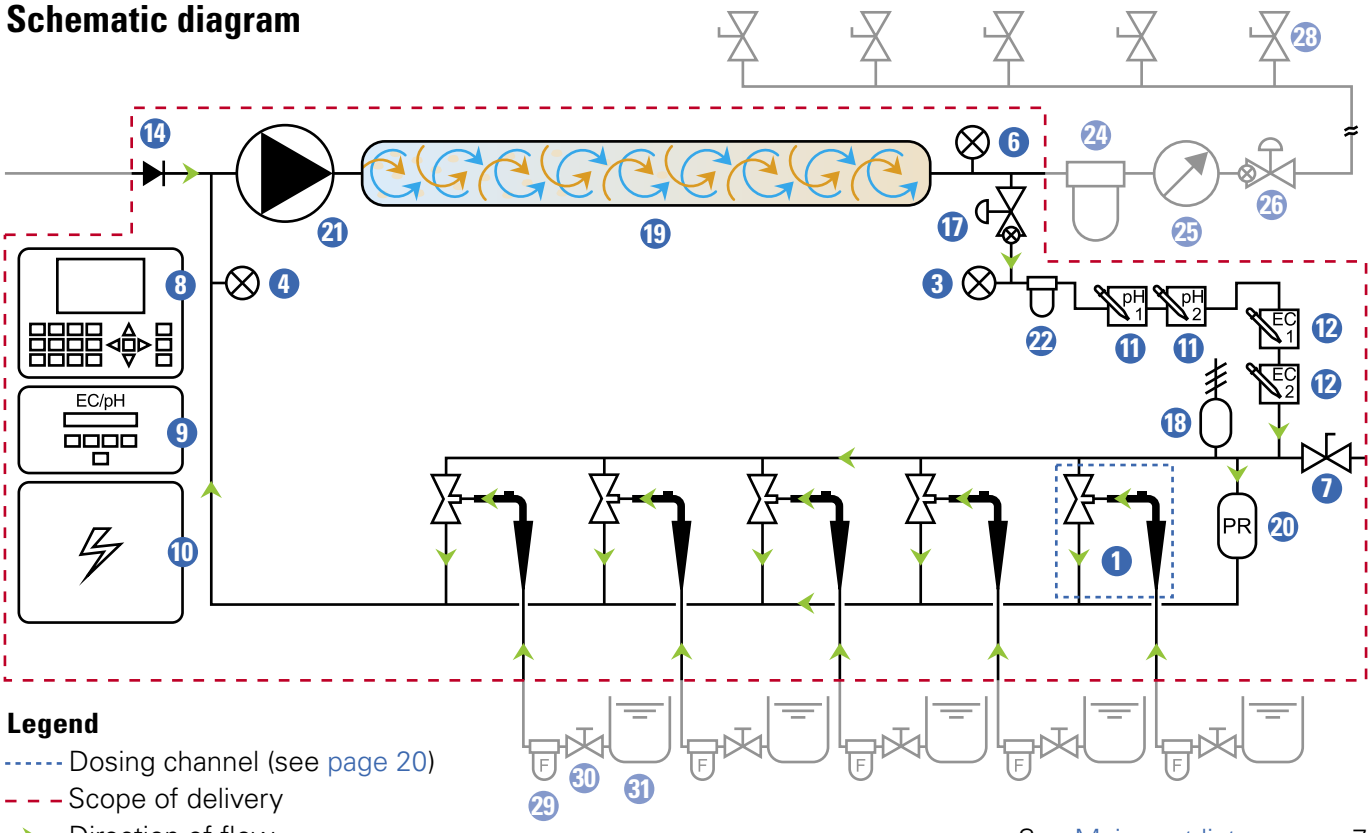


SELECTING A NETAJET™ 4G MODE

IL ST mode - typical setup



Schematic diagram



Legend

- Dosing channel (see page 20)
- Scope of delivery
- Direction of flow

See Main part list on page 7

SELECTING THE NETAJET™ 4G FEATURES

Dosing channels

CAUTION

High concentrations of some fertilizer combinations might induce crystallization in the NetaJet's lower manifold and cause clogging of the pipes. **These combinations should never be used in any concentration in the dual dosing channel (Octa mode only)!**

Fertilizer combinations prone to induce crystallization:

- 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

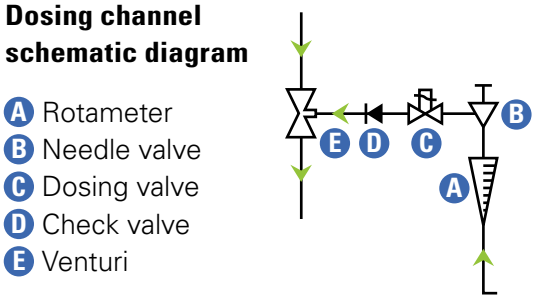
When injecting these fertilizer combinations:

- Make sure to dilute each fertilizer to the allowed concentration in the fertilizer tank prior to injection through the NetaJet™ 4G.
- Immediately after each injection of any of the fertilizer combinations above, flush the NetaJet™ 4G with clean water for at least 2 minutes.

In case of doubt regarding the use of any combination of fertilizers, contact your local Netafim™ representative.

To accommodate a variety of installations, flow rates and Nutrigation™ needs, the NetaJet™ 4G offers a wide range of dosing channels for fertilizer and acid.

Dosing channel schematic diagram



Analog (continuous) Up to 50 l/hr (13 GPH) with manual override	**Analog (continuous)** Up to 150 l/hr (39.5 GPH) with manual override	**Analog (continuous)** Up to 400 l/hr (105.5 GPH) with manual override	**Analog (continuous)** Up to 600 l/hr (158.5 GPH) with manual override	**Digital (pulsating)** Up to 1000 l/hr (264 GPH)
				

For a full overview, see the online configurator at https://cmtconfig.netafim.com

Dosing channels for fertilizer or diluted acid

Capacity: • 50 l/h (13 GPH) • 150 l/h (40 GPH) • 400 l/h (106 GPH) • 600 l/h (158 GPH) • 1000 l/h (265 GPH), AC 50 or 60 Hz - according to the electricity frequency.

SELECTING THE NETAJET™ 4G FEATURES

Dosing channel for concentrated acid

50l/h (13 GPH), AC 50 or 60 Hz - according to the electricity frequency.

ATTENTION

When dosing acid, use a dosing channel fitted with the appropriate components according to the type and concentration of acid used*:

		For pH correction			For maintenance of drippers		
Type of dosing channel	**Diaphragm and O-rings**	Nitric (HNO_3)	Phosphoric (H_3PO_4)	Sulfuric (H_2SO_4)	Hydrochloric (HCl)	Hydrogen peroxide (H_2O_2)	Chlorine (as hypochloride)
For diluted acid	EPDM	<3%	<85%	<30%	<10%	<30%	<1%
For concentrated acid	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

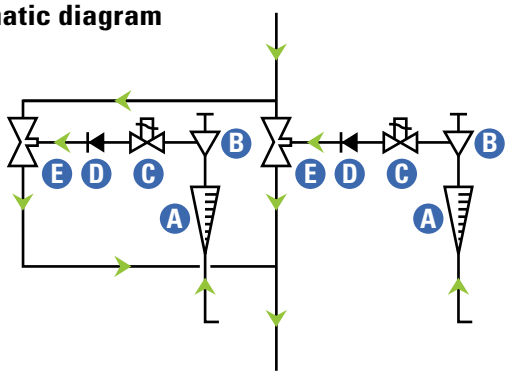
Substances such as chemicals for pest/disease control might be corrosive and damage the NetaJet™ 4G. When using any substance other than fertilizers or acids not exceeding the concentrations in the table above, always observe the manufacturer's instructions for corrosivity. In case of any doubt, contact your local Netafim™ representative.

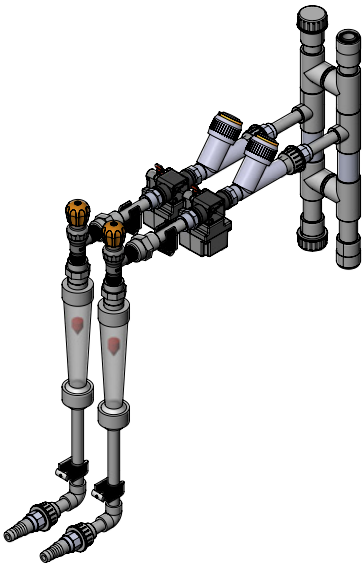
Dual dosing channel

The NetaJet™ 4G Octa mode (8 dosing channels) includes 3 dual dosing channels.
The dual dosing channel is applicable with 50 l/h (13 GPH) and 600 l/h (158 GPH) Venturis.

Dual dosing channel schematic diagram

- A Rotameter
- B Needle valve
- C Dosing valve
- D Check valve
- E Venturi





CAUTION

There are fertilizer combinations that should **never** be used in any concentration in the dual dosing channel! (see CAUTION, page 20)

SELECTING THE NETAJET™ 4G FEATURES

Use the table below to formulate the appropriate combination of Venturis and dosing channels.

Dosing channel - nominal capacity l/h (GPH)	Venturi		
	PVDF - M050	PVC - N600	PVC - N1000
50 (13) concentrated acid	+		
50 (13)	+		
150 (40)		+	
400 (106)		+	
600 (158)		+	
1000 (265)			+

ATTENTION

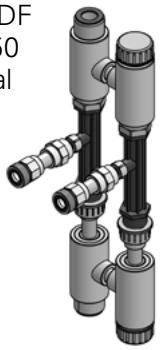
The fertilizer/acid suction capacity of a dosing channel depends on suitable pressure conditions on site (see main line pressure of each mode, pages 8-18).

Venturis

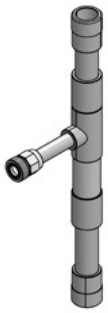
A complete line of Venturis is available to accommodate various flow rates of fertilizer or acid.

PVDF M50 single

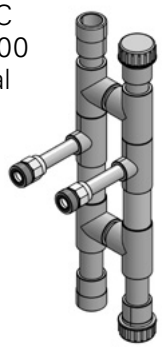
PVDF M50 dual



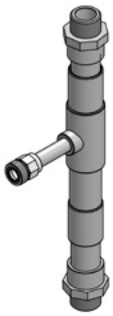
PVC N600 single



PVC N600 dual



PVC N1000 single



Matching the Venturis and the dosing channels

Venturi	Applicable for mode	Nominal suction flow - l/h (GPH)	Typical consumption* - m³/h (GPM) (at pressure up to 5 bar)
PVDF - M50	Any mode	50 (13)	1.2 (5.3)
PVC - N600	Any mode	600 (158)	1.2 (5.3)
PVC - N1000	BP PL HF	1000 (265)	4.0 (17.5)

* Consumption = the flow of water and fertilizers that pass through the dosing channel.

Compute the fertilizer flow rate

To select the appropriate fertilizer dosing channels and Venturis, perform the following calculation:

	Metric units	US units
Enter the flow rate of the largest irrigation shift	☐ m³/h	☐ GPM
	X	X
Enter the dosing ratio of a single fertilizer (for guidelines see Appendix 3, Dosing ratio estimates, page 33)	☐ l/m³	☐ US gal/1000 US gal
	=	X 0.06 =
Result: a single fertilizer flow rate	☐ l/h	☐ GPH

SELECTING THE NETAJET™ 4G FEATURES

Electricity supply

The NetaJet™ 4G dosing booster requires a 3-phase electricity supply.

To select the proper dosing channels, dosing booster, controller and accessories, it is essential to know the properties of the electricity on site. The electricity frequency (Hz) and voltage (V) depend on the country (in some countries, frequencies and voltages also differ by area).

NOTE

In cases where 3-phase electricity is supplied in addition to a single phase, take note:

- The controller is single-phase.
- The dosing booster is 3-phase.

EC/pH control

In case of flow variations, the EC/pH control set enables the controller to perform precise fertilizer/acid optimization.

There are 2 types of EC/pH sets:

- Dual EC/pH control set, assuring the highest accuracy, control and security.
- Single EC/pH control set.

The options above are selectable in the NetaJet™ 4G online configurator at https://cmtconfig.netafim.com (for further details, contact Netafim™).

Controller

The NetaJet™ 4G is controlled by the NMC Pro controller, offering many useful functions, including the operation of analog valves for very accurate EC/pH control.

In cases where the NetaJet™ 4G is to be controlled by a third-party controller, consult Netafim™.

Controller main features*

Feature	NMC-Pro
Operation of analog valves for very accurate EC/pH control	Yes
Analog outputs	up to 32
Digital outputs, 24 VAC	up to 256
Irrigation programs	15
External condition programs	15
Maximum number of valves in the system	255
Maximum number of valves running simultaneously	40
Maximum number of dosing programs running in parallel	1
Type of output, 24 VAC	Relay
Dry contact outputs	Yes
Number of digital inputs	32
Number of analog inputs	22

Feature	NMC-Pro
NMC Air compatible	Yes
RadioNet valve control (RTU)	Yes
SingleNet valve control (RTU)	Yes
Misting program by time	Yes
Cooling program by temperature/humidity	Yes
Maximum number of supply pumps	6
Maximum number of main lines	6 (not simultaneously)
Master flow meters	6
Auxiliary flow meters	8
Fertilizer flow meters	8
Control by pressure transducer	Yes
Filter flushing - number of filters	24
Fertilizer programs	10

*For a full list of features, see the controller literature.

SELECTING THE NETAJET™ 4G FEATURES

Controller languages

Group A	Group B	Group C	Group GLCD
English, Spanish, Italian, Japanese, German, French, Turkish, Dutch, Portuguese	English, Russian, Greek, Serbian, Hungarian, Dutch, Polish	English, Spanish, French, Hebrew	English, Russian, Korean, Chinese

Updated - May 2015

Select the connectivity to remote units

If there are DC latch* irrigation valves, select the connectivity type according to the type of the remote units (SingleNet** or RadioNet***) with the license key that accommodates the number of remote units (up to 128 or up to 256).

***DC latch** is the operating principle of remote activation of a hydraulic valve equipped with a solenoid.
****SingleNet** is a remote operation method to open/close DC latch valves via a 2-wire cable.
*****RadioNet** is a remote operation method to open/close DC latch valves via wireless transmission (radio frequency).

Select the PC communication

NOTE
All the above controllers can be connected to a control program on a PC (for further details, contact Netafim™).

Wired or wireless, the NMC PC communication offers many convenient features:
- Remote access for service and consultation
- Data logging
- Presentation of color graphs of the system activity history
- Comfortable and intuitive graphic interface

Select the connectivity to NMC Air

NMC Air by Netafim™ The NMC Pro controller is compatible with Netafim™ dedicated cloud service which provides the customer the ability to access the NMC controller, to operate and monitor the farm from anywhere at anytime.
- Web and mobile access
- HTML5 based: Windows/Mac/Android/ iOS/Windows Mobile

Additional controller accessories

- Power line protector
- Weather station
- Temperature and humidity measuring box
- Radiation sensor
- Communication (MUX)
- Communication card
- Cellular modem
- Voltage stabilizer and surge protector

For further details, contact Netafim™.

INSTALLATION REQUIREMENTS

Infrastructure

WARNING

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

- Sufficient space should be available between the fertilizer/acid tanks and the NetaJet™ 4G to allow inspection and maintenance operations.

Infrastructure installation components

The list below presents the main components of the infrastructure required for the operation of the NetaJet™ 4G in its various modes (see page 7).

Component	Specifications
23 Main line pump	Suitable for flow rate satisfying the maximum field requirement (ensure stable pressure)
24 Main line filter	≤ 130 µm (≥ 120 mesh)
25 Main line water meter	With electrical pulses. The pulse should be as short as possible according to the filling line diameter and the controller's limitations. (See Recommended flow meter pulse rate table, below.)
26 Main line pressure sustaining valve (PSV)	Installed on the main line upstream from the irrigation valves
27 Manual valve (isolation)	Manual ball valves at the NetaJet™ 4G inlet and outlet. For isolation of the NetaJet™ 4G during maintenance
28 Irrigation valve	
29 Fertilizer/acid filter	≤ 130 µm (≥ 120 mesh)
30 Manual valve (fertilizer)	A manual ball valve on each fertilizer/acid line at the stock tank outlet
31 Fertilizer/acid stock tank	Up to 8 fertilizer/acid solution stock tanks.

Recommended flow meter pulse rate*

Flow rate m^3/hr	Flow meter output l/pulse
Up to 6	1
6-60	10

Flow rate GPM	Flow meter output US gal/pulse
Up to 88	1
88-1000	10

*Compatible with Netafim™ NMC controllers. In cases where the NetaJet™ 4G is to be controlled by a third-party controller, consult Netafim™.

INSTALLATION REQUIREMENTS

Electrical installation

An electrical mains installation including a circuit breaker, complying with the local safety standards and regulations should be supplied in accordance with the power consumption requirements of the NetaJet™ 4G.

Power consumption (kW)

The total power consumption of the NetaJet™ 4G depends mainly on the consumption of the system pump.

NetaJet™ 4G power consumption with various system pumps

50 Hz

System pump	Mode	Power consumption (kW)
CRI 5-12	BP/IL PL	2.35
CRI 5-18	BP/IL PL (high-pressure ≤ 600 l/h)	3.15
CRI 10-8	Octa / IL ST	3.15
CRI 20-5	High-flow (PL modes)	5.65
CRI 20-7	High-flow (high-pressure)	7.65

60 Hz

System pump	Mode	Power consumption (kW)
CRI 5-7	BP/IL PL	2.35
CRI 5-11	BP/IL PL (high-pressure ≤ 600 l/h)	3.15
CRI 10-5	Octa / IL ST	3.15
CRI 20-3	High-flow (PL modes)	5.65
CRI 20-4	High-flow, high-pressure	7.65

Flow rate stability

Ensure that the consumption of the different irrigation shifts is as equal as possible. Each changeover between shifts with different consumption will result in consumption fluctuation, affecting the EC and pH stability. **The smallest shift should not be less than 75% of the largest shift.**

Source water

- The water entering the NetaJet™ 4G should be within a temperature range of 10°C and 35°C (50°F and 95°F).
- The source water to the NetaJet™ 4G should be of satisfactory chemical quality. If water pre-treatment is required, apply chemical conditioning before the water reaches the NetaJet™ 4G.

Source water quality

NetaJet™ 4G is specially designed for Fertigation™ in greenhouses using growing media or substrate. In such growing systems, especially in the high-tech sector, which uses a low-water-retention substrate, low substrate volume per plant, and a 2-3 l/h dripper, the irrigation pulse is very short (1.5-2.0 min) and the system has to reach the desired EC and pH in a very short time. The higher the bicarbonate (HCO_3) content of the water entering the NetaJet™ 4G, the more time it will need to reach the desired pH and stabilize.

In the high tech sector, when the bicarbonate (HCO_3) content in the source water is low, less than 2.0 meq/l (7.6 meq/US gal), it can be used in the NetaJet™ 4G without acid pre-treatment. The NetaJet™ 4G will control the pH using a pH sensor and an acid-dosing channel. For optimal performance, when the bicarbonate content in the source water is higher than 2.0 meq/l (7.6 meq/US gal), it is recommended to lower the bicarbonate content in the source water before it enters the NetaJet™ 4G. Thiswill insure fast achievement of the desired pH and a high stability of the pH during the irrigation pulse.

In the medium tech sector, when using a substrate of higher water retention and/or volume, the pulse duration is longer (3-5 min), so source water with a higher bicarbonate (HCO_3) content, up to 4 meq/l, can be used in the NetaJet™ 4G without acid pre-treatment.

INSTALLATION REQUIREMENTS

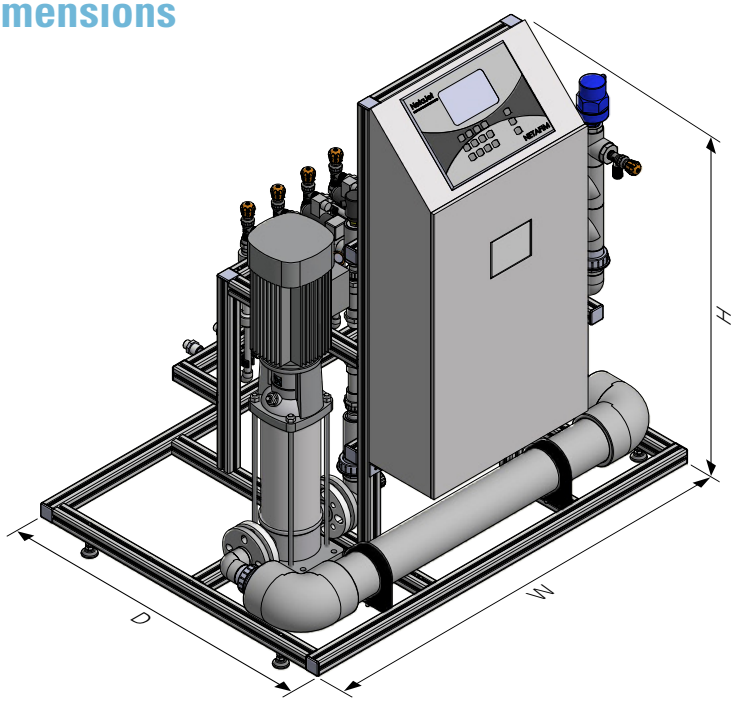
Adding a high concentration of fertilizers to water with a high bicarbonate (HCO_3) content may create low-solubility salts in the solution, which reduce Fertigation™ efficiency and may cause clogging of filters and drippers. This is why it is recommended not to use water with bicarbonate (HCO_3) content higher than 4 meq/l.

When the bicarbonate (HCO_3) content is higher than the required level, a pre-acidification of the source water is recommended. In this process, the incoming water is brought to a mild acid pH level of approx. 6.0 prior to its storage in a day-storage tank. This process can be performed by an additional dosing unit fitted with the appropriate features (consult Netafim™). The acid applied will neutralize the bicarbonate (HCO_3) in the storage tank by means of a chemical reaction and the carbon dioxide (CO_2) will be released from the source water. Aerating or spraying the acidified water into the storage tank will improve the discharge of CO_2, accelerating the neutralization process.

NOTE
A full analysis of the water is recommended. In case of doubt, consult a Netafim™ expert.

DIMENSIONS AND WEIGHTS

Dimensions



External dimensions

Mode	NetaJet™ 4G external dimensions (W/D/H*)	Package dimensions (W/D/H**)
BP PL	123/90/134 cm (48/35.5/53")	131/112/158 cm (52/44/62")
BP ST		
High-flow		
Octa - 8-channel		
IL PL	112/125/134 cm (44/49/53")	142/142/158 cm (56/56/62")
IL ST		

*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 NetaJet™ 4G for inlet, outlet and fertilizer pipes connections.

Weights

Mode	Net weight	Packed weight
BP PL	130-150 kg (287-331 lbs)	180-200 kg (397-441 lbs)
BP ST	90-100 kg (199-221 lbs)	140-150 kg (309-331 lbs)
High-flow	221-235 kg (487-518 lbs)	255-275 kg (562-606 lbs)
Octa - 8-channel	200-215 kg (441-474 lbs)	275-295 kg (606-650 lbs)
IL PL	130-150 kg (287-331 lbs)	180-200 kg (397-441 lbs)
IL ST	150-190 kg (331-419 lbs)	200-240 kg (441-529 lbs)

The weight ranges in the table above are order of magnitude only -
final weights, depending on the selected dosing booster, will be issued with the product order.

DIMENSIONS AND WEIGHTS

Fertilizer and acid line connection types

Fittings (interchangeable)	Diameter
PVC, hose nozzle insert connector (installed)	16 mm
PVC, nipple - male thread connector (supplied)	1/2"
PVC, half union - female thread connector (supplied)	3/4"

Inlet and outlet connection types

The diameter of the inlet and outlet connectors varies according to the selected system pump.

	Diameter	
Mode	**PVC, adaptor union - glue connector (installed)**	**PVC, BSP or NPT nipple - male thread connector (supplied)**
BP PL	50 mm	1.5"
BP ST		
High-flow	63 mm	2"
Octa - 8-channel		
IL PL		
IL ST		

SAFETY AND WARRANTY

Safety

- All safety regulations must be applied.
- Ensure that the installation is carried out in a manner that prevents leaks from the NetaJet™ 4G, the fertilizer/acid tanks and lines, the peripherals and the accessories (contaminating the environment, soil or ambient area).
- When using acid, always observe the acid manufacturer's safety instructions.
- Electrical installation and troubleshooting should be performed by an authorized electrician only.
- The electrical installation must comply with the local safety standards and regulations.
- Ensure that suitable electrical power supply is available in the vicinity of the installation for the NetaJet™ 4G electrical connection.
- Ensure there is an available electrical socket in the NetaJet™ 4G vicinity, for installation and for service purposes.
- Installation should 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.
- The NetaJet™ 4G should be placed in an environment with pollution not exceeding degree 3.

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

WARNING
In agricultural environment - always wear protective footwear.

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

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

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

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

SAFETY AND WARRANTY

Warranty

Netafim™ warrants all the components of the NetaJet™ 4G 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 NetaJet™ 4G 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 a temperature of 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 the warranty.

This warranty does not extend to repairs, adjustments or replacements of a NetaJet™ 4G 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 Netafim™ supplier.

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 Netafim™).

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DECLARATION OF CONFORMITY

Manufacturer's Name: NETAFIM LTD.
Manufacturer's Address: 10 DERECH HASHALOM, TEL AVIV 67897, ISRAEL

MODEL No.:

NETAJET 4G BYPASS PL
NETAJET 4G BYPASS PL HF
NETAJET 4G BYPASS PL OCTA
NETAJET 4G BYPASS ST
NETAJET 4G INLINE PL
NETAJET 4G INLINE ST

DESCRIPTION OF EQUIPMENT:
Netajet 4G- Nutrient Fertilizer, Acid and Alkaline Dosing System

Year of Equipment: **2017**

DIRECTIVE COMPLIED WITH:
EMC: 2014/30/EU
LVD: 2014/35/EU

Harmonized Standards to which Conformity is Declared:
EN 55011:2009+A1:2010
EN 61010-6-2:2005 + AC: 2006
EN 61000-4-2:2009
EN 61000-4-4:2012
EN 61010-1:2010 (Third Edition)

We, the undersigned hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer:

Date: 18/0/2017
Full Name: Avi Schweitzer
Signature: _____
Position: VC of R&D, NETAFIM LTD.

EU Authorized Representative:

Date: 19.06.2017
Full Name: Alon Shmuely
Signature: _____
Position: CEO, NETAFIM Deutschland GmbH.

NETAFIM Deutschland GmbH
Effektive Bewässerung
Im Fuchsloch 7
60437 Frankfurt am Main
Tel: 06101 / 50 51 0
Fax: 06101 / 50 51 1

APPENDIX 1

List of configurator items

NJ4 BPL -400 -5-12/5 -4 E40 +1 D60 -2EH -16 P2 -N/A

A B C D E F G H I J* K L*

*In case more output cards or communication to remote systems are needed, order separately by the catalog number in the respective table below.

A

NetaJet™ 4G

B Netajet type

Code	Description
BPL	Bypass PL
BST	Bypass ST
IPL	Inline PL
IST	Inline ST
HF	High Flow PL**
OCT	OCTA Flow PL***

C Voltage

Code	Description
-400	3x400V (Europe, Africa, Middle East, Australia, Korea, Brazil, China)
-440+1	3x440V + external 110V (USA, Mexico)
-220+1	3x220V + external 110V (USA, Mexico)
-440+2	3x440V + external 220V (Peru, India)
-220	3x220V (Central America, Colombia)
-1X220	1x220V
-1X110	1x110V

D Pump type

Code	Description
-5-12/5	CRI 5-12 50Hz (standard for PL models 50Hz) - 2.2 kW
-5-18/5	CRI 5-18 50Hz (PL high pressure 50Hz) - 3 kW
-10-8/5	CRI 10-8 50Hz - 3 kW
-20-5/5	CRI 20-5 50Hz (standard for HF 50Hz) - 5.5 kW
-20-7/5SF	CRI 20-7 50Hz (HF high pressure 50Hz) - 7.5 kW (with soft starter)
-5-7/6	CRI 5-7 60Hz (standard for PL models 60Hz) - 2.2 kW
-5-11/6	CRI 5-11 60Hz (PL high pressure 60Hz) - 3kW
-10-5/6	CRI 10-5 60Hz - 3kW
-20-3/6	CRI 20-3 60Hz (standard for HF 60Hz) - 5.5kW
-20-4/6SF	CRI 20-4 60Hz (HF high pressure 60Hz) - 7.5 kW (with soft starter)
N/A	No pump, single-phase switchboard for the controller only

E No of fertilizer channels

Code	Description
-1	1 channel for fertilizers
-2	2 channels for fertilizers
-3	3 channels for fertilizers
-4	4 channels for fertilizers
-5	5 channels for fertilizers
-6	6 channels for fertilizers
-7	7 channels for fertilizers
-8	8 channels for fertilizers

F Fertilizer channel flowrate

Code	Description
E100	1000 l/h per fertilizer channel
E60	600 l/h per fertilizer channel
E40	400 l/h per fertilizer channel
E15	150 l/h per fertilizer channel
E05	50 l/h per fertilizer channel

G No. of acid channels

Code	Description
N/A	No channel for acid
+1	1 channel for acid

H Acid channel

Code	Description
D60	Diluted acid 600 l/h
D40	Diluted acid 400 l/h
CA05	Concentrated acid 50 l/h
N/A	No channel for acid

I EC/pH measurement

Code	Description
-EH	Single EC/pH
-2EH	Dual EC/pH
N/A	None

J Number of outputs

Code	Description	
-16	16 outputs 24V AC	
N/A	Without controller	
	Order separately	**Cat. No.**
	NMC 64 outputs 24V AC additional card	74340-008500

K Controller

Code	Description
P1	NMC-PRO 115V
P2	NMC-PRO 230V
K2	NMC-PRO 230V (Korean/Chinese language)
-SSR	5 solid state relays for the dosing channel (no controller)
-GROW	Netagrow EC/pH module
N/A	Without controller

L Communication port

Code	Description	
N/A	None	
	Order separately	**Cat. No.**
	NMC64 communication card RS232	74340-009100
	NMC64 communication card RS485	74340-009200
	NMC-Pro communication card 2 X RS485 addition (expansion box)	74340-012800

**Dosing channels of 1000 l/h will work only in HF mode (up to 5 channels).

***Octa model will contain from 6 to 8 dosing channels (from 50 to 600 l/h).

APPENDIX 2

On-line configurator

To receive a quote or find the catalogue number for a selected NetaJet™ 4G configuration - after selecting the NetaJet™ 4G, go to https://cmtconfig.netafim.com

In the on-line configurator:

- Follow the instructions
- Send the resulting string to Netafim™

ATTENTION

Not every configuration of the NetaJet™ 4G is practicable.
Do not use the List of configurator items on the previous page to build a NetaJet™ 4G configuration.
To avoid unpracticable configurations, always use the on-line configurator.

APPENDIX 3

Dosing ratio estimates

WARNING

These are only estimates - for the exact fertilizer dosing ratio in a given project, consult an agronomist.

Protected Crops	**Dosing ratio per channel** (l/m³) (US gal/1000 US gal)
Vegetables in soil (A+B+acid)	5
Flowers in soil (A+B+acid)	5
Vegetables in soil (A+B+C+D+acid)	3.5
Flowers in soil (A+B+C+D+acid)	3.5
Vegetables in substrate	5
Flowers in substrate	5
Vegetables in substrate (high-tech greenhouse - multi-pulse*)	10
Flowers in substrate (high-tech greenhouse - multi-pulse*)	10

*Multi-pulse (dozens of short irrigation pulses per day)

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