

DIGITAL FILLING UNIT

USER MANUAL

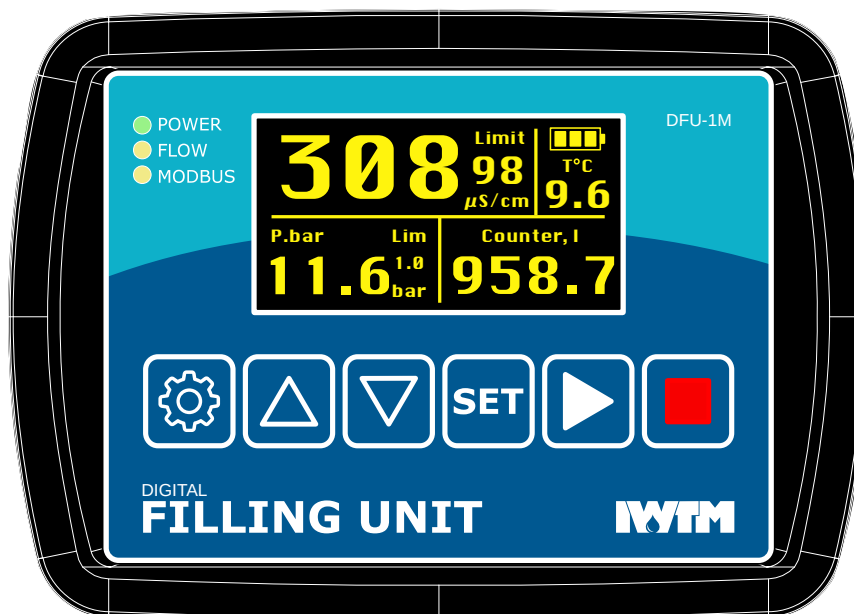


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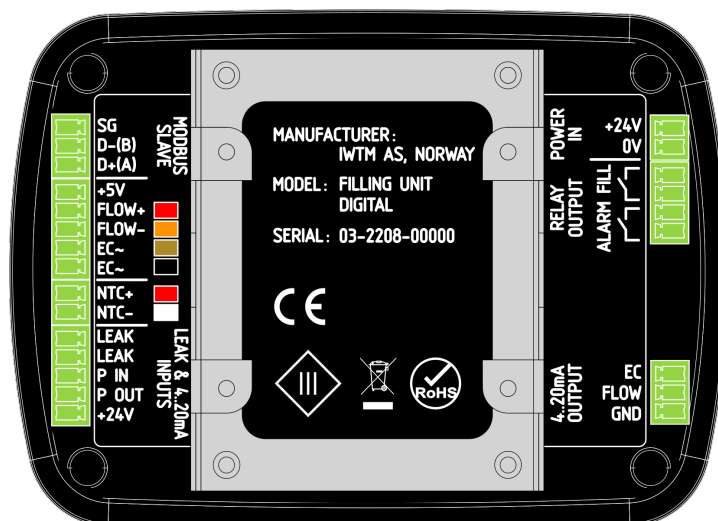
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WIRING

1. Connect 24V power supply shipped with the unit to “POWER IN” connector.
2. Connect pressure sensor: wire 1 to “+24V”, wire 2 to “P OUT”.
3. Connect fill valve to “RELAY OUTPUT/FILL” and power supply (max 250V/5A AC/DC), see below.
4. Connect leakage detection cable to the “LEAK” terminals.
5. For an external alarm, connect it to “RELAY OUTPUT/ALARM” and power supply (max 250V/5A AC/DC), see below.
6. Connect 4..20mA outputs to you BCS. They have a common GND pin.

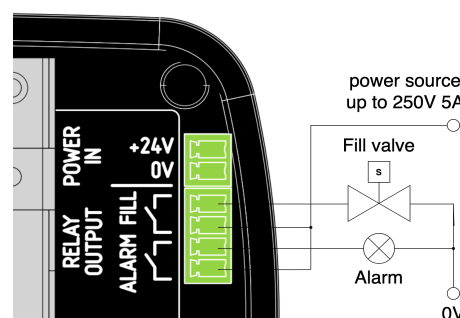


CONNECTIVITY

Fill Valve And Alarm

Both fill valve and alarm are connected as shown of the figure on the right. Max voltage for the power source is 250V, max current is 5A.

If you want to use a 24V valve and power it from the same supply as DFU, please purchase a more powerful power supply according to the valve specification. **Don't use the one shipped with the DFU.**



4..20mA outputs

Connect the unit 4..20 outputs to corresponding inputs of your system. The GND pin is common for both outputs.

#	Value	Range
1	Water flow	0..100 l/min
2	Electrical conductivity (EC)	0..1000 uS/cm

WiFi and cellular

DFU can be connected to the Internet by means of a cellular network or WiFi. “REMOTE CONTROL” section of the Mobile application guide (page 7) describes how to connect DFU to a local WiFi network. An IoT SIM-card is needed to connect to a cellular network. Traffic depends on how often the remote control application is used, but normally 25-100Mb/month should be enough.

Modbus/RTU.

Connect Filling Unit Digital to your BCS, Protector Digital or any other data collection system using RS485 interface.

Default modbus settings are: speed 19200 8N1, address 101 (0x65).

Read holding registers using "0x03" command.








Write holding registers using "0x06" command.

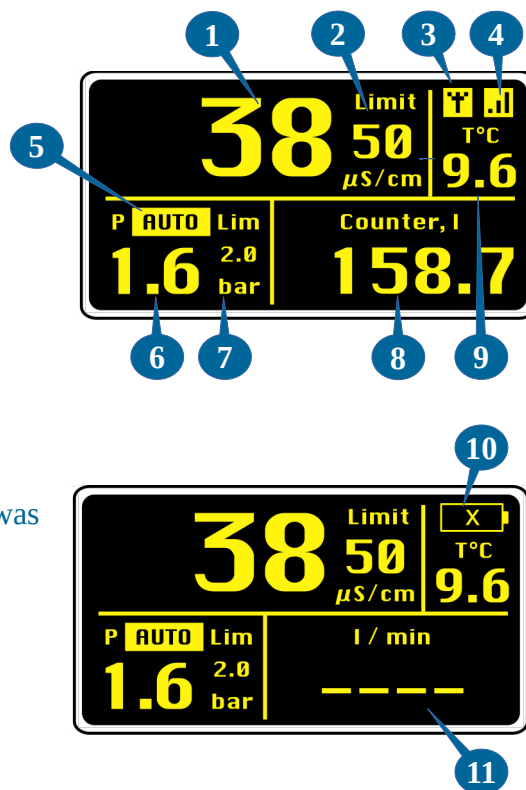
Holding registers

reg #	RW	Type	Value	Units	Range
0	R	UINT16	Modbus address	-	1-254
1	R	UINT16	Modbus speed	baud	
2	RW	UINT32	Runtime (RTU)	seconds	
6	RW	float dcba	Read: flow counter. Write: 0: reset the counter.	liters	0..999999
8	RO	float dcba	Flow, liters/min, zero when no flow.	l/min	3..100
10	RO	float dcba	Conductivity	µS/cm	0..2000
12	RO	float dcba	Temperature	°C	0..60
14	RO	float dcba	Pressure	bar	0..10
16	RW	UINT16	Max conductivity	µS/cm	0..2000
17	RW	UINT16	Min pressure	kPa	0..1000
18	RW	UINT16	Max pressure	kPa	0..1000
19	RW	UINT16	Leak. Read: 0: no leak, 1: leak cable active, 2: abnormal filling. Write: 0: disable leak cable for 1 day for drying, 1: re-enable leak cable.		







BUTTONS AND ON-SCREEN MENU

MAIN SCREEN





- Water conductivity
Blinking when over limit.
- Conductivity limit
- WiFi status
 blinking – connecting to network
 stable – connected to network
 stable – connected to IoT server over WiFi
- Cellular status
 blinking – SIM card found, connecting
 stable – connected to cellular network
 stable – connected to IoT server over cellular network
- Pressure control mode (manual/auto)
Blinking “AUTO” indicates that automatic pressure control was disabled manually for an hour.
- Pressure
Blinking indicates that pressure is out of range.
- Pressure limit
- Flow counter or flow (11).
Press  to switch between counter (8) and flow (11).
- Water temperature.
- Battery status.
Flashing battery status indicates that it's time to replace built-in battery. Battery type is CR2032.



BUTTON FUNCTIONS ON THE MAIN SCREEN

Press						
Single	Open “Settings”	-	-	Switch counter/flow	Start filling	Stop filling
Long	Show QR-code	-	-	Reset main flow counter	Force fill ignoring high EC	Re-enable leak detection cable




SETTINGS

1. Press  button to open the Settings screen.
2. Use  and  buttons to select an item.
3. Press  to open the item.

SETTINGS

> EC limit (alarm)
Pressure settings
Modbus settings
Date & Time
Sensors settings
Reset

EC LIMIT

1. Use  and  buttons to change value.
2. Press  to save and return to the main screen.





EC LIMIT (ALARM)

Current settings: 98 $\mu\text{S}/\text{cm}$

50 $\mu\text{S}/\text{cm}$

UP/DOWN: change, SET: save

PRESSURE SETTINGS





1. Use  and  to change current field (blinking).
2. Press  to save the value and select next field.
3. Press  button to exit to the main screen.

PRESSURE SETTINGS

Range: 1.0–2.0 bar
Auto-control: off
Max fill, l: 100

UP/DOWN: change, SET: select

MODBUS SETTINGS

1. Use  and  to change current field (blinking).
2. Press  to save value and select next field.
3. Press  button to exit to the main screen.





MODBUS SETTINGS

Address: 101
Speed: 19200

UP/DOWN: change, SET: select

DATE & TIME

If DFU is connected to the Internet it will take exact time from the net, so there is no need to set it manually.





1. Use  and  to change current field (blinking).
2. Press  to save value and select next field.
3. Press  button to exit to the main screen.

DATE & TIME

2022-01-01
08:30

UP/DOWN: change, SET: select

SENSOR SETTINGS

1. Use  and  to change current field (blinking).
2. Press  to save value and select next field.
3. Press  button to exit to the main screen.





SENSORS SETTINGS

Flow const: 71.0
EC type: EC+FLOW
Leak wire: ON
Leak flow: OFF

UP/DOWN: change, SET: select

For “EC type” select “EC+FLOW” for a combined EC-flow-temperature sensor (default), or “EC only” for any other combination of EC and flow sensors.

RESET MENU

1. Use  and  buttons to select an item.
2. Press  to open the item.
3. Press and hold  button to reset and return to the main screen.

Description:

1. “Flowcounter reset” will set main flow counter to 0, leaving leak detection counter unchanged.
2. “Wi-Fi reset” will erase WiFi settings. New WiFi connection can be set up only using mobile application.
3. “Leak detector reset” will reset software leak detection system. Software leak detection will be disabled for the next 10 automatic fill events because the system needs to collect some statistics about your system. Reset leak detection system if filling amount and frequency have considerably changed since last reset.
4. “Factory reset” will erase all data except module identity number (UUID).
5. “UUID reset” will reset module identity number. Use this function if you want to be sure that the module cannot be controlled remotely by any mobile device it was added to before. For example, if you have got a used DFU from another person or company.

RESET

> Flowcounter reset
Wi-Fi reset
Leak detector reset
Factory reset
UUID reset

REMOTE CONTROL

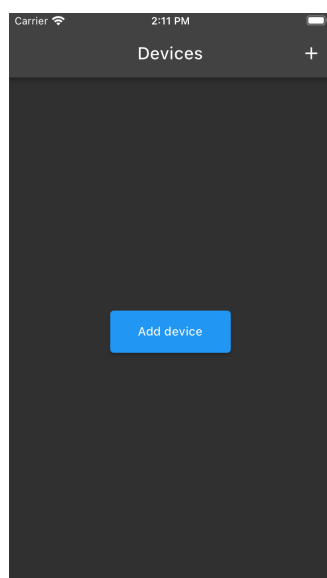
DFU can be controlled remotely from Android or iOS mobile application called “DFUremote”. The unit has to be connected to the internet via WiFi or cellular network. Download the application from Play market or AppStore:



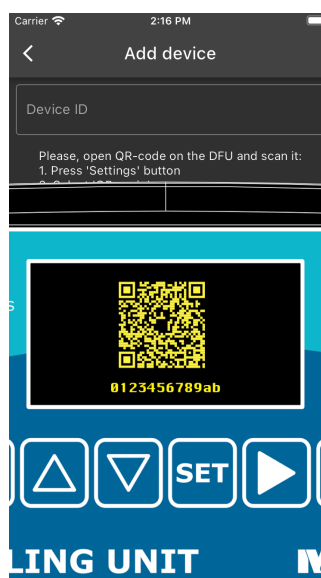
On DFU press  for 2 seconds to show QR-code



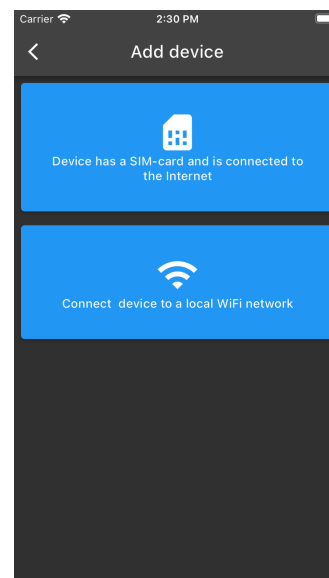
On mobile run the app and tap the “Add device”




Scan the QR-code with device camera.

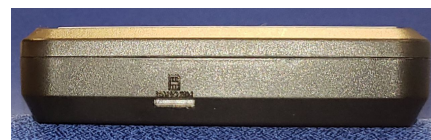


Select connection type: cellular or WiFi.



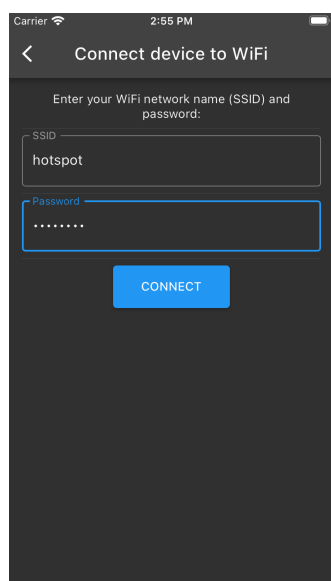
CELLULAR CONNECTION

1. Insert an IoT nano sim-card into slot on the bottom side of DFU.
2. Wait until cellular indicator looks like this: 

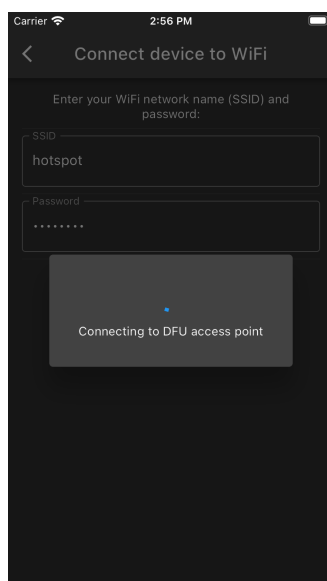


WIFI CONNECTION

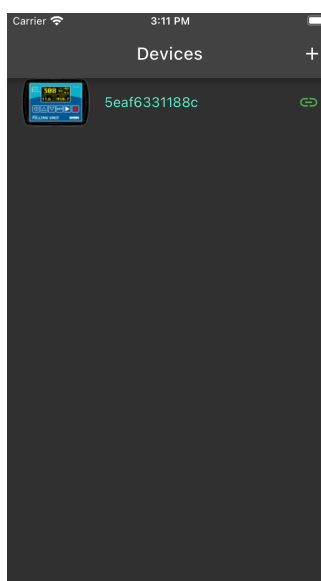
Enter your local WiFi name and password.



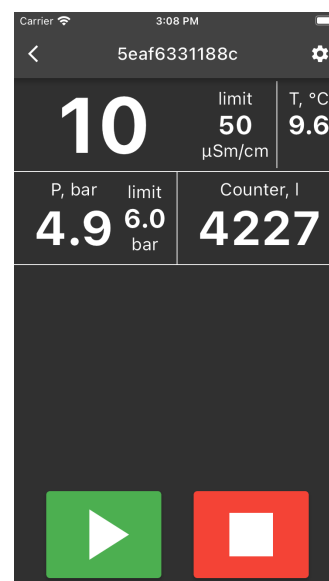
Wait until the DFU is configured



If connected the app will show list of devices.



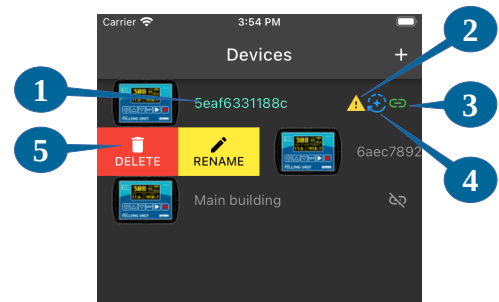
In case of a single device the app will switch to it.



MOBILE APP

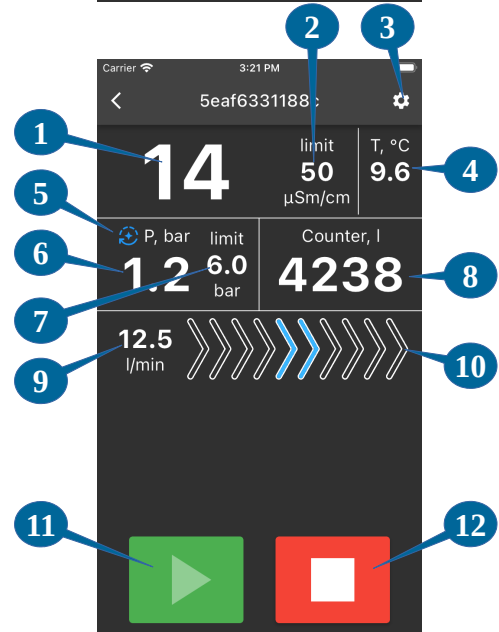
Device list

1. Device UUID or name (if set)
2. Alarm indicator
3. Online indicator
4. Automatic pressure control indicator
5. Rename/Delete buttons (swipe to the right to see)



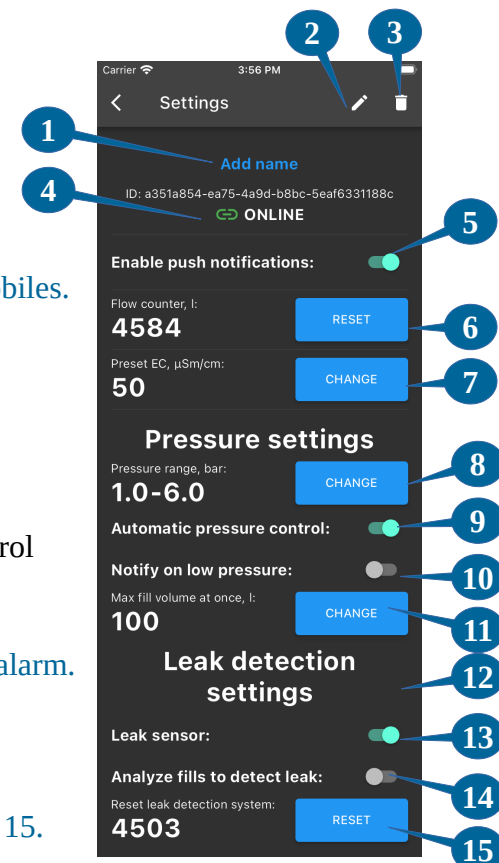
Device details

6. Conductivity
7. Conductivity limit
8. "Settings" button (opens device settings page)
9. Water temperature
10. Automatic pressure control indicator
11. Pressure, bar
12. Pressure limit, bar
13. Flow counter, liters
14. Flow, liter per minute
15. Fill indicator
16. Fill button
17. Stop button

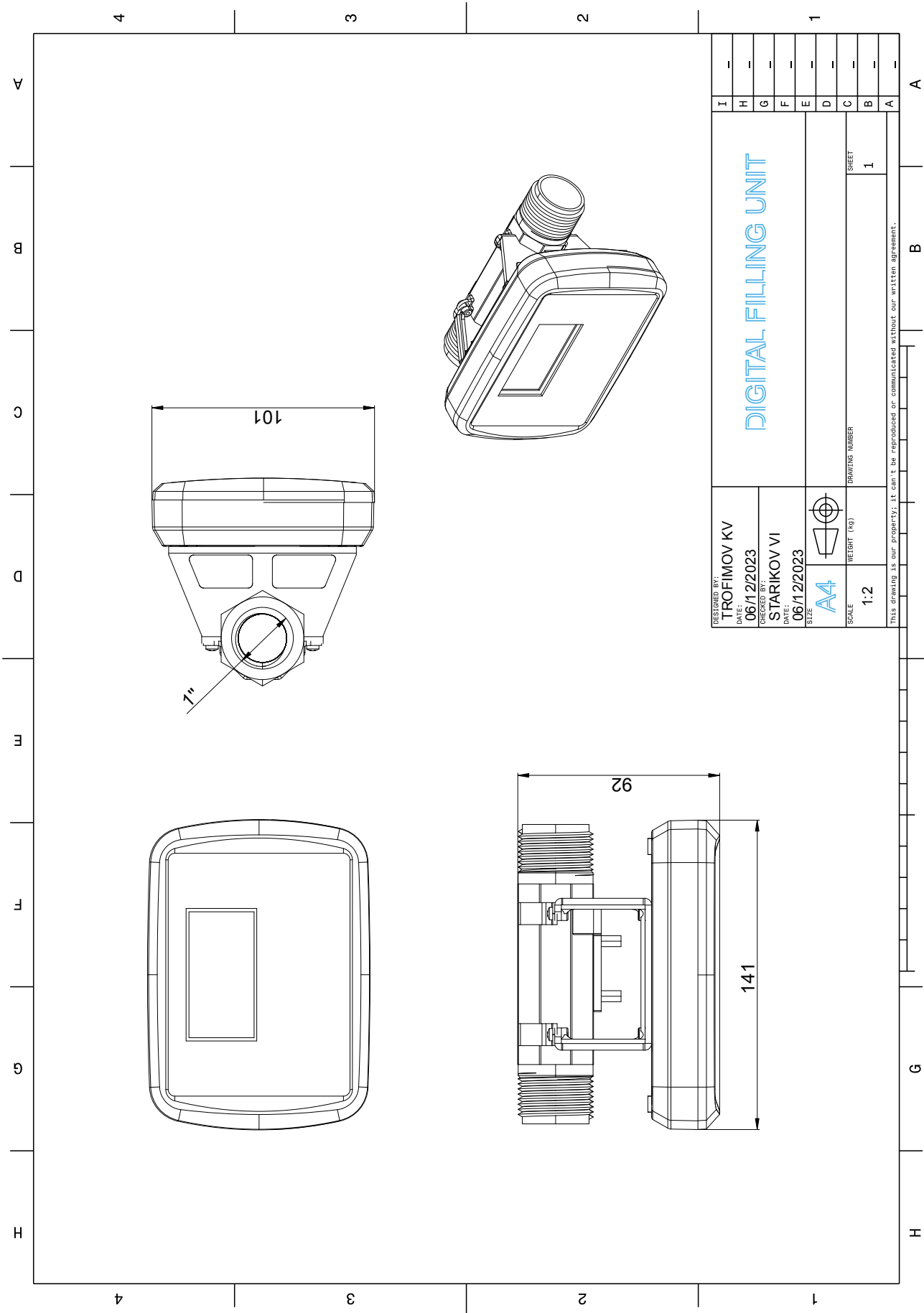


Device settings

1. Device name
2. Edit device name
3. Delete device
4. Online indicator
5. Push notifications switch.
If off, the device will not send any notifications to any mobiles.
6. Reset flow counter
7. Change conductivity limit
8. Change pressure limits and control type.
9. Automatic pressure control switch.
If enabled DFU will maintain pressure automatically.
10. Send notifications on low pressure even in automatic control mode.
11. Limit maximum one-time fill volume.
If the limit is exceeded DFU will stop filling and send an alarm.
12. Leak sensor cable switch.
13. Software leak detector.
Tries to detect leak by analyzing changes in fill amount, frequency and speed. Reset the system by pressing button 15.



DRAWING



CONTACTS

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