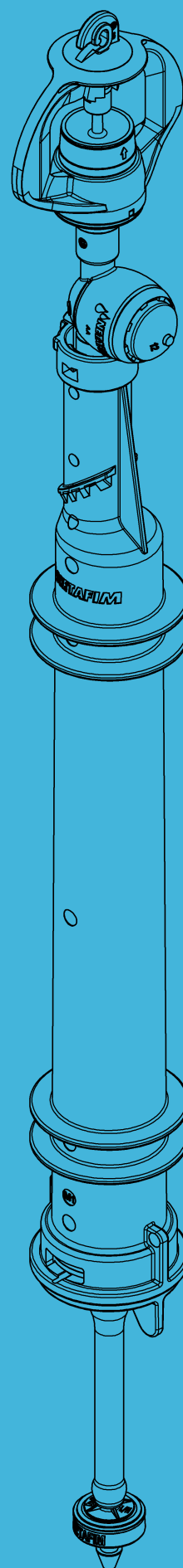


PULSAR™

USER MANUAL



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INTRODUCTION

The aim of this manual is to guide the user on the selection, the setup and installation, the operating and the maintenance of the Pulsar™ in its various applications.

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 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.



SAFETY FOOTWEAR

The following text contains instructions aimed at preventing foot injury.



TIP

The following text provides clarification, tips or useful information.



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.

INTRODUCTION

Safety instructions

- All applicable safety instructions and regulations must be observed and applied.
- Ensure that the installation is carried out in a manner which prevents leaks from the Pulsar™, the irrigation lines, the peripherals and the accessories, which may contaminate the environment, soil or adjacent area.
- The effectiveness of the equipment may be jeopardized or impaired if the equipment is used in a manner other than that specified by the manufacturer.



WARNING

In an agricultural environment - always wear protective footwear.



CAUTION

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

When using acid/chemicals



ACID HAZARD

When using acid/chemicals - always observe the manufacturer's safety instructions and use caution when handling any such acid/chemicals.



WARNING

When handling fertilizers, acid or other chemicals, always use protective equipment, gloves and goggles.



WARNING

To prevent damage to the environment and to the crop, acids and/or hydrogen peroxide must never be released to the atmosphere or come in contact with any part of the crop.



ATTENTION

When using acid or hydrogen peroxide, respect the recommended concentrations below in order to prevent damage to the Pulsar™, the infrastructure, the environment and the crop.

Using concentration levels in excess of the values listed below may cause damage to the Pulsar™, the infrastructure, the environment and the crop and will void the warranty for the Pulsar™ and/or any other parts of the irrigation system.

Recommended acid concentrations

Percentage of Acid	Recommended Concentration in Treated Water
Hydrochloric Acid 33%	0.6%
Phosphoric Acid 85%	0.6%
Nitric Acid 60%	0.6%
Sulfuric Acid 65%	0.6%

% is by weight at 21°C (70°F)



WARNING

Exceeding the above acid concentrations will damage the Pulsar™

INTRODUCTION

If the acid used has a different concentration level from the data included in the table above, adjust the concentration according to the percentage relative to the concentrations recommended in the table above.

Recommended dosage of hydrogen peroxide

Injection Method / Purpose	Injected Concentration	Residual Concentration*
Continuous Injection	50 ppm	0.5 ppm
Selective Injection	50 to 100 ppm	2 to 3 ppm
Annual maintenance treatment of the irrigation system	200 to 500 ppm	8 to 10 ppm

*Measurements must be taken at the point furthest from the injection point.



ATTENTION

The tables above indicates the recommended concentrations of the chemicals and is not a recommendation, endorsement or otherwise inducement to use the chemicals mentioned above or any other type of chemical.



WARNING

Substances such as chemicals for pest/disease control might be corrosive and damage the Pulsar™. When using any substance other than acids and hydrogen peroxide not exceeding the concentrations in the tables above, always observe the manufacturer's instructions for corrosiveness. In case of any doubt, consult your Netafim™ representative.

DESCRIPTION

The Pulsar™ is a pressure compensated pulsator that distributes relatively small amounts of water over a large wetted area, maintaining a uniform dispersion. It supplies continuous and uniform irrigation at low flow rates - 8/12/15/20 l/hr (2.1/3.2/4.0/5.3 GPH) - using micro-emitters originally designated for higher flow rates.



ATTENTION

The actual flow rate of the Pulsar™ is the flow rate of the flow regulator and not the flow rate of the emitter head.

Unique self compensating mechanism

The Pulsar's unique self compensating mechanism operates by means of a flow regulator (Pressure Compensated dripper) installed at its inlet.

The flow regulator consists of:

- a labyrinth which reduces the pressure and stabilizes the flow rate of the irrigation water running through it.
- a diaphragm which senses the pressure on both its surfaces, on one side - the inlet pressure, on the other side - the reduced pressure after the irrigation water passage through the labyrinth. The particular flexibility of the diaphragm determines the pressure difference the flow regulator allows between its inlet and its outlet.

The combination of the labyrinth and the diaphragm creates a self compensating mechanism which generates a stable flow rate at its outlet, regardless of the water pressure at its inlet (within the operating pressure range).

The Pulsar's unique self compensating mechanism amalgamates head losses/gains due to the distance between the pump and the field, the topography, the main pipes and the accessories, and ensures a uniform pressure at the inlet of the micro-emitter, regardless of its location in the field.

Operating principle

- The irrigation water enters the Pulsar™ through a flow regulator (Pressure Compensated dripper) plugged into the lateral.
- The flow regulator allows irrigation water to enter the pulsator tube through the micro-tube at a uniform, continuous and non fluctuating flow rate.
- An air bag inside the pulsator tube is compressed as water fills the pulsator tube.
- When the pressure inside the pulsator tube reaches the opening level of the anti drain valve - installed at the outlet of the pulsator tube - it opens and an irrigation pulse starts.
- The emitter head irrigates and the pressure inside the pulsator tube decreases, when it reaches the closing level of the anti drain valve, the irrigation pulse ends.
- When the anti drain valve closes the pressure inside the pulsator tube starts to build up again for the next irrigation pulse.

Advantages

- Pressure compensated: Precise and equal amounts of water are delivered over a broad pressure range.
- 100% uniformity of water distribution.
- Unique self compensation mechanism makes it the perfect choice for hillside applications or longer rows.
- Several pulses per minute, according to the selected combination of flow rate and emitter type, ensure continuous irrigation over a large area for many hours.
- Soil saturation or flooding are avoided even after many hours of irrigation.
- The water supply system, comprising a pump, a filtration system, pipes and fittings is relatively small and far less expensive to purchase, install and maintain.
- Highly profitable price/performance ratio.

DESCRIPTION

- Components are made of high-quality plastic materials resistant to any weather conditions and standard chemicals and nutrients used in agriculture.
- Energy and water saving.
- Simple, modular parts.
- Easy to install and maintain.
- A wide variety of accessories for a wide range of applications.
- Made by Netafim™.

Specifications

- Pressure-compensation range - 2.5 - 4.0 bar (36 - 58 PSI).
- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended filtration: 130 micron (120 mesh).
- UV resistant.
- Chemical resistance to standard chemicals and nutrients used in agriculture (see [tables](#) on pages 6-7).
- Inlet connector: barb.
- Several techniques/adapters/fittings are offered for installation in the field (not included), (see [Accessories](#), page 33).

Applications

- Frost-mitigation in vineyards, in trellised crops, in fruit trees.
- Cooling of fruit trees, of vineyards, of trellised crops, of nurseries and others open field crops.
- Long shift irrigation of fruit trees, of nurseries and others open field crops.
- Humidification of the trees area.

Micro-emitter head selection

Application	Mode	Required micro-emitter head			
		StripNet™	GyroNet™ SSR	MistNet™	GyroNet™ SR
Frost mitigation in vineyards	UR	+			
Frost mitigation in fruit trees			+		+
Humidification and/or cooling				+	
Long shift irrigation			+		+
Long shift irrigation	UD				+

DESCRIPTION

Key features according to application

Application	Mode	Micro-emitter head	Pressure range	Recommended flow rate (per unit)	Recommended distance between heads	Wetted area
- Strip frost mitigation in vineyards - Cooling of nurseries and trellised crops	UR	StripNet™	2.5 - 4.0 bar (36 - 58 PSI)	12.0 l/hr (3.2 GPH)	Maximum 5.0 m (16.5 ft)	Rectangular: 0.5 m (1.65 ft) wide 5.5 m (18.0 ft) long
Humidification or Cooling of trees area	UR	MistNet™	2.5 - 4.0 bar (36 - 58 PSI)	8.0 l/hr (2.1 GPH)	One in the middle of each tree.	A very fine mist of water particles is emitted into the atmosphere
Irrigation of fruit trees and other crops	UR	GyroNet™ SR Swivel (Short range)	2.5 - 4.0 bar (36 - 58 PSI)	8.0 - 12.0 l/hr (2.1 - 3.2 GPH)	One per tree, one per 2 trees or according to the crop needs	Circular: 5.0 m (16.5 ft) Diameter
	UD			12.0 l/hr (3.2 GPH)		Circular: 4.0 m (13.0 ft) Diameter
Frost mitigation in fruit trees	UR	GyroNet™ SSR Swivel (Super short range)	2.5 - 4.0 bar (36 - 58 PSI)	8.0 - 12.0 l/hr (2.1 - 3.2 GPH)	One above each tree	Circular: 3.0 m (10.0 ft) Diameter
Cooling of fruit trees and other crops	UR	GyroNet™ SR Swivel (Short range)	2.5 - 4.0 bar (36 - 58 PSI)	12.0 - 20.0 l/hr (3.2 - 5.3 GPH)	One above each tree or according to the crop needs	Circular: 5.0 m (16.5 ft) Diameter

* UR = upright, UD = upside down

DESCRIPTION

Pulsar™ UR with StripNet™ head

Applications

- Frost-mitigation in vineyards, in trellised crops.
- Cooling of vineyards, of trellised crops, of nurseries.

Specifications

- Pressure compensated static micro-emitter.
- Widest pressure regulating range: 2.5-4.0 bar (36 - 58 PSI), 2.5 bar (36 - PSI) minimum working pressure at the compensated dripper inlet.



ATTENTION

To calculate the required working pressure of the system take into consideration the height of the emitters above the distributor pipe (lateral).

- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended flow rate: 12 l/hr (3.17 GPH).
- Rectangular water covering pattern: 0.5 meters (1.65 ft) wide by 5.5 meters (18.0 ft) long.
- Maximum recommended distance between heads: 5.0 meters (16.5 ft), (see [page 16](#)).
- One active, brown colored nozzle; one plugged, black colored nozzle.
- No moving parts.



ATTENTION

In order to ensure the length of the water covering pattern, make sure that the poles of the vineyards on which the Pulsars are to be installed, are absolutely vertical.

Features and benefits

- The Pulsar™ - StripNet™ frost-mitigation/cooling system operates using as little as 10 m³/hr hectare (18 GPM/acre) depending on the row spacing - less than 70% the water required by full-coverage sprinkler systems.

Typical description* and catalog number

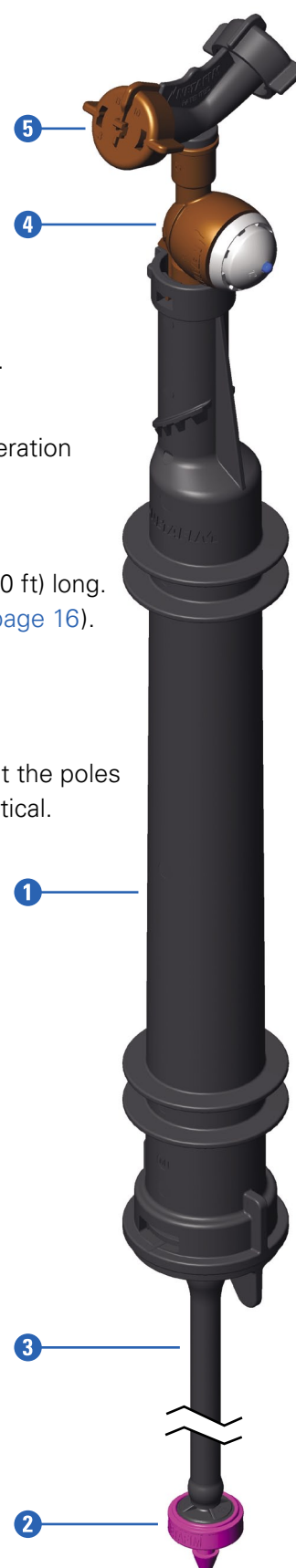
Catalog number	63700-005000
SAP description	PLSR URB 012 STR31 ADBLUP 120CM W/O ADP
Product components	1 Pulsar™ UR 2 Flow regulator - 12 l/hr (3.17 GPH) - color: Fuchsia 3 Micro-tube - 120 cm (4.0 ft) with barb inlet connector 4 AD valve - with blue pin - medium pressure 5 StripNet™ head - with one active nozzle

* The description above is of the typical Pulsar™ UR with StripNet™ head. Many other configurations are available (Call your Netafim™ representative).



ATTENTION

Before placing your order for Pulsars, note that the length of the micro-tube and the capacity of the flow regulator are compatible with the application and the conditions in the field. Other micro-tubes of other lengths and flow regulators of other capacities are available on request (call your Netafim™ representative).



DESCRIPTION

Pulsar™ UR with MistNet™ head

Applications

- Cooling of the trees area.
- Humidification of the trees area.

Specifications

- Pressure compensated micro-emitter.
- Widest pressure regulating range: 2.5-4.0 bar (36 - 58 PSI),
2.5 bar (36 PSI) minimum working pressure at the compensated dripper inlet.



ATTENTION

To calculate the required working pressure of the system take into consideration the height of the emitters above the distributor pipe (lateral).

- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended flow rate: 8.0 l/hr (2.1 GPH).
- Recommended distance between heads:
One in the middle of each tree (see [page 17](#)).
- Static micro-emitter,
- no moving parts.

Features and benefits

- The Pulsar™ - MistNet™ cooling/humidification system operates using as little as 10 m³/hr hectare (18 GPM/acre) depending on trees spacing.

Typical description* and catalog number

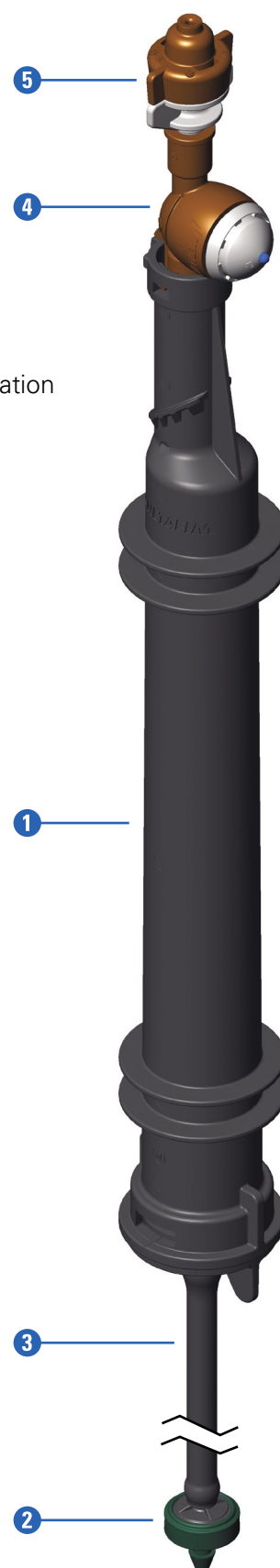
Catalog number	63700-006100
SAP description	PLSR URB 008 MST25 ADBLUP 200CM W/O ADP
Product components	① Pulsar™ UR ② Flow regulator - 8 l/hr (2.1 GPH) - color: Green ③ Micro-tube - 200 cm (6.6 ft) with barb inlet connector ④ AD valve - with blue pin - medium pressure ⑤ MistNet™ - brown nozzle

* The description above is of the typical Pulsar™ UR with MistNet™ head. Many other configurations are available (Call your Netafim™ representative).



ATTENTION

Before placing your order for Pulsars, note that the length of the micro-tube and the capacity of the flow regulator are compatible with the application and the conditions in the field. Other micro-tubes of other lengths and flow regulators of other capacities are available on request (call your Netafim™ representative).



DESCRIPTION

Pulsar™ UR with GyroNet™ SR head

Applications

- Long shift irrigation of fruit trees, of nurseries, and others open field crops.

Specifications

- Pressure compensated micro-emitter.
- Widest pressure regulating range: 2.5-4.0 bar (36 - 58 PSI), 2.5 bar (36 PSI) minimum working pressure at the compensated dripper inlet.



ATTENTION

To calculate the required working pressure of the system take into consideration the height of the emitters above the distributor pipe (lateral).

- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended flow rate: 8 l/hr (2.1 GPH) or 12 l/hr (3.17 GPH), according to the minimum projected ambient temperature.
- Recommended distance between heads: one above/below each tree or above/below 2 trees or according to the crop needs (see [page 17](#)).
- SR swivel, 5.0 meters (16.5 ft) wetted diameter.

Features and benefits

- The Pulsar™ - GyroNet™ irrigation system operates using as little as 15 m³/hr hectare (27 GPM/acre), depending on trees spacing.

Typical description* and catalog number

Catalog number	63700-007100
SAP description	PLSR URB 008 GYR9SR ADBCKP 60CM W/O ADP
Product components	① Pulsar™ UR ② Flow regulator - 8 l/hr (2.1 GPH) - color: Green ③ Micro-tube - 60 cm (2.0 ft) with barb inlet connector ④ AD valve - with black pin - low pressure ⑤ GyroNet™ SR - orange nozzle, blue swivel and orange upper bearing

* The description above is of the typical Pulsar™ UR with GyroNet™ SR head. Many other configurations are available (Call your Netafim™ representative).



ATTENTION

Before placing your order for Pulsars, note that the length of the micro-tube and the capacity of the flow regulator are compatible with the application and the conditions in the field. Other micro-tubes of other lengths and flow regulators of other capacities are available on request (call your Netafim™ representative).



DESCRIPTION

Pulsar™ UD with GyroNet™ SR head

Applications

- Long shift irrigation of fruit trees, of nurseries, and others open field crops.

Specifications

- Pressure compensated micro-emitter.
- Widest pressure regulating range: 2.5-4.0 bar (36 - 58 PSI), 2.5 bar (36 PSI) minimum working pressure at the compensated dripper inlet.
- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended flow rate: 12 l/hr (3.17 GPH),
- Recommended distance between heads: one below each tree or above 2 trees or according to the crop needs (see [page 18](#)).
- SR swivel, 4.0 meters (13.0 ft) wetted diameter.

Features and benefits

- The Pulsar™ - GyroNet™ irrigation system operates using as little as 15 m³/hr hectare (27 GPM/acre), depending on trees spacing.

Typical description* and catalog number

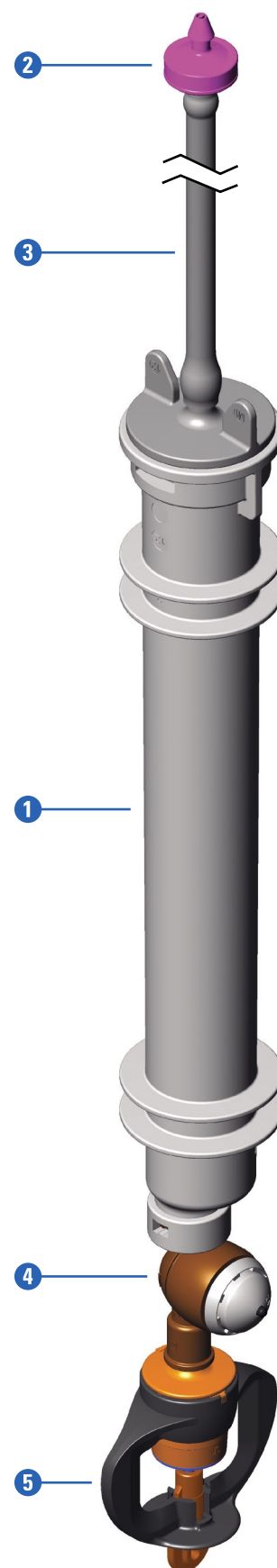
Catalog number	63700-010500
SAP description	PLSR UDB 012 GYR9SR ADBCKP 60CM GRAY
Product components	① Pulsar™ UD ② Flow regulator - 12 l/hr (3.17 GPH) - color: Fuchsia ③ Micro-tube - 60 cm (2.0 ft) with barb inlet connector ④ AD valve - with black pin - low pressure ⑤ GyroNet™ SR - orange nozzle, blue swivel and orange upper bearing

* The description above is of the typical Pulsar™ UD with GyroNet™ SR head. Many other configurations are available (Call your Netafim™ representative).



ATTENTION

Before placing your order for Pulsars, note that the length of the micro-tube and the capacity of the flow regulator are compatible with the application and the conditions in the field. Other micro-tubes of other lengths and flow regulators of other capacities are available on request (call your Netafim™ representative).



DESCRIPTION

Pulsar™ UR with GyroNet™ SSR head

Applications

- Frost mitigation in fruit trees.
- Cooling of fruit trees and others open field crops.

Specifications

- Pressure compensated micro-emitter.
- Widest pressure regulating range: 2.5-4.0 bar (36 - 58 PSI), 2.5 bar (36 PSI) minimum working pressure at the compensated dripper inlet.



ATTENTION

To calculate the required working pressure of the system take into consideration the height of the emitters above the distributor pipe (lateral).

- Optimal required pressure - 3.0 bar (43.5 PSI).
- Recommended flow rate: 12l/hr (3.17 GPH), 15l/hr (3.96 GPH) or 20l/hr (5.28 GPH), according to the minimum projected ambient temperature.
- Recommended distance between heads: one above each tree or according to the crop needs (see [page 17](#)).
- SSR swivel, 3.0 meters (10 ft) wetted diameter.

Features and benefits

- The Pulsar™ - GyroNet™ frost-mitigation/cooling system operates using as little as 15 m³/hr hectare (21 GPM/acre), depending on trees spacing - less than 50% the water required by full-coverage sprinkler systems.

Typical description* and catalog number

Catalog number	63700-008000
SAP description	PLSR URB 012 GYR9SSR ADBCKP 120CM W/O ADP
Product components	1 Pulsar™ UR 2 Flow regulator - 12l/hr (3.17 GPH) - color: Fuchsia 3 Micro-tube - 120 cm (4.0 ft) with barb inlet connector 4 AD valve - with black pin - low pressure 5 GyroNet™ SSR - orange nozzle, light green swivel and orange upper bearing

* The description above is of the typical Pulsar™ UR with GyroNet™ SSR head. Many other configurations are available (Call your Netafim™ representative).



ATTENTION

Before placing your order for Pulsars, note that the length of the micro-tube and the capacity of the flow regulator are compatible with the application and the conditions in the field. Other micro-tubes of other lengths and flow regulators of other capacities are available on request (call your Netafim™ representative).



ON-SITE PREPARATIONS

Typical setups

The Pulsar™ can be set up in various manners to accommodate its many applications. The most common setups for each application are detailed below.

Pulsar™ UR with StripNet™ head

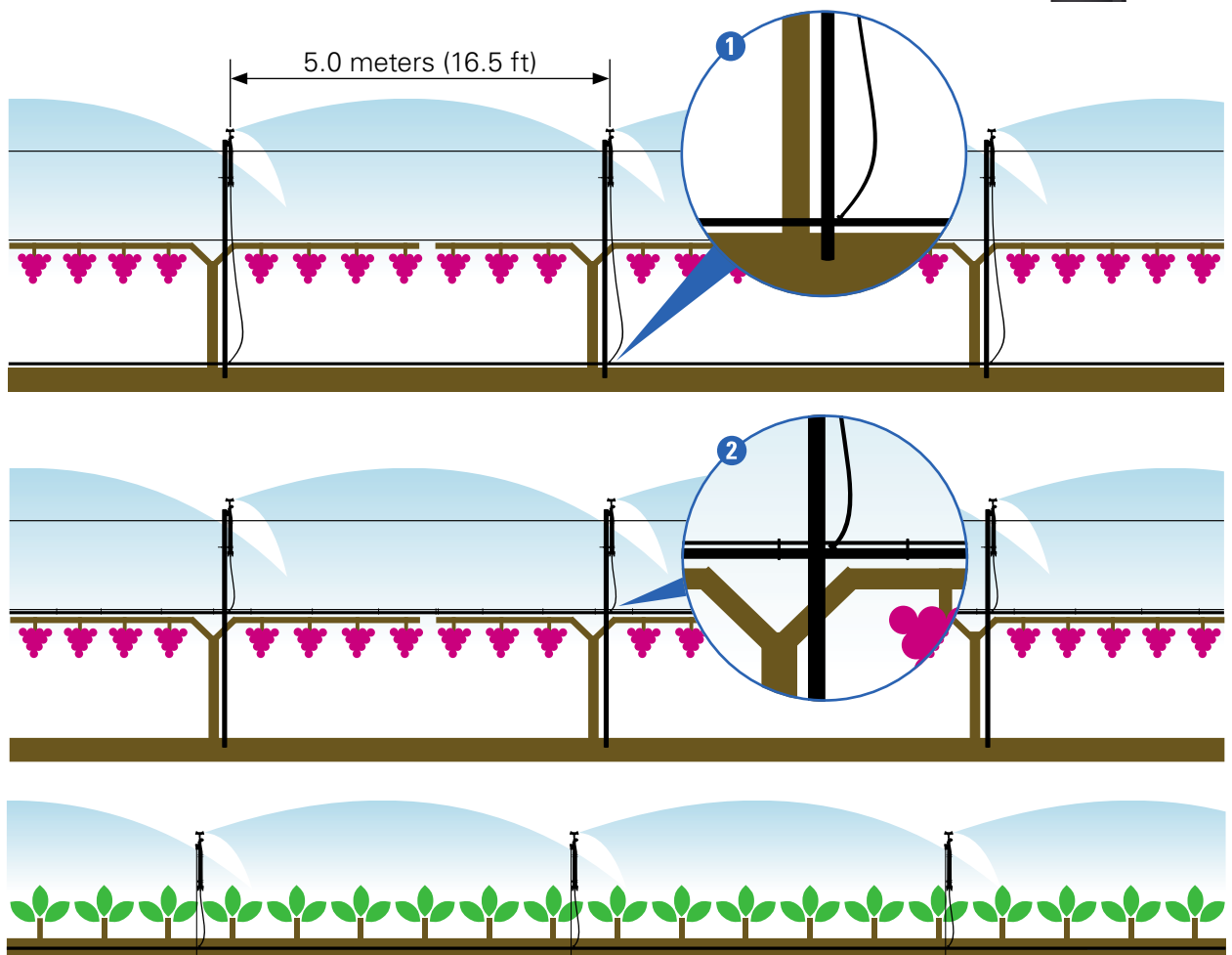
- Rectangular water covering pattern: 0.5 meters (1.65 ft) wide by 5.5 meters (18.0 ft) long.
- Maximum recommended distance between heads: 5.0 meters (16.5 ft).
- The distributor pipe (lateral):
 - 1 lies on the ground;
 - 2 is attached by plastic restraints (bands) or clips to handle to the lower wire of the trellis system.

Fig. 1



ATTENTION

Prior to beginning of season, check the system, make sure to adjust the spay direction exactly along the crop row (trellis). It is advised to orient the AD valve perpendicular to the direction of the emitter head (see Fig. 1)



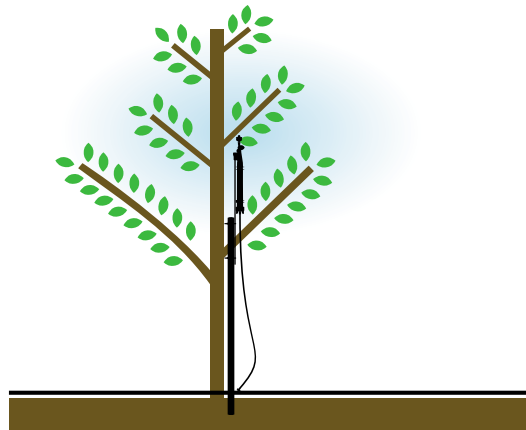
ATTENTION

Maximum recommended distance between heads: 5.0 meters (16.5 feet). If the distance between the poles along the trellis system is greater than 5 meters (16.5 feet), add metal or fiberglass rods in between to enable the installation of additional heads.

ON-SITE PREPARATIONS

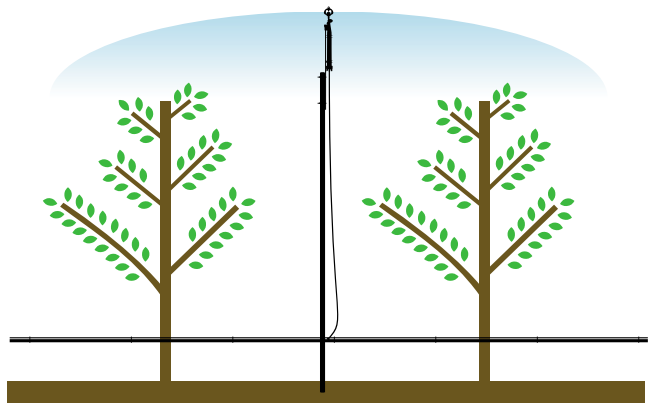
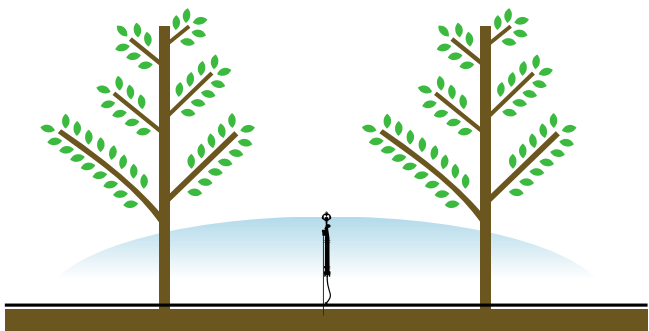
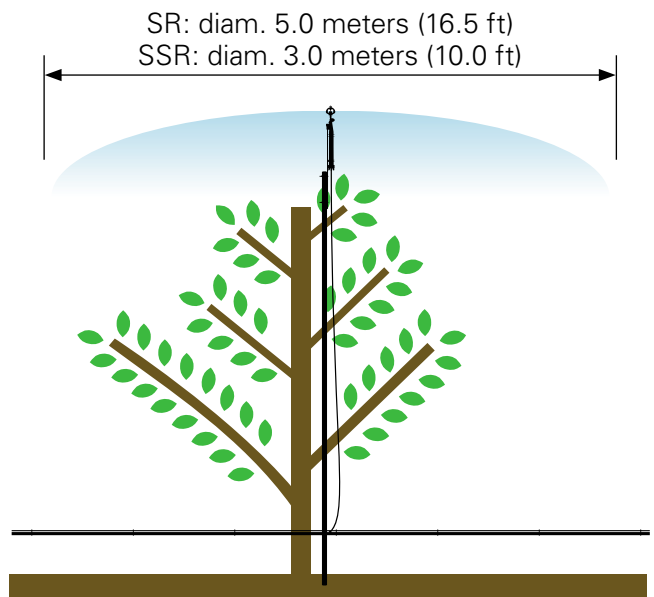
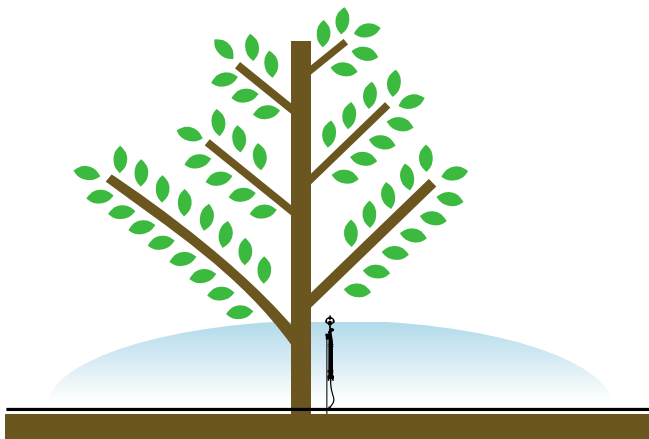
Pulsar™ UR with MistNet™ head

- Recommended distance between heads:
One in the middle of each tree.
- The distributor pipe (lateral):
 - 1) lies on the ground;
 - 2) is attached by plastic restraints (bands) or clips to a wire extended at approximately 1 meter (3 feet) off the ground.



Pulsar™ UR with GyroNet™ SR/SSR head

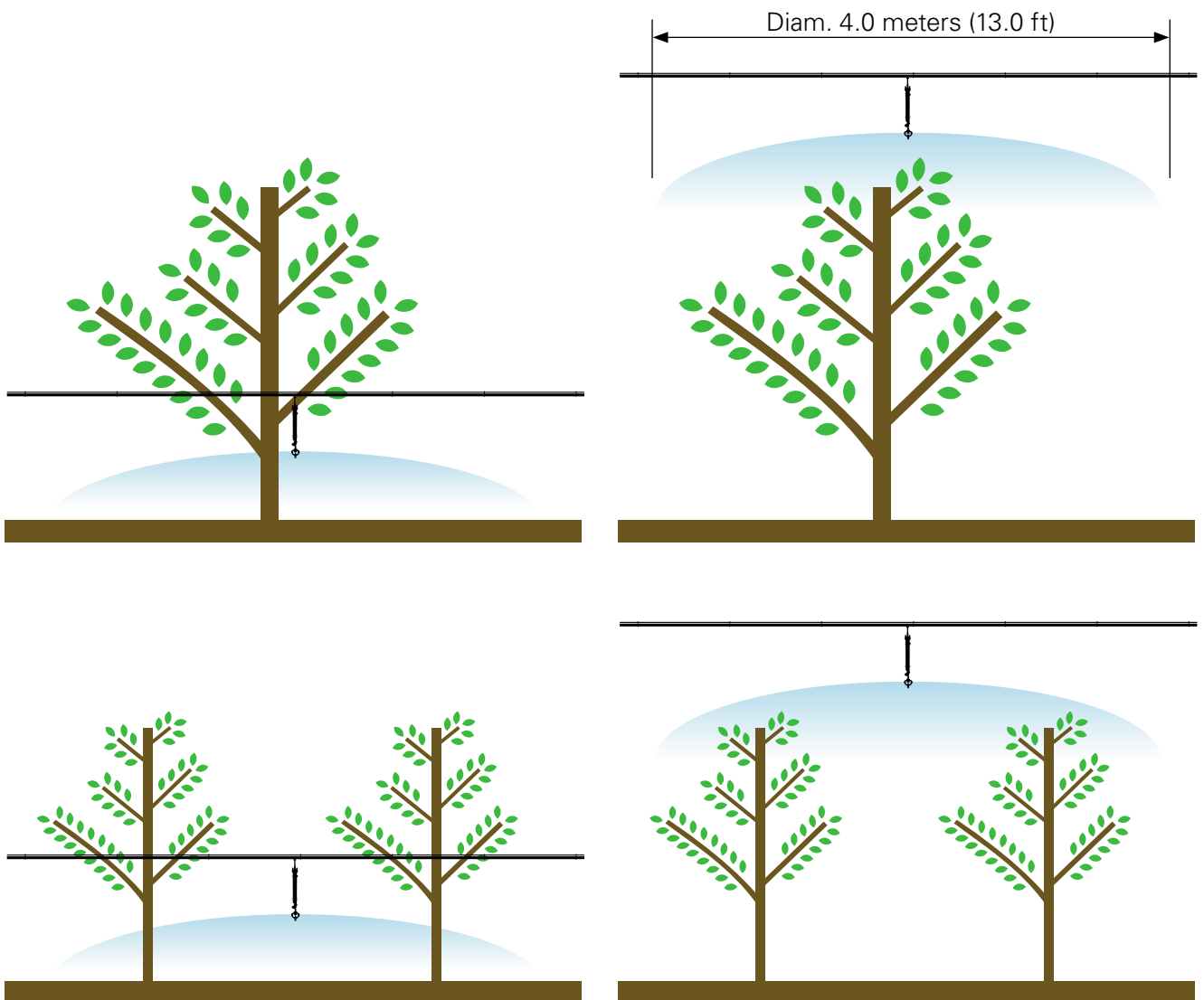
- Recommended distance between heads: one above/below each tree or above/below 2 trees or according to the crop needs.
- SR swivel, 5.0 meters (16.5 ft) wetted diameter (depending on height of installation).
- SSR swivel, 3.0 meters (10.0 ft) wetted diameter (depending on height of installation).
- The distributor pipe (lateral):
 - 1) lies on the ground;
 - 2) is attached by plastic restraints (bands) or clips to a wire extended at approximately 1 meter (3 feet) off the ground.



ON-SITE PREPARATIONS

Pulsar™ UD with GyroNet™ SR head

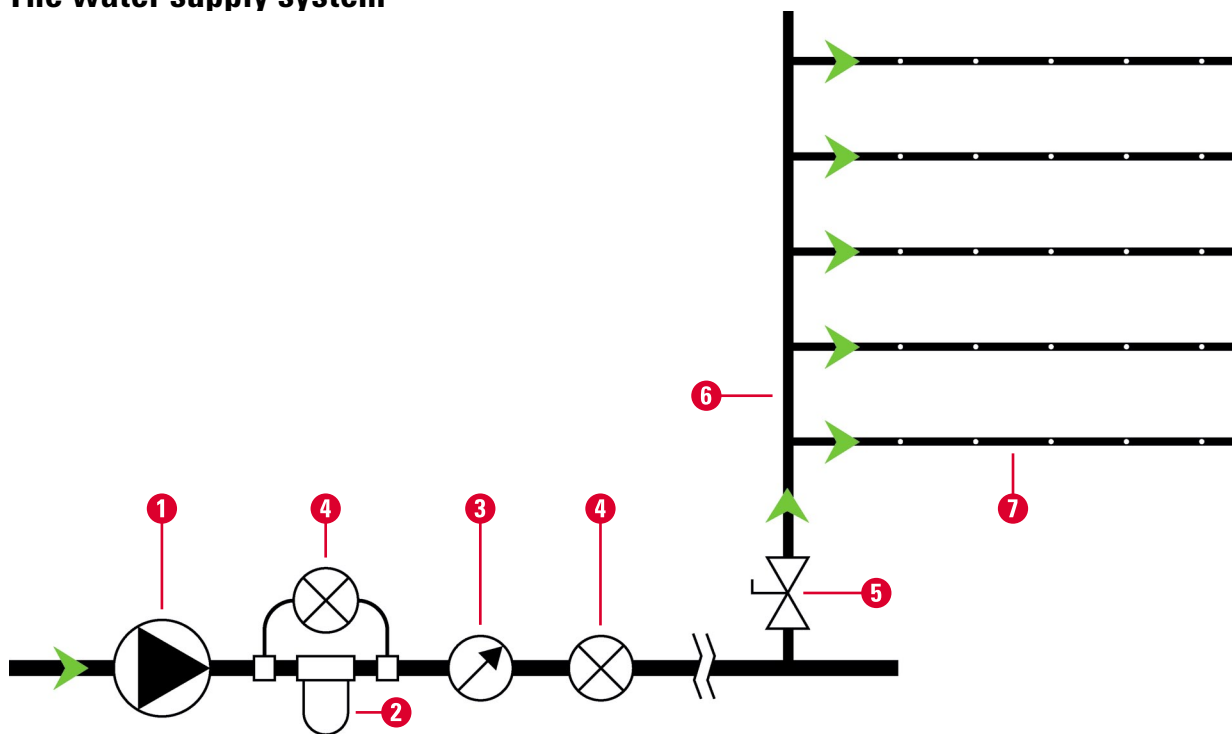
- Recommended distance between heads:
one above/below each tree or above/below 2 trees
or according to the crop needs.
- SR swivel, 4.0 meters (13.0 ft) wetted diameter.
- The distributor pipe (lateral):
 - 1) is attached by plastic restraints (bands) or clips to handle to a wire extended at approximately 1 meter (3 feet) off the ground.
 - 2) is attached by plastic restraints (bands) or clips to handle to a wire extended over the treetops.



ON-SITE PREPARATIONS

Infrastructure requirements

The water supply system



Install a water supply system of sufficient capacity, including:

A pump ① able to supply the pressure and flow rate required for the application.

- Minimum required pressure according to specific micro-emitter head.
- Head losses due to the distance between the pump and the field, the topography, the main pipes and accessories and the micro-emitter height above distributor pipe (lateral) should be added to the recommended working pressure when calculating it for the proper operation of the product.
- Required flow rate according to specific micro-emitter head type and quantity.
- TC (total consumption of the system) = The quantity of Pulsars X The flow rate of each Pulsar™.

A filtration system ②.

- Recommended filtration: 130 micron (120 mesh).
- Filtration method is to be selected based on the kind and concentration of the dirt particles contained in the water.
- Wherever sand contained in the water exceeds 2ppm, Hydrocyclone filter is to be installed upstream from the main filter.
- When sand/silt/clay exceeds 100ppm, pre treatment will be applied according to Netafim's expert team's instructions.

Flow meter ③, pressure gauges ④, irrigation valves ⑤, lines ⑥ and laterals ⑦ as required for the application.

- Planning of the system head is beyond the scope of this manual and should be performed by an expert. For initial guidance consult your Netafim™ representative.



ATTENTION

Since the conditions of the field are different for each installation, the installer should prepare the appropriate infrastructure as planned by an expert according to the actual conditions in the field (consult your Netafim™ representative).

ON-SITE PREPARATIONS



CAUTION

During the preparation of the infrastructure and the installation of the Pulsars, make sure the ends of the pipes and the laterals are never left open, to prevent dirt, insects or rodents from penetrating them.

Maximum lateral length on a flat terrain* at different inlet pressures

Flow rate l/hr (GPH)	Lateral Diam./class	Inlet pressure bar (PSI)	Distance between emitters - meters (feet)			
			3.0 (10.0)	5.0 (16.5)	7.0 (23.0)	9.0 (29.5)
			Maximum lateral length - meters (feet)			
8.0 (2.1)	16/4	3.0 (43.5)	159 (522)	225 (738)	280 (919)	333 (1093)
		3.5 (51.0)	204 (669)	285 (935)	357 (1171)	423 (1388)
		4.0 (58.0)	237 (778)	330 (1083)	413 (1355)	486 (1594)
	20/4	3.0 (43.5)	249 (817)	345 (1132)	434 (1424)	504 (1654)
		3.5 (51.0)	318 (1043)	445 (1460)	553 (1814)	648 (2126)
		4.0 (58.0)	369 (1211)	515 (1690)	637 (2090)	747 (2451)
12.0 (3.2)	16/4	3.0 (43.5)	123 (404)	175 (574)	217 (712)	261 (856)
		3.5 (51.0)	159 (522)	225 (738)	280 (919)	324 (1063)
		4.0 (58.0)	183 (600)	255 (837)	322 (1056)	378 (1240)
	20/4	3.0 (43.5)	192 (630)	270 (886)	336 (1102)	396 (1299)
		3.5 (51.0)	246 (807)	345 (738)	427 (1401)	504 (1654)
		4.0 (58.0)	285 (935)	395 (1132)	497 (1631)	585 (1919)
15.0 (4.0)	16/4	3.0 (43.5)	108 (354)	150 (492)	189 (620)	225 (738)
		3.5 (51.0)	138 (453)	195 (640)	245 (804)	288 (945)
		4.0 (58.0)	159 (522)	225 (738)	280 (919)	333 (1093)
	20/4	3.0 (43.5)	168 (551)	235 (771)	294 (965)	342 (1122)
		3.5 (51.0)	213 (699)	300 (984)	371 (1217)	441 (1447)
		4.0 (58.0)	249 (817)	345 (1132)	427 (1401)	504 (1654)
20.0 (5.3)	16/4	3.0 (43.5)	90 (295)	125 (410)	161 (528)	189 (620)
		3.5 (51.0)	114 (374)	160 (525)	203 (666)	243 (797)
		4.0 (58.0)	132 (433)	185 (607)	231 (758)	279 (915)
	20/4	3.0 (43.5)	141 (463)	195 (640)	245 (804)	288 (945)
		3.5 (51.0)	180 (591)	250 (820)	308 (1010)	369 (1211)
		4.0 (58.0)	207 (679)	290 (951)	357 (1171)	423 (1388)

*The maximum lateral length differs according to variations in the elevation of the terrain. In case the terrain is not flat, consult your Netafim™ representative.

INSTALLATION

Attaching the Pulsar™

The Pulsar™ tube can be attached in four manners:



ATTENTION

In UR applications, the length of the Pulsar's micro-tube should allow some tolerance. Attach the Pulsar™ at a distance from the lateral that allows its micro-tube to reach the lateral without tension.

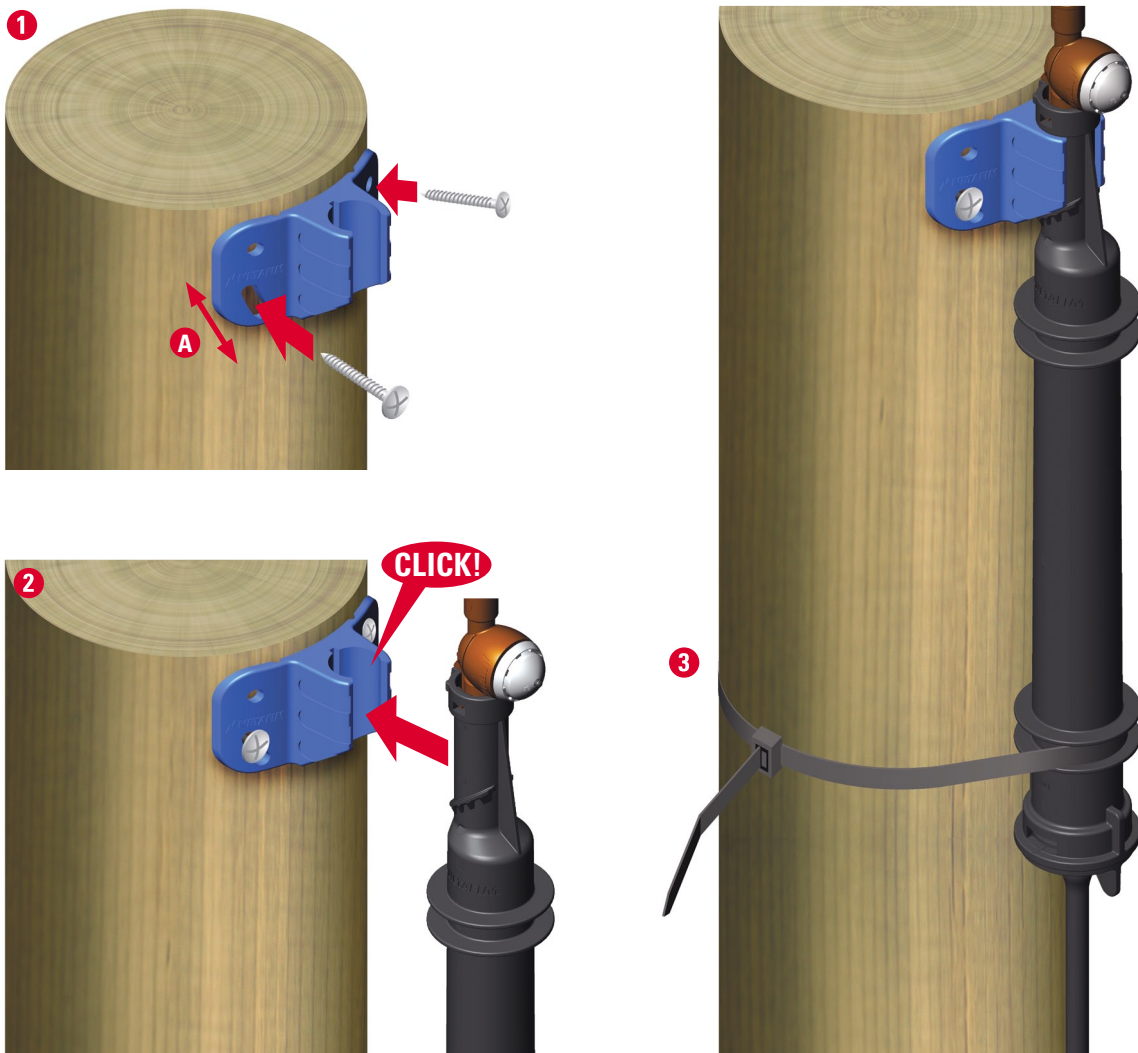
To wooden poles using clamps (catalog number: 64420-003100)

- 1 Fasten the clamp to the wooden pole using 2 wood screws.
 - A Insert one of the screws into a buttonhole and use it to vertically adjust the clamp.
 - 2 Press the neck of the Pulsar™ tube into the clamp - a "CLICK" is heard.
 - 3 Couple the Pulsar™ tube to the wooden pole using a plastic restraint (band).
- If the circumference of the wooden pole is bigger than 25 cm (10") use 2 plastic restraints (bands) connected together.



CAUTION

Make sure to use UV protected plastic restraints (bands) to fit the Pulsar™ tube to the stake/pole (for recommended product and catalog number see [Part List](#), page 35).

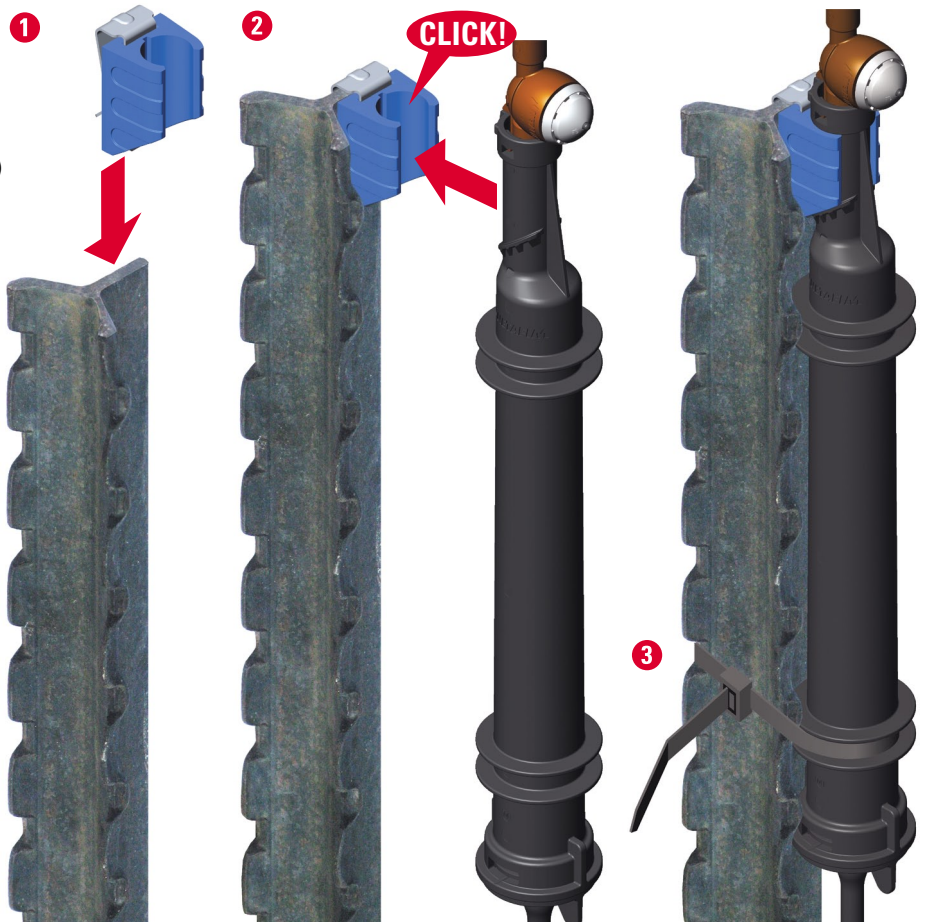


INSTALLATION

To metal stakes - up to 5 mm (0.2") thick, using clamps

(catalog number: 64420-003010)

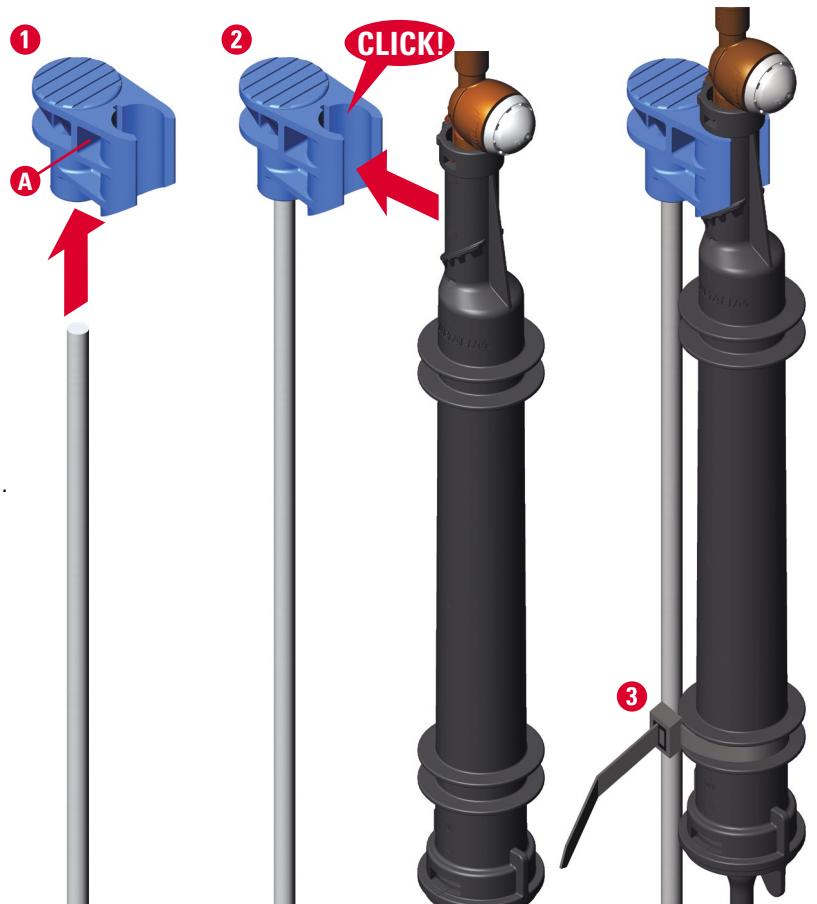
- 1 Slide the clamp onto the top of the metal stake.
- 2 Press the neck of the Pulsar™ tube into the clamp - a "CLICK" is heard.
- 3 Couple the Pulsar™ tube to the metal stake using a plastic restraint (band).



To metal or fiberglass rods using adapters

Blue color adapter -
for 6 mm (0.24") diameter rod -
catalog number: 63520-005950
Black color adapter -
for 8 mm (0.31") diameter rod -
catalog number: 63520-005970

- 1 Insert the rod into the adapter (use a hammer).
A Observe the aperture - make sure the rod is fully inserted.
- 2 Press the neck of the Pulsar™ tube into the clamp - a "CLICK" is heard.
- 3 Couple the Pulsar™ tube to the rod using a plastic restraint (band).



INSTALLATION

Connecting the Pulsar™ to the lateral

For all the UR applications

- 1 Punch a hole in the lateral using a 3 mm punching tool.



CAUTION

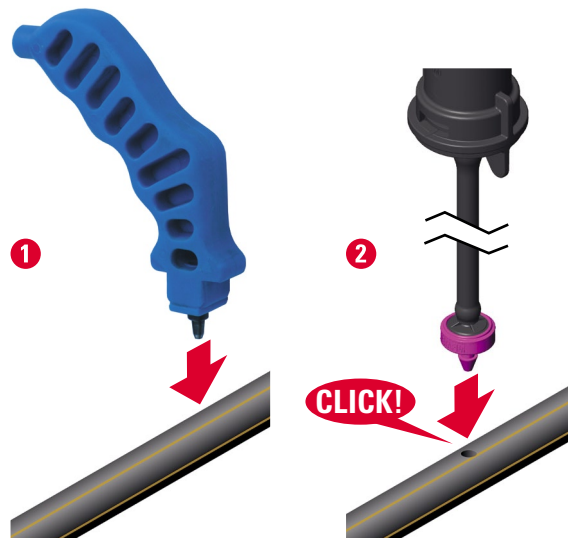
After completion of the infrastructure - water supply system, lines and laterals, and punching the holes in the laterals, before the installation of the Pulsators, open the ends of the laterals and thoroughly rinse the infrastructure by running water through it in order to wash away any residues (chips, shavings, sawdust) due to the setup work. After rinsing the infrastructure, close the ends of the laterals.



ATTENTION

In UR applications, the length of the Pulsar's micro-tube should allow some tolerance. The Pulsar's micro-tube must reach the lateral without tension.

- 2 Plug the flow regulator's barb into the hole in the lateral.



For the UD application only

The Pulsar™ is hanging from the distributor pipe (lateral), not attached to a clamp.

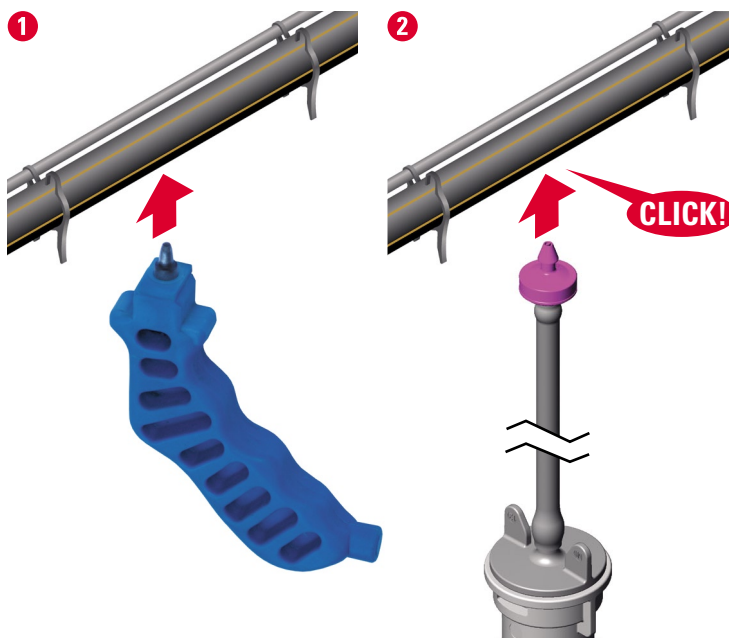
- 1 Punch a hole on the underside of the lateral using a punching tool.



CAUTION

After completion of the infrastructure - water supply system, lines and laterals, and punching the holes in the laterals, before the installation of the Pulsators, open the ends of the laterals and thoroughly rinse the infrastructure by running water through it in order to wash away any residues (chips, shavings, sawdust) due to the setup work. After rinsing the infrastructure, close the ends of the laterals.

- 2 Plug the flow regulator's barb into the hole in the lateral.



Inspection after installation

- 1) Operate the system until it reaches the head pressure as planned.
- 2) See that the flow rate indicated by the water meter is as planned.
- 3) Perform a visual sample inspection in the field. See that the Pulsars are pulsating.
- 4) If a Pulsar™ is not pulsating or is leaking, refer to [Troubleshooting](#), page 27.

OPERATION AND MAINTENANCE

Current operation according to application

Frost mitigation

Operate the system according to the temperature, the relative humidity and the phenological state of the crop.

Irrigate continuously until the end of the frost event (until all the ice accumulated on the crop completely melted).

Recommended precipitation rate (PR) > 3 mm/hr (0.12"/hr)

Long shift irrigation

Irrigate at a precipitation rate (PR) of at least 1 mm/hr (or as needed) and make sure the precipitation rate during all the irrigation shift is higher than the evaporation rate (for clarifications call Netafim™).

The duration of irrigation is calculated on the basis of the daily return required by the crop (based on the phenological stage of the crop and the evapotranspiration), divided by the calculated precipitation rate.

Humidification and cooling

Misting (Using the Pulsar™ UR with the MistNet™ head) - A very fine mist of water particles is emitted, absorbing the heat energy from the atmosphere while evaporating (The lower the relative humidity, the higher the cooling efficiency).

Contact cooling (Using the Pulsar™ UR or UD with the GyroNet™ SR or SSR head, or the Pulsar™ UR with the StripNet™ head) - Drops of water are in contact with the crop. The temperature difference between the drops and the crop is equalized by means of the drops absorbing the heat from the crop and pouring from its surface.

Activation and operating duration of the system according to the temperature, the relative humidity and the effect the agriculturist wants to achieve in accordance with the phenological stage of the crop (consult an expert/agronomist).



TIP

It is possible to use cooling to extend the hours of low temperature per day (before sunset and after sunrise) in areas and seasons where the low temperature per day is borderline and not sufficient to meet the conditions required for the crop according to the recommendations of the expert/agronomist.

Calculating the precipitation rate (PR)

Calculation of the wetted area (WA):

For GyroNet™ applications (round wetted area)

Square the radius (half the diameter) of the wetted area and then multiply by 3.14 (π).

$$\text{Wetted area} = \pi \times r^2$$

For StripNet™ applications (rectangular wetted area)

Multiply the length (L) of the wetted area by its width (W).

$$\text{Wetted area} = L \times W$$

Calculation of the precipitation rate (PR):

Precipitation rate (PR) =
the flow rate divided by the wetted area

$$\text{Precipitation rate (PR)} = \frac{\text{Flow rate}}{\text{wetted area}}$$

Units	Metric	US
Length:	Meter (m)	Feet (ft)
Area:	Square meter (m²)	Square feet (ft²)
Flow rate:	l/hr	GPH
Precipitation rate (PR):	mm/hr	Inch/hour ("/hr)

OPERATION AND MAINTENANCE

Maintenance

Rinsing of the laterals



ATTENTION

Rinsing of the laterals is an essential action and should be abidingly performed in order to maintain the proper operation of the system.



ACID HAZARD

When using acid/chemicals - always observe the manufacturer's safety instructions and use caution when handling any such acid/chemicals.



WARNING

When handling fertilizers, acid or other chemicals, always use protective equipment, gloves and goggles.



WARNING

To prevent damage to the environment and to the crop, acids and hydrogen peroxide must never be released to the atmosphere or come in contact with any part of the crop.



ATTENTION

When using acid or hydrogen peroxide, respect the recommended concentrations below in order to prevent damage to the Pulsar™, the infrastructure, the environment and the crop. Using concentrations levels in excess of the values listed below may cause damage to the Pulsar™, the infrastructure, the environment and the crop and will void the warranty for the Pulsar™ and/or any other parts of the irrigation system.

In order to wash away accumulated dirt from the laterals

Open the end of the line, allow the irrigation water to flow for a couple of minutes:

If the water is transparent - rinse once a year

If the color of the water is light brown - rinse once a month

If the color of the water is dark brown - rinse once a week

To ensure that the capacity of the pump allows a sufficient flow speed for efficient removal of dirt from the piping while rinsing, never open simultaneously more than 5 laterals (repeat this actions for all the laterals in the system).

In case of presence of organic substances in the water, inject hydrogen peroxide.

Recommended dosage of hydrogen peroxide

Injection Method / Purpose	Injected Concentration	Residual Concentration*
Continuous Injection	50 ppm	0.5 ppm
Selective Injection	50 to 100 ppm	2 to 3 ppm
Annual maintenance treatment of the irrigation system	200 to 500 ppm	8 to 10 ppm

*Measurements must be taken at the point furthest from the injection point.

In case of potential for scale formation in the water, and to avoid sedimentation of low solubility salts/ carbonates, injection of acid is recommended.

OPERATION AND MAINTENANCE

Recommended acid concentrations

Percentage of Acid	Recommended Concentration in Treated Water
Hydrochloric Acid 33%	0.6%
Phosphoric Acid 85%	0.6%
Nitric Acid 60%	0.6%
Sulfuric Acid 65%	0.6%

% is by weight at 21°C (70°F)



WARNING

Exceeding the above acid concentrations will damage the Pulsar™

If the acid used has a different concentration level from the data included in the table above, adjust the concentration according to the percentage relative to the concentrations recommended in the table above.



WARNING

The amount of chemicals to be injected should be according to the amount of pollution in the pipes (for further instructions see Preventive maintenance of dripping systems on appendix 1, [Further reading](#), page 37)



WARNING

To prevent damage to the environment and to the crop, acids and hydrogen peroxide must never be released to the atmosphere or come in contact with any part of the crop.

While rinsing the system with those substances, make sure that the pressure in the system does not exceed 1.5 bar (22 PSI) to ensure that the anti-drain valves (AD) of the Pulsars do not open. After completion of the rinsing process, make sure to reset the system to its usual operating pressure.

After injecting acids or hydrogen peroxide, operate the system for at least an hour with clean water.

Periodic inspection

Perform a visual inspection once every 1 million pulses while the system is active in order to detect natural wear of the Pulsar's components. See that the pulse rate is uniform, if it is not, see [Troubleshooting](#), page 27.

TROUBLESHOOTING

A thorough consideration of all the possible malfunctions of the Pulsars system and infrastructure is beyond the scope of this manual. If you experience a malfunction that is not referred to in this chapter, consult your Netafim™ representative.

Malfunction	Possible causes	Actions
Water is not emitted.	The micro-emitter's head is blocked.	1) While the system is operating, disconnect the micro-emitter from the anti-drain valve (AD) and check: If water is pulsating from the outlet of the anti-drain valve (AD) - Check for clogging of the micro-emitter nozzle (proceed to step 2). 2) Disassemble the micro-emitter head. 3) Thoroughly clean the micro-emitter nozzle with pressurized air. 4) Visually check for remaining clogging and clean again with pressurized air if needed. 5) Reassemble and reinstall the micro-emitter head. 6) Activate the Pulsar™. If the malfunction persists, replace the micro-emitter head with a new one.
	The anti-drain valve (AD) is defective.	 ATTENTION For GyroNet™ - Make sure to replace the micro-emitter head with one with a swivel of the same color.
	The anti-drain valve (AD) does not open.	1) Check that the pressure on the lateral near the flow regulator is according to the recommendation + the height of the anti-drain valve (AD) above the lateral (use a Needle Pressure Gauge). If it is not - restore the pressure. If the pressure is correct and the anti-drain valve (AD) still does not open - Replace the anti-drain valve (AD) (see CAUTION , page 29). 1) Remove the faulty anti-drain valve (see Fig. 2 , page 30). 2) Install a new anti-drain valve. Mind the protruding placemarks (see Fig. 5 , page 30).
	There is a breach, a tear or a hole in the micro-tube.	 ATTENTION Make sure to replace the anti-drain valve (AD) with one with a pin of the same color.
The inlet of the flow regulator (pressure compensated dripper) is blocked.	There is a breach, a tear or a hole in the micro-tube.	Replace the faulty section of the micro-tube. 1) Cut the micro-tube on both sides of the faulty section. 2) Prepare a new section of the micro-tube of the same length as the deleted section. 3) Connect the new section using two coupling barb micro-tube connectors (see Accessories , page 35).
	The inlet of the flow regulator (pressure compensated dripper) is blocked.	Replace the flow regulator (pressure compensated dripper). 1) Unplug the flow regulator from the lateral. 2) Plug the hole in the lateral using a dripline plug (see Fig. 1 , page 30). 3) Punch a new hole in the lateral at a distance of at least 2 cm (1") from the plugged one, using a punching tool (see Fig. 4 , page 30). 4) Insert the colored barb of the new flow regulator into the new hole in the lateral. 5) Cut the micro-tube a few millimeters from the faulty flow regulator. 6) Connect the micro-tube to the black barb of the new flow regulator.
		 ATTENTION In UR applications, the length of the Pulsar's micro-tube should allow some tolerance. If after cutting the micro-tube, it is too short to allow it to reach the lateral without tension, add a section of micro-tube and connect it using a coupling barb micro-tube connector (see Accessories , page 35).

TROUBLESHOOTING

Malfunction	Possible causes	Actions
Water emitted continuously, not pulsating.	The anti-drain valve (AD) is out of order.	Replace the anti-drain valve (AD) (see CAUTION, page 29). 1) Remove the faulty anti-drain valve (see Fig. 4, page 30). 2) Install a new anti-drain valve. Mind the protruding placemarks (see Fig. 5, page 30).  ATTENTION Make sure to replace the anti-drain valve (AD) with one with a pin of the same color.
Pulsating rate is not regular.	The anti-drain valve (AD) is out of order.	Replace the anti-drain valve (AD) (see CAUTION, page 29). 1) Remove the faulty anti-drain valve (see Fig. 4, page 30). 2) Install a new anti-drain valve. Mind the placemarks (see Fig. 3, page 30).  ATTENTION Make sure to replace the anti-drain valve (AD) with one with a pin of the same color.
	There is a puncture or a tear in the pulsator's air bag.	Check the integrity of the pulsator's air bag. 1) Disconnect the Pulsar™ from the adapter.  ATTENTION To prevent damage to the adapter - do not pull the Pulsar™. Rotate the Pulsar™ to disconnect it (see Fig. 3, page 30). 2) Unscrew the cap from of the pulsator's tube.  ATTENTION Unscrew the cap from the pulsator's tube by rotating the pulsator's tube and avoiding twisting the micro-tube (see Fig. 8, page 30). 3) Manually pull the pulsator's air bag out of the pulsator's tube (see Fig. 9, page 30).  ATTENTION To avoid damaging the pulsator's air bag, do not use tools to manipulate it. However, if it is impossible to pull the air bag out of the pulsator's tube by hand, gently use tweezers and mind not to puncture or scratch the air bag. 4) Manually apply pressure to the air bag and check if it is flat. 5) If any doubt, fill a recipient with water. 6) Dip the air bag in the water, manually apply pressure to the air bag and check for air bubbles. 7) If the pulsator's air bag is damaged, replace it. 8) Insert the air bag into the pulsator's tube and push it in until it stops (see Fig. 10, page 30). 9) Screw the pulsator's cap a full circle until the tooth on the thread snaps into the slot in the pulsator's tube (see Fig. 6, page 30).  ATTENTION Screw the pulsator's cap by rotating the pulsator's tube and avoiding twisting the micro-tube.
GyroNet™ swivel does not rotate.	The swivel is worn.	Replace the swivel. 1) Remove the GyroNet™ head and disassemble it (see Fig. 7, page 30). 2) Replace the swivel.  ATTENTION Make sure to replace the swivel with one of the same color. 3) Reinstall the GyroNet™ head.

TROUBLESHOOTING

Malfunction	Possible causes	Actions
The Pulsar™ is leaking	Loose connections between the parts.	Check all the connections between the parts and tighten them if necessary.
	The MistNet™ is leaking at the connection between the MistNet's body and nozzle. The O-ring is worn or riven.	Replace the O-ring of the MistNet™. 1) Disconnect the MistNet™ and disassemble it (see Fig. 11 , page 30). 2) Gently remove the O-ring using a small screwdriver 3) Replace the O-ring with a new one  ATTENTION When reassembling, make sure that the diffuser is in place. 4) Reassemble the MistNet™ and reconnect it
	The anti-drain valve (AD) is leaking from its cap (around the pin). The anti-drain valve (AD) is out of order.	Replace the anti-drain valve (AD) (see CAUTION below). 1) Remove the faulty anti-drain valve (see Fig. 2 , page 30). 2) Install a new anti-drain valve. Mind the protruding placemarks (see Fig. 5 , page 30).  ATTENTION Make sure to replace the anti-drain valve (AD) with one with a pin of the same color
	The O-ring of the pulsator's cap is worn or riven.	1) Check if the pulsator's cap is properly closed, the tooth on the thread snaps into the slot in the pulsator's tube (see Fig. 6 , page 30). If it is not properly closed - close it and check again if the Pulsar™ is leaking. If it is properly closed - proceed to step 2 . Replace the O-ring of the pulsator's cap. 1) Disconnect the Pulsar™ from the adapter (see Fig. 3 , page 30). 2) Unscrew the cap from of the pulsator's tube.  ATTENTION Unscrew the cap from the pulsator's tube by rotating the pulsator's tube and avoiding twisting the micro-tube (see Fig. 8 , page 30). 3) Gently remove the O-ring using a small screwdriver. 4) Replace the O-ring with a new one. 5) Screw the pulsator's cap a full circle until the tooth on the thread snaps into the slot in the pulsator's tube (see Fig. 6 , page 30).  ATTENTION Screw the pulsator's cap by rotating the pulsator's tube and avoiding twisting the micro-tube. 6) Reattach the Pulsar™ to the adapter (see Installation , pages 21-23).
	There is a leak at the connection of the flow regulator (pressure compensated dripper) to the lateral. Improper hole punch in the lateral.	Relocate the flow regulator (pressure compensated dripper) in a new hole. 1) Unplug the flow regulator from the lateral. 2) Plug the hole in the lateral using a dripline plug (see Fig. 1 , page 30). 3) Punch a new hole in the lateral at a distance of at least 2 cm (1") from the plugged one, using a punching tool (see Fig. 4 , page 30). 4) Plug the flow regulator's barb into the new hole in the lateral.



CAUTION

When replacing an anti-drain valve (AD), make sure that there are no remains of broken parts left in the pulsator-tube connector. If there are, gently remove them using a small screwdriver.

TROUBLESHOOTING

Reference illustrations



PART LIST

Spare parts

Name	Description	Quantity	Catalog number	Image
StripNet™ head	With one active nozzle - brown	1 unit	64420-002770	
MistNet™ head	Brown nozzle	1 unit	63100-040000	
		100 units/ bag	63100-040020	
GyroNet™ SR head	Orange nozzle, blue swivel, Everspin™ upper bearing - orange	1 unit	64000-030507	
GyroNet™ SSR head	Orange nozzle, light green swivel, Everspin™ upper bearing - orange	1 unit	64000-030509	
Anti drain (AD) valve	PLSR AD - black pin	1 unit	63700-001000	
	PLSR AD - blue pin	1 unit	63700-001020	

PART LIST

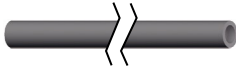
Name	Image
Pulsar™ UR	
Description	
Upright pulsator tube. PLSR tube barb assy for UR, Air bag included	
Quantity	
1 unit	
Catalog number	
63700-001400	

Name	Image
Pulsar™ UD	
Description	
Upside down pulsator tube. PLSR tube barb assy for UD, Air bag included	
Quantity	
1 unit	
Catalog number	
63700-001500	

Name	Image
Pulsar™ air bag	
Description	
for all application	
Quantity	
1 unit	
Catalog number	
63720-002000	

Name	Description	Quantity	Catalog number	Image
Flow regulator (Pressure Compensated dripper)	Green. With barb inlet and 4 mm (0.16") barb outlet. 8 l/hr (2.1 GPH)	1 unit	21500-002300	
	Fuchsia. With barb inlet and 4 mm (0.16") barb outlet. 12 l/hr (3.17 GPH)	1 unit	21500-002400	
	Black. With barb inlet and 4 mm (0.16") barb outlet. 15 l/hr (4.0 GPH)	1 unit	21500-003020	
	Orange. With barb inlet and 4 mm (0.16") barb outlet. 20 l/hr (5.3 GPH)	1 unit	21620-001350	

PART LIST

Name	Description	Quantity	Catalog number	Image
SPE 4/6.5 black micro-tube For UR	60 cm (2.0 ft) length	1 unit	40000-006160	
	120 cm (4.0 ft) length	1 unit	40000-006260	
	100 meter (328 ft) coil	1 coil	40000-006510	
	200 meter (656 ft) coil	1 coil	40000-006560	
	500 meter (1640 ft) coil	1 coil	40000-006580	
SPE 4/6.5 light gray micro-tube For UD	60 cm (2.0 ft) length	1 unit	40000-005120	
	120 cm (4.0 ft) length	1 unit	40000-005280	
	200 meter (656 ft) coil	1 coil	40000-004850	
	500 meter (1640 ft) coil	1 coil	40000-004950	

Name	Description	Quantity	Catalog number	Image
GyroNet™ SR swivel	blue	1 unit	63520-005200	
		100 units/ bag	63520-005220	
GyroNet™ SSR swivel	light green	1 unit	63520-005320	
		100 units/ bag	63520-003400	
Everspin™ upper bearing -	orange	1 unit	63520-011400	
		100 units/ bag	63520-011425	

Name	Description	Quantity	Catalog number	Image
MistNet™ "O" ring	Rubber "O" ring	1 unit	63120-001000	
Pulsator tube "O" ring	Rubber "O" ring	1 unit	63720-001700	

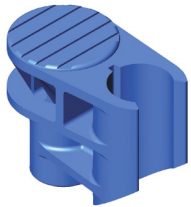
Spare parts and accessories for the Pulsar™ products

For further information: www.netafim.com, E-mail: products_solutions@netafim.com

Download the product catalogs at <http://www.netafim.com/irrigation-products-technical-materials>

PART LIST

Accessories

Name	Description	Quantity	Catalog number	Image
Clamp for wood poles	Clamp adapter, connecting to wood poles by 2 wood screws (not included).	1 unit	64420-003100	
Clamp for metal stakes	Clamp adapter, for 2.5 to 5.0 mm (0.1 to 0.2") thick metal stakes.	1 unit	64420-003010	
Adapter to metal/fiberglass rods	Adapter Blue. For 6 mm (0.24") rod.	1 unit	63520-005950	
	Adapter Black. For 8 mm (0.31") rod.	1 unit	63520-005970	

Name	Description	Quantity	Catalog number	Image
Metal rod	6 mm (0.24") diameter, 60 cm (2.0 ft) length.	1 unit	65080-001000	
	6 mm (0.24") diameter, 100 cm (3.3 ft) length.	1 unit	65080-001100	
	6 mm (0.24") diameter, 120 cm (3.9 ft) length.	1 unit	65080-001200	
	8 mm (0.31") diameter, 60 cm (2.0 ft) length.	1 unit	65080-001500	
	8 mm (0.31") diameter, 100 cm (3.3 ft) length.	1 unit	65080-001600	
	8 mm (0.31") diameter, 120 cm (3.9 ft) length.	1 unit	65080-001700	

PART LIST

Name	Description	Quantity	Catalog number	Image
Plastic restraint (band)	Black band 380*4.8 UV. For correct installation of the Pulsar™ it is recommended to use special UV protected bands.	100 units/ bag	63720-001800	
Micro-tube coupling barb	4/6.5	1 unit	63520-006000	
		50 units/ bag	63520-006010	
		100 units/ bag	63520-006020	
Plug 5 mm	To plug holes in PE pipes.	1 unit	32000-001100	
		50 units/ bag	32000-001110	
		100 units/ bag	32000-001120	
Smart clip to handle	16 mm (0.63") OD tube. For correct handling of irrigation pipe.	1 unit	32000-003400	
		50 units/ bag	32000-003420	
		100 units/ bag	32000-0034XX	
"8" line end	16 mm (0.63").	1 unit	32500-013000	
		50 units/ bag	32500-013020	
		100 units/ bag	32500-013030	
	20 mm (0.79").	1 unit	32500-014400	
		50 units/ bag	32500-014420	
		100 units/ bag	32500-014430	
Punching tool	A 3 mm reliable and strong plastic punch designed with a comfortable grip handle.	1 unit	45000-001200	

Spare parts and accessories for the Pulsar™ products

For further information: www.netafim.com, E-mail: products_solutions@netafim.com

Download the product catalogs at <http://www.netafim.com/irrigation-products-technical-materials>

WARRANTY

Netafim™ warrants all the components of the Pulsar™ to be free of substantial defects in material and workmanship for a period of no more than 1 (one) year from the date of purchase.

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

This warranty does not extend to repairs, adjustments or replacements of a Pulsar™ or part resulting from misuse, negligence, alteration, force majeure, lightning, improper installation or improper maintenance, including the misapplication of acid/chemicals or any other maltreatment of the Pulsar™ or any part of the irrigation systems.

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

Limited warranty

This warranty is subject to the terms and conditions contained in Netafim's official warranty statement, as such is in force from time to time.

For the full text of Netafim's official warranty statement, go to:

<http://www.netafim.com/irrigation-products-technical-materials>

APPENDIX 1

Further reading

This appendix provides Pulsar™ users with links to recommended complementary documents discussing related subjects at length.

Download them at <http://www.netafim.com/irrigation-products-technical-materials>

Guidelines for Irrigation Systems Maintenance

The implementation of a simple yet strict maintenance program for drip irrigation systems will achieve the following:

- Keep the system operating at peak performance
- Increase the system's work life expectancy.

This manual will guide you in determining the correct procedure and its implementation. The best way to determine if your maintenance program is effective is to constantly monitor and record the flow rate and pressures in the system.

Maintenance is divided in two categories: PREVENTIVE and CORRECTIVE.

Avoiding Frost Damage

Frost mitigation constitutes an integral component of deciduous plant cultivation in numerous regions throughout the world. This guide provides fundamental data and explanations for dealing with frost and frost mitigation. By means of professional articles, the guide presents and explains the principles and basic terms of the phenomenon and sets out possible solutions. Numerous professional articles and data banks provide information and explain how to deal with the subject. We at Netafim™ have selected only a small part of the existing material, and will continue to publish more articles that will expand our knowledge in this subject.

Guide book - Cooling

How to avoid crops and animals from being affected by high temperatures.

There are some areas of the world in which the agricultural crops require assistance and cooling, especially during hot days, in order to prevent them from being subjected to unnecessary stress. In other areas, the color of fruit can be improved by cooling the trees during the correct time period.

It is possible to extend the shelf life of some types of fruit by cooling them while they are still on the trees. And by using correct and supervised cooling, we can increase the flower fruit set during periods of very hot weather. In other regions, we can aid and improve the yield of fruit crops by cooling during the autumn and winter months, and then adding cold units to the same trees or cooling the same crops at the end of the winter months in order to cause early blossoming.

Dripperlines, drippers & other emitters - Product catalog

The following catalog is an aid material to enable to find basic data on each of the drip products at hands reach.

In each section you will find:

1. Main applications of the item displayed.
2. Features and benefits.
3. Technical data of drippers and dripperlines.
4. A table of all active catalog numbers.
5. Basic packaging data.

APPENDIX 1

Micro sprinklers, micro emitters & sprinklers - Product catalog

The following catalog is an aid material to enable to find basic data on each of the products at hands reach.

1. Pressure compensated Micro-sprinklers and Micro-emitters.
2. Micro-sprinklers and Micro-emitters.
3. Micro-sprinklers and Micro-emitters Up-right stands complementary accessories.
4. Micro-emitters for nurseries and pot irrigation.
5. Micro-sprinklers and Micro-emitters for protected crops.
6. Micro-sprinklers and Micro-emitters Upside-down stands complementary accessories.
7. Sprinklers and Midi-sprinklers.
8. Sprinklers stands complementary accessories.
9. Micro-tubes and tubes, complementary accessories.
10. Tools.

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