



**LIQUIDTOOL.**

# **LIQUIDTOOL AutoPilot**

Site readiness specification

# 1 The 4 key requirements

1

Internet connection

- LAN or WLAN possible
- See chapter 4

2

Water supply

- Each SmartFiller needs a water supply
- See chapter 5.6

3

Power connection

- Power outlet at every machine
- 100 - 230V AC

4

Piping

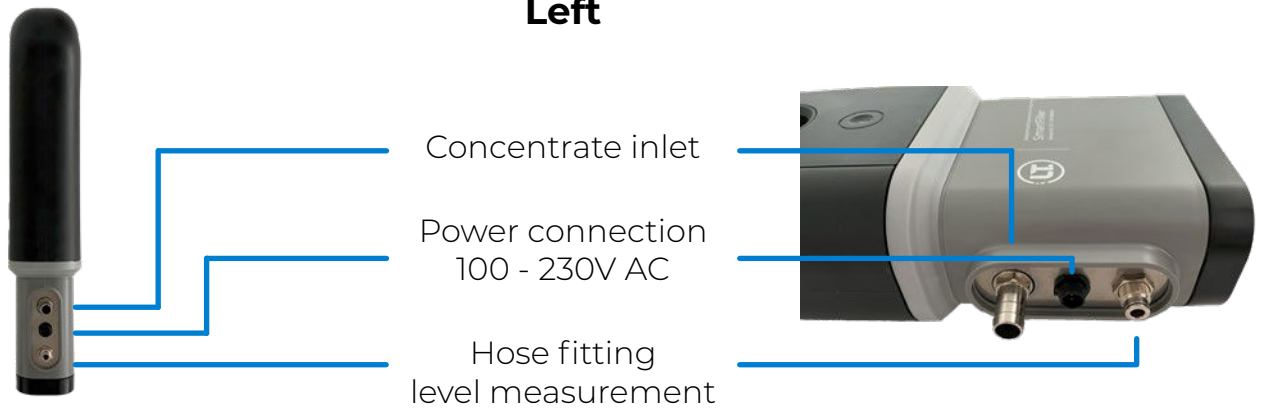
- Only necessary, when multiple machines/sumps are connected to 1 SmartFiller
- See chapter 5

# 2 SmartFiller

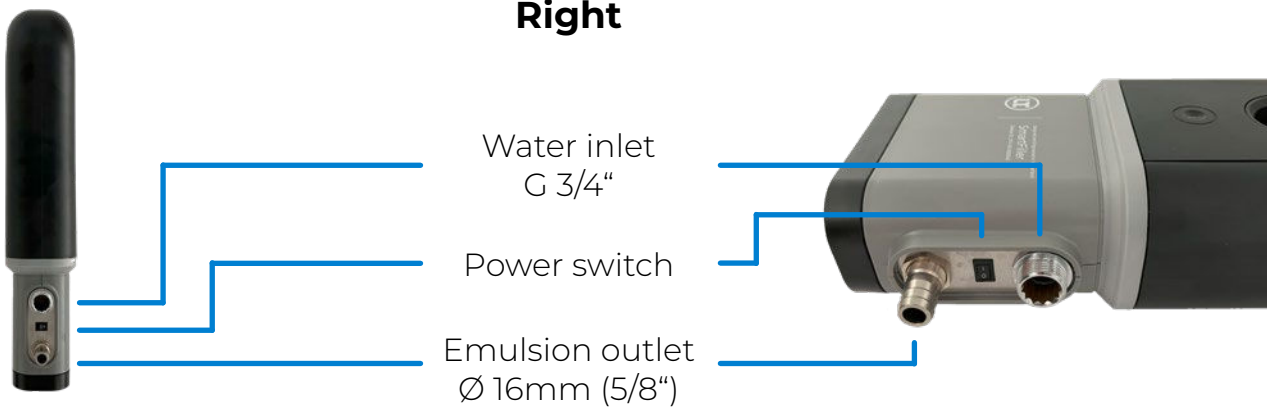
## Front



## Left



## Right



## 2.1 Remarks

- Max. suction height of the concentrate is 1.5m (5ft.)
- Necessary water pressure 3 to 6 bar (45 to 85 psi)
- System separator type BA
- Power supply 100-230V AC within a radius of 3m (10ft.)

## 2.2 Specification SmartFiller

Name	LIQUIDTOOL SmartFiller		
Weight	Net: 5.5 kg (12.13lbs)	Gross: 8.1 kg (17.86lbs)	
Size (H x W x D)	503 x 180 x 95 mm	19.8 x 7.09 x 3.74 inch	
Device	Mixing Volume	800 litres/hr (211 gal/hr)	
	Mixing concentrations	0.1 to 16%	
	Input pressure	3 - 6 bar (45 - 85 psi)	
	Suction lift for concentrates	Max. 1500mm (5ft.)	
	Max. length of piping to machine	50m (165ft.)	When using 3/4 inch (19mm) pipes
	IP enclosure rating	IP44	
	Emulsion outlet pressure	= Water inlet pressure	
	Fixation	Magnetic	
Measurements	Concentrate level	Differential pressure	0 - 1500 mm (+/- 5) 0 - 59 inch (+/- 2")
Connections & Interfaces	Power supply	100-240V 50/60Hz	24VDC / 2.5A screwed connector WEIPU SP1112/P2 N
	Digital Ports	RJ45, Bluetooth, WLAN	
	Water inlet	G 3/4"	
	Concentrate inlet	Hose barb 13mm (1/2")	
	Emulsion outlet	Hose barb 16mm (5/8")	
	Concentrate level measurement	6mm (1/4")	
Operation conditions	>5 to 55 °C (41 to 131 °F) 0 to 95 % relative humidity		
Storage temperature	-20 to 60 °C (dry) -4 to 140 °F (dry)		

## 2.3 Scope of delivery SmartFiller



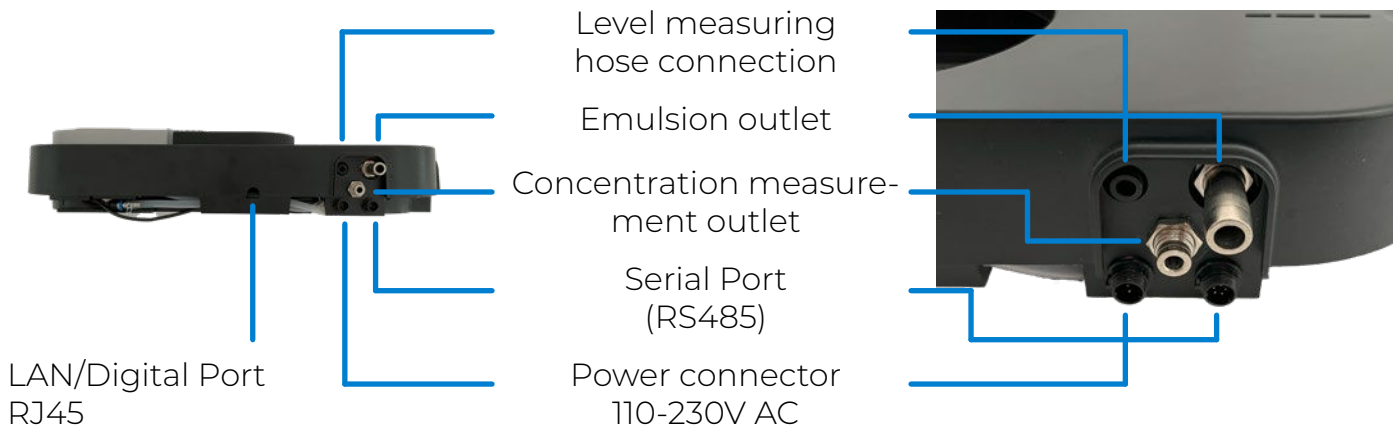
- 1 Liquidtool SmartFiller
- 2 Hoses  
(1x 12mm (1/2") concentrate inlet, 1x 6mm (1/4") level sensing)
- 1 Hose fixation
- 1 Power supply
- 4 Adapter plugs
- 1 Water hose connection set

# 3 Sensor 01 & Extender

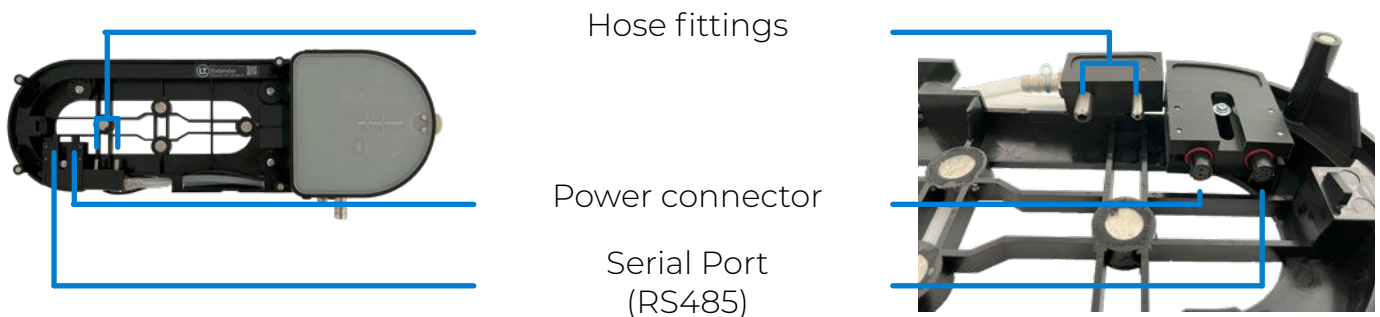
**Front**  
(with Sensor 01)



**Bottom**



**Top**  
(connections to Sensor 01)



## 3.1 Remarks

- Max. suction height of the concentrate is 1.5m (5ft.)
- Magnetic mounting surface of min. 500x250mm (20x10in.)
- Opening in the coolant tank of at least Ø110mm (4.5in.)
- Power supply 100-230V AC within a radius of 3m (10ft.)

## 3.2 Specification Extender

Name	LIQUIDTOOL Extender		
Weight	Net: 2.2 kg (4.85lbs.)	Gross: 6.3 kg (13.89lbs.)	
Size (W x H x D)	512 x 172 x 103 mm	20.16 x 6.77 x 4.06 inch	
Device	IP enclosure rating	IP44	
	Clamp	Ø 110mm (4.5 in.)	
	Suction lift	max. 1.5m (5ft.)	
	Fixation	Magnetic	Surface min. 500x250mm (20 x 10 in.)
Measurements	Sump level	Differential pressure	0 – 1500 mm (+/- 5) 0 - 59 inch (+/- 2")
	Foam level (redundancy for sump level)	Ultrasonic	20 – 1500 mm (+/- 5) 0.8 - 59 inch (+/- 2")
Connections & Interfaces	Power supply	100-240V 50/60Hz	24VDC / 2.5A screwed connector WEIPU SP1112/P2 N
	Serial Port	RS485	Protocol: Modbus
	Emulsion inlet	G3/4"	
	Emulsion outlet	Hose barb 13mm (1/2 in.)	
	Concentrate level measurement	6mm (1/4 in.)	
	Measuring tube	6mm (1/4 in.)	
Operation conditions	>5 to 55 °C (41 to 131 °F) 0 to 95 % relative humidity		
Storage temperature	-20 to 60 °C (dry) -4 to 140 °F (dry)		

## 3.3 Scope of delivery Extender

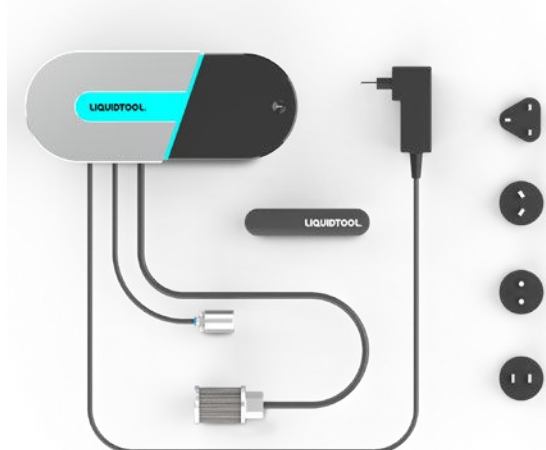


- 1 Liquidtool Extender
- 3 Hoses  
(1x 12mm (1/2") top up, 1x 6mm (1/4") measuring outlet, 1x 6mm (1/2") level sensing)
- 1 Ultrasonic sensor
- 1 Base element for 3 hoses and filter
- 1 Power supply
- 4 Adapter plugs
- 1 Hose connection set

### 3.4 Specification Sensor 01

Name	LIQUIDTOOL Sensor 01 (LTS)		
Weight	Net: 3.1 kg (6.83lbs)	Gross: 4.5 kg (9.9lbs)	
Size (W x H x D)	317 x 130 x 84 mm	12.48 x 5.12 x 3.31 in	
		Range	Resolution
Concentration [Brix]	Optical Refractometer (Total Reflection)	0 - 20 (+/- 0.3) - Below 2 Bx a one-time manual calibration may be necessary	0.1
Temperature	PT100/PT1000	0 - 50 °C (32 - 122 °F)	1
Measuring Interval [min]	Selective	15 min - 60 min	15 min
Connections & Interfaces	Power Supply	100-240V 50/60Hz	24VDC / 2.5A screwed connector WEIPU SP1112/P2 N
	Digital Ports	RJ45, Bluetooth, USB, WiFi	USB disabled (not functional)
	Serial Port	RS485	Protocol: Modbus
	Tube connections	8 mm/0.31" (Intake) 6 mm/0.25" (Outlet)	
Device	Pump	Piston pump	Pump volume: 400 ml/min (13.53 fl oz/min)
	Filter	Particle size: 100µm (0.0039 in.)	
	Tubing	Suction lift: 150 cm (5ft.) max.	
	IP enclosure rating	IP44	
	Fixation	Magnetic	
Operation conditions	>5 to 55 °C (41 to 131 °F) 0 to 95 % relative humidity		
Storage temperature	-20 to 60 °C (dry) -4 to 140 °F (dry)		

### 3.5 Scope of delivery Sensor 01



- 1 Sensor device
- 1 NFC token
- 2 Hoses  
(1x 8mm (0.31") intake, 1x 6mm (0.25") outlet)
- 1 Outlet weight
- 1 Intake filter
- 1 Power supply
- 4 Adapter plugs

# 4 IT infrastructure

Requirements apply to all devices. The SmartFiller and the Sensor 01 (as part of the Extender & Sensor bundle) need the same stable data connection.

- Data connection (with Internet access)
  - WLAN  
WPA, WPA2, WPA2 Enterprise encryption is possible  
Login data via web input is not possible
  - or*
  - LAN/Ethernet connection (RJ45)  
(The required patch cables are not part in the scope of delivery)
- All devices must be in the same network, incl. subnet
- IT infrastructure requirements, according to the following table.  
Please check these specifications with your local network administrator to ensure that the installation runs smoothly.
- If you use spoofing SSL certificates, disable it for domains from the table below

## 4.1 Requirements

Please check these specifications with your local network administrator to make sure the installation runs smoothly.

API	Protocol	Host name (current)	Postfix	Port
<b>Data Telemetrie (AMQP) *</b>	AMQPS (TCP), SSL	mq.iiot.liquidtool.com (net 20.50.116.0/24)	/	5671, 5523
<b>Authentication Server (REST) *</b>	HTTPS (TCP)	identity.liquidtool.com (net 20.50.116.0/24)	/auth/realms/lts	443
<b>Firmware Updates *</b>	HTTPS	deb.iiot.liquidtool.com (net 213.136.80.0/24)	/*	443, 11371
<b>Time server (NTP) *</b>	UDP	ntp.liquidtool.com/ (ip: 52.143.133.0/24) ntp.ubuntu.com		123
<b>OpenVPN **</b>	UDP (TCP)	20.50.116.192 (net 20.50.116.0/24)		1194
<b>DNS (optional) ***</b>	UDP	8.8.8.8, 1.1.1.1		53

\* Mandatory; without these, the devices will not work

\*\* Mandatory if the SmartFiller and Extender are on different local networks

\*\*\* Mandatory if your DNS blocks or spoofs IP addresses.



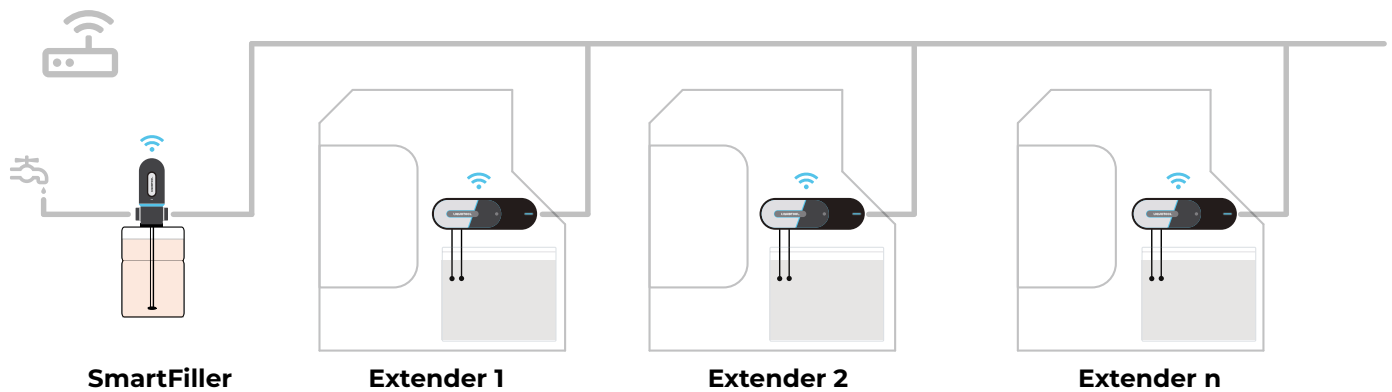
## 4.2 Local Devices Communication Requirements

- The router and its settings should allow the discovery and communication of devices within the network.
- All devices for an AutoPilot setup must be in the same local subnetwork
- Broadcast - allowed (as an example: 192.168.1.255)
- ICMP - allowed
- TCP/IP - allowed for communication between devices
- DHCP - make sure that the router provides IP addresses from the same subnet, it is also recommended to keep the binding of the given address to the MAC address of the device.

If you have problems with your WLAN network, we recommended using a LAN/Ethernet (RJ45) connection.

**Note: Some TP-Link router models may have problems with communication between devices if they are connected via WLAN. In this case, we recommend another brand of routers or using a LAN/Ethernet (RJ45) connection.**

# 5 Piping recommendation



The illustration above shows what components will be delivered by Liquidtool (see also chapter 2.3, 3.3, and 3.5). Hoses and piping to the machines has to be provided by the user since every installation is different depending on the conditions and the layout of each shop floor. Each user must choose the right type of installation for himself.

## 5.1 Connections

### SmartFiller

Water inlet  
Emulsion outlet

G3/4" male thread  
Hose barb Ø16mm  
(5/8 in.)



### Extender

Emulsion inlet

G3/4" male thread



## 5.2 Connection cross-section

The expected volume that the SmartFiller mixes is around 800 liters per hour (211 gal). Note that the applied water pressure, the pipe length as well as their cross-section and condition directly influence this volume. In general, we recommend using a 3/4 inch pipe cross-section, so as not to unnecessarily affect the flow. For short piping under 10 meters (33ft.), however, we also recommend 5/8 inches.

## 5.3 Flexible / temporary installation

Installations on single machines and temporary installations can be done through flexible hoses. Since the length in this case is small, 5/8 inch hoses are suitable. Please note that the hoses must be resistant to the coolant in use.

## 5.4 Fixed installation

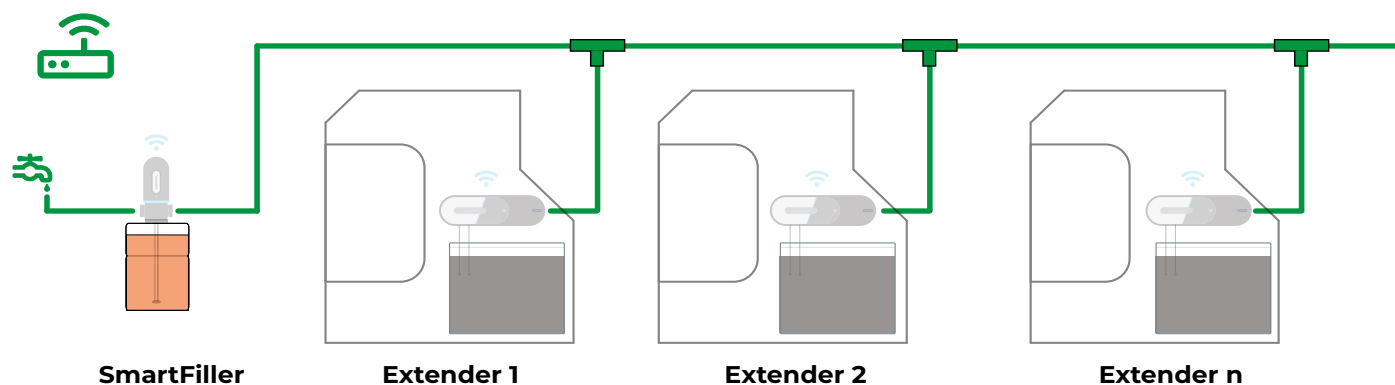
For fixed installations with a connection length of more than 10m (33ft.), we always recommend fixed piping. However, since the Liquidtool devices are only attached magnetically and are therefore relatively flexible, we recommend to use a flexible hose as the last piece of connection to the devices.

## 5.5 Types of piping

Depending on the application, there are different possibilities of piping. Either one of the following variants or a combination of both can be used.

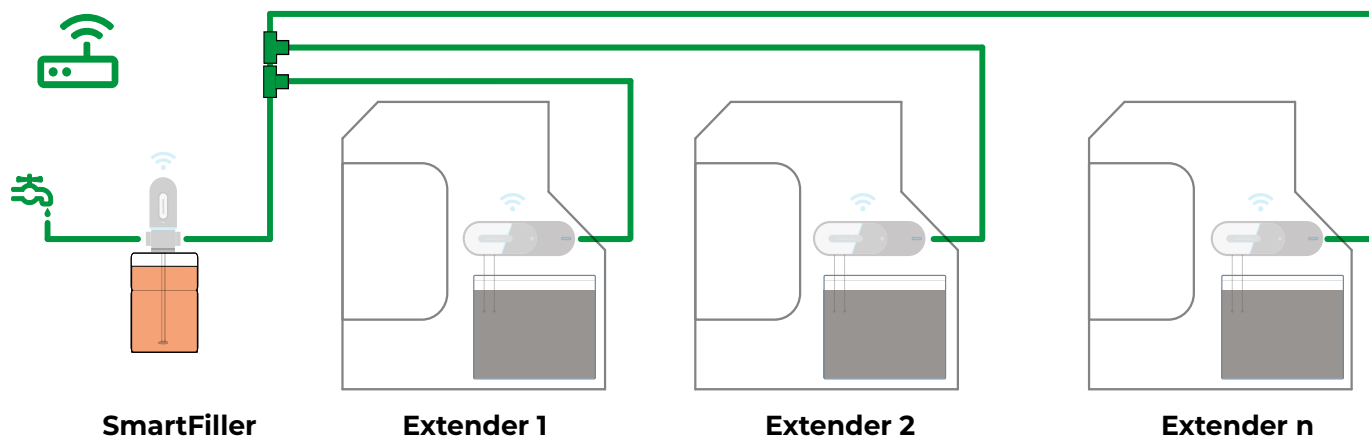
### 5.5.1 Branch system

One pipe passes all machines and has a branch to each machine. This type of installation is particularly recommended when several machines are **in line** and require a **similar target concentration**.



### 5.5.2 Manifold system

A manifold is installed as close as possible to the SmartFiller and then individual pipes are routed to the machines. If the connected machines have a **big difference** in target concentration and top up rate, this variant is recommended because the common pipe to the machines is only short.



## 5.6 Customer provides

### For the whole system

- Internet connection (see Chapter 4)

### For each SmartFiller

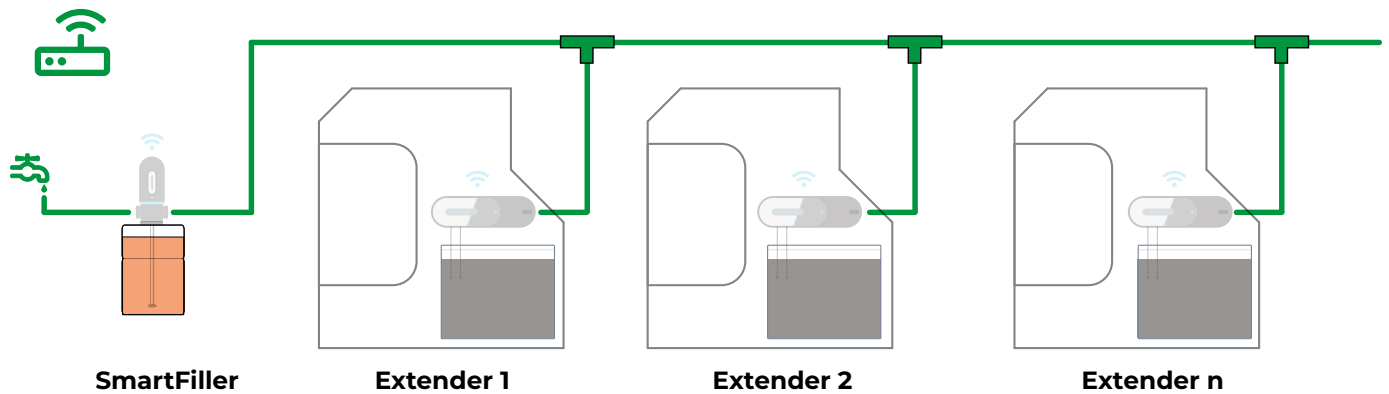
- Water connection
- Hose (water) from Faucet to SmartFiller
- Hose fitting to 3/4" barb
- Power supply

### For each Extender







- Hose (16mm (5/8"); coolant proof) or pipe from SmartFiller to Extender
- Hose barb 3/4" thread (G3/4"); 5/8" barb
- Hose clamps
- Power supply

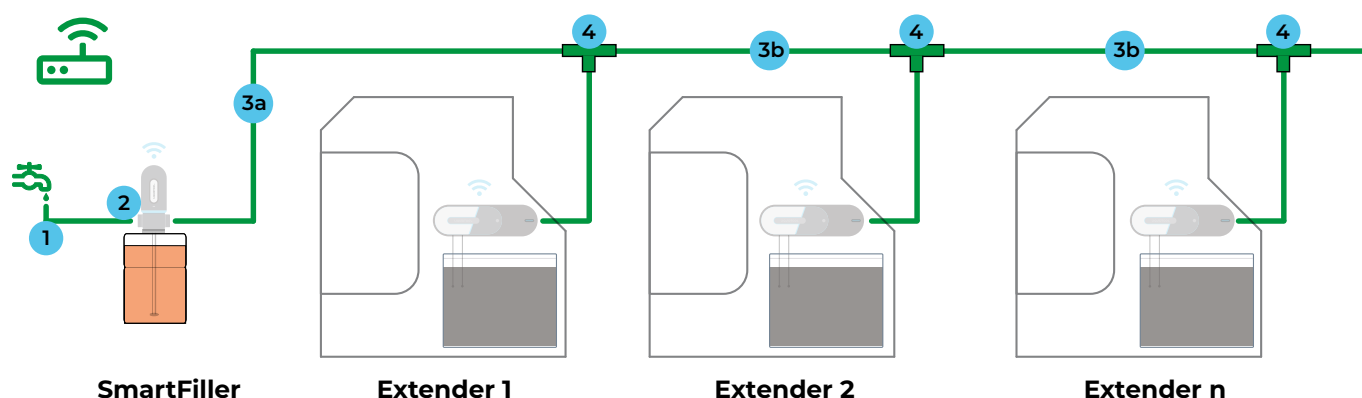
### For multiple Extenders

- T-style connection



# 6 Recommended shopping list

1		Hose (water) from Faucet to SmartFiller
2		Hose fitting to connect water hose to 3/4" G thread (nickel-plated recommended) <i>1x per SmartFiller</i>
3a		Hose (5/8" (16mm); oil resistant) or pipe from SmartFiller to Extender <i>For single-filled machines (see chapter 5.3)</i>
3b		Piping to multiple machines <i>For multiple connected machines (see chapter 5.4 &amp; 5.5)</i>
4		T-style connection <i>for multiple Extenders only</i>
		Hose clamps <i>3x per Extender</i>



The installation of a Liquidtool AutoPilot is a straight-forward process. Please prepare your site according to this document, so installation can be smooth and your AutoPilot will be up and running quickly.

If you are unsure that all requirements are correctly prepared, please reach out to your business partner or Liquidtool ([support@liquidtool.com](mailto:support@liquidtool.com)) ahead of the installation date.