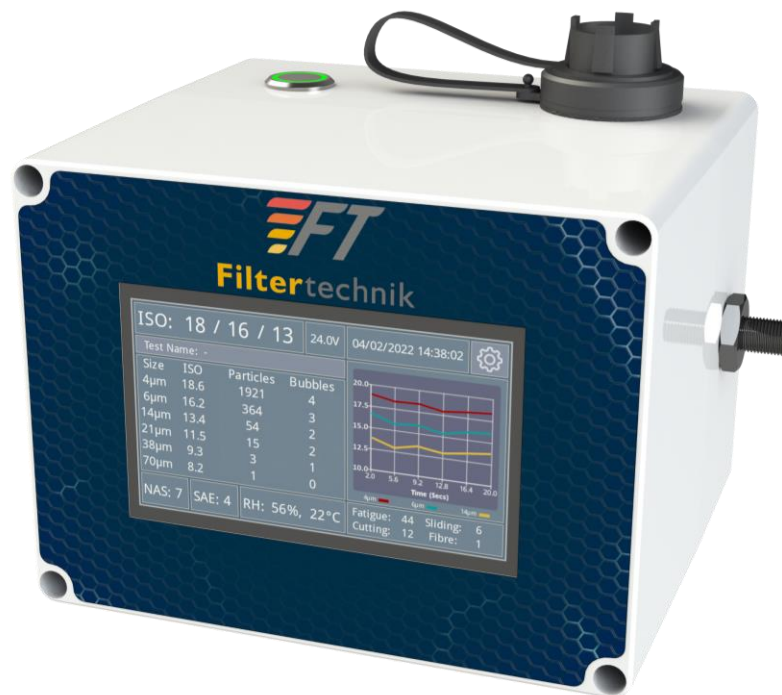


S120-PM

Fuel & Oil Cleanliness Analyser

User Manual



August 2022

V1.00

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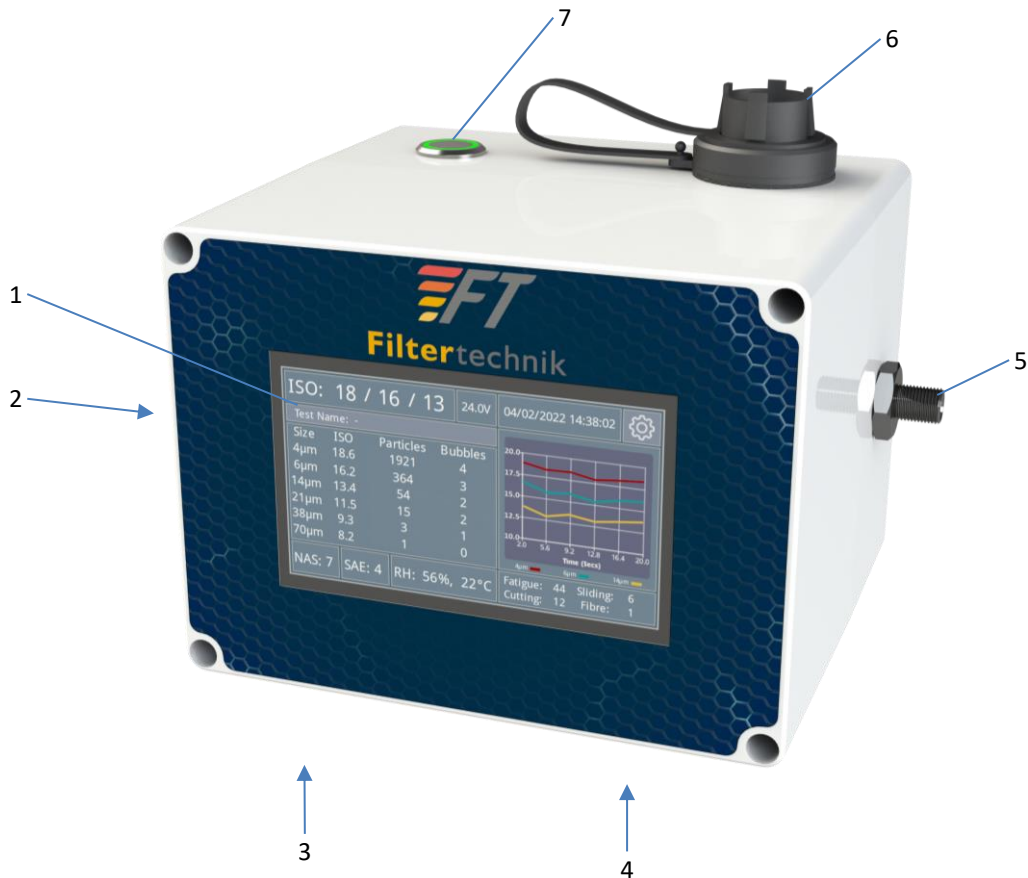
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Specifications

Specification	Detail
Dimensions	(w)160mm x (d)145mm x (h)166mm
Weight	1.5kg
Finish	White weatherproof case
Nominal Voltage	24 VDC
Voltage Range	20-28 VDC
Cleanliness standards	ISO 4406, NAS 1638, SAE AS4059
Viscosity range	Up to 2400 cSt (as long as pressure limit is not exceeded)
Fluid compatibility	Diesel & oil (hydraulic, lubrication, mineral, synthetic)
Fluid temperature	0 to 60°C (oils) 0 to 50°C (diesel)
Ambient temperature	0°C to +40°C
Environment	IP65
Connections	1/8" BSPP, 60° coned
Pressure	0 -5 bar nominal, 100 bar maximum
Maximum humidity	97% relative humidity, non-condensing
Certification	Factory calibration certificate CE declaration
Verification frequency	12 months recommended
PC requirements	Windows (with USB port), spreadsheet software (e.g. MS Excel)

Component Identification



Key:

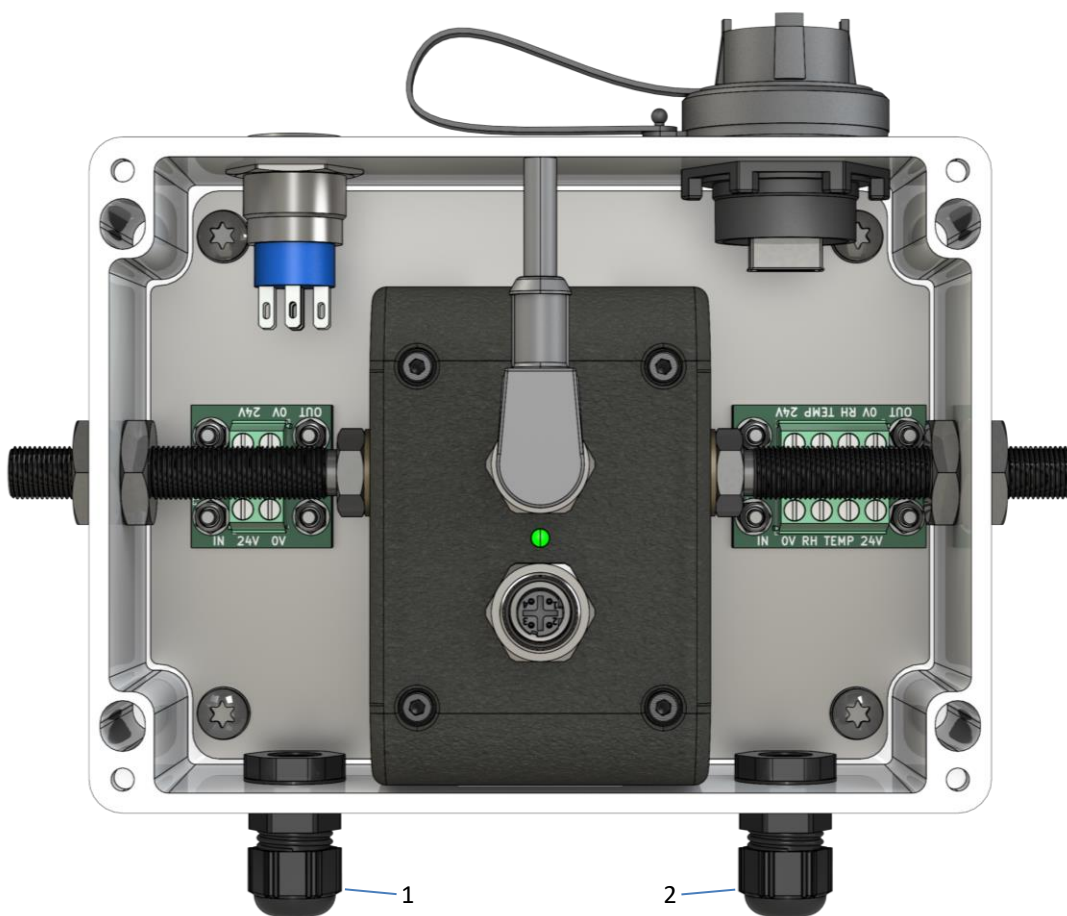
1.) Touch screen display	5.) Inlet/Outlet Port – 1/8" BSPP Coned
2.) Inlet/Outlet Port – 1/8" BSP Coned	6.) USB Port (data log download)
3.) Power Input	7.) Power Switch
4.) RH Sensor Input	

Inlet & Outlet Connections

Flow through the unit can be in either direction. The connections provided are 1/8" BSSP threads to ISO 228/1 with a 60° internal cone to BS 5200, suitable for connecting hydraulic hoses with female swivel ends.

When attaching hose connections, it's best practice to remove the front cover of the enclosure and support the threaded fitting with a spanner where it connects to the particle counter to prevent over tightening the fitting in the particle counter or put excessive force on the mounting plate.

Electrical Connections



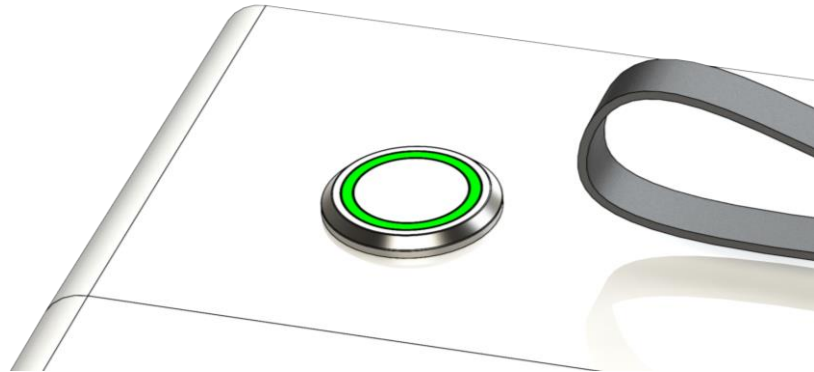
Power is provided through the cable glands on the left (1) and should be 24V, connected to the 2-pin terminal block.

The cable gland on the right (2) is for connection of an RH moisture sensor. The 4-pin terminal blocks 0V and 24V connections provide power to the sensor, where the 4-20mA outputs of the sensor are connected to the RH and TEMP terminals to display %RH and temperature on the display.

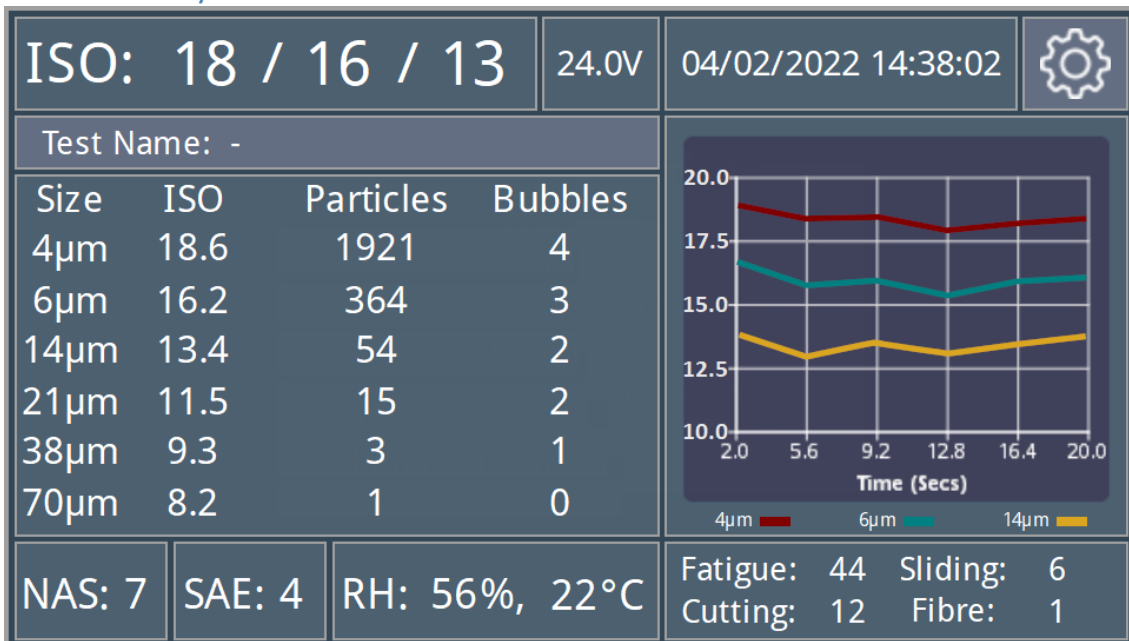
Operating the Unit

On/Off Switch

Units have a single push button switch which illuminates when switched on, powering up the display and RH sensor if connected.

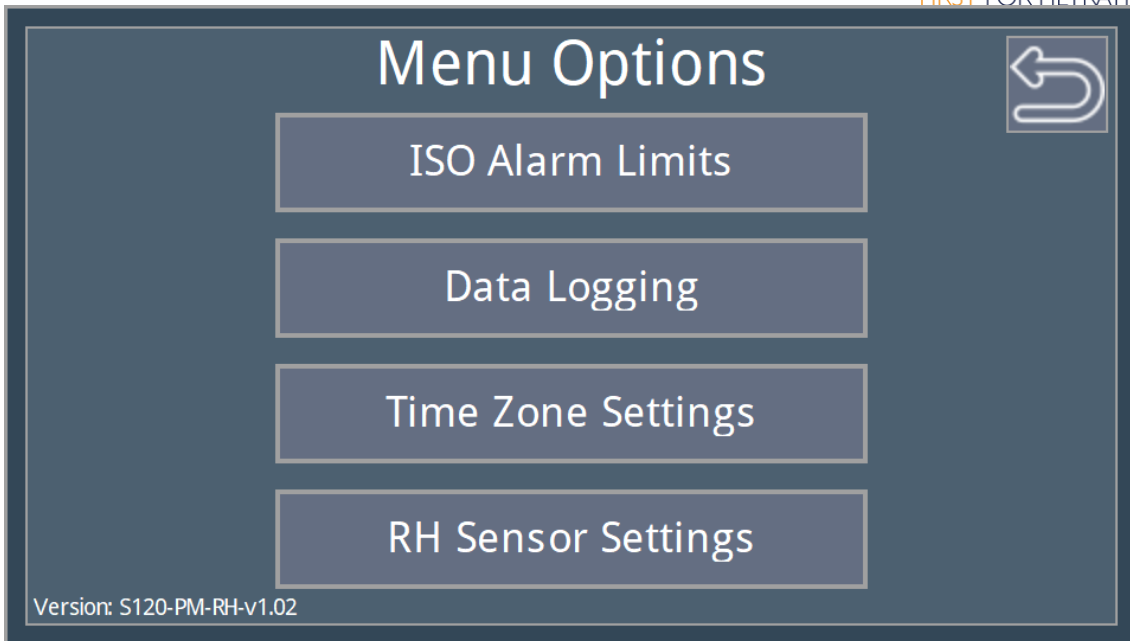


Touch Screen Layout



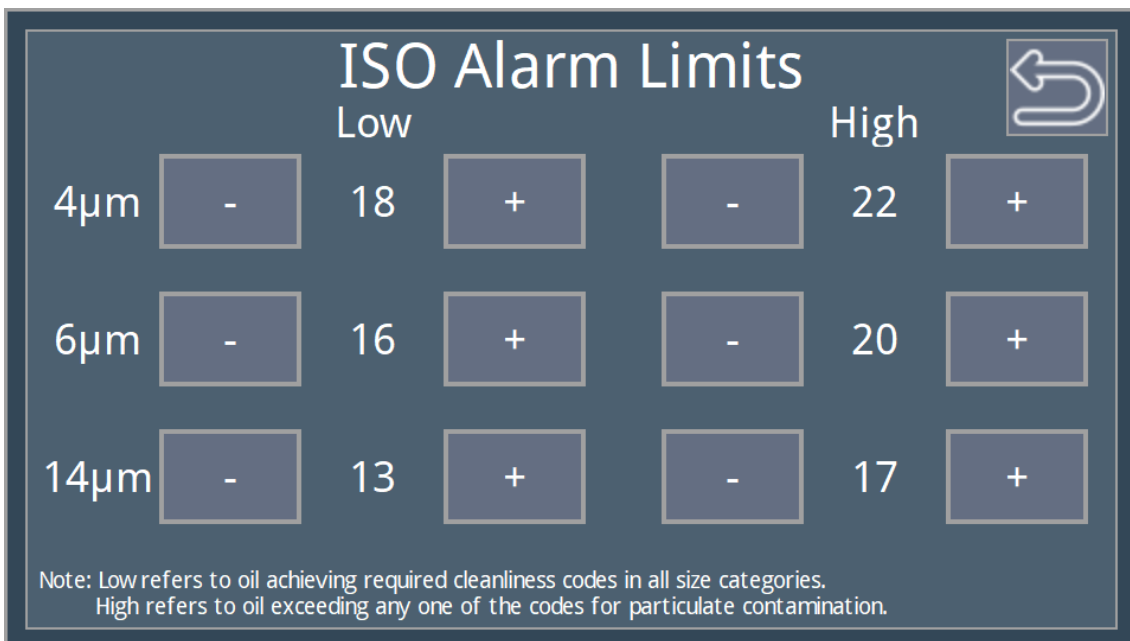
The main window of the touch screen displays all information provided by the particle counter and any other sensor that may be installed, including the input voltage. The ISO code can change from white to green or red depending on the alarm limits set.

In the top right corner of the screen is a settings icon, clicking this will open the settings page.



At the bottom left of the settings page the software version is displayed.

ISO Alarm Limits

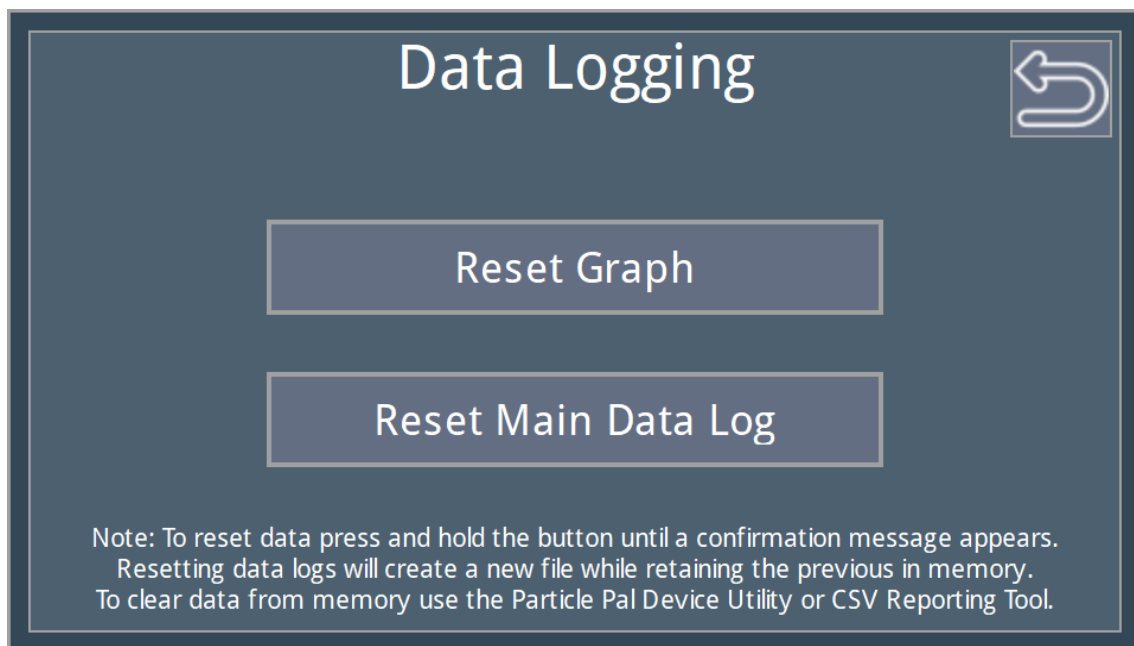


Alarm limits for low (clean) or high (dirty) can be set. Low refers to oil achieving required cleanliness codes in all size categories. High refers to oil exceeding any one of the codes for particulate contamination. When the oil is clean the ISO code on the main screen will turn green, when dirty it will become red, between the two values the text is white.

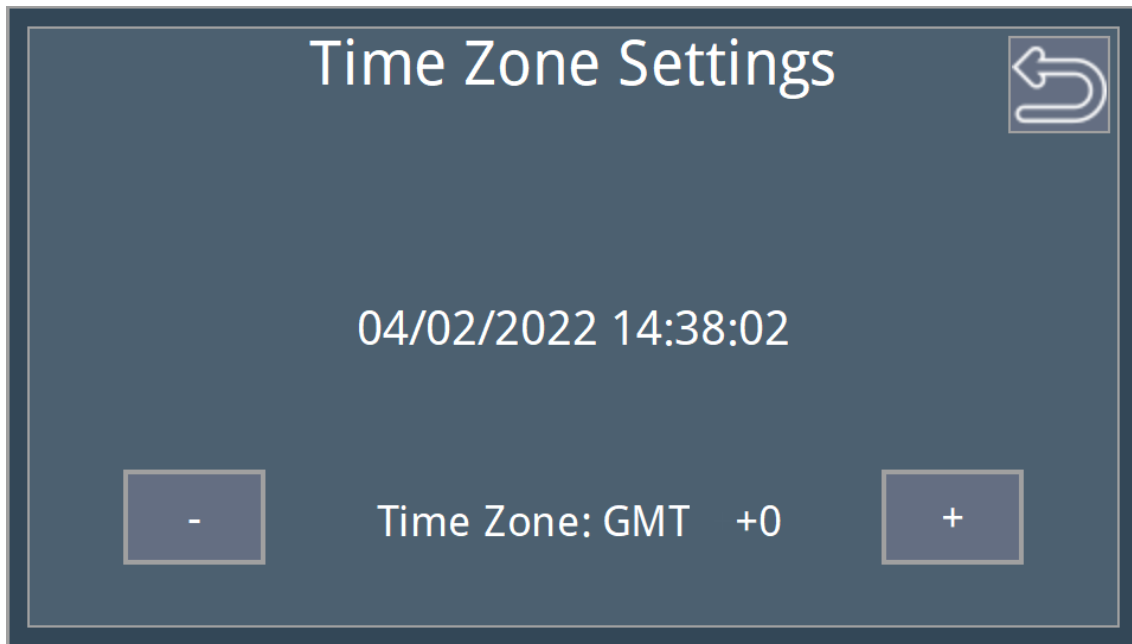
Datalogging

The unit contains two internal dataloggers, one for the graph and one for the tests. Whenever the unit is switched off the graph will be reset, but this can also be done from the screen without having to switch off the unit. The main data log tied to the sensors will hold 500 lines of data (500 polls of the sensors) which equates to 16.6 hours of testing.

To create a new log file the button needs to be held down for a couple of seconds, until a confirmation message is displayed.

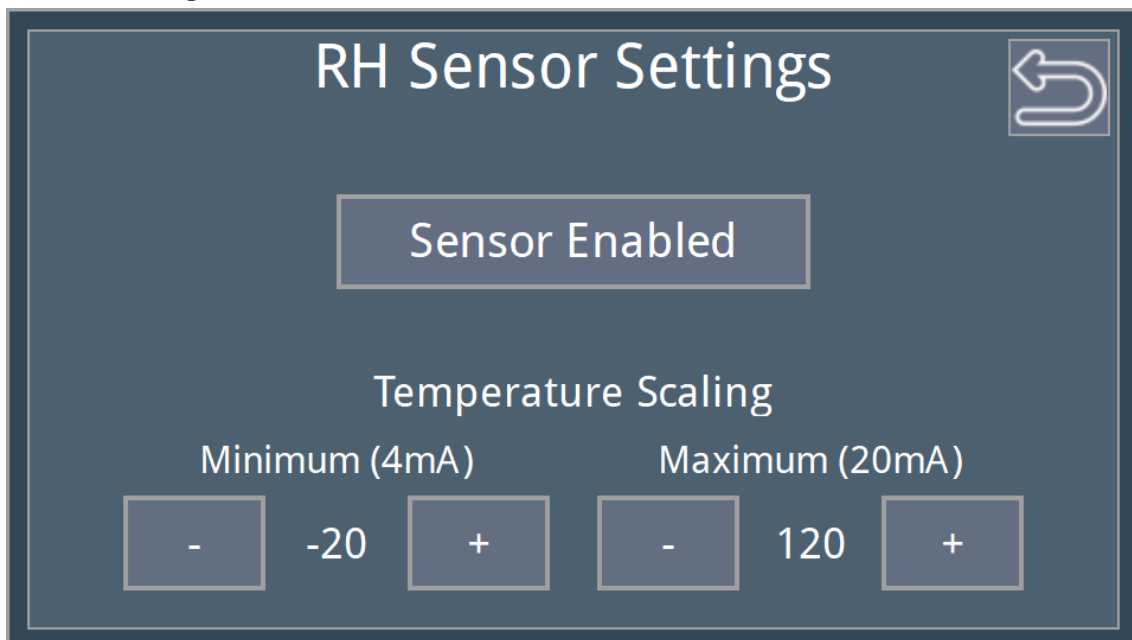


Time Zone Adjustment



The display screen is pre-set with the date and time to GMT +0 (UK time) this can be adjusted according to your time zone if required.

RH Sensor Settings



If an RH sensor is connected to the unit this will need to be activated in the “RH Sensor Settings” page. Here the temperature scaling can be adjusted to suit the sensor being used.

Troubleshooting

General Operational Errors

Problem	Possible Cause	Solution
Unit will not switch on.	Power supply issue.	With a multimeter check at the input terminal block that 24V is being supplied.
Touch screen does not power up.	Internal connector issue.	If the switch illuminates but the screen does not power up check the Molex connector has been reconnected after assembly.
Screen is behaving erratically.	Dirt or moisture on the screen.	Wipe the screen clean to remove traces of dirt, oil, or moisture. In most cases thick gloves will not work with the touch screen.

Particle Counting

Problem	Possible Cause	Solution
Contamination codes dropped to near zero..	A blockage in the flow path.	Check there is adequate flow rate going through the unit (approximately 20-50ml/min). Check/clean the suction strainer for any contamination.
Erratic count levels.	Unstable sample.	Check for the presence of air. Bubble counts should be maintained below 200 bubbles/ml in each channel.

RH & Water Content

Problem	Possible Cause	Solution
Water content is above 95%	High moisture levels in the sample. Damaged moisture sensor.	Flush the unit immediately with dry oil to avoid damage to the moisture sensor. If levels still don't fall the sensor could be permanently damaged.
Water content bouncing from near 0 to 100%.	Damaged moisture sensor.	Permanent damaged due to excessive moisture. Sensor will require replacing.
Temperature not reading correctly.	Scaling issue.	Go into the "RH Sensor Setting" menu item and make sure the scaling has been correctly configured.

Particle Count ISO Codes

ISO Codes (ISO4406)

The table below shows the ISO 4406 codes by number of particles per 1 ml of fluid sampled.

ISO 4406 Code	Counts/mL	
	Greater than	Up to/including
0	0	0.01
1	0.01	0.02
2	0.02	0.04
3	0.04	0.08
4	0.08	0.16
5	0.16	0.32
6	0.32	0.64
7	0.64	1.3
8	1.3	2.5
9	2.5	5
10	5	10
11	10	20
12	20	40
13	40	80
14	80	160
15	160	320
16	320	640
17	640	1300
18	1300	2500
19	2500	5000
20	5000	10000
21	10000	20000
22	20000	40000
23	40000	80000
24	80000	160000
25	160000	320000
26	320000	640000
27	640000	1300000
28	1300000	2500000
29	2500000	∞

ISO Decimal Codes

The S120 particle counter gives a greater insight into cleanliness by showing ISO decimal codes, with the particle counts as per the below table.

Code	Counts/mL	Code	Counts/mL	Code	Counts/mL	Code	Counts/mL	Code	Counts/mL
5	0.16	10	5	15	160	20	5000	25	160000
5.1	0.176	10.1	5.5	15.1	176	20.1	5500	25.1	176000
5.2	0.192	10.2	6	15.2	192	20.2	6000	25.2	192000
5.3	0.208	10.3	6.5	15.3	208	20.3	6500	25.3	208000
5.4	0.224	10.4	7	15.4	224	20.4	7000	25.4	224000
5.5	0.24	10.5	7.5	15.5	240	20.5	7500	25.5	240000
5.6	0.256	10.6	8	15.6	256	20.6	8000	25.6	256000
5.7	0.272	10.7	8.5	15.7	272	20.7	8500	25.7	272000
5.8	0.288	10.8	9	15.8	288	20.8	9000	25.8	288000
5.9	0.304	10.9	9.5	15.9	304	20.9	9500	25.9	304000
6	0.32	11	10	16	320	21	10000	26	320000
6.1	0.352	11.1	11	16.1	352	21.1	11000	26.1	352000
6.2	0.384	11.2	12	16.2	384	21.2	12000	26.2	384000
6.3	0.416	11.3	13	16.3	416	21.3	13000	26.3	416000
6.4	0.448	11.4	14	16.4	448	21.4	14000	26.4	448000
6.5	0.48	11.5	15	16.5	480	21.5	15000	26.5	480000
6.6	0.512	11.6	16	16.6	512	21.6	16000	26.6	512000
6.7	0.544	11.7	17	16.7	544	21.7	17000	26.7	544000
6.8	0.576	11.8	18	16.8	576	21.8	18000	26.8	576000
6.9	0.608	11.9	19	16.9	608	21.9	19000	26.9	608000
7	0.64	12	20	17	640	22	20000	27	640000
7.1	0.706	12.1	22	17.1	706	22.1	22000	27.1	706000
7.2	0.772	12.2	24	17.2	772	22.2	24000	27.2	772000
7.3	0.838	12.3	26	17.3	838	22.3	26000	27.3	838000
7.4	0.904	12.4	28	17.4	904	22.4	28000	27.4	904000
7.5	0.97	12.5	30	17.5	970	22.5	30000	27.5	970000
7.6	1.036	12.6	32	17.6	1036	22.6	32000	27.6	1036000
7.7	1.102	12.7	34	17.7	1102	22.7	34000	27.7	1102000
7.8	1.168	12.8	36	17.8	1168	22.8	36000	27.8	1168000
7.9	1.234	12.9	38	17.9	1234	22.9	38000	27.9	1234000
8	1.3	13	40	18	1300	23	40000	28	1300000
8.1	1.42	13.1	44	18.1	1420	23.1	44000	28.1	1420000
8.2	1.54	13.2	48	18.2	1540	23.2	48000	28.2	1540000

8.3	1.66	13.3	52	18.3	1660	23.3	52000	28.3	1660000
8.4	1.78	13.4	56	18.4	1780	23.4	56000	28.4	1780000
8.5	1.9	13.5	60	18.5	1900	23.5	60000	28.5	1900000
8.6	2.02	13.6	64	18.6	2020	23.6	64000	28.6	2020000
8.7	2.14	13.7	68	18.7	2140	23.7	68000	28.7	2140000
8.8	2.26	13.8	72	18.8	2260	23.8	72000	28.8	2260000
8.9	2.38	13.9	76	18.9	2380	23.9	76000	28.9	2380000
9	2.5	14	80	19	2500	24	80000	>29	2500000
9.1	2.75	14.1	88	19.1	2750	24.1	88000	-	-
9.2	3	14.2	96	19.2	3000	24.2	96000	-	-
9.3	3.25	14.3	104	19.3	3250	24.3	104000	-	-
9.4	3.5	14.4	112	19.4	3500	24.4	112000	-	-
9.5	3.75	14.5	120	19.5	3750	24.5	120000	-	-
9.6	4	14.6	128	19.6	4000	24.6	128000	-	-
9.7	4.25	14.7	136	19.7	4250	24.7	136000	-	-
9.8	4.5	14.8	144	19.8	4500	24.8	144000	-	-
9.9	4.75	14.9	152	19.9	4750	24.9	152000	-	-

Warranty Statement

All products manufactured or distributed by Filtertechnik Ltd are subject to the following, and only the following, Limited Express Warranties, and no others:

For a period of one (1) year from and after the date of delivery of a new Filtertechnik product, Filtertechnik warrants and guarantees only to the original purchaser/user that such a product shall be free from defects of materials and workmanship in the manufacturing process. The warranty period for pumps and motors is specifically limited to ninety (90) days from the date of delivery. A product claimed to be defective must be returned to the place of purchase. Filtertechnik, at its sole option, shall replace the defective product with a comparable new product or repair the defective product. This express warranty shall be inapplicable to any product damaged or impaired by external forces or used for any purpose other than that for which it was originally sold.

THIS IS THE EXTENT OF WARRANTIES AVAILABLE ON THIS PRODUCT. FILTERTECHNIK SHALL HAVE NO LIABILITY WHATSOEVER FOR CONSEQUENTIAL DAMAGES FOLLOWING THE USE OF ANY DEFECTIVE PRODUCT OR BY REASON OF THE FAILURE OF ANY PRODUCT. FILTERTECHNIK SPECIFICALLY DISAVOWS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE (EXCEPT FOR THOSE WHICH APPLY TO PRODUCT OR PART THEREOF THAT IS USED OR BOUGHT FOR USE PRIMARILY FOR PERSONAL, FAMILY OR HOUSEHOLD PURPOSES), WARRANTIES OF DESCRIPTION, WARRANTIES OF MERCHANTABILITY, TRADE USE OR WARRANTIES OF TRADE USAGE.

EC Declaration of Conformity

Manufacturer's Name: Filtertechnik Ltd.
Manufacturer's Address: 1 Central Park, Lenton Lane, Nottingham, NG7 2NR
EC Representative's Name: N/A
EC Representative's Address: N/A
Equipment Description: Portable analysers for fuel and oil
Equipment Model Designation: S120-PM


Application of Council Directive:

EMC Directive 2004/108/EEC
Low Voltage Directive 2006/95/EC
Batteries Directive 2006/66/EC

Referenced Standards:

EN61000-6-3: 2001
EN61000-6-1: 2001
EN61326-1: 2006
CISPR 11
EN60825-1: 2007
EN61010-1:01

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Signature: 
Printed Name: Daniel Whittaker
Title: Engineering Director
Date: 17th February 2022

