

GrowSphere[™] **MAX** Irrigation & Fertigation Controller

Quick Setup Guide

July 2024



Precision Agriculture NETAFIM" DIGITAL FARMING

Thank you for purchasing the **Grow**Sphere[™] **MAX** Controller, an intuitive and simple-to-use device designed to speak the language of growers. **Grow**Sphere[™] **MAX** regulates water and fertilizer delivery in a precision irrigation system, activating local and remote devices such as pumps, valves, filters, dosing pumps and other hydraulic components. This ensures that crops receive the optimal amount of water and nutrients at all times.

This **Grow**Sphere[™] **MAX** quick guide contains basic setup instructions and wiring diagrams for your convenience.

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Technical Resources

Internal Design

GrowSphere[™] MAX - Internal Design



- Switches the main power on and off
- Enable connecting the peripheral components
- You can find the connector in the accessories box
- * Subject to product configuration

GrowSphere[™] MAX - CPU



Netafim[™] | GrowSphere[™] MAX QSG 2024

• Easy visual Indication

24AC LED 24DC LED

CPU Reset

• Controlled by Modem remotely

What's in the box

	Grow Sphere™ MAX controller
**	3 x (colors) gaskets for power cable
O	1 x BSU feed cable
	1 x electricity connector
	Wall mount adaptors
\$	Wall mount screws
	SIM adaptors and pin
	2 x fuses
	2 x mobile antenna
ĨĮ.	Plastic bands
	Global SIM Card
	1 x Touch screen pen

GrowSphere™ MAX Power connector



GrowSphere[™] MAX Cable connector



Firmware upgrade (Manual)

To upgrade the firmware in your GrowSphere[™] MAX controller, follow these steps below. Remember to stay up to date with future firmware versions.

- 1. Turn OFF GS Max, takeout existing SD Card
- 2. Prepare a clean SD card formatted with FAT32
- 3. Download required latest version. Unzip it to a folder.
- 4. Copy only the content of the folder into SD card root.
- 5. The SD card contents should look like:

Name	Туре
FIRMWARE	File folder
USERDATA	File folder
SDCARD.INI	Configuration settings
Version.txt	Text Document
Version.txt.sig	SIG File

- 6. Insert this SD card into PLC
- 7. Power ON the PLC.
- 8. If a new FW is found on the SD card, RUN and ERR LEDs will start blinking in 1 HZ
- 9. Wait ~5min until only the RUN LED is blinking.
- 10. Power OFF the PLC .

- 11. Take out the SD card and insert SD card that was taken out from PLC before upgrade or it may be empty card.
- 12. Power ON the PLC.
- 13. The controller will reboot once again automatically, wait the process to complete. When the process complete, the RUN LED should remain constantly on. When the process complete, the RUN LED should remain constantly on.
- 14. if the process is successful RUN LED should be constantly on (ERR LED might be red, that is OK , MC LED will be ON, if SD Card is inserted in the slot).

Product technical specifications

	Per mainline	Total
Mainline	1	4
Main valve	1	4
Main water meter	1	4
Pump	3	12
External filter (flushing control+indication)	32	128
Dosing station	1	4
Dosing channel	8	8
Valves	256	256

Irrigation programs	10
Shifts per program	32
Valves per shift	32
Dosing recipe	10

Local and Remote Control

Local access via LAN

For local access, you can connect to the controller' Wi-Fi by scanning the QR code on the controller or connect via LAN. To access remotely, you can use GrowSphere[™]Cloud by clicking on the link icon or use Anydesk from any device by entering the username and password provided with the controller.



- 1. Connect a LAN cable to the switch and type the IP address 192.168.0.10 in the URL
- 2. Create static IP address In the address range of my system 192.168.0.4
- 3. Ensure the Default gateway address is: 192.168.0. 10

Navigate to your ethernet port properties and set the TCP/IPv4 option, as demonstrated below

To easily find your Ethernet port, navigate to the Control Panel > Network and Sharing Center > Change adapter settings







- By scanning the QR code on the controller you will get the Wi-Fi address and password for the controller's modem

- By typing 192.168.0.10 in the URL line, you will be able to access to the controller dashboard.



Remote access - Using Anydesk

The controller comes with a SIM card and can be accessed through the **Grow**Sphere[™] Cloud. However, you can also access it through AnyDesk by following these two steps:

To get started, you'll need to install Anydesk on your computer, tablet, or mobile device. Once you have it installed, you can use the username found on the controller's internal door. The password for this account is GrowSphere01.



GrowSphere[™] **MAX - Basic Settings**

Getting started

Select the Desktop / Mobile view, in the case of Tablet, you can select Desktop



System preferences

Set your system preferences

Set your preferences and continue to the next step, your settings will be saved automatically.

l	General	System	Demicions	System Delays
	Language	English 👻	Units	Imperial
	Time format	24 hours 👻	First day of the week	Sunday
	Time Zone Daylight Savings	итс 👻	Current date	11.07.2023
	Current UTC time 🛛 Auto	00.42	Date format	dd/mm/yyyy
	Farm name		CS Demo	
	Phone number for alarms	972528343844		Send SM5 te

Set definitions for operation time and flow Select the relevant mainline - From this stage, all the settings will be per mainline. Set the System Definitions

a ne	atural	C3 Denio			Presecutiv			an 35	
6		Gener	al		System	Definitions		System 0	ielays
2	Dise	bie Mainline							
ŝ	Start o	day time 06	:00	Erid day t	ime 23:00				
71	Pau	se Mainline (on energy save	period					Edit
7	Sur	1ay	Montley	Tuesday		ednesday	Thursday	Folday	Saturday
2	- 4		(4	-		4	**		-
a	Power off	recovery							
_	When eler	ctrical power is	off for more than	00:00	hhanm			Reset 🗌 Que	sue 🔲 Irrigation
3)	Add t	o queue imige	tion programs who	start time wee	on power off p	eriod			
	Minimal	left quantity fo	er uncompleted lim	gation (%)	3.0	Minimal	eft time for uncomple	ited Irrigation	(%) 3.0
	Mainling	Max Flow	IGP	0	200.0	Min mean	cureble flow	(CPM)	0.50

Define system delays

Set the delays for the mainline components

Ú.	General	System Definitions	System Delays				
5	System Delays Program Delays	Dosing station					
p	System Delays		On	orr	Unit		
	Pump/s	00:10	00:00	mm:ss			
ξ	Main Valve delay	00:05	00:04	mm:ss			
7	Irrigation valves delay		00:00	00:10	mmiss		
5	Line fill delay		01:00		mm:55		
3							

System settings

Navigate to settings

Enter the password 287451



Set mainlines configuration

Define the number of valves and the devices that connected to each mainlines



Set valves configurations

- Set name, flow rate, and irrigated area for each valve

- The Flow and Area are used to manage and monitor the irrigation in the **Grow**Sphere[™] cloud

Configuration		Lor	al VO	Remote I/O	Cor	mmunication		Wiring Diagram	
Mainline		Pump Station	Filter Station	Dosing Station	Cooling & M	isting	/alves	Other De	evice
Device type	NO.	Source	Name		Flow	Area	Assigned	Module/RTU	00
Valve	1	M.Line1	Almond 1		43.00 GPM	2.10 ac	~	PM5052	3
Valve	2	M.Line1	Almond 2		27.00 GPM	1.50 ac	~	PM5052	4
Valve	3	M.Line1	Almond 3		11.00 GPM	1.50 ac	-	PM5052	5
Valve	4	M.Line1	Almond 4		37.00 GPM	1.80 ac	~	D0573.1	0
Valve	5	M.Line1	Apple 1		46.00 GPM	2.20 ac	~	D0573.1	1
Value	6	M.Line1	Apple 2		14.00 GPM	0.70 ac	-	D0573.1	2
Valve	7	M.Line1	Apple 3		20.00 GPM	1.00 ac	~	D0573.1	3

Define other devices configurations

Set the parameters for each device

	Config	uration	Lo	cal I/O	Remote 1/0	Communication		Wiring Diagr	am
	Mainlin	ne F	ump Station	Filter Station	Dosing Station Coo	ling & Misting V	alves	Other De	evic
	Device type	E.	NO	Source	Name	Flow	Assigned	Module/RTU	D
	DosingCl	hannel	1	D.Statio1	DCH1.1	25.00 GPH	~	D0572.1	0
	DosingCh	hannel	2	D.Statio1	DCH1.2	25.00 GPH	~	D0572.1	1
	DosingCh	hannel	3	D.Statio1	DCH1.3	25.00 GPH	~	D0572.1	2
	DosingCh	sannel	4	D.Statio1	DCH1.4	25.00 GPH	~	D0572.1	3
	Pump		1	M.Line1	PMP1	0.00 GPM	~	PM5052	1
)	BoostPun	np	1	M.Line1	BPMP1.1	114	~	PM5052	2
	MainValy	e	1	M.Line1	M.Valve	14-11		PM5052	0

Assign digital outputs to I/O modules

- 1 Click assign for each row to assign
- 2 Define the Flow and irrigated area for each valve
- The I/O module to which the device has been assigned to can be selected, by skip between pages 1-5

Config	uratio	n 🔡	Local I/	0	Remote I/O	Communicat	ion	Wiring Diagram
Local digit	al outp	ut Local digi	tal input	Local an	alog input			
Module	DO	Device type	NO.	Source	Name	Flaw	Area	Assigned
PM5052	0	MainValve	1	M.Linel	M.Valve	1.00	-	Unassig
PM5052	1	Pump	1	M.Line1	PMP1	0.0 m²/h	2-	Unassig
PM5052	2	Dosing Booste	H 1	M.Line1	BPMP1.1	-	(-	Unassig
PM5052	3	Valve	1	M.Line1	Almond 1	43.0 m³/h	2.1 ha	Unassig
PM5052	4	Valve	2	M.Linel	Almond 2	27.0 m³/h	1.5 ha	Unassig
PM5052	5	Valve	3	M.Linel	Almond 3	11.0 m ³ /h	1.5 ha	Unassig
D0573.1	0	Assign	0			122	12	Unassig

Assign digital outputs to I/O modules

By clicking Assign, the system will indicate how many devices are not yet assigned, and will automatically assign it to the next available port

2						-	sgram
L	Valve	(0)	Dosing Booster	(0)	Condition active	(0)	
	MainValve	(0)	Alarm	(0)	EC Pre-Control open	(0)	
	Pump	(0)	Selector	(0)	EC Pre-Control close	(0)	nstign
8 -	Filter	(0)	Agitator	(0)	Relay	(0)	ssign
33 — 3	Main Filter Valve	(0)	Cooling	(0)	Same as DO	\supset	asign
	Dosing Channel	(1)	Misting	(0)	EC Pre-Control pump	(0)	asigo
1	Mist Cool pump	(0)	Mist Cool Main valve	(0)	Agitator Pump	(0)	ngizza
							issign

Assign digital inputs to I/O module

- Assign each device to I/O Module and port
- Provide the name, flow rate, and irrigated area for each input.
- You can select the I/O module to which the device has been assigned by navigating between pages 1-5.

	Config	juration	Lo	cal I/	0	Remote I/O	Communica	ation	Wiring Diagram
	Local digiti	al outp	ut Local digita	linpu	Local an	alog input			
	Module	DF	Device type	NO.	Source	Name	туре	Rate	Assigned
	PM5052	0	Water Meter	1	M.Line1	WM1	GPP	10.00	Unassign
	PM5052	1	Pump Overload	1	M.Line1	POL	NO	• -	Unassign
	PM5052	2	Dosing Meter	1	M.Line1	DMTR1.1	GPP	0.80	Unassign
	PM5052	з	Dosing Meter	2	M.Line1	DMTR1.2	GPP	0.80	Unassign
	PM5052	4	Dosing Meter	3	M.Line1	DMTR1.3	GPP	0.80	Unassign
)	PM5052	5	Dosing Meter	4	M.Line1	DMTR1.4	GPP	0.80	Unassign
	PM5052	6	Assign	0					

View the wiring diagram

The wiring diagram shows the module and port for each device that has been assigned. You can follow the diagram to properly connect the devices

Gr	owSphere-	CS Demo	All Mainl	lines 🔻	Settings			A 🗟 T.e	11 Jul 2023 08:55:44 🛸
â	Con	figuration	L.	ocal I/O	Rem	note VO	Commu	nication	Wiring Diagram
8	PM-5052	- CPU	DO-573	3 - Output	DO-57	2 - Output	AI-561	- Analog input	
8 1 1 8 4	 ⊕ + ⊕ 100 ⊕ + ⊕ 101 ⊕ + ⊕ 102 ⊕ + ⊕ 103 ⊕ + ⊕ 104 ⊕ + ⊕ 105 	WM1 POL DMTR1.1 DMTR1.2 DMTR1.3 DMTR1.4	 ● 0 ● 1 ● 2 ● 3 ● 4 ● 5 ● 6 ● 7 ● C ● 8 ● 9 	viv4 viv5 viv7 Common viv8 AGTRL1 AGTRL3 Common AGTRL4 AGTRL4	 ⊕ 0 ⊕ 1 ⊕ 2 ⊕ 2 ⊕ 3 ⊕ 4 ⊕ 5 	DCH1.1 Common DCH1.2 Common DCH1.3 Common DCH1.4 Common Common	 ⊕ + ⊕ A0 ⊕ + ⊕ A1 ⊕ + ⊕ A2 ⊕ + ⊕ A3 ⊕ + 	EC1.1 PH1.1 Rad Temp.out	
3	 		 ⊕ 10 ⊕ 11 ⊕ C ⊕ 12 ⊕ 13 ⊕ 14 	Common	 € C € C € 7 € C 	Common Common Common	• • •		
	⊕ 108		⊕ 15	Common					

Wiring Instructions

GrowSphere[™] MAX - CPU



Expantion modules

GrowSphere[™] MAX - DO573 Module

- 16 normally open relay outputs
- Isolation Groups = 2 (8 channels per group)
- Output current per channel = 2 A
- Indication of output signals 1 yellow LED per ch.



GrowSphere[™] MAX - AI561 Module

- 4 Analog Inputs
- Feed (Sourcing) voltage 24 VDC
- Resolution 0-20mA; 4 -20mA; 12 bit
- Channel input resistance 250 ohm





Connecting current transmitter



Connect to remote units

Connection of Weather Station – RS232

Grou	wSphere-	7	Mainline 3	-	Settings		Tue 18 Apr 2023 10:55 5	*
命	Cont	iguration	Local I/C		Remote VO	Communicatio	Wiring Diagr	m
8	RS-	485	R5-232	U over	New			
0°	RS-232	- Serial port	ts		2			_ 3
-	O Ne	tRTU (GW)	Allocation O Weath	ner station	J		Detect system	
≙								
8								
0								
9								
_								
7								

RS232 Module



Signal	Descrition
RTS	Request To Send DCE is ready to accept data from the DTE
TxD	Transmit Data (output)
GRD	Common Ground
RxD	Receive Data (input)
CTS	Clear To Send (input) DCE is ready to accept data from the DTE

State LEDs

Signal	Color	State	Descrition
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving

Connection of RadioNet / SingleNet - RS485

- Please note: Before starting this process, ensure you have the latest version of PoleNet & Polenet2Max Apps.
- In order to set up the Remote units, kindly get in touch with our Global support team via email at cmt.support@netafim.com
- 1. From the settings \rightarrow communication \rightarrow RS485 screen.
- 2. Mark the RadioNet allocation.
- 3. Start allocation.



RS485 Module



State LEDs

	Signal	Color	State	Descrition
	TxD	Yellow	ON (blinking)	Transmitting
B	RxD	Yellow	ON (blinking)	Receiving
4	120R	Yellow	ON	Bus termination
n k	PUD	Yellow	ON	Pull-up / Pull-down

- 1. 2 LEDs for communication state display (TxD and R&D).
- **2.** 2 LEDs for termination state display.
- **3.** Allocation of signal name.
- 4. 5-pin terminal block for communication interface.



GrowSphere[™] Max

SingleNet Host



B1 in MAX to B1 in Host

Wiring RadioNet to GrowSphere[™] MAX



GrowSphere[™] Max RadioNet Host





B in MAX to B1 in Host

Dosing Setting

Set dosing station configuration

1. Define the numbers of dosing channels and agitators and activate them

2. Select the connected devices that relates to the dosing station



Define analog inputs

1. When you click on Assign, a list of devices that have been allocated will appear.

From there, you can choose the sensor you want to work with and set the input ranges, name, and offset for each sensor

2. To assign additional analog sensors, simply navigate between the pages

1	Configuration	Local I/O	Remote I/O	Communication	Wiring Diagram
5	Local digital output Lo	cal digital input	Analog intput		
	Module AI Device type	NO. Source	Name	Input Unit	Assigned
ł	AI561.10 EC	1 M.Line	1 EC1.1	4 - 20 mA	
	Input Range (mA)	Output Range		Offset	Unassign
	4 . 20	= 0	- 5	0.00	
5	AJ561.11 Assig				_
1	Input Range (mA)	Output Range		Offset	t nassign
	4 - 20	= 0	- 14	0.00	

By clicking on Assign, the list below will be opened. The allocated devices are presented in the list

								×
EC	(0)	Analog Flow Sensor (0)	SM150	(0)	PlantSense	(0)	Pressure0_20	(0)
pH	(1)	Out Temperature (0)	ECH205	(0)	LeafWetness	(0)	Pressure0_60	(0)
EC Verify	(0)	Out Humidity (0)	Irrometer	(0)	General rSense S	iens(0)	Accumulated Rain	(0)
pH Verify	(0)	Radiation (0)	Dewpoint	(0)	Identification Ser	rsor(0)	Solar Radiation sur	m (0)
EC Pre-Control	(0)	Wind Speed Max (0)	HygroClip2	(0)	NetaCap water c	onte(0)	General 0-5V	(0)

Set Dosing channels

- Activate the connected channels.

- Define the Type, Minimum and Nominal flow, Reaction, DM rate and deviations for each of the channels.

		F	lecipes	Overview User		Overview *	Technician	Gene	ral Sett	ings	Char	nels	Setting	gs.
	Active	iD	Dosing Channel	Channel Type		Minimum Flow GPH	Nominal Flow GPH	Reaction		Dosing Neter Rate	Low	ation	High devi	atio
		1	DCH1.1	Venturi Soleno	•	1.0	150.0	Passive	•	0.2 GPP	30	%	40	%
)		z	DCH1.2	Venturi Soleno	•]	1.0	450.0	Passive	•	0.2 GPP	30	%	40	%
		3	DCH1.3	Venturi Soleno	•	1.0	450.0	EC	•	0.2 GPP	30	%	40	%
		4	DCH1.4	Venturi Soleno	•	1.0	300.0	Acid	•	0.2 GPP	30	%	40	*

Set EC and pH reaction methods

 Select Intensive dosing method Extensive can be selected when dosing is controlled by remote units, then EC and pH control are not optional.
 Activate the relevant reaction method (EC/pH) and set the reactions parameters for each of the sensors

2	Berine		C Internetion		verview Technicia	Geo	eral Settings	Channels Settings
9	- weiper		U intensive					Chairme Sectings
à	EC pH contro	Mo	ing valve	Tanks	Agitators			
D	O Extensio	ve	O Intensive					
	EC						EC Sensors	
r .	Control Cycle	Delta	Fine Tuning	Coarse Tuning	Deadband	Integ time	Control	Aug filter speed
	15.0 Sec	0.2	\$0.0	50.0	0.1	10.0 Sec	Sensor 1 👻	5 🗸
1	DH pH						pH Sensors	
	Control Cycle	Delta	Fine Tuning	Coarse Tuning	Deadband	Integ time	Control	Aug filter speed
3	15.0 Sec	0.2	25.0	50.0	0.1	10.0 Sec	Sensor 1 👻	5 🔻
	Minimum ce tin	ne	Minimum off time	Water flo	w stability time	Booster off del	ay	
	1.8 Ger		20500	5.0 Sec		20.0 Sec		

Create new dosing recipe

Click on the Insert new recipe to create a new dosing program. Activate the recipe, and repeat this action for other dosing recipes as required.

3 C	Recipes	Overview User	Overview Technician	General Settings	Channels Settings
6	💽 Insert new recip	e			
p	🔁 Insert new recip	e			
Œ	🔁 Insert new recip	e			
5	🚹 Insert new recip	e			
2	E Insert new recip	e			
3	Insert new recip	e			
5	🔁 Insert new recip	e			
,	💽 Insert new recip	e			
	Insert new recip	•			
5	H Insert new recip	e			

Define the dosing recipe channels

- 1. Name the recipe
- 2. Activate the recipe's dosing channels.
- 3. Select the methods and quantities and the Value for each channel. DM Control can be activated if required.
- 4. Set the target EC and pH.



Activate the recipe

CActivate the recipe, and repeat this action for other dosing recipes as required.

- by gran	CS Demo		Dosing	4 H ·	an an ha sons a source of
۵.	Recipes	Dverview User	Overview Technician	General Settings	Channels Settings
&	1 Dosing 1				1
0°	2 Dosing 2)
	😑 Insert new recipe				
*	💽 Insert new recipe				
	Insert new recipe				
8	🛃 Insert new recipe				
6	🛃 Insert new recipe				
÷	Insert new recipe				
	😑 Insert new recipe				
CD	Insert new recipe				

Connection of DO572 Module

- 8 triac outputs 24 VAC
- 'C' Shared common
- Output current per channel = 2 A
- 2A Fuse on each channel. Not removable
- Indication of output signals 1 yellow LED per ch.
- The LED is on when output signal is high







Connection of Analog Inputs Module EC, pH - A1561

D

O

+ A14 8

Create irrigation program

Create new irrigation program

Click on Insert new program

Gro	wSpho	re" CS Demo	Mainline 1 🗸	Irrigation	A 🖾 Tue 11 Jul	2023 10:10:30 🦃
۵	•	Insert new program				:
&	•	Insert new pr	ogram		:	
ď	•	Insert new pr	ogram		:	
h#1	0	Insert new program				
*		Insert new program				1
	٠	Insert new pr	ogram			1
	٠	Insert new pr	ogram			1
Ì	•	Insert new pr	ogram			1
	•	Insert new pr	ogram			1
CD		Insert new pr	ogram			-

Set irrigation program

- 1. Name the irrigation program.
- 2. Specify the type of irrigation program, its priority, and the units to be used.
- 3. Click on Shifts to create shifts (see next page)
- 4. Click Dosing to select the Dosing program.
- 5. Set start times and triggers for irrigation.
- 6. Choose the days for irrigation and specify whether you want to use water only (indicated by blue) or dosing plus irrigation (indicated by green) for each selected day
- 7. Provide definitions for water before and after a shift or program.



Edit and/or add a new shift

- 1. Click to add a new Shift
- 2. Click to edit an existing Shift



Edit and/or add irrigation shifts

Assign dosing recipe to irrigation program

To assign valves to a shift, follow these three steps:

- 1. Give the shift a name
- 2. Choose the valves you want to assign to the shift
- 3. Assign the shift to a dosing recipe



Assign dosing recipe to irrigation program



Quick view of your irrigation operation status







