ZT-100-C Water Cut Meter — Quick Start

Quick Start - Zelentech

Manufacturer: Zelentech
Product: ZT-100-C Digital Water Cut Meter
Firmware covered: CAP card `0.16.37-cap-b38` · SIGNAL card `0.17.35-sig-c59`
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Contents

Before You Start 3
Terminal Block 4
Step 1 — Connect the supply 5
Step 2 — Connect the 4-20 mA loop 6
Step 3 — Connect the console (recommended) 7
Step 4 — Power up and read the LEDs 8
Step 5 — Talk to the meter 9
Step 6 — Set the output range 10
Step 7 — Set damping if the process is noisy 11
Step 8 — Verify the loop 12
Step 9 — Confirm a sensible reading 13
What Next 14

Before You Start

This guide takes a new ZT-100-C from unpacking to a live water cut reading, in nine steps. It is the short path. For anything beyond it — day-to-day operation, calibration, troubleshooting — see the **User Manual**.

Allow about 45 minutes, not counting the process work of fitting the probe.

What you need

Item	Note
24 V DC supply, regulated	The meter draws well under 1 A
Screwdriver, small slotted	The terminals are screw clamp
Twisted pair cable, up to 0.82 mm² (AWG 18)	For the loop and for RS485
A USB-to-RS485 adapter and a PC	Strongly recommended — it is how you verify the meter is healthy
A terminal program	115200 baud, 8N1, no flow control

What is inside

Two cards share the enclosure and one internal bus:

- **CAP** measures — probe, temperature, the water cut calculation, all calibration data.
- **SIGNAL** outputs — the 4-20 mA loop, HART, the operator console.

SIGNAL displays what CAP measures. **If CAP stops, SIGNAL drives the 3.6 mA alarm within about 2.5 seconds.** That is correct behaviour, and you will see it briefly at every power-up.

Where you work

The enclosure has **two compartments**. You work in the **connection compartment** only — that is where the 10-position terminal block is.

> **Do not open the electronics compartment.** The cards are factory wired and plug together. There is nothing in there to connect, and nothing you need for commissioning.

Terminal Block

All field wiring lands on these ten terminals.

Terminal	Function	Wire colour
0	4-20 mA **IN** (+)	Red
1	4-20 mA **IN** (−)	Black
2	Internal RS485 **A**	Grey
3	Internal RS485 **B**	Purple
4	4-20 mA (−)	Blue
5	4-20 mA (+)	Green
6	External RS485 **B**	Orange
7	External RS485 **A**	Yellow
8	**24 VDC (−)**	White
9	**24 VDC (+)**	Brown

You will use **four** of them: 8 and 9 for power, 5 and 4 for the loop. Add 7 and 6 if you are connecting a console, which we recommend.

> **Wire by terminal number, not by colour.** Terminals 2 and 3 are the factory-wired bus between the two cards — leave them alone. Terminals 0 and 1 feed a display card that is not released; leave them unconnected.

Step 1 — Connect the supply

Supply off. Land the supply on terminals **9 (+)** and **8 (−)**.

> ### ⚠ Check polarity twice
>
> The regulators are protected against reversed polarity. **The 4-20 mA output stage is not.** Reversing the supply will stop the meter from starting and risks damaging the loop driver.
>
> Terminal **9 is positive**. Terminal **8 is negative**.

Do not switch on yet.

Step 2 — Connect the 4-20 mA loop

Land the loop on terminals **5 (+)** and **4 (−)**.

> ### ⚠ DO NOT APPLY A LOOP SUPPLY
>
> **The meter powers its own loop.** The receiving system must present a passive load — a sense resistor or an analog input — and must **not** apply its own supply to terminals 5 and 4.

Keep the total loop burden at 500 Ω or less. That covers a standard 250 Ω HART sense resistor plus normal cable and input burden with room to spare.

If you intend to use HART, the loop needs a defined impedance, nominally **250 Ω**. It is **not fitted inside the meter** — it is part of your loop. Many control-system inputs already include one.

Step 3 — Connect the console (recommended)

Land the RS485 pair on terminals **7 (A)** and **6 (B)**.

This is a **two-wire connection.** There is no signal-common terminal, so run a twisted pair, keep it reasonably short, and if you use shielded cable, earth the shield at the **control-system end only** — there is no shield landing point inside this enclosure.

> The meter is permanently terminated at 120 Ω, so it is always an end of the bus. Do not fit another terminator at the meter, and do not install it as a middle node on a multi-drop segment.

Step 4 — Power up and read the LEDs

Switch the supply on and look at the **red heartbeat LED on both cards**, if you can see them with the compartment open.

Pattern	Meaning
2 flashes, pause — on both cards	**Normal.** The pair is talking
1 flash, pause	That card is alone — it cannot hear the other
Fast continuous flicker	The card is about to reset

Two flashes on both cards is what you want.

The loop will sit at **3.6 mA** for the first moments after power-up, until CAP's first measurement reaches SIGNAL. This is normal.

Step 5 — Talk to the meter

Open your terminal program at **115200 baud, 8N1**, no flow control. Press Enter and type:

```
sys version
```

You should get the product name and firmware version back.

> **Nothing, or garbled characters? Swap the two data wires** on terminals 7 and 6 and try again. Reversed A/B is by far the most common commissioning fault on this product — it is the first thing to try, not the last.
>
> Also check: local echo on in your terminal (the meter never echoes your keystrokes, so a silent screen proves nothing), and 115200 rather than 9600.

Now check the pair:

```
cap
```

This shows link health and every measured value with its quality. You want the peer count at **1** and the values reading `good`.

Step 6 — Set the output range

`pv.range` is the water cut percentage that corresponds to 20 mA. 4 mA is always 0 %.

```
auth commission 1234
cfg set pv.range 10
```

`pv.range`	20 mA means	Resolution
25 % (default)	25 % water cut	1.5625 % per mA
10 %	10 % water cut	0.625 % per mA
5 %	5 % water cut	0.3125 % per mA

Choose the smallest range that comfortably covers your process. A narrower range gives better resolution on the loop, but saturates sooner — above range the output pins at 20.4 mA.

Takes effect immediately, no reboot.

Step 7 — Set damping if the process is noisy

Damping smooths the reading. It lives on the **measuring card**, so it is set through the `cap` prefix, and it affects the console, the loop and HART alike.

```
cap cfg set meas.damping 5
```

Range **0 to 60 seconds**; **0 is the shipped default**, and no password is needed: a command forwarded with `cap` reaches the measuring card already authorised. Start at 0 and add damping only if the reading is restless. Damping slows the response to real process changes just as much as to noise.

Step 8 — Verify the loop

Drive known currents and check them at the receiving end:

```
out test 4
out test 12
out test 20
out auto
```

Each `out test` holds for **30 seconds** and then returns to normal by itself. `out auto` returns immediately.

If your reference meter disagrees, the output can be trimmed — see *Output trim* in the User Manual. Do not adjust anything else to compensate for a loop reading.

Step 9 — Confirm a sensible reading

With the probe fitted and wetted by the process:

```
cap meas read
```

Check that:

- `wcut` reads plausibly and is `good`
- `temp_proc` is near process temperature and is `good` — `fault` means the PT100 is not connected, and the meter will substitute 25 °C and keep running at reduced accuracy
- `cap_pf` is `good`

The meter is now running. Its factory calibration is in place.

What Next

Before you trust the number, calibrate against a laboratory sample — the meter's factory calibration does not know your crude. See *Field Calibration* in the User Manual.

If you want to	See, in the User Manual
Read and interpret the output day to day	*Reading the Water Cut*
Calibrate against a laboratory result	*Field Calibration*
Understand 3.6 mA and 20.4 mA	*Special currents*
Connect a HART master	*HART Connection*
Diagnose a problem	*Troubleshooting*

Two things worth knowing now

3.6 mA means something. This firmware drives the alarm current when the measurement is stale or faulted — it does not freeze at the last good value the way the previous generation did. Configure your control system to treat anything below 3.8 mA as a fault, not as a low water cut.

Every value carries a quality. `good`, `stale`, `fault` and the rest are printed beside each reading. A missing or faulted sensor is always stated, never dressed up as a live number.