FRB-93380
User Manual



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Table of Contents

Specifications 2
Dimensions 2
Basic Description 3
Best Efficiency 3
Health, Safety & Environmental Considerations 3
Achieving ISO Cleanliness Codes 4
Component Identification: 6
Starting & Stopping – DOL (Direct-On-Line) 7
System Operating Instructions 8
System Notifications: 9
Setup Screen: 9
System Outputs: 10
Filtration 12
Differential Pressure Gauge 12
Filter Cell Housing 13
Changing a Filter Cell 13
Cleaning the Magnet (Optional) 14
Spare Parts List 16
Piusi E300 Diesel Transfer Pump 17
Features: 17
Pump Information: 17
Modbus Registers: 19
Modbus Holding Registers: 19
Modbus Input Registers: 20
Warranty Statement 25
EC Declaration Of Conformity 26

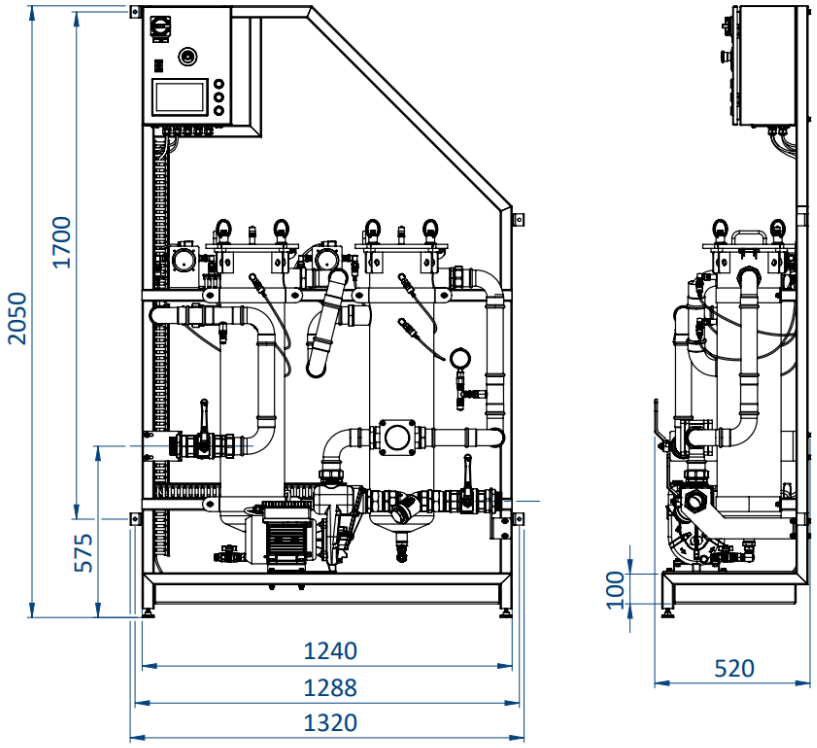
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Specifications

Specification	Detail
Dimensions	(w)1320mm x (d)520mm x (h)2050 mm
Weight	100kg Approx.
Finish	Powder coated: RAL 7001 Silver
Frame material	Plain Carbon Steel
Voltage	230 VAC
Frequency	50 Hz ±2%
Current	16 Amp supply
Power	1.5 kW
Duty cycle	Continuous
Noise level	<70dB @ 1 meter
Fluid compatibility	Diesel Fuel
Motor protection	Automatic thermal switch
Filtration	Particulate and/or Water Removal
System bypass	N/A
Filter indicators	Mechanical Gauge display
Operational Pressure	Up To 5 Bar
Fluid temperature	80°C Max
Flow	Up to 300 Lmin/min
Fluid type	Diesel Fuel
Environment	IP55
Connections	2” BSP Male Connection c/w Ball Valve

Dimensions



Basic Description

The FRB-93380 is a static, self-contained Fuel filtration system, equipped with a 2 high efficiency, high- capacity filter cells capable of removing particulate contaminants and/or water quickly, conveniently and economically. It is designed for on-site preventative maintenance.

Best Efficiency

When used for recirculation filtration (as opposed to transfer filtration) position the ends of both the inlet and outlet standpipe as far apart as possible inside the reservoir in order to ensure proper recirculation and cleaning.
Operate the filtration cart until the total volume of the system fluid passes through the filtration cart. For recirculation filtration, cycle the reservoir fluid through the filter cart six to eight times to ensure the total system fluid is filtered completely.

Health, Safety & Environmental Considerations

- This equipment should only be used for its intended purpose by competent and authorised persons, inappropriate use of electrical and mechanical equipment could cause serious injury or death.
- Children and minors should NEVER be permitted to operate or move this equipment.
- Do not attempt to open the electrical panel unless you are qualified to do so, risk of electric shock or death.
- Prolonged contact with oil or diesel fuel can cause damage to the skin. Appropriate PPE (personal protective equipment) should be worn when operating the unit e.g. protective gloves, safety glasses, safety shoes etc. Always observe local health and safety requirements.
- The unit should only be used on a flat, even surface and be attended at all times.
- Do not operate switches with wet hands.
- The unit must always be disconnected from the mains supply before carrying out any routine maintenance or repairs.
- Never start or stop the unit by inserting/removing the power supply or other plugs.
- Electrical cables and tubes should be checked for any signs of damage before starting the unit.
- Ensure a spill kit is available in case of any accidental spills.
- Used samples must be disposed of in accordance with local environmental requirements.
- Ensure any water drained from this equipment is disposed of in a responsible manner and in accordance with local environmental requirements.

Achieving ISO Cleanliness Codes

Filtertechnik has a wide range of elements available to effectively achieve the required cleanliness level for the intended system. Maintaining the fluid at the required cleanliness level is a cost-effective way of extending the service life of system components. The tables below can be used to determine the required micron rating of the filter to achieve the desired cleanliness code, understand the ISO 4406 contamination scale, conversion between the various cleanliness standards and understanding how the ISO 4406 scale relates to the NAS contamination scale.

Desired Cleanliness Level (ISO Code)	Recommended Filtration Media
20/18/15 – 19/17/14	25 µm
19/17/14 – 18/16/13	10 µm
18/16/13 – 15/13/10	5 µm
15/13/10 – 14/12/9	3 µm
14/12/9 – 13/11/8	1 µm

Table 1 – Filter Media Selection Guide

Number of Particles per 1ml of Fluid		ISO Scale Number
More Than	Up to and Including	
1,300,000	2,500,000	28
640,000	1,300,000	27
320,000	640,000	26
160,000	320,000	25
80,000	160,000	24
40,000	80,000	23
20,000	40,000	22
10,000	20,000	21
5,000	10,000	20
2,500	5,000	19
1,300	2,500	18
640	1,300	17
320	640	16
160	320	15
80	160	14
40	80	13
20	40	12
10	20	11
5	10	10
2.5	5	9
1.3	2.5	8
0.64	1.3	7
0.32	0.64	6
0.16	0.32	5
0.08	0.16	4
0.04	0.08	3
0.02	0.04	2
0.01	0.02	1
0.00	0.01	0

Table 2 – ISO 4406 Contamination Scale

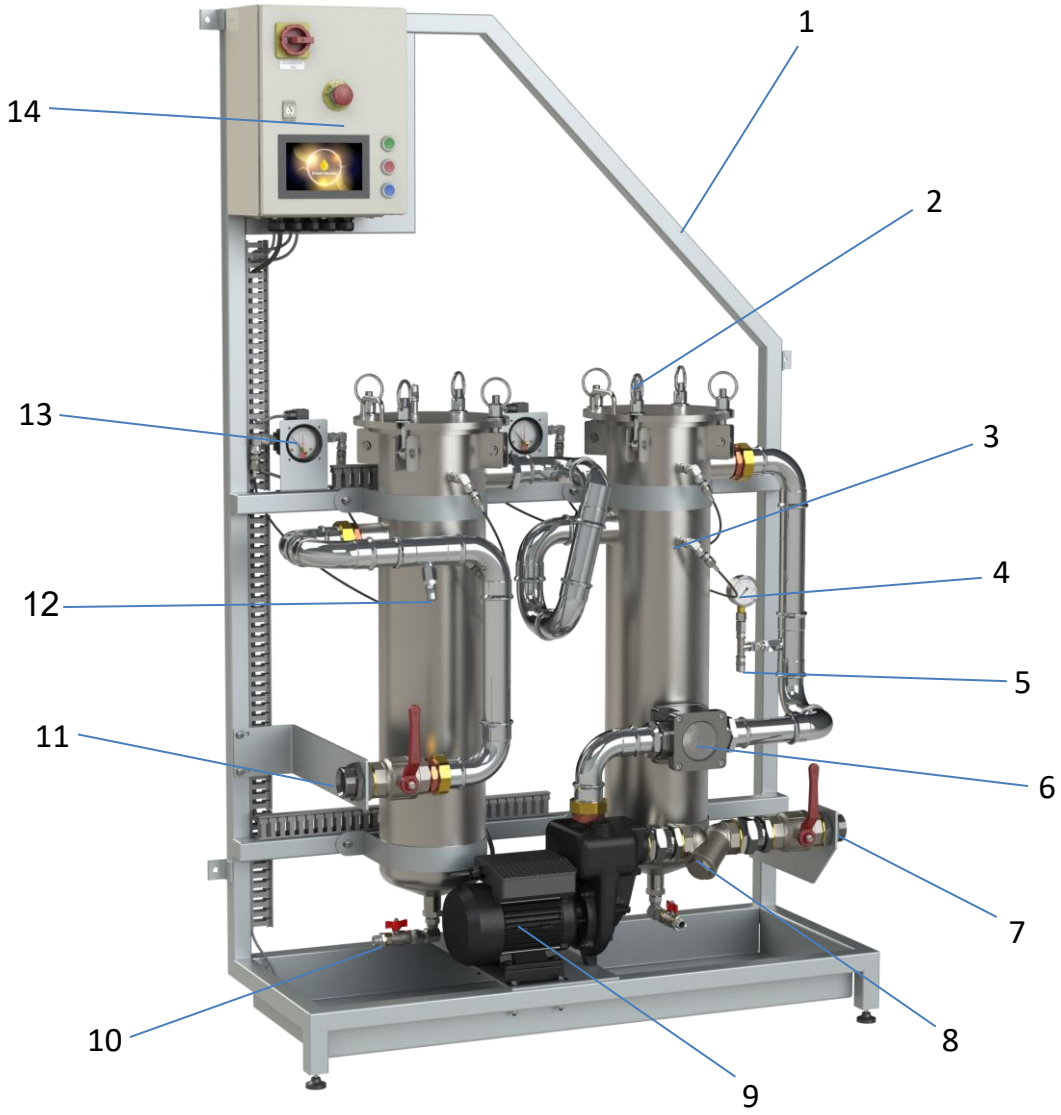
ISO 4406 Code 4µm / 6µm / 14µm	Mil Std. NAS 1638	Mil Std. 1246A	ACFTD Gravimetric Level mg/L	SAE Level
21/19/16	10			
20/18/15	9			6
19/17/14	8	300		5
18/16/13	7		1	4
17/15/12	6			3
16/14/12		200		
16/14/11	5			2
15/13/10	4		0.1	1
14/12/9	3			0
13/11/8	2			
12/10/8		100		
10/10/7	1			
12/10/6			0.01	
11/9/6				

Table 3 – Cleanliness Standards Conversion

Equivalent ISO 4406 Code (approx.)	NAS Code	Size Range in Microns (µm)				
		5-15	15-25	25-50	50-100	>100
-	00	125	22	4	1	0
-	0	250	44	8	2	0
10/12/7	1	500	89	16	3	1
13/11/8	2	1,000	178	32	6	1
14/12/9	3	2,000	356	63	11	2
15/13/10	4	4,000	712	126	22	4
16/14/11	5	8,000	1,425	253	45	8
17/15/12	6	16,000	2,850	506	90	16
18/16/13	7	32,000	5,700	1,012	190	32
19/17/14	8	64,000	11,400	2,025	360	64
20/18/15	9	128,000	22,800	4,050	720	128
21/19/16	10	256,000	45,600	8,100	1,440	256
22/20/17	11	512,000	91,200	16,200	2,880	512
23/21/18	12	1,024,000	182,400	32,400	5,760	1,020

Table 4 – ISO 4406 vs NAS 1638 Contamination

Component Identification:

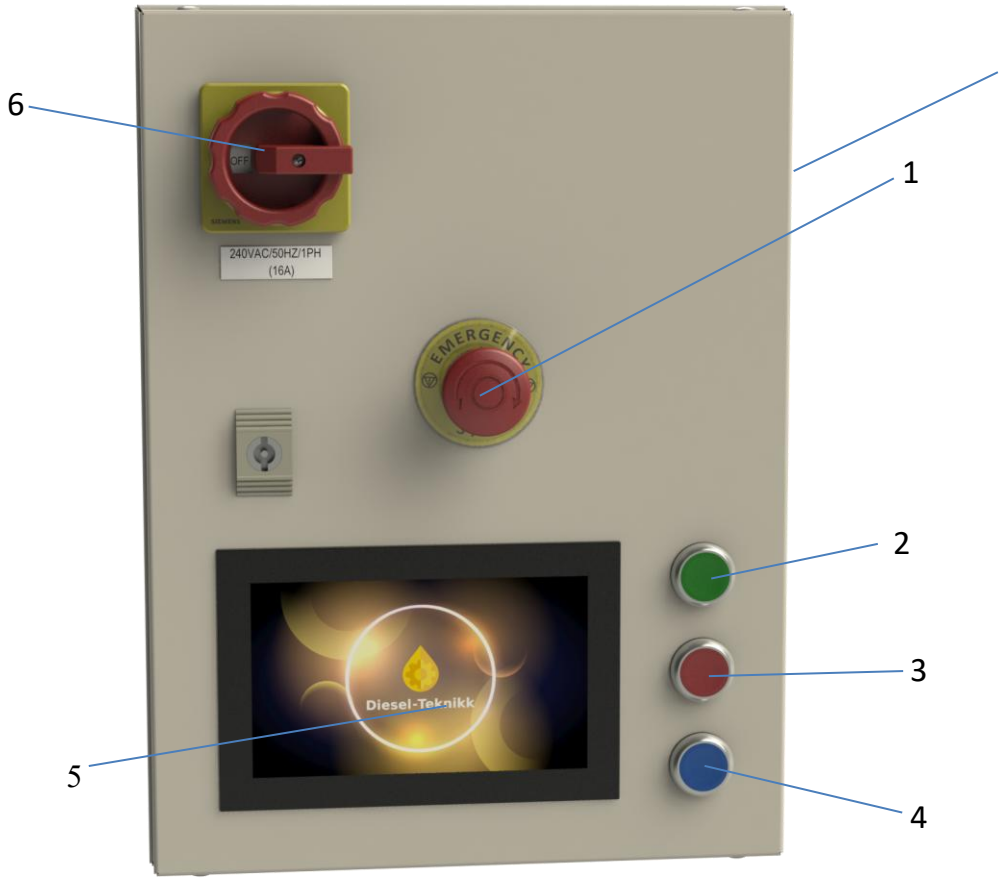


Key:

1.) Wall Mounted Frame c/w 100mm Bund	8.) Y-Strainer
2.) Filter Vent Port- Minimess Testpoint 1620	9.) E300 Self Priming Diesel Fuel Pump
3.) 2 x Size 2 Filter Vessels	10.) Filter Vessel Drain Port ½" BSP c/w Ball Valve
4.) System Pressure Gauge	11.) Outlet Port – 2" BSP Mae c/w Ball Valve
5.) Sample Point 1 – Pre Filtration 1620 Testpoint	12.) Sample Point 2- Post Filtration 1620 Testpoint
6.) Visual Sight Glass	13.) Differential Pressure Gauge X 2
7.) Inlet Port – 2" BSP Male c/w Ball Valve	14.) UPC-Control Panel

Starting & Stopping – DOL (Direct-On-Line)

To start the unit, make sure it's plugged into a fused supply (with RCD when used outdoors) of thecorrect voltage rating and that the inlet and outlet hoses have been correctly attached. Before switching on the unit ensure hoses are connected to the fuel supply pipework and/or lances are securely inserted into the barrel/tank.



Key:

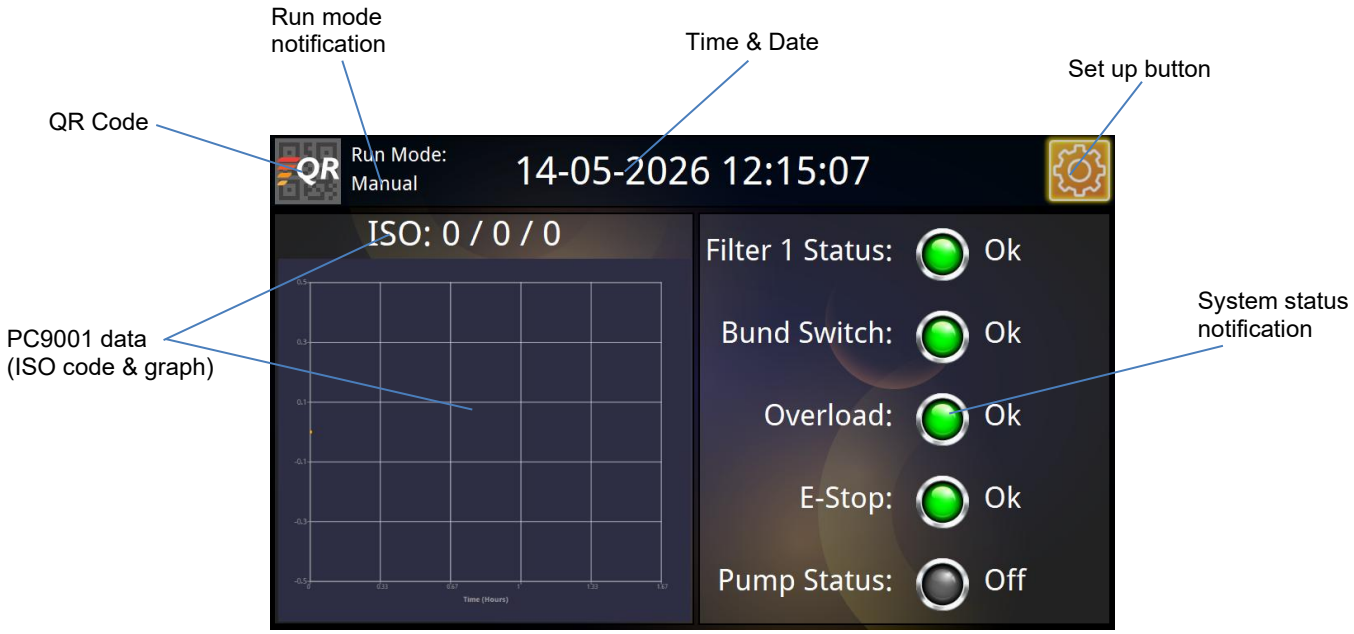
1.) Emergency Stop Button	4.) RESET Button (BLUE)
2.) START Button (GREEN)	5.) 7" Touch Screen Display
3.) STOP Button (RED)	6.) Mains Isolator 230 VAC

System Operating Instructions

1.) Connect the unit to a suitable 240 VAC,16 Amp Supply.
2.) Make sure all physical hose connections are made.
3.) Move the Isolator to the ON position, on power up the splash screen (below) is shown for several seconds whilst the system initialises.



4.) Once the system initialises the main operating screen is shown below.

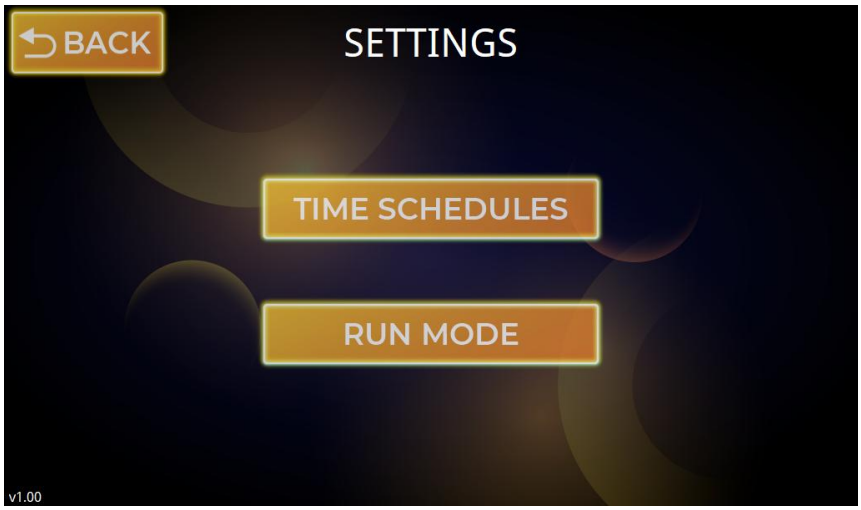


System Notifications:

Any fault condition will turn the corresponding indicator RED, alert the operator to the fault, activate the common fault output and stop the pump. To restart the pump the BLUE reset button needs to be pushed for 1 second once the fault has been rectified. Please note in SCHEDULED mode the pump will re-start once the reset button is pushed, if the schedule is in an ON cycle.

Setup Screen:

5.) Pressing the setup button takes you to the screen below.



6.) Pressing the RUN MODE button allows the operator to switch between MANUAL operation and SCHEDULED operation.

7.) In MANUAL operation the pump is controlled by using the green (START) and red (STOP) pushbuttons. The buttons need to be held for 1 second to initiate a response.

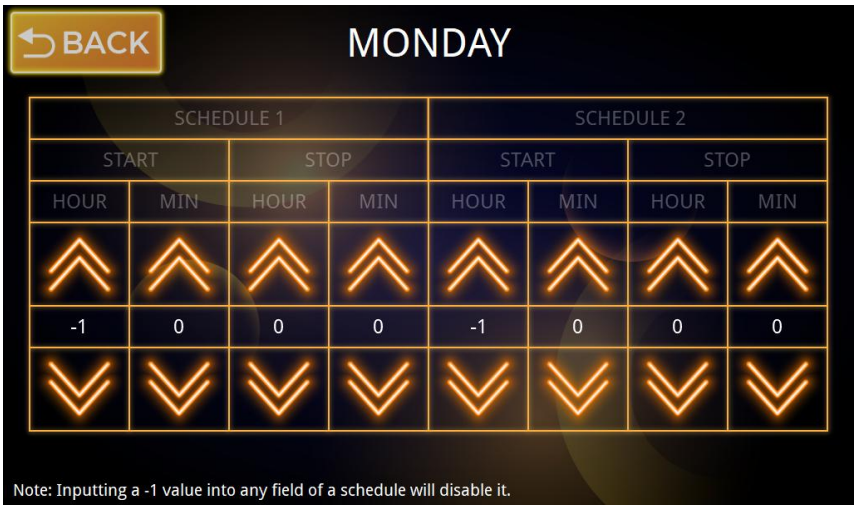
8.) In SCHEDULED operation the pump is controlled automatically using the time settings programmed in the TIME SCCHEDULES menu shown below.



	SCHEDULE 1				SCHEDULE 2			
	START		STOP		START		STOP	
	HOUR	MIN	HOUR	MIN	HOUR	MIN	HOUR	MIN
MON	-1	0	0	0	-1	0	0	0
TUE	-1	0	0	0	-1	0	0	0
WED	-1	0	0	0	-1	0	0	0
THU	-1	0	0	0	-1	0	0	0
FRI	-1	0	0	0	-1	0	0	0
SAT	-1	0	0	0	-1	0	0	0
SUN	-1	0	0	0	-1	0	0	0

The pump can be set to have upto two duty cycles per day

9.) To set the ON/OFF times, touch the appropriate box on the screen and set the time using the up and down arrows, please note the time settings are in 24hr format. Entering a -1 into a box disables the function for that schedule.



System Outputs:

The system has 4 output types:

- Common Fault Signal – This is a 24VDC signal that is activated on any fault condition. Pressing the blue RESET button returns the signal to 0VDC. The output is on terminals 1 (+24VDC) and 2 (0VDC).
- MODBUS RTU – A MODBUS RTU (RS485) output is available on terminals 11 (A) and 12 (B). The unit is always the slave device. It uses the following parameters:

  Baud = 9600
  Data = 8
  Parity = None
  Stop = One

- MODBUS TCP/IP – A MODBUS TCP/IP output is available through the Ethernet connection on the left-hand side of the panel. The unit is always the slave device. The slave ID number is always 2 as default.
- QR Code – An instant report of the ISO codes can be created by scanning the QR code with your phone. The QR code is generated by pressing the QR button on the Main Operating screen.

Terminal Diagram:

1. Common Fault Output (+24 VDC)
2. Common Fault Output (0 VDC)
3. Filter Alarm Input (1)
4. Filter Alarm Input (2)
5. PC9001 +24 VDC
6. PC9001 0 VDC
7. PC9001 Modbus A
8. PC9001 Modbus B
9. Bund Alarm Input (1)
10. Bund Alarm Input (2)
11. Modbus RTU Output A
12. Modbus RTU Output B
13. N/A
14. N/A

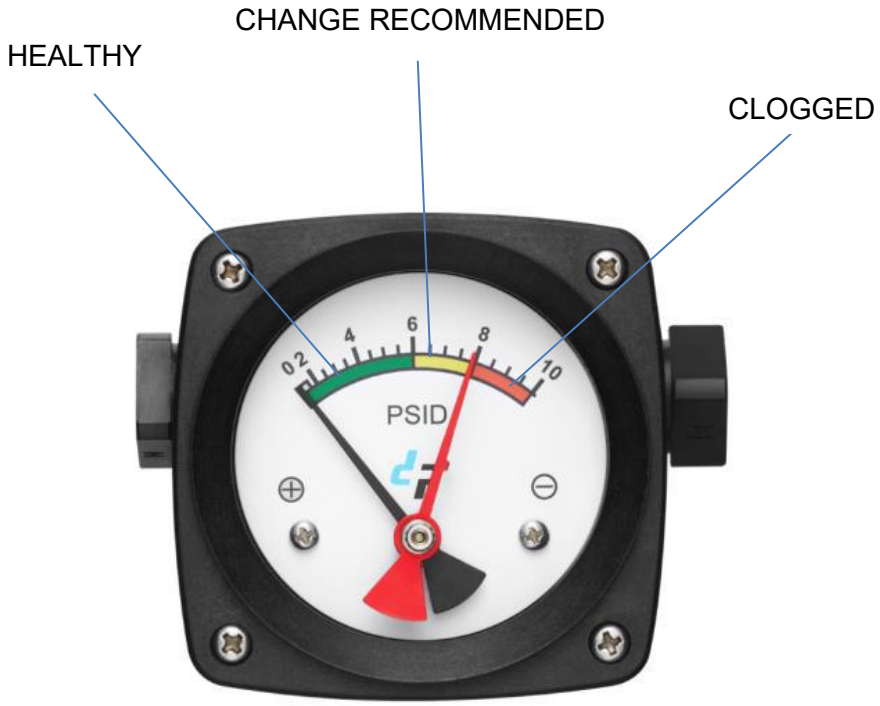
Any activation of the EMERGENCY STOP requires a manual reset of the system, this done by resetting the E-stop switch (Twist until it pops out). Press the blue RESET button.

Filtration

The unit is equipped with 2 x Full Length filter cell housings which can be fitted with a range of media for removing large quantities of particulate and water contamination from oil.

Differential Pressure Gauge

There are 2 differential pressure gauges (see below) fitted to the system, these use a traffic light style colour display to determine the filter media life, If the needle is in the green there is life in the filter media, if the needle moves into the yellow it is recommended to change the media, and if the needle is in the red the media is blocked. A switch within the gauge will shut the system down when either of the filters become clogged.

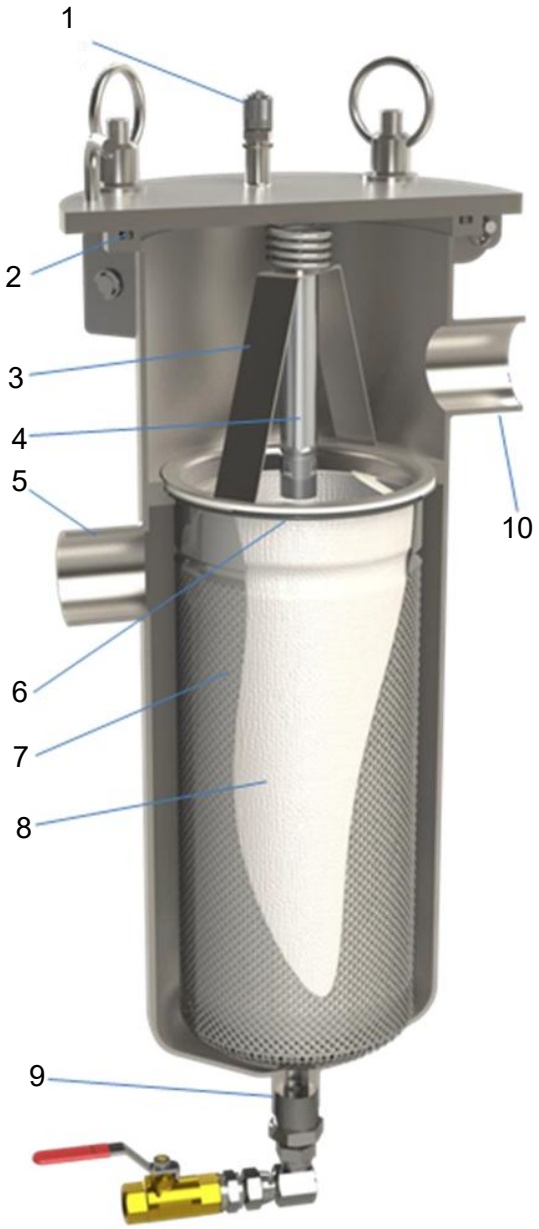


Filter Cell Housing

Changing a Filter Cell

As a guideline the following procedure can be used for changing a filter cell:

1. Ensure inlet and outlet pipework has been closed off to present siphoning
2. Relieve any excess pressure by briefly opening the drain valve or vent.
3. Loosen the 4 swing bolts and open the lid.
4. Remove the filter securing bracket (if the optional magnet is included, clean off any rust).
5. Lift out the filter cell via the strap handle. It is likely the filter basket will also come out.
6. Remove the filter cell from the basket and replace with a clean filter.
7. Refit the filter basket, making sure the basket O-ring is still in place and correctly seated.
8. Refit the filter securing bracket, making sure the spring is attached.
9. Close the lid, making sure the lid O-ring is correctly seated.
10. Gradually tighten each of the 4 swing bolts in a typical star/cross sequence to allow even seating of the lid onto the O-ring seal.



Key:

1.) Vent (1620 test point)	6.) Filter basket O-ring
2.) Lid O-ring	7.) Filter basket
3.) Filter securing bracket	8.) Filter cell
4.) Magnet (optional)	9.) Drain port
5.) Outlet port	10.) Inlet port

Cleaning the Magnet (Optional)

An optional magnet can be installed into the filter housing bracket clamp for removal of ferromagnetic material, extending the useful life of the filter cell.



Removal of ferromagnetic material can be carried out using a suitable tool as shown above (Filtertechnik part number FT-RRT01).

The tool is to be located at the top of the magnet and downward force applied to push the material off the magnet. This waste material can then be disposed of or recycled.

Purging Air from the Filter Housing

When starting the system for the first time or after a filter cell change air will be trapped within the upper section of the filter housing and requiring purging. Failure to remove all the air can result in aeration of the fuel and reduced filtration performance.



When the system is turned on the sampling / vent tube and be screwed onto the vent port, where the remaining air will be pushed out of the filter housing. The end of the tube should be inserted into a sample bottle or cloth to prevent any fluid from spraying towards the operator.

Once all the air has been removed make sure the sampling / vent tube is disconnected to prevent siphoning or spillage of fluid.

Spare Parts List

Description	Part Number
1 µm disposable polypropylene	FT-19PP001-2GYEP
5 µm disposable polypropylene	FT-19PP005-2GYEP
10 µm disposable polypropylene	FT-19PP010-2GYEP
25 µm disposable polypropylene	FT-19PP025-2GYEP
50 µm disposable polypropylene	FT-19PP050-2GYEP
100 µm disposable polypropylene	FT-19PP100-2GYEP
200 µm disposable polypropylene	FT-19PP200-2GYEP
10 µm recleanable nylon	FT-19NM010-2GYEP
25 µm recleanable nylon	FT-19NM025-2GYEP
50 µm recleanable nylon	FT-19NM050-2GYEP
75 µm recleanable nylon	FT-19NM075-2GYEP
100 µm recleanable nylon	FT-19NM100-2GYEP
200 µm recleanable nylon	FT-19NM200-2GYEP
300 µm recleanable nylon	FT-19NM300-2GYEP
400 µm recleanable nylon	FT-19NM400-2GYEP
600 µm recleanable nylon	FT-19NM600-2GYEP
800 µm recleanable nylon	FT-19NM800-2GYEP
1 µm absolute rated pleated polypropylene	EPO-522-P2G
1 µm high efficiency disposable polypropylene	FT-19HE001-2GYEP
5 µm high efficiency disposable polypropylene	FT-19HE005-2GYEP
1 µm FiltaSorb2 water removal cell	FT-FA-02-001

Piusi E300 Diesel Transfer Pump

Features:

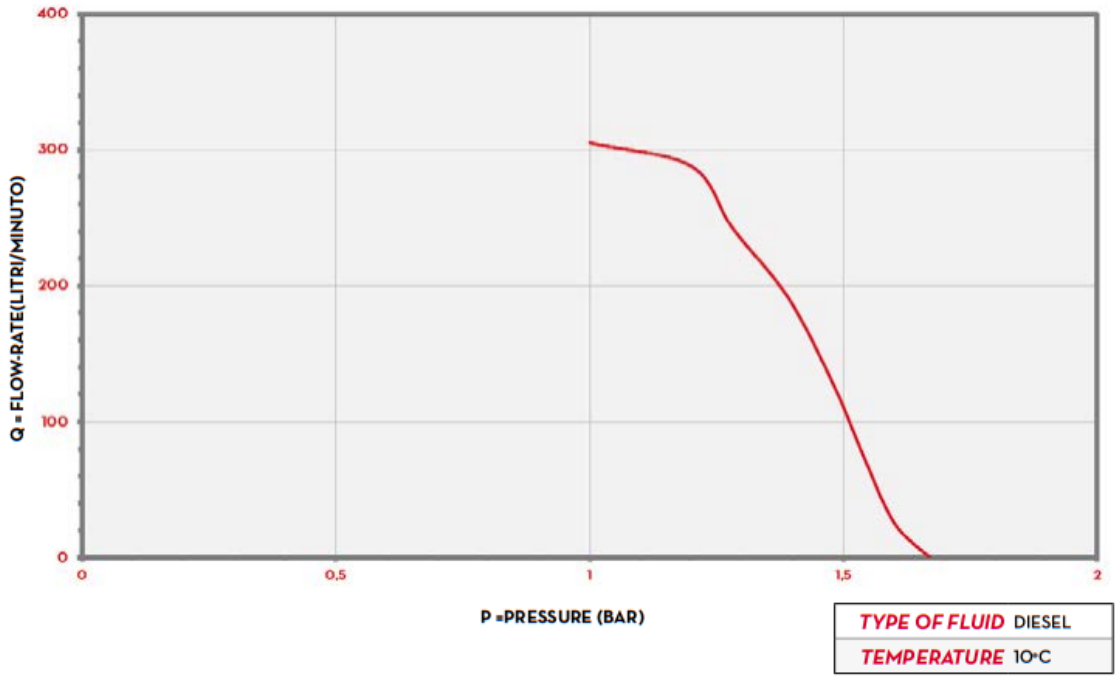


- Self-priming electric diesel pump
- Ceramic & Graphite shaft seal
- Flow Rtae: 300ltrs per min
- Continuous running in an open flow
- Available in 230V
- Cast iron open impeller
- Incorporated check valve in suction port
- Protection grade: IP55
- 2” F BSP inlet/outlet Ports
- Max pressure rating 1.7 Bar

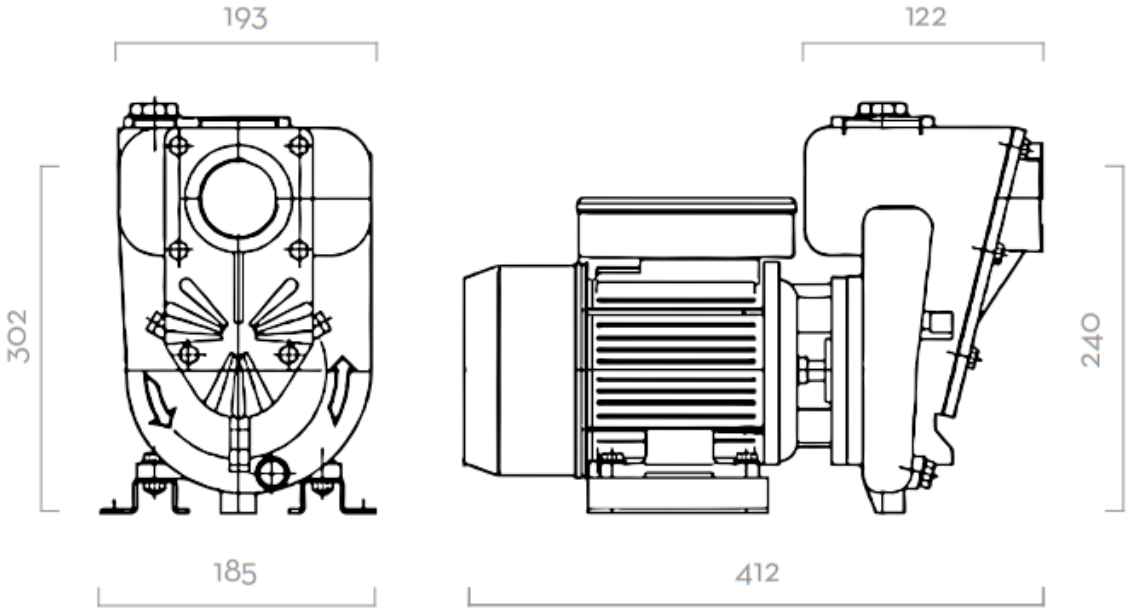
Pump Information:

The Piusi E300 Diesel Transfer Pump is a self-priming, electric pump specifically designed for high flow Transfer of diesel. Being mains-powered, this pump is ideal for static installations where high quantities of diesel need to be dispensed quickly for example decanting from one fuel tank to another. This has therefore been a popular solution for tank engineers and suppliers needing to drain in an existing tank of diesel before decommissioning it and installing its replacement.

Pump Curve:



Pump Dimensions:



Dimensions expressed in millimeters

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Modbus Registers:

Modbus Holding Registers:

Holding Registers (FC03 read / FC06 write / FC16 multi-write, base 0)

Reg (dec)	Reg (hex)	Name	Type	Access	Group	Notes
0	0x0000	HR_MAGIC	uint16	R/W	Config	Magic word 0xB2B2 (sanity)
1	0x0001	HR_SLAVE_ID	uint16	R/W	Config	Modbus slave ID (Default value=2)
2	0x0002	HR_BAUD_ENUM	uint16	R/W	Config	Baud enum (0=4800,1=9600,2=19200,3=38400,4=57600,5=115200) (Default value 1=9600)
3	0x0003	HR_DATABITS	uint16	R/W	Config	Data bits (Default value=8)
4	0x0004	HR_PARITY	uint16	R/W	Config	Parity (0=N, 1=O, 2=E) (Default value 0=N)
5	0x0005	HR_STOPBITS	uint16	R/W	Config	Stop bits (Default value=1)
6	0x0006	HR_COMMIT	uint16	W	Config	Write 1 to save serial config and reboot
7-8	0x0007-0x0008	HR_EPOCH_H/L	uint32 (ABCD)	R/W	RTC	Unix epoch (UTC). Write to set RTC.
9	0x0009	HR_SENSOR_CONFIG	uint16	R/W	Config	Bitmask enabling READ_HMI/PC9001/S120/RH485/VD
10	0x000A	HR_IP0	uint16	R/W	Network	Static IP octet 0 (future Ethernet)
11	0x000B	HR_IP1	uint16	R/W	Network	Static IP octet 1
12	0x000C	HR_IP2	uint16	R/W	Network	Static IP octet 2
13	0x000D	HR_IP3	uint16	R/W	Network	Static IP octet 3
14	0x000E	HR_GW0	uint16	R/W	Network	Gateway octet 0
15	0x000F	HR_GW1	uint16	R/W	Network	Gateway octet 1
16	0x0010	HR_GW2	uint16	R/W	Network	Gateway octet 2
17	0x0011	HR_GW3	uint16	R/W	Network	Gateway octet 3
18	0x0012	HR_MK0	uint16	R/W	Network	Subnet mask octet 0
19	0x0013	HR_MK1	uint16	R/W	Network	Subnet mask octet 1
20	0x0014	HR_MK2	uint16	R/W	Network	Subnet mask octet 2
21	0x0015	HR_MK3	uint16	R/W	Network	Subnet mask octet 3
22	0x0016	HR_ISO4_L	int16	R/W	ISO Alarm	ISO 4um lower threshold
23	0x0017	HR_ISO4_H	int16	R/W	ISO Alarm	ISO 4um upper threshold
24	0x0018	HR_ISO6_L	int16	R/W	ISO Alarm	ISO 6um lower threshold
25	0x0019	HR_ISO6_H	int16	R/W	ISO Alarm	ISO 6um upper threshold
26	0x001A	HR_ISO14_L	int16	R/W	ISO Alarm	ISO 14um lower threshold
27	0x001B	HR_ISO14_H	int16	R/W	ISO Alarm	ISO 14um upper threshold
28-29	0x001C-0x001D	HR_CH1_420_VALUE_4	float32 (ABCD)	R/W	4-20 mA	CH1 scaling value at 4 mA

Modbus Input Registers:

Input Registers (FC04, base 0) - read-only telemetry

Reg (dec)	Reg (hex)	Name	Type	Access	Group	Notes
0-1	0x0000-0x0001	PC_i_4f	float32 (ABCD)	R	PC9001	Filterability index 4um
2-3	0x0002-0x0003	PC_i_6f	float32 (ABCD)	R	PC9001	Filterability index 6um
4-5	0x0004-0x0005	PC_i_14f	float32 (ABCD)	R	PC9001	Filterability index 14um
6-7	0x0006-0x0007	PC_i_21f	float32 (ABCD)	R	PC9001	Filterability index 21um
8	0x0008	PC_NAS_5_15	uint16	R	PC9001	NAS particles 5-15um
9	0x0009	PC_NAS_15_25	uint16	R	PC9001	NAS particles 15-25um
10	0x000A	PC_NAS_25_50	uint16	R	PC9001	NAS particles 25-50um
11	0x000B	PC_NAS_50_100	uint16	R	PC9001	NAS particles 50-100um
12	0x000C	PC_NAS_100	uint16	R	PC9001	NAS particles >100um
13	0x000D	PC_SAE_4	uint16	R	PC9001	SAE class 4um
14	0x000E	PC_SAE_6	uint16	R	PC9001	SAE class 6um
15	0x000F	PC_SAE_14	uint16	R	PC9001	SAE class 14um
16	0x0010	PC_SAE_21	uint16	R	PC9001	SAE class 21um
17	0x0011	PC_SAE_38	uint16	R	PC9001	SAE class 38um
18	0x0012	PC_SAE_70	uint16	R	PC9001	SAE class 70um
19	0x0013	S120_TOT_BUB	uint16	R	S120	Total bubbles
20	0x0014	S120_TOT_PART	uint16	R	S120	Total particles
21	0x0015	S120_i_4_INT	uint16	R	S120	Index 4um (int)
22	0x0016	S120_i_6_INT	uint16	R	S120	Index 6um (int)
23	0x0017	S120_i_14_INT	uint16	R	S120	Index 14um (int)
24	0x0018	S120_SAE	uint16	R	S120	SAE classification
25	0x0019	S120_NAS	uint16	R	S120	NAS classification
26	0x001A	S120_CUTTING	uint16	R	S120	Cutting wear count
27	0x001B	S120_SLIDING	uint16	R	S120	Sliding wear count
28	0x001C	S120_FATIGUE	uint16	R	S120	Fatigue wear count
29	0x001D	S120_FIBRE	uint16	R	S120	Fibre count
30	0x001E	S120_AIR	uint16	R	S120	Air bubble count
31-32	0x001F-0x0020	S120_b_4	uint32 (ABCD)	R	S120	Bubble count 4um (32-bit)
33-34	0x0021-0x0022	S120_b_6	uint32 (ABCD)	R	S120	Bubble count 6um
35-36	0x0023-0x0024	S120_b_14	uint32 (ABCD)	R	S120	Bubble count 14um
37-38	0x0025-0x0026	S120_b_21	uint32 (ABCD)	R	S120	Bubble count 21um
39-40	0x0027-0x0028	S120_b_38	uint32 (ABCD)	R	S120	Bubble count 38um
41-42	0x0029-0x002A	S120_b_70	uint32 (ABCD)	R	S120	Bubble count 70um
43-44	0x002B-0x002C	S120_b_100	uint32 (ABCD)	R	S120	Bubble count >100um
45-46	0x002D-0x002E	S120_p_4	uint32 (ABCD)	R	S120	Particle count 4um (32-bit)
47-48	0x002F-0x0030	S120_p_6	uint32 (ABCD)	R	S120	Particle count 6um
49-50	0x0031-0x0032	S120_p_14	uint32 (ABCD)	R	S120	Particle count 14um

55-56	0x0037-0x0038	S120_p_70	uint32 (ABCD)	R	S120	Particle count 70um
57-58	0x0039-0x003A	S120_p_100	uint32 (ABCD)	R	S120	Particle count >100um
59-60	0x003B-0x003C	S120_i_4_FLOAT	float32 (ABCD)	R	S120	Index 4um (float)
61-62	0x003D-0x003E	S120_i_6_FLOAT	float32 (ABCD)	R	S120	Index 6um (float)
63-64	0x003F-0x0040	S120_i_14_FLOAT	float32 (ABCD)	R	S120	Index 14um (float)
65-66	0x0041-0x0042	S120_i_21_FLOAT	float32 (ABCD)	R	S120	Index 21um (float)
67-68	0x0043-0x0044	S120_i_38_FLOAT	float32 (ABCD)	R	S120	Index 38um (float)
69-70	0x0045-0x0046	S120_i_70_FLOAT	float32 (ABCD)	R	S120	Index 70um (float)
71-72	0x0047-0x0048	RH485_RH	float32 (ABCD)	R	RH485	Relative humidity %
73-74	0x0049-0x004A	RH485_TempC	float32 (ABCD)	R	RH485	Temperature degC
75-76	0x004B-0x004C	RH485_TempF	float32 (ABCD)	R	RH485	Temperature degF
77	0x004D	RH485_PPM	int16	R	RH485	Water content ppm
78-79	0x004E-0x004F	VD_VISC	float32 (ABCD)	R	VD	Viscosity (cSt)
80-81	0x0050-0x0051	VD_DEN	float32 (ABCD)	R	VD	Density (g/cc)
82-83	0x0052-0x0053	VD_TEMP	float32 (ABCD)	R	VD	Temperature degC
84-85	0x0054-0x0055	CH1_420_VALUE_SCALED	float32 (ABCD)	R	4-20 mA	CH1 scaled value (engineering units)
86-87	0x0056-0x0057	CH2_420_VALUE_SCALED	float32 (ABCD)	R	4-20 mA	CH2 scaled value (engineering units)
88	0x0058	FILTER_DP_1	bool (uint16)	R	Status	Latched filter DP 1 alarm
89	0x0059	FILTER_DP_2	bool (uint16)	R	Status	Latched filter DP 2 alarm
90	0x005A	FILTER_DP_3	bool (uint16)	R	Status	Latched filter DP 3 alarm
91	0x005B	BUND_SWITCH	bool (uint16)	R	Status	Latched bund switch alarm
92	0x005C	MOTOR_OVERLOAD	bool (uint16)	R	Status	Latched motor overload alarm
93	0x005D	FLOW_SWITCH	bool (uint16)	R	Status	Latched flow switch alarm
94	0x005E	E_STOP	bool (uint16)	R	Status	Latched E-Stop alarm
95	0x005F	COMMON_FAULT	bool (uint16)	R	Status	OR of all latched faults
96	0x0060	PUMP_STATUS	bool (uint16)	R	Status	Pump status (note: currently always 0 - never assigned)
97	0x0061	RESET_BUTTON	bool (uint16)	R	Status	Reset command state
98	0x0062	RUN_MODE	bool (uint16)	R	Status	0=Manual, 1=Schedules
99	0x0063	START_BUTTON	bool (uint16)	R	Status	Latched START command
100	0x0064	STOP_BUTTON	bool (uint16)	R	Status	Latched STOP command
101	0x0065	ISO_ALARM	int16	R	Status	ISO alarm code
102-103	0x0066-0x0067	EPOCH_TIME	uint32 (ABCD)	R	RTC	Unix epoch (UTC) from RTC
110	0x006E	HMI_MON_1_START_HR	int16	R	Schedule	MON window 1 start hr
111	0x006F	HMI_MON_1_START_MIN	int16	R	Schedule	MON window 1 start min
112	0x0070	HMI_MON_1_STOP_HR	int16	R	Schedule	MON window 1 stop hr
113	0x0071	HMI_MON_1_STOP_MIN	int16	R	Schedule	MON window 1 stop min
114	0x0072	HMI_MON_2_START_HR	int16	R	Schedule	MON window 2 start hr

115	0x0073	HMI_MON_2_START_MIN	int16	R	Schedule	MON window 2 start min
116	0x0074	HMI_MON_2_STOP_HR	int16	R	Schedule	MON window 2 stop hr
117	0x0075	HMI_MON_2_STOP_MIN	int16	R	Schedule	MON window 2 stop min
120	0x0078	HMI_TUE_1_START_HR	int16	R	Schedule	TUE window 1 start hr
121	0x0079	HMI_TUE_1_START_MIN	int16	R	Schedule	TUE window 1 start min
122	0x007A	HMI_TUE_1_STOP_HR	int16	R	Schedule	TUE window 1 stop hr
123	0x007B	HMI_TUE_1_STOP_MIN	int16	R	Schedule	TUE window 1 stop min
124	0x007C	HMI_TUE_2_START_HR	int16	R	Schedule	TUE window 2 start hr
125	0x007D	HMI_TUE_2_START_MIN	int16	R	Schedule	TUE window 2 start min
126	0x007E	HMI_TUE_2_STOP_HR	int16	R	Schedule	TUE window 2 stop hr
127	0x007F	HMI_TUE_2_STOP_MIN	int16	R	Schedule	TUE window 2 stop min
130	0x0082	HMI_WED_1_START_HR	int16	R	Schedule	WED window 1 start hr
131	0x0083	HMI_WED_1_START_MIN	int16	R	Schedule	WED window 1 start min
132	0x0084	HMI_WED_1_STOP_HR	int16	R	Schedule	WED window 1 stop hr
133	0x0085	HMI_WED_1_STOP_MIN	int16	R	Schedule	WED window 1 stop min
134	0x0086	HMI_WED_2_START_HR	int16	R	Schedule	WED window 2 start hr
135	0x0087	HMI_WED_2_START_MIN	int16	R	Schedule	WED window 2 start min
136	0x0088	HMI_WED_2_STOP_HR	int16	R	Schedule	WED window 2 stop hr
137	0x0089	HMI_WED_2_STOP_MIN	int16	R	Schedule	WED window 2 stop min
140	0x008C	HMI_THU_1_START_HR	int16	R	Schedule	THU window 1 start hr
141	0x008D	HMI_THU_1_START_MIN	int16	R	Schedule	THU window 1 start min
142	0x008E	HMI_THU_1_STOP_HR	int16	R	Schedule	THU window 1 stop hr
143	0x008F	HMI_THU_1_STOP_MIN	int16	R	Schedule	THU window 1 stop min
144	0x0090	HMI_THU_2_START_HR	int16	R	Schedule	THU window 2 start hr
145	0x0091	HMI_THU_2_START_MIN	int16	R	Schedule	THU window 2 start min
146	0x0092	HMI_THU_2_STOP_HR	int16	R	Schedule	THU window 2 stop hr
147	0x0093	HMI_THU_2_STOP_MIN	int16	R	Schedule	THU window 2 stop min
150	0x0096	HMI_FRI_1_START_HR	int16	R	Schedule	FRI window 1 start hr
151	0x0097	HMI_FRI_1_START_MIN	int16	R	Schedule	FRI window 1 start min
152	0x0098	HMI_FRI_1_STOP_HR	int16	R	Schedule	FRI window 1 stop hr
153	0x0099	HMI_FRI_1_STOP_MIN	int16	R	Schedule	FRI window 1 stop min
154	0x009A	HMI_FRI_2_START_HR	int16	R	Schedule	FRI window 2 start hr
155	0x009B	HMI_FRI_2_START_MIN	int16	R	Schedule	FRI window 2 start min
156	0x009C	HMI_FRI_2_STOP_HR	int16	R	Schedule	FRI window 2 stop hr
157	0x009D	HMI_FRI_2_STOP_MIN	int16	R	Schedule	FRI window 2 stop min
160	0x00A0	HMI_SAT_1_START_HR	int16	R	Schedule	SAT window 1 start hr

161	0x00A1	HMI_SAT_1_START_MIN	int16	R	Schedule	SAT window 1 start min
162	0x00A2	HMI_SAT_1_STOP_HR	int16	R	Schedule	SAT window 1 stop hr
163	0x00A3	HMI_SAT_1_STOP_MIN	int16	R	Schedule	SAT window 1 stop min
164	0x00A4	HMI_SAT_2_START_HR	int16	R	Schedule	SAT window 2 start hr
165	0x00A5	HMI_SAT_2_START_MIN	int16	R	Schedule	SAT window 2 start min
166	0x00A6	HMI_SAT_2_STOP_HR	int16	R	Schedule	SAT window 2 stop hr
167	0x00A7	HMI_SAT_2_STOP_MIN	int16	R	Schedule	SAT window 2 stop min
170	0x00AA	HMI_SUN_1_START_HR	int16	R	Schedule	SUN window 1 start hr
171	0x00AB	HMI_SUN_1_START_MIN	int16	R	Schedule	SUN window 1 start min
172	0x00AC	HMI_SUN_1_STOP_HR	int16	R	Schedule	SUN window 1 stop hr
173	0x00AD	HMI_SUN_1_STOP_MIN	int16	R	Schedule	SUN window 1 stop min
174	0x00AE	HMI_SUN_2_START_HR	int16	R	Schedule	SUN window 2 start hr
175	0x00AF	HMI_SUN_2_START_MIN	int16	R	Schedule	SUN window 2 start min
176	0x00B0	HMI_SUN_2_STOP_HR	int16	R	Schedule	SUN window 2 stop hr
177	0x00B1	HMI_SUN_2_STOP_MIN	int16	R	Schedule	SUN window 2 stop min

Modbus Slave Map Summary:

FT-UFPC-04 - Bus2 Modbus Slave Map	
Device acts as Modbus slave on Bus2 (RTU on UART, optional TCP).	
Defaults	
Slave ID	Register 1 - Default Slave ID = 2 (configurable via HR_SLAVE_ID; commit via HR_COMMIT)
UART	9600 8N1 (configurable via HR_BAUD_ENUM / HR_PARITY / etc.)
HR base	0 - 40 registers - read/write (FC03/FC06/FC16)
IR base	0 - 180 register slots - read-only (FC04)

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

Filtertechnik
Filtration, Purification & Separation Solutions

EC DECLARATION OF CONFORMITY

Machinery Description

Machine Type	FRB-93880
Serial Number	

Applicable Directives

Low voltage Directive 73/23/EEC (as ammended by 93/68/EEC)
Electromagnetic Compatibility Directive 2004/108/EC
Machinery Directive 98/37/EC

Declaration

We, Filtertechnik Limited, decalre that the above referenced product(s), to which the declaration relates, is in conformity with the provisions of the Directives listed above

IMPORTANT

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with the applicable Installation, Operation and Maintenance Instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.

The technical construction file for this product is maintained at the address given below.



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